CALIBRATION METHODOLOGY FOR THE SCRIPPS $^{13}C/^{12}C$ AND $^{18}O/^{16}O$ STABLE ISOTOPE PROGRAM, 1996-2000

A Report Prepared for the Global Environmental Monitoring Program of the World Meteorological Organization

by

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Introduction

The calibration methodology for stable isotopic measurements of $^{13}C/^{12}C$ and $^{18}O/^{16}O$ by the laboratory of Dr. Charles D. Keeling at Scripps Institution of Oceanography (SIO) has been described by Bollenbacher *et. al.* [2001]. That report presented calibration measurements made on the VG Instrument Inc. Prism II dual-inlet stable isotope ratio mass spectrometer of Dr. Martin Wahlen at SIO from 1992 until September, 1996, and also described combination of the SIO data set with previous measurements made on the VG Sira mass spectrometer of Dr. Willem Mook at the University of Groningen, the Netherlands. The present report describes calibration measurements at SIO on the VG Prism II instrument from November, 1996 until July, 2000.

A new calibration of the VG Prism II mass spectrometer with three National Institute of Science and Technology ^{13}C standards (termed "NBS standards" here) was accomplished in January, 1997 and applied to all samples analyzed during the period of this report. However, daily results were normalized to agree with the 1994 NBS calibration. The normalization was accomplished by determining corrections from the daily performance of secondary standards with reference to their assigned values relative to the 1994 NBS calibration. The assigned values of the original set of secondary standards are the same as those defined in the previous report. The procedure of correcting each analysis day back to the 1994 calibration is valid if the $\delta^{13}C$ and $\delta^{18}O$ of the secondary standards are stable. Evidence for their stability is discussed later in this report.

Five new secondary standards were established and analyzed during the period of the present report, in addition to the six standards analyzed during the period of the previous report. Assigned $\delta^{13}C$ and $\delta^{18}O$ values for the new secondary standards were established, relative to the longer-term standards (again, on the 1994 NBS calibration scale). The behavior of the original standards over an additional three years will also

be discussed.

Calibration methodologies described in Bollenbacher *et. al.* [2001] were followed here, except that analyses of atmospheric secondary standards (containing N_2O) and oceanic standards (N_2O-free) were not merged together. At least two atmospheric secondary standards were analyzed on every day when atmospheric samples were analyzed; likewise, at least two oceanic standards were analyzed on days when oceanic samples were analyzed. The appropriate secondary standards were used to calculate the daily correction terms.

NBS Calibration of the Wahlen VG Prism II Mass Spectrometer in 1997

In January 1997, Dr. Wahlen calibrated his VG Prism II mass spectrometer with three NBS standards (NBS16, NBS17 and NBS19). Carbon dioxide gas from NBS19, a limestone, must be extracted by acidification with 100% H_3PO_4 at 25°C. Two fresh batches of CO_2 from NBS19 were prepared by Bruce Deck: batch number 10 on November 6, 1996 and batch number 11 on November 12, 1996. NBS16 and NBS17 are pure CO_2 gas standards.

Calibrations were run on January 28, 29, 30, and 31, 1997. On each day the three NBS standards and all of the secondary standards (atmospheric and oceanic) were analyzed on the mass spectrometer against the "machine" working reference standard MW1. Table A(1) summarizes the calibration data and Figure 1 displays the offsets of the measured values versus the assigned values, for both $^{13}C/^{12}C$ and $^{18}O/^{16}O$. Linear fits were made to the data and compared to fits from the 1994 NBS calibration. The difference between the 1994 and 1997 NBS calibrations is displayed in Figure 2. In the natural range of atmospheric samples (approximately −8‰ PDB), the 1994 and 1997 calibrations of $^{13}C/^{12}C$ agree to within 0.01‰; and for oceanic samples, near 0‰ PDB, the difference betweeen the calibrations is essentially zero. Thus the evidence is that the VG Prism II mass spectrometer behaved nearly identically for the NBS standards in 1994 and in 1997 (within 0.01‰), except for the NBS 16 standard,

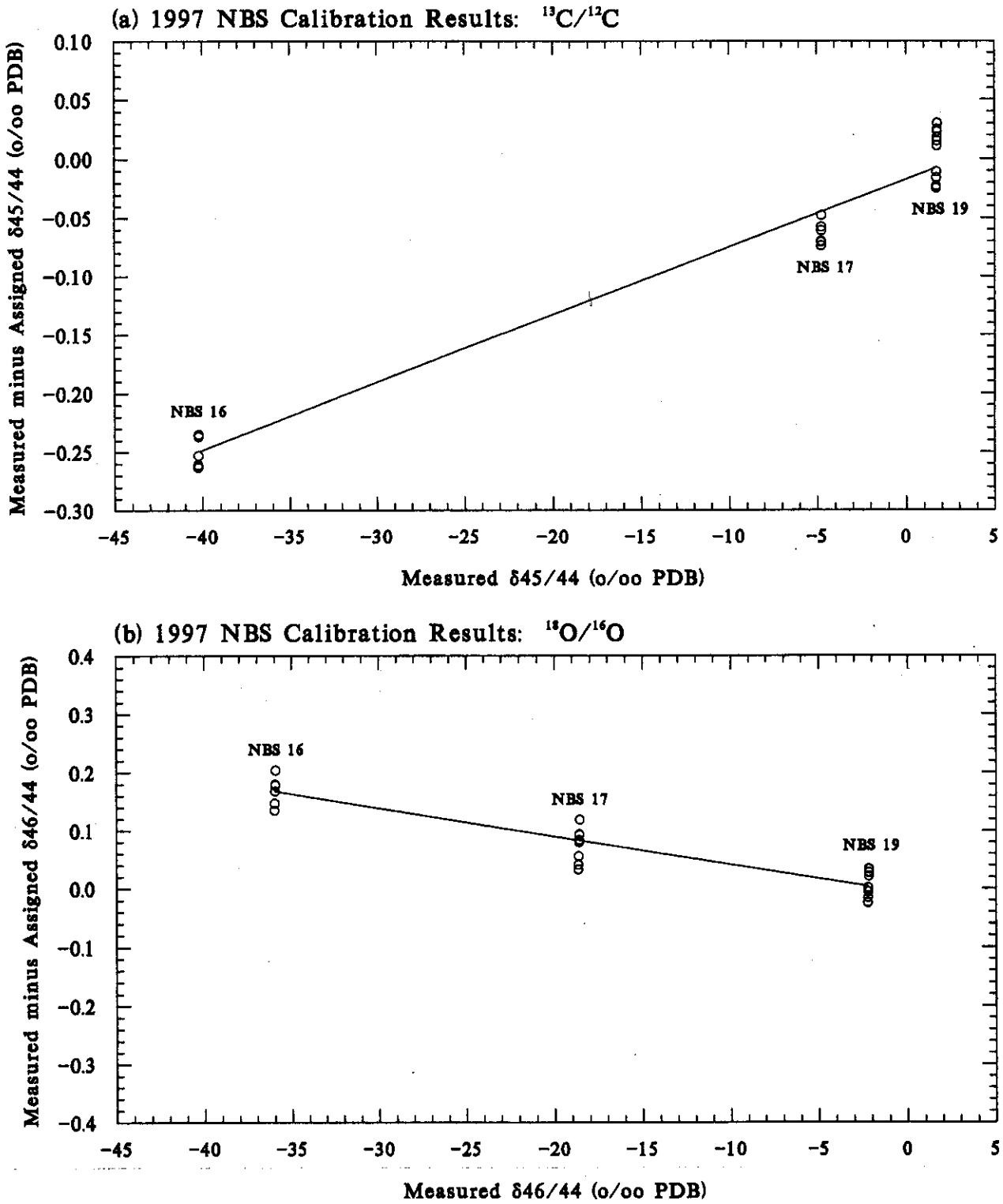
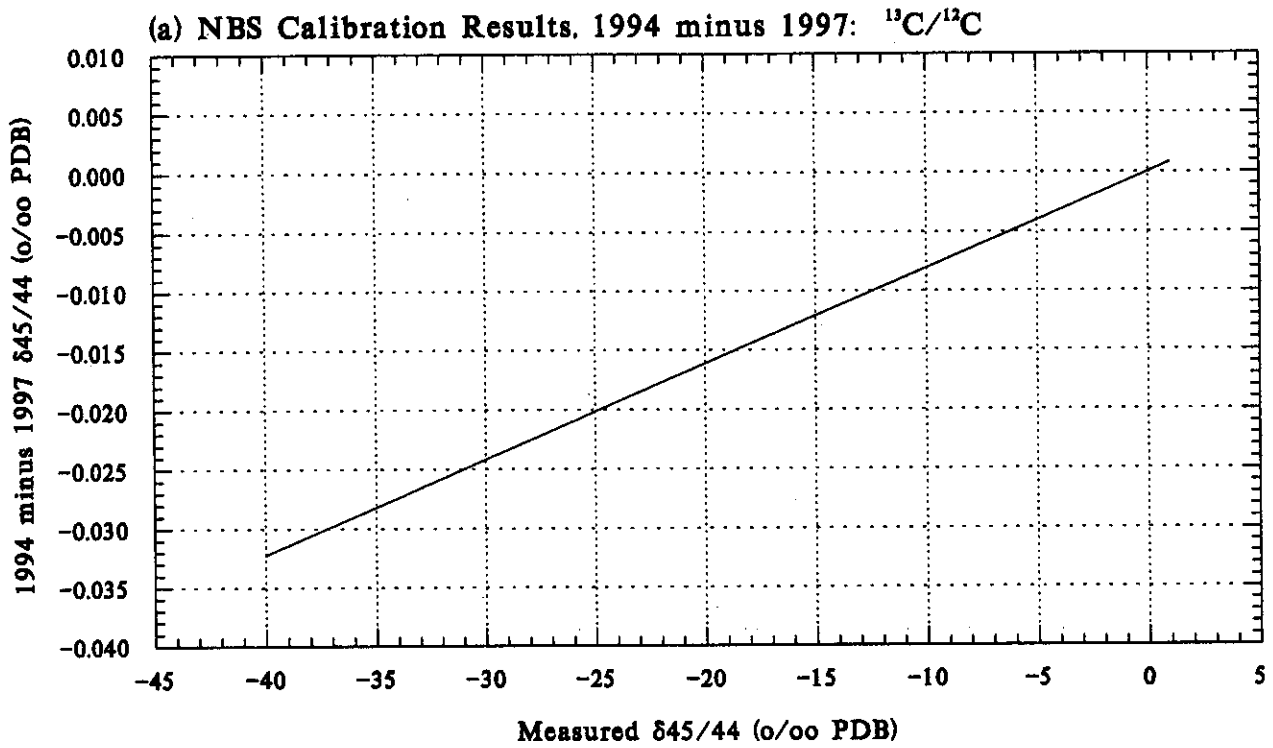


Figure 1. 1997 NBS 3-point calibration of VG Prism II mass spectrometer. NBS standards 16, 17 and 19 were analyzed on January 28, 29, 30, and 31, 1997. The measured values are plotted versus the measured values minus the NBS assigned values (without Craig correction). The plotted lines are linear fits of the average values of the data for each NBS standard. (a) is a plot of the δ45/44 data and (b) is a plot of the δ46/44 data for the same analyses. Data are from Table A1.



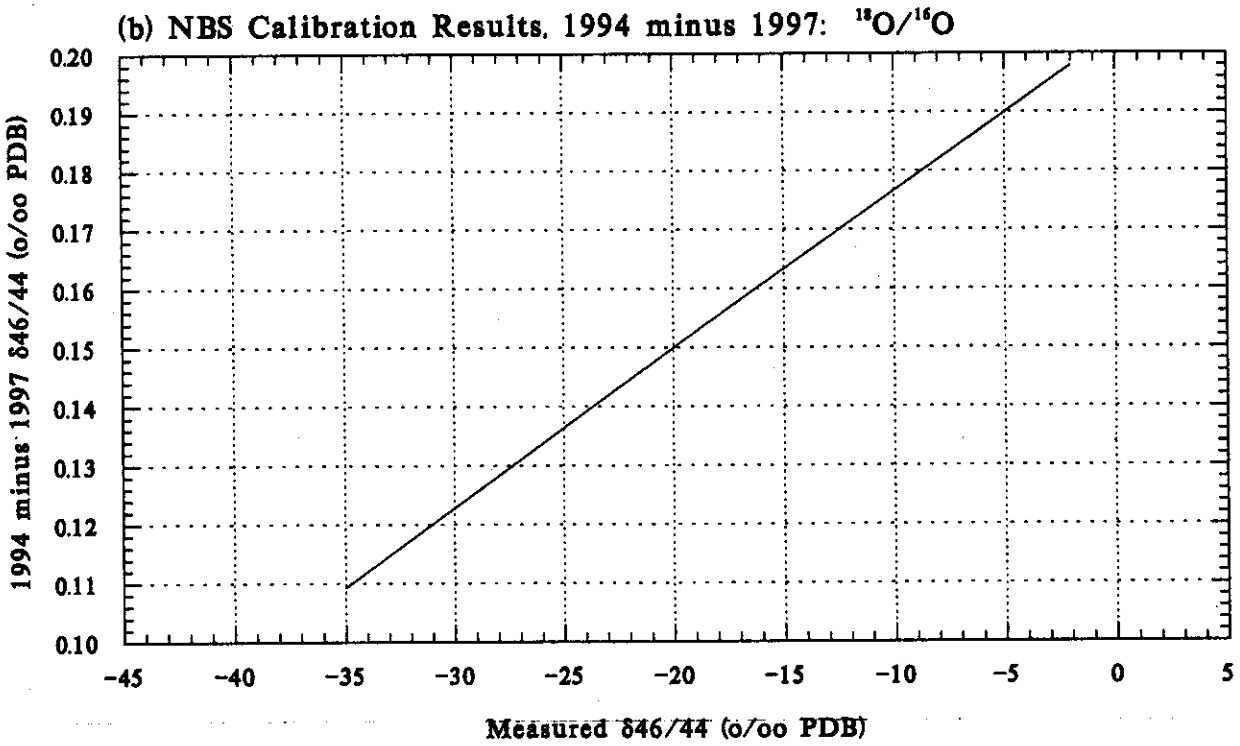


Figure 2. Difference between the 1994 and 1997 NBS 3-point calibrations of VG Prism II mass spectrometer. The plotted lines represent the differences between the 1994 and 1997 linear NBS calibration equations for (a) δ45/44 and (b) δ46/44 evaluated at the same measured (non-Craig-corrected) values.

at –40‰ PDB.

For $^{18}O/^{16}O$, the 1994 and 1997 calibrations differ by substantially more, about 0.2‰ at the level of natural samples.

Use of the NBS calibration equation to correct $\delta^{13}C$ and $\delta^{18}O$ data obtained from the VG Prism II was described in Bollenbacher *et al.* [2001, p. 3]. Following that scheme, the 1997 calibration is as follows:

1. Remove the Craig correction:

$$\delta 45/44 = (\delta^{13}C_{craig} + 0.0338 * \delta^{18}O_{craig}) / 1.0676$$

$$\delta 46/44 = (\delta^{18}O_{craig} + 0.0021 * \delta^{13}C_{craig}) / 1.001$$

2. Apply the 3 point NBS correction (1997):

$$\delta 45/44' = (0.994228 * \delta 45/44) + 0.017353$$

$$\delta 46/44' = (1.00487 * \delta 46/44) + 0.007153$$

3. Re-apply the Craig correction:

$$\delta^{13}C_{nbscorr} = ((1.0676 * \delta 45/44') - (0.0338338 * \delta 46/44')) / 0.99992902$$

$$\delta^{18}O_{nbscorr} = ((1.001 * \delta 46/44') - (0.00224196 * \delta 45/44')) / 0.99992902$$

In Table A(2), the 1997 NBS calibration equation is applied to the calibration data itself. The daily corrections (described later in this report) are applied and averages of the fully corrected data compared to the assigned $\delta^{13}C$ and $\delta^{18}O$ values. As discussed in the Introduction, the 1997 calibration only affected the "machine" values

of $^{13}C/^{12}C$ and $^{18}O/^{16}O$, because daily results have been normalized to agree with the 1994 calibration.

Tables B(1) and B(2) compare measurements of atmospheric and oceanic secondary standards, respectively, that were made on the NBS calibration days, to their assigned values, after application of the daily corrections described later in this report.

The working reference standard MW1, described in the previous report, continued to be used exclusively for the entire period of the current report.

The composition of the working reference standard MW1 is:

$\delta 45/44 = -40.599‰$ PDB

$\delta^{13}C = -42.405$

$\delta 46/44 = -27.828$

$\delta^{18}O = -27.767$

Description of Secondary Standards

The six secondary standards described in Bollenbacher *et. al.* [2001] continued to be used during the period of the present report to correct for the daily variations of the mass spectrometer. Five additional secondary standards were prepared and analyzed along with the original standards to establish their assigned values. Four of the new secondary standards were "atmospheric", i.e. cryogenic extractions of CO_2 gas from natural-air standards containing the atmospheric amount of N_2O gas, approximately 0.1%. The fifth new standard is "oceanic"; the CO_2 gas contains only trace amounts of N_2O.

Atmospheric Secondary Standards. Three additional natural-air compressed gases were designated as atmospheric secondary standards. These gases, contained in cylinder numbers 2407, 39414 , and 96364, were prepared at SIO on June 27, 1996, November 23, 1990, and September 5, 1996, respectively. A fourth new atmospheric

standard is a bulk extraction of CO_2 gas from a cylinder of compressed natural air, number 13523 (prepared at SIO on September 5, 1996). The extraction was done in January, 1997 and the extracted CO_2 (including 0.1% N_2O) stored in a glass flask. Subsequently, aliquots of approximately 1cc in size were transferred from the flask and sealed in glass ampoules that we call "flame-off tubes". Approximately 100 of these samples have been made, and the remainder of the bulk extraction is still contained in the flask.

The mole fraction of CO_2 in each of the natural-air standards has been measured by repeated infrared analysis, as summarized in the following table.

Atmospheric Secondary Standards

Cylinder No.	Mole Fraction CO_2 ("X_{99}") (ppm)
39382	360.27
75635	361.96
75859	360.20
2407	355.23
39414	350.71
96364	354.03
13523	353.30

Table C(1) lists measurements on the mass spectrometer of samples from the original three standards (39382, 75635, and 75859), and Table C(2) measurements from the new set of gases, made during the period of the current report. The measurements of $\delta^{13}C$ and $\delta^{18}O$ are listed in order of "Fill Number" and are "raw" machine values (ion- or Craig-corrected, but not NBS- and daily-corrected). A new series of fill numbers has been started for the three new natural-air standards stored in high-

pressure gas cyulinders. As with the original three atmospheric standards, the new ones are extracted as a group, six extractions from each of the three gas cylinders. However, since Fill No. 50 of the original standards in July and August, 1997, a total of 522 extractions from all six standard gases have been made by flowing the gases at a set flow rate for a set period of time directly into the automated extraction line: aliquots in flasks have not been collected from the cylinders.

Oceanic Secondary Standards. A new oceanic secondary standard, designated GES1, was prepared on November 24, 1997 by Guy Emanuele. A Dover chalk sample of approximately 22 grams was acidified under vacuum with 40% H_3PO_4. The evolved CO_2 gas was collected, dried, and stored in bulk in a 5-liter glass flask. A total of 75 1-2cc aliquots have been transferred into flame-off tubes for use as daily secondary standards. The remainder of GES1 is still stored in the glass flask.

Performance of Secondary Standards on the VG Prism II Mass Spectrometer

Daily corrections for each day of measurements on the mass spectrometer were determined from the results of secondary standards measured on each day. During the period of the current report, at least two and sometimes three atmospheric standards were measured on every day when atmospheric samples were measured, and likewise at least two oceanic standards on every day when samples extracted from sea water samples were measured.

All measurements of secondary standards made during the period of the current report are listed in chronological order in Tables D(1) and D(2), for atmospheric and oceanic standards, respectively. The measured (and Craig-corrected) $\delta^{13}C$ and $\delta^{18}O$ values are listed, as well as results corrected according to the 1997 NBS calibration. Corrections for N_2O have *not* been applied to the atmospheric secondary standard data in Table D(1).

Table E summarizes the suites of seven atmospheric and four oceanic secondary standards. "Experimental" values of $\delta^{13}C$ and $\delta^{18}O$ listed on the right side of the table are means of measurements made in the Wahlen laboratory. For the original six secondary standards, "current" designates those measurements made during the period of the present report, and "all data", the entire data set. These measurements have been completely corrected according to the scheme presented here. The sample standard deviation of an individual measurement, s, is listed for each standard, as calculated from N measurements. The left side of the table lists the offsets between the standards and their assigned values as described below.

Performance of the secondary standards is presented in Figures 3 and 4, for atmospheric and oceanic standards, respectively. The NBS-corrected $\delta^{13}C$ and $\delta^{18}O$ values are plotted versus time for all eleven standards. The entire record has been plotted for the original 6 standards, including the period from 1992 through 1996 that is the subject of Bollenbacher *et al.* [2001].

Figures 3 and 4 clearly show that results from the VG Prism II mass spectrometer drift with time toward lighter (more negative) values. There are, however, variations in the slope of this drift and also jumps in the levels, that correlate with hardware changes made to the mass spectrometer. See page 14 for a discussion of some of these. In order to characterize and correct for the drift, we calculate daily corrections from the performance of secondary standards relative to their assigned values. The correction scheme described in the following pages, although focused on $\delta^{13}C$, is identical for both $\delta^{13}C$ and $\delta^{18}O$. Assigned values, offsets, and daily correction terms have been calculated in the same way for both isotopes from the same data sets.

Relative Stability of Secondary Standards. As shown in Bollenbacher *et al.*, [2001], secondary standards of like type (atmospheric or oceanic) display nearly identical rates of drift, so that constant offsets (determined from the entire record) can be used to merge the data sets together. Figures 5 and 6 are plots of the differences of

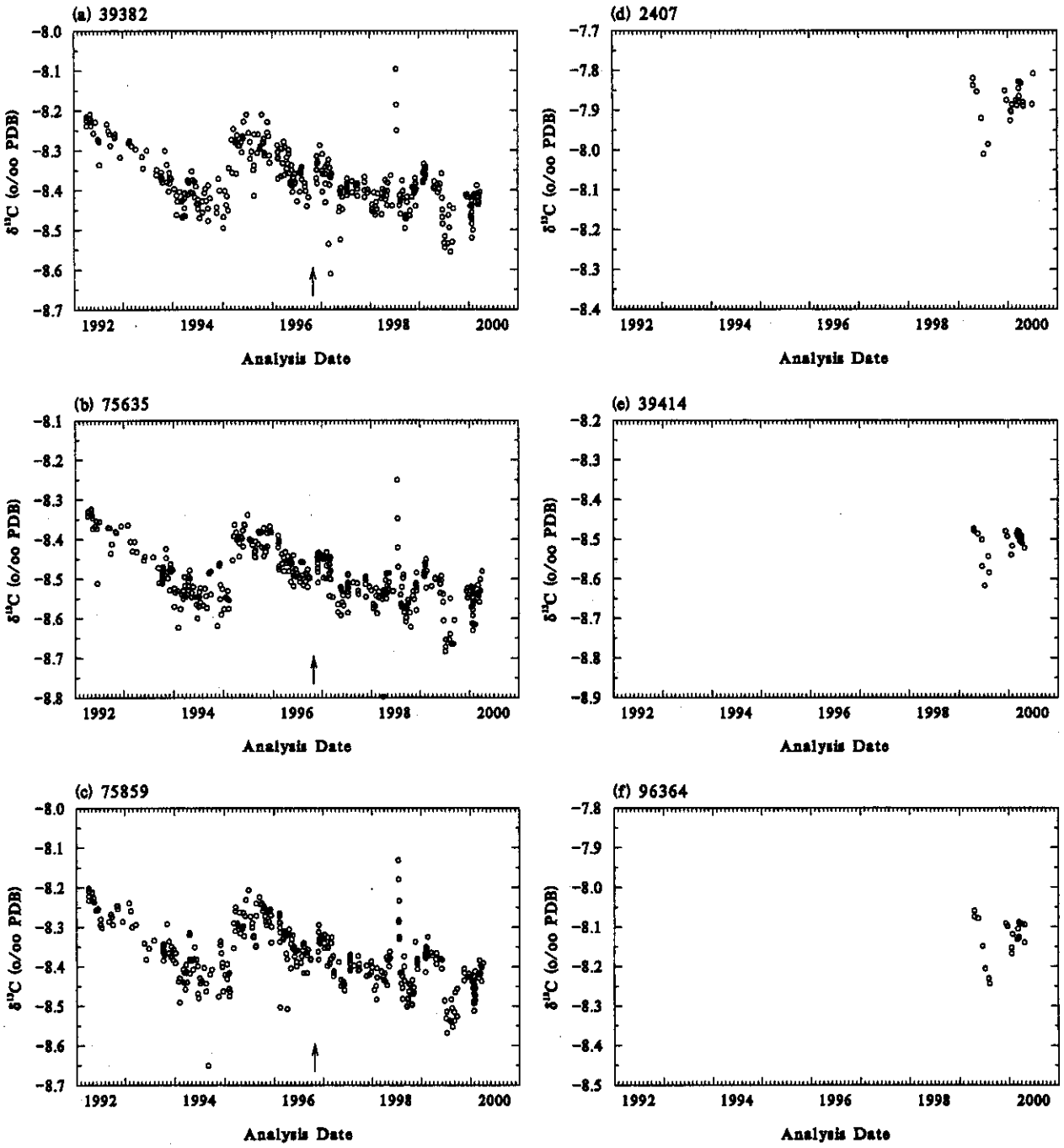


Figure 3a. NBS-corrected $\delta^{13}C$ measurements of natural-air ("atmospheric") secondary standards stored in high-pressure gas cylinders. Data are plotted versus dates of analysis on VG Prism II mass spectrometer. Extractions of gas containing 99.9% CO_2 and 0.1% N_2O were analyzed . Data are from Table D(1) of this report and Table D of Bollenbacher *et al* [2000]. The arrow indicates the division between reporting periods.

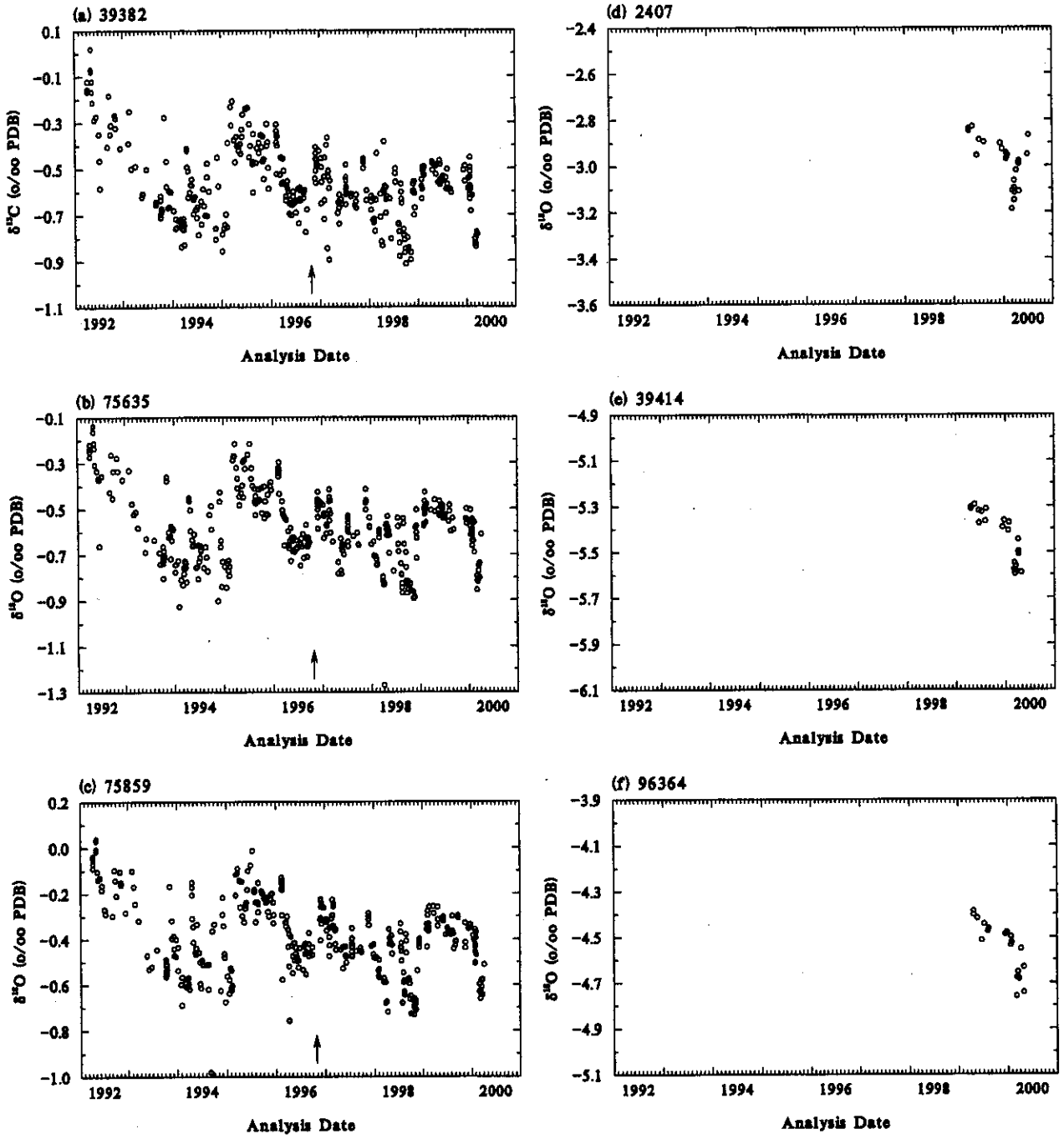


Figure 3b. NBS-corrected $\delta^{18}O$ measurements of natural-air ("atmospheric") secondary standards. Data are plotted as in Figure 3a.

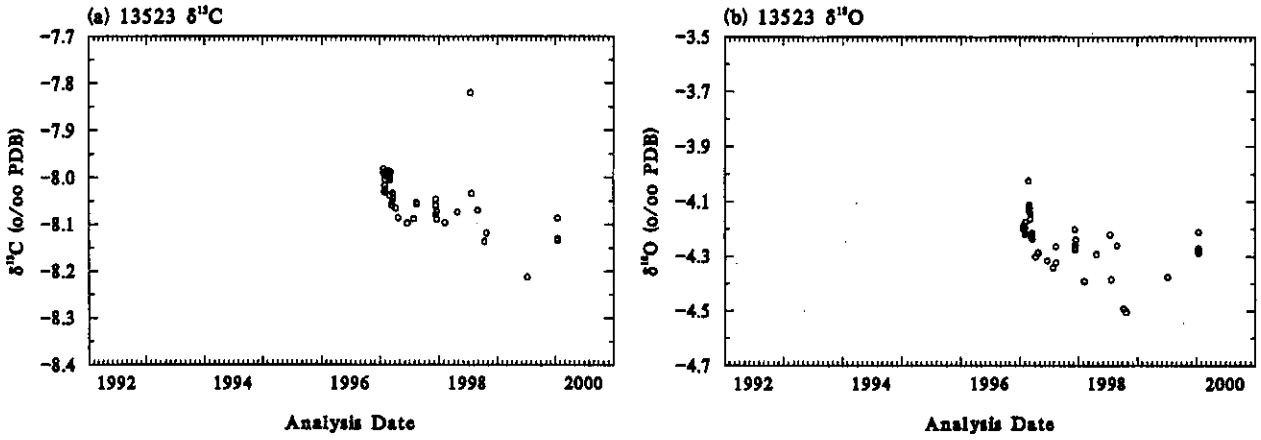


Figure 3c. NBS-corrected $\delta^{13}C$ and $\delta^{18}O$ measurements of bulk natural-air ("atmospheric") secondary standard 13523, stored in glass flame-off tubes. Data are plotted versus dates of analysis on VG Prism II mass spectrometer. Extractions of gas containing 99.9% CO_2 and 0.1% N_2O were analyzed . Data are from Table D(1).

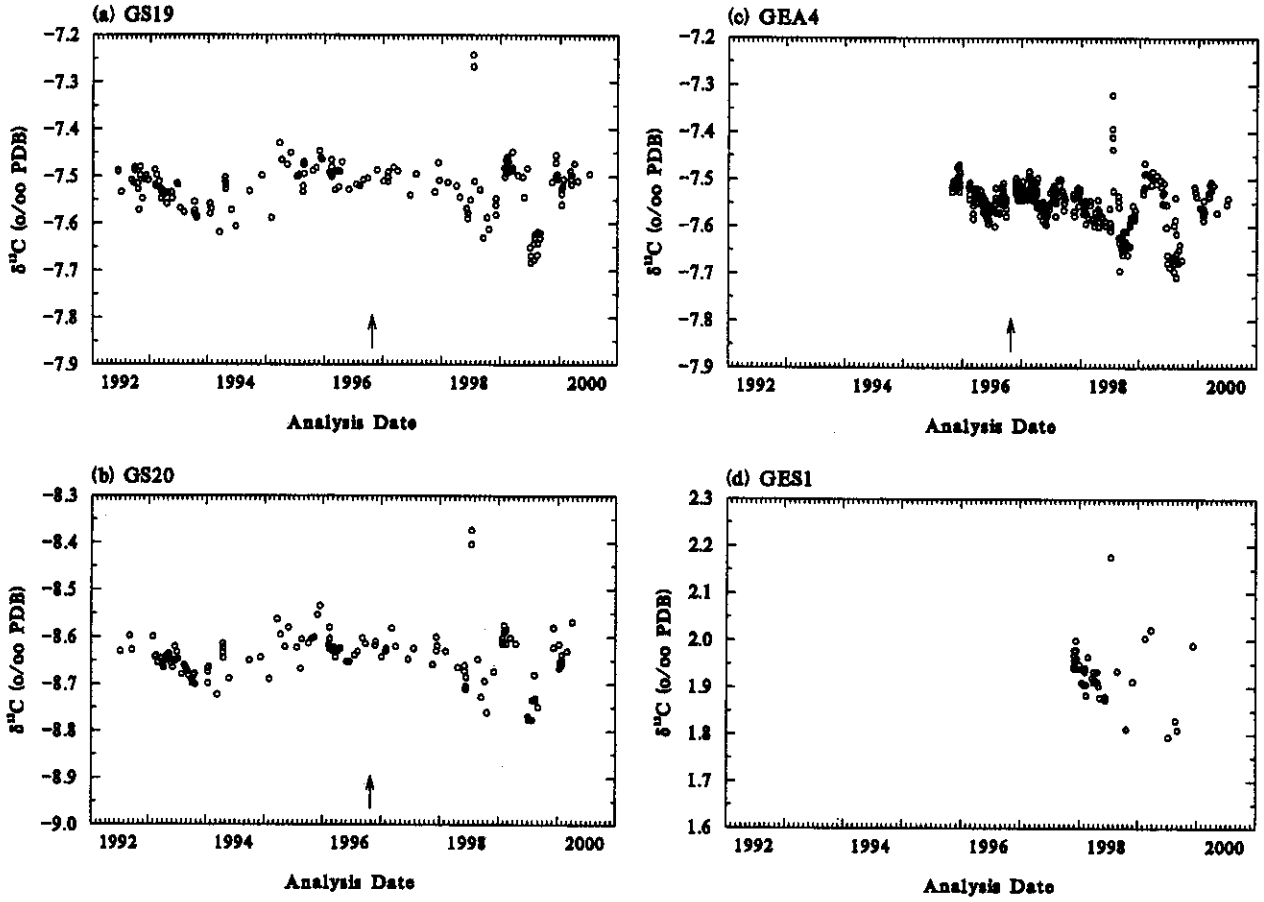


Figure 4a. NBS-corrected $\delta^{13}C$ measurements of pure CO_2 ("oceanic") secondary standards. Data are plotted versus dates of analysis on VG Prism II mass spectrometer. GS19 and GS20 are stored in 0.5 liter stainless steel flasks, and GEA4 and GES1 samples are stored in glass flame-off tubes. Data are from Table D(2) of this report and Table D of Bollenbacher *et al* [2000]. The arrow indicates the division between reporting periods.

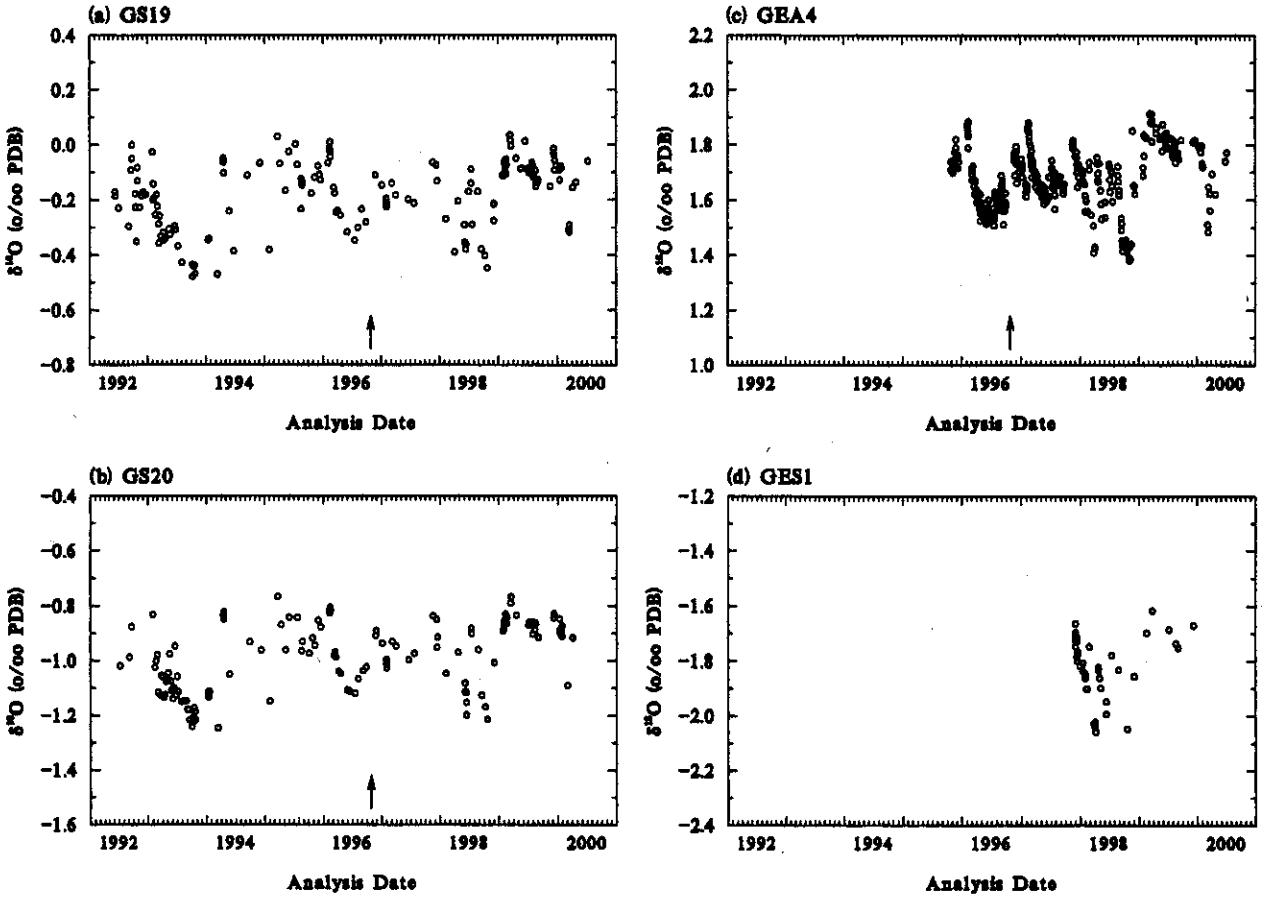


Figure 4b. NBS-corrected $\delta^{18}O$ measurements of pure CO_2 ("oceanic") secondary standards. Data are plotted as in Figure 4a.

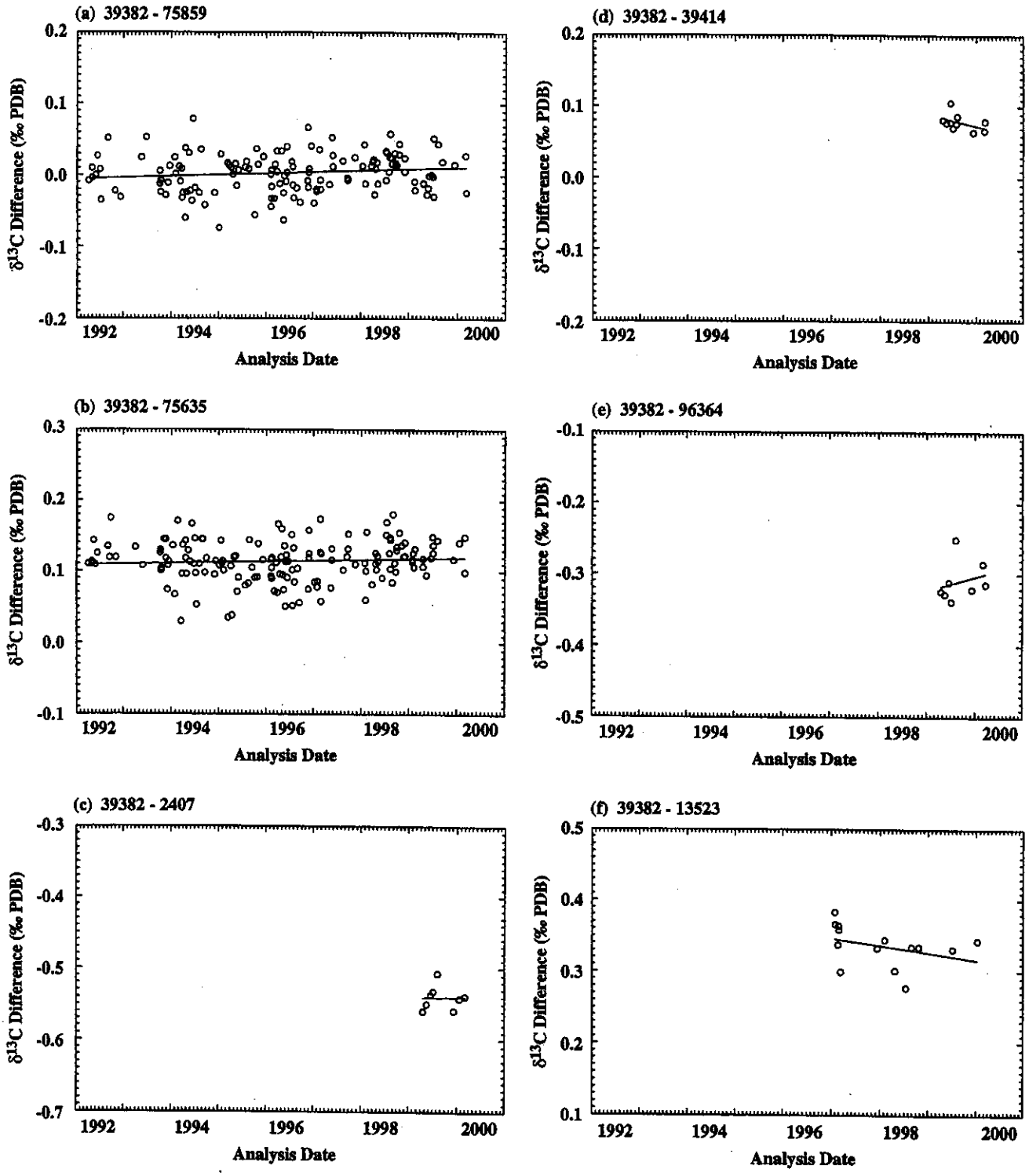


Figure 5a. Atmospheric secondary standard offsets for $\delta^{13}C$. Differences between NBS-corrected $\delta^{13}C$ of atmospheric standards measured on the same analysis day are plotted versus the dates of analysis. The lines are linear fits to the data.

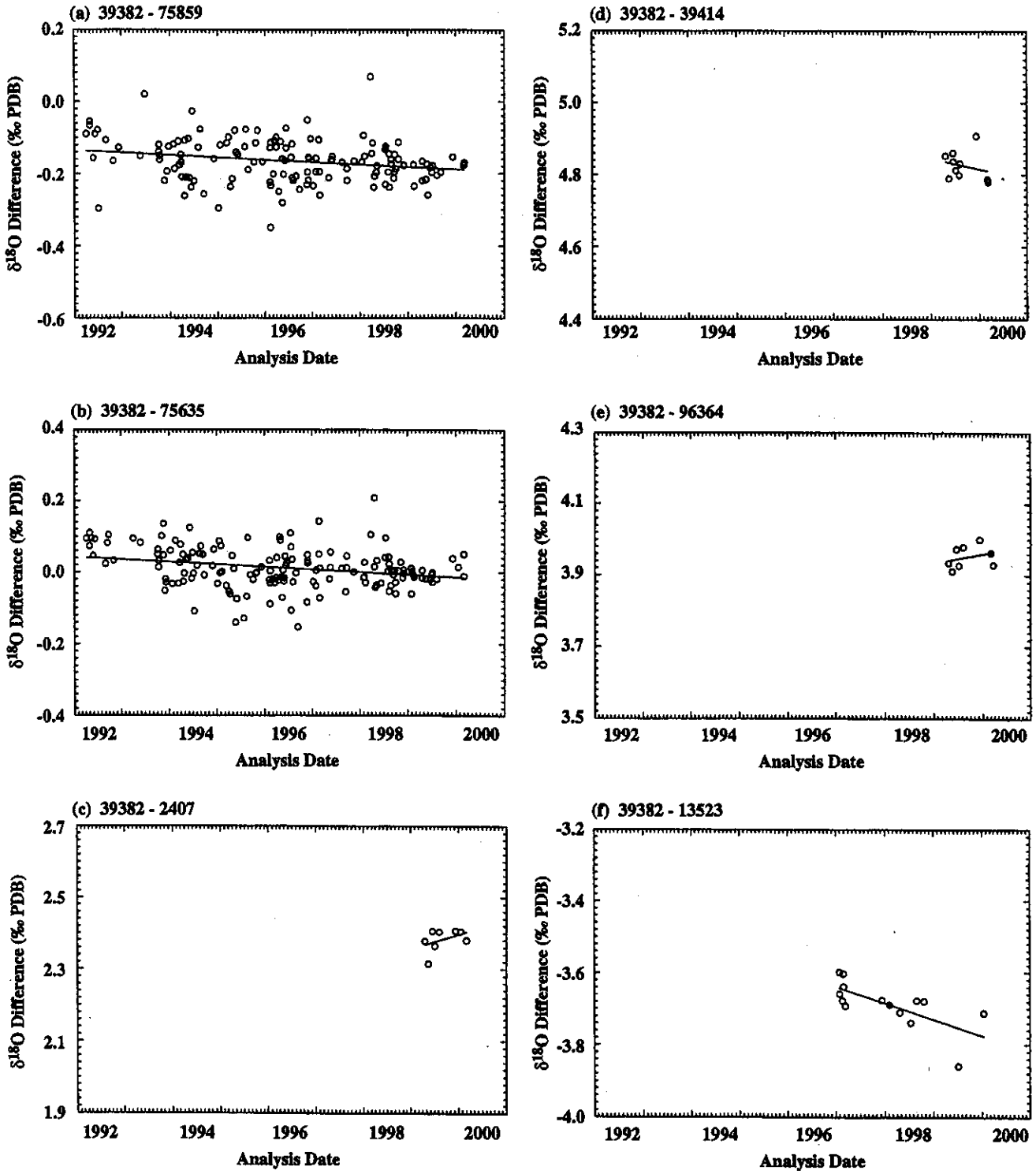


Figure 5b. Atmospheric secondary standard offsets for $\delta^{18}O$. Differences are plotted as in Figure 5a.

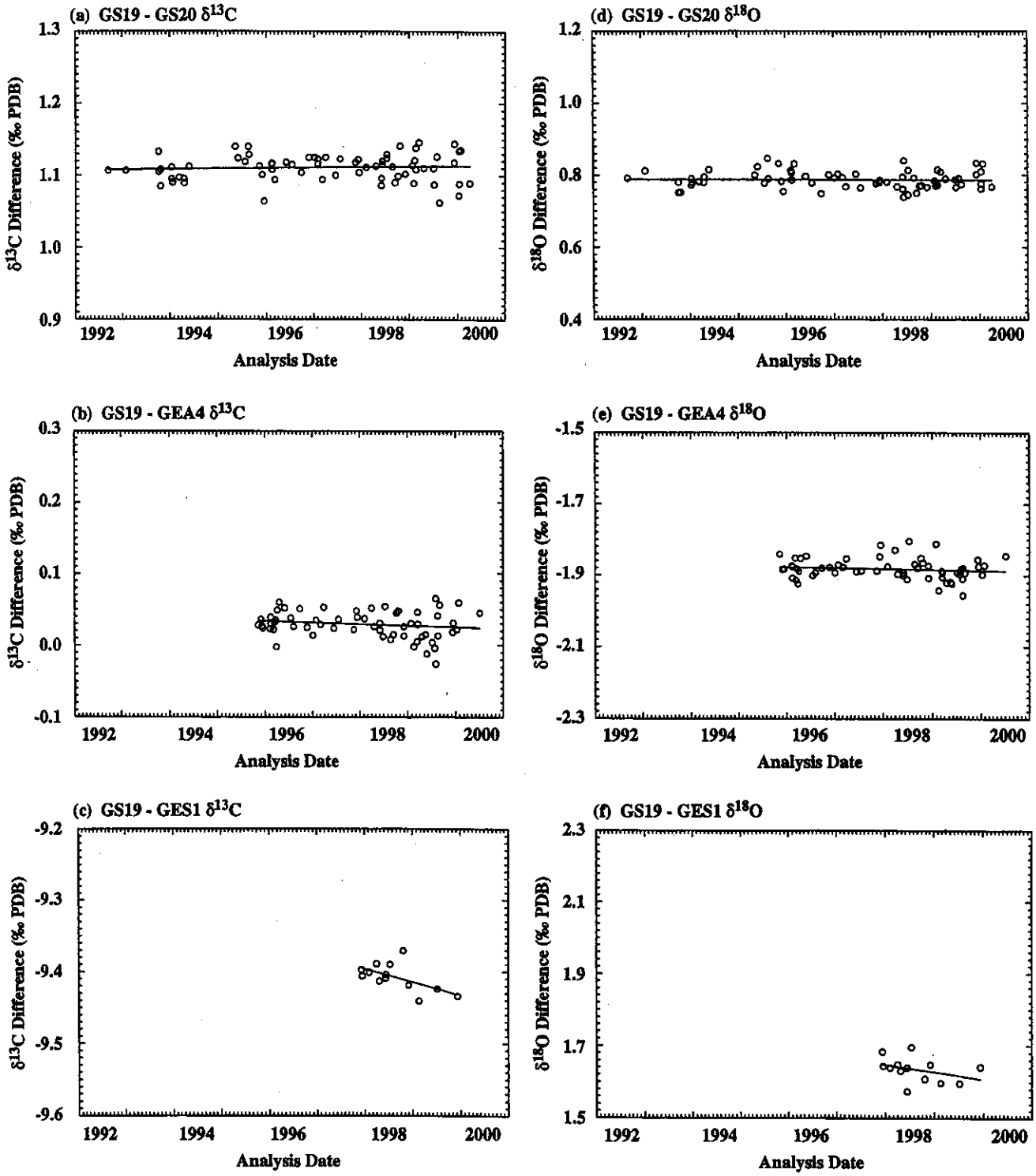


Figure 6. Oceanic secondary standard offsets for $\delta^{13}C$ and $\delta^{18}O$. (a), (b), and (c): Differences between NBS-corrected $\delta^{13}C$ of oceanic standards measured on the same analysis day are plotted versus the dates of analysis. The lines are linear fits to the data. (d), (e), and (f): Differences for $\delta^{18}O$ are plotted.

each secondary standard from each other on each measurement day (when both are measured), for atmospheric and oceanic standards, respectively, and for both $\delta^{13}C$ and $\delta^{18}O$. The oceanic standards are compared to GS19 and the atmospheric standards to 39382. When there are more than one comparison on a day, data are averaged to obtain one daily difference. Table F lists the results of these comparisons. The slopes of the linear fits versus time for the long-term standards (three "original" atmospheric and three oceanic) indicate that relative drifts in $\delta^{13}C$ are at maximum about 0.02‰ per ten years. Assuming stability, the average offsets for the long-term atmospheric standards have a standard deviation of slightly less than 0.03‰, and for the long-term oceanic standards, slightly less than 0.02‰. The shorter-term standards introduced during the period of the present report have offset fits with larger slopes, but these are probably resulting from insufficiently long records rather than from lesser stability, since the standard deviations calculated from averaging the offsets are all no larger than those of the long-term standards. We have thus concluded that all of the secondary standards appear to be stable in relation to each other, atmospheric to atmospheric (containing N_2O) and oceanic to oceanic (N_2O-free).

Merged Atmospheric and Oceanic Secondary Standard Data. In order to maximize the utility of the secondary standard data, we combined together all of the atmospheric standard data, and separately, all of the oceanic data. To accomplish this, the average offset of each of the atmospheric standards from 39382, as detailed in Table F, was added to adjust, or "merge," the data to 39382. The oceanic secondary standard data were merged together similarly, using the average offset of each standard from GS-19, also detailed in Table F. In order to continue reference to the 1994 NBS calibration, and because the new data support the original offset data (see Table F), assignments of the original six secondary standards have remained the same. As described in Bollenbacher *et al.*, [2001], the oceanic secondary standard GS-19 was assigned its value relative to the 1994 NBS calibration. GS-20 and GEA4, the other

two original oceanic standards, were assigned values according to their average offsets from GS-19 (see "original" assignments at the bottom of Table F). The atmospheric secondary standard 39382 was assigned relative to GS-19 using the differential drift relationship between atmospheric and oceanic standards. Finally, the remaining two atmospheric secondary standards, 75635 and 75859, were assigned values according to their average offsets from 39382 (bottom section of Table F).

The new secondary standards introduced during the period of this report have been assigned values by using the average offsets detailed in Table F. The atmospheric secondary standards 2407, 39314, 96364, and 13523 were assigned $\delta^{13}C$ and $\delta^{18}O$ values according to their average offsets from 39382, obtained from analysis days when both standards were measured. All such days during the period of the present report were used for this purpose. Similarly, the new oceanic secondary standard GES1 was assigned values from the average of the offsets from GS-19, on days when both were measured.

Each analysis of an atmospheric secondary standard was adjusted to the value of 39382 by adding the average offset. The resulting data are plotted in Figure 7a for $\delta^{13}C$ and 7b for $\delta^{18}O$. For completeness, we have included on the plots the period of the first report as well, before October 1996. These plots show all of the available secondary standard data that define the response over time of the VG Prism II mass spectrometer to CO_2 samples containing approximately 0.1% N_2O gas. Similarly, the oceanic secondary standard data were adjusted to the value of GS-19 and plotted along with the GS-19 data in Figures 8a and 8b. These plots define the response of the mass spectrometer to CO_2 samples having only a trace of N_2O gas.

Differential Drift Between Atmospheric and Oceanic Secondary Standard Data Sets. In the early part of the record, and continuing through September, 1997, the atmospheric and oceanic standards displayed similar qualitative behavior, although

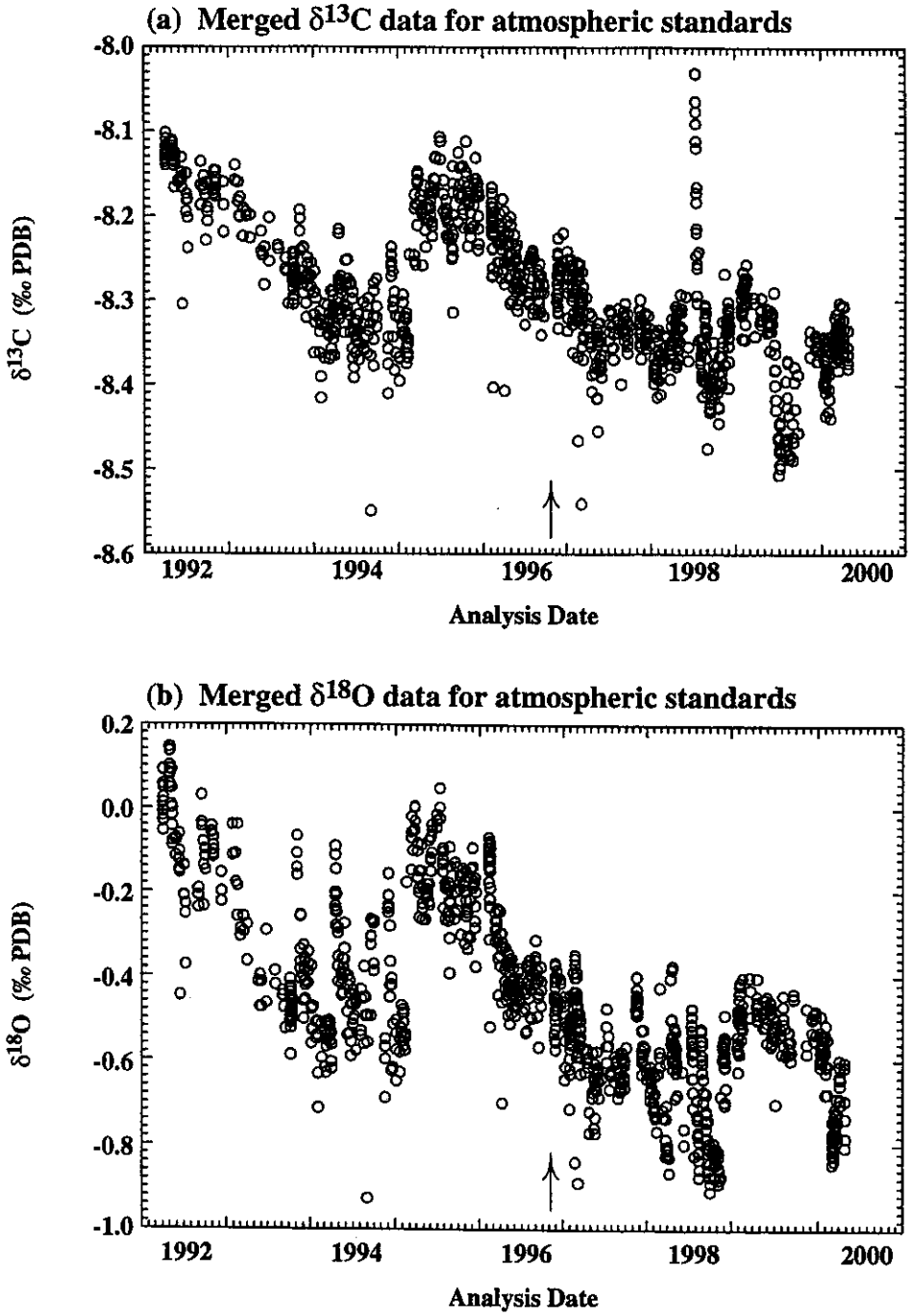


Figure 7. Merged atmospheric secondary standard data. Data for standards 75635, 75859, 2407, 39414, 96364, and 13523 have been adjusted to 39382, using the average offsets, and are plotted along with 39382 data versus the dates of analysis. (a) is a plot of the $\delta^{13}C$ data, and (b) is a plot of the $\delta^{18}O$ data for the same analyses. Data are from Table D(1) of this report and Table D of Bollenbacher *et al.* [2000]. The arrow indicates the division between reporting periods.

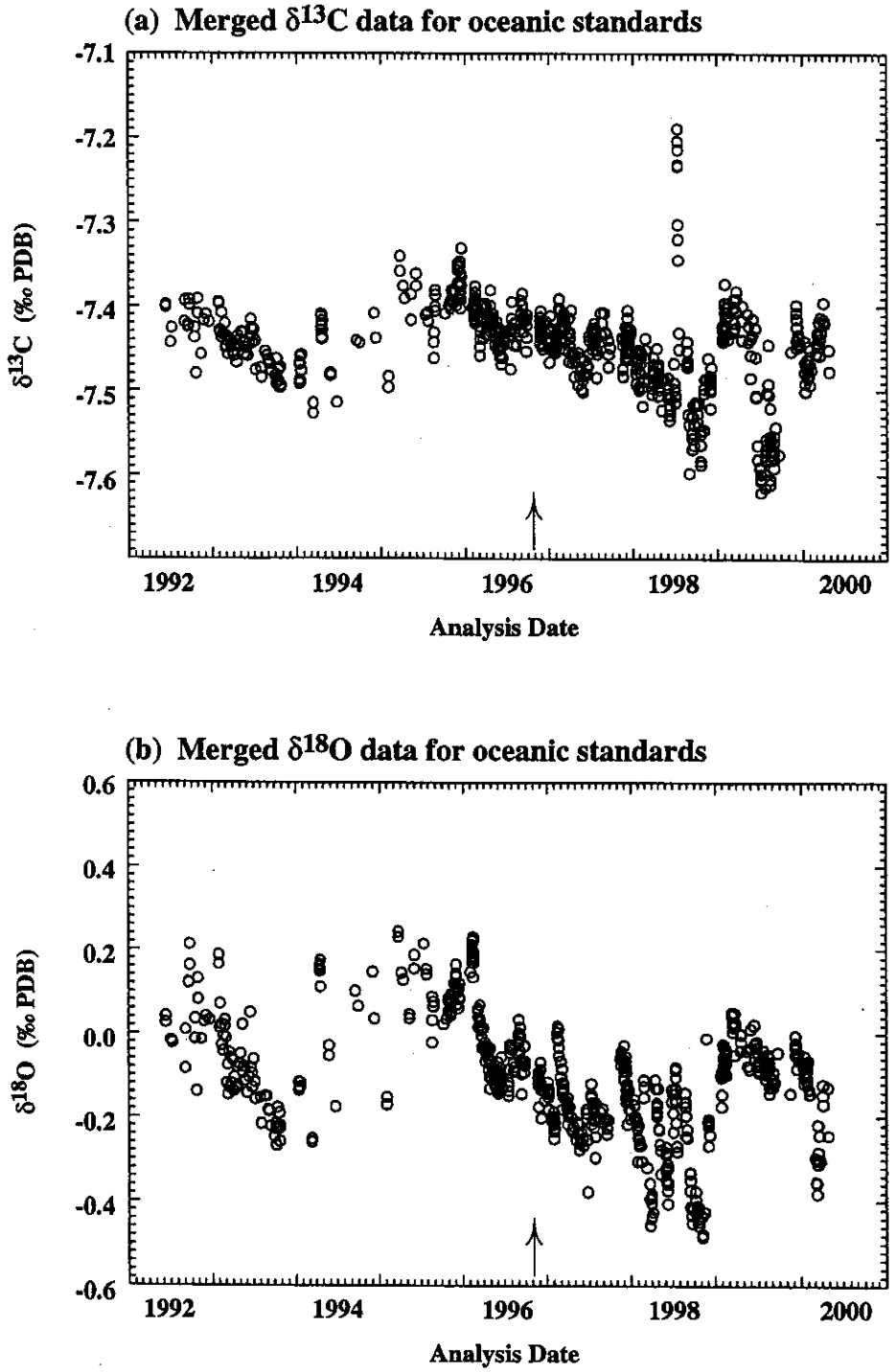


Figure 8. Merged oceanic secondary standard data. Data for standards GS20, GEA4, and GES1 have been adjusted to GS19, using the average offsets, and are plotted along with GS19 data versus the dates of analysis. (a) is a plot of the $\delta^{13}C$ data, and (b) is a plot of the $\delta^{18}O$ data for the same analyses. Data are from Table D(2) of this report and Table D of Bollenbacher *et al.* [2000]. The arrow indicates the division between reporting periods.

the oceanic standards have a much lower rate of drift. Figures 9a and 9b plot the difference between the atmospheric standards (merged to 39382) and the oceanic standards (merged to GS19) for each day when both types were run. The plots include the data from the earlier period discussed in Bollenbacher *et al.*, [2001]. The consistent behavior in the early period was utilized in the "differential drift" analysis discussed there. (Note that Figures 9a and 9b display more data points in 1995 and 1996 than the corresponding Figures 8 and 9 in Bollenbacher *et al.*, [2001]. The reason for this is that data of atmospheric standard GEA4 is included in Figures 9a and 9b, whereas GEA4 data was specifically excluded from the previous workup due to uncertainty about the standard's stability. See page 14 in Bollenbacher *et al.*, [2001].) The two linear fit lines shown in Figures 9a and 9b for the period of the present report are provided as a visual aid. Their slopes are not utilized in the calibration discussed here, and details of the fits are not provided.

Instrumental Events Affecting Secondary Standard Drift. A number of events have affected the drift behavior of the secondary standards. Most of these events were hardware changes on the VG Prism II mass spectrometer. A brief discussion of five of these events follows.

(1) As discussed in Bollenbacher *et al.* [2001], the replacement of the SC changeover valve on February 28, 1995 caused the $\delta^{13}C$ and $\delta^{18}O$ to jump to heavier values and the difference between the atmospheric and oceanic secondary standards (the "differential drift") to shift by approximately 0.1‰. Consequently, two differential drift functions (for the periods *before* and *after* the valve change) were used for the record from April, 1992 to September, 1996. This event is clearly evident in Figures 9a and 9b.

(2) Between the reporting periods, on September 29, 1996, the source filament in the VG Prism II was replaced. Although this event had little effect on the differential drift (see Figures 9a and 9b), it appears to have caused a slight shift toward heavier values. See Figures 3 (especially) and 4.

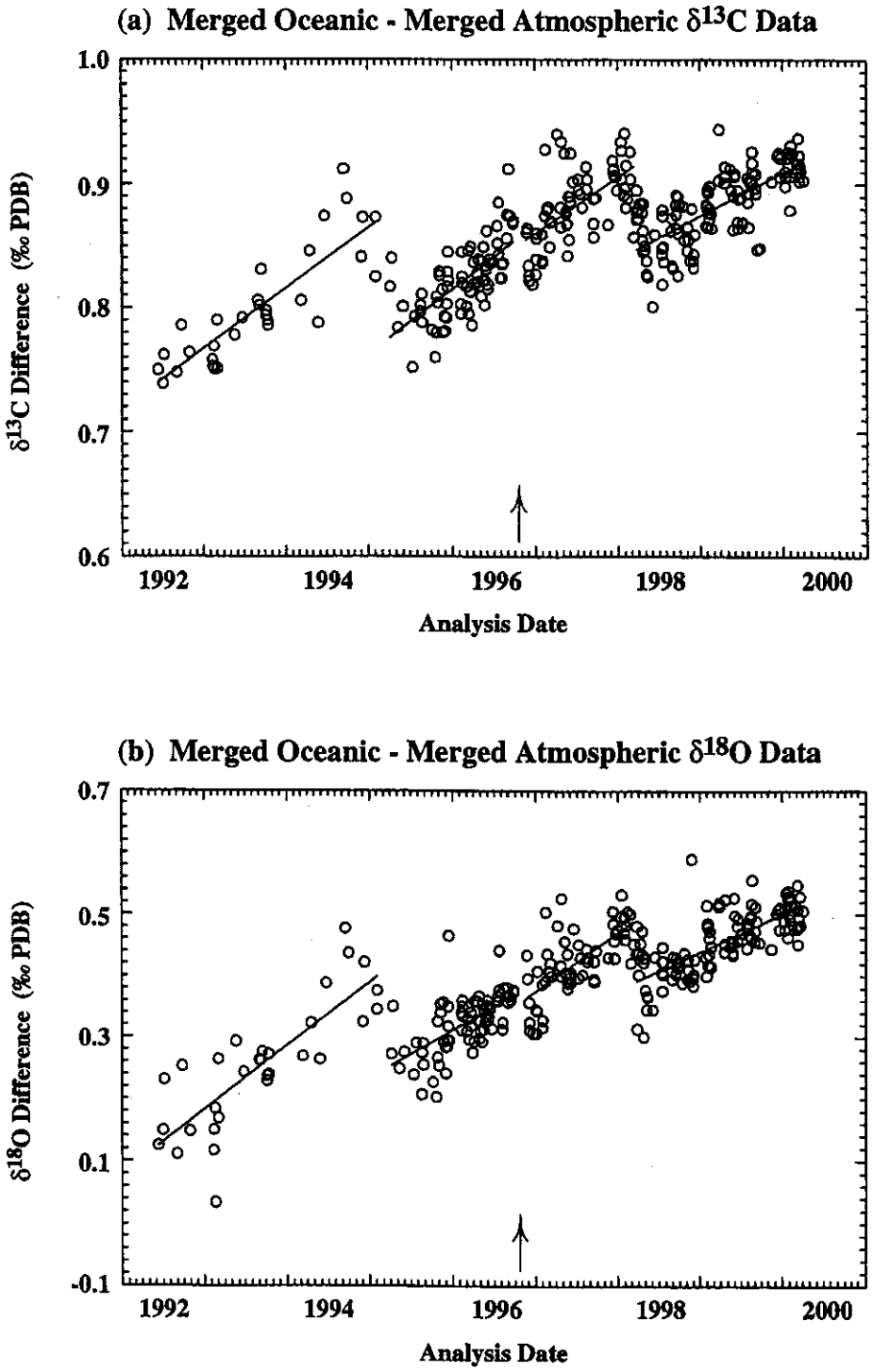


Figure 9. Differential drift between oceanic and atmospheric standards. For each analysis day, (a) is the average difference in $\delta^{13}C$ between oceanic standards (all adjusted to GS19) and atmospheric standards (all adjusted to 39382) plotted versus the date of analysis, and (b) is the average difference in $\delta^{18}O$. The lines are linear fits to the data for designated periods of mass spectrometer performance. The arrow indicates the division between reporting periods.

(3) The source filament was replaced again on November 10, 1997. No evident change in behavior occurred as a result.

(4) On February 19, 1998, a leak in the source relief valve was repaired and the SC changeover valve was cleaned. As in February, 1995, a substantial shift is evident in the differential drift, apparently also caused by a shift to heavier values, especially for the atmospheric secondary standards (see Figures 3 and 4). After this event the differential drift does not appear to be as consistent as it was previously.

(5) An event that affected the record but was not a hardware change occurred in early July, 1998. A sample extremely heavy in $^{13}C/^{12}C$ (approximately 3200‰ PDB!) was measured in the mass spectrometer. For several measurement days thereafter, the $\delta^{13}C$ values of the secondary standards were abnormally heavy, as is evident on Figures 3 and 4. Corrections were nonetheless determined from the standard data on these days and used to correct data for samples analyzed on those days. The $\delta^{18}O$ plots do not display any deflection.

Beginning in February, 1998, and continuing until the end of the record discussed here, in April 2000, the correlation between the oceanic and atmospheric standards has been less consistent. For this reason, and because sufficient standards of the appropriate type were measured on each day, use of the differential drift relationship between atmospheric and oceanic standards for calibration purposes was not carried forward into the time period of the present report.

Determination of Daily Corrections for Atmospheric and Oceanic Data. Daily correction terms were calculated from the differences of secondary standard values measured on any given day from their respective assigned values. On analysis days when atmospheric samples were measured, atmospheric secondary standard results (at least two) were adjusted to standard 39382 using offsets as discussed above. The average difference from the assigned value of 39382 was applied as the additive factor to correct the measurements of the day. This is called the "daily air correction

term". Similarly, on days when oceanic samples were measured, the oceanic secondary standards were adjusted to standard GS-19, and the average difference from the assigned value of GS-19 applied as the daily sea correction term. For each standard measurement, the adjustment and calculated correction term are listed in Tables D(1) and D(2), for atmospheric and oceanic standards, respectively.

Daily averages of all correction terms in Tables D1 and D2 were calculated to create a look-up table including every analysis date along with the corresponding $\delta^{13}C$ and $\delta^{18}O$ term for that day (Tables G(1) and G(2), for atmospheric and oceanic correction terms, respectively). These daily correction terms were then added to the NBS-corrected values of a sample. Atmospheric samples also must be corrected to the CIO data set by subtracting 0.112‰ for $\delta^{13}C$ and 0.109‰ for $\delta^{18}O$, and finally corrected for N_2O. These corrections are described in detail in Bollenbacher *et al.* [2001]. The N_2O correction for $\delta^{13}C$ is approximately +0.2‰, and for $\delta^{18}O$ approximately +0.3‰.

Samples were routinely analyzed on a weekly basis, as the reference cell was freshly filled with reference standard MW1 each week. Samples were usually analyzed on two consecutive days each week. A week number has been assigned to each standard in order to group the data according to fills of the reference cell. For example, Week No. 162 corresponds to 21, 22, and 25 November 1996 and Week No. 290 corresponds to 14 and 15 December 1999.

After an inspection of the entire secondary standard record, as well as station data, a total of thirteen standard measurements during the present report period were declared to be outliers and were flagged. Details are given in Table H, which also includes flagging information for the period of the first report. These outliers were found in the $\delta^{13}C$ record. The $\delta^{18}O$ record was not inspected separately for outliers, although the $\delta^{18}O$ values for the flagged $\delta^{13}C$ measurements were also flagged. Neither $\delta^{13}C$ nor $\delta^{18}O$ from flagged data were used in the calculation of daily correction terms.

Figure 10 shows plots of the final daily correction terms for atmospheric data ("Air terms") and for oceanic data ("Sea terms"), for both $\delta^{13}C$ and $\delta^{18}O$. Figures 11 and 12 show the daily corrected data for each of the six standards. Comparison to Figures 3 and 4 demonstrate clearly that the correction scheme has removed the drift feature from the data.

Long-Term Stability of Atmospheric Standards

The three original atmospheric secondary standards, consisting of natural-air gases stored in high pressure cylinders, have been in use since March, 1991. During this period of use, samples of CO_2 gas extracted from the standards have been archived in order to check for stability at later times. These archived samples are listed in the summary of standard gas "fills" in Table C(1). When a number of these archived samples from the same standard are analyzed on the same day on the mass spectrometer, the results afford an estimate of the "real" stability of the standard, since all applied corrections are the same for an individual day of analysis. Such stability check experiments have been performed several times. The most definitive experiment was the most recent one, performed in January, 2000. The $\delta^{13}C$ and $\delta^{18}O$ data are plotted in Figure 13.

For each of the standards, ten extractions made between 1993 and 1999 were analyzed on a single day. Extractions made before 1998 were done on the manual extraction line; those in 1998 and 1999 on the automated extraction line. No distinction is made between the two sets of data in the analysis of the results to follow. The samples were analyzed as "unknowns." Their values were not used to determine the air terms for the analysis days, and hence do not appear in the tabular summaries of this report. The extractions of standard 75635 were measured on 25 January 2000; of 39382, on 26 January, 2000; and of 75859, on 27 January 2000. For all three standards, extractions from Fill No. 21 made in late April 1994 were rejected as they all were offset by approximately 0.07‰ more negative than the averages. For standard

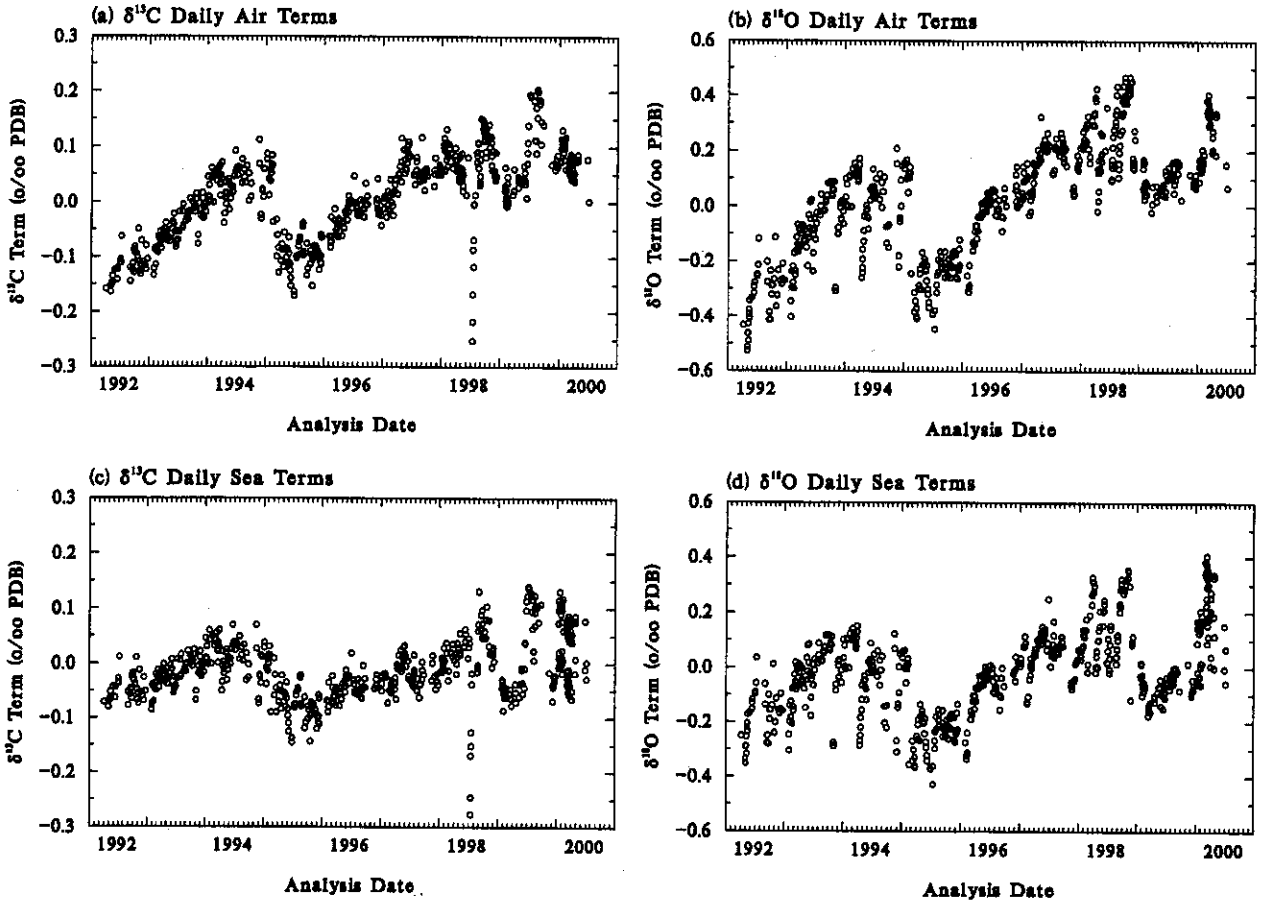


Figure 10. Daily air and sea terms for $\delta^{13}C$ and $\delta^{18}O$. Air correction terms are the differences of atmospheric secondary standard measurements (merged relative to 39382) from the 1994 NBS assigned value for 39382. (a) is a plot of $\delta^{13}C$ differences averaged daily, and (b) is a plot of $\delta^{18}O$ differences averaged daily. The air terms are from Table J(1) of this report and Table J of Bollenbacher *et al.* [2000]. Sea correction terms are the differences of oceanic secondary standard measurements (merged relative to GS19) from the 1994 NBS assigned value for GS19. (c) is a plot of $\delta^{13}C$ differences averaged daily, and (d) is a plot of $\delta^{18}O$ differences averaged daily. The daily sea terms are from Table J(2) of this report and Table J of Bollenbacher *et al.* [2000]. The arrow indicates the division between reporting periods.

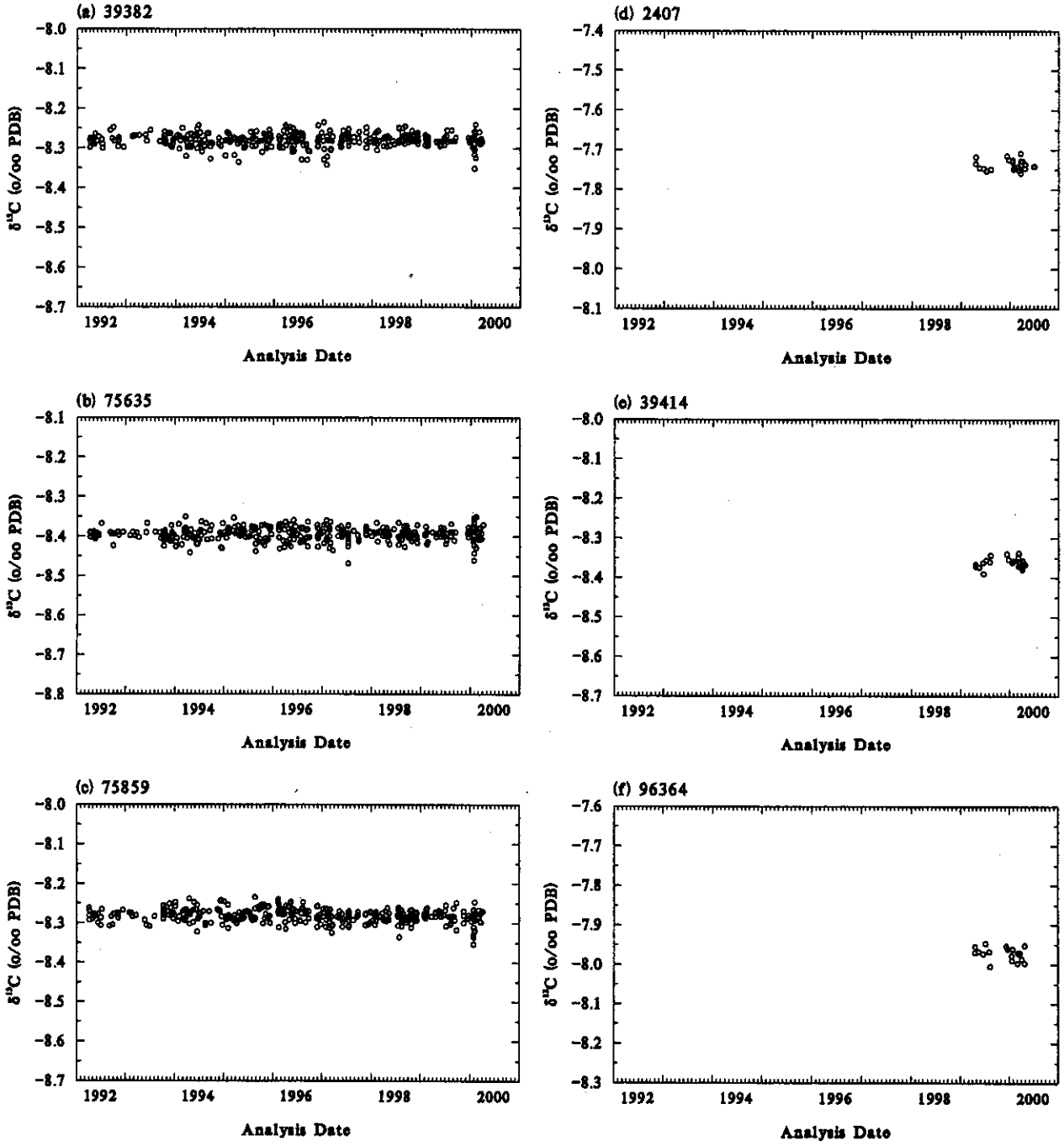


Figure 11a. NBS- and "daily-corrected" $\delta^{13}C$ measurements of natural-air ("atmospheric") secondary standards. Compare with Figure 3a. These plots show the same data as Figure 3a, but corrected for daily machine variations using the air terms. Data are from Table D(1) of this report and Table D of Bollenbacher *et al.* [2000]. The arrow indicates the division between reporting periods.

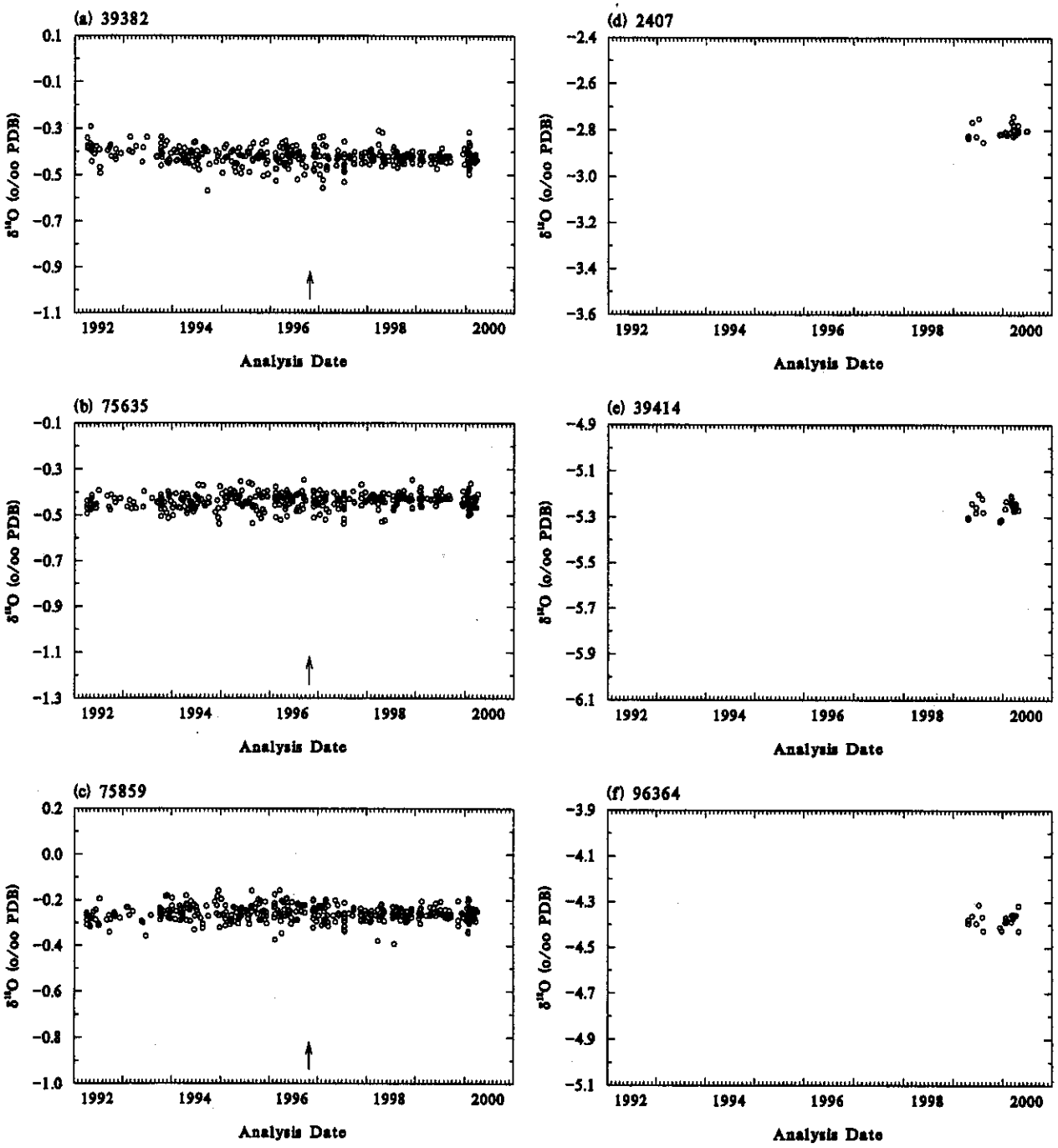


Figure 11b. NBS- and "daily-corrected" $\delta^{18}O$ measurements of natural-air ("atmospheric") secondary standards. Compare with Figure 3b. Data are plotted as in Figure 11a.

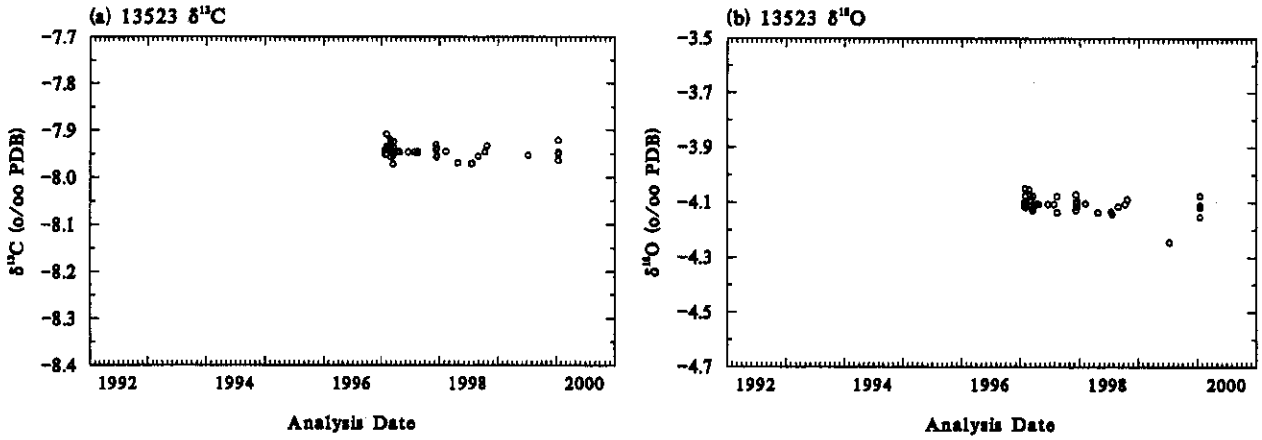


Figure 11c. NBS- and "daily-corrected" $\delta^{13}C$ and $\delta^{18}O$ measurements of bulk natural-air ("atmospheric") secondary standard 13523. Compare with Figure 3c. These plots show the same data as Figure 3c, but corrected for daily machine variations using the air terms. Data are from Table D(1).

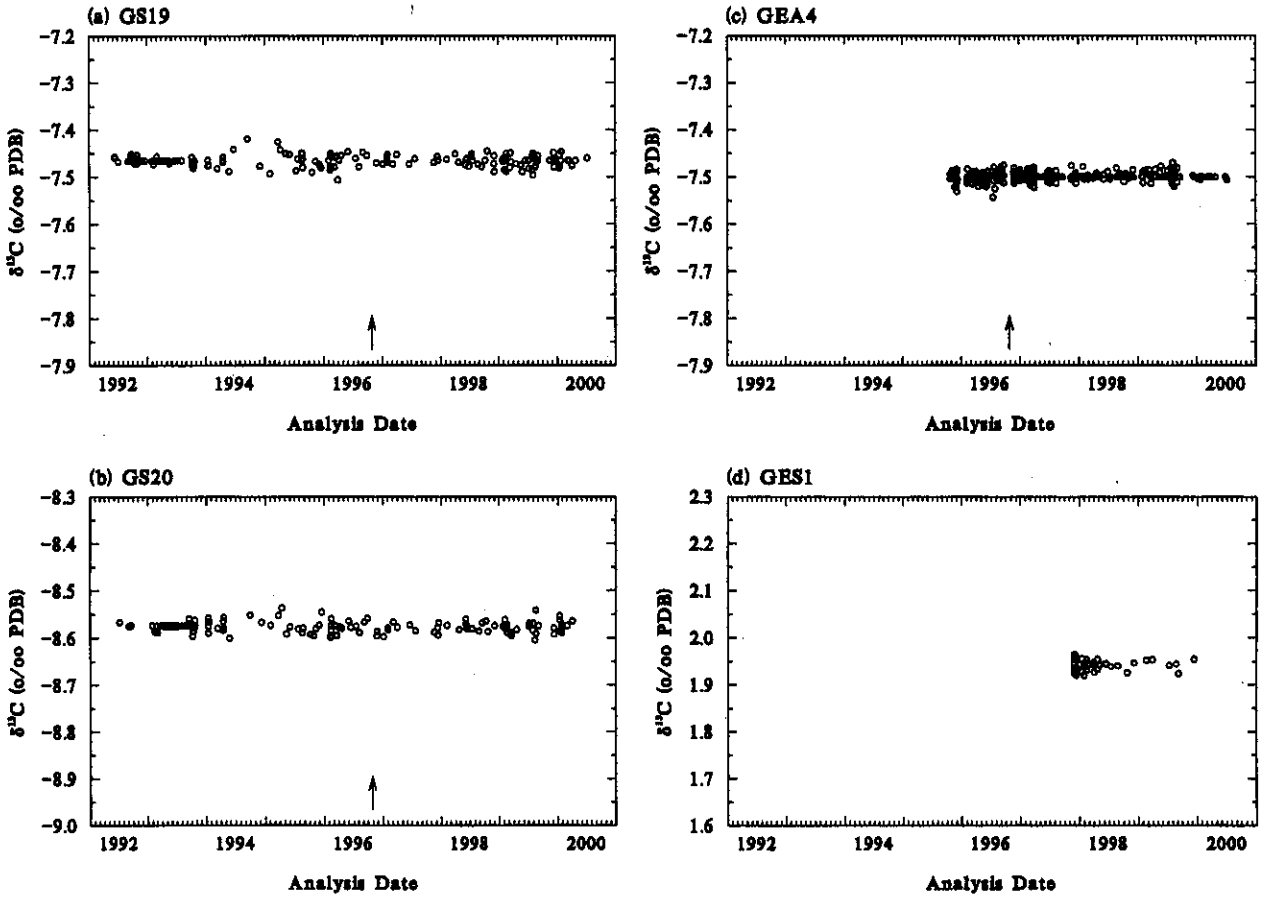


Figure 12a. NBS- and "daily-corrected" $\delta^{13}C$ measurements of pure CO_2 ("oceanic") secondary standards. Compare with Figure 4a. These plots show the same data as Figure 4a, but corrected for daily machine variations using the sea terms. Data are from Table D(2) of this report and Table B of Bollenbacher *et al.* [2000]. The arrow indicates the division between reporting periods.

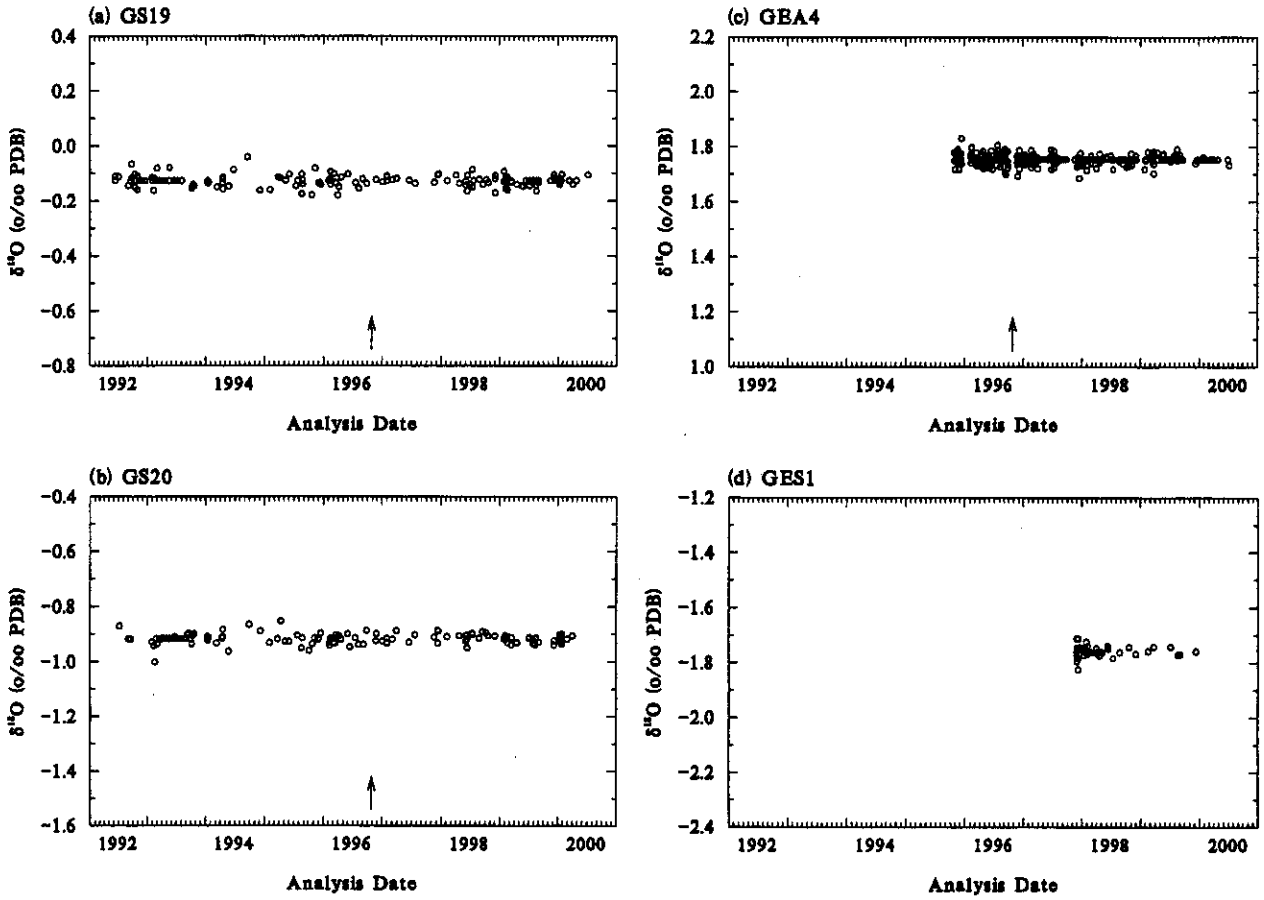


Figure 12b. NBS- and "daily-corrected" $\delta^{18}O$ measurements of pure CO_2 ("oceanic") secondary standards. Compare with Figure 4b. Data are plotted as in Figure 12a.

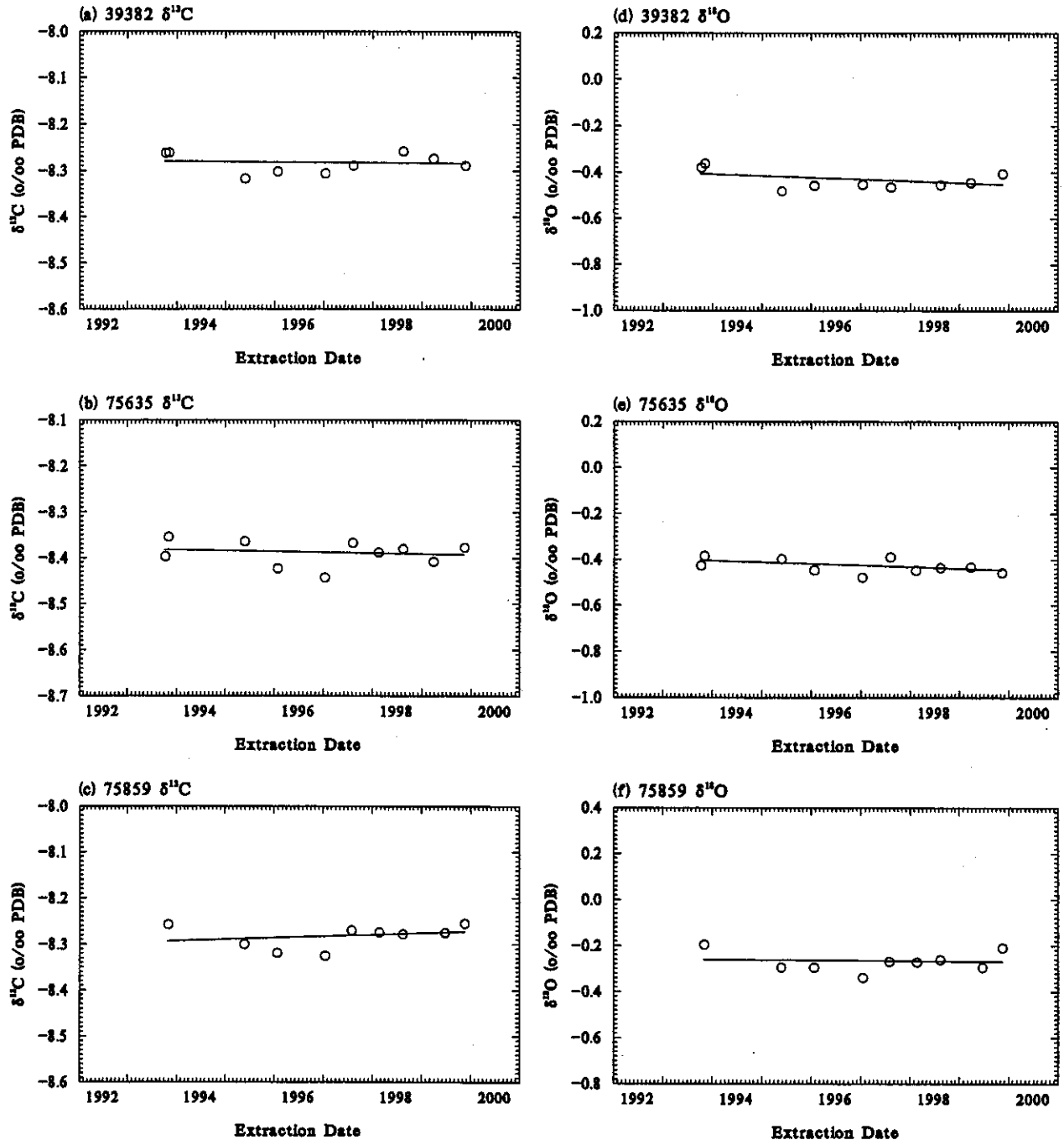


Figure 13. Stability check of the three original atmospheric secondary standards. In order to check for real changes in $\delta^{13}C$ and $\delta^{18}O$, ten archived samples extracted from each of the steel cylinders over a period of six years were analyzed on the same day, January 25, 26, or 27, 2000. Results are plotted here as NBS- and "daily corrected" values. (a), (b), and (c) plot $\delta^{13}C$ data versus dates of extraction. (d), (e), and (f) plot $\delta^{18}O$ data versus dates of extraction. The lines are linear fits to the data.

39382, an additional extraction, from Fill No. 54 extracted in February, 1998, was rejected since the $\delta^{18}O$ value was offset 0.18‰ more positive than the average.

The plots in Figure 13 display excellent stability in $\delta^{13}C$ over a period of six years. The following table summarizes the averages and standard deviations of the data shown in Figure 13 and also tabulates the slopes of linear fits to the data.

Stability of Atmospheric Secondary Standards (January, 2000 - Figure 13)

Cyl. No.		No.	Av. (‰)	s_i (‰)	Slope (‰/year)
39382	$\delta^{13}C$	9	−8.282	0.022	−0.0007
	$\delta^{18}O$	9	−0.429	0.041	−0.007
75635	$\delta^{13}C$	10	−8.388	0.028	−0.002
	$\delta^{18}O$	10	−0.425	0.031	−0.007
75859	$\delta^{13}C$	9	−8.282	0.025	+0.003
	$\delta^{18}O$	9	−0.266	0.045	−0.002

Summary of Corrections

The following steps comprise the sequence of corrections applied to measurements of the stable carbon and oxygen isotopes of natural-air samples made on the VG Prism II mass spectrometer during the period of the present report.

(1) Original data are δ45/44 and δ46/44 mass ratios with reference to the machine standard MW1. See page 4 of this report.

(2) The NBS calibration equations determined in January, 1997 are applied to the original data and then the values are converted to $\delta^{13}C$ and $\delta^{18}O$ using the Craig corrections. See pages 2 to 4 of this report.

(3) The daily air terms for $\delta^{13}C$ and $\delta^{18}O$ determined as described in this report are added. These corrections are defined relative to the 1994 NBS calibration; therefore, this step essentially converts the values to the 1994 standard. See Table G(1) for the

daily air terms.

(4) The values are corrected to the CIO standard by adding –0.112‰ for $\delta^{13}C$ and –0.109‰ for $\delta^{18}O$. See the section entitled "CIO vs. SIO Isotopic Data" in Bollenbacher *et al.* [2001].

(5) Finally, the N_2O correction is added, as discussed in Bollenbacher *et al.* [2001].

For measurements of the stable carbon and oxygen isotopes in extractions of CO_2 gas from sea water samples, the sequence of corrections is as listed above, except that the appropriate daily sea terms are added in step (3), as listed in Table G(2) of this report, and steps (4) and (5) are omitted.

Future Plans

Subsequent to the period of this report, the laboratory began use of the Micromass Inc. (formerly VG Instrument Inc.) Optima dual-inlet stable isotope ratio mass spectrometer located in the T43 instrument laboratory at SIO. A new "machine" standard reference gas, with a $\delta^{13}C$ signature close to that of natural air, is being used on this instrument. However, we continue to measure the atmospheric and oceanic secondary standards. These measurements will provide the continuity between these new measurements on a new instrument and the previous measurements on the VG Prism II. A third report in this series will describe and summarize the calibration of the new measurements.

Acknowledgments

The authors wish to acknowledge the contributions of additional personnel to this work. In Dr. Wahlen's group, Dr. Bruce Deck was responsible for the maintenance of the VG Prism II mass spectrometer and for the preparation of NBS 19 standard. In the Carbon Dioxide Research Group, Guy Emanuele, David Moss, and David Stow contributed to the preparation of secondary standards. Kathryne Piper did the word processing.

References

Bollenbacher, A. F., P. R. Guenther, C. D. Keeling, E. F. Stewart, M. Wahlen, and T. P. Whorf, Calibration methodology for the Scripps $^{13}C/^{12}C$ and $^{18}O/^{16}O$ stable isotope program, 1992-1996, *SIO Reference Series*, No. 01-2, 2001.

TABLE A(1): Data for 1997 Calibration of VG Prism II Mass Spectrometer with NBS 16, NBS 17, and NBS 19.

Standard No.	National Institute of Science and Technology Stable Carbon Isotopic Standard No., NBS 19, NBS 17, or NBS 16.
Batch No.	For NBS 19, the chronological number of the preparation batch of CO2 gas from the standard carbonate, performed in the Wahlen laboratory.
NBS Assignments	Assigned values of the standards, for d13C and d18O (Craig-corrected reduced isotopic ratio) and d45/44 and d46/44 (non-Craig-corrected reduced isotopic ratio).
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
SIO Measured Values	Measured values of the standards, for d13C and d18O (Craig-corrected reduced isotopic ratio) and d45/44 and d46/44 (non-Craig-corrected reduced isotopic ratio), with reference to the assigned value of the machine standard MW1.

TABLE A(1): Data for 1997 Calibration of VG Prism II Mass Spectrometer with NBS 16, NBS 17, and NBS 19

Standard No.	Batch No.	NBS Assignments d13C	NBS Assignments d18O	NBS Assignments d45/44	NBS Assignments d46/44	Date of Analysis	SIO Measured Values d13C	SIO Measured Values d18O	SIO Measured Values d45/44	SIO Measured Values d46/44
NBS 19	11	1.912	-2.239	1.720	-2.233	970128	+1.928	-2.210	1.736	-2.204
NBS 19	11					970128	+1.900	-2.203	1.710	-2.197
NBS 19	11					970128	+1.895	-2.209	1.705	-2.203
NBS 19	10					970128	+1.886	-2.237	1.696	-2.230
NBS 19	10					970128	+1.888	-2.216	1.698	-2.210
NBS 19	10					970129	+1.937	-2.244	1.744	-2.237
NBS 19	10					970129	+1.938	-2.205	1.746	-2.198
NBS 19	11					970130	+1.946	-2.253	1.751	-2.247
NBS 19	11					970130	+1.932	-2.253	1.739	-2.247
NBS 19	10					970131	+1.926	-2.263	1.732	-2.256
NBS 19	10					970131	+1.930	-2.262	1.736	-2.255
Average (of 11)				1.720	-2.233				1.727	-2.226
Standard deviation									0.020	0.024
NBS 17		-4.41	-18.71	-4.723	-18.701	970129	-4.472	-18.652	-4.780	-18.643
NBS 17						970129	-4.491	-18.628	-4.796	-18.619
NBS 17						970129	-4.475	-18.667	-4.783	-18.658
NBS 17						970129	-4.485	-18.676	-4.792	-18.666
NBS 17						970129	-4.477	-18.615	-4.783	-18.606
NBS 17						970129	-4.464	-18.624	-4.770	-18.615
NBS 17						970129	-4.488	-18.614	-4.793	-18.605
NBS 17						970129	-4.475	-18.590	-4.780	-18.580
Average (of 8)				-4.723	-18.701				-4.785	-18.624
Standard deviation									0.009	0.029
NBS 16		-41.48	-36.09	-39.996	-36.141	940119	-41.761	-35.919	-40.256	-35.971
NBS 16						940119	-41.762	-35.952	-40.258	-36.004
NBS 16						940119	-41.734	-35.940	-40.231	-35.992
NBS 16						940120	-41.753	-35.909	-40.248	-35.961
NBS 16						940120	-41.736	-35.907	-40.232	-35.959
NBS 16						940120	-41.735	-35.883	-40.230	-35.935
Average (of 6)				-39.996	-36.141				-40.243	-35.970
Standard deviation									0.013	0.025

TABLE A(2): NBS 3 Point Calibration (1997): Confirmation

Standard No.	National Institute of Science and Technology Stable Carbon Isotopic Standard No., NBS 19, NBS 17, or NBS 16.
Batch No.	For NBS 19, the chronological number of the preparation batch of CO2 gas from the standard carbonate, performed in the Wahlen laboratory.
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
(Craig) Measured	Reduced isotopic ratios d13C and d18O, as measured and Craig-corrected.
NBS Corrected d45/44 d46/44	Application of the average correction from the calibration to each measurement of d45/44 and d46/44.
NBS Corrected d13C d18O	Craig correction applied to each measurement.
d13C term	Daily d13C correction term. See text, page 24, and Table G(2).
daily d13C	NBS-corrected d13C plus daily d13C correction term.
d18O term	Daily d18O correction term. See text, page 24, and Table G(2).
daily d18O	NBS-corrected d18O plus daily d18O correction term.

TABLE A(2): NBS 3 Point Calibration (1997): Confirmation

Standard No.	Batch No.	Date of Analysis	(Craig) ---Measured---- d13C	d18O	NBS ----Corrected---- d45/44	d46/44	NBS ----Corrected---- d13C	d18O	d13C term	daily d13C	d18O term	daily d18O
NBS 19	11	970128	+1.928	-2.210	+1.743	-2.207	+1.936	-2.214	-0.017	+1.919	+0.079	-2.135
NBS 19	11	970128	+1.900	-2.203	+1.717	-2.200	+1.908	-2.207	-0.017	+1.891	+0.079	-2.128
NBS 19	11	970128	+1.895	-2.209	+1.713	-2.206	+1.903	-2.213	-0.017	+1.886	+0.079	-2.134
NBS 19	10	970128	+1.886	-2.237	+1.703	-2.235	+1.894	-2.241	-0.017	+1.877	+0.079	-2.162
NBS 19	10	970128	+1.888	-2.216	+1.706	-2.213	+1.896	-2.220	-0.017	+1.879	+0.079	-2.141
NBS 19	10	970129	+1.937	-2.244	+1.751	-2.241	+1.945	-2.248	-0.019	+1.926	+0.080	-2.168
NBS 19	10	970129	+1.938	-2.205	+1.753	-2.202	+1.946	-2.209	-0.019	+1.927	+0.080	-2.129
NBS 19	11	970130	+1.946	-2.253	+1.759	-2.250	+1.954	-2.257	-0.025	+1.929	+0.117	-2.140
NBS 19	11	970130	+1.932	-2.253	+1.746	-2.250	+1.940	-2.257	-0.025	+1.915	+0.117	-2.140
NBS 19	10	970131	+1.926	-2.263	+1.740	-2.261	+1.934	-2.267	-0.023	+1.911	+0.091	-2.176
NBS 19	10	970131	+1.930	-2.262	+1.744	-2.260	+1.938	-2.266	-0.023	+1.915	+0.091	-2.175
								Average (of 11)		+1.907		-2.148
								Assigned Value		+1.912		-2.239
NBS 17		970128	-4.472	-18.652	-4.734	-18.726	-4.421	-18.736	-0.017	-4.438	+0.079	-18.657
NBS 17		970128	-4.491	-18.628	-4.751	-18.702	-4.440	-18.712	-0.017	-4.457	+0.079	-18.633
NBS 17		970129	-4.475	-18.667	-4.738	-18.741	-4.424	-18.751	-0.019	-4.443	+0.080	-18.671
NBS 17		970129	-4.485	-18.676	-4.747	-18.750	-4.434	-18.760	-0.019	-4.453	+0.080	-18.680
NBS 17		970130	-4.477	-18.615	-4.738	-18.689	-4.426	-18.699	-0.025	-4.451	+0.117	-18.582
NBS 17		970130	-4.464	-18.624	-4.726	-18.698	-4.413	-18.708	-0.025	-4.438	+0.117	-18.591
NBS 17		970131	-4.488	-18.614	-4.748	-18.688	-4.437	-18.698	-0.023	-4.460	+0.091	-18.607
NBS 17		970131	-4.475	-18.590	-4.735	-18.664	-4.424	-18.673	-0.023	-4.447	+0.091	-18.582
								Average (of 8)		-4.448		-18.625
								Assigned Value		-4.41		-18.71
NBS 16		970128	-41.761	-35.919	-40.004	-36.139	-41.489	-36.088	-0.017	-41.506	+0.079	-36.009
NBS 16		970128	-41.762	-35.952	-40.006	-36.172	-41.490	-36.121	-0.017	-41.507	+0.079	-36.042
NBS 16		970129	-41.734	-35.940	-39.980	-36.160	-41.462	-36.109	-0.019	-41.481	+0.080	-36.029
NBS 16		970129	-41.753	-35.909	-39.996	-36.129	-41.481	-36.078	-0.019	-41.500	+0.080	-35.998
NBS 16		970131	-41.736	-35.907	-39.981	-36.127	-41.464	-36.076	-0.023	-41.487	+0.091	-35.985
NBS 16		970131	-41.735	-35.883	-39.979	-36.102	-41.463	-36.051	-0.023	-41.486	+0.091	-35.960
								Average (of 6)		-41.494		-36.004
								Assigned Value		-41.48		-36.09

TABLE B(1) (B(2)): Summary of Atmospheric (Oceanic) Secondary Standards, 1997 NBS Calibration.

Standard No.	Designated number of atmospheric (oceanic) secondary standard.
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
Measured d13C d18O	Measured (and Craig-corrected) reduced isotopic ratio, with reference to machine standard MW1.
NBS corrected d13 d18O	Application of 1997 NBS calibration to data.
d13C daily term d13C	Daily d13C correction term and its addition to NBS-corrected data. See text, page 24, and Table G(1) (G(2)).
d18O daily term d18O	Daily d18O correction term and its addition to NBS-corrected data. See text, page 24, and Table G(1) (G(2)).
N2O corrected d13C d18O	Application of N2O correction for Atmospheric Secondary Standards (Table B(1)). See Bollenbacher et al., [2001], page 33.

TABLE B(1): Summary of Atmospheric Secondary Standards, 1997 NBS Calibration

Standard No.	Date of Analysis	--Measured--- d13C	d180	NBS --corrected-- d13C	d180	d13C term	daily d13C	d18O term	daily d180	N2O corrected d13C	d180
13523	970128	-8.016	-4.191	-7.950	-4.204	+0.012	-7.938	+0.102	-4.102	-7.728	-3.788
13523	970128	-8.030	-4.194	-7.964	-4.207	+0.012	-7.952	+0.102	-4.105	-7.742	-3.791
13523	970129	-7.994	-4.192	-7.928	-4.205	+0.021	-7.907	+0.158	-4.047	-7.697	-3.733
13523	970129	-8.025	-4.216	-7.959	-4.230	+0.021	-7.938	+0.158	-4.072	-7.728	-3.757
13523	970130	-8.003	-4.189	-7.937	-4.202	-0.012	-7.949	+0.109	-4.093	-7.739	-3.779
13523	970130	-7.994	-4.210	-7.928	-4.224	-0.012	-7.940	+0.109	-4.115	-7.730	-3.800
13523	970131	-7.995	-4.193	-7.929	-4.206	-0.005	-7.934	+0.111	-4.095	-7.724	-3.781
13523	970131	-7.994	-4.173	-7.928	-4.186	-0.005	-7.933	+0.111	-4.075	-7.723	-3.760
							---		---		
				Average (of 8)			-7.936		-4.088		
				Standard deviation			0.014		0.022		
				Assigned Value			-7.945		-4.104		
75635	970129	-8.498	-0.605	-8.430	-0.601	+0.021	-8.409	+0.158	-0.443	-8.203	-0.133
75635	970129	-8.446	-0.566	-8.379	-0.562	+0.021	-8.358	+0.158	-0.404	-8.151	-0.094
75635	970131	-8.431	-0.521	-8.364	-0.517	-0.005	-8.369	+0.111	-0.406	-8.163	-0.096
75635	970131	-8.465	-0.572	-8.398	-0.568	-0.005	-8.403	+0.111	-0.457	-8.196	-0.147
							---		---		
				Average (of 4)			-8.385		-0.428		
				Standard deviation			0.025		0.027		
				Assigned Value			-8.388		-0.425		
39382	970129	-8.358	-0.531	-8.291	-0.527	+0.021	-8.270	+0.158	-0.369	-8.063	-0.057
39382	970129	-8.429	-0.716	-8.362	-0.713	+0.021	-8.341	+0.158	-0.555	-8.134	-0.243
39382	970131	-8.383	-0.635	-8.316	-0.631	-0.005	-8.321	+0.111	-0.520	-8.114	-0.209
39382	970131	-8.340	-0.449	-8.273	-0.444	-0.005	-8.278	+0.111	-0.333	-8.071	-0.022
							---		---		
				Average (of 4)			-8.302		-0.444		
				Standard deviation			0.034		0.110		
				Assigned Value			-8.281		-0.418		
75859	970129	-8.350	-0.388	-8.283	-0.383	+0.021	-8.262	+0.158	-0.225	-8.055	+0.086
75859	970129	-8.397	-0.472	-8.330	-0.467	+0.021	-8.309	+0.158	-0.309	-8.102	+0.002
75859	970131	-8.325	-0.348	-8.259	-0.343	-0.005	-8.264	+0.111	-0.232	-8.056	+0.080
75859	970131	-8.352	-0.424	-8.285	-0.419	-0.005	-8.290	+0.111	-0.308	-8.083	+0.003
							---		---		
				Average (of 4)			-8.281		-0.268		
				Standard deviation			0.022		0.046		
				Assigned Value			-8.282		-0.266		

TABLE B(2): Summary of Oceanic Secondary Standards, 1997 NBS Calibration

Standard No.	Date of Analysis	---Measured---- d13C	d180	NBS ---corrected---- d13C	d180	d13C term	daily d13C	d180 term	daily d180
GS19	970129	-7.500	-0.193	-7.438	-0.187	-0.019	-7.457	+0.080	-0.107
GS19	970129	-7.510	-0.213	-7.448	-0.207	-0.019	-7.467	+0.080	-0.127
GS19	970131	-7.490	-0.223	-7.428	-0.217	-0.023	-7.451	+0.091	-0.126
GS19	970131	-7.502	-0.208	-7.440	-0.202	-0.023	-7.463	+0.091	-0.111
				Average (of 4)			-7.460		-0.118
				Standard deviation			0.007		0.010
				Assigned Value			-7.464		-0.125
GS20	970129	-8.629	-0.995	-8.561	-0.993	-0.019	-8.580	+0.080	-0.913
GS20	970129	-8.626	-1.010	-8.558	-1.008	-0.019	-8.577	+0.080	-0.928
GS20	970131	-8.626	-1.006	-8.558	-1.004	-0.023	-8.581	+0.091	-0.913
GS20	970131	-8.623	-1.024	-8.555	-1.022	-0.023	-8.578	+0.091	-0.931
				Average (of 4)			-8.579		-0.921
				Standard deviation			0.002		0.010
				Assigned Value			-8.573		-0.915
GEA4	970129	-7.539	+1.657	-7.478	+1.672	-0.019	-7.497	+0.080	+1.752
GEA4	970129	-7.538	+1.660	-7.477	+1.675	-0.019	-7.496	+0.080	+1.755
GEA4	970130	-7.541	+1.615	-7.480	+1.630	-0.025	-7.505	+0.117	+1.747
GEA4	970130	-7.529	+1.633	-7.468	+1.648	-0.025	-7.493	+0.117	+1.765
				Average (of 4)			-7.498		+1.755
				Standard deviation			0.005		0.008
				Assigned Value			-7.499		+1.756

TABLE C(1) (C(2)): Summary of Original (New) Atmospheric Secondary Standards by FILL No.

Sample No.	Number assigned to extracted sample. Separate consecutively-numbered series for each year.
Shpt. No.	"Shipment No." A consecutive number assigned to sets of samples (standards and natural atmospheric and oceanic) analyzed on the mass spectrometer each week. ARC refers to samples archived for later stability tests.
Fill No.	Each fill consists of sets of six extractions from each atmospheric natural-air secondary standard (stored as whole air in high-pressure cylinders). There are two consecutively numbered series, one for the original three atmospheric secondary standards (Table C(1)) and one for the three new standards (Table C(2)).
Tube No.	Extraction order for each standard of each fill (numbered 1 to 6).
Cylinder No.	Designated (cylinder) number of atmospheric secondary standard.
Extraction Date	Date of extraction of sample from standard.
Measured d13C d18O	Craig-corrected (but not NBS- or daily-corrected) reduced isotopic ratios of measurement. One extraction from each fill of each cylinder is archived.
Date of Analysis	Date of measurement of sample on mass spectrometer.

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K96-853	163	44	1	75635	12NOV96	-8.508	-0.584	27NOV96
K96-854	193	44	2	75635	12NOV96	.	.	09JUL97
K96-855	163	44	3	75635	12NOV96	-8.450	-0.472	26NOV96
K96-856	162	44	4	75635	12NOV96	-8.472	-0.501	25NOV96
K96-857	163	44	5	75635	12NOV96	-8.481	-0.534	26NOV96
K96-858	162	44	6	75635	12NOV96	-8.444	-0.457	21NOV96
K96-859	163	44	1	39382	18NOV96	-8.382	-0.559	27NOV96
K96-860	163	44	2	39382	18NOV96	-8.348	-0.506	26NOV96
K96-861	193	44	3	39382	18NOV96	-8.392	-0.607	10JUL97
K96-862	162	44	4	39382	18NOV96	-8.313	-0.454	25NOV96
K96-863	162	44	5	39382	18NOV96	-8.347	-0.540	22NOV96
K96-864	162	44	6	39382	18NOV96	-8.369	-0.540	21NOV96
K96-865	ARC	44	1	75859	11NOV96	.	.	
K96-866	164	44	2	75859	11NOV96	-8.328	-0.239	02DEC96
K96-867	163	44	3	75859	11NOV96	-8.293	-0.256	27NOV96
K96-868	162	44	4	75859	11NOV96	-8.381	-0.403	25NOV96
K96-869	162	44	5	75859	11NOV96	-8.361	-0.310	21NOV96
K96-870	163	44	6	75859	11NOV96	-8.337	-0.305	26NOV96
K96-871	169	45	1	75635	25NOV96	-8.496	-0.625	10JAN97
K96-872	169	45	2	75635	25NOV96	-8.449	-0.518	10JAN97
K96-873	169	45	3	75635	25NOV96	-8.443	-0.528	09JAN97
K96-874	193	45	4	75635	25NOV96	-8.584	-0.661	09JUL97
K96-875	167	45	5	75635	25NOV96	-8.444	-0.480	03JAN97
K96-876	166	45	6	75635	25NOV96	-8.436	-0.472	18DEC96
K96-877	169	45	1	39382	19NOV96	-8.358	-0.555	09JAN97
K96-878	168	45	2	39382	19NOV96	-8.308	-0.490	07JAN97
K96-879	295	45	3	39382	19NOV96	-8.499	-0.682	02FEB00
K96-880	168	45	4	39382	19NOV96	-8.403	-0.648	07JAN97
K96-881	167	45	5	39382	19NOV96	-8.350	-0.452	04JAN97
K96-882	166	45	6	39382	19NOV96	-8.286	-0.420	20DEC96
K96-883	169	45	1	75859	22NOV96	-8.352	-0.360	10JAN97
K96-884	169	45	2	75859	22NOV96	-8.318	-0.322	09JAN97
K96-885	168	45	3	75859	22NOV96	-8.339	-0.310	06JAN97
K96-886	296	45	4	75859	22NOV96	-8.454	-0.391	03FEB00
K96-887	166	45	5	75859	22NOV96	-8.327	-0.317	20DEC96
K96-888	166	45	6	75859	22NOV96	-8.320	-0.259	18DEC96

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K97- 5	175	46	1	75635	09JAN97	-8.462	-0.447	20FEB97
K97- 6	175	46	2	75635	09JAN97	-8.484	-0.465	20FEB97
K97- 7	175	46	3	75635	09JAN97	-8.542	-0.548	20FEB97
K97- 8	294	46	4	75635	09JAN97	-8.611	-0.637	26JAN00
K97- 9	172	46	5	75635	09JAN97	-8.465	-0.572	31JAN97
K97- 10	171	46	6	75635	09JAN97	-8.498	-0.605	29JAN97
K97- 11	177	46	1	39382	13JAN97	-8.367	-0.582	07MAR97
K97- 12	175	46	2	39382	13JAN97	-8.534	-0.843	21FEB97
K97- 13	172	46	3	39382	13JAN97	-8.383	-0.635	31JAN97
K97- 14	171	46	4	39382	13JAN97	-8.429	-0.716	29JAN97
K97- 15	174	46	5	39382	13JAN97	-8.334	-0.395	13FEB97
K97- 16	294	46	6	39382	13JAN97	-8.472	-0.583	25JAN00
K97- 17	171	46	1	75859	14JAN97	-8.397	-0.472	29JAN97
K97- 18	175	46	2	75859	14JAN97	-8.339	-0.224	21FEB97
K97- 19	294	46	3	75859	14JAN97	-8.492	-0.499	27JAN00
K97- 20	174	46	4	75859	14JAN97	-8.389	-0.344	14FEB97
K97- 21	174	46	5	75859	14JAN97	-8.392	-0.306	14FEB97
K97- 22	172	46	6	75859	14JAN97	-8.352	-0.424	31JAN97
K97- 73	176	47	1	75635	20FEB97	-8.499	-0.601	28FEB97
K97- 74	176	47	2	75635	20FEB97	-8.478	-0.518	28FEB97
K97- 75	176	47	3	75635	20FEB97	-8.444	-0.461	27FEB97
K97- 76	ARC	47	4	75635	20FEB97	.	.	
K97- 77	175	47	5	75635	20FEB97	-8.450	-0.413	21FEB97
K97- 78	175	47	6	75635	20FEB97	-8.498	-0.505	21FEB97
K97- 79	176	47	1	39382	19FEB97	-8.343	-0.510	28FEB97
K97- 80	176	47	2	39382	19FEB97	-8.363	-0.505	28FEB97
K97- 81	177	47	3	39382	19FEB97	-8.609	-0.892	07MAR97
K97- 82	ARC	47	4	39382	19FEB97	.	.	
K97- 83	175	47	5	39382	19FEB97	-8.322	-0.363	21FEB97
K97- 84	176	47	6	39382	19FEB97	-8.386	-0.532	27FEB97
K97- 85	178	47	1	75859	18FEB97	-8.372	-0.359	12MAR97
K97- 86	176	47	2	75859	18FEB97	-8.325	-0.243	28FEB97
K97- 87	176	47	3	75859	18FEB97	-8.379	-0.338	27FEB97
K97- 88	175	47	4	75859	18FEB97	-8.379	-0.292	21FEB97
K97- 89	176	47	5	75859	18FEB97	-8.339	-0.254	28FEB97
K97- 90	ARC	47	6	75859	18FEB97	.	.	

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K97-124	186	48	1	75635	18MAR97	-8.519	-0.627	15MAY97
K97-125	186	48	2	75635	18MAR97	-8.591	-0.768	16MAY97
K97-126	187	48	3	75635	18MAR97	-8.590	-0.781	20MAY97
K97-127	193	48	4	75635	18MAR97	-8.532	-0.641	09JUL97
K97-128	184	48	5	75635	18MAR97	-8.563	-0.730	25APR97
K97-129	184	48	6	75635	18MAR97	-8.583	-0.780	25APR97
K97-130	185	48	1	39382	19MAR97	-8.453	-0.690	09MAY97
K97-131	187	48	2	39382	19MAR97	-8.523	-0.736	20MAY97
K97-132	186	48	3	39382	19MAR97	-8.441	-0.646	15MAY97
K97-133	193	48	4	39382	19MAR97	-8.387	-0.598	10JUL97
K97-134	187	48	5	39382	19MAR97	-8.409	-0.667	20MAY97
K97-135	186	48	6	39382	19MAR97	-8.401	-0.642	16MAY97
K97-136	184	48	1	75859	17MAR97	-8.387	-0.443	24APR97
K97-137	185	48	2	75859	17MAR97	-8.432	-0.432	09MAY97
K97-138	180	48	3	75859	17MAR97	-8.410	-0.354	18MAR97
K97-139	ARC	48	4	75859	17MAR97	.	.	
K97-140	185	48	5	75859	17MAR97	-8.448	-0.525	09MAY97
K97-141	180	48	6	75859	17MAR97	-8.414	-0.444	18MAR97
K97-236	187	49	1	75635	19MAY97	-8.522	-0.656	21MAY97
K97-237	188	49	2	75635	19MAY97	-8.558	-0.680	28MAY97
K97-238	189	49	3	75635	19MAY97	-8.540	-0.654	03JUN97
K97-239	187	49	4	75635	19MAY97	-8.527	-0.667	22MAY97
K97-240	190	49	5	75635	19MAY97	-8.566	-0.697	06JUN97
K97-241	ARC	49	6	75635	19MAY97	.	.	
K97-242	187	49	1	39382	20MAY97	-8.405	-0.643	21MAY97
K97-243	187	49	2	39382	20MAY97	-8.394	-0.611	22MAY97
K97-244	ARC	49	3	39382	20MAY97	.	.	
K97-245	189	49	4	39382	20MAY97	-8.416	-0.631	04JUN97
K97-246	190	49	5	39382	20MAY97	-8.447	-0.652	05JUN97
K97-247	188	49	6	39382	20MAY97	-8.394	-0.630	29MAY97
K97-248	189	49	1	75859	27MAY97	-8.444	-0.471	04JUN97
K97-249	190	49	2	75859	27MAY97	-8.459	-0.500	05JUN97
K97-250	ARC	49	3	75859	27MAY97	.	.	
K97-251	188	49	4	75859	27MAY97	-8.437	-0.430	28MAY97
K97-252	188	49	5	75859	27MAY97	-8.447	-0.468	29MAY97
K97-253	189	49	6	75859	27MAY97	-8.444	-0.475	03JUN97

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K97-443	207	50	1	75635	05AUG97	-8.518	-0.578	16DEC97
K97-444	294	50	2	75635	05AUG97	-8.535	-0.548	26JAN00
K97-445	201	50	3	75635	05AUG97	-8.510	-0.602	16SEP97
K97-446	207	50	4	75635	05AUG97	-8.520	-0.573	16DEC97
K97-447	207	50	5	75635	05AUG97	-8.518	-0.536	16DEC97
K97-448	198	50	6	75635	05AUG97	-8.508	-0.617	18AUG97
K97-449	198	50	1	39382	08AUG97	-8.377	-0.618	19AUG97
K97-450	198	50	2	39382	08AUG97	-8.405	-0.607	18AUG97
K97-451	210	50	3	39382	08AUG97	-8.446	-0.640	15JAN98
K97-452	294	50	4	39382	08AUG97	-8.455	-0.594	25JAN00
K97-453	210	50	5	39382	08AUG97	-8.435	-0.617	15JAN98
K97-454	201	50	6	39382	08AUG97	-8.388	-0.657	16SEP97
K97-455	201	50	1	75859	29JUL97	-8.372	-0.448	15SEP97
K97-456	201	50	2	75859	29JUL97	-8.409	-0.435	17SEP97
K97-457	198	50	3	75859	29JUL97	-8.397	-0.450	19AUG97
K97-458	208	50	4	75859	29JUL97	-8.413	-0.464	23DEC97
K97-459	208	50	5	75859	29JUL97	-8.386	-0.421	23DEC97
K97-460	294	50	6	75859	29JUL97	-8.437	-0.429	27JAN00
K97-521	204	51	1	75635	07AUG97	-8.544	-0.461	21NOV97
K97-522	253	51	2	75635	07AUG97	-8.483	-0.502	02DEC98
K97-523	204	51	3	75635	07AUG97	-8.501	-0.471	18NOV97
K97-524	204	51	4	75635	07AUG97	-8.493	-0.412	18NOV97
K97-525	202	51	5	75635	07AUG97	-8.537	-0.657	25SEP97
K97-526	202	51	6	75635	07AUG97	-8.529	-0.653	24SEP97
K97-527	204	51	1	39382	11SEP97	-8.366	-0.455	18NOV97
K97-528	204	51	2	39382	11SEP97	-8.417	-0.469	18NOV97
K97-529	202	51	3	39382	11SEP97	-8.414	-0.668	26SEP97
K97-530	253	51	4	39382	11SEP97	-8.401	-0.606	02DEC98
K97-531	202	51	5	39382	11SEP97	-8.383	-0.612	25SEP97
K97-532	202	51	6	39382	11SEP97	-8.396	-0.641	24SEP97
K97-533	202	51	1	75859	12SEP97	-8.407	-0.450	26SEP97
K97-534	202	51	2	75859	12SEP97	-8.392	-0.456	24SEP97
K97-535	204	51	3	75859	12SEP97	-8.422	-0.284	18NOV97
K97-536	204	51	4	75859	12SEP97	-8.396	-0.297	18NOV97
K97-537	204	51	5	75859	12SEP97	-8.422	-0.336	21NOV97
K97-538	253	51	6	75859	12SEP97	-8.388	-0.409	02DEC98

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K97-614	204	52	1	75635	060CT97	-8.512	-0.501	18NOV97
K97-615	204	52	2	75635	060CT97	-8.500	-0.502	18NOV97
K97-616	209	52	3	75635	060CT97	-8.528	-0.652	30DEC97
K97-617	ARC	52	4	75635	060CT97	.	.	
K97-618	210	52	5	75635	060CT97	-8.562	-0.641	14JAN98
K97-619	210	52	6	75635	060CT97	-8.573	-0.703	16JAN98
K97-620	204	52	1	39382	030CT97	-8.379	-0.466	18NOV97
K97-621	204	52	2	39382	030CT97	-8.400	-0.496	18NOV97
K97-622	ARC	52	3	39382	030CT97	.	.	
K97-623	206	52	4	39382	030CT97	-8.406	-0.593	11DEC97
K97-624	206	52	5	39382	030CT97	-8.398	-0.635	11DEC97
K97-625	210	52	6	39382	030CT97	-8.453	-0.677	15JAN98
K97-626	ARC	52	1	75859	29SEP97	.	.	
K97-627	204	52	2	75859	29SEP97	-8.423	-0.310	18NOV97
K97-628	204	52	3	75859	30SEP97	-8.423	-0.336	18NOV97
K97-629	206	52	4	75859	30SEP97	-8.419	-0.427	09DEC97
K97-630	209	52	5	75859	30SEP97	-8.401	-0.478	30DEC97
K97-631	210	52	6	75859	30SEP97	-8.458	-0.478	15JAN98
K98- 34	213	53	1	75635	24JAN98	-8.541	-0.744	06FEB98
K98- 35	213	53	2	75635	24JAN98	-8.522	-0.717	05FEB98
K98- 36	212	53	3	75635	24JAN98	-8.567	-0.705	29JAN98
K98- 37	ARC	53	4	75635	24JAN98	.	.	
K98- 38	216	53	5	75635	24JAN98	-8.543	-0.601	26FEB98
K98- 39	214	53	6	75635	24JAN98	-8.586	-0.739	13FEB98
K98- 40	212	53	1	39382	27JAN98	-8.454	-0.721	29JAN98
K98- 41	ARC	53	2	39382	27JAN98	.	.	
K98- 42	214	53	3	39382	27JAN98	-8.429	-0.769	13FEB98
K98- 43	213	53	4	39382	27JAN98	-8.461	-0.731	05FEB98
K98- 44	213	53	5	39382	27JAN98	-8.439	-0.717	06FEB98
K98- 45	212	53	6	39382	27JAN98	-8.405	-0.628	28JAN98
K98- 46	213	53	1	75859	26JAN98	-8.426	-0.529	04FEB98
K98- 47	212	53	2	75859	26JAN98	-8.482	-0.559	30JAN98
K98- 48	ARC	53	3	75859	26JAN98	.	.	
K98- 49	213	53	4	75859	26JAN98	-8.403	-0.488	04FEB98
K98- 50	212	53	5	75859	26JAN98	-8.448	-0.534	28JAN98
K98- 51	213	53	6	75859	26JAN98	-8.427	-0.566	06FEB98

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A98- 25	216	54	1	75635	13FEB98	-8.531	-0.589	25FEB98
A98- 26	294	54	2	75635	13FEB98	-8.556	-0.606	26JAN00
A98- 27	218	54	3	75635	13FEB98	-8.550	-0.795	24MAR98
A98- 28	216	54	4	75635	13FEB98	-8.546	-0.623	26FEB98
A98- 29	218	54	5	75635	13FEB98	-8.543	-0.813	26MAR98
A98- 30	219	54	6	75635	13FEB98	-8.534	-0.821	01APR98
A98- 31	216	54	1	39382	11FEB98	-8.408	-0.431	26FEB98
A98- 32	215	54	2	39382	11FEB98	-8.447	-0.633	18FEB98
A98- 33	218	54	3	39382	11FEB98	-8.420	-0.608	25MAR98
A98- 34	222	54	4	39382	11FEB98	-8.422	-0.380	22APR98
A98- 35	218	54	5	39382	11FEB98	-8.460	-0.708	26MAR98
A98- 36	294	54	6	39382	11FEB98	-8.445	-0.389	25JAN00
A98- 37	217	54	1	75859	20FEB98	-8.411	-0.585	11MAR98
A98- 38	218	54	2	75859	20FEB98	-8.425	-0.587	24MAR98
A98- 39	218	54	3	75859	20FEB98	-8.433	-0.677	25MAR98
A98- 40	294	54	4	75859	20FEB98	-8.441	-0.431	27JAN00
A98- 41	222	54	5	75859	20FEB98	-8.383	-0.392	23APR98
A98- 42	217	54	6	75859	20FEB98	-8.412	-0.568	11MAR98
A98- 52	222	55	1	75635	31MAR98	-8.549	-0.588	22APR98
A98- 53	222	55	2	75635	31MAR98	-8.530	-0.564	21APR98
A98- 54	221	55	3	75635	31MAR98	-8.502	-0.568	16APR98
A98- 55	219	55	4	75635	31MAR98	-8.796	-1.268	01APR98
A98- 56	219	55	5	75635	31MAR98	-8.528	-0.830	01APR98
A98- 57	222	55	6	75635	31MAR98	-8.485	-0.613	23APR98
A98- 58	221	55	1	39382	14FEB98	-8.402	-0.591	17APR98
A98- 59	219	55	2	39382	14FEB98	-8.397	-0.814	02APR98
A98- 60	222	55	3	39382	14FEB98	-8.374	-0.598	23APR98
A98- 61	295	55	4	39382	14FEB98	-8.414	-0.583	02FEB00
A98- 62	223	55	5	39382	14FEB98	-8.413	-0.574	29APR98
A98- 63	220	55	6	39382	14FEB98	-8.415	-0.831	08APR98
A98- 64	220	55	1	75859	31MAR98	-8.437	-0.716	08APR98
A98- 65	221	55	2	75859	31MAR98	-8.375	-0.354	17APR98
A98- 66	222	55	3	75859	31MAR98	-8.446	-0.418	21APR98
A98- 67	295	55	4	75859	31MAR98	-8.425	-0.393	01FEB00
A98- 68	219	55	5	75859	31MAR98	-8.416	-0.671	02APR98
A98- 69	223	55	6	75859	31MAR98	-8.382	-0.408	30APR98

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A98-114	229	56	1	75635	24APR98	-8.249	-0.538	14JUL98
A98-115	225	56	2	75635	24APR98	-8.484	-0.613	11MAY98
A98-116	223	56	3	75635	24APR98	-8.533	-0.577	30APR98
A98-117	ARC	56	4	75635	24APR98	.	.	
A98-118	224	56	5	75635	24APR98	-8.524	-0.594	07MAY98
A98-119	223	56	6	75635	27APR98	-8.517	-0.531	29APR98
A98-120	ARC	56	1	39382	27APR98	.	.	
A98-121	224	56	2	39382	27APR98	-8.437	-0.691	04MAY98
A98-122	224	56	3	39382	27APR98	-8.401	-0.631	07MAY98
A98-123	229	56	4	39382	27APR98	-8.096	-0.498	14JUL98
A98-124	226	56	5	39382	27APR98	-8.362	-0.628	03JUN98
A98-125	225	56	6	39382	27APR98	-8.381	-0.620	12MAY98
A98-108	231	56	1	75859	24APR98	-8.232	-0.415	19JUL98
A98-109	230	56	2	75859	24APR98	-8.286	-0.436	16JUL98
A98-110	231	56	3	75859	24APR98	-8.329	-0.450	20JUL98
A98-111	229	56	4	75859	24APR98	-8.130	-0.365	14JUL98
A98-112	225	56	5	75859	24APR98	-8.361	-0.422	11MAY98
A98-113	ARC	56	6	75859	24APR98	.	.	
A98-150	225	57	1	75635	05MAY98	-8.507	-0.691	13MAY98
A98-151	227	57	2	75635	05MAY98	-8.530	-0.770	12JUN98
A98-152	231	57	3	75635	05MAY98	-8.468	-0.684	20JUL98
A98-153	230	57	4	75635	05MAY98	-8.346	-0.574	16JUL98
A98-154	230	57	5	75635	05MAY98	-8.420	-0.652	17JUL98
A98-155	ARC	57	6	75635	05MAY98	.	.	
A98-138	230	57	1	39382	04MAY98	-8.249	-0.556	17JUL98
A98-139	ARC	57	2	39382	04MAY98	.	.	
A98-140	229	57	3	39382	04MAY98	-8.185	-0.558	15JUL98
A98-141	229	57	4	39382	04MAY98	-8.095	-0.519	13JUL98
A98-142	227	57	5	39382	04MAY98	-8.438	-0.801	12JUN98
A98-143	224	57	6	39382	04MAY98	-8.380	-0.578	06MAY98
A98-144	229	57	1	75859	05MAY98	-8.178	-0.329	15JUL98
A98-145	231	57	2	75859	05MAY98	-8.324	-0.492	21JUL98
A98-146	ARC	57	3	75859	05MAY98	.	.	
A98-147	224	57	4	75859	05MAY98	-8.398	-0.382	06MAY98
A98-148	230	57	5	75859	05MAY98	-8.281	-0.432	17JUL98
A98-149	225	57	6	75859	05MAY98	-8.377	-0.462	12MAY98

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A98-281	232	58	1	75635	03AUG98	-8.539	-0.737	06AUG98
A98-282	234	58	2	75635	03AUG98	-8.561	-0.783	10AUG98
A98-283	236	58	3	75635	03AUG98	-8.564	-0.843	13AUG98
A98-284	233	58	4	75635	03AUG98	-8.538	-0.785	07AUG98
A98-285	ARC	58	5	75635	03AUG98	.	.	
A98-286	235	58	6	75635	03AUG98	-8.564	-0.787	11AUG98
A98-275	232	58	1	39382	03AUG98	-8.437	-0.739	05AUG98
A98-276	ARC	58	2	39382	03AUG98	.	.	
A98-277	234	58	3	39382	03AUG98	-8.412	-0.741	10AUG98
A98-278	232	58	4	39382	03AUG98	-8.412	-0.735	06AUG98
A98-279	235	58	5	39382	03AUG98	-8.428	-0.771	12AUG98
A98-280	236	58	6	39382	03AUG98	-8.459	-0.820	13AUG98
A98-287	233	58	1	75859	04AUG98	-8.413	-0.586	07AUG98
A98-288	234	58	2	75859	04AUG98	-8.423	-0.579	11AUG98
A98-289	ARC	58	3	75859	04AUG98	.	.	
A98-290	232	58	4	75859	04AUG98	-8.442	-0.544	05AUG98
A98-291	235	58	5	75859	04AUG98	-8.453	-0.627	12AUG98
A98-292	236	58	6	75859	04AUG98	-8.481	-0.641	14AUG98
A98-308	294	59	1	75635	12AUG98	-8.548	-0.594	26JAN00
A98-309	236	59	2	75635	12AUG98	-8.569	-0.824	14AUG98
A98-310	237	59	3	75635	12AUG98	-8.519	-0.866	16AUG98
A98-311	238	59	4	75635	12AUG98	-8.488	-0.561	27AUG98
A98-312	237	59	5	75635	12AUG98	-8.496	-0.540	24AUG98
A98-313	240	59	6	75635	12AUG98	-8.583	-0.652	01SEP98
A98-302	236	59	1	39382	11AUG98	-8.423	-0.878	14AUG98
A98-303	238	59	2	39382	11AUG98	-8.403	-0.599	27AUG98
A98-304	294	59	3	39382	11AUG98	-8.424	-0.584	25JAN00
A98-305	238	59	4	39382	11AUG98	-8.375	-0.565	26AUG98
A98-306	239	59	5	39382	11AUG98	-8.419	-0.630	28AUG98
A98-307	240	59	6	39382	11AUG98	-8.401	-0.647	01SEP98
A98-314	237	59	1	75859	12AUG98	-8.373	-0.376	24AUG98
A98-315	232	59	2	75859	12AUG98	-8.415	-0.676	27JUL98
A98-316	237	59	3	75859	12AUG98	.	.	16AUG98
A98-317	239	59	4	75859	12AUG98	-8.435	-0.458	28AUG98
A98-318	238	59	5	75859	12AUG98	-8.399	-0.405	26AUG98
A98-319	294	59	6	75859	12AUG98	-8.445	-0.421	27JAN00

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A98-386	242	60	1	75635	03SEP98	-8.597	-0.813	17SEP98
A98-387	242	60	2	75635	03SEP98	-8.607	-0.754	15SEP98
A98-388	241	60	3	75635	03SEP98	-8.574	-0.688	14SEP98
A98-389	243	60	4	75635	03SEP98	-8.567	-0.827	22SEP98
A98-390	243	60	5	75635	03SEP98	-8.572	-0.867	24SEP98
A98-391	ARC	60	6	75635	03SEP98	.	.	
A98-392	ARC	60	1	39382	03SEP98	.	.	
A98-393	242	60	2	39382	03SEP98	-8.469	-0.788	16SEP98
A98-394	243	60	3	39382	04SEP98	-8.462	-0.806	23SEP98
A98-395	243	60	4	39382	04SEP98	-8.472	-0.862	24SEP98
A98-396	243	60	5	39382	03SEP98	-8.469	-0.785	21SEP98
A98-397	242	60	6	39382	04SEP98	-8.495	-0.761	15SEP98
A98-380	240	60	1	75859	28AUG98	-8.458	-0.525	02SEP98
A98-381	241	60	2	75859	28AUG98	-8.499	-0.570	14SEP98
A98-382	243	60	3	75859	28AUG98	-8.482	-0.591	21SEP98
A98-383	ARC	60	4	75859	28AUG98	.	.	
A98-384	243	60	5	75859	28AUG98	-8.479	-0.660	23SEP98
A98-385	242	60	6	75859	28AUG98	-8.501	-0.576	16SEP98
A98-458	244	61	1	75635	29SEP98	-8.552	-0.816	30SEP98
A98-459	245	61	2	75635	29SEP98	-8.591	-0.899	03OCT98
A98-460	313	61	3	75635	29SEP98	-8.474	-0.699	11SEP00
A98-461	244	61	4	75635	29SEP98	-8.560	-0.852	01OCT98
A98-462	246	61	5	75635	29SEP98	-8.584	-0.826	15OCT98
A98-463	247	61	6	75635	29SEP98	-8.620	-0.854	21OCT98
A98-464	244	61	1	39382	30SEP98	-8.416	-0.845	30SEP98
A98-465	244	61	2	39382	30SEP98	-8.429	-0.911	01OCT98
A98-466	246	61	3	39382	30SEP98	-8.462	-0.797	14OCT98
A98-467	247	61	4	39382	30SEP98	-8.451	-0.840	22OCT98
A98-468	313	61	5	39382	30SEP98	-8.348	-0.671	11SEP00
A98-469	247	61	6	39382	30SEP98	-8.464	-0.850	21OCT98
A98-452	244	61	1	75859	29SEP98	-8.462	-0.646	29SEP98
A98-453	247	61	2	75859	29SEP98	-8.494	-0.691	21OCT98
A98-454	313	61	3	75859	29SEP98	-8.342	-0.534	11SEP00
A98-455	246	61	4	75859	29SEP98	-8.446	-0.663	15OCT98
A98-456	247	61	5	75859	29SEP98	-8.496	-0.727	22OCT98
A98-457	244	61	6	75859	29SEP98	-8.443	-0.725	01OCT98

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A98-510	249	62	1	75635	05NOV98	-8.541	-0.861	05NOV98
A98-511	252	62	2	75635	05NOV98	-8.513	-0.579	24NOV98
A98-512	250	62	3	75635	05NOV98	-8.530	-0.890	09NOV98
A98-513	256	62	4	75635	05NOV98	-8.481	-0.573	27JAN99
A98-514	257	62	5	75635	05NOV98	-8.492	-0.565	28JAN99
A98-515	ARC	62	6	75635	05NOV98	.	.	
A98-516	250	62	1	39382	05NOV98	-8.392	-0.862	09NOV98
A98-517	252	62	2	39382	05NOV98	-8.406	-0.600	23NOV98
A98-518	252	62	3	39382	05NOV98	-8.391	-0.595	24NOV98
A98-519	ARC	62	4	39382	05NOV98	.	.	
A98-520	256	62	5	39382	05NOV98	-8.380	-0.576	27JAN99
A98-521	250	62	6	39382	05NOV98	-8.416	-0.893	06NOV98
A98-504	249	62	1	75859	19OCT98	-8.468	-0.680	03NOV98
A98-505	ARC	62	2	75859	19OCT98	.	.	
A98-506	249	62	3	75859	19OCT98	-8.463	-0.667	04NOV98
A98-507	249	62	4	75859	19OCT98	-8.452	-0.706	04NOV98
A98-508	248	62	5	75859	19OCT98	-8.468	-0.697	26OCT98
A98-509	248	62	6	75859	19OCT98	-8.433	-0.659	26OCT98
A98-553	251	63	1	75635	10NOV98	-8.550	-0.884	16NOV98
A98-554	253	63	2	75635	10NOV98	-8.511	-0.601	01DEC98
A98-555	ARC	63	3	75635	10NOV98	.	.	
A98-556	253	63	4	75635	10NOV98	-8.509	-0.572	30NOV98
A98-557	253	63	5	75635	10NOV98	-8.519	-0.623	02DEC98
A98-558	253	63	6	75635	10NOV98	-8.529	-0.626	02DEC98
A98-559	254	63	1	39382	23NOV98	-8.396	-0.668	07DEC98
A98-560	254	63	2	39382	23NOV98	-8.439	-0.700	03DEC98
A98-561	253	63	3	39382	23NOV98	-8.397	-0.565	25NOV98
A98-562	253	63	4	39382	23NOV98	-8.369	-0.595	01DEC98
A98-563	253	63	5	39382	23NOV98	-8.380	-0.604	02DEC98
A98-564	ARC	63	6	39382	23NOV98	.	.	
A98-547	253	63	1	75859	06NOV98	-8.393	-0.418	01DEC98
A98-548	253	63	2	75859	06NOV98	-8.405	-0.433	02DEC98
A98-549	253	63	3	75859	06NOV98	-8.379	-0.404	30NOV98
A98-550	ARC	63	4	75859	06NOV98	.	.	
A98-551	251	63	5	75859	06NOV98	-8.336	-0.535	16NOV98
A98-552	257	63	6	75859	06NOV98	-8.375	-0.354	28JAN99

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A98-586	259	64	1	75635	04DEC98	-8.458	-0.521	03FEB99
A98-587	259	64	2	75635	04DEC98	-8.459	-0.465	03FEB99
A98-588	257	64	3	75635	04DEC98	-8.488	-0.498	28JAN99
A98-589	ARC	64	4	75635	04DEC98	.	.	
A98-590	258	64	5	75635	04DEC98	-8.492	-0.568	29JAN99
A98-591	260	64	6	75635	04DEC98	-8.503	-0.519	13FEB99
A98-592	260	64	1	39382	04DEC98	-8.359	-0.511	06FEB99
A98-593	258	64	2	39382	04DEC98	-8.374	-0.629	29JAN99
A98-594	259	64	3	39382	04DEC98	-8.352	-0.587	02FEB99
A98-595	256	64	4	39382	04DEC98	-8.355	-0.547	27JAN99
A98-596	ARC	64	5	39382	04DEC98	.	.	
A98-597	259	64	6	39382	04DEC98	-8.333	-0.492	03FEB99
A98-598	257	64	1	75859	07DEC98	-8.366	-0.332	28JAN99
A98-599	259	64	2	75859	07DEC98	-8.349	-0.293	04FEB99
A98-600	259	64	3	75859	07DEC98	-8.378	-0.331	31JAN99
A98-601	ARC	64	4	75859	07DEC98	.	.	
A98-602	259	64	5	75859	07DEC98	-8.357	-0.275	04FEB99
A98-603	259	64	6	75859	07DEC98	-8.413	-0.431	30JAN99
A99- 53	260	65	1	75635	03FEB99	-8.521	-0.558	11FEB99
A99- 54	259	65	2	75635	03FEB99	-8.485	-0.486	05FEB99
A99- 55	ARC	65	3	75635	03FEB99	.	.	
A99- 56	260	65	4	75635	03FEB99	-8.449	-0.496	10FEB99
A99- 57	259	65	5	75635	03FEB99	-8.485	-0.509	05FEB99
A99- 58	259	65	6	75635	03FEB99	-8.464	-0.425	05FEB99
A99- 59	260	65	1	39382	05FEB99	-8.347	-0.496	09FEB99
A99- 60	260	65	2	39382	05FEB99	-8.370	-0.500	09FEB99
A99- 61	260	65	3	39382	05FEB99	-8.340	-0.505	10FEB99
A99- 62	260	65	4	39382	05FEB99	-8.361	-0.522	12FEB99
A99- 63	ARC	65	5	39382	05FEB99	.	.	
A99- 64	260	65	6	39382	05FEB99	-8.345	-0.499	10FEB99
A99- 47	260	65	1	75859	29JAN99	-8.352	-0.348	12FEB99
A99- 48	259	65	2	75859	29JAN99	-8.353	-0.334	04FEB99
A99- 49	ARC	65	3	75859	29JAN99	.	.	
A99- 50	260	65	4	75859	29JAN99	-8.374	-0.331	11FEB99
A99- 51	261	65	5	75859	29JAN99	-8.324	-0.257	17FEB99
A99- 52	260	65	6	75859	29JAN99	-8.365	-0.362	11FEB99

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A99- 80	268	66	1	75635	16FEB99	-8.502	-0.518	03JUN99
A99- 81	270	66	2	75635	16FEB99	-8.557	-0.483	17JUN99
A99- 82	268	66	3	75635	16FEB99	-8.491	-0.489	03JUN99
A99- 83	264	66	4	75635	16FEB99	-8.517	-0.505	25MAR99
A99- 84	ARC	66	5	75635	16FEB99	.	.	
A99- 85	261	66	6	75635	16FEB99	-8.478	-0.477	17FEB99
A99- 86	261	66	1	39382	17FEB99	-8.346	-0.491	17FEB99
A99- 87	266	66	2	39382	17FEB99	-8.384	-0.487	13MAY99
A99- 88	268	66	3	39382	17FEB99	-8.383	-0.559	02JUN99
A99- 89	261	66	4	39382	17FEB99	-8.340	-0.491	18FEB99
A99- 90	ARC	66	5	39382	17FEB99	.	.	
A99- 91	261	66	6	39382	17FEB99	-8.361	-0.526	18FEB99
A99- 74	268	66	1	75859	16FEB99	-8.382	-0.300	02JUN99
A99- 75	264	66	2	75859	16FEB99	-8.364	-0.255	19MAR99
A99- 76	264	66	3	75859	16FEB99	-8.371	-0.285	24MAR99
A99- 77	288	66	4	75859	16FEB99	-8.404	-0.327	15NOV99
A99- 78	265	66	5	75859	16FEB99	-8.392	-0.312	22APR99
A99- 79	ARC	66	6	75859	16FEB99	.	.	
A99-160	266	67	1	75635	25MAR99	-8.501	-0.504	17MAY99
A99-161	267	67	2	75635	25MAR99	-8.534	-0.465	27MAY99
A99-162	267	67	3	75635	25MAR99	-8.511	-0.528	27MAY99
A99-163	265	67	4	75635	25MAR99	-8.496	-0.510	21APR99
A99-164	294	67	5	75635	25MAR99	-8.576	-0.591	26JAN00
A99-165	265	67	6	75635	25MAR99	-8.499	-0.459	20APR99
A99-154	266	67	1	39382	24MAR99	-8.405	-0.523	17MAY99
A99-155	265	67	2	39382	24MAR99	-8.395	-0.469	19APR99
A99-156	267	67	3	39382	24MAR99	-8.397	-0.481	26MAY99
A99-157	265	67	4	39382	24MAR99	-8.391	-0.476	20APR99
A99-158	294	67	5	39382	24MAR99	-8.440	-0.573	25JAN00
A99-159	265	67	6	39382	24MAR99	-8.377	-0.505	21APR99
A99-166	265	67	1	75859	25MAR99	-8.380	-0.257	20APR99
A99-167	294	67	2	75859	25MAR99	.	.	27JAN00
A99-168	266	67	3	75859	25MAR99	-8.378	-0.307	17MAY99
A99-169	265	67	4	75859	25MAR99	-8.365	-0.340	21APR99
A99-170	267	67	5	75859	25MAR99	-8.379	-0.307	26MAY99
A99-171	268	67	6	75859	25MAR99	-8.404	-0.318	01JUN99

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A99-302	277	68	1	75635	28MAY99	-8.638	-0.482	09AUG99
A99-303	ARC	68	2	75635	28MAY99	.	.	
A99-304	292	68	3	75635	28MAY99	-8.518	-0.503	12JAN00
A99-305	273	68	4	75635	28MAY99	-8.652	-0.524	08JUL99
A99-306	282	68	5	75635	28MAY99	-8.663	-0.540	01SEP99
A99-307	289	68	6	75635	28MAY99	-8.516	-0.506	08DEC99
A99-314	273	68	1	39382	03JUN99	-8.515	-0.552	08JUL99
A99-315	ARC	68	2	39382	03JUN99	.	.	
A99-316	276	68	3	39382	03JUN99	-8.462	-0.587	03AUG99
A99-317	280	68	4	39382	03JUN99	-8.554	-0.591	19AUG99
A99-318	283	68	5	39382	03JUN99	-8.445	-0.602	09SEP99
A99-319	277	68	6	39382	03JUN99	-8.493	-0.501	09AUG99
A99-308	282	68	1	75859	28MAY99	-8.514	-0.407	01SEP99
A99-309	277	68	2	75859	28MAY99	-8.538	-0.297	09AUG99
A99-310	273	68	3	75859	28MAY99	-8.567	-0.374	08JUL99
A99-311	281	68	4	75859	28MAY99	-8.551	-0.440	20AUG99
A99-312	283	68	5	75859	28MAY99	-8.464	-0.406	09SEP99
A99-313	ARC	68	6	75859	28MAY99	.	.	
A99-332	271	69	1	75635	07JUN99	-8.604	-0.540	21JUN99
A99-333	293	69	2	75635	07JUN99	-8.611	-0.595	20JAN00
A99-334	283	69	3	75635	07JUN99	-8.603	-0.589	10SEP99
A99-335	280	69	4	75635	07JUN99	-8.663	-0.596	18AUG99
A99-336	278	69	5	75635	07JUN99	-8.548	-0.508	10AUG99
A99-337	270	69	6	75635	07JUN99	-8.537	-0.497	17JUN99
A99-320	269	69	1	39382	03JUN99	-8.419	-0.480	16JUN99
A99-321	270	69	2	39382	03JUN99	-8.448	-0.546	18JUN99
A99-322	293	69	3	39382	03JUN99	-8.469	-0.581	20JAN00
A99-323	270	69	4	39382	03JUN99	-8.467	-0.568	18JUN99
A99-324	269	69	5	39382	03JUN99	-8.357	-0.464	14JUN99
A99-325	271	69	6	39382	03JUN99	-8.484	-0.561	21JUN99
A99-326	288	69	1	75859	07JUN99	-8.434	-0.412	15NOV99
A99-327	275	69	2	75859	07JUN99	-8.535	-0.376	30JUL99
A99-328	293	69	3	75859	07JUN99	-8.453	-0.400	19JAN00
A99-329	282	69	4	75859	07JUN99	-8.536	-0.422	03SEP99
A99-330	278	69	5	75859	07JUN99	-8.482	-0.363	10AUG99
A99-331	271	69	6	75859	07JUN99	-8.485	-0.378	21JUN99

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A99-382	292	70	1	75635	21JUN99	-8.569	-0.576	14JAN00
A99-383	289	70	2	75635	21JUN99	-8.529	-0.542	09DEC99
A99-384	273	70	3	75635	21JUN99	-8.670	-0.531	07JUL99
A99-385	276	70	4	75635	21JUN99	-8.652	-0.553	02AUG99
A99-386	272	70	5	75635	21JUN99	-8.682	-0.537	02JUL99
A99-387	ARC	70	6	75635	21JUN99	.	.	
A99-370	ARC	70	1	39382	18JUN99	.	.	
A99-371	273	70	2	39382	18JUN99	-8.543	-0.532	07JUL99
A99-372	275	70	3	39382	18JUN99	-8.533	-0.538	29JUL99
A99-373	278	70	4	39382	18JUN99	-8.438	-0.566	11AUG99
A99-374	282	70	5	39382	18JUN99	-8.529	-0.588	02SEP99
A99-375	272	70	6	39382	18JUN99	-8.532	-0.544	02JUL99
A99-376	273	70	1	75859	21JUN99	-8.513	-0.355	07JUL99
A99-377	272	70	2	75859	21JUN99	-8.530	-0.348	02JUL99
A99-378	279	70	3	75859	21JUN99	-8.504	-0.373	17AUG99
A99-379	294	70	4	75859	21JUN99	-8.442	-0.454	27JAN00
A99-380	284	70	5	75859	21JUN99	-8.525	-0.304	23SEP99
A99-381	284	70	6	75859	21JUN99	-8.455	-0.294	23SEP99
A99-720	290	71	1	75635	12NOV99	-8.522	-0.498	15DEC99
A99-721	291	71	2	75635	12NOV99	-8.546	-0.547	22DEC99
A99-722	291	71	3	75635	12NOV99	-8.538	-0.547	22DEC99
A99-723	290	71	4	75635	12NOV99	-8.546	-0.561	15DEC99
A99-724	294	71	5	75635	12NOV99	-8.545	-0.616	26JAN00
A99-725	292	71	6	75635	12NOV99	-8.569	-0.611	14JAN00
A99-732	291	71	1	39382	16NOV99	-8.410	-0.553	20DEC99
A99-733	292	71	2	39382	16NOV99	-8.438	-0.584	13JAN00
A99-734	292	71	3	39382	16NOV99	-8.463	-0.541	13JAN00
A99-735	294	71	4	39382	16NOV99	-8.455	-0.535	25JAN00
A99-736	291	71	5	39382	16NOV99	-8.416	-0.487	20DEC99
A99-737	289	71	6	39382	16NOV99	-8.411	-0.504	09DEC99
A99-726	288	71	1	75859	16NOV99	-8.415	-0.435	15NOV99
A99-727	291	71	2	75859	16NOV99	-8.417	-0.334	21DEC99
A99-728	291	71	3	75859	16NOV99	-8.424	-0.348	21DEC99
A99-729	294	71	4	75859	16NOV99	-8.422	-0.369	27JAN00
A99-730	292	71	5	75859	16NOV99	-8.436	-0.383	12JAN00
A99-731	289	71	6	75859	16NOV99	-8.426	-0.351	09DEC99

ARC: Archived sample

TABLE C(1): Summary of Original Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A00-073	298	72	1	75635	07FEB00	-8.537	-0.853	01MAR00
A00-074	301	72	2	75635	07FEB00	-8.541	-0.818	08MAR00
A00-075	299	72	3	75635	07FEB00	-8.514	-0.812	03MAR00
A00-076	299	72	4	75635	07FEB00	-8.534	-0.793	02MAR00
A00-077	297	72	5	75635	07FEB00	-8.536	-0.558	10FEB00
A00-078	ARC	72	6	75635	07FEB00	.	.	
A00-067	299	72	1	39382	07FEB00	-8.414	-0.827	03MAR00
A00-068	ARC	72	2	39382	07FEB00	.	.	
A00-069	299	72	3	39382	07FEB00	-8.416	-0.822	03MAR00
A00-070	297	72	4	39382	07FEB00	-8.409	-0.614	11FEB00
A00-071	298	72	5	39382	07FEB00	-8.387	-0.803	01MAR00
A00-072	300	72	6	39382	07FEB00	-8.407	-0.802	07MAR00
A00-079	299	72	1	75859	08FEB00	-8.427	-0.594	02MAR00
A00-080	301	72	2	75859	08FEB00	-8.415	-0.658	09MAR00
A00-081	ARC	72	3	75859	08FEB00	.	.	
A00-082	300	72	4	75859	08FEB00	-8.383	-0.633	07MAR00
A00-083	298	72	5	75859	08FEB00	-8.415	-0.627	01MAR00
A00-084	300	72	6	75859	08FEB00	-8.419	-0.624	06MAR00
A00-143	302	73	1	75635	10MAR00	-8.532	-0.747	14MAR00
A00-144	ARC	73	2	75635	10MAR00	.	.	
A00-145	306	73	3	75635	10MAR00	-8.479	-0.609	03APR00
A00-146	304	73	4	75635	10MAR00	-8.500	-0.735	20MAR00
A00-147	302	73	5	75635	10MAR00	-8.557	-0.769	14MAR00
A00-148	304	73	6	75635	10MAR00	-8.528	-0.799	21MAR00
A00-137	301	73	1	39382	09MAR00	-8.435	-0.823	10MAR00
A00-138	301	73	2	39382	09MAR00	-8.426	-0.837	10MAR00
A00-139	303	73	3	39382	09MAR00	-8.429	-0.774	15MAR00
A00-140	303	73	4	39382	09MAR00	-8.417	-0.787	15MAR00
A00-141	305	73	5	39382	09MAR00	-8.404	-0.782	22MAR00
A00-142	ARC	73	6	39382	09MAR00	.	.	
A00-149	306	73	1	75859	10MAR00	-8.390	-0.509	04APR00
A00-150	305	73	2	75859	10MAR00	-8.401	-0.575	24MAR00
A00-151	ARC	73	3	75859	10MAR00	.	.	
A00-152	303	73	4	75859	10MAR00	-8.396	-0.606	16MAR00
A00-153	303	73	5	75859	10MAR00	-8.417	-0.577	16MAR00
A00-154	305	73	6	75859	10MAR00	-8.436	-0.641	23MAR00

ARC: Archived sample

TABLE C(2): Summary of New Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A99-184	265	01	1	39414	13APR99	-8.472	-5.308	20APR99
A99-185	266	01	2	39414	13APR99	-8.485	-5.290	17MAY99
A99-186	ARC	01	3	39414	13APR99	.	.	
A99-187	320	01	4	39414	13APR99	-8.445	-5.409	17NOV00
A99-188	265	01	5	39414	13APR99	-8.477	-5.302	20APR99
A99-189	320	01	6	39414	13APR99	-8.455	-5.432	17NOV00
A99-178	265	01	1	96364	14APR99	-8.058	-4.399	20APR99
A99-179	265	01	2	96364	14APR99	-8.073	-4.384	20APR99
A99-180	ARC	01	3	96364	14APR99	.	.	
A99-181	266	01	4	96364	14APR99	-8.077	-4.415	17MAY99
A99-182	320	01	5	96364	14APR99	-8.071	-4.541	17NOV00
A99-183	293	01	6	96364	14APR99	-8.166	-4.495	21JAN00
A99-172	265	01	1	2407	26MAR99	-7.837	-2.846	20APR99
A99-173	266	01	2	2407	26MAR99	-7.853	-2.827	17MAY99
A99-174	304	01	3	2407	26MAR99	-7.877	-3.147	21MAR00
A99-175	293	01	4	2407	26MAR99	-7.900	-2.941	21JAN00
A99-176	265	01	5	2407	26MAR99	-7.819	-2.837	20APR99
A99-177	ARC	01	6	2407	26MAR99	.	.	
A99-283	305	02	1	39414	26MAY99	-8.503	-5.584	24MAR00
A99-284	294	02	2	39414	26MAY99	-8.516	-5.369	27JAN00
A99-285	270	02	3	39414	26MAY99	-8.567	-5.371	18JUN99
A99-286	273	02	4	39414	26MAY99	-8.616	-5.322	07JUL99
A99-287	ARC	02	5	39414	26MAY99	.	.	
A99-288	269	02	6	39414	26MAY99	-8.500	-5.317	16JUN99
A99-277	273	02	1	96364	25MAY99	-8.204	-4.440	07JUL99
A99-278	320	02	2	96364	25MAY99	-8.050	-4.524	16NOV00
A99-279	ARC	02	3	96364	25MAY99	.	.	
A99-280	270	02	4	96364	25MAY99	-8.147	-4.511	18JUN99
A99-281	314	02	5	96364	25MAY99	-8.034	-4.457	17OCT00
A99-282	294	02	6	96364	25MAY99	-8.117	-4.521	27JAN00
A99-271	294	02	1	2407	25MAY99	-7.903	-2.960	27JAN00
A99-272	ARC	02	2	2407	25MAY99	.	.	
A99-273	270	02	3	2407	25MAY99	-7.919	-2.952	18JUN99
A99-274	309	02	4	2407	25MAY99	-7.807	-2.864	06JUL00
A99-275	273	02	5	2407	25MAY99	-8.009	-2.885	07JUL99
A99-276	314	02	6	2407	25MAY99	-7.821	-2.914	18OCT00

ARC: Archived sample

TABLE C(2): Summary of New Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A99-435	ARC	03	1	39414	14JUL99	.	.	
A99-436	291	03	2	39414	14JUL99	-8.492	-5.360	21DEC99
A99-437	277	03	3	39414	14JUL99	-8.583	-5.309	09AUG99
A99-438	276	03	4	39414	14JUL99	-8.542	-5.363	03AUG99
A99-439	289	03	5	39414	14JUL99	-8.478	-5.389	09DEC99
A99-440	293	03	6	39414	14JUL99	-8.538	-5.404	19JAN00
A99-429	276	03	1	96364	14JUL99	-8.229	-4.472	02AUG99
A99-430	ARC	03	2	96364	14JUL99	.	.	
A99-431	291	03	3	96364	14JUL99	-8.097	-4.477	21DEC99
A99-432	293	03	4	96364	14JUL99	-8.151	-4.533	19JAN00
A99-433	277	03	5	96364	14JUL99	-8.242	-4.461	09AUG99
A99-434	289	03	6	96364	14JUL99	-8.090	-4.485	09DEC99
A99-441	293	03	1	2407	20JUL99	-7.925	-2.968	20JAN00
A99-442	ARC	03	2	2407	20JUL99	.	.	
A99-443	289	03	3	2407	20JUL99	-7.850	-2.900	09DEC99
A99-444	291	03	4	2407	20JUL99	-7.874	-2.925	22DEC99
A99-445	295	03	5	2407	20JUL99	-7.885	-2.950	01FEB00
A99-446	277	03	6	2407	20JUL99	-7.984	-2.894	09AUG99
A00-055	303	04	1	39414	27JAN00	-8.480	-5.560	16MAR00
A00-056	300	04	2	39414	27JAN00	-8.489	-5.546	07MAR00
A00-057	299	04	3	39414	27JAN00	-8.484	-5.575	03MAR00
A00-058	301	04	4	39414	27JAN00	-8.477	-5.577	08MAR00
A00-059	301	04	5	39414	27JAN00	-8.492	-5.593	09MAR00
A00-060	ARC	04	6	39414	27JAN00	.	.	
A00-049	299	04	1	96364	26JAN00	-8.130	-4.757	03MAR00
A00-050	302	04	2	96364	26JAN00	-8.087	-4.650	13MAR00
A00-051	ARC	04	3	96364	26JAN00	.	.	
A00-052	302	04	4	96364	26JAN00	-8.125	-4.675	14MAR00
A00-053	305	04	5	96364	26JAN00	-8.090	-4.682	22MAR00
A00-054	300	04	6	96364	26JAN00	-8.103	-4.675	06MAR00
A00-061	299	04	1	2407	27JAN00	-7.874	-3.186	03MAR00
A00-062	305	04	2	2407	27JAN00	-7.864	-3.114	23MAR00
A00-063	304	04	3	2407	27JAN00	-7.827	-3.062	21MAR00
A00-064	ARC	04	4	2407	27JAN00	.	.	
A00-065	301	04	5	2407	27JAN00	-7.887	-3.105	08MAR00
A00-066	304	04	6	2407	27JAN00	-7.844	-3.094	20MAR00

ARC: Archived sample

TABLE C(2): Summary of New Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
A00-197	308	05	1	39414	28MAR00	-8.521	-5.588	26APR00
A00-198	ARC	05	2	39414	28MAR00	.	.	
A00-199	307	05	3	39414	28MAR00	-8.499	-5.507	06APR00
A00-200	307	05	4	39414	28MAR00	-8.508	-5.495	06APR00
A00-201	306	05	5	39414	28MAR00	-8.497	-5.497	04APR00
A00-202	306	05	6	39414	28MAR00	-8.490	-5.443	03APR00
A00-191	000	05	1	96364	24MAR00	.	.	
A00-192	ARC	05	2	96364	24MAR00	.	.	
A00-193	000	05	3	96364	24MAR00	.	.	
A00-194	308	05	4	96364	24MAR00	-8.138	-4.629	25APR00
A00-195	307	05	5	96364	24MAR00	-8.091	-4.549	05APR00
A00-196	308	05	6	96364	24MAR00	-8.093	-4.740	25APR00
A00-203	ARC	05	1	2407	29MAR00	.	.	
A00-204	308	05	2	2407	29MAR00	-7.889	-2.988	24APR00
A00-205	307	05	3	2407	29MAR00	-7.831	-3.017	05APR00
A00-206	308	05	4	2407	29MAR00	-7.887	-3.109	26APR00
A00-207	308	05	5	2407	29MAR00	-7.879	-2.977	24APR00
A00-208	309	05	6	2407	29MAR00	-7.884	-2.948	27JUN00

TABLE D(1) (D(2)): Complete Amospheric (Oceanic) Secondary Standards Data Summary (with adjustment to 39382 (GS19))

Date	Date of measurement on mass spectrometer.
Standard No.	Designated atmospheric (oceanic) secondary standard number.
Measured d13C d18O	Craig-corrected (but not NBS - or daily-corrected) reduced isotopic ratios.
NBS Corrected d13C d18O	NBS-corrected reduced isotopic ratio. See calibration equation, text, page 5.
Adjusted to 39382 (GS19) d13C d18O	Adjustment of NBS-corrected values using average offsets from 39382 (GS19). See Tables E and F and text, page 18.
AIR (SEA) Terms	Differences of individual adjusted values from assigned value of 39382 (GS19).
Week No.	Designated week number for measurements (corresponds to shipment number (Tables C(1), C(2))).

Flagged data are indicated with a #. See Table H. Data indicated with a "T" are early extractions of atmospheric secondary standards on the automated extraction line that were considered "tests" and hence are not listed in the fills in Tables C(1) and C(2). They were analyzed on the mass spectrometer and later accepted as good data.

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
21-Nov-96	39382	-8.369	-0.540	-8.302	-0.536	-8.302	-0.536	0.021	0.118	162
21-Nov-96	75635	-8.444	-0.457	-8.377	-0.452	-8.270	-0.445	-0.011	0.027	162
21-Nov-96	75859	-8.361	-0.310	-8.294	-0.305	-8.293	-0.457	0.012	0.039	162
22-Nov-96	39382	-8.347	-0.540	-8.280	-0.536	-8.280	-0.536	-0.001	0.118	162
25-Nov-96	75859	-8.381	-0.403	-8.314	-0.398	-8.313	-0.550	0.032	0.132	162
25-Nov-96	75635	-8.472	-0.501	-8.405	-0.497	-8.298	-0.490	0.017	0.072	162
25-Nov-96	39382	-8.313	-0.454	-8.247	-0.449	-8.247	-0.449	-0.034	0.031	162
26-Nov-96	75635	-8.481	-0.534	-8.414	-0.530	-8.307	-0.523	0.026	0.105	163
26-Nov-96	75635	-8.460	-0.486	-8.393	-0.481	-8.286	-0.474	0.005	0.056	163
26-Nov-96	75635	-8.434	-0.423	-8.367	-0.418	-8.260	-0.411	-0.021	-0.007	163
26-Nov-96	75859	-8.312	-0.227	-8.246	-0.221	-8.245	-0.373	-0.036	-0.045	163
26-Nov-96	75859	-8.310	-0.222	-8.244	-0.216	-8.243	-0.368	-0.038	-0.050	163
26-Nov-96	75859	-8.337	-0.305	-8.270	-0.300	-8.269	-0.452	-0.012	0.034	163
26-Nov-96	39382	-8.348	-0.506	-8.281	-0.502	-8.281	-0.502	0.000	0.084	163
26-Nov-96	39382	-8.332	-0.430	-8.265	-0.425	-8.265	-0.425	-0.016	0.007	163
26-Nov-96	39382	-8.331	-0.404	-8.264	-0.399	-8.264	-0.399	-0.017	-0.019	163
26-Nov-96	75635	-8.450	-0.472	-8.383	-0.467	-8.276	-0.460	-0.005	0.042	163
27-Nov-96	75859	-8.293	-0.256	-8.227	-0.250	-8.226	-0.402	-0.055#	-0.016#	163
27-Nov-96	75635	-8.508	-0.584	-8.440	-0.580	-8.333	-0.573	0.052	0.155	163
27-Nov-96	39382	-8.382	-0.559	-8.315	-0.555	-8.315	-0.555	0.034	0.137	163
02-Dec-96	75859	-8.328	-0.239	-8.262	-0.233	-8.261	-0.385	-0.020	-0.033	164
02-Dec-96	39382	-8.325	-0.457	-8.258	-0.452	-8.258	-0.452	-0.023	0.034	164
03-Dec-96	39382	-8.330	-0.484	-8.263	-0.479	-8.263	-0.479	-0.018	0.061	164
03-Dec-96	75859	-8.339	-0.330	-8.272	-0.325	-8.271	-0.477	-0.010	0.059	164
04-Dec-96	75859	-8.340	-0.256	-8.273	-0.250	-8.272	-0.402	-0.009	-0.016	165
04-Dec-96	75635	-8.432	-0.461	-8.365	-0.456	-8.258	-0.449	-0.023	0.031	165
05-Dec-96	39382	-8.329	-0.472	-8.262	-0.467	-8.262	-0.467	-0.019	0.049	165
05-Dec-96	75859	-8.338	-0.314	-8.271	-0.309	-8.270	-0.461	-0.011	0.043	165
18-Dec-96	75635	-8.436	-0.472	-8.369	-0.467	-8.262	-0.460	-0.019	0.042	166
18-Dec-96	75859	-8.320	-0.259	-8.254	-0.253	-8.253	-0.405	-0.028	-0.013	166
20-Dec-96	39382	-8.286	-0.420	-8.220	-0.415	-8.220	-0.415	-0.061	-0.003	166
20-Dec-96	75859	-8.327	-0.317	-8.261	-0.312	-8.260	-0.464	-0.021	0.046	166
03-Jan-97	75635	-8.444	-0.480	-8.377	-0.475	-8.270	-0.468	-0.011	0.050	167
04-Jan-97	39382	-8.350	-0.452	-8.283	-0.447	-8.283	-0.447	0.002	0.029	167
06-Jan-97	75859	-8.339	-0.310	-8.272	-0.305	-8.271	-0.457	-0.010	0.039	168
07-Jan-97	39382	-8.403	-0.648	-8.336	-0.644	-8.336	-0.644	0.055	0.226	168
07-Jan-97	39382	-8.308	-0.490	-8.242	-0.485	-8.242	-0.485	-0.039	0.067	168

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
09-Jan-97	75635	-8.443	-0.528	-8.376	-0.524	-8.269	-0.517	-0.012	0.099	169
09-Jan-97	75859	-8.318	-0.322	-8.252	-0.317	-8.251	-0.469	-0.030	0.051	169
09-Jan-97	39382	-8.358	-0.555	-8.291	-0.551	-8.291	-0.551	0.010	0.133	169
10-Jan-97	75635	-8.449	-0.518	-8.382	-0.514	-8.275	-0.507	-0.006	0.089	169
10-Jan-97	75859	-8.352	-0.360	-8.285	-0.355	-8.284	-0.507	0.003	0.089	169
10-Jan-97	75635	-8.496	-0.625	-8.428	-0.621	-8.321	-0.614	0.040	0.196	169
21-Jan-97	13523	-7.989	-4.185	-7.923	-4.198	-8.259	-0.512	-0.022	0.094	170
21-Jan-97	13523	-7.981	-4.198	-7.915	-4.211	-8.251	-0.525	-0.030	0.107	170
28-Jan-97	13523	-8.016	-4.191	-7.950	-4.204	-8.286	-0.518	0.005	0.100	171
28-Jan-97	13523	-8.030	-4.194	-7.964	-4.207	-8.300	-0.521	0.019	0.103	171
29-Jan-97	39382	-8.358	-0.531	-8.291	-0.527	-8.291	-0.527	0.010	0.109	171
29-Jan-97	39382	-8.429	-0.716	-8.362	-0.713	-8.362	-0.713	0.081	0.295	171
29-Jan-97	75635	-8.498	-0.605	-8.430	-0.601	-8.323	-0.594	0.042	0.176	171
29-Jan-97	75635	-8.446	-0.566	-8.379	-0.562	-8.272	-0.555	-0.009	0.137	171
29-Jan-97	75859	-8.350	-0.388	-8.283	-0.383	-8.282	-0.535	0.001	0.117	171
29-Jan-97	75859	-8.397	-0.472	-8.330	-0.467	-8.329	-0.619	0.048	0.201	171
29-Jan-97	13523	-7.994	-4.192	-7.928	-4.205	-8.264	-0.519	-0.017	0.101	171
29-Jan-97	13523	-8.025	-4.216	-7.959	-4.230	-8.295	-0.544	0.014	0.126	171
30-Jan-97	13523	-8.003	-4.189	-7.937	-4.202	-8.273	-0.516	-0.008	0.098	172
30-Jan-97	13523	-7.994	-4.210	-7.928	-4.224	-8.264	-0.538	-0.017	0.120	172
31-Jan-97	75859	-8.325	-0.348	-8.259	-0.343	-8.258	-0.495	-0.023	0.077	172
31-Jan-97	75859	-8.352	-0.424	-8.285	-0.419	-8.284	-0.571	0.003	0.153	172
31-Jan-97	39382	-8.383	-0.635	-8.316	-0.631	-8.316	-0.631	0.035	0.213	172
31-Jan-97	39382	-8.340	-0.449	-8.273	-0.444	-8.273	-0.444	-0.008	0.026	172
31-Jan-97	75635	-8.431	-0.521	-8.364	-0.517	-8.257	-0.510	-0.024	0.092	172
31-Jan-97	75635	-8.465	-0.572	-8.398	-0.568	-8.291	-0.561	0.010	0.143	172
31-Jan-97	13523	-7.995	-4.193	-7.929	-4.206	-8.265	-0.520	-0.016	0.102	172
31-Jan-97	13523	-7.994	-4.173	-7.928	-4.186	-8.264	-0.500	-0.017	0.082	172
13-Feb-97	39382	-8.334	-0.395	-8.267	-0.390	-8.267	-0.390	-0.014	-0.028	174
14-Feb-97	75859	-8.392	-0.306	-8.325	-0.301	-8.324	-0.453	0.043	0.035	174
14-Feb-97	75859	-8.389	-0.344	-8.322	-0.339	-8.321	-0.491	0.040	0.073	174
20-Feb-97	75635	-8.542	-0.548	-8.474	-0.544	-8.367	-0.537	0.086#	0.119#	175
20-Feb-97	75635	-8.484	-0.465	-8.417	-0.460	-8.310	-0.453	0.029	0.035	175
20-Feb-97	75635	-8.462	-0.447	-8.395	-0.442	-8.288	-0.435	0.007	0.017	175
21-Feb-97	39382	-8.322	-0.363	-8.256	-0.358	-8.256	-0.358	-0.025	-0.060	175
21-Feb-97	75859	-8.339	-0.224	-8.272	-0.218	-8.271	-0.370	-0.010	-0.048	175
21-Feb-97	75635	-8.498	-0.505	-8.430	-0.501	-8.323	-0.494	0.042	0.076	175
21-Feb-97	75635	-8.450	-0.413	-8.383	-0.408	-8.276	-0.401	-0.005	-0.017	175
21-Feb-97	39382	-8.534	-0.843	-8.466	-0.840	-8.466	-0.840	0.185#	0.422#	175
21-Feb-97	75859	-8.379	-0.292	-8.312	-0.286	-8.311	-0.438	0.030	0.020	175
21-Feb-97	13523	-7.985	-4.022	-7.919	-4.035	-8.255	-0.349	-0.026	-0.069	175

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
27-Feb-97	39382	-8.386	-0.532	-8.319	-0.528	-8.319	-0.528	0.038	0.110	176
27-Feb-97	75859	-8.379	-0.338	-8.312	-0.333	-8.311	-0.485	0.030	0.067	176
27-Feb-97	75635	-8.444	-0.461	-8.377	-0.456	-8.270	-0.449	-0.011	0.031	176
27-Feb-97	13523	-8.004	-4.127	-7.938	-4.140	-8.274	-0.454	-0.007	0.036	176
27-Feb-97	13523	-8.037	-4.109	-7.971	-4.122	-8.307	-0.436	0.026	0.018	176
28-Feb-97	75635	-8.478	-0.518	-8.411	-0.514	-8.304	-0.507	0.023	0.089	176
28-Feb-97	75859	-8.339	-0.254	-8.272	-0.248	-8.271	-0.400	-0.010	-0.018	176
28-Feb-97	39382	-8.363	-0.505	-8.296	-0.501	-8.296	-0.501	0.015	0.083	176
28-Feb-97	39382	-8.343	-0.510	-8.276	-0.506	-8.276	-0.506	-0.005	0.088	176
28-Feb-97	75635	-8.499	-0.601	-8.431	-0.597	-8.324	-0.590	0.043#	0.172#	176
28-Feb-97	75859	-8.325	-0.243	-8.259	-0.237	-8.258	-0.389	-0.023	-0.029	176
28-Feb-97	13523	-7.989	-4.137	-7.923	-4.150	-8.259	-0.464	-0.022	0.046	176
28-Feb-97	13523	-7.999	-4.119	-7.933	-4.132	-8.269	-0.446	-0.012	0.028	176
05-Mar-97	13523	-7.987	-4.161	-7.921	-4.174	-8.257	-0.488	-0.024	0.070	177
05-Mar-97	13523	-7.989	-4.140	-7.923	-4.153	-8.259	-0.467	-0.022	0.049	177
07-Mar-97	39382	-8.609	-0.892	-8.541	-0.889	-8.541	-0.889	0.260#	0.471#	177
07-Mar-97	39382	-8.367	-0.582	-8.300	-0.578	-8.300	-0.578	0.019	0.160	177
12-Mar-97	75859	-8.372	-0.359	-8.305	-0.354	-8.304	-0.506	0.023	0.088	178
13-Mar-97	39382	-8.358	-0.549	-8.291	-0.545	-8.291	-0.545	0.010	0.127	179
13-Mar-97	39382	-8.359	-0.524	-8.292	-0.520	-8.292	-0.520	0.011	0.102T	179
13-Mar-97	39382	-8.363	-0.525	-8.296	-0.521	-8.296	-0.521	0.015	0.103T	179
13-Mar-97	13523	-8.058	-4.223	-7.992	-4.237	-8.328	-0.551	0.047	0.133	179
14-Mar-97	39382	-8.333	-0.492	-8.266	-0.487	-8.266	-0.487	-0.015	0.069T	179
14-Mar-97	75859	-8.423	-0.418	-8.356	-0.413	-8.355	-0.565	0.074	0.147	179
14-Mar-97	13523	-8.051	-4.232	-7.985	-4.246	-8.321	-0.560	0.040	0.142	179
17-Mar-97	75635	-8.545	-0.641	-8.477	-0.637	-8.370	-0.630	0.089	0.212	180
17-Mar-97	39382	-8.367	-0.547	-8.300	-0.543	-8.300	-0.543	0.019	0.125T	180
17-Mar-97	13523	-8.032	-4.213	-7.966	-4.227	-8.302	-0.541	0.021	0.123	180
18-Mar-97	39382	-8.351	-0.526	-8.284	-0.522	-8.284	-0.522	0.003	0.104T	180
18-Mar-97	75859	-8.414	-0.444	-8.347	-0.439	-8.346	-0.591	0.065	0.173	180
18-Mar-97	75859	-8.410	-0.354	-8.343	-0.349	-8.342	-0.501	0.061	0.083	180
18-Mar-97	13523	-8.044	-4.234	-7.978	-4.248	-8.314	-0.562	0.033	0.144	180
01-Apr-97	39382	-8.364	-0.575	-8.297	-0.571	-8.297	-0.571	0.016	0.153	182
07-Apr-97	13523	-8.064	-4.298	-7.998	-4.312	-8.334	-0.626	0.053	0.208	183
14-Apr-97	39382	-8.416	-0.598	-8.349	-0.594	-8.349	-0.594	0.068	0.176T	183
14-Apr-97	39382	-8.382	-0.575	-8.315	-0.571	-8.315	-0.571	0.034	0.153T	183
15-Apr-97	39382	-8.418	-0.599	-8.351	-0.595	-8.351	-0.595	0.070	0.177T	183
15-Apr-97	39382	-8.410	-0.607	-8.343	-0.603	-8.343	-0.603	0.062	0.185T	183

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
22-Apr-97	13523	-8.085	-4.285	-8.019	-4.299	-8.355	-0.613	0.074	0.195	184
24-Apr-97	75859	-8.387	-0.443	-8.320	-0.438	-8.319	-0.590	0.038	0.172	184
25-Apr-97	75635	-8.583	-0.780	-8.515	-0.777	-8.408	-0.770	0.127	0.352	184
25-Apr-97	75635	-8.563	-0.730	-8.495	-0.727	-8.388	-0.720	0.107	0.302	184
09-May-97	75859	-8.432	-0.432	-8.365	-0.427	-8.364	-0.579	0.083	0.161	185
09-May-97	39382	-8.453	-0.690	-8.386	-0.686	-8.386	-0.686	0.105	0.268	185
09-May-97	75859	-8.448	-0.525	-8.381	-0.521	-8.380	-0.673	0.099	0.255	185
15-May-97	39382	-8.441	-0.646	-8.374	-0.642	-8.374	-0.642	0.093	0.224	186
15-May-97	75635	-8.519	-0.627	-8.451	-0.623	-8.344	-0.616	0.063	0.198	186
16-May-97	39382	-8.401	-0.642	-8.334	-0.638	-8.334	-0.638	0.053	0.220	186
16-May-97	75635	-8.591	-0.768	-8.523	-0.765	-8.416	-0.758	0.135#	0.340#	186
20-May-97	39382	-8.523	-0.736	-8.455	-0.733	-8.455	-0.733	0.174#	0.315#	187
20-May-97	39382	-8.409	-0.667	-8.342	-0.663	-8.342	-0.663	0.061	0.245	187
20-May-97	75635	-8.590	-0.781	-8.522	-0.778	-8.415	-0.771	0.134#	0.353#	187
21-May-97	75635	-8.522	-0.656	-8.454	-0.652	-8.347	-0.645	0.066	0.227	187
21-May-97	39382	-8.405	-0.643	-8.338	-0.639	-8.338	-0.639	0.057	0.221	187
22-May-97	39382	-8.394	-0.611	-8.327	-0.607	-8.327	-0.607	0.046	0.189	187
22-May-97	75635	-8.527	-0.667	-8.459	-0.663	-8.352	-0.656	0.071	0.238	187
28-May-97	75635	-8.558	-0.680	-8.490	-0.676	-8.383	-0.669	0.102	0.251	188
28-May-97	75859	-8.437	-0.430	-8.370	-0.425	-8.369	-0.577	0.088	0.159	188
29-May-97	75859	-8.447	-0.468	-8.380	-0.463	-8.379	-0.615	0.098	0.197	188
29-May-97	39382	-8.394	-0.630	-8.327	-0.626	-8.327	-0.626	0.046	0.208	188
03-Jun-97	75859	-8.444	-0.475	-8.377	-0.470	-8.376	-0.622	0.095	0.204	189
03-Jun-97	75635	-8.540	-0.654	-8.472	-0.650	-8.365	-0.643	0.084	0.225	189
04-Jun-97	39382	-8.416	-0.631	-8.349	-0.627	-8.349	-0.627	0.068	0.209	189
04-Jun-97	75859	-8.444	-0.471	-8.377	-0.466	-8.376	-0.618	0.095	0.200	189
05-Jun-97	39382	-8.447	-0.652	-8.380	-0.648	-8.380	-0.648	0.099	0.230	190
05-Jun-97	75859	-8.459	-0.500	-8.392	-0.496	-8.391	-0.648	0.110	0.230	190
06-Jun-97	75635	-8.566	-0.697	-8.498	-0.693	-8.391	-0.686	0.110	0.268	190
17-Jun-97	13523	-8.096	-4.313	-8.029	-4.327	-8.365	-0.641	0.084	0.223	191
09-Jul-97	75635	-8.486	-0.528	-8.419	-0.524	-8.312	-0.517	0.031	0.099	193
09-Jul-97	75635	-8.523	-0.575	-8.455	-0.571	-8.348	-0.564	0.067	0.146	193
10-Jul-97	39382	-8.395	-0.480	-8.328	-0.475	-8.328	-0.475	0.047	0.057	193
10-Jul-97	39382	-8.404	-0.606	-8.337	-0.602	-8.337	-0.602	0.056	0.184	193

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
18-Jul-97	75859	-8.381	-0.393	-8.314	-0.388	-8.313	-0.540	0.032	0.122	194
18-Jul-97	75859	-8.384	-0.416	-8.317	-0.411	-8.316	-0.563	0.035	0.145	194
22-Jul-97	75635	-8.506	-0.642	-8.438	-0.638	-8.331	-0.631	0.050	0.213T	195
23-Jul-97	75635	-8.514	-0.649	-8.446	-0.645	-8.339	-0.638	0.058	0.220	195
27-Jul-97	13523	-8.087	-4.339	-8.020	-4.353	-8.356	-0.667	0.075	0.249	196
28-Jul-97	75635	-8.545	-0.639	-8.477	-0.635	-8.370	-0.628	0.089	0.210T	196
28-Jul-97	75635	-8.531	-0.634	-8.463	-0.630	-8.356	-0.623	0.075	0.205T	196
29-Jul-97	75635	-8.515	-0.645	-8.447	-0.641	-8.340	-0.634	0.059	0.216T	196
14-Aug-97	13523	-8.055	-4.320	-7.989	-4.334	-8.325	-0.648	0.044	0.230	197
14-Aug-97	13523	-8.052	-4.261	-7.986	-4.275	-8.322	-0.589	0.041	0.171	197
18-Aug-97	39382	-8.405	-0.607	-8.338	-0.603	-8.338	-0.603	0.057	0.185	198
18-Aug-97	75635	-8.508	-0.617	-8.440	-0.613	-8.333	-0.606	0.052	0.188	198
19-Aug-97	75859	-8.397	-0.450	-8.330	-0.445	-8.329	-0.597	0.048	0.179	198
19-Aug-97	39382	-8.377	-0.618	-8.310	-0.614	-8.310	-0.614	0.029	0.196	198
29-Aug-97	75859	-8.467	-0.539	-8.400	-0.535	-8.399	-0.687	0.118	0.269T	199
06-Sep-97	39382	-8.402	-0.673	-8.335	-0.669	-8.335	-0.669	0.054	0.251T	199
08-Sep-97	39382	-8.393	-0.640	-8.326	-0.636	-8.326	-0.636	0.045	0.218T	199
08-Sep-97	39382	-8.386	-0.644	-8.319	-0.640	-8.319	-0.640	0.038	0.222T	199
09-Sep-97	39382	-8.399	-0.676	-8.332	-0.672	-8.332	-0.672	0.051	0.254T	199
09-Sep-97	39382	-8.380	-0.622	-8.313	-0.618	-8.313	-0.618	0.032	0.200T	199
10-Sep-97	39382	-8.401	-0.664	-8.334	-0.660	-8.334	-0.660	0.053	0.242T	200
10-Sep-97	39382	-8.399	-0.651	-8.332	-0.647	-8.332	-0.647	0.051	0.229T	200
12-Sep-97	75859	-8.415	-0.516	-8.348	-0.512	-8.347	-0.664	0.066	0.246T	200
12-Sep-97	75635	-8.493	-0.590	-8.425	-0.586	-8.318	-0.579	0.037	0.161T	200
15-Sep-97	75859	-8.372	-0.448	-8.305	-0.443	-8.304	-0.595	0.023	0.177	201
16-Sep-97	75635	-8.510	-0.602	-8.442	-0.598	-8.335	-0.591	0.054	0.173	201
16-Sep-97	39382	-8.388	-0.657	-8.321	-0.653	-8.321	-0.653	0.040	0.235	201
17-Sep-97	75859	-8.409	-0.435	-8.342	-0.430	-8.341	-0.582	0.060	0.164	201
24-Sep-97	75635	-8.529	-0.653	-8.461	-0.649	-8.354	-0.642	0.073	0.224	202
24-Sep-97	39382	-8.396	-0.641	-8.329	-0.637	-8.329	-0.637	0.048	0.219	202
24-Sep-97	75859	-8.392	-0.456	-8.325	-0.451	-8.324	-0.603	0.043	0.185	202
25-Sep-97	39382	-8.383	-0.612	-8.316	-0.608	-8.316	-0.608	0.035	0.190	202
25-Sep-97	75635	-8.537	-0.657	-8.469	-0.653	-8.362	-0.646	0.081	0.228	202
26-Sep-97	75859	-8.407	-0.450	-8.340	-0.445	-8.339	-0.597	0.058	0.179	202
26-Sep-97	39382	-8.414	-0.668	-8.347	-0.664	-8.347	-0.664	0.066	0.246	202

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
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Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
03-Oct-97	75859	-8.398	-0.420	-8.331	-0.415	-8.330	-0.567	0.049	0.149T	203
14-Nov-97	39382	-8.378	-0.484	-8.311	-0.479	-8.311	-0.479	0.030	0.061T	203
17-Nov-97	75635	-8.515	-0.502	-8.447	-0.498	-8.340	-0.491	0.059	0.073T	203
18-Nov-97	75635	-8.512	-0.501	-8.444	-0.497	-8.337	-0.490	0.056	0.072	204
18-Nov-97	75635	-8.501	-0.471	-8.433	-0.466	-8.326	-0.459	0.045	0.041	204
18-Nov-97	75635	-8.500	-0.502	-8.432	-0.498	-8.325	-0.491	0.044	0.073	204
18-Nov-97	75635	-8.493	-0.412	-8.426	-0.407	-8.319	-0.400	0.038	-0.018	204
18-Nov-97	39382	-8.379	-0.466	-8.312	-0.461	-8.312	-0.461	0.031	0.043	204
18-Nov-97	39382	-8.366	-0.455	-8.299	-0.450	-8.299	-0.450	0.018	0.032	204
18-Nov-97	39382	-8.400	-0.496	-8.333	-0.491	-8.333	-0.491	0.052	0.073	204
18-Nov-97	39382	-8.417	-0.469	-8.350	-0.464	-8.350	-0.464	0.069	0.046	204
18-Nov-97	75859	-8.423	-0.310	-8.356	-0.305	-8.355	-0.457	0.074	0.039	204
18-Nov-97	75859	-8.422	-0.284	-8.355	-0.278	-8.354	-0.430	0.073	0.012	204
18-Nov-97	75859	-8.423	-0.336	-8.356	-0.331	-8.355	-0.483	0.074	0.065	204
18-Nov-97	75859	-8.396	-0.297	-8.329	-0.292	-8.328	-0.444	0.047	0.026	204
21-Nov-97	75635	-8.544	-0.461	-8.476	-0.456	-8.369	-0.449	0.088	0.031	204
21-Nov-97	75859	-8.422	-0.336	-8.355	-0.331	-8.354	-0.483	0.073	0.065	204
09-Dec-97	75859	-8.419	-0.427	-8.352	-0.422	-8.351	-0.574	0.070	0.156	206
09-Dec-97	13523	-8.057	-4.255	-7.991	-4.269	-8.327	-0.583	0.046	0.165	206
09-Dec-97	13523	-8.045	-4.199	-7.979	-4.212	-8.315	-0.526	0.034	0.108	206
11-Dec-97	39382	-8.406	-0.593	-8.339	-0.589	-8.339	-0.589	0.058	0.171	206
11-Dec-97	39382	-8.398	-0.635	-8.331	-0.631	-8.331	-0.631	0.050	0.213	206
11-Dec-97	13523	-8.078	-4.274	-8.012	-4.288	-8.348	-0.602	0.067	0.184	206
11-Dec-97	13523	-8.059	-4.269	-7.993	-4.283	-8.329	-0.597	0.048	0.179	206
15-Dec-97	13523	-8.088	-4.254	-8.021	-4.268	-8.357	-0.582	0.076	0.164	207
15-Dec-97	13523	-8.071	-4.236	-8.005	-4.250	-8.341	-0.564	0.060	0.146	207
16-Dec-97	75635	-8.520	-0.573	-8.452	-0.569	-8.345	-0.562	0.064	0.144	207
16-Dec-97	75635	-8.518	-0.536	-8.450	-0.532	-8.343	-0.525	0.062	0.107	207
16-Dec-97	75635	-8.518	-0.578	-8.450	-0.574	-8.343	-0.567	0.062	0.149	207
23-Dec-97	75859	-8.386	-0.421	-8.319	-0.416	-8.318	-0.568	0.037	0.150	208
23-Dec-97	75859	-8.413	-0.464	-8.346	-0.459	-8.345	-0.611	0.064	0.193	208
30-Dec-97	75635	-8.528	-0.652	-8.460	-0.648	-8.353	-0.641	0.072	0.223	209
30-Dec-97	75859	-8.401	-0.478	-8.334	-0.473	-8.333	-0.625	0.052	0.207	209

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
14-Jan-98	75635	-8.562	-0.641	-8.494	-0.637	-8.387	-0.630	0.106	0.212	210
15-Jan-98	39382	-8.453	-0.677	-8.386	-0.673	-8.386	-0.673	0.105	0.255	210
15-Jan-98	39382	-8.446	-0.640	-8.379	-0.636	-8.379	-0.636	0.098	0.218	210
15-Jan-98	39382	-8.435	-0.617	-8.368	-0.613	-8.368	-0.613	0.087	0.195	210
15-Jan-98	75859	-8.458	-0.478	-8.391	-0.473	-8.390	-0.625	0.109	0.207	210
16-Jan-98	75635	-8.573	-0.703	-8.505	-0.699	-8.398	-0.692	0.117	0.274	210
18-Jan-98	75859	-8.449	-0.502	-8.382	-0.498	-8.381	-0.650	0.100	0.232T	211
18-Jan-98	75859	-8.447	-0.502	-8.380	-0.498	-8.379	-0.650	0.098	0.232T	211
19-Jan-98	75859	-8.443	-0.498	-8.376	-0.493	-8.375	-0.645	0.094	0.227T	211
21-Jan-98	39382	-8.406	-0.644	-8.339	-0.640	-8.339	-0.640	0.058	0.222T	211
22-Jan-98	39382	-8.409	-0.668	-8.342	-0.664	-8.342	-0.664	0.061	0.246T	211
28-Jan-98	39382	-8.405	-0.628	-8.338	-0.624	-8.338	-0.624	0.057	0.206	212
28-Jan-98	75859	-8.448	-0.534	-8.381	-0.530	-8.380	-0.682	0.099	0.264	212
29-Jan-98	75635	-8.567	-0.705	-8.499	-0.702	-8.392	-0.695	0.111	0.277	212
29-Jan-98	39382	-8.454	-0.721	-8.387	-0.718	-8.387	-0.718	0.106	0.300	212
30-Jan-98	75859	-8.482	-0.559	-8.415	-0.555	-8.414	-0.707	0.133	0.289	212
04-Feb-98	75859	-8.403	-0.488	-8.336	-0.483	-8.335	-0.635	0.054	0.217	213
04-Feb-98	75859	-8.426	-0.529	-8.359	-0.525	-8.358	-0.677	0.077	0.259	213
05-Feb-98	75635	-8.522	-0.717	-8.454	-0.714	-8.347	-0.707	0.066	0.289	213
05-Feb-98	39382	-8.461	-0.731	-8.394	-0.728	-8.394	-0.728	0.113	0.310	213
06-Feb-98	75635	-8.541	-0.744	-8.473	-0.741	-8.366	-0.734	0.085	0.316	213
06-Feb-98	75859	-8.427	-0.566	-8.360	-0.562	-8.359	-0.714	0.078	0.296	213
06-Feb-98	39382	-8.439	-0.717	-8.372	-0.714	-8.372	-0.714	0.091	0.296	213
06-Feb-98	13523	-8.095	-4.389	-8.028	-4.403	-8.364	-0.717	0.083	0.299	213
13-Feb-98	75635	-8.586	-0.739	-8.518	-0.736	-8.411	-0.729	0.130	0.311	214
13-Feb-98	39382	-8.429	-0.769	-8.362	-0.766	-8.362	-0.766	0.081	0.348	214
18-Feb-98	39382	-8.447	-0.633	-8.380	-0.629	-8.380	-0.629	0.099	0.211	215
25-Feb-98	75635	-8.531	-0.589	-8.463	-0.585	-8.356	-0.578	0.075	0.160	216
26-Feb-98	75635	-8.543	-0.601	-8.475	-0.597	-8.368	-0.590	0.087	0.172	216
26-Feb-98	39382	-8.408	-0.431	-8.341	-0.426	-8.341	-0.426	0.060#	0.008#	216
26-Feb-98	75635	-8.546	-0.623	-8.478	-0.619	-8.371	-0.612	0.090	0.194	216
11-Mar-98	75859	-8.411	-0.585	-8.344	-0.581	-8.343	-0.733	0.062	0.315	217
12-Mar-98	75859	-8.412	-0.568	-8.345	-0.564	-8.344	-0.716	0.063	0.298	217

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
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Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
24-Mar-98	75859	-8.425	-0.587	-8.358	-0.583	-8.357	-0.735	0.076	0.317	218
24-Mar-98	75635	-8.550	-0.795	-8.482	-0.792	-8.375	-0.785	0.094	0.367	218
25-Mar-98	39382	-8.420	-0.608	-8.353	-0.604	-8.353	-0.604	0.072	0.186	218
25-Mar-98	75859	-8.433	-0.677	-8.366	-0.673	-8.365	-0.825	0.084	0.407	218
26-Mar-98	75635	-8.543	-0.813	-8.475	-0.810	-8.368	-0.803	0.087	0.385	218
26-Mar-98	39382	-8.460	-0.708	-8.393	-0.705	-8.393	-0.705	0.112	0.287	218
01-Apr-98	75635	-8.796	-1.268	-8.726	-1.267	-8.619	-1.260	0.338#	0.842#	219
01-Apr-98	75635	-8.534	-0.821	-8.466	-0.818	-8.359	-0.811	0.078	0.393	219
01-Apr-98	75635	-8.528	-0.830	-8.460	-0.827	-8.353	-0.820	0.072	0.402	219
02-Apr-98	39382	-8.397	-0.814	-8.330	-0.811	-8.330	-0.811	0.049	0.393	219
02-Apr-98	75859	-8.416	-0.671	-8.349	-0.667	-8.348	-0.819	0.067	0.401	219
03-Apr-98	75635	-8.497	-0.816	-8.429	-0.813	-8.322	-0.806	0.041	0.388T	220
03-Apr-98	75635	-8.537	-0.812	-8.469	-0.809	-8.362	-0.802	0.081	0.384T	220
08-Apr-98	39382	-8.415	-0.831	-8.348	-0.828	-8.348	-0.828	0.067	0.410	220
08-Apr-98	75859	-8.437	-0.716	-8.370	-0.713	-8.369	-0.865	0.088	0.447	220
14-Apr-98	39382	-8.411	-0.409	-8.344	-0.404	-8.344	-0.404	0.063	-0.014T	221
16-Apr-98	75635	-8.502	-0.568	-8.434	-0.564	-8.327	-0.557	0.046	0.139	221
17-Apr-98	75859	-8.375	-0.354	-8.308	-0.349	-8.307	-0.501	0.026	0.083	221
17-Apr-98	39382	-8.402	-0.591	-8.335	-0.587	-8.335	-0.587	0.054	0.169	221
18-Apr-98	39382	-8.406	-0.549	-8.339	-0.545	-8.339	-0.545	0.058	0.127T	222
19-Apr-98	39382	-8.388	-0.504	-8.321	-0.500	-8.321	-0.500	0.040	0.082T	222
19-Apr-98	39382	-8.395	-0.388	-8.328	-0.383	-8.328	-0.383	0.047	-0.035T	222
21-Apr-98	75635	-8.530	-0.564	-8.462	-0.560	-8.355	-0.553	0.074	0.135	222
21-Apr-98	75859	-8.446	-0.418	-8.379	-0.413	-8.378	-0.565	0.097	0.147	222
22-Apr-98	39382	-8.422	-0.380	-8.355	-0.375	-8.355	-0.375	0.074	-0.043	222
22-Apr-98	75635	-8.549	-0.588	-8.481	-0.584	-8.374	-0.577	0.093	0.159	222
23-Apr-98	75859	-8.383	-0.392	-8.316	-0.387	-8.315	-0.539	0.034	0.121	222
23-Apr-98	39382	-8.374	-0.598	-8.307	-0.594	-8.307	-0.594	0.026	0.176	222
23-Apr-98	75635	-8.485	-0.613	-8.418	-0.609	-8.311	-0.602	0.030	0.184	222
23-Apr-98	13523	-8.072	-4.290	-8.006	-4.304	-8.342	-0.618	0.061	0.200	222
29-Apr-98	75635	-8.517	-0.531	-8.449	-0.527	-8.342	-0.520	0.061	0.102	223
29-Apr-98	39382	-8.413	-0.574	-8.346	-0.570	-8.346	-0.570	0.065	0.152	223
30-Apr-98	75859	-8.382	-0.408	-8.315	-0.403	-8.314	-0.555	0.033	0.137	223
30-Apr-98	75635	-8.533	-0.577	-8.465	-0.573	-8.358	-0.566	0.077	0.148	223

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
04-May-98	39382	-8.437	-0.691	-8.370	-0.687	-8.370	-0.687	0.089	0.269	224
06-May-98	39382	-8.380	-0.578	-8.313	-0.574	-8.313	-0.574	0.032	0.156	224
06-May-98	75859	-8.398	-0.382	-8.331	-0.377	-8.330	-0.529	0.049	0.111	224
07-May-98	75635	-8.524	-0.594	-8.456	-0.590	-8.349	-0.583	0.068	0.165	224
07-May-98	39382	-8.401	-0.631	-8.334	-0.627	-8.334	-0.627	0.053	0.209	224
11-May-98	75859	-8.361	-0.422	-8.294	-0.417	-8.293	-0.569	0.012	0.151	225
11-May-98	75635	-8.484	-0.613	-8.417	-0.609	-8.310	-0.602	0.029	0.184	225
12-May-98	39382	-8.381	-0.620	-8.314	-0.616	-8.314	-0.616	0.033	0.198	225
12-May-98	75859	-8.377	-0.462	-8.310	-0.457	-8.309	-0.609	0.028	0.191	225
13-May-98	75635	-8.507	-0.691	-8.439	-0.687	-8.332	-0.680	0.051	0.262	225
03-Jun-98	39382	-8.362	-0.628	-8.295	-0.624	-8.295	-0.624	0.014	0.206	226
12-Jun-98	75635	-8.530	-0.770	-8.462	-0.767	-8.355	-0.760	0.074	0.342	227
12-Jun-98	39382	-8.438	-0.801	-8.371	-0.798	-8.371	-0.798	0.090	0.380	227
13-Jul-98	39382	-8.095	-0.519	-8.030	-0.515	-8.030	-0.515	-0.251	0.097	229
14-Jul-98	39382	-8.096	-0.498	-8.031	-0.493	-8.031	-0.493	-0.250	0.075	229
14-Jul-98	75859	-8.130	-0.365	-8.065	-0.360	-8.064	-0.512	-0.217	0.094	229
14-Jul-98	75635	-8.249	-0.538	-8.183	-0.534	-8.076	-0.527	-0.205	0.109	229
14-Jul-98	13523	-7.819	-4.218	-7.754	-4.232	-8.090	-0.546	-0.191	0.128	229
15-Jul-98	75859	-8.178	-0.329	-8.112	-0.324	-8.111	-0.476	-0.170	0.058	229
15-Jul-98	39382	-8.185	-0.558	-8.119	-0.554	-8.119	-0.554	-0.162	0.136	229
16-Jul-98	75635	-8.346	-0.574	-8.279	-0.570	-8.172	-0.563	-0.109	0.145	230
16-Jul-98	75859	-8.286	-0.436	-8.220	-0.431	-8.219	-0.583	-0.062	0.165	230
17-Jul-98	39382	-8.249	-0.556	-8.183	-0.552	-8.183	-0.552	-0.098	0.134	230
17-Jul-98	75859	-8.281	-0.432	-8.215	-0.427	-8.214	-0.579	-0.067	0.161	230
17-Jul-98	75635	-8.420	-0.652	-8.353	-0.648	-8.246	-0.641	-0.035	0.223	230
19-Jul-98	75859	-8.232	-0.415	-8.166	-0.410	-8.165	-0.562	-0.116	0.144	231
20-Jul-98	75859	-8.329	-0.450	-8.262	-0.445	-8.261	-0.597	-0.020	0.179	231
20-Jul-98	75635	-8.468	-0.684	-8.401	-0.680	-8.294	-0.673	0.013	0.255	231
21-Jul-98	75859	-8.324	-0.492	-8.257	-0.487	-8.256	-0.639	-0.025	0.221	231
21-Jul-98	13523	-8.033	-4.382	-7.967	-4.396	-8.303	-0.710	0.022	0.292	231
27-Jul-98	13523	-7.972	-4.249	-7.906	-4.263	-8.242	-0.577	-0.039	0.159	232
27-Jul-98	75859	-8.415	-0.676	-8.348	-0.672	-8.347	-0.824	0.066	0.406	232
05-Aug-98	39382	-8.437	-0.739	-8.370	-0.736	-8.370	-0.736	0.089	0.318	232
05-Aug-98	75859	-8.442	-0.544	-8.375	-0.540	-8.374	-0.692	0.093	0.274	232
06-Aug-98	75635	-8.539	-0.737	-8.471	-0.734	-8.364	-0.727	0.083	0.309	232
06-Aug-98	39382	-8.412	-0.735	-8.345	-0.732	-8.345	-0.732	0.064	0.314	232

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
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Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
07-Aug-98	75859	-8.413	-0.586	-8.346	-0.582	-8.345	-0.734	0.064	0.316	233
07-Aug-98	75635	-8.538	-0.785	-8.470	-0.782	-8.363	-0.775	0.082	0.357	233
10-Aug-98	39382	-8.412	-0.741	-8.345	-0.738	-8.345	-0.738	0.064	0.320	234
10-Aug-98	75635	-8.561	-0.783	-8.493	-0.780	-8.386	-0.773	0.105	0.355	234
11-Aug-98	75859	-8.423	-0.579	-8.356	-0.575	-8.355	-0.727	0.074	0.309	234
11-Aug-98	75635	-8.564	-0.787	-8.496	-0.784	-8.389	-0.777	0.108	0.359	235
12-Aug-98	39382	-8.428	-0.771	-8.361	-0.768	-8.361	-0.768	0.080	0.350	235
12-Aug-98	75859	-8.453	-0.627	-8.386	-0.623	-8.385	-0.775	0.104	0.357	235
13-Aug-98	75635	-8.564	-0.843	-8.496	-0.840	-8.389	-0.833	0.108	0.415	236
13-Aug-98	39382	-8.459	-0.820	-8.392	-0.817	-8.392	-0.817	0.111	0.399	236
14-Aug-98	75859	-8.481	-0.641	-8.414	-0.637	-8.413	-0.789	0.132	0.371	236
14-Aug-98	75635	-8.569	-0.824	-8.501	-0.821	-8.394	-0.814	0.113	0.396	236
14-Aug-98	39382	-8.423	-0.878	-8.356	-0.875	-8.356	-0.875	0.075	0.457	236
16-Aug-98	75635	-8.519	-0.866	-8.451	-0.863	-8.344	-0.856	0.063	0.438	237
24-Aug-98	75859	-8.373	-0.376	-8.306	-0.371	-8.305	-0.523	0.024	0.105	237
24-Aug-98	75635	-8.496	-0.540	-8.428	-0.536	-8.321	-0.529	0.040	0.111	237
26-Aug-98	39382	-8.375	-0.565	-8.308	-0.561	-8.308	-0.561	0.027	0.143	238
26-Aug-98	75859	-8.399	-0.405	-8.332	-0.400	-8.331	-0.552	0.050	0.134	238
27-Aug-98	75635	-8.488	-0.561	-8.421	-0.557	-8.314	-0.550	0.033	0.132	238
27-Aug-98	39382	-8.403	-0.599	-8.336	-0.595	-8.336	-0.595	0.055	0.177	238
27-Aug-98	13523	-8.068	-4.258	-8.002	-4.272	-8.338	-0.586	0.057	0.168	238
28-Aug-98	75859	-8.435	-0.458	-8.368	-0.453	-8.367	-0.605	0.086	0.187	239
28-Aug-98	39382	-8.419	-0.630	-8.352	-0.626	-8.352	-0.626	0.071	0.208	239
01-Sep-98	75635	-8.583	-0.652	-8.515	-0.648	-8.408	-0.641	0.127	0.223	240
01-Sep-98	39382	-8.401	-0.647	-8.334	-0.643	-8.334	-0.643	0.053	0.225	240
02-Sep-98	13523	-8.206	-4.366	-8.139	-4.380	-8.475	-0.694	0.194	0.276	240
02-Sep-98	75859	-8.458	-0.525	-8.391	-0.521	-8.390	-0.673	0.109	0.255	240
14-Sep-98	75635	-8.574	-0.688	-8.506	-0.684	-8.399	-0.677	0.118	0.259	241
14-Sep-98	75859	-8.499	-0.570	-8.431	-0.566	-8.430	-0.718	0.149	0.300	241
15-Sep-98	39382	-8.495	-0.761	-8.427	-0.758	-8.427	-0.758	0.146	0.340	242
15-Sep-98	75635	-8.607	-0.754	-8.539	-0.751	-8.432	-0.744	0.151	0.326	242
16-Sep-98	75859	-8.501	-0.576	-8.433	-0.572	-8.432	-0.724	0.151	0.306	242
16-Sep-98	39382	-8.469	-0.788	-8.402	-0.785	-8.402	-0.785	0.121	0.367	242
17-Sep-98	75635	-8.597	-0.813	-8.529	-0.810	-8.422	-0.803	0.141	0.385	242

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
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Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
21-Sep-98	75859	-8.482	-0.591	-8.415	-0.587	-8.414	-0.739	0.133	0.321	243
21-Sep-98	39382	-8.469	-0.785	-8.402	-0.782	-8.402	-0.782	0.121	0.364	243
22-Sep-98	75635	-8.567	-0.827	-8.499	-0.824	-8.392	-0.817	0.111	0.399	243
23-Sep-98	39382	-8.462	-0.806	-8.395	-0.803	-8.395	-0.803	0.114	0.385	243
23-Sep-98	75859	-8.479	-0.660	-8.412	-0.656	-8.411	-0.808	0.130	0.390	243
24-Sep-98	75635	-8.572	-0.867	-8.504	-0.864	-8.397	-0.857	0.116	0.439	243
24-Sep-98	39382	-8.472	-0.862	-8.404	-0.859	-8.404	-0.859	0.123	0.441	243
29-Sep-98	75859	-8.462	-0.646	-8.395	-0.642	-8.394	-0.794	0.113	0.376	244
30-Sep-98	75635	-8.552	-0.816	-8.484	-0.813	-8.377	-0.806	0.096	0.388	244
30-Sep-98	39382	-8.416	-0.845	-8.349	-0.842	-8.349	-0.842	0.068	0.424	244
01-Oct-98	75635	-8.560	-0.852	-8.492	-0.849	-8.385	-0.842	0.104	0.424	244
01-Oct-98	39382	-8.429	-0.911	-8.362	-0.909	-8.362	-0.909	0.081	0.491	244
01-Oct-98	75859	-8.443	-0.725	-8.376	-0.722	-8.375	-0.874	0.094	0.456	244
03-Oct-98	75635	-8.591	-0.899	-8.523	-0.896	-8.416	-0.889	0.135	0.471	245
09-Oct-98	13523	-8.135	-4.489	-8.068	-4.504	-8.404	-0.818	0.123	0.400	246
14-Oct-98	39382	-8.462	-0.797	-8.395	-0.794	-8.395	-0.794	0.114	0.376	246
15-Oct-98	75859	-8.446	-0.663	-8.379	-0.659	-8.378	-0.811	0.097	0.393	246
15-Oct-98	75635	-8.584	-0.826	-8.516	-0.823	-8.409	-0.816	0.128	0.398	246
21-Oct-98	39382	-8.464	-0.850	-8.397	-0.847	-8.397	-0.847	0.116	0.429	247
21-Oct-98	75859	-8.494	-0.691	-8.426	-0.687	-8.425	-0.839	0.144	0.421	247
21-Oct-98	75635	-8.620	-0.854	-8.552	-0.851	-8.445	-0.844	0.164	0.426	247
22-Oct-98	13523	-8.117	-4.501	-8.050	-4.516	-8.386	-0.830	0.105	0.412	247
22-Oct-98	39382	-8.451	-0.840	-8.384	-0.837	-8.384	-0.837	0.103	0.419	247
22-Oct-98	75859	-8.496	-0.727	-8.428	-0.724	-8.427	-0.876	0.146	0.458	247
26-Oct-98	75859	-8.433	-0.659	-8.366	-0.655	-8.365	-0.807	0.084	0.389	248
26-Oct-98	75859	-8.468	-0.697	-8.401	-0.693	-8.400	-0.845	0.119	0.427	248
03-Nov-98	75859	-8.468	-0.680	-8.401	-0.676	-8.400	-0.828	0.119	0.410	249
04-Nov-98	75859	-8.463	-0.667	-8.396	-0.663	-8.395	-0.815	0.114	0.397	249
04-Nov-98	75859	-8.452	-0.706	-8.385	-0.703	-8.384	-0.855	0.103	0.437	249
05-Nov-98	75635	-8.541	-0.861	-8.473	-0.858	-8.366	-0.851	0.085	0.433	249
06-Nov-98	39382	-8.416	-0.893	-8.349	-0.890	-8.349	-0.890	0.068	0.472	250
09-Nov-98	39382	-8.392	-0.862	-8.325	-0.859	-8.325	-0.859	0.044	0.441	250
09-Nov-98	75635	-8.530	-0.890	-8.462	-0.887	-8.355	-0.880	0.074	0.462	250

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
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Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
16-Nov-98	75859	-8.336	-0.535	-8.269	-0.531	-8.268	-0.683	-0.013#	0.265#	251
16-Nov-98	75635	-8.550	-0.884	-8.482	-0.881	-8.375	-0.874	0.094	0.456	251
23-Nov-98	39382	-8.406	-0.600	-8.339	-0.596	-8.339	-0.596	0.058	0.178	252
24-Nov-98	75635	-8.513	-0.579	-8.445	-0.575	-8.338	-0.568	0.057	0.150	252
24-Nov-98	39382	-8.391	-0.595	-8.324	-0.591	-8.324	-0.591	0.043	0.173	252
25-Nov-98	39382	-8.397	-0.565	-8.330	-0.561	-8.330	-0.561	0.049	0.143	253
30-Nov-98	75859	-8.379	-0.404	-8.312	-0.399	-8.311	-0.551	0.030	0.133	253
30-Nov-98	75635	-8.509	-0.572	-8.441	-0.568	-8.334	-0.561	0.053	0.143	253
01-Dec-98	39382	-8.369	-0.595	-8.302	-0.591	-8.302	-0.591	0.021	0.173	253
01-Dec-98	75859	-8.393	-0.418	-8.326	-0.413	-8.325	-0.565	0.044	0.147	253
01-Dec-98	75635	-8.511	-0.601	-8.443	-0.597	-8.336	-0.590	0.055	0.172	253
01-Dec-98	13523	-8.056	-4.261	-7.990	-4.275	-8.326	-0.589	0.045	0.171	253
02-Dec-98	75635	-8.529	-0.626	-8.461	-0.622	-8.354	-0.615	0.073	0.197	253
02-Dec-98	39382	-8.384	-0.554	-8.317	-0.550	-8.317	-0.550	0.036	0.132	253
02-Dec-98	75859	-8.388	-0.409	-8.321	-0.404	-8.320	-0.556	0.039	0.138	253
02-Dec-98	75635	-8.483	-0.502	-8.416	-0.498	-8.309	-0.491	0.028	0.073	253
02-Dec-98	39382	-8.401	-0.606	-8.334	-0.602	-8.334	-0.602	0.053	0.184	253
02-Dec-98	75859	-8.385	-0.396	-8.318	-0.391	-8.317	-0.543	0.036	0.125	253
02-Dec-98	75635	-8.578	-0.714	-8.510	-0.711	-8.403	-0.704	0.122#	0.286#	253
02-Dec-98	39382	-8.380	-0.604	-8.313	-0.600	-8.313	-0.600	0.032	0.182	253
02-Dec-98	75859	-8.405	-0.433	-8.338	-0.428	-8.337	-0.580	0.056	0.162	253
02-Dec-98	75635	-8.519	-0.623	-8.451	-0.619	-8.344	-0.612	0.063	0.194	253
03-Dec-98	39382	-8.439	-0.700	-8.372	-0.696	-8.372	-0.696	0.091	0.278	254
07-Dec-98	39382	-8.396	-0.668	-8.329	-0.664	-8.329	-0.664	0.048	0.246	254
27-Jan-99	39382	-8.380	-0.576	-8.313	-0.572	-8.313	-0.572	0.032	0.154	256
27-Jan-99	75635	-8.481	-0.573	-8.414	-0.569	-8.307	-0.562	0.026	0.144	256
27-Jan-99	39382	-8.355	-0.547	-8.288	-0.543	-8.288	-0.543	0.007	0.125	256
28-Jan-99	75859	-8.366	-0.332	-8.299	-0.327	-8.298	-0.479	0.017	0.061	257
28-Jan-99	75635	-8.488	-0.498	-8.421	-0.493	-8.314	-0.486	0.033	0.068	257
28-Jan-99	75859	-8.375	-0.354	-8.308	-0.349	-8.307	-0.501	0.026	0.083	257
28-Jan-99	75635	-8.492	-0.565	-8.424	-0.561	-8.317	-0.554	0.036#	0.136#	257
29-Jan-99	75635	-8.492	-0.568	-8.424	-0.564	-8.317	-0.557	0.036	0.139	258
29-Jan-99	39382	-8.374	-0.629	-8.307	-0.625	-8.307	-0.625	0.026	0.207	258

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
30-Jan-99	75859	-8.413	-0.431	-8.346	-0.426	-8.345	-0.578	0.064	0.160	259
31-Jan-99	75859	-8.378	-0.331	-8.311	-0.326	-8.310	-0.478	0.029	0.060	259
02-Feb-99	39382	-8.352	-0.587	-8.285	-0.583	-8.285	-0.583	0.004	0.165	259
03-Feb-99	75635	-8.458	-0.521	-8.391	-0.517	-8.284	-0.510	0.003	0.092	259
03-Feb-99	39382	-8.333	-0.492	-8.266	-0.487	-8.266	-0.487	-0.015	0.069	259
03-Feb-99	75635	-8.459	-0.465	-8.392	-0.460	-8.285	-0.453	0.004	0.035	259
04-Feb-99	75859	-8.353	-0.334	-8.286	-0.329	-8.285	-0.481	0.004	0.063	259
04-Feb-99	75859	-8.357	-0.275	-8.290	-0.269	-8.289	-0.421	0.008	0.003	259
04-Feb-99	75859	-8.349	-0.293	-8.282	-0.287	-8.281	-0.439	0.000	0.021	259
05-Feb-99	75635	-8.464	-0.425	-8.397	-0.420	-8.290	-0.413	0.009	-0.005	259
05-Feb-99	75635	-8.485	-0.509	-8.418	-0.505	-8.311	-0.498	0.030	0.080	259
05-Feb-99	75635	-8.485	-0.486	-8.418	-0.481	-8.311	-0.474	0.030	0.056	259
06-Feb-99	39382	-8.359	-0.511	-8.292	-0.507	-8.292	-0.507	0.011	0.089	260
09-Feb-99	39382	-8.370	-0.500	-8.303	-0.495	-8.303	-0.495	0.022	0.077	260
09-Feb-99	39382	-8.347	-0.496	-8.280	-0.491	-8.280	-0.491	-0.001	0.073	260
10-Feb-99	39382	-8.340	-0.505	-8.273	-0.501	-8.273	-0.501	-0.008	0.083	260
10-Feb-99	75635	-8.449	-0.496	-8.382	-0.491	-8.275	-0.484	-0.006	0.066	260
10-Feb-99	39382	-8.345	-0.499	-8.278	-0.494	-8.278	-0.494	-0.003	0.076	260
11-Feb-99	75859	-8.365	-0.362	-8.298	-0.357	-8.297	-0.509	0.016	0.091	260
11-Feb-99	75635	-8.521	-0.558	-8.453	-0.554	-8.346	-0.547	0.065	0.129	260
11-Feb-99	75859	-8.374	-0.331	-8.307	-0.326	-8.306	-0.478	0.025	0.060	260
12-Feb-99	39382	-8.361	-0.522	-8.294	-0.518	-8.294	-0.518	0.013	0.100	260
12-Feb-99	75859	-8.352	-0.348	-8.285	-0.343	-8.284	-0.495	0.003	0.077	260
13-Feb-99	75635	-8.503	-0.519	-8.435	-0.515	-8.328	-0.508	0.047	0.090	260
17-Feb-99	75635	-8.478	-0.477	-8.411	-0.472	-8.304	-0.465	0.023	0.047	261
17-Feb-99	75859	-8.324	-0.257	-8.258	-0.251	-8.257	-0.403	-0.024	-0.015	261
17-Feb-99	39382	-8.346	-0.491	-8.279	-0.486	-8.279	-0.486	-0.002	0.068	261
17-Feb-99	13523	-8.004	-4.182	-7.938	-4.195	-8.274	-0.509	-0.007	0.091	261
18-Feb-99	39382	-8.361	-0.526	-8.294	-0.522	-8.294	-0.522	0.013	0.104	261
18-Feb-99	39382	-8.340	-0.491	-8.273	-0.486	-8.273	-0.486	-0.008	0.068	261
19-Mar-99	75859	-8.364	-0.255	-8.297	-0.249	-8.296	-0.401	0.015	-0.017	264
24-Mar-99	75859	-8.371	-0.285	-8.304	-0.279	-8.303	-0.431	0.022	0.013	264
25-Mar-99	75635	-8.517	-0.505	-8.449	-0.501	-8.342	-0.494	0.061	0.076	264

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
19-Apr-99	39382	-8.395	-0.469	-8.328	-0.464	-8.328	-0.464	0.047	0.046	265
20-Apr-99	39382	-8.391	-0.476	-8.324	-0.471	-8.324	-0.471	0.043	0.053	265
20-Apr-99	75635	-8.499	-0.459	-8.431	-0.454	-8.324	-0.447	0.043	0.029	265
20-Apr-99	75859	-8.380	-0.257	-8.313	-0.251	-8.312	-0.403	0.031	-0.015	265
21-Apr-99	39382	-8.377	-0.505	-8.310	-0.501	-8.310	-0.501	0.029	0.083	265
21-Apr-99	75635	-8.496	-0.510	-8.428	-0.506	-8.321	-0.499	0.040	0.081	265
21-Apr-99	75859	-8.365	-0.340	-8.298	-0.335	-8.297	-0.487	0.016	0.069	265
22-Apr-99	75859	-8.392	-0.312	-8.325	-0.307	-8.324	-0.459	0.043	0.041	265
13-May-99	39382	-8.384	-0.487	-8.317	-0.482	-8.317	-0.482	0.036	0.064	266
17-May-99	75859	-8.378	-0.307	-8.311	-0.302	-8.310	-0.454	0.029	0.036	266
17-May-99	39382	-8.405	-0.523	-8.338	-0.519	-8.338	-0.519	0.057	0.101	266
17-May-99	75635	-8.501	-0.504	-8.433	-0.500	-8.326	-0.493	0.045	0.075	266
26-May-99	39382	-8.397	-0.481	-8.330	-0.476	-8.330	-0.476	0.049	0.058	267
26-May-99	75859	-8.379	-0.307	-8.312	-0.302	-8.311	-0.454	0.030	0.036	267
27-May-99	75635	-8.511	-0.528	-8.443	-0.524	-8.336	-0.517	0.055	0.099	267
27-May-99	75635	-8.534	-0.465	-8.466	-0.460	-8.359	-0.453	0.078	0.035	267
01-Jun-99	75859	-8.404	-0.318	-8.337	-0.313	-8.336	-0.465	0.055	0.047	268
02-Jun-99	75859	-8.382	-0.300	-8.315	-0.295	-8.314	-0.447	0.033	0.029	268
02-Jun-99	39382	-8.383	-0.559	-8.316	-0.555	-8.316	-0.555	0.035	0.137	268
03-Jun-99	75635	-8.502	-0.518	-8.434	-0.514	-8.327	-0.507	0.046	0.089	268
03-Jun-99	75635	-8.491	-0.489	-8.424	-0.484	-8.317	-0.477	0.036	0.059	268
14-Jun-99	39382	-8.357	-0.464	-8.290	-0.459	-8.290	-0.459	0.009	0.041	269
16-Jun-99	39382	-8.419	-0.480	-8.352	-0.475	-8.352	-0.475	0.071	0.057	269
17-Jun-99	75635	-8.557	-0.483	-8.489	-0.478	-8.382	-0.471	0.101	0.053	270
17-Jun-99	75635	-8.537	-0.497	-8.469	-0.492	-8.362	-0.485	0.081	0.067	270
18-Jun-99	39382	-8.448	-0.546	-8.381	-0.542	-8.381	-0.542	0.100	0.124	270
18-Jun-99	39382	-8.467	-0.568	-8.400	-0.564	-8.400	-0.564	0.119	0.146	270
21-Jun-99	75635	-8.604	-0.540	-8.536	-0.536	-8.429	-0.529	0.148	0.111	271
21-Jun-99	39382	-8.484	-0.561	-8.417	-0.557	-8.417	-0.557	0.136	0.139	271
21-Jun-99	75859	-8.485	-0.378	-8.418	-0.373	-8.417	-0.525	0.136	0.107	271
02-Jul-99	75859	-8.530	-0.348	-8.462	-0.343	-8.461	-0.495	0.180	0.077	272
02-Jul-99	39382	-8.532	-0.544	-8.464	-0.540	-8.464	-0.540	0.183	0.122	272
02-Jul-99	75635	-8.682	-0.537	-8.613	-0.533	-8.506	-0.526	0.225	0.108	272

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d180	NBS ---Corrected--- d13C	d180	Adjusted to 39382 d13C	d180	AIR -----Terms----- d13C	d180	Week No.
07-Jul-99	75859	-8.513	-0.355	-8.445	-0.350	-8.444	-0.502	0.163	0.084	273
07-Jul-99	75635	-8.670	-0.531	-8.601	-0.527	-8.494	-0.520	0.213	0.102	273
07-Jul-99	39382	-8.543	-0.532	-8.475	-0.528	-8.475	-0.528	0.194	0.110	273
07-Jul-99	13523	-8.211	-4.373	-8.144	-4.387	-8.480	-0.701	0.199	0.283	273
08-Jul-99	75635	-8.652	-0.524	-8.584	-0.520	-8.477	-0.513	0.196	0.095	273
08-Jul-99	39382	-8.515	-0.552	-8.447	-0.548	-8.447	-0.548	0.166	0.130	273
08-Jul-99	75859	-8.567	-0.374	-8.499	-0.369	-8.498	-0.521	0.217	0.103	273
29-Jul-99	39382	-8.533	-0.538	-8.465	-0.534	-8.465	-0.534	0.184	0.116	275
30-Jul-99	75859	-8.535	-0.376	-8.467	-0.371	-8.466	-0.523	0.185	0.105	275
02-Aug-99	75635	-8.652	-0.553	-8.584	-0.549	-8.477	-0.542	0.196	0.124	276
03-Aug-99	39382	-8.462	-0.587	-8.395	-0.583	-8.395	-0.583	0.114	0.165	276
09-Aug-99	75859	-8.538	-0.297	-8.470	-0.292	-8.469	-0.444	0.188	0.026	277
09-Aug-99	39382	-8.493	-0.501	-8.426	-0.497	-8.426	-0.497	0.145	0.079	277
09-Aug-99	75635	-8.638	-0.482	-8.570	-0.477	-8.463	-0.470	0.182	0.052	277
10-Aug-99	75635	-8.548	-0.508	-8.480	-0.504	-8.373	-0.497	0.092	0.079	278
10-Aug-99	75859	-8.482	-0.363	-8.415	-0.358	-8.414	-0.510	0.133	0.092	278
11-Aug-99	39382	-8.438	-0.566	-8.371	-0.562	-8.371	-0.562	0.090	0.144	278
17-Aug-99	75859	-8.504	-0.373	-8.436	-0.368	-8.435	-0.520	0.154	0.102	279
18-Aug-99	75635	-8.663	-0.596	-8.594	-0.592	-8.487	-0.585	0.206	0.167	280
19-Aug-99	39382	-8.554	-0.591	-8.486	-0.587	-8.486	-0.587	0.205	0.169	280
20-Aug-99	75859	-8.551	-0.440	-8.483	-0.435	-8.482	-0.587	0.201	0.169	281
01-Sep-99	75635	-8.663	-0.540	-8.595	-0.536	-8.488	-0.529	0.207	0.111	282
01-Sep-99	75859	-8.514	-0.407	-8.446	-0.402	-8.445	-0.554	0.164	0.136	282
02-Sep-99	39382	-8.529	-0.588	-8.461	-0.584	-8.461	-0.584	0.180	0.166	282
03-Sep-99	75859	-8.536	-0.422	-8.468	-0.417	-8.467	-0.569	0.186	0.151	282
09-Sep-99	75859	-8.464	-0.406	-8.397	-0.401	-8.396	-0.553	0.115	0.135	283
09-Sep-99	39382	-8.445	-0.602	-8.378	-0.598	-8.378	-0.598	0.097	0.180	283
10-Sep-99	75635	-8.603	-0.589	-8.535	-0.585	-8.428	-0.578	0.147	0.160	283
23-Sep-99	75859	-8.525	-0.304	-8.457	-0.299	-8.456	-0.451	0.175	0.033	284
23-Sep-99	75859	-8.455	-0.294	-8.388	-0.288	-8.387	-0.440	0.106	0.022	284

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
15-Nov-99	75859	-8.434	-0.412	-8.367	-0.407	-8.366	-0.559	0.085	0.141	288
15-Nov-99	75859	-8.404	-0.327	-8.337	-0.322	-8.336	-0.474	0.055	0.056	288
15-Nov-99	75859	-8.415	-0.435	-8.348	-0.430	-8.347	-0.582	0.066	0.164	288
08-Dec-99	75635	-8.516	-0.506	-8.448	-0.502	-8.341	-0.495	0.060	0.077	289
09-Dec-99	75635	-8.529	-0.542	-8.461	-0.538	-8.354	-0.531	0.073	0.113	289
09-Dec-99	75859	-8.426	-0.351	-8.359	-0.346	-8.358	-0.498	0.077	0.080	289
09-Dec-99	39382	-8.411	-0.504	-8.344	-0.500	-8.344	-0.500	0.063	0.082	289
15-Dec-99	75635	-8.522	-0.498	-8.454	-0.493	-8.347	-0.486	0.066	0.068	290
15-Dec-99	75635	-8.546	-0.561	-8.478	-0.557	-8.371	-0.550	0.090	0.132	290
20-Dec-99	39382	-8.416	-0.487	-8.349	-0.482	-8.349	-0.482	0.068	0.064	291
20-Dec-99	39382	-8.410	-0.553	-8.343	-0.549	-8.343	-0.549	0.062	0.131	291
21-Dec-99	75859	-8.417	-0.334	-8.350	-0.329	-8.349	-0.481	0.068	0.063	291
21-Dec-99	75859	-8.424	-0.348	-8.357	-0.343	-8.356	-0.495	0.075	0.077	291
22-Dec-99	75635	-8.538	-0.547	-8.470	-0.543	-8.363	-0.536	0.082	0.118	291
22-Dec-99	75635	-8.546	-0.547	-8.478	-0.543	-8.371	-0.536	0.090	0.118	291
12-Jan-00	75635	-8.518	-0.503	-8.450	-0.499	-8.343	-0.492	0.062	0.074	292
12-Jan-00	75859	-8.436	-0.383	-8.369	-0.378	-8.368	-0.530	0.087	0.112	292
13-Jan-00	39382	-8.438	-0.584	-8.371	-0.580	-8.371	-0.580	0.090	0.162	292
13-Jan-00	13523	-8.085	-4.209	-8.019	-4.223	-8.355	-0.537	0.074	0.119	292
13-Jan-00	13523	-8.129	-4.285	-8.062	-4.299	-8.398	-0.613	0.117	0.195	292
13-Jan-00	39382	-8.463	-0.541	-8.396	-0.537	-8.396	-0.537	0.115	0.119	292
14-Jan-00	75635	-8.569	-0.611	-8.501	-0.607	-8.394	-0.600	0.113	0.182	292
14-Jan-00	13523	-8.129	-4.275	-8.062	-4.289	-8.398	-0.603	0.117	0.185	292
14-Jan-00	13523	-8.132	-4.268	-8.065	-4.282	-8.401	-0.596	0.120	0.178	292
14-Jan-00	75635	-8.569	-0.576	-8.501	-0.572	-8.394	-0.565	0.113	0.147	292
19-Jan-00	96364	-8.151	-4.533	-8.084	-4.548	-8.393	-0.596	0.112	0.178	293
19-Jan-00	75859	-8.453	-0.400	-8.386	-0.395	-8.385	-0.547	0.104	0.129	293
19-Jan-00	39414	-8.538	-5.404	-8.468	-5.423	-8.389	-0.597	0.108	0.179	293
20-Jan-00	39382	-8.469	-0.581	-8.402	-0.577	-8.402	-0.577	0.121	0.159	293
20-Jan-00	2407	-7.925	-2.968	-7.860	-2.975	-8.401	-0.593	0.120	0.175	293
20-Jan-00	75635	-8.611	-0.595	-8.543	-0.591	-8.436	-0.584	0.155	0.166	293
21-Jan-00	2407	-7.900	-2.941	-7.835	-2.948	-8.376	-0.566	0.095	0.148	293
21-Jan-00	96364	-8.166	-4.495	-8.099	-4.510	-8.408	-0.558	0.127	0.140	293

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
25-Jan-00	39382	-8.449	-0.552	-8.382	-0.548	-8.382	-0.548	0.101	0.130	294
26-Jan-00	75635	-8.558	-0.588	-8.490	-0.584	-8.383	-0.577	0.102	0.159	294
27-Jan-00	75859	-8.451	-0.430	-8.384	-0.425	-8.383	-0.577	0.102	0.159	294
27-Jan-00	39414	-8.516	-5.369	-8.447	-5.388	-8.368	-0.562	0.087	0.144	294
27-Jan-00	96364	-8.117	-4.521	-8.050	-4.536	-8.359	-0.584	0.078	0.166	294
27-Jan-00	2407	-7.903	-2.960	-7.838	-2.967	-8.379	-0.585	0.098	0.167	294
01-Feb-00	75859	-8.425	-0.393	-8.358	-0.388	-8.357	-0.540	0.076	0.122	295
01-Feb-00	2407	-7.885	-2.950	-7.820	-2.957	-8.361	-0.575	0.080	0.157	295
02-Feb-00	39382	-8.414	-0.583	-8.347	-0.579	-8.347	-0.579	0.066	0.161	295
02-Feb-00	39382	-8.499	-0.682	-8.431	-0.678	-8.431	-0.678	0.150	0.260	295
03-Feb-00	75859	-8.454	-0.391	-8.387	-0.386	-8.386	-0.538	0.105	0.120	296
03-Feb-00	75859	-8.472	-0.463	-8.405	-0.458	-8.404	-0.610	0.123	0.192	296
04-Feb-00	75859	-8.411	-0.367	-8.344	-0.362	-8.343	-0.514	0.062	0.096	296
04-Feb-00	75635	-8.555	-0.637	-8.487	-0.633	-8.380	-0.626	0.099	0.208	296
04-Feb-00	75859	-8.484	-0.466	-8.417	-0.461	-8.416	-0.613	0.135	0.195	296
10-Feb-00	75635	-8.614	-0.688	-8.546	-0.684	-8.439	-0.677	0.158	0.259	297
10-Feb-00	75635	-8.536	-0.558	-8.468	-0.554	-8.361	-0.547	0.080	0.129	297
11-Feb-00	39382	-8.409	-0.614	-8.342	-0.610	-8.342	-0.610	0.061	0.192	297
01-Mar-00	75859	-8.415	-0.627	-8.348	-0.623	-8.347	-0.775	0.066	0.357	298
01-Mar-00	39382	-8.387	-0.803	-8.320	-0.800	-8.320	-0.800	0.039	0.382	298
01-Mar-00	75635	-8.537	-0.853	-8.469	-0.850	-8.362	-0.843	0.081	0.425	298
02-Mar-00	75635	-8.534	-0.793	-8.466	-0.790	-8.359	-0.783	0.078	0.365	299
02-Mar-00	75859	-8.427	-0.594	-8.360	-0.590	-8.359	-0.742	0.078	0.324	299
03-Mar-00	39382	-8.414	-0.827	-8.347	-0.824	-8.347	-0.824	0.066	0.406	299
03-Mar-00	75635	-8.514	-0.812	-8.446	-0.809	-8.339	-0.802	0.058	0.384	299
03-Mar-00	39382	-8.416	-0.822	-8.349	-0.819	-8.349	-0.819	0.068	0.401	299
03-Mar-00	39414	-8.484	-5.575	-8.415	-5.595	-8.336	-0.769	0.055	0.351	299
03-Mar-00	96364	-8.130	-4.757	-8.063	-4.773	-8.372	-0.821	0.091	0.403	299
03-Mar-00	2407	-7.874	-3.186	-7.809	-3.195	-8.350	-0.813	0.069	0.395	299
06-Mar-00	75859	-8.419	-0.624	-8.352	-0.620	-8.351	-0.772	0.070	0.354	300
06-Mar-00	96364	-8.103	-4.675	-8.036	-4.691	-8.345	-0.739	0.064	0.321	300
07-Mar-00	75859	-8.383	-0.633	-8.316	-0.629	-8.315	-0.781	0.034	0.363	300
07-Mar-00	39414	-8.489	-5.546	-8.420	-5.566	-8.341	-0.740	0.060	0.322	300
07-Mar-00	39382	-8.407	-0.802	-8.340	-0.799	-8.340	-0.799	0.059	0.381	300

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
08-Mar-00	2407	-7.887	-3.105	-7.822	-3.113	-8.363	-0.731	0.082	0.313	301
08-Mar-00	75635	-8.541	-0.818	-8.473	-0.815	-8.366	-0.808	0.085	0.390	301
08-Mar-00	39414	-8.477	-5.577	-8.408	-5.597	-8.329	-0.771	0.048	0.353	301
09-Mar-00	39414	-8.492	-5.593	-8.423	-5.613	-8.344	-0.787	0.063	0.369	301
09-Mar-00	75859	-8.415	-0.658	-8.348	-0.654	-8.347	-0.806	0.066	0.388	301
10-Mar-00	39382	-8.435	-0.823	-8.368	-0.820	-8.368	-0.820	0.087	0.402	301
10-Mar-00	39382	-8.426	-0.837	-8.359	-0.834	-8.359	-0.834	0.078	0.416	301
13-Mar-00	96364	-8.087	-4.650	-8.020	-4.666	-8.329	-0.714	0.048	0.296	302
14-Mar-00	75635	-8.532	-0.747	-8.464	-0.744	-8.357	-0.737	0.076	0.319	302
14-Mar-00	96364	-8.125	-4.675	-8.058	-4.691	-8.367	-0.739	0.086	0.321	302
14-Mar-00	75635	-8.557	-0.769	-8.489	-0.766	-8.382	-0.759	0.101	0.341	302
15-Mar-00	39382	-8.429	-0.774	-8.362	-0.771	-8.362	-0.771	0.081	0.353	303
15-Mar-00	39382	-8.417	-0.787	-8.350	-0.784	-8.350	-0.784	0.069	0.366	303
16-Mar-00	75859	-8.417	-0.577	-8.350	-0.573	-8.349	-0.725	0.068	0.307	303
16-Mar-00	39414	-8.480	-5.560	-8.411	-5.580	-8.332	-0.754	0.051	0.336	303
16-Mar-00	75859	-8.396	-0.606	-8.329	-0.602	-8.328	-0.754	0.047	0.336	303
20-Mar-00	75635	-8.500	-0.735	-8.432	-0.732	-8.325	-0.725	0.044	0.307	304
20-Mar-00	2407	-7.844	-3.094	-7.779	-3.102	-8.320	-0.720	0.039	0.302	304
21-Mar-00	2407	-7.827	-3.062	-7.762	-3.070	-8.303	-0.688	0.022	0.270	304
21-Mar-00	75635	-8.528	-0.799	-8.460	-0.796	-8.353	-0.789	0.072	0.371	304
21-Mar-00	2407	-7.877	-3.147	-7.812	-3.155	-8.353	-0.773	0.072	0.355	304
22-Mar-00	39382	-8.404	-0.782	-8.337	-0.779	-8.337	-0.779	0.056	0.361	305
22-Mar-00	96364	-8.090	-4.682	-8.023	-4.698	-8.332	-0.746	0.051	0.328	305
23-Mar-00	2407	-7.864	-3.114	-7.799	-3.122	-8.340	-0.740	0.059	0.322	305
23-Mar-00	75859	-8.436	-0.641	-8.369	-0.637	-8.368	-0.789	0.087	0.371	305
24-Mar-00	75859	-8.401	-0.575	-8.334	-0.571	-8.333	-0.723	0.052	0.305	305
24-Mar-00	39414	-8.503	-5.584	-8.434	-5.604	-8.355	-0.778	0.074	0.360	305
03-Apr-00	75635	-8.479	-0.609	-8.412	-0.605	-8.305	-0.598	0.024	0.180	306
03-Apr-00	39414	-8.490	-5.443	-8.421	-5.463	-8.342	-0.637	0.061	0.219	306
04-Apr-00	39414	-8.497	-5.497	-8.428	-5.517	-8.349	-0.691	0.068	0.273	306
04-Apr-00	75859	-8.390	-0.509	-8.323	-0.505	-8.322	-0.657	0.041	0.239	306
05-Apr-00	2407	-7.831	-3.017	-7.766	-3.025	-8.307	-0.643	0.026	0.225	307
05-Apr-00	96364	-8.091	-4.549	-8.024	-4.564	-8.333	-0.612	0.052	0.194	307
06-Apr-00	39414	-8.499	-5.507	-8.430	-5.527	-8.351	-0.701	0.070	0.283	307
06-Apr-00	39414	-8.508	-5.495	-8.439	-5.515	-8.360	-0.689	0.079	0.271	307

TABLE D(1): Complete Atmospheric Secondary Standards Data Summary (with adjustment to 39382)

MASS SPECTROMETER ATMOSPHERIC SECONDARY STANDARDS

# denotes flagged data
T denotes "test" automated extractions

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to 39382 d13C	d18O	AIR -----Terms----- d13C	d18O	Week No.
24-Apr-00	2407	-7.879	-2.977	-7.814	-2.985	-8.355	-0.603	0.074	0.185	308
24-Apr-00	2407	-7.889	-2.988	-7.824	-2.996	-8.365	-0.614	0.084	0.196	308
25-Apr-00	96364	-8.093	-4.740	-8.026	-4.756	-8.335	-0.804	0.054	0.386	308
25-Apr-00	96364	-8.138	-4.629	-8.071	-4.645	-8.380	-0.693	0.099	0.275	308
26-Apr-00	39414	-8.521	-5.588	-8.452	-5.608	-8.373	-0.782	0.092	0.364	308
26-Apr-00	2407	-7.887	-3.109	-7.822	-3.117	-8.363	-0.735	0.082	0.317	308
27-Jun-00	2407	-7.884	-2.948	-7.819	-2.955	-8.360	-0.573	0.079	0.155	309
06-Jul-00	2407	-7.807	-2.864	-7.743	-2.871	-8.284	-0.489	0.003	0.071	309

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
22-Nov-96	GEA4	-7.504	1.757	-7.443	1.773	-7.408	-0.108	-0.056	-0.017	162
22-Nov-96	GEA4	-7.509	1.750	-7.448	1.765	-7.413	-0.116	-0.051	-0.009	162
22-Nov-96	GEA4	-7.509	1.773	-7.448	1.789	-7.413	-0.092	-0.051	-0.033	162
22-Nov-96	GEA4	-7.516	1.765	-7.455	1.781	-7.420	-0.100	-0.044	-0.025	162
22-Nov-96	GEA4	-7.505	1.773	-7.444	1.789	-7.409	-0.092	-0.055	-0.033	162
22-Nov-96	GEA4	-7.518	1.743	-7.457	1.758	-7.422	-0.123	-0.042	-0.002	162
22-Nov-96	GS19	-7.486	-0.108	-7.424	-0.102	-7.424	-0.102	-0.040	-0.023	162
22-Nov-96	GS20	-8.617	-0.906	-8.549	-0.903	-7.440	-0.113	-0.024	-0.012	162
25-Nov-96	GEA4	-7.497	1.764	-7.436	1.780	-7.401	-0.101	-0.063	-0.024	162
25-Nov-96	GEA4	-7.511	1.761	-7.450	1.777	-7.415	-0.104	-0.049	-0.021	162
25-Nov-96	GEA4	-7.529	1.758	-7.468	1.774	-7.433	-0.107	-0.031	-0.018	162
25-Nov-96	GEA4	-7.512	1.747	-7.451	1.762	-7.416	-0.119	-0.048	-0.006	162
25-Nov-96	GEA4	-7.510	1.761	-7.449	1.777	-7.414	-0.104	-0.050	-0.021	162
25-Nov-96	GEA4	-7.515	1.747	-7.454	1.762	-7.419	-0.119	-0.045	-0.006	162
25-Nov-96	GEA4	-7.518	1.749	-7.457	1.764	-7.422	-0.117	-0.042	-0.008	162
25-Nov-96	GEA4	-7.510	1.759	-7.449	1.775	-7.414	-0.106	-0.050	-0.019	162
25-Nov-96	GEA4	-7.514	1.757	-7.453	1.773	-7.418	-0.108	-0.046	-0.017	162
25-Nov-96	GEA4	-7.519	1.691	-7.458	1.706	-7.423	-0.175	-0.041	0.050	162
25-Nov-96	GEA4	-7.523	1.748	-7.462	1.763	-7.427	-0.118	-0.037	-0.007	162
25-Nov-96	GEA4	-7.517	1.760	-7.456	1.776	-7.421	-0.105	-0.043	-0.020	162
25-Nov-96	GEA4	-7.521	1.747	-7.460	1.762	-7.425	-0.119	-0.039	-0.006	162
25-Nov-96	GEA4	-7.522	1.742	-7.461	1.757	-7.426	-0.124	-0.038	-0.001	162
25-Nov-96	GS20	-8.609	-0.889	-8.541	-0.886	-7.432	-0.096	-0.032	-0.029	162
02-Dec-96	GEA4	-7.519	1.796	-7.458	1.812	-7.423	-0.069	-0.041	-0.056	164
02-Dec-96	GEA4	-7.523	1.779	-7.462	1.795	-7.427	-0.086	-0.037	-0.039	164
04-Dec-96	GEA4	-7.526	1.748	-7.465	1.763	-7.430	-0.118	-0.034	-0.007	165
04-Dec-96	GEA4	-7.539	1.741	-7.478	1.756	-7.443	-0.125	-0.021	0.000	165
05-Dec-96	GEA4	-7.537	1.732	-7.476	1.747	-7.441	-0.134	-0.023	0.009	165
05-Dec-96	GEA4	-7.543	1.664	-7.482	1.679	-7.447	-0.202	-0.017	0.077	165
20-Dec-96	GEA4	-7.510	1.705	-7.449	1.720	-7.414	-0.161	-0.050	0.036	166
20-Dec-96	GEA4	-7.524	1.730	-7.463	1.745	-7.428	-0.136	-0.036	0.011	166
03-Jan-97	GEA4	-7.522	1.728	-7.461	1.743	-7.426	-0.138	-0.038	0.013	167
03-Jan-97	GEA4	-7.521	1.750	-7.460	1.765	-7.425	-0.116	-0.039	-0.009	167
03-Jan-97	GS19	-7.509	-0.145	-7.447	-0.139	-7.447	-0.139	-0.017	0.014	167
03-Jan-97	GS20	-8.641	-0.934	-8.572	-0.932	-7.463	-0.142	-0.001	0.017	167
04-Jan-97	GEA4	-7.543	1.728	-7.482	1.743	-7.447	-0.138	-0.017	0.013	167
04-Jan-97	GEA4	-7.536	1.714	-7.475	1.729	-7.440	-0.152	-0.024	0.027	167

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d180	NBS ---Corrected--- d13C	d180	Adjusted to GS19 d13C	d180	SEA -----Terms---- d13C	d180	Week No.
06-Jan-97	GEA4	-7.503	1.734	-7.442	1.749	-7.407	-0.132	-0.057	0.007	168
06-Jan-97	GEA4	-7.519	1.714	-7.458	1.729	-7.423	-0.152	-0.041	0.027	168
07-Jan-97	GEA4	-7.517	1.685	-7.456	1.700	-7.421	-0.181	-0.043	0.056	168
07-Jan-97	GEA4	-7.530	1.722	-7.469	1.737	-7.434	-0.144	-0.030	0.019	168
21-Jan-97	GS19	-7.505	-0.203	-7.443	-0.197	-7.443	-0.197	-0.021	0.072	170
21-Jan-97	GS20	-8.628	-1.002	-8.560	-1.000	-7.451	-0.210	-0.013	0.085	170
28-Jan-97	GS19	-7.505	-0.203	-7.443	-0.197	-7.443	-0.197	-0.021	0.072	171
28-Jan-97	GS20	-8.628	-1.002	-8.560	-1.000	-7.451	-0.210	-0.013	0.085	171
29-Jan-97	GEA4	-7.539	1.657	-7.478	1.672	-7.443	-0.209	-0.021	0.084	171
29-Jan-97	GEA4	-7.538	1.660	-7.477	1.675	-7.442	-0.206	-0.022	0.081	171
29-Jan-97	GS19	-7.500	-0.193	-7.438	-0.187	-7.438	-0.187	-0.026	0.062	171
29-Jan-97	GS19	-7.510	-0.213	-7.448	-0.207	-7.448	-0.207	-0.016	0.082	171
29-Jan-97	GS20	-8.629	-0.995	-8.561	-0.993	-7.452	-0.203	-0.012	0.078	171
29-Jan-97	GS20	-8.626	-1.010	-8.558	-1.008	-7.449	-0.218	-0.015	0.093	171
30-Jan-97	GEA4	-7.541	1.615	-7.480	1.630	-7.445	-0.251	-0.019	0.126	172
30-Jan-97	GEA4	-7.529	1.633	-7.468	1.648	-7.433	-0.233	-0.031	0.108	172
31-Jan-97	GS20	-8.626	-1.006	-8.558	-1.004	-7.449	-0.214	-0.015	0.089	172
31-Jan-97	GS20	-8.623	-1.024	-8.555	-1.022	-7.446	-0.232	-0.018	0.107	172
31-Jan-97	GS19	-7.490	-0.223	-7.428	-0.217	-7.428	-0.217	-0.036	0.092	172
31-Jan-97	GS19	-7.502	-0.208	-7.440	-0.202	-7.440	-0.202	-0.024	0.077	172
03-Feb-97	GEA4	-7.542	1.641	-7.481	1.656	-7.446	-0.225	-0.018	0.100	173
03-Feb-97	GEA4	-7.533	1.655	-7.472	1.670	-7.437	-0.211	-0.027	0.086	173
13-Feb-97	GEA4	-7.493	1.868	-7.432	1.884	-7.397	0.003	-0.067	-0.128	174
13-Feb-97	GEA4	-7.483	1.855	-7.422	1.871	-7.387	-0.010	-0.077	-0.115	174
14-Feb-97	GEA4	-7.482	1.883	-7.421	1.899	-7.386	0.018	-0.078	-0.143	174
14-Feb-97	GEA4	-7.497	1.853	-7.436	1.869	-7.401	-0.012	-0.063	-0.113	174
20-Feb-97	GEA4	-7.521	1.877	-7.460	1.893	-7.425	0.012	-0.039	-0.137	175
20-Feb-97	GEA4	-7.495	1.850	-7.434	1.866	-7.399	-0.015	-0.065	-0.110	175
20-Feb-97	GEA4	-7.515	1.813	-7.454	1.829	-7.419	-0.052	-0.045	-0.073	175
20-Feb-97	GEA4	-7.518	1.833	-7.457	1.849	-7.422	-0.032	-0.042	-0.093	175
27-Feb-97	GEA4	-7.507	1.762	-7.446	1.778	-7.411	-0.103	-0.053	-0.022	176
27-Feb-97	GEA4	-7.519	1.799	-7.458	1.815	-7.423	-0.066	-0.041	-0.059	176
28-Feb-97	GEA4	-7.507	1.762	-7.446	1.778	-7.411	-0.103	-0.053	-0.022	176
28-Feb-97	GEA4	-7.519	1.799	-7.458	1.815	-7.423	-0.066	-0.041	-0.059	176

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS # denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
05-Mar-97	GEA4	-7.501	1.781	-7.440	1.797	-7.405	-0.084	-0.059	-0.041	177
05-Mar-97	GEA4	-7.521	1.748	-7.460	1.763	-7.425	-0.118	-0.039	-0.007	177
06-Mar-97	GEA4	-7.499	1.732	-7.438	1.747	-7.403	-0.134	-0.061	0.009	177
06-Mar-97	GS19	-7.480	-0.138	-7.418	-0.132	-7.418	-0.132	-0.046	0.007	177
06-Mar-97	GS20	-8.580	-0.928	-8.512	-0.926	-7.403	-0.136	-0.061	0.011	177
06-Mar-97	GEA4	-7.517	1.730	-7.456	1.745	-7.421	-0.136	-0.043	0.011	177
07-Mar-97	GEA4	-7.509	1.723	-7.448	1.738	-7.413	-0.143	-0.051	0.018	177
07-Mar-97	GEA4	-7.542	1.685	-7.481	1.700	-7.446	-0.181	-0.018	0.056	177
10-Mar-97	GEA4	-7.520	1.728	-7.459	1.741	-7.424	-0.140	-0.040	0.015	178
10-Mar-97	GEA4	-7.514	1.715	-7.453	1.730	-7.418	-0.151	-0.046	0.026	178
11-Mar-97	GEA4	-7.507	1.746	-7.446	1.761	-7.411	-0.120	-0.053	-0.005	178
11-Mar-97	GEA4	-7.535	1.731	-7.474	1.746	-7.439	-0.135	-0.025	0.010	178
12-Mar-97	GEA4	-7.515	1.734	-7.454	1.749	-7.419	-0.132	-0.045	0.007	178
12-Mar-97	GEA4	-7.544	1.729	-7.483	1.744	-7.448	-0.137	-0.016	0.012	178
28-Mar-97	GEA4	-7.546	1.691	-7.485	1.706	-7.450	-0.175	-0.014	0.050	181
28-Mar-97	GEA4	-7.506	1.704	-7.445	1.719	-7.410	-0.162	-0.054	0.037	181
29-Mar-97	GEA4	-7.505	1.685	-7.444	1.700	-7.409	-0.181	-0.055	0.056	181
29-Mar-97	GEA4	-7.524	1.697	-7.463	1.712	-7.428	-0.169	-0.036	0.044	181
31-Mar-97	GEA4	-7.558	1.650	-7.497	1.665	-7.462	-0.216	-0.002	0.091	182
31-Mar-97	GS20	-8.619	-0.945	-8.551	-0.943	-7.442	-0.153	-0.022	0.028	182
31-Mar-97	GS19	-7.488	-0.181	-7.426	-0.175	-7.426	-0.175	-0.038	0.050	182
31-Mar-97	GEA4	-7.522	1.678	-7.461	1.693	-7.426	-0.188	-0.038	0.063	182
01-Apr-97	GEA4	-7.522	1.672	-7.461	1.687	-7.426	-0.194	-0.038	0.069	182
01-Apr-97	GEA4	-7.530	1.668	-7.469	1.683	-7.434	-0.198	-0.030	0.073	182
07-Apr-97	GEA4	-7.496	1.691	-7.435	1.706	-7.400	-0.175	-0.064	0.050	183
14-Apr-97	GEA4	-7.559	1.668	-7.498	1.683	-7.463	-0.198	-0.001	0.073	183
15-Apr-97	GEA4	-7.552	1.636	-7.491	1.651	-7.456	-0.230	-0.008	0.105	183
22-Apr-97	GEA4	-7.576	1.639	-7.515	1.654	-7.480	-0.227	0.016	0.102	184
24-Apr-97	GEA4	-7.550	1.646	-7.489	1.661	-7.454	-0.220	-0.010	0.095	184
25-Apr-97	GEA4	-7.556	1.631	-7.495	1.646	-7.460	-0.235	-0.004	0.110	184
08-May-97	GEA4	-7.586	1.611	-7.525	1.626	-7.490	-0.255	0.026	0.130	185
09-May-97	GEA4	-7.547	1.654	-7.486	1.669	-7.451	-0.212	-0.013	0.087	185
15-May-97	GEA4	-7.575	1.632	-7.514	1.647	-7.479	-0.234	0.015	0.109	186
16-May-97	GEA4	-7.553	1.625	-7.492	1.640	-7.457	-0.241	-0.007	0.116	186

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS # denotes flagged data

Date	Standard No.	---Measured--- d13C	d180	NBS ---Corrected--- d13C	d180	Adjusted to GS19 d13C	d180	SEA -----Terms---- d13C	d180	Week No.
20-May-97	GEA4	-7.570	1.589	-7.509	1.604	-7.474	-0.277	0.010	0.152	187
21-May-97	GEA4	-7.568	1.649	-7.507	1.664	-7.472	-0.217	0.008	0.092	187
22-May-97	GEA4	-7.592	1.604	-7.530	1.619	-7.495	-0.262	0.031	0.137	187
28-May-97	GEA4	-7.580	1.607	-7.519	1.622	-7.484	-0.259	0.020	0.134	188
29-May-97	GEA4	-7.595	1.630	-7.533	1.645	-7.498	-0.236	0.034	0.111	188
03-Jun-97	GEA4	-7.575	1.616	-7.514	1.631	-7.479	-0.250	0.015	0.125	189
04-Jun-97	GEA4	-7.572	1.614	-7.511	1.629	-7.476	-0.252	0.012	0.127	189
05-Jun-97	GEA4	-7.556	1.598	-7.495	1.613	-7.460	-0.268	-0.004	0.143	190
17-Jun-97	GEA4	-7.562	1.685	-7.501	1.700	-7.466	-0.181	0.002	0.056	191
17-Jun-97	GS19	-7.539	-0.196	-7.477	-0.190	-7.477	-0.190	0.013	0.065	191
17-Jun-97	GS20	-8.646	-0.995	-8.577	-0.993	-7.468	-0.203	0.004	0.078	191
24-Jun-97	GEA4	-7.527	1.685	-7.466	1.700	-7.431	-0.181	-0.033	0.056	192
24-Jun-97	GEA4	-7.549	1.613	-7.488	1.628	-7.453	-0.253	-0.011	0.128	192
25-Jun-97	GES1	1.964	-2.008	1.972	-2.011	-7.436	-0.377	-0.028	0.252	192
09-Jul-97	GEA4	-7.518	1.746	-7.457	1.761	-7.422	-0.120	-0.042	-0.005	193
09-Jul-97	GEA4	-7.543	1.720	-7.482	1.735	-7.447	-0.146	-0.017	0.021	193
10-Jul-97	GEA4	-7.523	1.713	-7.462	1.728	-7.427	-0.153	-0.037	0.028	193
10-Jul-97	GEA4	-7.531	1.650	-7.470	1.665	-7.435	-0.216	-0.029	0.091	193
17-Jul-97	GEA4	-7.530	1.701	-7.469	1.716	-7.434	-0.165	-0.030	0.040	194
17-Jul-97	GEA4	-7.512	1.691	-7.451	1.706	-7.416	-0.175	-0.048	0.050	194
18-Jul-97	GEA4	-7.519	1.699	-7.458	1.714	-7.423	-0.167	-0.041	0.042	194
18-Jul-97	GEA4	-7.531	1.683	-7.470	1.698	-7.435	-0.183	-0.029	0.058	194
21-Jul-97	GEA4	-7.535	1.676	-7.474	1.691	-7.439	-0.190	-0.025	0.065	195
21-Jul-97	GEA4	-7.517	1.685	-7.456	1.700	-7.421	-0.181	-0.043	0.056	195
22-Jul-97	GEA4	-7.517	1.662	-7.456	1.677	-7.421	-0.204	-0.043	0.079	195
22-Jul-97	GEA4	-7.522	1.643	-7.461	1.658	-7.426	-0.223	-0.038	0.098	195
23-Jul-97	GEA4	-7.533	1.679	-7.472	1.694	-7.437	-0.187	-0.027	0.062	195
23-Jul-97	GS19	-7.494	-0.210	-7.432	-0.204	-7.432	-0.204	-0.032	0.079	195
23-Jul-97	GS20	-8.623	-0.971	-8.555	-0.969	-7.446	-0.179	-0.018	0.054	195
23-Jul-97	GEA4	-7.525	1.659	-7.464	1.674	-7.429	-0.207	-0.035	0.082	195

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS # denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
27-Jul-97	GEA4	-7.577	1.570	-7.516	1.585	-7.481	-0.296	0.017	0.171	196
28-Jul-97	GEA4	-7.544	1.620	-7.483	1.635	-7.448	-0.246	-0.016	0.121	196
29-Jul-97	GEA4	-7.549	1.700	-7.488	1.715	-7.453	-0.166	-0.011	0.041	196
14-Aug-97	GEA4	-7.499	1.656	-7.438	1.671	-7.403	-0.210	-0.061	0.085	197
14-Aug-97	GEA4	-7.525	1.663	-7.464	1.678	-7.429	-0.203	-0.035	0.078	197
18-Aug-97	GEA4	-7.533	1.679	-7.472	1.694	-7.437	-0.187	-0.027	0.062	198
19-Aug-97	GEA4	-7.511	1.665	-7.450	1.680	-7.415	-0.201	-0.049	0.076	198
29-Aug-97	GEA4	-7.499	1.686	-7.438	1.701	-7.403	-0.180	-0.061	0.055	199
02-Sep-97	GEA4	-7.522	1.655	-7.461	1.670	-7.426	-0.211	-0.038	0.086	199
05-Sep-97	GEA4	-7.524	1.665	-7.463	1.680	-7.428	-0.201	-0.036	0.076	199
15-Sep-97	GEA4	-7.532	1.661	-7.471	1.676	-7.436	-0.205	-0.028	0.080	201
16-Sep-97	GEA4	-7.564	1.626	-7.503	1.641	-7.468	-0.240	0.004	0.115	201
17-Sep-97	GEA4	-7.549	1.641	-7.488	1.656	-7.453	-0.225	-0.011	0.100	201
24-Sep-97	GEA4	-7.541	1.660	-7.480	1.675	-7.445	-0.206	-0.019	0.081	202
14-Nov-97	GEA4	-7.529	1.805	-7.468	1.821	-7.433	-0.060	-0.031	-0.065	203
17-Nov-97	GEA4	-7.530	1.790	-7.469	1.806	-7.434	-0.075	-0.030	-0.050	203
18-Nov-97	GEA4	-7.538	1.814	-7.477	1.830	-7.442	-0.051	-0.022	-0.074	204
18-Nov-97	GEA4	-7.567	1.819	-7.506	1.835	-7.471	-0.046	0.007	-0.079	204
18-Nov-97	GS19	-7.532	-0.062	-7.470	-0.055	-7.470	-0.055	0.006	-0.070	204
18-Nov-97	GS20	-8.657	-0.835	-8.588	-0.832	-7.479	-0.042	0.015	-0.083	204
20-Nov-97	GEA4	-7.576	1.802	-7.515	1.818	-7.480	-0.063	0.016	-0.062	204
01-Dec-97	GEA4	-7.535	1.760	-7.474	1.776	-7.439	-0.105	-0.025	-0.020	205
01-Dec-97	GES1	1.941	-1.722	1.949	-1.723	-7.459	-0.089	-0.005	-0.036	205
01-Dec-97	GES1	1.960	-1.744	1.968	-1.745	-7.440	-0.111	-0.024	-0.014	205
01-Dec-97	GES1	1.981	-1.661	1.988	-1.662	-7.420	-0.028	-0.044	-0.097	205
01-Dec-97	GES1	1.944	-1.710	1.952	-1.711	-7.456	-0.077	-0.008	-0.048	205
01-Dec-97	GES1	1.949	-1.705	1.957	-1.706	-7.451	-0.072	-0.013	-0.053	205
01-Dec-97	GES1	1.969	-1.694	1.977	-1.695	-7.431	-0.061	-0.033	-0.064	205

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
09-Dec-97	GEA4	-7.516	1.776	-7.455	1.792	-7.420	-0.089	-0.044	-0.036	206
09-Dec-97	GS19	-7.470	-0.072	-7.409	-0.065	-7.409	-0.065	-0.055	-0.060	206
09-Dec-97	GS20	-8.599	-0.848	-8.531	-0.845	-7.422	-0.055	-0.042	-0.070	206
09-Dec-97	GES1	2.001	-1.711	2.008	-1.712	-7.400	-0.078	-0.064	-0.047	206
09-Dec-97	GES1	1.960	-1.782	1.968	-1.784	-7.440	-0.150	-0.024	0.025	206
11-Dec-97	GEA4	-7.525	1.733	-7.464	1.748	-7.429	-0.133	-0.035	0.008	206
11-Dec-97	GS20	-8.628	-0.949	-8.560	-0.947	-7.451	-0.157	-0.013	0.032	206
11-Dec-97	GEA4	-7.521	1.703	-7.460	1.718	-7.425	-0.163	-0.039	0.038	206
11-Dec-97	GES1	1.981	-1.725	1.988	-1.726	-7.420	-0.092	-0.044	-0.033	206
11-Dec-97	GES1	1.963	-1.796	1.971	-1.798	-7.437	-0.164	-0.027	0.039	206
15-Dec-97	GEA4	-7.555	1.649	-7.494	1.664	-7.459	-0.217	-0.005	0.092	207
15-Dec-97	GS19	-7.507	-0.130	-7.445	-0.124	-7.445	-0.124	-0.019	-0.001	207
15-Dec-97	GS20	-8.617	-0.912	-8.549	-0.910	-7.440	-0.120	-0.024	-0.005	207
15-Dec-97	GEA4	-7.534	1.702	-7.473	1.717	-7.438	-0.164	-0.026	0.039	207
15-Dec-97	GES1	1.942	-1.764	1.950	-1.765	-7.458	-0.131	-0.006	0.006	207
15-Dec-97	GES1	1.964	-1.770	1.972	-1.771	-7.436	-0.137	-0.028	0.012	207
16-Dec-97	GEA4	-7.529	1.721	-7.468	1.736	-7.433	-0.145	-0.031	0.020	207
23-Dec-97	GEA4	-7.525	1.685	-7.464	1.700	-7.429	-0.181	-0.035	0.056	208
23-Dec-97	GEA4	-7.519	1.731	-7.458	1.746	-7.423	-0.135	-0.041	0.010	208
30-Dec-97	GEA4	-7.546	1.663	-7.485	1.678	-7.450	-0.203	-0.014	0.078	209
30-Dec-97	GES1	1.951	-1.815	1.959	-1.817	-7.449	-0.183	-0.015	0.058	209
14-Jan-98	GEA4	-7.545	1.709	-7.484	1.724	-7.449	-0.157	-0.015	0.032	210
15-Jan-98	GEA4	-7.572	1.696	-7.511	1.711	-7.476	-0.170	0.012	0.045	210
16-Jan-98	GEA4	-7.566	1.668	-7.505	1.683	-7.470	-0.198	0.006	0.073	210
16-Jan-98	GES1	1.912	-1.804	1.920	-1.806	-7.488	-0.172	0.024	0.047	210
16-Jan-98	GES1	1.941	-1.833	1.949	-1.835	-7.459	-0.201	-0.005	0.076	210
21-Jan-98	GEA4	-7.553	1.666	-7.492	1.681	-7.457	-0.200	-0.007	0.075	211
22-Jan-98	GEA4	-7.559	1.667	-7.498	1.682	-7.463	-0.199	-0.001	0.074	211
28-Jan-98	GEA4	-7.544	1.660	-7.483	1.675	-7.448	-0.206	-0.016	0.081	212
28-Jan-98	GES1	1.907	-1.843	1.915	-1.845	-7.493	-0.211	0.029	0.086	212
29-Jan-98	GES1	1.909	-1.860	1.917	-1.862	-7.491	-0.228	0.027	0.103	212
29-Jan-98	GEA4	-7.593	1.561	-7.531	1.576	-7.496	-0.305	0.032	0.180	212
30-Jan-98	GEA4	-7.569	1.618	-7.508	1.633	-7.473	-0.248	0.009	0.123	212

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
04-Feb-98	GES1	1.935	-1.851	1.943	-1.853	-7.465	-0.219	0.001	0.094	213
04-Feb-98	GEA4	-7.571	1.604	-7.510	1.619	-7.475	-0.262	0.011	0.137	213
06-Feb-98	GEA4	-7.548	1.599	-7.487	1.614	-7.452	-0.267	-0.012	0.142	213
06-Feb-98	GES1	1.943	-1.899	1.951	-1.901	-7.457	-0.267	-0.007	0.142	213
06-Feb-98	GS20	-8.629	-1.045	-8.561	-1.043	-7.452	-0.253	-0.012	0.128	213
06-Feb-98	GS19	-7.512	-0.268	-7.450	-0.262	-7.450	-0.262	-0.014	0.137	213
13-Feb-98	GES1	1.885	-1.899	1.893	-1.901	-7.515	-0.267	0.051	0.142	214
13-Feb-98	GES1	1.908	-1.898	1.916	-1.900	-7.492	-0.266	0.028	0.141	214
17-Feb-98	GEA4	-7.581	1.561	-7.520	1.576	-7.485	-0.305	0.021	0.180	215
25-Feb-98	GES1	1.966	-1.745	1.974	-1.746	-7.434	-0.112	-0.030	-0.013	216
25-Feb-98	GES1	1.966	-1.744	1.974	-1.745	-7.434	-0.111	-0.030	-0.014	216
26-Feb-98	GEA4	-7.544	1.739	-7.483	1.754	-7.448	-0.127	-0.016	0.002	216
26-Feb-98	GEA4	-7.553	1.713	-7.492	1.728	-7.457	-0.153	-0.007	0.028	216
11-Mar-98	GEA4	-7.583	1.548	-7.521	1.562	-7.486	-0.319	0.022	0.194	217
24-Mar-98	GEA4	-7.590	1.510	-7.528	1.524	-7.493	-0.357	0.029	0.232	218
25-Mar-98	GES1	1.922	-2.024	1.930	-2.027	-7.478	-0.393	0.014	0.268	218
26-Mar-98	GEA4	-7.598	1.411	-7.536	1.425	-7.501	-0.456	0.037	0.331	218
01-Apr-98	GEA4	-7.568	1.427	-7.507	1.441	-7.472	-0.440	0.008	0.315	219
02-Apr-98	GEA4	-7.570	1.432	-7.509	1.446	-7.474	-0.435	0.010	0.310	219
02-Apr-98	GES1	1.913	-2.019	1.921	-2.022	-7.487	-0.388	0.023	0.263	219
02-Apr-98	GES1	1.935	-2.036	1.943	-2.039	-7.465	-0.405	0.001	0.280	219
02-Apr-98	GS19	-7.519	-0.388	-7.457	-0.383	-7.457	-0.383	-0.007	0.258	219
08-Apr-98	GES1	1.918	-2.056	1.926	-2.059	-7.482	-0.425	0.018	0.300	220
16-Apr-98	GEA4	-7.542	1.756	-7.481	1.771	-7.446	-0.110	-0.018	-0.015	221
17-Apr-98	GEA4	-7.561	1.735	-7.500	1.750	-7.465	-0.131	0.001	0.006	221
21-Apr-98	GEA4	-7.600	1.697	-7.538	1.712	-7.503	-0.169	0.039	0.044	222
22-Apr-98	GEA4	-7.574	1.676	-7.513	1.691	-7.478	-0.190	0.014	0.065	222
23-Apr-98	GES1	1.935	-1.830	1.943	-1.832	-7.465	-0.198	0.001	0.073	222
23-Apr-98	GEA4	-7.565	1.700	-7.504	1.715	-7.469	-0.166	0.005	0.041	222
23-Apr-98	GS19	-7.543	-0.203	-7.481	-0.197	-7.481	-0.197	0.017	0.072	222
23-Apr-98	GS20	-8.663	-0.967	-8.594	-0.965	-7.485	-0.175	0.021	0.050	222
23-Apr-98	GES1	1.913	-1.819	1.921	-1.821	-7.487	-0.187	0.023	0.062	222
23-Apr-98	GEA4	-7.571	1.669	-7.510	1.684	-7.475	-0.197	0.011	0.072	222

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
29-Apr-98	GEA4	-7.587	1.735	-7.526	1.750	-7.491	-0.131	0.027	0.006	223
30-Apr-98	GES1	1.905	-1.859	1.913	-1.861	-7.495	-0.227	0.031	0.102	223
06-May-98	GEA4	-7.579	1.637	-7.518	1.652	-7.483	-0.229	0.019	0.104	224
07-May-98	GES1	1.880	-1.896	1.888	-1.898	-7.520	-0.264	0.058	0.139	224
11-May-98	GEA4	-7.581	1.588	-7.520	1.603	-7.485	-0.278	0.021	0.153	225
13-May-98	GEA4	-7.577	1.533	-7.516	1.547	-7.481	-0.334	0.017	0.209	225
03-Jun-98	GEA4	-7.597	1.595	-7.535	1.610	-7.500	-0.271	0.036	0.146	226
03-Jun-98	GS19	-7.566	-0.289	-7.504	-0.283	-7.504	-0.283	0.040	0.158	226
03-Jun-98	GS20	-8.659	-1.080	-8.590	-1.078	-7.481	-0.288	0.017	0.163	226
04-Jun-98	GEA4	-7.589	1.539	-7.527	1.553	-7.492	-0.328	0.028	0.203	226
04-Jun-98	GS20	-8.671	-1.111	-8.602	-1.109	-7.493	-0.319	0.029	0.194	226
04-Jun-98	GS19	-7.568	-0.353	-7.506	-0.348	-7.506	-0.348	0.042	0.223	226
10-Jun-98	GS20	-8.710	-1.114	-8.641	-1.112	-7.532	-0.322	0.068	0.197	227
10-Jun-98	GES1	1.875	-1.945	1.883	-1.947	-7.525	-0.313	0.061	0.188	227
10-Jun-98	GS19	-7.588	-0.378	-7.526	-0.373	-7.526	-0.373	0.062	0.248	227
11-Jun-98	GS19	-7.576	-0.359	-7.514	-0.354	-7.514	-0.354	0.050	0.229	227
11-Jun-98	GES1	1.882	-1.990	1.890	-1.993	-7.518	-0.359	0.054	0.234	227
11-Jun-98	GS20	-8.703	-1.196	-8.634	-1.195	-7.525	-0.405	0.061	0.280	227
12-Jun-98	GS20	-8.684	-1.150	-8.615	-1.149	-7.506	-0.359	0.042	0.234	227
28-Jun-98	GEA4	-7.560	1.733	-7.499	1.748	-7.464	-0.133	0.000	0.008	228
28-Jun-98	GS19	-7.549	-0.169	-7.487	-0.163	-7.487	-0.163	0.023	0.038	228
02-Jul-98	GEA4	-7.591	1.722	-7.530	1.737	-7.495	-0.144	0.031	0.019	228
03-Jul-98	GEA4	-7.608	1.676	-7.546	1.691	-7.511	-0.190	0.047	0.065	228
05-Jul-98	GEA4	-7.600	1.631	-7.538	1.646	-7.503	-0.235	0.039	0.110	228
13-Jul-98	GS20	-8.372	-0.880	-8.305	-0.877	-7.196	-0.087	-0.268	-0.038	229
13-Jul-98	GS19	-7.241	-0.138	-7.181	-0.132	-7.181	-0.132	-0.283	0.007	229
14-Jul-98	GS19	-7.266	-0.088	-7.206	-0.081	-7.206	-0.081	-0.258	-0.044	229
14-Jul-98	GEA4	-7.320	1.708	-7.260	1.723	-7.225	-0.158	-0.239	0.033	229
14-Jul-98	GES1	2.178	-1.776	2.184	-1.777	-7.224	-0.143	-0.240	0.018	229
14-Jul-98	GS20	-8.402	-0.898	-8.335	-0.895	-7.226	-0.105	-0.238	-0.020	229
15-Jul-98	GEA4	-7.391	1.703	-7.331	1.718	-7.296	-0.163	-0.168	0.038	229
16-Jul-98	GEA4	-7.409	1.704	-7.349	1.719	-7.314	-0.162	-0.150	0.037	230
17-Jul-98	GEA4	-7.435	1.653	-7.374	1.668	-7.339	-0.213	-0.125	0.088	230

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
20-Jul-98	GEA4	-7.523	1.597	-7.462	1.612	-7.427	-0.269	-0.037	0.144	231
21-Jul-98	GS19	-7.509	-0.288	-7.447	-0.282	-7.447	-0.282	-0.017	0.157	231
24-Aug-98	GEA4	-7.545	1.724	-7.484	1.739	-7.449	-0.142	-0.015	0.017	237
25-Aug-98	GEA4	-7.534	1.691	-7.473	1.706	-7.438	-0.175	-0.026	0.050	237
25-Aug-98	GS19	-7.527	-0.169	-7.465	-0.163	-7.465	-0.163	0.001	0.038	237
25-Aug-98	GS20	-8.646	-0.957	-8.577	-0.955	-7.468	-0.165	0.004	0.040	237
27-Aug-98	GEA4	-7.557	1.670	-7.496	1.685	-7.461	-0.196	-0.003	0.071	238
27-Aug-98	GES1	1.936	-1.829	1.944	-1.831	-7.464	-0.197	0.000	0.072	238
28-Aug-98	GEA4	-7.622	1.621	-7.560	1.636	-7.525	-0.245	0.061	0.120	239
01-Sep-98	GEA4	-7.634	1.637	-7.572	1.652	-7.537	-0.229	0.073	0.104	240
02-Sep-98	GEA4	-7.693	1.618	-7.631	1.633	-7.596	-0.248	0.132	0.123	240
14-Sep-98	GEA4	-7.626	1.536	-7.564	1.550	-7.529	-0.331	0.065	0.206	241
15-Sep-98	GEA4	-7.644	1.493	-7.582	1.507	-7.547	-0.374	0.083	0.249	242
15-Sep-98	GS20	-8.726	-1.124	-8.657	-1.123	-7.548	-0.333	0.084	0.208	242
15-Sep-98	GS19	-7.629	-0.378	-7.567	-0.373	-7.567	-0.373	0.103	0.248	242
16-Sep-98	GEA4	-7.623	1.518	-7.561	1.532	-7.526	-0.349	0.062	0.224	242
17-Sep-98	GEA4	-7.651	1.455	-7.589	1.469	-7.554	-0.412	0.090	0.287	242
22-Sep-98	GEA4	-7.659	1.434	-7.597	1.448	-7.562	-0.433	0.098	0.308	243
23-Sep-98	GEA4	-7.610	1.450	-7.548	1.464	-7.513	-0.417	0.049	0.292	243
24-Sep-98	GEA4	-7.635	1.416	-7.573	1.430	-7.538	-0.451	0.074	0.326	243
29-Sep-98	GEA4	-7.608	1.452	-7.546	1.466	-7.511	-0.415	0.047	0.290	244
08-Oct-98	GEA4	-7.631	1.442	-7.569	1.456	-7.534	-0.425	0.070	0.300	245
08-Oct-98	GS20	-8.692	-1.167	-8.623	-1.166	-7.514	-0.376	0.050	0.251	245
08-Oct-98	GS19	-7.586	-0.401	-7.524	-0.396	-7.524	-0.396	0.060	0.271	245
14-Oct-98	GEA4	-7.609	1.457	-7.547	1.471	-7.512	-0.410	0.048	0.285	246
20-Oct-98	GEA4	-7.642	1.419	-7.580	1.433	-7.545	-0.448	0.081	0.323	247
21-Oct-98	GEA4	-7.659	1.411	-7.597	1.425	-7.562	-0.456	0.098	0.331	247
21-Oct-98	GES1	1.813	-2.045	1.822	-2.048	-7.586	-0.414	0.122	0.289	247
21-Oct-98	GS19	-7.611	-0.445	-7.549	-0.440	-7.549	-0.440	0.085	0.315	247
21-Oct-98	GS20	-8.759	-1.212	-8.690	-1.211	-7.581	-0.421	0.117	0.296	247

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
04-Nov-98	GEA4	-7.641	1.383	-7.579	1.397	-7.544	-0.484	0.080	0.359	249
05-Nov-98	GEA4	-7.597	1.433	-7.535	1.447	-7.500	-0.434	0.036	0.309	249
05-Nov-98	GEA4	-7.591	1.390	-7.529	1.404	-7.494	-0.477	0.030	0.352	249
09-Nov-98	GEA4	-7.580	1.389	-7.518	1.403	-7.483	-0.478	0.019	0.353	250
16-Nov-98	GEA4	-7.579	1.442	-7.517	1.456	-7.482	-0.425	0.018	0.300	251
23-Nov-98	GEA4	-7.554	1.854	-7.493	1.870	-7.458	-0.011	-0.006	-0.114	252
30-Nov-98	GEA4	-7.579	1.655	-7.518	1.670	-7.483	-0.211	0.019	0.086	253
01-Dec-98	GES1	1.914	-1.853	1.922	-1.855	-7.486	-0.221	0.022	0.096	253
01-Dec-98	GEA4	-7.584	1.651	-7.523	1.666	-7.488	-0.215	0.024	0.090	253
01-Dec-98	GS19	-7.559	-0.214	-7.497	-0.208	-7.497	-0.208	0.033	0.083	253
02-Dec-98	GS19	-7.546	-0.211	-7.484	-0.205	-7.484	-0.205	0.020	0.080	253
02-Dec-98	GS20	-8.672	-1.005	-8.603	-1.003	-7.494	-0.213	0.030	0.088	253
02-Dec-98	GEA4	-7.575	1.656	-7.514	1.671	-7.479	-0.210	0.015	0.085	253
02-Dec-98	GS19	-7.580	-0.274	-7.518	-0.268	-7.518	-0.268	0.054	0.143	253
07-Dec-98	GEA4	-7.565	1.624	-7.504	1.639	-7.469	-0.242	0.005	0.117	254
25-Jan-99	GS19	-7.481	-0.108	-7.419	-0.102	-7.419	-0.102	-0.045	-0.023	255
25-Jan-99	GS20	-8.601	-0.889	-8.533	-0.886	-7.424	-0.096	-0.040	-0.029	255
26-Jan-99	GS20	-8.613	-0.887	-8.545	-0.884	-7.436	-0.094	-0.028	-0.031	255
27-Jan-99	GS19	-7.500	-0.112	-7.438	-0.106	-7.438	-0.106	-0.026	-0.019	256
27-Jan-99	GEA4	-7.529	1.691	-7.468	1.706	-7.433	-0.175	-0.031	0.050	256
28-Jan-99	GEA4	-7.520	1.720	-7.459	1.735	-7.424	-0.146	-0.040	0.021	257
29-Jan-99	GS20	-8.609	-0.884	-8.541	-0.881	-7.432	-0.091	-0.032	-0.034	258
02-Feb-99	GEA4	-7.515	1.762	-7.454	1.778	-7.419	-0.103	-0.045	-0.022	259
03-Feb-99	GEA4	-7.464	1.835	-7.403	1.851	-7.368	-0.030	-0.096	-0.095	259
03-Feb-99	GEA4	-7.487	1.840	-7.426	1.856	-7.391	-0.025	-0.073	-0.100	259
04-Feb-99	GS19	-7.464	-0.063	-7.403	-0.056	-7.403	-0.056	-0.061	-0.069	259
04-Feb-99	GS19	-7.492	-0.106	-7.430	-0.100	-7.430	-0.100	-0.034	-0.025	259
04-Feb-99	GS20	-8.574	-0.851	-8.506	-0.848	-7.397	-0.058	-0.067	-0.067	259
05-Feb-99	GS20	-8.588	-0.867	-8.520	-0.864	-7.411	-0.074	-0.053	-0.051	259

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
09-Feb-99	GS19	-7.473	-0.065	-7.412	-0.058	-7.412	-0.058	-0.052	-0.067	260
10-Feb-99	GS20	-8.586	-0.828	-8.518	-0.825	-7.409	-0.035	-0.055	-0.090	260
10-Feb-99	GS19	-7.458	-0.054	-7.397	-0.047	-7.397	-0.047	-0.067	-0.078	260
11-Feb-99	GS19	-7.479	-0.083	-7.418	-0.076	-7.418	-0.076	-0.046	-0.049	260
17-Feb-99	GEA4	-7.487	1.827	-7.426	1.843	-7.391	-0.038	-0.073	-0.087	261
17-Feb-99	GES1	2.006	-1.695	2.013	-1.696	-7.395	-0.062	-0.069	-0.063	261
17-Feb-99	GS19	-7.490	-0.105	-7.428	-0.099	-7.428	-0.099	-0.036	-0.026	261
18-Feb-99	GS19	-7.467	-0.051	-7.406	-0.044	-7.406	-0.044	-0.058	-0.081	261
18-Feb-99	GS20	-8.612	-0.862	-8.544	-0.859	-7.435	-0.069	-0.029	-0.056	261
19-Feb-99	GS20	-8.583	-0.839	-8.515	-0.836	-7.406	-0.046	-0.058	-0.079	261
19-Feb-99	GS19	-7.468	-0.071	-7.407	-0.064	-7.407	-0.064	-0.057	-0.061	261
12-Mar-99	GEA4	-7.492	1.916	-7.431	1.932	-7.396	0.051	-0.068	-0.176	262
12-Mar-99	GS19	-7.487	0.037	-7.426	0.044	-7.426	0.044	-0.038	-0.169	262
15-Mar-99	GS19	-7.447	0.017	-7.386	0.024	-7.386	0.024	-0.078	-0.149	262
15-Mar-99	GEA4	-7.493	1.913	-7.432	1.929	-7.397	0.048	-0.067	-0.173	262
15-Mar-99	GS20	-8.600	-0.788	-8.532	-0.785	-7.423	0.005	-0.041	-0.130	262
16-Mar-99	GS20	-8.600	-0.765	-8.532	-0.762	-7.423	0.028	-0.041	-0.153	263
16-Mar-99	GEA4	-7.491	1.883	-7.430	1.899	-7.395	0.018	-0.069	-0.143	263
18-Mar-99	GS19	-7.482	-0.003	-7.421	0.004	-7.421	0.004	-0.043	-0.129	263
18-Mar-99	GEA4	-7.511	1.881	-7.450	1.897	-7.415	0.016	-0.049	-0.141	263
24-Mar-99	GEA4	-7.496	1.915	-7.435	1.931	-7.400	0.050	-0.064	-0.175	264
24-Mar-99	GEA4	-7.496	1.883	-7.435	1.899	-7.400	0.018	-0.064	-0.143	264
25-Mar-99	GEA4	-7.482	1.893	-7.421	1.909	-7.386	0.028	-0.078	-0.153	264
25-Mar-99	GEA4	-7.498	1.814	-7.437	1.830	-7.402	-0.051	-0.062	-0.074	264
25-Mar-99	GES1	2.024	-1.614	2.031	-1.615	-7.377	0.019	-0.087	-0.144	264
19-Apr-99	GEA4	-7.508	1.865	-7.447	1.881	-7.412	0.000	-0.052	-0.125	265
19-Apr-99	GS19	-7.497	-0.047	-7.435	-0.040	-7.435	-0.040	-0.029	-0.085	265
19-Apr-99	GS20	-8.613	-0.832	-8.545	-0.829	-7.436	-0.039	-0.028	-0.086	265
20-Apr-99	GEA4	-7.508	1.846	-7.447	1.862	-7.412	-0.019	-0.052	-0.106	265
21-Apr-99	GEA4	-7.490	1.863	-7.429	1.879	-7.394	-0.002	-0.070	-0.123	265
13-May-99	GEA4	-7.500	1.825	-7.439	1.841	-7.404	-0.040	-0.060	-0.085	266
17-May-99	GEA4	-7.514	1.825	-7.453	1.841	-7.418	-0.040	-0.046	-0.085	266
17-May-99	GS19	-7.500	-0.085	-7.438	-0.078	-7.438	-0.078	-0.026	-0.047	266

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
26-May-99	GS19	-7.543	-0.084	-7.481	-0.077	-7.481	-0.077	0.017	-0.048	267
26-May-99	GEA4	-7.530	1.830	-7.469	1.846	-7.434	-0.035	-0.030	-0.090	267
27-May-99	GEA4	-7.550	1.780	-7.489	1.796	-7.454	-0.085	-0.010	-0.040	267
01-Jun-99	GEA4	-7.526	1.877	-7.465	1.893	-7.430	0.012	-0.034	-0.137	268
03-Jun-99	GEA4	-7.506	1.833	-7.445	1.849	-7.410	-0.032	-0.054	-0.093	268
14-Jun-99	GS19	-7.482	0.015	-7.421	0.022	-7.421	0.022	-0.043	-0.147	269
16-Jun-99	GEA4	-7.552	1.841	-7.491	1.857	-7.456	-0.024	-0.008	-0.101	269
17-Jun-99	GEA4	-7.601	1.808	-7.539	1.824	-7.504	-0.057	0.040	-0.068	270
18-Jun-99	GEA4	-7.599	1.800	-7.537	1.816	-7.502	-0.065	0.038	-0.060	270
24-Jun-99	GEA4	-7.659	1.832	-7.597	1.848	-7.562	-0.033	0.098	-0.092	272
25-Jun-99	GEA4	-7.676	1.846	-7.614	1.862	-7.579	-0.019	0.115	-0.106	272
02-Jul-99	GS19	-7.650	-0.085	-7.588	-0.078	-7.588	-0.078	0.124	-0.047	272
02-Jul-99	GS20	-8.767	-0.868	-8.698	-0.865	-7.589	-0.075	0.125	-0.050	272
07-Jul-99	GEA4	-7.685	1.789	-7.623	1.805	-7.588	-0.076	0.124	-0.049	273
07-Jul-99	GS20	-8.775	-0.857	-8.706	-0.854	-7.597	-0.064	0.133	-0.061	273
07-Jul-99	GES1	1.796	-1.683	1.805	-1.684	-7.603	-0.050	0.139	-0.075	273
07-Jul-99	GS19	-7.682	-0.094	-7.619	-0.088	-7.619	-0.088	0.155	-0.037	273
08-Jul-99	GS19	-7.668	-0.100	-7.605	-0.094	-7.605	-0.094	0.141	-0.031	273
26-Jul-99	GEA4	-7.671	1.825	-7.609	1.841	-7.574	-0.040	0.110	-0.085	274
26-Jul-99	GS19	-7.676	-0.063	-7.613	-0.056	-7.613	-0.056	0.149	-0.069	274
27-Jul-99	GS19	-7.642	-0.070	-7.580	-0.063	-7.580	-0.063	0.116	-0.062	274
27-Jul-99	GS20	-8.775	-0.857	-8.706	-0.854	-7.597	-0.064	0.133	-0.061	274
29-Jul-99	GS20	-8.733	-0.900	-8.664	-0.897	-7.555	-0.107	0.091	-0.018	275
29-Jul-99	GEA4	-7.663	1.789	-7.601	1.805	-7.566	-0.076	0.102	-0.049	275
30-Jul-99	GEA4	-7.678	1.769	-7.616	1.785	-7.581	-0.096	0.117	-0.029	275
02-Aug-99	GEA4	-7.694	1.775	-7.632	1.791	-7.597	-0.090	0.133	-0.035	276
02-Aug-99	GS19	-7.629	-0.104	-7.567	-0.098	-7.567	-0.098	0.103	-0.027	276
03-Aug-99	GS19	-7.622	-0.115	-7.560	-0.109	-7.560	-0.109	0.096	-0.016	276
03-Aug-99	GEA4	-7.596	1.758	-7.534	1.774	-7.499	-0.107	0.035	-0.018	276
10-Aug-99	GEA4	-7.584	1.782	-7.523	1.798	-7.488	-0.083	0.024	-0.042	278
11-Aug-99	GEA4	-7.537	1.816	-7.476	1.832	-7.441	-0.049	-0.023	-0.076	278
11-Aug-99	GS20	-8.679	-0.884	-8.610	-0.881	-7.501	-0.091	0.037	-0.034	278

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
16-Aug-99	GEA4	-7.706	1.810	-7.644	1.826	-7.609	-0.055	0.145	-0.070	279
16-Aug-99	GS19	-7.666	-0.091	-7.603	-0.084	-7.603	-0.084	0.139	-0.041	279
16-Aug-99	GS20	-8.734	-0.861	-8.665	-0.858	-7.556	-0.068	0.092	-0.057	279
17-Aug-99	GS20	-8.729	-0.861	-8.660	-0.858	-7.551	-0.068	0.087	-0.057	279
17-Aug-99	GEA4	-7.614	1.788	-7.552	1.804	-7.517	-0.077	0.053	-0.048	279
18-Aug-99	GEA4	-7.658	1.797	-7.596	1.813	-7.561	-0.068	0.097	-0.057	280
18-Aug-99	GS19	-7.617	-0.149	-7.555	-0.143	-7.555	-0.143	0.091	0.018	280
19-Aug-99	GS19	-7.641	-0.133	-7.579	-0.127	-7.579	-0.127	0.115	0.002	280
19-Aug-99	GEA4	-7.654	1.738	-7.592	1.753	-7.557	-0.128	0.093	0.003	280
20-Aug-99	GEA4	-7.670	1.782	-7.608	1.798	-7.573	-0.083	0.109	-0.042	281
20-Aug-99	GES1	1.831	-1.733	1.839	-1.734	-7.569	-0.100	0.105	-0.025	281
01-Sep-99	GS19	-7.630	-0.133	-7.568	-0.127	-7.568	-0.127	0.104	0.002	282
02-Sep-99	GS19	-7.620	-0.125	-7.558	-0.119	-7.558	-0.119	0.094	-0.006	282
02-Sep-99	GEA4	-7.676	1.758	-7.614	1.774	-7.579	-0.107	0.115	-0.018	282
03-Sep-99	GEA4	-7.648	1.773	-7.586	1.789	-7.551	-0.092	0.087	-0.033	282
03-Sep-99	GES1	1.811	-1.749	1.819	-1.750	-7.589	-0.116	0.125	-0.009	282
03-Sep-99	GS20	-8.748	-0.912	-8.679	-0.910	-7.570	-0.120	0.106	-0.005	282
09-Sep-99	GEA4	-7.637	1.751	-7.575	1.766	-7.540	-0.115	0.076	-0.010	283
23-Sep-99	GEA4	-7.670	1.820	-7.608	1.836	-7.573	-0.045	0.109	-0.080	284
15-Nov-99	GS19	-7.511	-0.149	-7.449	-0.143	-7.449	-0.143	-0.015	0.018	288
07-Dec-99	GS19	-7.454	-0.012	-7.393	-0.005	-7.393	-0.005	-0.071	-0.120	289
07-Dec-99	GS20	-8.579	-0.842	-8.511	-0.839	-7.402	-0.049	-0.062	-0.076	289
08-Dec-99	GS20	-8.621	-0.827	-8.553	-0.824	-7.444	-0.034	-0.020	-0.091	289
08-Dec-99	GS19	-7.470	-0.029	-7.409	-0.022	-7.409	-0.022	-0.055	-0.103	289
09-Dec-99	GEA4	-7.515	1.812	-7.454	1.828	-7.419	-0.053	-0.045	-0.072	289
09-Dec-99	GES1	1.991	-1.668	1.998	-1.669	-7.410	-0.035	-0.054	-0.090	289
09-Dec-99	GS19	-7.498	-0.035	-7.436	-0.028	-7.436	-0.028	-0.028	-0.097	289
14-Dec-99	GS19	-7.503	-0.090	-7.441	-0.083	-7.441	-0.083	-0.023	-0.042	290
15-Dec-99	GS19	-7.495	-0.055	-7.433	-0.048	-7.433	-0.048	-0.031	-0.077	290
15-Dec-99	GEA4	-7.525	1.811	-7.464	1.827	-7.429	-0.054	-0.035	-0.071	290
20-Dec-99	GEA4	-7.535	1.819	-7.474	1.835	-7.439	-0.046	-0.025	-0.079	291
22-Dec-99	GS19	-7.505	-0.071	-7.443	-0.064	-7.443	-0.064	-0.021	-0.061	291

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS # denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
12-Jan-00	GS20	-8.614	-0.846	-8.546	-0.843	-7.437	-0.053	-0.027	-0.072	292
12-Jan-00	GEA4	-7.558	1.794	-7.497	1.810	-7.462	-0.071	-0.002	-0.054	292
12-Jan-00	GS19	-7.536	-0.090	-7.474	-0.083	-7.474	-0.083	0.010	-0.042	292
13-Jan-00	GS19	-7.525	-0.081	-7.463	-0.074	-7.463	-0.074	-0.001	-0.051	292
13-Jan-00	GS20	-8.665	-0.885	-8.596	-0.882	-7.487	-0.092	0.023	-0.033	292
14-Jan-00	GS20	-8.653	-0.896	-8.584	-0.893	-7.475	-0.103	0.011	-0.022	292
14-Jan-00	GS19	-7.559	-0.126	-7.497	-0.120	-7.497	-0.120	0.033	-0.005	292
19-Jan-00	GEA4	-7.560	1.798	-7.499	1.814	-7.464	-0.067	0.000	-0.058	293
21-Jan-00	GS19	-7.520	-0.075	-7.458	-0.068	-7.458	-0.068	-0.006	-0.057	293
25-Jan-00	GS20	-8.659	-0.895	-8.590	-0.892	-7.481	-0.102	0.017	-0.023	294
25-Jan-00	GS20	-8.650	-0.875	-8.581	-0.872	-7.472	-0.082	0.008	-0.043	294
26-Jan-00	GS20	-8.637	-0.910	-8.569	-0.908	-7.460	-0.118	-0.004	-0.007	294
26-Jan-00	GEA4	-7.564	1.775	-7.503	1.791	-7.468	-0.090	0.004	-0.035	294
26-Jan-00	GS19	-7.505	-0.083	-7.443	-0.076	-7.443	-0.076	-0.021	-0.049	294
26-Jan-00	GS20	-8.655	-0.906	-8.586	-0.903	-7.477	-0.113	0.013	-0.012	294
27-Jan-00	GS20	-8.650	-0.872	-8.581	-0.869	-7.472	-0.079	0.008	-0.046	294
27-Jan-00	GS20	-8.648	-0.908	-8.579	-0.905	-7.470	-0.115	0.006	-0.010	294
01-Feb-00	GEA4	-7.574	1.799	-7.513	1.815	-7.478	-0.066	0.014	-0.059	295
02-Feb-00	GEA4	-7.560	1.735	-7.499	1.750	-7.464	-0.131	0.000	0.006	295
03-Feb-00	GEA4	-7.585	1.733	-7.524	1.748	-7.489	-0.133	0.025	0.008	296
04-Feb-00	GEA4	-7.543	1.721	-7.482	1.736	-7.447	-0.145	-0.017	0.020	296
10-Feb-00	GEA4	-7.567	1.722	-7.506	1.737	-7.471	-0.144	0.007	0.019	297
02-Mar-00	GS20	-8.629	-1.088	-8.561	-1.086	-7.452	-0.296	-0.012	0.171	299
06-Mar-00	GEA4	-7.534	1.514	-7.473	1.528	-7.438	-0.353	-0.026	0.228	300
08-Mar-00	GS19	-7.488	-0.306	-7.426	-0.301	-7.426	-0.301	-0.038	0.176	301
09-Mar-00	GEA4	-7.526	1.511	-7.465	1.525	-7.430	-0.356	-0.034	0.231	301
10-Mar-00	GEA4	-7.536	1.486	-7.475	1.500	-7.440	-0.381	-0.024	0.256	301
13-Mar-00	GEA4	-7.509	1.649	-7.448	1.664	-7.413	-0.217	-0.051	0.092	302
14-Mar-00	GS19	-7.505	-0.315	-7.443	-0.310	-7.443	-0.310	-0.021	0.185	302

TABLE D(2): Complete Oceanic Secondary Standards Data Summary (with adjustment to GS19)

MASS SPECTROMETER OCEANIC SECONDARY STANDARDS # denotes flagged data

Date	Standard No.	---Measured--- d13C	d18O	NBS ---Corrected--- d13C	d18O	Adjusted to GS19 d13C	d18O	SEA -----Terms---- d13C	d18O	Week No.
15-Mar-00	GS19	-7.516	-0.289	-7.454	-0.283	-7.454	-0.283	-0.010	0.158	303
16-Mar-00	GS19	-7.496	-0.304	-7.434	-0.299	-7.434	-0.299	-0.030	0.174	303
20-Mar-00	GEA4	-7.504	1.624	-7.443	1.639	-7.408	-0.242	-0.056	0.117	304
22-Mar-00	GEA4	-7.522	1.564	-7.461	1.579	-7.426	-0.302	-0.038	0.177	305
03-Apr-00	GS19	-7.472	-0.153	-7.411	-0.147	-7.411	-0.147	-0.053	0.022	306
03-Apr-00	GS20	-8.567	-0.914	-8.499	-0.912	-7.390	-0.122	-0.074	-0.003	306
05-Apr-00	GEA4	-7.511	1.697	-7.450	1.712	-7.415	-0.169	-0.049	0.044	307
24-Apr-00	GS19	-7.509	-0.134	-7.447	-0.128	-7.447	-0.128	-0.017	0.003	308
26-Apr-00	GEA4	-7.569	1.623	-7.508	1.638	-7.473	-0.243	0.009	0.118	308
27-Jun-00	GEA4	-7.551	1.743	-7.490	1.758	-7.455	-0.123	-0.009	-0.002	309
06-Jul-00	GS19	-7.494	-0.057	-7.432	-0.050	-7.432	-0.050	-0.032	-0.075	309
06-Jul-00	GEA4	-7.539	1.774	-7.478	1.790	-7.443	-0.091	-0.021	-0.034	309

TABLE E: Summary of Standards, Including NBS Standards, Secondary Standards, and Working Reference Standard

The left side of the table ("Assigned") lists the assigned NBS-corrected reduced isotopic ratios for the secondary standards, atmospheric and oceanic. Also listed are the average offsets (from 39382) determined for each atmospheric standard and (from GS19), for each oceanic standard. See text, page 9, and Figures 5 and 6. The right side of the table ("Experimental") lists averages and standard deviations for measurements of the standards over their entire periods of measurement (all data) (1992-2000), and over the current reporting period alone (1996-2000).

TABLE E: Summary of Standards, Including NBS Standards, Secondary Standards, and Working Reference Standard
(Values are in NBS-corrected d13C and d18O) (N2O corrections have not been applied for air standards)

	d13C (offset)	Assigned d13C	Assigned d18O	d18O (offset)	Experimental d13C	Experimental s	Experimental d18O	Experimental s	N
Atmospheric:									
39382		-8.281	-0.418		-8.278	0.016	-0.425	0.034	180 (current)
					-8.279	0.016	-0.420	0.037	363 (all data)
75635	(0.107)	-8.388	-0.425	(0.007)	-8.393	0.017	-0.431	0.030	173 (current)
					-8.393	0.017	-0.435	0.032	365 (all data)
75859	(0.001)	-8.282	-0.266	(-0.152)	-8.284	0.016	-0.261	0.031	184 (current)
					-8.280	0.017	-0.258	0.035	364 (all data)
2407	(-0.541)	-7.740	-2.800	(2.382)	-7.736	0.013	-2.800	0.027	24
39414	(0.079)	-8.360	-5.244	(4.826)	-8.360	0.013	-5.256	0.033	23
96364	(-0.309)	-7.972	-4.370	(3.952)	-7.971	0.016	-4.375	0.031	20
Bulk extraction (Atmospheric):									
13523	(-0.336)	-7.945	-4.104	(3.686)	-7.934	0.014	-4.104	0.031	45
Oceanic:									
GS19		-7.464	-0.125		-7.465	0.011	-0.126	0.015	79 (current)
					-7.465	0.012	-0.126	0.020	169 (all data)
GS20	(1.109)	-8.573	-0.915	(0.790)	-8.576	0.011	-0.913	0.016	61 (current)
					-8.575	0.012	-0.914	0.018	142 (all data)
GEA4	(0.035)	-7.499	+1.756	(-1.881)	-7.498	0.008	+1.755	0.013	270 (current)
					-7.499	0.009	+1.755	0.016	393 (all data)
GES1	(-9.408)	+1.944	-1.759	(1.634)	+1.943	0.011	-1.755	0.020	43
NBS Standards:									
NBS 19		+1.92	-2.19						
		(+1.912	-2.239)	acid corrected, values used for 3 point calibration correction					
NBS 17		-4.41	-18.71						
NBS 16		-41.48	-36.09						
Working Reference Standard:									
MW1		-42.405	-27.767						
		-40.599	-27.828	(without Craig correction)					

TABLE F: Relative Stability and Offset Comparison of Secondary Standards

Secondary Stds Compared	Lists the two secondary standards compared in the direction as listed, e.g. the d13C of 39382 minus the d13C of 75635 for the first line.
No. of Differences (Days)	The number of days of comparisons. For days on which there are multiple non-flagged comparisons, a daily average is taken.
d13C (NBS corr.) and d18O (NBS corr.)	Lists the average difference and the standard deviation of the set of differences and the slope of a linear fit to the differences. See Figures 5 and 6.

The bottom section of the table lists the original offset information from 1992-1996 [Bollenbacher et al., 2001].

TABLE F: Relative Stability and Offset Comparison of Secondary Standards

Secondary Stds Compared	No. of Differences (Days)	d13C (NBS corr.) Average Diff. (per mil)	d13C (NBS corr.) St. Dev. of Diff. (per mil)	d13C (NBS corr.) Slope of Linear Fit (per mil/yr)	d18O (NBS corr.) Average Diff. (per mil)	d18O (NBS corr.) St. Dev. of Diff. (per mil)	d18O (NBS corr.) Slope of Linear Fit (per mil/yr)
Atmospheric Secondary Standards:							
39382-75635	156	0.114	0.029	0.00127	0.011	0.056	-0.00719
39382-75859	140	0.003	0.027	0.00202	-0.165	0.061	-0.00667
75635-75859	151	-0.119	0.029	0.00020	-0.193	0.059	0.00160
39382- 2407	8	-0.541	0.017	0.00128	2.382	0.032	0.04213
39382-39414	10	0.079	0.012	-0.01591	4.826	0.040	-0.02808
39382-96364	8	-0.309	0.028	0.02003	3.952	0.031	0.02435
39382-13523	14	-0.336	0.028	-0.00983	3.686	0.063	-0.04530
Oceanic Secondary Standards:							
GS19- GS20	70	1.111	0.018	0.00068	0.787	0.024	-0.00024
GS19- GEA4	61	0.029	0.019	-0.00218	-1.882	0.029	-0.00243
GS19- GES1	13	-9.408	0.019	-0.01865	1.634	0.034	-0.01969
Atmospheric Secondary Standards: Original Assignments:							
39382-75635	82	0.107	0.030	-0.00496	0.007	0.061	-0.01650
39382-75859	78	0.001	0.031	0.00103	-0.152	0.068	-0.00780
75635-75859	94	-0.119	0.031	-0.00154	-0.195	0.067	-0.00555
Oceanic Secondary Standards: Original Assignments:							
GS19- GS20	29	1.109	0.017	0.00274	0.790	0.026	0.00486
GS19- GEA4	17	0.035	0.016	0.00287	-1.881	0.023	-0.00945

TABLE G(1) (G(2)): Daily Atmospheric (Oceanic) Isotopic Correction Terms

For each measurement date on the VG Prism II mass spectrometer, the tables list the daily correction terms (d13C and d18O) to be added to the NBS-Corrected reduced isotopic ratio of atmospheric (oceanic) samples measured on that date. These are daily averages of all non-flagged individual terms, as listed in Tables D(1) and D(2).

TABLE G(1): Daily Atmospheric Isotopic Correction Terms

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d18O
21-Nov-96	162	0.007	0.061
22-Nov-96	162	-0.001	0.118
25-Nov-96	162	0.005	0.078
26-Nov-96	163	-0.011	0.021
27-Nov-96	163	0.043	0.146
02-Dec-96	164	-0.021	0.000
03-Dec-96	164	-0.014	0.060
04-Dec-96	165	-0.016	0.007
05-Dec-96	165	-0.015	0.046
18-Dec-96	166	-0.023	0.014
20-Dec-96	166	-0.041	0.021
03-Jan-97	167	-0.011	0.050
04-Jan-97	167	0.002	0.029
06-Jan-97	168	-0.010	0.039
07-Jan-97	168	0.008	0.147
09-Jan-97	169	-0.011	0.094
10-Jan-97	169	0.012	0.125
21-Jan-97	170	-0.026	0.101
28-Jan-97	171	0.012	0.102
29-Jan-97	171	0.021	0.158
30-Jan-97	172	-0.012	0.109
31-Jan-97	172	-0.005	0.111
13-Feb-97	174	-0.014	-0.028
14-Feb-97	174	0.042	0.054
20-Feb-97	175	0.018	0.026
21-Feb-97	175	0.001	-0.016
27-Feb-97	176	0.015	0.052
28-Feb-97	176	-0.005	0.041
05-Mar-97	177	-0.023	0.060
07-Mar-97	177	0.019	0.160
12-Mar-97	178	0.023	0.088
13-Mar-97	179	0.021	0.116
14-Mar-97	179	0.033	0.119
17-Mar-97	180	0.043	0.153
18-Mar-97	180	0.041	0.126
01-Apr-97	182	0.016	0.153
07-Apr-97	183	0.053	0.208
14-Apr-97	183	0.051	0.164
15-Apr-97	183	0.066	0.181
22-Apr-97	184	0.074	0.195
24-Apr-97	184	0.038	0.172
25-Apr-97	184	0.117	0.327

TABLE G(1): Daily Atmospheric Isotopic Correction Terms

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d180
09-May-97	185	0.096	0.228
15-May-97	186	0.078	0.211
16-May-97	186	0.053	0.220
20-May-97	187	0.061	0.245
21-May-97	187	0.062	0.224
22-May-97	187	0.059	0.213
28-May-97	188	0.095	0.205
29-May-97	188	0.072	0.203
03-Jun-97	189	0.090	0.214
04-Jun-97	189	0.082	0.204
05-Jun-97	190	0.104	0.230
06-Jun-97	190	0.110	0.268
17-Jun-97	191	0.084	0.223
09-Jul-97	193	0.049	0.123
10-Jul-97	193	0.052	0.120
17-Jul-97	194	0.033	0.134
18-Jul-97	194	0.033	0.134
22-Jul-97	195	0.050	0.213
23-Jul-97	195	0.058	0.220
27-Jul-97	196	0.075	0.249
28-Jul-97	196	0.082	0.208
29-Jul-97	196	0.059	0.216
14-Aug-97	197	0.042	0.200
18-Aug-97	198	0.055	0.186
19-Aug-97	198	0.039	0.188
29-Aug-97	199	0.118	0.269
06-Sep-97	199	0.054	0.251
08-Sep-97	199	0.042	0.220
09-Sep-97	199	0.042	0.227
10-Sep-97	200	0.052	0.236
12-Sep-97	200	0.052	0.204
15-Sep-97	201	0.023	0.177
16-Sep-97	201	0.047	0.204
17-Sep-97	201	0.060	0.164
24-Sep-97	202	0.055	0.209
25-Sep-97	202	0.058	0.209
26-Sep-97	202	0.062	0.213
03-Oct-97	203	0.049	0.149
14-Nov-97	203	0.030	0.061
17-Nov-97	203	0.059	0.073
18-Nov-97	204	0.052	0.042
21-Nov-97	204	0.081	0.048

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d18O
09-Dec-97	206	0.050	0.143
11-Dec-97	206	0.056	0.187
15-Dec-97	207	0.068	0.155
16-Dec-97	207	0.063	0.133
23-Dec-97	208	0.050	0.171
30-Dec-97	209	0.062	0.215
14-Jan-98	210	0.106	0.212
15-Jan-98	210	0.100	0.219
16-Jan-98	210	0.117	0.274
18-Jan-98	211	0.099	0.232
19-Jan-98	211	0.094	0.227
21-Jan-98	211	0.058	0.222
22-Jan-98	211	0.061	0.246
28-Jan-98	212	0.078	0.235
29-Jan-98	212	0.109	0.288
30-Jan-98	212	0.133	0.289
04-Feb-98	213	0.066	0.238
05-Feb-98	213	0.090	0.300
06-Feb-98	213	0.084	0.302
13-Feb-98	214	0.106	0.329
18-Feb-98	215	0.099	0.211
25-Feb-98	216	0.075	0.160
26-Feb-98	216	0.089	0.183
11-Mar-98	217	0.062	0.315
12-Mar-98	217	0.063	0.298
24-Mar-98	218	0.085	0.342
25-Mar-98	218	0.078	0.296
26-Mar-98	218	0.099	0.336
01-Apr-98	219	0.075	0.398
02-Apr-98	219	0.058	0.397
03-Apr-98	220	0.061	0.386
08-Apr-98	220	0.078	0.429
14-Apr-98	221	0.063	-0.014
16-Apr-98	221	0.046	0.139
17-Apr-98	221	0.040	0.126
18-Apr-98	222	0.058	0.127
19-Apr-98	222	0.043	0.023
21-Apr-98	222	0.085	0.141
22-Apr-98	222	0.083	0.058
23-Apr-98	222	0.038	0.170
29-Apr-98	223	0.063	0.127
30-Apr-98	223	0.055	0.143

TABLE G(1): Daily Atmospheric Isotopic Correction Terms

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d18O
04-May-98	224	0.089	0.269
06-May-98	224	0.040	0.134
07-May-98	224	0.061	0.187
11-May-98	225	0.021	0.167
12-May-98	225	0.031	0.194
13-May-98	225	0.051	0.262
03-Jun-98	226	0.014	0.206
12-Jun-98	227	0.082	0.361
13-Jul-98	229	-0.251	0.097
14-Jul-98	229	-0.216	0.102
15-Jul-98	229	-0.166	0.097
16-Jul-98	230	-0.085	0.155
17-Jul-98	230	-0.067	0.173
19-Jul-98	231	-0.116	0.144
20-Jul-98	231	-0.003	0.217
21-Jul-98	231	-0.002	0.256
27-Jul-98	232	0.014	0.282
05-Aug-98	232	0.091	0.296
06-Aug-98	232	0.074	0.311
07-Aug-98	233	0.073	0.337
10-Aug-98	234	0.085	0.338
11-Aug-98	235	0.091	0.334
12-Aug-98	235	0.092	0.353
13-Aug-98	236	0.109	0.407
14-Aug-98	236	0.107	0.408
16-Aug-98	237	0.063	0.438
24-Aug-98	237	0.032	0.108
26-Aug-98	238	0.038	0.139
27-Aug-98	238	0.048	0.159
28-Aug-98	239	0.078	0.198
01-Sep-98	240	0.090	0.224
02-Sep-98	240	0.152	0.265
14-Sep-98	241	0.134	0.279
15-Sep-98	242	0.149	0.333
16-Sep-98	242	0.136	0.337
17-Sep-98	242	0.141	0.385
21-Sep-98	243	0.127	0.343
22-Sep-98	243	0.111	0.399
23-Sep-98	243	0.122	0.388
24-Sep-98	243	0.120	0.440
29-Sep-98	244	0.113	0.376
30-Sep-98	244	0.082	0.406

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d18O
01-Oct-98	244	0.093	0.457
03-Oct-98	245	0.135	0.471
09-Oct-98	246	0.123	0.400
14-Oct-98	246	0.114	0.376
15-Oct-98	246	0.113	0.395
21-Oct-98	247	0.141	0.425
22-Oct-98	247	0.118	0.430
26-Oct-98	248	0.101	0.408
03-Nov-98	249	0.119	0.410
04-Nov-98	249	0.109	0.417
05-Nov-98	249	0.085	0.433
06-Nov-98	250	0.068	0.472
09-Nov-98	250	0.059	0.452
16-Nov-98	251	0.094	0.456
23-Nov-98	252	0.058	0.178
24-Nov-98	252	0.050	0.162
25-Nov-98	253	0.049	0.143
30-Nov-98	253	0.042	0.138
01-Dec-98	253	0.041	0.166
02-Dec-98	253	0.046	0.154
03-Dec-98	254	0.091	0.278
07-Dec-98	254	0.048	0.246
27-Jan-99	256	0.022	0.141
28-Jan-99	257	0.025	0.071
29-Jan-99	258	0.031	0.173
30-Jan-99	259	0.064	0.160
31-Jan-99	259	0.029	0.060
02-Feb-99	259	0.004	0.165
03-Feb-99	259	-0.003	0.065
04-Feb-99	259	0.004	0.029
05-Feb-99	259	0.023	0.044
06-Feb-99	260	0.011	0.089
09-Feb-99	260	0.010	0.075
10-Feb-99	260	-0.006	0.075
11-Feb-99	260	0.035	0.093
12-Feb-99	260	0.008	0.088
13-Feb-99	260	0.047	0.090
17-Feb-99	261	-0.002	0.048
18-Feb-99	261	0.002	0.086
19-Mar-99	264	0.015	-0.017
24-Mar-99	264	0.022	0.013
25-Mar-99	264	0.061	0.076

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d18O
19-Apr-99	265	0.047	0.046
20-Apr-99	265	0.039	0.022
21-Apr-99	265	0.028	0.078
22-Apr-99	265	0.043	0.041
13-May-99	266	0.036	0.064
17-May-99	266	0.044	0.071
26-May-99	267	0.040	0.047
27-May-99	267	0.067	0.067
01-Jun-99	268	0.055	0.047
02-Jun-99	268	0.034	0.083
03-Jun-99	268	0.041	0.074
14-Jun-99	269	0.009	0.041
16-Jun-99	269	0.071	0.057
17-Jun-99	270	0.091	0.060
18-Jun-99	270	0.109	0.135
21-Jun-99	271	0.140	0.119
02-Jul-99	272	0.196	0.102
07-Jul-99	273	0.192	0.145
08-Jul-99	273	0.193	0.109
29-Jul-99	275	0.184	0.116
30-Jul-99	275	0.185	0.105
02-Aug-99	276	0.196	0.124
03-Aug-99	276	0.114	0.165
09-Aug-99	277	0.172	0.052
10-Aug-99	278	0.113	0.085
11-Aug-99	278	0.090	0.144
17-Aug-99	279	0.154	0.102
18-Aug-99	280	0.206	0.167
19-Aug-99	280	0.205	0.169
20-Aug-99	281	0.201	0.169
01-Sep-99	282	0.186	0.124
02-Sep-99	282	0.180	0.166
03-Sep-99	282	0.186	0.151
09-Sep-99	283	0.106	0.157
10-Sep-99	283	0.147	0.160
23-Sep-99	284	0.141	0.028
15-Nov-99	288	0.069	0.120
08-Dec-99	289	0.060	0.077
09-Dec-99	289	0.071	0.092
15-Dec-99	290	0.078	0.100
20-Dec-99	291	0.065	0.097
21-Dec-99	291	0.071	0.070
22-Dec-99	291	0.086	0.118

TABLE G(1): Daily Atmospheric Isotopic Correction Terms

DAILY AIR TERMS

Correction terms (combined 39382, 75635, 75859, 13523, 2407, 39414 and 96364)

Date of Analysis	week	Atmospheric Terms d13C	d18O
12-Jan-00	292	0.075	0.093
13-Jan-00	292	0.099	0.149
14-Jan-00	292	0.116	0.173
19-Jan-00	293	0.108	0.162
20-Jan-00	293	0.132	0.167
21-Jan-00	293	0.111	0.144
25-Jan-00	294	0.101	0.130
26-Jan-00	294	0.102	0.159
27-Jan-00	294	0.091	0.159
01-Feb-00	295	0.078	0.139
02-Feb-00	295	0.108	0.210
03-Feb-00	296	0.114	0.156
04-Feb-00	296	0.099	0.166
10-Feb-00	297	0.119	0.194
11-Feb-00	297	0.061	0.192
01-Mar-00	298	0.062	0.388
02-Mar-00	299	0.078	0.344
03-Mar-00	299	0.068	0.390
06-Mar-00	300	0.067	0.338
07-Mar-00	300	0.051	0.355
08-Mar-00	301	0.072	0.352
09-Mar-00	301	0.064	0.379
10-Mar-00	301	0.083	0.409
13-Mar-00	302	0.048	0.296
14-Mar-00	302	0.088	0.327
15-Mar-00	303	0.075	0.360
16-Mar-00	303	0.055	0.326
20-Mar-00	304	0.042	0.305
21-Mar-00	304	0.055	0.332
22-Mar-00	305	0.054	0.344
23-Mar-00	305	0.073	0.347
24-Mar-00	305	0.063	0.333
03-Apr-00	306	0.043	0.199
04-Apr-00	306	0.054	0.256
05-Apr-00	307	0.039	0.209
06-Apr-00	307	0.075	0.277
24-Apr-00	308	0.079	0.190
25-Apr-00	308	0.076	0.331
26-Apr-00	308	0.087	0.341
27-Jun-00	309	0.079	0.155
06-Jul-00	309	0.003	0.071

TABLE G(2): Daily Oceanic Isotopic Correction Terms

DAILY SEA TERMS

Correction terms (combined GEA4, GS19, GS20, and GES1)

Date of Analysis	week	Oceanic Terms d13C	d18O
22-Nov-96	162	-0.045	-0.019
25-Nov-96	162	-0.044	-0.010
02-Dec-96	164	-0.039	-0.047
04-Dec-96	165	-0.028	-0.003
05-Dec-96	165	-0.020	0.043
20-Dec-96	166	-0.043	0.024
03-Jan-97	167	-0.024	0.009
04-Jan-97	167	-0.021	0.020
06-Jan-97	168	-0.049	0.017
07-Jan-97	168	-0.036	0.037
21-Jan-97	170	-0.017	0.079
28-Jan-97	171	-0.017	0.079
29-Jan-97	171	-0.019	0.080
30-Jan-97	172	-0.025	0.117
31-Jan-97	172	-0.023	0.091
03-Feb-97	173	-0.023	0.093
13-Feb-97	174	-0.072	-0.122
14-Feb-97	174	-0.070	-0.128
20-Feb-97	175	-0.048	-0.103
27-Feb-97	176	-0.047	-0.041
28-Feb-97	176	-0.047	-0.041
05-Mar-97	177	-0.049	-0.024
06-Mar-97	177	-0.053	0.010
07-Mar-97	177	-0.035	0.037
10-Mar-97	178	-0.043	0.021
11-Mar-97	178	-0.039	0.002
12-Mar-97	178	-0.030	0.009
28-Mar-97	181	-0.034	0.044
29-Mar-97	181	-0.046	0.050
31-Mar-97	182	-0.025	0.058
01-Apr-97	182	-0.034	0.071
07-Apr-97	183	-0.064	0.050
14-Apr-97	183	-0.001	0.073
15-Apr-97	183	-0.008	0.105
22-Apr-97	184	0.016	0.102
24-Apr-97	184	-0.010	0.095
25-Apr-97	184	-0.004	0.110
08-May-97	185	0.026	0.130
09-May-97	185	-0.013	0.087
15-May-97	186	0.015	0.109
16-May-97	186	-0.007	0.116

DAILY SEA TERMS

Correction terms (combined GEA4, GS19, GS20, and GES1)

Date of Analysis	week	Oceanic Terms d13C	d18O
20-May-97	187	0.010	0.152
21-May-97	187	0.008	0.092
22-May-97	187	0.031	0.137
28-May-97	188	0.020	0.134
29-May-97	188	0.034	0.111
03-Jun-97	189	0.015	0.125
04-Jun-97	189	0.012	0.127
05-Jun-97	190	-0.004	0.143
17-Jun-97	191	0.006	0.066
24-Jun-97	192	-0.022	0.092
25-Jun-97	192	-0.028	0.252
09-Jul-97	193	-0.030	0.008
10-Jul-97	193	-0.033	0.060
17-Jul-97	194	-0.039	0.045
18-Jul-97	194	-0.035	0.050
21-Jul-97	195	-0.034	0.060
22-Jul-97	195	-0.041	0.089
23-Jul-97	195	-0.028	0.069
27-Jul-97	196	0.017	0.171
28-Jul-97	196	-0.016	0.121
29-Jul-97	196	-0.011	0.041
14-Aug-97	197	-0.048	0.081
18-Aug-97	198	-0.027	0.062
19-Aug-97	198	-0.049	0.076
29-Aug-97	199	-0.061	0.055
02-Sep-97	199	-0.038	0.086
05-Sep-97	199	-0.036	0.076
15-Sep-97	201	-0.028	0.080
16-Sep-97	201	0.004	0.115
17-Sep-97	201	-0.011	0.100
24-Sep-97	202	-0.019	0.081
14-Nov-97	203	-0.031	-0.065
17-Nov-97	203	-0.030	-0.050
18-Nov-97	204	0.002	-0.076
20-Nov-97	204	0.016	-0.062
01-Dec-97	205	-0.022	-0.047
09-Dec-97	206	-0.046	-0.038
11-Dec-97	206	-0.032	0.017
15-Dec-97	207	-0.018	0.024
16-Dec-97	207	-0.031	0.020
23-Dec-97	208	-0.038	0.033
30-Dec-97	209	-0.015	0.068

DAILY SEA TERMS

Correction terms (combined GEA4, GS19, GS20, and GES1)

Date of Analysis	week	Oceanic Terms d13C	d18O
14-Jan-98	210	-0.015	0.032
15-Jan-98	210	0.012	0.045
16-Jan-98	210	0.008	0.065
21-Jan-98	211	-0.007	0.075
22-Jan-98	211	-0.001	0.074
28-Jan-98	212	0.006	0.083
29-Jan-98	212	0.030	0.141
30-Jan-98	212	0.009	0.123
04-Feb-98	213	0.006	0.116
06-Feb-98	213	-0.011	0.137
13-Feb-98	214	0.039	0.141
17-Feb-98	215	0.021	0.180
25-Feb-98	216	-0.030	-0.013
26-Feb-98	216	-0.012	0.015
11-Mar-98	217	0.022	0.194
24-Mar-98	218	0.029	0.232
25-Mar-98	218	0.014	0.268
26-Mar-98	218	0.037	0.331
01-Apr-98	219	0.008	0.315
02-Apr-98	219	0.007	0.278
08-Apr-98	220	0.018	0.300
16-Apr-98	221	-0.018	-0.015
17-Apr-98	221	0.001	0.006
21-Apr-98	222	0.039	0.044
22-Apr-98	222	0.014	0.065
23-Apr-98	222	0.013	0.062
29-Apr-98	223	0.027	0.006
30-Apr-98	223	0.031	0.102
06-May-98	224	0.019	0.104
07-May-98	224	0.056	0.139
11-May-98	225	0.021	0.153
13-May-98	225	0.017	0.209
03-Jun-98	226	0.031	0.156
04-Jun-98	226	0.033	0.207
10-Jun-98	227	0.064	0.211
11-Jun-98	227	0.055	0.248
12-Jun-98	227	0.042	0.234
28-Jun-98	228	0.011	0.023
02-Jul-98	228	0.031	0.019
03-Jul-98	228	0.047	0.065
05-Jul-98	228	0.039	0.110

TABLE G(2): Daily Oceanic Isotopic Correction Terms

DAILY SEA TERMS

Correction terms (combined GEA4, GS19, GS20, and GES1)

Date of Analysis	week	Oceanic Terms d13C	d18O
13-Jul-98	229	-0.275	-0.016
14-Jul-98	229	-0.244	-0.003
15-Jul-98	229	-0.168	0.038
16-Jul-98	230	-0.150	0.037
17-Jul-98	230	-0.125	0.088
20-Jul-98	231	-0.037	0.144
21-Jul-98	231	-0.017	0.157
24-Aug-98	237	-0.015	0.017
25-Aug-98	237	-0.007	0.043
27-Aug-98	238	-0.002	0.072
28-Aug-98	239	0.061	0.120
01-Sep-98	240	0.073	0.104
02-Sep-98	240	0.132	0.123
14-Sep-98	241	0.065	0.206
15-Sep-98	242	0.090	0.235
16-Sep-98	242	0.062	0.224
17-Sep-98	242	0.090	0.287
22-Sep-98	243	0.098	0.308
23-Sep-98	243	0.049	0.292
24-Sep-98	243	0.074	0.326
29-Sep-98	244	0.047	0.290
08-Oct-98	245	0.060	0.274
14-Oct-98	246	0.048	0.285
20-Oct-98	247	0.081	0.323
21-Oct-98	247	0.105	0.308
04-Nov-98	249	0.080	0.359
05-Nov-98	249	0.033	0.331
09-Nov-98	250	0.019	0.353
16-Nov-98	251	0.018	0.300
23-Nov-98	252	-0.006	-0.114
30-Nov-98	253	0.019	0.086
01-Dec-98	253	0.026	0.090
02-Dec-98	253	0.030	0.099
07-Dec-98	254	0.005	0.117
25-Jan-99	255	-0.043	-0.026
26-Jan-99	255	-0.028	-0.031
27-Jan-99	256	-0.029	0.015
28-Jan-99	257	-0.040	0.021
29-Jan-99	258	-0.032	-0.034
02-Feb-99	259	-0.045	-0.022
03-Feb-99	259	-0.085	-0.098
04-Feb-99	259	-0.054	-0.054
05-Feb-99	259	-0.053	-0.051

DAILY SEA TERMS

Correction terms (combined GEA4, GS19, GS20, and GES1)

Date of Analysis	week	Oceanic Terms d13C	d18O
09-Feb-99	260	-0.052	-0.067
10-Feb-99	260	-0.061	-0.084
11-Feb-99	260	-0.046	-0.049
17-Feb-99	261	-0.059	-0.059
18-Feb-99	261	-0.043	-0.069
19-Feb-99	261	-0.057	-0.070
12-Mar-99	262	-0.053	-0.172
15-Mar-99	262	-0.062	-0.151
16-Mar-99	263	-0.055	-0.148
18-Mar-99	263	-0.046	-0.135
24-Mar-99	264	-0.064	-0.159
25-Mar-99	264	-0.076	-0.124
19-Apr-99	265	-0.036	-0.099
20-Apr-99	265	-0.052	-0.106
21-Apr-99	265	-0.070	-0.123
13-May-99	266	-0.060	-0.085
17-May-99	266	-0.036	-0.066
26-May-99	267	-0.007	-0.069
27-May-99	267	-0.010	-0.040
01-Jun-99	268	-0.034	-0.137
03-Jun-99	268	-0.054	-0.093
14-Jun-99	269	-0.043	-0.147
16-Jun-99	269	-0.008	-0.101
17-Jun-99	270	0.040	-0.068
18-Jun-99	270	0.038	-0.060
24-Jun-99	272	0.098	-0.092
25-Jun-99	272	0.115	-0.106
02-Jul-99	272	0.124	-0.048
07-Jul-99	273	0.138	-0.055
08-Jul-99	273	0.141	-0.031
26-Jul-99	274	0.129	-0.077
27-Jul-99	274	0.124	-0.061
29-Jul-99	275	0.096	-0.034
30-Jul-99	275	0.117	-0.029
02-Aug-99	276	0.118	-0.031
03-Aug-99	276	0.065	-0.017
10-Aug-99	278	0.024	-0.042
11-Aug-99	278	0.007	-0.055
16-Aug-99	279	0.125	-0.056
17-Aug-99	279	0.070	-0.052
18-Aug-99	280	0.094	-0.019
19-Aug-99	280	0.104	0.003
20-Aug-99	281	0.107	-0.034

TABLE G(2): Daily Oceanic Isotopic Correction Terms

DAILY SEA TERMS

Correction terms (combined GEA4, GS19, GS20, and GES1)

Date of Analysis	week	Oceanic Terms d13C	d18O
01-Sep-99	282	0.104	0.002
02-Sep-99	282	0.104	-0.012
03-Sep-99	282	0.106	-0.016
09-Sep-99	283	0.076	-0.010
23-Sep-99	284	0.109	-0.080
15-Nov-99	288	-0.015	0.018
07-Dec-99	289	-0.067	-0.098
08-Dec-99	289	-0.038	-0.097
09-Dec-99	289	-0.042	-0.086
14-Dec-99	290	-0.023	-0.042
15-Dec-99	290	-0.033	-0.074
20-Dec-99	291	-0.025	-0.079
22-Dec-99	291	-0.021	-0.061
12-Jan-00	292	-0.006	-0.056
13-Jan-00	292	0.011	-0.042
14-Jan-00	292	0.022	-0.013
19-Jan-00	293	0.000	-0.058
21-Jan-00	293	-0.006	-0.057
25-Jan-00	294	0.012	-0.033
26-Jan-00	294	-0.002	-0.026
27-Jan-00	294	0.007	-0.028
01-Feb-00	295	0.014	-0.059
02-Feb-00	295	0.000	0.006
03-Feb-00	296	0.025	0.008
04-Feb-00	296	-0.017	0.020
10-Feb-00	297	0.007	0.019
02-Mar-00	299	-0.012	0.171
06-Mar-00	300	-0.026	0.228
08-Mar-00	301	-0.038	0.176
09-Mar-00	301	-0.034	0.231
10-Mar-00	301	-0.024	0.256
13-Mar-00	302	-0.051	0.092
14-Mar-00	302	-0.021	0.185
15-Mar-00	303	-0.010	0.158
16-Mar-00	303	-0.030	0.174
20-Mar-00	304	-0.056	0.117
22-Mar-00	305	-0.038	0.177
03-Apr-00	306	-0.064	0.009
05-Apr-00	307	-0.049	0.044
24-Apr-00	308	-0.017	0.003
26-Apr-00	308	0.009	0.118
27-Jun-00	309	-0.009	-0.002
06-Jul-00	309	-0.027	-0.054

TABLE H: Summary of Flagged Secondary Standard Data

Sample No.	Number assigned to atmospheric secondary standards. See Table C of Bollenbacher et al. [2001] and Table C(1) of the present report.
Week No.	Week ("shipment") number of analysis on mass spectrometer.
Fill No. Tube No.	Fill and Tube numbers of atmospheric secondary standard extractions. See Table C of Bollenbacher et al. [2001] and Table C(1) of the present report.
Standard No.	Designated number of secondary standard.
Extraction Date	Date of extraction (fill) of atmospheric secondary standard.
Measured d13C d18O	Craig- but not NBS- or daily-corrected reduced isotopic ratio. See Table D of Bollenbacher et al., [2001] and Tables D(1) and D(2) of the present report.
Date of Analysis	Measurement date on mass spectrometer.
Criteria	Reason for flagged data.

TABLE H: Summary of Flagged Secondary Standard Data

Sample No.	Week No.	Fill No.	Tube No.	Standard No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis	Criteria
K94-210	72	18	4	39382	03FEB94	-8.468	-0.835	09MAR94	Inspection of SPO data set
K95-823	120	31	2	39382	13JUN95	-8.413	-0.600	22AUG95	*
K97- 12	175	46	2	39382	13JAN97	-8.534	-0.843	21FEB97	*
K97- 81	177	47	3	39382	19FEB97	-8.609	-0.892	07MAR97	*
K97-131	187	48	2	39382	19MAR97	-8.523	-0.736	20MAY97	*
A98- 31	216	54	1	39382	11FEB98	-8.408	-0.431	26FEB98	(d18O value suspect)
K92-269	07	8	1	75635	01JUN92	-8.510	-0.659	15JUN92	Inspection of LJO data set
K94- 3	68	17	3	75635	04JAN94	-8.622	-0.924	02FEB94	Inspection of MLO data set
K94-594	253	22	2	75635	04MAY94	-8.578	-0.714	02DEC98	*
K97- 7	175	46	3	75635	09JAN97	-8.542	-0.548	20FEB97	*
K97- 73	176	47	1	75635	20FEB97	-8.499	-0.601	28FEB97	*
K97-125	186	48	2	75635	18MAR97	-8.591	-0.768	16MAY97	*
K97-126	187	48	3	75635	18MAR97	-8.590	-0.781	20MAY97	*
A98- 55	219	55	4	75635	31MAR98	-8.796	-1.268	01APR98	*
A98-514	257	62	5	75635	05NOV98	-8.492	-0.565	28JAN99	(d18O value suspect)
K94- 16	68	17	4	75859	03JAN94	-8.490	-0.686	02FEB94	Inspection of MLO data set
K94-848	90	24	6	75859	23JUL94	-8.649	-0.979	01SEP94	*
K96- 68	137	36	3	75859	22JAN96	-8.502	-0.575	14FEB96	*
K96-201	145	38	1	75859	30MAR96	-8.403	-0.546	01MAY96	*
K96-205	142	38	5	75859	30MAR96	-8.506	-0.754	05APR96	*
K96-657	158	42	3	75859	02AUG96	-8.415	-0.472	29AUG96	*
K96-659	156	42	5	75859	02AUG96	-8.415	-0.551	07AUG96	*
K96-867	163	44	3	75859	11NOV96	-8.293	-0.256	27NOV96	*
A98-551	251	63	5	75859	06NOV98	-8.336	-0.535	16NOV98	*
	105			GS19		-7.428	0.032	23MAR95	Inspection of KER data set
	105			GS20		-8.561	-0.764	23MAR95	Inspection of KER data set
	153			GEA4		-7.599	1.510	17JUL96	*

* When a standard is run, and its value looks suspect based on recent runs....another standard is run immediately. In each of these cases the resulting comparison warranted flagging of the suspect standard run.