

Chapter 1 Overview of Reporting

One fundamental purpose of the World Ocean Circulation Experiment (WOCE) is to assemble a global hydrographic data set to uniform standards of accuracy (or reproducibility) and precision. There are many interrelated tasks involved in accomplishing that goal and this manual attempts to address the problems associated with collecting and assembling such data.

In order to accomplish the objectives of WOCE the Hydrographic Programme Office (WHPO) needs a variety of information to carry out its assigned tasks of coordination, data quality control, and reporting of results for one-time surveys, supplementary cruises,¹ repeat hydrographic sections, and time series stations. At present the WHPO expects to collect data from investigators in 30 countries at 100+ different institutions. In order to handle the voluminous data from such a diverse community, and to enable the WHPO to ensure that WOCE standards are being met, the WHPO requests information and data from the chief scientist² and the principal investigators (PI)² concerned with the various measurements made during the cruise.

In order to facilitate the assembly of a uniform global database this manual provides the standards and sampling requirements for one time and repeat hydrography done for WOCE. The target accuracy and reproducibility for the common hydrographic measurements are given, and units of measurement are defined for the WOCE parameters. The data reporting expected of all chief scientists and PIs participating in WOCE is outlined and examples of the necessary documentation are provided. Data formats are stated and precision for all known parameters is specified. Data quality information is incorporated so that a permanent record of each measurement's quality assessment is carried with the data.

To accomplish the tasks assigned to the WHPO, we rely heavily on the close cooperation of the chief scientist for each cruise. As only the chief scientists are in a position to know what was measured, and where, on a WHP cruise, in practice it must be their responsibility to assemble and submit all of the data. In that regard it is anticipated that most communications will occur between the WHPO and the chief scientist, who has the primary responsibility for

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1. Multiple occupations of a one-time line that has been completed but does not have an overlapping repeat section defined, partial sections (particularly those that do not go coast to coast), and some cruises lacking adequate tracer measurements, or station spacing substantially greater than the WHP target of 50 km, or 30 nm, will be listed as supplementary cruises. Such a designation is presently indicated by an * after the section number on OCEANIC and in other reports issued by the WHPO and the WOCE International Project Office (IPO).
 2. In our usage the chief scientist(s) leads the expedition at sea. Principal Investigators (PIs) are the individuals responsible for the measurements made on the cruise. PIs may, or may not go to sea on a particular cruise but are, nonetheless, expected to perform the data analysis and reporting outlined in this manual for PIs. PIs should normally submit all data for a cruise to the chief scientist, who will then assemble the data and forward it to the WHPO.

submitting the plans, reports, and data. If asked, the WHPO will make every possible effort to help chief scientists to assemble their cruise data and documentation.

Correspondence between other PIs, DQEs, the WHPO, SAC, IPO, or DIU should be copied to the chief scientist as a matter of courtesy and to enable them to carry out their responsibilities. All correspondence between DQEs and PIs should be copied to the WHPO as well, and to the chief scientist if appropriate. All data are held in confidence by the WHPO or the SAC until the data are finalized and the proprietary period has expired.

Questions, comments, or suggestions from any individuals using this manual are always welcome.

1.1 Summary of Requirements

This manual contains a great many details necessitated by the demands of the program and the various queries and comments about the manual we have received over the past few years. For most users, particularly those whose native language is not English, most of these details will be unnecessary and may cause confusion and vexation. *To minimize the amount of essential translation the following is a list of the basic sections and tables included in this manual and their location. Tables in this manual considered essential are bordered with a heavy black line* in contrast with tables of more limited utility and interest, which have only a thin border line. The following list is presented in the sequence in which events should occur.

- **Cruise plan** – chief scientists should try to get at least a preliminary cruise plan to the WHPO *one year* before the cruise, except for time series stations. An outline is given in Table 3.1 on page 24. Details can be found in Section 3.1 beginning on page 23. Sampling requirements for one-time sections are given in Section 2.1.1 and those for repeat hydrography and time series in Section 2.1.2 on page 14.
- **Quality control** – samples must be accurately identified in time and space. Station positions are kept in a —.SUM file, Table 3.5 on page 30, and described in Section 3.3 on page 29. Water sample identification is discussed in Section 4.2 on page 37. The quality of water sample data is evaluated both by the individuals making the measurements and independently by WHPO assigned quality evaluators. Quality evaluation by the individuals is best done and recorded while the measurements are being made aboard ship. These evaluations are noted in the data records by means of quality flags, or data bytes. For water samples, the quality flags are defined in Table 4.9 on page 53. CTD quality flags are given in Table 4.10 on page 55. Further, a quality flag is also attached to the sampling device from which the sample was collected, and that flag is defined in Table 4.8 on page 52. Details can be found in Section 4.5 beginning on page 52. The quality flags are also used in the —.SEA file to indicate, by setting the quality flag to 1 (sample taken), or 9 (sample not taken), what water samples for which measurements were taken from each bottle. That is particularly important where the water sample analysis is delayed, as in the case of samples taken for analysis by shore-based laboratories. The quality flags thus also act as an inventory of sampling done.

- **Cruise report** – is due from the chief scientist *one month* after the cruise. An outline for the expected report is given in Table 3.4 on page 28. All items listed in *italics* in Table 3.4 should be included with the initial cruise report together with station positions (—.SUM file, Table 3.5 on page 30).
- **Shipboard Data** – data taken and analyzed aboard the ship are due from the chief scientist *six months* after the expedition has finished. Small and large volume water sample data should be formatted in the fashion described in Table 4.3 on page 43. Individual small volume parameters are described in Table 4.1 on page 39. Large volume parameters are listed in Table 4.4 on page 44. Details for water sampling formats are given in Section 4.3 beginning on page 38. CTD data should be formatted as shown in Table 4.6 on page 50. Details of the CTD data format are given in Section 4.4 beginning on page 49. Requirements for underway data reporting are given in Chapter 5. The final cruise report (—.DOC file, Table 3.4 on page 28) and updated —.SUM file (Table 3.5 on page 30) are due at the same time as the water sample and underway data.
- **Shore-based data** – data from water samples taken during the cruise that require shore-based analysis are nominally due *eighteen months* after the voyage is completed. Ideally, the PIs providing shore-based data will have received a copy of the —.SEA file from the chief scientist containing columns filled with –9's where the shore-based data should be added. The quality flag for a parameter should be set to 1 on board the ship when a sample is taken from a water bottle. These quality flags must also be updated as the shore-based data are added to the —.SEA file when analysis is complete. The revised —.SEA file should then be routed through, or at least copied to, the chief scientist for forwarding to the WHPO.

1.1.1 Types of Data to be Submitted to the WHPO

Not all data from a WOCE hydrographic programme expedition are to be submitted to the WHPO. For example, data from current meters that may have been recovered during the cruise would go to a separate DAC with, perhaps, only a mooring location given in the —.SUM file and a brief comment in the —.DOC file. Data taken on WHP cruises by affiliated programs, such as JGOFS, may, at the option of the chief scientist, be included in data files sent to the WHPO. Table 1.1 lists the types of data commonly taken on WHP cruises and where the data should be sent and where it can be located after the quality evaluation is complete. The current status of all WOCE data is summarized on OCEANIC. Access to OCEANIC is described in Appendix A.³

Postal and electronic addresses for existing DACs and SACs are given in Appendix A, and are also available from OCEANIC. As DACs continue to be formed, OCEANIC should be consulted if you have any questions about where particular data can be obtained.

3. The DIU also prints hard-copy updates of the field program status for those who do not have electronic access. Please contact DIU directly if you would like a printed copy.

TABLE 1.1: Types of data commonly taken on WHP cruises and what happens to them

Type of Data	Data Should be Sent To:	Final Data Located At ¹ :	Contact Individual	Comments
Air chemistry and underway dissolved gases	JGOFS	JGOFS-WHOI	G. Heimerdinger	PI listed on OCEANIC
ADCP ² and LADCP	Kept by PI	PI	PI	PI listed on OCEANIC
Bathymetry and Navigation	WHPO	NOAA/NGDC	R. Warnken	
CTD	WHPO	WHP-SAC	K. Jancke	
Current meters	OSU	OSU	D. Pillsbury	
Drifters	AOML	MEDS	A. Bolduc	
Floats	WHOI	WDC	C. Wooding	
Meteorological	WHPO	FSU	D. Legler	
Thermosalinograph	WHPO	ORSTOM-Brest	A. Dessier	
Water sample	WHPO	WHP-SAC	K. Jancke	Non-WOCE parameters are optional.
XBT and XCTD	See Section 5.6	See Section 5.6		

¹ After WOCE is completed the data will be available via the World Data Centers.

² As of this writing an ADCP DAC does not exist but one may be implemented in the future. *Electronic and postal addresses for all WOCE DACs and SACs are given in Appendix A.*

1.2 Uniform Data Format Requirement

In order to handle the voluminous data expected from the diverse WOCE community, and to enable the WHPO to ensure that WOCE standards are being met and that the data are relocatable, it is necessary that all investigators use a standard format, consistent naming convention (mnemonics), and units for data reporting so that the data can be assembled into a uniform, global database.

In originally preparing this manual, a number of data formats were examined. All of the existing data formats have drawbacks of one sort or another. As a result, the WHPO and the WHP Planning Committee have evolved the standard, uniform data formats presented here.

The formats used are designed to:

- Ensure that WOCE data are in consistent units and reported to the same accuracy and precision insofar as possible.
- Provide consistent naming conventions for the plethora of measurements made on WOCE/JGOFS cruises.

- Provide reasonably consistent, machine-readable quality information usually in the form of quality flags for each individual measurement. Quality flags for measurements are normally assigned both by the analyst and an independent quality evaluator.
- Provide a machine-readable inventory of what measurements were made on the cruise, and where in time and space the samples were taken.
- Provide global data of a wide variety of measurements from a multitude of investigators in one consistent format and naming convention so that the data are easily read and compared.
- Provide consistent documentation of how the measurements were made.

We are under no illusions that we have solved all of the diverse problems of hydrographic and underway data reporting that will be encountered during WOCE. We do hope that the flexibility built into the present formats will cover the great majority of the data reporting requirements. Chief scientists or investigators who foresee problems with the data formats defined here should contact the WHPO, preferably before their cruise begins.

1.3 Pre-Cruise Information

The WOCE community and the WHPO generally have no way of knowing about your cruise unless you tell us. WOCE is simply too large, with too many participants in too many countries for word-of-mouth to be reliable. Thus, a formal reporting and publishing scheme has been developed and that scheme is described in this manual.

The initial information requested is a **cruise plan**, as described in Section 3.1, ideally prepared by the **chief scientist** *one year* before the cruise. The cruise plan contains an overview of the cruise, describes the scientific goals, and lists the Principal Investigators (PIs) and measurement groups (and their institutions) showing what measurements are planned and who will be responsible for different measurements. Additional information requested in the cruise plan includes a preliminary cruise track, estimates of the total number (and type) of hydrographic stations, and a logistical summary. An example of a cruise plan is given in Appendix B.

After review by the WHPO, cruise plan summaries are published on OCEANIC (see Appendix A) in order to make the information widely available to the oceanographic community.

1.4 Post-Cruise Documentation

For hydrographic data the WHPO also functions as a Data Assembly Center (DAC) and is responsible for forwarding quality-evaluated cruise data sets to the Special Analysis Center (SAC) in Hamburg for assembly of a uniform global data set. The WHPO is also responsible for collecting underway data from each cruise and forwarding it to the appropriate DAC.

In order to carry out these responsibilities the WHPO needs a great deal of information about the cruise and the data acquired during the cruise from the **chief scientist**.

The schedule for post-cruise data flow is shown schematically in the timing diagram, Table 1.2.

TABLE 1.2: Target planning timetable for WHP data

Time After Cruise Ends (months)	Post-Cruise Data Flow WOCE Hydrographic Programme Office Data Assembly Center WHPO-DAC	Data Flow Special Analysis Center WHP-SAC
1	Initial cruise report received at WHPO from chief scientist. Summary published on OCEANIC.	
6	Assembled bottle (ship-based), CTD/O ₂ , and underway data with complete cruise report received at WHPO from chief scientist.	
7	Bottle and CTD/O ₂ data out to data quality evaluators (DQEs) from WHPO. Underway data to data assembly centers (DACs).	
7 to 12	DQEs, PIs, and WHPO quality evaluate and prepare final ship-based hydrographic data sets.	
12	Data report Number 1 prepared by WHPO for SAC.	
14	Ship-based data and Data Report 1 sent to SAC. Report summary published on OCEANIC.	Quality evaluated CTD/O ₂ and ship-based bottle data and Data Report Number 1 received.
18	Shore-based tracer analysis results received at WHPO.	
19	Shore-based data out to DQEs.	
19 to 24	DQEs, PIs, and WHPO quality evaluate and prepare final shore-based data sets.	
24	If no shore-based analyses are required, Data Report Number 1 is published as a final report in archival form. If shore-based analyses are required for the final report then the ship-based data are published only on electronic media for limited distribution at this time.	Ship-based hydrographic data sent to World Data Centers and becomes publicly available via anonymous ftp or other electronic means from SAC.
24	Data Report Number 2 prepared by WHPO for SAC. Includes ship- and shore-based data.	
26	Complete data set from cruise and Data Report Number 2 sent to SAC. Report summary published on OCEANIC.	Quality evaluated shore-based data and Data Report 2 received.
42	Final version of Data Report Number 2 prepared for SAC, if required, with shore-based analyses included.	Final data report printed in archival form for libraries and available on electronic media to others. Complete data set out to data centers at end of proprietary period.

1.4.1 Cruise Report — Chief Scientist

Within *one month* after a cruise the **chief scientist** should submit an initial **cruise report** to the WHPO. The format for this report is described in Chapter 3, Section 3.2. The cruise report will be published in summary form on OCEANIC and serves to inform the oceanographic community what was accomplished on the cruise and as a guide for future work in the same area. This report is also provided to interested government agencies.

Early submittal of a cruise report also helps the WHPO and the chief scientist to recognize and, hopefully, correct problems with both the present cruise as well as future cruises using the same techniques or in the same area.

An updated and expanded version of the cruise report describing the techniques used for each and every measurement made on the cruise should be submitted by the **chief scientist** with the data. This complete report is expected to serve as part of the final documentation for the data reports to be produced by the WHPO.

1.4.2 Data and Methods Report — Chief Scientist

Early data submittal for independent quality evaluation is an integral part of the WOCE Hydrographic Programme. In order to accomplish this the **chief scientist** should send a copy of the data files to the WHPO *within six months* after the end of the cruise. In the initial data submittal it is expected that the data from *all* measurements, including tracers, made aboard the ship will be included. The WHPO will accept partial data sets if complete sets are not available within a reasonable time. Partial water sample data sets, and all samples taken for later analysis on shore, should be indexed using the data quality flags so that it is possible to determine which water sample data are to be expected in the future. Example data files for water samples and CTD data are given in Chapter 4. Underway data formats are described in Chapter 5. The data files must be accompanied by a text file (*filename.DOC*)⁴ that includes an updated and corrected cruise report and documents all measurements made on the cruise in the fashion outlined in Table 3.4, Chapter 3. A —.DOC file example is given in Appendix C.

WHPO quality assessment will begin after the data *and* documentation are submitted to the WHPO. During this phase Data Quality Evaluators (DQEs) will work with the WHPO and those responsible for the measurements. The data will be available only to the WHPO, to the DQEs, and to the Principal Investigators (PIs) of the cruise during this period. *Outside requests for preliminary data must be made directly to the chief scientist prior to completion of the DQE process and the expiration of the two-year proprietary period.* After the end of the proprietary period and completion of the DQE process the SAC will make the data available through the World Data Centers and via anonymous ftp (see Appendix A).

The **PI** for each measurement group, for example, CTD, nutrients, salinity, CFCs, oxygen, meteorology, etc., are expected to provide the chief scientist with their data in the proper format (see Chapter 4 and Chapter 5) and a report that provides information in sufficient detail to establish how the final data sets were created and to assess the data quality. Examples of such reports are included in Appendix C. A standard measurement reporting protocol is given in Appendix D. References to the analytical methods used must be supplied, and any variations from these techniques described. If no published reference exists then the technique must be

4. It is recommended that the *filename* be the EXPOCODE (defined in Section 3.3 on page 29) but WOCE section number, etc. are acceptable. *Filename* is represented by a — throughout the rest of this manual.

described in detail in the report. The suggested format for describing nonstandard techniques is given in Appendix D. Each report must include an assessment of the uncertainty of the measurements and should note any problems peculiar to the data gathered during the cruise. Precision and accuracy standards for hydrographic measurements for the one-time WHP survey are given in Chapter 4, Table 2.5 and Table 2.6.

The **chief scientist** is expected to assemble the cruise information from the PIs into a report similar to the outline presented in Chapter 3, Table 3.4. The WHPO will help with this task if asked.

1.4.3 Data Report Number 1—WHPO

The first data report prepared by the WHPO for a cruise will consist of the cruise report supplied by the chief scientist, listings of all station data from the ship-based measurements including CTD at standard levels and associated water bottle data, a data quality assessment, and the documentation of the procedures used and problems encountered. Most documentation will be provided to the WHPO by the chief scientist and PIs who participated on the cruise, and will be augmented by the reports of the data quality evaluators and a summary by the WHPO. If no shore-based analyses are required for the cruise this will be the final data report produced for the cruise by the WHPO.

Data Report Number 1, based on shipboard data, will be prepared by the WHPO approximately 12 months after the cruise. This report is prepared once the DQEs have completed their work and the chief scientist has reviewed the DQE comments and corrected the data, if required.

Initial distribution of the data report will be limited to the PIs, the Special Analysis Center (SAC) for WHP data, and those groups or individuals designated in writing by the chief scientist(s) and the PIs. At this time the WHPO will distribute only a summary, without any data, of this report to the WOCE community via OCEANIC.

The proprietary rights of the data originators must and will be respected. At the end of the proprietary period, if no measurements requiring shore-based analyses were made during the cruise, Data Report Number 1 will be published by the SAC both on electronic media and in archival form and distributed as the final cruise report. If shore-based analyses are expected then the data report will only be published on electronic media for limited distribution. All data reports are published and distributed at no cost to the investigators.

1.4.4 Data Report Number 2—WHPO

Data Report Number 2 is only prepared for cruises that include measurements requiring shore-based analyses and replaces Report 1 when completed. If shore-based analyses are required for the cruise then Data Report Number 2 must wait until all such analyses are completed or, in the judgement of the WHPO, there is no reasonable expectation of the additional data analyses being submitted within a reasonable time.

It is assumed that shore-based data will be submitted to the WHPO approximately 18 months after the end of the cruise; quality assessment and the preparation of the final data summary will take an additional six months. Data Report Number 2 will then be prepared by the WHPO and a summary published on OCEANIC.

When completed, the data report will include the information in the —.DOC, —.SUM, —.SEA, —.CTD, and —.LVS files submitted to the WHPO, plus the DQE reports and a cruise

summary by the WHPO. At the end of the proprietary period these reports will be printed and distributed to libraries by the SAC, and made available in electronic or printed format to individuals (see Appendix A). The SAC will forward the documentation and data to the World Data Centers at the end of the proprietary period.

1.5 Data Sharing Policy

There is a fundamental trade-off in WOCE — on the one hand, the protection of the intellectual effort and time of originating investigators (those who plan an experiment, collect, calibrate, and process a data set to answer some questions about the ocean), and on the other hand the need to compare various data sets and data types to check their consistency, to better understand the ocean processes involved, and to see how well the numerical models describe the real ocean. The policy adopted by WOCE is a trade-off between these conflicting needs.

Any data collected as part of WOCE should be made publicly available no later than 2 years (the publication rights period) from collection, *unless differing proprietary rights are specifically granted by the WOCE Scientific Steering Group (SSG) and funding agencies*. However, in the case of hydrographic data submitted to the WHPO–DAC the data will not be made publicly available until the DQE process has been completed and a final data set submitted by the chief scientist to the WHPO. Prior to that time the data will be considered *preliminary* and can be obtained, if necessary, only from the chief scientist.

Collection is interpreted as the completion of the determination of the value of the particular parameter. Thus, for example, tritium/helium collection may not be complete for over a year after return to shore/laboratory. Individual WOCE programmes (hydrography, surface velocity, etc.) require all participating investigators to submit (usually within a few months after collection) data collected as part of WOCE to the WHPO or other DAC for the purposes of quality control and data synthesis during the public rights period. In that case the recipient DAC may not redistribute such data, or a derivative containing most of the information unless specifically approved by the originating PI, and should use the data for the stated purpose only.

Originating investigators are strongly encouraged to share their data before the end of the publication rights period. The receiving investigator should not publish any paper during that period based predominantly on the received data, should coauthor results with the originating investigator, and should not redistribute the data.

1.6 Electronic Data Submission

Submission of reports and data on electronic media or via ftp⁵ is strongly preferred. Personal computer software formats that can be read at the WHPO are tabulated in Appendix E.

The WHPO can read 3.5 or 5.25 floppy disks at any standard density for both DOS and Macintosh, and 3.5 high-density floppies for SUN SPARC 10.

5. See Appendix A for address.

In addition, data may be submitted on 8 mm ANSI tape cartridges.

At present the WHPO can read 9-track tapes at 1600 to 6250 bpi, ASCII or EBCDIC files formatted with fixed block size. However, 9-track tape facilities may not be available after mid-1994 so if you intend to submit data on 9-track tape after that time please contact us in advance to insure we can still read them. IBM backup format cannot be read with present equipment.

The NEC format used in Japan cannot be read.

A monospaced font, for example, *Courier*, without pair kerning should be used for data entry with word processing or spreadsheet programs to ensure proper column alignment.

When you prepare the —.DOC file, if you are using a Microsoft program such as Word or Works it is suggested that a Rich Text Format (RTF) version of the file be included as well as the original file. Also, a number of other word processing programs are capable of producing RTF files and that option should be used if available. If you use FrameMaker, a file in Maker Interchange Format (MIF) should be included. With either RTF or MIF files, electronic versions of the figures should be included in the file.

Electronic versions of all figures should be submitted, if possible, in some commonly acceptable format (see Appendix E). All reports are printed directly from the electronic files and it is thus necessary to include all figures in those files. If electronic versions of the figures cannot be created at your facility, please submit the original line drawings, or glossy photos of the *original* line drawings, rather than copies so that they can be scanned at the WHPO. Scanning Xerox™ copies, or photos of copies, results in moiré effects and the resultant figure quality is very poor.

While a variety of word processing programs are available at the WHPO, as tabulated in Appendix E, it is suggested that an unformatted, or export ASCII⁶ version of the files on the floppy also be included as a backup.

Paper copies of reports and data will be accepted if that is all that is available.

Please note that the values are often to be reported with a greater number of digits than are significant in the uniform data formats given below. It is common to report data so that the standard deviation has 2 significant figures⁷ to minimize roundoff errors during data processing, and we follow that practice for most measurements.

If you have any questions about media or data transmittal please contact the WHPO as soon as possible, preferably before the cruise.

6. ASCII is defined in Appendix F. If submitting text files in ASCII only please observe the following conventions to facilitate formatting by the WHPO for printing. Do not use a hyphen (-) to separate parts of a compound word. Please use a decimal (.) to delineate fractional values rather than a comma (,) and include the leading zero on small numbers, that is, 0.045 rather than .045 or 0,045. Tables should be tab or comma delimited with no spaces between entries and each row delimited by a carriage return/line feed (CR/LF). Put a CR/LF only between paragraphs in text if possible or, alternatively, include one blank line between paragraphs.

7. If the standard deviation is 0.0023, the data are reported to 4 decimal places.

1.7 Data Distribution

While the main purpose and focus of this manual is on data collection, assembly, and quality evaluation, it is appropriate to inform the WOCE community of how the hydrographic data collected during WOCE can be retrieved. The current status of the data for any WHP cruise can be found on OCEANIC.

Prior to a cruise the WHPO will provide, or assist you in getting, previous data from high quality sections near to or crossing your proposed ship track. If you know of such preexisting data, but do not have a copy, or it is still proprietary, please contact us and we will make arrangements to obtain the necessary data for you.

The technology for data handling and transmittal is changing rapidly, and the WHPO and SAC are attempting to keep up with these changes. The following system was put into place in early 1994. So if you happen to be reading this in 1997, the then extant system will probably be quite different from the one described here. Notices and instructions will be posted on OCEANIC as updates and improvements are made to the system. Remaining questions about data retrieval should be addressed directly to the WHP SAC.

As indicated in Table 1.2, the WHPO sends all data and documentation to the SAC after completion of all quality checks and review by the chief scientist. At the end of the proprietary period, 2 years from the date the measurement was made, SAC makes the data and documentation available via an ftp directory for those with an Internet connection. Directions for accessing the SAC ftp directory, as it presently exists, are given in Appendix A. Because the water sample data have been through an extensive quality evaluation before being posted by SAC the —.SEA file is renamed the —.HYD file for each cruise in their ftp directory. The QUALT2 word is also deleted before posting. Otherwise, the data format for the —.HYD file is the same as described here for a —.SEA file. A corrected depth column is added to the —.SUM file by the WHPO following the uncorrected depth submitted by the chief scientist. With that exception, the —.SUM file for an expedition posted at SAC is identical to the one shown in Table 3.5 on page 30. —.CTD files posted by SAC are identical in format to the example given in Table 4.7 on page 51.

