

Chapter 3 Cruise Plan and Cruise Report

Because uniform, consistent cruise-related information is needed from a diverse community, the WHPO has prepared the following recommendations for the contents of a **cruise plan** and **cruise report** to be submitted to the WHPO for each one-time survey cruise and most repeat cruises by the **chief scientist**. However, if a repeat cruise is run two or more times annually over the same line then only an annual cruise plan and cruise report need be submitted. In the case of time-series stations we request only an initial plan when the station begins and an annual cruise report, together with the assembled hydrographic data for the year.

3.1 Cruise Plan

A preliminary **cruise plan** is requested from each **chief scientist** one year prior to the cruise. Much of the information needed may not be available until closer to the actual cruise date and that the initial cruise plan will have to be updated. Nonetheless, for planning purposes and coordination within the global context of the WOCE Hydrographic Programme, it is urgently requested that a preliminary cruise plan be submitted to the WHPO as far in advance of the cruise as practical.

Experience to date suggests that final plans for a cruise will be made from three (3) to six (6) months before the actual departure. When the cruise plans are relatively final, the WHPO would very much appreciate an updated cruise plan. Updates are welcome at any time, however. It is also helpful to know the funding status for the various measurements planned on the cruise.

If help from the WHPO for international cooperation is requested, then the type of support needed should be stated in the preliminary cruise plan. The further in advance of the cruise the WHPO is aware of support or coordination problems, the more likely it is that we can be of some help. Conversely, there is very little chance we can be of any help just two or three months before the cruise.

An example cruise plan is presented in Appendix B and outlined in Table 3.1. Please try and include as much of the information requested as practical. Naturally, cruise plans for one-time sections will need to be more extensive and detailed than those for most repeat hydrography cruises.

If a repeat section is being done more than once a year by the same group, a single cruise plan for the year is adequate with updates as needed if plans change.

For time series stations a cruise plan is requested as the station is begun, with occasional updates as plans change over the years.

TABLE 3.1: Cruise plan outline

CRUISE PLAN	
<i>(Prepared by Chief Scientist nominally one year before cruise)</i>	
A. Summary information	
1. WOCE section designation	
2. Chief Scientist(s) and their affiliation	
3. Expedition designation (EXPOCODE)	
4. Tentative dates	
5. Ship	
6. Ports of call	
B. Overview	
C. Scientific goals	
D. Parameters, contributing institutions, and personnel	
E. Underway measurements	
F. Water sampling equipment	
G. Cruise track and planned station locations	
H. Logistics	
<i>Cruise plans are posted on OCEANIC</i>	

Cruise Summary Information

The summary information tabulated in Table 3.1 should be included at the beginning of each cruise plan. EXPOCODE's are discussed in Section 3.3 and serve to uniquely identify the cruise. If multiple legs are planned, then summary information should be given for each leg.

The body of the cruise plan should address the following topics:

Overview

A brief overview of the cruise should be given here, including a summary of the objectives to help place the cruise within the goals of the overall WOCE Hydrographic Programme.

Scientific Goals

Succinctly define the scientific goal(s) of the study. A brief discussion of the relevance to previous and future work in the region should be included. Specific sampling strategies for the scientific questions addressed by the cruise and descriptions of particular problems that might be encountered in answering these questions might also be discussed.

Parameters, Contributing Institutions, and Personnel

The information requested in this section is best presented in tables. In one table list each of the various parameters to be measured during the cruise, including the investigator responsible for each measurement together with their institution. A second table is a list of

cruise participants and their functions during the cruise. Ancillary programs, such as surface drifters, floats, underway measurements, etc., should also be described here together with the names and institutions of the associated investigator. If the information on groups and individuals is incomplete when the preliminary cruise plan is submitted, please supply the information as it becomes available. The estimated personnel required for a one-time survey cruise are given in Table 2.1.

TABLE 3.2: Estimated minimum personnel requirements for a WOCE one-time hydrographic survey

Number of People	Task or Measurement Responsibility
1	Chief scientist.
9	Stand watches; run the CTD and water sampling.
2	Nutrients.
2	CFCs.
3	CO ₂ (JGOFS).
1	Electronics.
1	Data processing.
1	Oxygen.
1	Salinity.
1	Underway sampling.
1	Large volume sampling.
1	JGOFS biooptics.
Assumes three (3) watch groups. Experience to date suggests that if the cruise is to extend past thirty (30) days then additional personnel will be required.	

Water Sampling Equipment and Underway Measurements

A description of the primary water sampling equipment is needed. Examples are the type, number, and size of all water sampling equipment and the number and type of CTDs, salinometers, etc. A list of underway measurements and equipment (ADCP, thermosalinograph, etc.) planned, and the individual responsible for them, should be included in this section.

Cruise Track and Stations

A brief description and chart of the region that shows the proposed ship's track and the type and location of the stations should be included. The time budgeted for steaming, stations, weather, etc., should also be included. The assumptions and algorithms used by the WHPO to make initial time estimates are given in Table 3.3. Since vagaries of the weather and other conditions may alter a cruise plan, a statement defining priorities would be useful. Any major deviations from WOCE requirements should also be discussed here and justification presented.

TABLE 3.3: Assumptions used by the WHPO for calculating time required to do a WHP section.

<p><i>The number of small and large volume stations and number of days required for the sections of the WOCE Hydrographic Programme are based on the following assumptions:</i></p>
<ol style="list-style-type: none"> 1. 10 knot cruising speed. 2. 15% of the total steaming time and station time is added as port time. 3. No time is allowed for bad weather. 4. Small volume stations are spaced 30 nm apart along the entire section plus one at the beginning. 5. For one-time sections large volume stations, if required, are spaced 300 nm apart along the entire section plus one at the beginning. 6. Small volume stations require 4 hours each (full depth). 7. Large volume stations (except argon) require 12 hours each (full depth). 8. No argon stations are assumed. For every argon station add 1 day (24 hours) to total time estimate. 9. Repeat hydrography stations are all assumed to be full depth (recommended).

Logistics

Please provide details in your report as to where the ship will be loaded, any special equipment requirements, number of vans (portable laboratories) to be used and where they will be on the ship. Any special requirements, port facilities, customs problems anticipated, etc., should also be outlined here. The scheduled port stops and the names and addresses, both postal and electronic, of the ship's agents for all ports of call should be listed. It is also useful to spell out visa requirements and any health precautions for the cruise participants.

Please ensure that the information for the ship you intend to use is already available via OCEANIC. If the relevant data are not available via OCEANIC then ship information should be included in the cruise plan. If you do not have access to OCEANIC, or have questions about ship information, for example, possible radioactive contamination on the ship, please contact the WHPO as soon as possible.

Updates

Should any information change concerning logistics, or other details, please advise the WHPO as soon as possible. Also, please feel free to call on the WHPO at any time for help with any of the information requested here, or if we can be of assistance in any other way.

3.2 Cruise Report

A detailed report on the cruise is required from the **chief scientist** for a variety of purposes. An initial report immediately after the cruise is used to inform the WOCE community of what took place via OCEANIC, provide information to coastal states whose economic zones may have been traversed during the cruise, summarize events and station locations for cruise participants and others, and satisfy various intergovernmental agency requirements. A complete report documenting the types of measurements made and methods used to make these measurements is requested at the time the data are submitted.

The following sections describe the content of the report and station summary.

3.2.1 Initial Cruise Report

The **chief scientist's** initial cruise report is to be submitted *one month* after the cruise and consists of two major sections—the chief scientist's report (preliminary —.DOC file, Section 3.2.2) and a station summary (—.SUM file, Section 3.3). The chief scientist's initial report is expected to include at least the subjects indicated by asterisks(*) in Table 3.4 plus a station summary (—.SUM file).

In the interests of standardization, and ease of searching through the large number of cruise reports that will be generated during WOCE, it is requested that the outline and sequence of reporting presented in Table 3.4 be followed for all cruises, and that the report be in English. To facilitate international understanding please do *not* abbreviate words in your cruise report.

Initial cruise report contains at least:

- A brief narrative of the cruise highlights, goals achieved or not achieved, major problems, etc. as indicated by sections marked with an asterisk (*) in Table 3.4.
- A list of the principal investigators (PIs) responsible for underway measurements, drifter and floats, moorings, and water sample and CTD analysis or interpretation.
- A cruise track plotted on a chart showing the location of each station with different symbols used to indicate each type of station. Optionally, vertical sections along the ship's track showing the bottle depth distribution for both large and small volume samples.
- A —.SUM file with parameters measured at each station listed.

3.2.2 Chief Scientist's Final Report

Approximately *six months* after the end of the cruise an updated and complete cruise report (—.DOC file) and station summary (—.SUM file) must be submitted by the **chief scientist** together with the assembled water (—.SEA, Section 4.3), and —.LVS (Section 4.3) files, CTD (—.CTD files, Section 4.4), and underway data.

In order to ensure uniform reporting from the diverse WOCE community it is strongly recommended that the outline presented in Table 3.4 be followed when preparing the cruise report. Additional cruise-related information felt to be pertinent may be included at the

TABLE 3.4: Outline of a cruise report (—.DOC file)**CRUISE REPORT***(Prepared by Chief Scientist with the help of cruise PIs)***A. Cruise narrative****1. Highlights***

- a. *WOCE designation* (for example A11, IR4, etc.; include all sections covered on cruise).*
- b. *Expedition designation* (EXPCODE, each cruise/leg has a unique designator).*
- c. *Chief scientist* (for each leg if multiple legs, include postal and electronic addresses).*
- d. *Ship* (name and call sign).*
- e. *Ports of call*. Port(s) where cruise begins and ends plus any stops during the cruise. For each leg if multiple legs.*
- f. *Cruise dates* (for each leg if multiple legs).*

2. Cruise Summary Information*

- a. *Text giving geographic boundaries of the survey*.* Cruise track showing each station with different symbols used to indicate station type.
- b. *Total number of stations occupied* (for each WOCE section if multiple sections) *and breakdown by type of station and parameters sampled*.*
- c. *Floats and drifters deployed* (type, identification number, location, and time).*
- d. *Moorings deployed or recovered* (type, identification, location, and time).*

3. List of Principal Investigators for All Measurements*

- a. *Name* (please spell out).*
- b. *Measurement responsibility*.*
- c. *Institution or affiliation* (abbreviations must be defined and postal and electronic addresses given)*

4. Scientific Programme and Methods*

- a. *Narrative*.*
- b. Interlaboratory comparisons made (if any) or comparisons with previous cruise data.
- c. (Optional) Vertical sections along the ship's track showing the bottle depth distributions for both large and small volume samples and plots of property vs. property relationships.

5. Major Problems and Goals Not Achieved***6. Other Incidents of Note*****7. List of Cruise Participants**

- a. Name (please spell out), responsibility on cruise, and institution or affiliation (abbreviations must be defined and postal and electronic addresses given).

B. Underway Measurements

1. Navigation and bathymetry
2. Acoustic Doppler Current Profiler (ADCP)
3. Thermosalinograph and underway dissolved oxygen, fluorometer, etc.
4. XBT and XCTD
5. Meteorological observations
6. Atmospheric chemistry

C. Hydrographic Measurements – Descriptions, Techniques, and Calibrations

Similar section for each type of measurement. Example sections for nutrients, oxygen, salinity, CTD, and etc., measurements are given in Appendix C.

1. Measurement, with section author's name(s) and date, or revision date. See Appendix D for nonstandard measurements.
 - a. Description of equipment and technique or *published* reference.
 - b. Sampling and data processing techniques followed or *published* reference for these techniques.
 - c. Calibration data with dates and laboratory where calibrations were done.
 - d. Error estimates and noise sources including effect of noise on samples, and comparisons with historical data or test stations.
 - e. Laboratory and sample temperatures where required.
 - f. Replicate analyses (tables).
 - g. Standards used (for example, standard sea water batch number and ampoule number of standard sea water for each station).
 - h. Reagents - purity and concentrations of stock solutions where applicable.
 - i. Values for blanks where applicable (blank values should be subtracted from the data).
 - j. Atmospheric values for tracers where applicable.

D. Acknowledgments - Funding sources, contract numbers, contributors, etc.**E. References****F. Appendices - Deck logs, sampling rates, etc.**

* — *These sections will be posted on OCEANIC and should always be included with the initial cruise report.*

discretion of the chief scientist, or may be requested by the WHPO or the DQEs. An example —.DOC file is given in Appendix C.

For final report add the following if not included in initial report:

- The underway data and reports.
- A detailed section on each and every parameter measured on the cruise.
- A list of the cruise participants with affiliations, addresses, and measurement responsibilities.
- While not required, various plots showing preliminary property vs. property relationships, sections, etc., could be included where deemed useful.

It is expected that the water sample data files submitted by the chief scientist will include all shipboard analyses and an index, based on quality flags (Section 4.5, Table 4.9), of the shore-based, or any other, water sample data to be expected later. Please ensure that the shipboard data for *all* hydrographic parameters measured during the cruise are described in the cruise report (—.DOC file), and that columns are included in the —.SEA and —.LVS files for parameters that require shore based analyses.

The cruise report and data should preferably be submitted on electronic media or via ftp (see Appendix A) to the WHPO whenever possible. The WHPO has VAX/VMS, Unix, PCs (DOS and Windows), and Macintosh equipment, and reports in any of the word processing programs tabulated in Appendix E are readable with formatting preserved. The WHPO can read 3.5 or 5.25 floppy disks at standard densities for DOS, Macintosh, and Sun Unix. In addition, data may be submitted on 8 mm ANSI tape cartridges.¹ If using a Microsoft program, a Rich Text Format (RTF) version should be submitted as well. If using FrameMaker, a Maker Interchange Format (MIF) version should be included. ASCII files, see Appendix F, or paper copies will be accepted, however.

Where possible, figures should be included in the formatted report, or supplied as PostScript™ (EPSI format preferred) or other graphic electronic format listed in Table E.1, Appendix E.

If submitting figures on paper we need either original line drawings or high quality glossy photos of the *original* line drawings in order to scan them into our machines. Photocopies cannot be scanned because moiré effects produce a very poor reproduction when the drawing is printed out again for the cruise data reports produced by the WHPO.

3.3 Station Summary (—SUM file)

In addition to the cruise report, station positions, time, parameters measured on each station, etc. should be tabulated in a summary file (—SUM) and submitted to the WHPO with the cruise report within *one month* after the cruise. The —SUM file is used as the *sole* reference for position and time of stations and casts. It evolved in part to reduce the problems with multiple times or positions being recorded for a station/cast when different groups

1. While the WHPO can presently read 9-track tapes those facilities are rapidly being removed as of mid-1994. If you would like to submit your data on 9-track tape please contact us first to ensure that we can still read them.

TABLE 3.5: Sample station summary (—SUM file for cruise report)

Please include 4 header rows as shown. Leave at least 1 space between columns. Columns whose headings are printed in **bold** are left justified. Columns whose headings are italicized should be right justified. Rationale is that columns whose data may be longer than their mnemonic are left justified.

Country- Ship	WOCE Section	<i>Station Number</i>	<i>Cast Number</i>	<i>Cast¹ Type</i>	Cast Date	<i>Universal Time Code²</i>	Latitude	Longitude	<i>Code³</i>	<i>Uncorr. Bottom Depth</i>	<i>Height⁴ Above Bottom</i>	<i>Meter⁵ Wheel Pressure⁶</i>	<i>Maximum of Bottles</i>	Parameters⁷	Comments	
S1 AND S4 R/V METEOR CRUISE 11 LEG 5	SHIP/CRS WOCE	STNNBR	CASTNOTYPE	CAST	DATE	UTC EVENT TIME CODE	LATITUDE	POSITION LONGITUDE	NAV	UNC DEPTH	HT BOTTOM	ABOVE WIRE OUT	MAX PRESS	NO. OF BOTTLES	PARAMETERS	COMMENTS
06MT11/5 S01		119	1	LVS	013090	2145	EN . . .									
06MT11/5 S01		119	2	ROS	013090	2205	BE 61 35.95	S 66 40.28	W DR	4020						
06MT11/5 S01		119	2	ROS	013090	2353	BO 61 36.00	S 66 40.30	W CN	3995	12	4001	4095	24	1-8	AWI CTD 1
06MT11/5 S01		119	2	ROS	013190	0150	EN 61 36.05	S 66 40.35	W DR	3970						
06MT11/5 S01		119	3	LVS	020190	0200	BE 61 36.12	S 66 40.42	W DR	3755						
06MT11/5 S01		119	3	LVS	020190	0244	MR 61 36.20	S 66 40.50	W CN	3760	175	3750	3805	7	1,2,12,13	
06MT11/5 S01		119	3	LVS	020190	0345	EN 61 36.27	S 66 40.53	W DR	3762						
06MT11/5 S01		120	1	ROS	020190	1255	BE 58 19.55	S 68 15.25	W DR	3850						
06MT11/5 S01		120	1	ROS	020190	1437	BO 58 20.10	S 68 15.30	W GPS	3855	15	3901	3920	24	1-8	AWI CTD 1
06MT11/5 S01		120	1	ROS	020190	1605	EN 58 20.09	S 68 15.33	W DR	3865						
06MT11/5 S04		121	1	ROS	020390	2225	BE 55 29.38	S 64 29.05	W DR	3780						
06MT11/5 S04		121	1	ROS	020390	2313	BO 55 29.40	S 64 29.10	W CN	3642	12	3650	3710	24	1-8	AWI CTD 1
06MT11/5 S04		121	1	ROS	020490	0150	EN 55 29.35	S 64 29.12	W DR	3687						
06MT11/5 S04		122	1	ROS	020690	1038	BE 59 15.01	S 47 14.80	W DR	3872						
06MT11/5 S04		122	1	ROS	020690	1233	BO 59 15.10	S 47 15.00	W DR	3895	15	3920	3925	24	1-8	AWI CTD 1
06MT11/5 S04		123	1	ROS . . .			etc. See note 8.									

¹ Cast Type Code

BIO - Biological or biooptical cast.
 BUC - Surface bucket sample (not recommended)
 BOT - Small volume bottle cast only. No CTD.
 CTD - CTD only, no water samples. Includes fast fish casts.
 DRF - Drifter deployment.
 FLT - Float deployment.
 LVS - Large volume samples.
 MOR - Mooring.
 ROS - Rosette water sampler plus CTD.
 XBT - Expendable bathythermograph.
 XCP - Expendable current profiler.
 XCT - Expendable CTD casts.
 UNK - Unknown
 USW - Surface soak or sample taken from uncontaminated sea water line.

² Time-event Code

AT - Time bottles were acoustically tripped on large volume cast.
 BE - Beginning of cast. BE, BO, and EN time, position, and depth required for each BOT, CTD, LVS, and ROS cast.
 BO - Bottom time for cast. Usually taken for station position.
 DE - Time mooring, float, drifter, XCP, XCTD, or XBT was deployed.
 EN - Time cast completed.
 MR - Time messenger was released on bottle or LVS cast.
 RE - Time mooring, drifter, float, or other device recovered.
 UN - Unknown

³ Navigation system code

CIK - GLONASS - Russian version of GPS.
 CN - Celestial navigation.
 DEC - Decca.
 DR - Dead reckoning (more accurate methods are preferred).
 GPS - Global Positioning System.
 INS - Inertial navigation system.
 LOR - Loran.
 OM - Omega.
 RDR - Radar fix.
 TRS - Transit satellite system.
 UNK - Unknown.

⁴ Height above bottom. Only required at bottom of BOT, CTD, ROS, or LVS cast.

⁵ Wire counter reading in meters. Only required at the bottom of bottle, rosette, tethered CTD, or LVS casts.

⁶ Maximum pressure, only required at bottom of casts with CTD or reversing thermometers aboard.

⁷ Water sample parameter numbers are defined in Appendix G.

⁸ File must be FORTRAN readable. Use only ASCII characters recognized by FORTRAN-77. Fields are separated by blanks. Header records identifying the columns are required. The box and superscript footnote numbers used here are for illustration only and should not be included in the —SUM file submitted to the WHOI.

recorded such events. This file may be used as an event log for the cruise, if desired, but it *must* include all casts for measurements reported to the WHPO.

The —.SUM file (example given in Table 3.5) should list casts by station number including all scientific events such as moorings, drifter deployments, etc., if desired. The WHPO prefers the —.SUM file on electronic media formatted as shown in Table 3.5. Header records, as illustrated in Table 3.5, aligned with the columns are requested. Because some fields in this table are of variable length, for example, EXPOCODE, parameters, comments, and other fields are copied in other tables, such as station and cast number, both left- and right-justified columns are used, as shown by **bold** headings for **left justified** fields, and *italicized* headings for *right justified* fields. Only ASCII characters recognized by FORTRAN-77 should be used in the file (see Appendix F). If an electronic version of the —.SUM file is not available, then paper copies are acceptable. Where information is missing or does not apply leave the space blank as shown in Table 3.5.

3.3.1 Details of Station Summary File

Each record in the —.SUM file should contain the following information:

Country Code-Ship Code-Expedition Designation/Leg (EXPOCODE-left justify)—Due to the number of cruises involved, a unique identifier is required for all WOCE cruises. To provide such identification please use the following procedure to form the requisite mnemonic.

The first 4 characters are the US National Oceanographic Data Center (NODC) country-ship code. The US NODC country codes are defined in Table 3.5. Note that the country code is associated with the country of origin for the ship. That may be different from the country actually conducting the cruise. The US NODC ship code can normally be obtained from OCEANIC. If you cannot obtain the ship code from there, the WHPO can provide the proper code for you.

The country-ship code is followed by up to an 8 character expedition name or cruise number and the leg (default = 1) of the cruise is appended after the / (slash) symbol. The expedition name or cruise number is normally assigned by the ship operator and their conventions should be used. For example, German cruises are designated by a number and leg while French cruises are usually given a name. Thus, a name should not be given in the EXPOCODE for a German cruise. Further, some countries designate their cruises by a number but that number is reset to 1 every year. In such cases the year should be included with the cruise number, for example, the 9th cruise of the R/V *A. von Humboldt* in 1991 would be given cruise number 991 in the EXPOCODE to ensure uniqueness.

An alias for the cruise may be given in the —.DOC file and will be retained with the metadata for the cruise. For formatting reasons, the expedition name is limited to eight (8) characters. Therefore, if necessary, the expedition name should be abbreviated to 8 characters for the EXPOCODE, but will be carried full length with the metadata. The EXPOCODE is also used in the water sample (—.SEA) and —.CTD files to tie these files to the —.SUM file in order to uniquely identify the cruise or expedition in those files.

WOCE Section (left justified)—The WHP section designator. Section designations were originally assigned in the WOCE Implementation Plan. However, many sections have been added or modified since then. If you have a question about the section designation for the work you are doing please contact the WHPO.

TABLE 3.6: IOC and US NODC country codes

Code	Country	Abbr.	Code	Country	Abbr.
08	Argentina	ARG	64	Netherlands	NL
09	Australia	AA	59	New Caledonia	
10	Austria		61	New Zealand	NZ
11	Belgium		NI	Nigeria	NI
14	Brazil	BR	58	Norway	N
18	Canada	CAN	62	Pakistan	PAK
20	Chile	CL	65	Peru	PE
21	China (Taiwan)	ROC	66	Philippines	PH
76	People's Republic of China	PRC	67	Poland	
22	Columbia	COL	68	Portugal	P
RC	Republic Populaire du Congo	RC	90	former USSR	SU
26	Denmark	DK	RU	Russian Federation	RUS
34	Finland	SF	91	South Africa	SA
35	France	F	29	Spain	E
06	Federal Republic of Germany	D	19	Sri Lanka	
07	Federal Republic of Germany (former GDR)	D	77	Sweden	S
GH	Ghana		86	Thailand	
36	Greece	G	89	Turkey	
46	Iceland	ICE	UR	Ukraine	UKR
41	India	IND	27	United Arab Republic	
42	Indonesia	IDO	74	United Kingdom	UK
45	Ireland	IRE	31	United States of America	USA
47	Israel	IS	32	United States of America	USA
48	Italy	I	33	United States of America	USA
IC	Ivory Coast	IC	92	Uruguay	UY
49	Japan	J	93	Venezuela	VE
24	Republic of Korea	ROK	95	Yugoslavia	

These codes are used solely for the sake of uniformity within a diverse community .

Note that the country code is associated with the country of origin for the ship and that it may not be the same as the country actually conducting the expedition.

Many one-time sections are broken into segments that are often done by different investigators on different ships. To account for this the WHPO frequently assigns suffixes to the section designator to distinguish among these segments. The same is true for some repeat sections as well. If a suffix has been assigned to your segment (this information is available from the WHPO or via OCEANIC) it would be appreciated if that identification is included in the WHP-ID. Also, in order for sort routines in a database to work correctly it is necessary that all section numbers be the same length, which requires a leading zero for single digit sections. That is, section P1 should be written as P01, AR5 is AR05, and so on.

If stations are taken on a cruise that are not associated with a WHP section then this field should be left blank in the —.SUM file.

Station Numbers (*right justify*)—Whenever possible the station numbering should be continuous for each section, i.e., station numbers should not be reset at the beginning of each leg of long WHP cruises carried out with multiple legs. Repeat and time series cruises often use the same station number(s) on sequential cruises and that presents no difficulties as long as each cruise is given a unique EXPCODE. In order to gauge the accuracy of the station position we ask that position, time, and the uncorrected depth be given in the —.SUM file for the beginning, bottom, and end of every hydrographic cast. That allows an estimate of the ship drift during the station and whether or not the ship drifted across significant topography during the station.

Cast Numbers and Type (*right justify*)—The cast numbers are sequential and preferably numbered from 1 to n at each station position. Every over-the-side operation or discrete sampling at a station is assigned a sequential cast number. The cast type is a three-character description, for example, ROSette water samples plus CTD (ROS), Large Volume Samples (LVS); CTD only (CTD) including fast fish CTD launches; etc. A complete list of cast types is given in Table 3.5. If any other abbreviations for cast types are necessary an explanation and definition of such abbreviations must be included in the cruise report (—.DOC file) and in the text file accompanying the CTD and water sample data file.

If a station is reoccupied during the same cruise, and the same station number is used, the cast numbers should increment upward from the last cast number at the same station. *In no case should two records in the —.SUM file contain the same STNNBR and CASTNO on the same cruise.*

Date (*left justify*)—This field consists of the number of the month, day, and the last two digits of the year (MMDDYY). The date should be zero filled, that is, 050793, not 5 793. Note that this system probably differs from the system used in your country. We request the use of this method solely for the sake of uniformity within a diverse community.

Time (*right justify*)—Time (UTC) must be recorded for each cast, together with the ship's position.

For most over the side operations, and *all* hydrographic casts, the recorded time and position should indicate the beginning (BE), bottom (BO or MR), and completion (EN) of the cast. Bottom depths should also be recorded at each of these times. If additional time or position codes are used they should be defined in the chief scientist's cruise report.

Position (*left justify*)—Position is to be recorded three (3) times during each hydrographic cast, at the beginning, bottom, and end, together with the time the position was taken, as described above, and the depth, as described below. Best available positioning technology should be employed and the technique used should be entered as illustrated in Table 3.5. Codes for all known navigation methods are defined in Table 2.3. Positions should be recorded as (D)DD MM.MM X, where X is N or S for latitude and E or W for longitude, for example,

27°10.11 S, 117°52.43 E should be recorded as 27 10.11 S 117 52.43 E. Only ASCII characters recognized by FORTRAN-77 should be used in the file, for example, a ° (degree) symbol is not recognized and should not be included. The ASCII character set is given in Appendix F.

Uncorrected bottom depth (*right justify*)—The uncorrected acoustic sounding in meters assuming a sound velocity of 1,500 m/s should be noted for each time and position recorded. For most casts the depth and position should be recorded at the beginning, bottom, and end of the cast. Corrections should be made only for the depth of the acoustic transducer beneath the ocean surface, or if the echo sounder assumed a sound velocity different than 1500 m/s. The WHPO will provide a corrected water depth for the station, based on Carter Tables, in the Data Reports and the —.SUM file available from SAC.

If the depth reading is questionable, some estimate of uncertainty should be given in the bathymetry section of the cruise report (—.DOC file).

The WHPO adds a corrected depth column adjacent to the uncorrected depth before sending the final —.SUM file to the SAC.

Height above bottom (*right justify*)—If a pinger or acoustic altimeter is used on a bottle, rosette, tethered CTD, or LVS cast that approaches close to the bottom, the height above bottom should be reported for the deepest water sample collected. May be left blank for other types of casts, for example, shallow casts or XBT launches.

Meter wheel (*right justify*)—The wire counter reading in meters. Only required at the bottom of bottle, rosette, tethered CTD, or LVS casts.

Maximum pressure (*right justify*)—The data header should indicate the deepest sampling pressure for each cast, if applicable.

Number of bottles (*right justify*)—For bottle, rosette, and LVS casts the total number of bottles attempted during the cast is to be recorded. For example, on a shallow cast only 6 of a possible 24 bottles may actually be tripped. Number of bottles in that instance would be recorded as 6.

A bottle that is tripped but comes up empty, or with the lanyard caught in the cap, etc., would be included in this count. In some cases it may be subsequently discovered that failure to trip may be a mistrip with the next bottle closing at the depth of the empty bottle. Investigators may also want to include a record in the —.SEA file with CTD pressure, temperature, and salinity at the level where a bottle failed to close, even though no bottle data are available, for the sake of continuity in the cast.

Parameters (*left justify*)—A list of the various parameters measured or sampled for from the water samples collected during this cast. Refer to the identification numbers in Appendix G to identify each parameter. Only the WOCE parameters need identification numbers, but other parameters may be included if desired. If no parameter number is defined for a measurement you wish to include please consult with the WHPO for the number to be used in order to avoid conflicts between the diverse groups participating in WOCE.

The list of parameters should be limited to 30 characters per line. However, parameter numbers can be continued on all 3 records (BE, BO, EN) associated with a bottle cast.

Comments (*left justify*)—This column is used for nonstandard information, such as comments about duplicate samples, float or drifter identification number, or other text. Comments should be limited to 50 characters per line but can be continued on all records associated with a given cast.