ASCII Code Manual for Quality Controlled
Surface Meteorological Data

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1. Introduction

The WOCE American Standard Code for Information Interchange (ASCII) manual for quality controlled (QC) surface meteorological data outlines the codes used within the DAC surface meteorological data sets released to the WOCE community. The code is a synthesis of the COADS documentation (Slutz et al. 1985), standard World Meteorological Organization (WMO) synoptic code, and new codes derived at Florida State University (FSU). In many places numeric codes were used to keep the data set compact.

The WOCE ASCII data file includes up to 31 possible parameters. In some cases, multiple measurements of the same parameter are available (e.g. sea temperature measured from a thermosalinograph and a bucket temperature) and are differentiated using sequentially numbered variable names (TS, TS2, TS3, TS4, etc). As described in section 2, variables include not only meteorological data (temperature, pressure, etc.), but also a number of supporting variables (time of observation, platform position and movement, etc.). A variable containing quality control (QC) flags is included to indicate the QC applied to the data values. Multiple variable attributes provide information on data units, instruments used, instrument height, etc. in an attempt to provide an even mix between raw data and metadata. Thirteen global attributes contain general information for all data within the ASCII file.

When the data arrive at the Surface Meteorology DAC, the only change to the data is a simple conversion to a standard set of units. The original units are noted in a variable attribute. Any data arriving without an accurate time stamp or information on whether the time is local or UTC were discarded only after all attempts to obtain correct time information were exhausted. The data also must have position information, i.e. data lacking latitude and longitude values were discarded only after all attempts to correctly position the data failed. Furthermore, if data arrived with no units attached, only after every effort to determine their units was exhausted, were the data discarded. Data collected without a record of time, position, or units are useless to the research community. However, all original data contributions are archived in the event additional information is discovered later that would allow the inclusion of discarded data.

The ASCII file Appendix 1 contains 3 parts, a multi-line header containing metadata information, a multi-line discription of the Quality Control Flags, and the data in columnar format. The first line of the header contains the NetCDF file name used to create the ASCII file followed by a blank line. The next 17 lines contain the file's global attributes followed by another blank line. The third section of the the header (next 21 lines) contains a summarized description of the QC flags in use as of the date the ASCII file was created. The fourth section of the header contains a table giving the values for the variable attributes. The length of this table is determined by the number of variables in the file. The data section follows after a blank line and a line of column titles for each data type.

The DAC has now expanded beyond the WOCE parameters to provide other useful cruise data to researchers. These (non-woce;RVSMDC) cruises are set up in very much the same way as WOCE cruises, but are not resricted to the same time and location constraints. Many of the RVSMDC cruises are infact the same ships that provide WOCE data, but just at different times. One of the main differences between WOCE and RVSMDC data are the longitude convention. At the request of the WOCE Data Committee, all WOCE ASCII files (version 300) contain longitude units in the (+E/-W) 180 degrees convention. The RVSMDC *standard* longitude units are from 0-359.99 degrees East. All data that are not included in WOCE have the 0-359.99 degrees East units convention.

Section 2 outlines the data variables and attributes and describes all numeric codes that are employed. Section 3 covers the global attributes. Throughout the manual, variables will be indicated by **bold** type and attributes will be *italicized*.

2.Variables

Up to 31 parameters may appear in a surface meteorology file for WOCE, Table 1. All data files will contain the time, latitude, longitude, and quality control flag variables. The quality control flags are single alphabetic characters that represent either problems or notable features in the data. The quality control flags for multiple variables are combined in a single string and stored in the flag variable. The flag variable as a result is a character string that has a length equal to the number of variables that underwent quality control (a list of the flags, their definitions, and an example of their usage is found in section 2bb). For each variable, Table 1 shows whether or not that attribute is associated with a particular variable.

Table 1: Variable attribute list.

Variable	*long_name*	*units*	*convers_units*	*type*	*instrument*	*height*	*FORTRAN_format*	*qcindex*
cruise_track_code	cruise track code	code (see text)					A9	
woce_date	woce date	YYYYMMDD UTC					I9	*
woce_time_of_day	woce time of day	HHMMSS.SS UTC					F10.2	*
time	time	min. since 1-1-1980 00:00 UTC		Table 2			I12	*
latitude	latitude	degrees N	Table 3				F9.2	*
longitude**	longitude**	degrees E**, (+E/-W) 180 degrees**	Table 3**				F9.2	*
PL_HD	platform heading	degrees - clockwise from N	Table 4		*		F9.1	*
PL_CRS	platform course	degrees - clockwise from N	Table 4		*		F9.1	*
PL_SPD	platform speed	m s-1	Table 5		*		F9.1	*
PL_WDIR	platform relative wind direction	degrees - clockwise from bow	Table 4		*	*	F9.1	*
PL_WSPD	platform relative wind speed	m s-1	Table 5		*	*	F9.1	*
DIR	earth relative wind direction	degrees - clockwise from N	Table 4		*	*	F9.1	*
SPD	earth relative wind speed	m s-1	Table 5		*	*	F9.1	*

P	atmospheric pressure	hPa	Table 6	Table 7	*	*	F9.1	*
T	air temperature	degrees C	Table 8		*	*	F9.2	*
TW	wet-bulb temperature	degrees C	Table 8		*	*	F9.2	*
TD	dew point temperature	degrees C	Table 8		*	*	F9.2	*
TS	sea temperature	degrees C	Table 8	Table 9	*	*	F9.2	*
RH	relative humidity	percent			*	*	F9.1	*
Q	specific humidity	g kg-1	Table 10		*	*	F9.1	*
PRECIP	precipitation	mm	Table 11		*	*	F9.1	*
RRATE	rain rate	mm/min	Table 11		*	*	F9.1	*
RAD	radiation	W m-2	Table 12	Table 13	*	*	F9.1	*
WX	present weather	code (Table 14)					I6	
TCA	total cloud amount	code (Table 15)	Table 17				I6	
LMCA	low/middle cloud amount	code (Table 15)	Table 17				I6	
ZCL	cloud height	code (Table 18)					I6	
LCT	low cloud type	code (Table 19)					I6	
MCT	middle cloud type	code (Table 20)					I6	
HCT	high cloud type	code (Table 21)					I6	
flag	quality control flags	code (Table 22)					A*	

**At the request of the WOCE Data Committee, all WOCE files (version 300) contain longitude units in the (+E/-W) 180 degrees convention. An example of the WOCE ASCII file is located in Appendix 1. The RVSMDC *standard* longitude units are from 0-359.99 degrees East. All data that are not included in WOCE have the 0-359.99 degrees East units convention.

The definition of the attributes are:

- *long_name:* A descriptive name for the variable which is given in Table 1.
- *units:* The SI units used for the variable values. Since no data are useful without units, this attribute will always have a value (when *units:* is applicable). Units are given for most variables in Table 1. The exception are those variables that are coded (ctc, WX, etc.) which refer to the specific code table.
- *convers_units:* The units (SI, English, cgs, etc.) of the variable value when it arrived at the DAC. Again, since no data are useful without units, this attribute will always have a value when present. If a variable has *convers_units:*, Table 1 references specific code tables for the *convers_units:*.
- *type:* A coded attribute that signifies the variable value as being a certain type. For example, *type:* indicates if the pressure is station level or converted to sea level. Code tables for *type:* are referenced in Table 1
- *instrument:* A character attribute that contains the make, model number, manufacturer and/or type of instrument used to record the variable values. When no information on the instrument type is known, *instrument:* = "unknown". Table 1 lists whether or not an *instrument:* attribute exists for each variable.
- *height:* The instrument height in meters above the station elevation (see Global Attributes, section 3). When unknown, *height:* = -999.9. Table 1 lists whether or not a *height:* attribute exists for a variable. NOTE: the height attribute for sea temperature is named "*depth:* "and is a positive number in meters below sea level.
- *FORTRAN_format:* A FORTRAN specific format for printing each variable. The formats for **ctc, time, woce_date, woce_time_of_day, WX, TCA, LMCA, ZCL, LCT, MCT, and HCT** are a fixed length. The length of the **flag** *FORTRAN_format:* varies depending on the number of variables that were quality controlled in the netCDF file. All floating point values are represented by F9.n where n indicates the decimal precision of the supplied data. The formats provided in Table 1 show the maximum precision a variable can have within the WOCE netCDF file. As an example, **latitude** and **longitude** have a *FORTRAN_format:* of F9.2 in Table 1. If the position data we receive is accurate to two decimal places, the *FORTRAN_format:* will remain F9.2. If the position data is only accurate to the tenths place the *FORTRAN: _format:* will be F9.1 and for data accurate to the whole number the *FORTRAN_format:* will be F9.0.
- *qcindex:* An integer pointer to the **flag** for the selected variable. Table 1 lists which variables have a *qcindex*.

a) Cruise track code (**cruise_track_code**)

The cruise track code stores up to a 9 character string that marks each recording time as being either a WOCE cruise, another dedicated cruise (other), or a cruise with an 'unknown' designation. A WOCE **cruise_track_code** will include the WOCE Hydrographic Program transect line number and a sequential cruise number using the format BRS##D/## where:

- **B:** basin (P - Pacific, A - Atlantic, I - Indian, and S - Southern)
- **R:** repeat cruise (if not a repeat, an '_' will occur here)
- **S:** time series cruise (if not a time series, an '_' will occur here)
- **##:** WHP line number
- **D:** portion of cruise line (E - east, N - north, W - west, S -south, C - central) where applicable (if not used, an '_' will occur here)
- **/##:** repeat cruise number (all repeat and time series cruises will have a number starting from 01.

All one time cruises are labeled 00, unless a one time cruise line is completed in several legs, then cruise numbers starting at 01 are given) - in all cases the numbers are sequential based on the date when a cruise became known to the DAC, with the smallest number being the oldest data. The repeat cruise # is unique for each WHP line; however, some gaps in the numbering sequence do exist (e.g., when a planned WHP line was deleted from our archive).

For example, the code PRS14E/17 represents the 17th cruise on the Eastern portion of the Pacific Repeat time Series line number 14.

b) Date (**woce_date**)

The woce_date contains a four digit year (YYYY), two digit month (MM), and two digit date (DD) for each data record. The woce_date is stored as an integer with a format YYYYMMDD and units in the Universal Time Coordinate (UTC). Note: additional information about the data recording times are located in the variable attributes for time (see below).

c) Time of day (**woce_time_of_day**)

The woce_time_of_day contains the hour (HH), minute (MM), and seconds (SS.SS) for each data record. The woce_time_of_day is stored as a floating point values of the form HHMMSS.SS and units in the Universal Time Coordinate (UTC). Note: additional information about the data recording times are located in the variable attributes for time (see below).

d) **time**

The **time** is a double precision variable with *units* equal to minutes since 1-1-1980 00:00 UTC. We chose 1980 as our reference year primarily because it is the beginning of the decade that is nearest the start of the WOCE data collection. The **time** is quality controlled for non-sequential and unrealistic values. The *type* is encoded according to Table 2.

Table 2: Time types.

code definition

- **0:** unknown time type
- **1:** mean time (Data represent a mean observed/recorded over some period of time. Note: prior to 30 March 1996 the position of the recorded time stamp within the mean (e.g. beginning, end, or middle of mean) and the length of the averaging period will be provided in the data quality reports).
- **2:** instantaneous time (Data are recorded as instantaneous values at the time indicated)

Two other attributes, *ave_period* and *ave_center*, were added to files after 30 March 1996 to add detail to mean times. The *ave_period* will contain the length of the averaging period in seconds or have a value of zero when the *ave_period* is unknown or N/A.

The codes for the *ave_center* are:

code definition

- **0:** unknown, N/A
- **1:** time stamp at start of averaging period
- **2:** time stamp at center of averaging period
- **3:** time stamp at end of averaging period

The **time** will be quality controlled primarily for non-sequential and duplicate time values and the QC flag index will be stored in *qcindex.*

A FORTRAN subroutine to convert from minutes since 1-1-1980 00:00 UTC to year, month, day, hour, and minute values is provided in Appendix 2.

e) latitude (**latitude**)
f) longitude (**longitude**)

Platform position is in *units* of degrees; positive degrees for north latitude, negative degrees for south latitude, positive 0-359.99 degrees east longitude for all RVSMDC cruises, and (+E/-W) 180 degrees longitude for all WOCE cruises. The units of the original values of latitude and longitude are found in Table 3.

Table 3: Units of original latitude and longitude.

code definition

- **0:** degrees and tenths
- **1:** whole degrees
- **2:** non-random tenths
- **3:** interpolated
- **4:** degrees and minutes
- **5:** high resolution data (e.g., degrees to seconds, or degrees and hundredths)
- **6:** other (refer to supplemental data)

The latitude and longitude are quality controlled for data validity, unrealistic platform movement, and whether an oceanographic platform moves over land.

g) platform heading (**PL_HD**)

The heading is recorded in *units* of degrees (recorded clockwise relative to true north) and represents the direction that the bow of the ship is pointing. Valid headings range from 000.0 to 359.9 degrees. A *convers_units* attribute stores the original format of compass values using the codes found below in Table 4.

h) platform course (**PL_CRS**)

The course is recorded in *units* of degrees (recorded clockwise relative to true north) and represents the direction that the ship is moving relative to the fixed earth. Valid course values range from 000.0 to

359.9 degrees. A *convers_units* attribute stores the original method of recording the course using the codes in Table 4.

i) platform speed (**PL_SPD**)

The platform speed is recorded in *units* of meter per second after a conversion from the original units (encoded using Table 5). Often multiple values are present including, but not limited to, a speed relative to the water (doppler log, etc.) and a speed relative to the earth (gps).

j) earth-relative wind direction (**DIR**)

The earth-relative wind direction is stored with *units* of degrees and is encoded using
000.0 = calm
001.0-360.0 = direction in degrees
361.0 = variable (rarely used in bridge data only)
going clockwise from true north. All wind directions are reported in the standard meteorological convention; the direction the wind is blowing from. Table 4 lists the possible compass types used to record the original data.

Table 4: Wind direction conversion units.

Code Definition

- **0:** 36-point compass
- **1:** 32-point compass
- **2:** 16 of 36-point compass
- **3:** 16 of 32-point compass
- **4:** 8-point compass
- **5:** 360-point compass
- **6:** high resolution data (e.g., tenths of degrees)
- **7:** 16 point compass
- **8:** u,v components

k) earth-relative wind speed (**SPD**)

The earth-relative wind speed is recorded in *units* of meters per second, and Table 5 lists the codes for the original units of the wind speed data.

Table 5: Wind speed conversion units.

Code Definition

- **0:** meters per second, estimated
- **1:** meters per second, unknown
- **2:** meters per second, measured
- **3:** knots, estimated
- **4:** knots, unknown

- **5:** knots, measured
- **6:** Beaufort force (based on documentation)
- **7:** high resolution measurement (e.g., hundredths of a meter per second)
- **8:** u,v components (m/s)
- **9:** u,v components (knots)

NOTE: TRUE WIND SPEED AND DIRECTION ARE EITHER CALCULATED BY THE DATA PROVIDER AND CHECKED BY THE DAC, OR THEY ARE CALCULATED BY THE DAC. A comment in the *instrument* attribute will be included.

NOTE 2: FILES RELEASED AFTER 19 AUGUST 1997 MAY CONTAIN PLATFORM RELATIVE WIND DIRECTION (**PL_WDIR**) AND SPEED (**PL_WSPD**). These variables are necessary when assessing errors caused by flow over the vessel or the vessel's acceleration. **PL_WDIR** and **PL_WSPD** data for cruises released before 19 August 1997 are available upon request. All coding and units for **PL_WDIR** and **PL_WSPD** are the same as **DIR** and **SPD**, with the exception that the **PL_WDIR** is referenced to a zero line on the vessel. This *zero_line_ref* is included as a variable attribute and coded:

Code Definition

- 000.0 : Bow (Default value)
- 090.0 : Starboard
- 180.0 : Stern
- 270.0 ; Port

l) atmospheric pressure (**P**)

Pressure is recorded in *units* of hectopascals. The units of the original data are listed in Table 6 and Table 7 outlines the codes for the pressure *type*.

Table 6: Atmospheric pressure conversion units.

Code Definition

- **0:** hectopascals (millibars)
- **1:** bars
- **2:** millimeters of mercury
- **3:** inches of mercury
- **4:** pascals
- **5:** high resolution (0.01 mb)
- **6:** kilopascals

Table 7: Atmospheric pressure type.

Code Definition

- **0:** unknown type
- **1:** sea level

- **2:** station level

m) air temperature (**T**)
n) wet-bulb temperature (**TW**)
o) dew point temperature (**TD**)

All atmospheric temperatures are recorded in *units* of degrees Celsius after a conversion from the original units (see Table 8).

Table 8: Temperature conversion units.

Code Definition

- **0:** degrees Celsius and tenths
- **1:** half degrees Celsius
- **2:** whole degrees Celsius
- **3:** degrees Fahrenheit and tenths
- **4:** half degrees Fahrenheit
- **5:** whole degrees Fahrenheit
- **6:** high resolution data (e.g., hundredths of a degree Celsius or Fahrenheit)
- **7:** other (notes will be found in data quality reports)

p) sea temperature (**TS**)

The sea temperature is recorded in *units* of degrees Celsius with the original units encoded according to Table 8. NOTE: The sensor *depth* is recorded in meters and has a positive value for all non-missing values (the attribute name is changed from *height* to avoid confusion). The specific instrument type used to measure the sea temperature is stored in *instrument* while the general instrument *type* is recorded using the codes in Table 9.

Table 9: General instrument types used to record sea temperature.

Code Definition

- **0:** unknown
- **1:** condenser inlet (intake)
- **2:** trailing thermistor
- **3:** hull contact sensor
- **4:** through hull sensor
- **5:** radiation thermometer
- **6:** bait tanks thermometer
- **7:** others
- **8:** bucket
- **9:** implied bucket (an HSST SID or any match)
- **10:** reversing thermometer
- **11:** other electronic sensor
- **12:** thermosalinograph

q) relative humidity (**RH**)

The relative humidity is recorded in *units* of percent.

r) specific humidity (**Q**)

Specific humidity is recorded in *units* of grams per kilogram and the codes for *convers_units* are found in Table 10.

Table 10: Original specific humidity units.

Code Definition

- **0:** g kg-1
- **1:** kg kg-1

s) precipitation (**PRECIP**) [rain rate (**RRATE**)]

The precipitation [rain rate] is recorded in *units* of millimeters [per minute] and Table 11 lists the original precipitation [rain rate] units.

Table 11: Precipitation conversion units.

Code Definition

- **0:** inches [per minute]
- **1:** tenths of an inch [per minute]
- **2:** hundredths of an inch [per minute]
- **3:** centimeters [per minute]
- **4:** millimeters [per minute]
- **5:** high resolution (>0.1 millimeter) [per minute]

t) atmospheric radiation (**RAD**)

All radiation parameters will be stored in sequentially numbered **RAD** variables with *units* of watts per meter squared. The original radiation units are encoded based on Table 12 and the radiation *type*s are listed in Table 13.

Table 12: Radiation conversion units.

Code Definition

- **0:** watts meter-2
- **1:** calories centimeters-2 minute-1
- **2:** langley
- **3:** other

- **4:** kilowatts meter-2

Table 13: Radiation types.

Code Definition

- **0:** unknown
- **1:** downwelling shortwave
- **2:** upwelling shortwave
- **3:** downwelling longwave
- **4:** upwelling longwave
- **5:** total downwelling
- **6:** total upwelling
- **7:** net
- **8:** other
- **9:** ultraviolet
- **10:** net longwave
- **11:** Photosynthetically Active Radiation (PAR)

u) present weather (**WX**)

Table 14: Present weather codes are the same as those from COADS data (Slutz et al. 1985).

Code Definition

- *Codes 00 to 19 indicate no precipitation at the site (e.g., ship, buoy, etc.) at time of observation:*
  - **00:** cloud development not observed.
  - **01:** clouds generally dissolving or becoming less developed.
  - **02:** state of the sky unchanged.
  - **03:** clouds generally forming or developing.
  - **04:** visibility reduced by smoke.
  - **05:** haze.
  - **06:** widespread dust in suspension in the air, not raised by wind at or near the station at time of observation.
  - **07:** dust or sand raised by wind at or near the station at time of observation, but no well-developed dust whirls or sand whirls and no dust storm or sandstorm seen.
  - **08:** well developed dust whirls or sand whirls seen at or near the station during the preceding hour or at time of observation, but no dust storm or sandstorm.
  - **09:** dust storm or sandstorm within sight at time of observation, or at the station during the preceding hour.
  - **10:** light fog (visibility 1,100 yards or more); synonymous with European term "mist."
  - **11:** patches of shallow fog or ice fog at the station, not deeper than about 10 meters.
  - **12:** more or less continuous shallow fog or ice fog at the station, not deeper than about 10 meters.
  - **13:** lightning visible, no thunder heard.
  - **14:** precipitation within sight, not reaching the surface of the sea.
  - **15:** precipitation within sight, reaching the surface of the sea, but more than 5 kilometers

from the station.

  - **16:** precipitation within sight, reaching the surface of the sea, near to, but not at the station.
  - **17:** thunderstorm, but no precipitation at time of observation.
  - **18:** squalls at or within sight of the station during the preceding hour or at time of observation.
  - **19:** funnel cloud or waterspout at or within sight of the station during the preceding hour or at time of observation.
- *Codes 20 to 29 refer to phenomena that occurred at the station during the preceding hour but not at time of observation:*
  - **20:** drizzle (not freezing) or snow grains.
  - **21:** rain (not freezing).
  - **22:** snow.
  - **23:** rain and snow or ice pellets, type (a).
  - **24:** freezing drizzle or freezing rain.
  - **25:** shower of rain.
  - **26:** shower of snow, or of rain and snow.
  - **27:** shower of hail (ice pellets, type (b), snow pellets), or of rain and hail.
  - **28:** fog or ice fog.
  - **29:** thunderstorm (with or without precipitation).
- *Codes 30 to 99 refer to phenomena occurring at the ship at time of observation:*

  - **30:** slight or moderate dust storm or sandstorm has decreased during the preceding hour.
  - **31:** slight or moderate dust storm or sandstorm with no appreciable change during the preceding hour.
  - **32:** slight or moderate dust storm or sandstorm has begun or has increased during the preceding hour.
  - **33:** severe dust storm or sandstorm has decreased during the preceding hour.
  - **34:** severe dust storm or sandstorm with no appreciable change during the preceding hour.
  - **35:** severe dust storm or sandstorm has begun or has increased during the preceding hour.
  - **36:** slight or moderate drifting snow generally low (below eye-level, less than 6 feet).
  - **37:** heavy drifting snow generally low (below eye level, less than 6 feet).
  - **38:** slight or moderate blowing snow generally high (above eye-level, 6 feet or more).
  - **39:** heavy blowing snow generally high (above eye level, 6 feet or more).
  - **40:** fog or ice fog at a distance at time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer.
  - **41:** fog or ice fog in patches.
  - **42:** fog or ice fog (sky visible) has become thinner during the preceding hour.
  - **43:** fog or ice fog (sky invisible) has become thinner during the preceding hour.
  - **44:** fog or ice fog (sky visible) with no appreciable change during the preceding hour.
  - **45:** fog or ice fog (sky invisible) with no appreciable change during the preceding hour.
  - **46:** fog or ice fog (sky visible) has begun or has become thicker during the preceding hour.
  - **47:** fog or ice fog (sky invisible) has begun or has become thicker during the preceding hour.
  - **48:** fog, depositing rime, sky visible.
  - **49:** fog, depositing rime, sky invisible.
- *Codes 50 to 99 indicate precipitation at the station at time of observation:*

  - **50:** drizzle, not freezing, intermittent, slight at time of observation.

- **51:** drizzle, not freezing, continuous, slight at time of observation.
- **52:** drizzle, not freezing, intermittent, moderate at time of observation.
- **53:** drizzle, not freezing, continuous, moderate at time of observation.
- **54:** drizzle, not freezing, intermittent, heavy (dense) at time of observation.
- **55:** drizzle, not freezing, continuous, heavy (dense) at time of observation.
- **56:** drizzle, freezing, slight.
- **57:** drizzle, freezing, moderate or heavy (dense).
- **58:** drizzle and rain, slight.
- **59:**drizzle and rain, moderate or heavy.
- **60:** rain, not freezing, intermittent, slight at time of observation.
- **61:** rain, not freezing, continuous, slight at time of observation.
- **62:** rain, not freezing, intermittent, moderate at time of observation.
- **63:** rain, not freezing, continuous, moderate at time of observation.
- **64:** rain, not freezing, intermittent, heavy at time of observation.
- **65:** rain, not freezing, continuous, heavy at time of observation.
- **66:** rain, freezing, slight.
- **67:** rain, freezing, moderate or heavy.
- **68:** rain or drizzle and snow, slight.
- **69:** rain or drizzle and snow, moderate or heavy.
- **70:** intermittent fall of snowflakes, slight at time of observation.
- **71:** continuous fall of snowflakes, slight at time of observation.
- **72:** intermittent fall of snowflakes, moderate at time of observation.
- **73:** continuous fall of snowflakes, moderate at time of observation.
- **74:** intermittent fall of snowflakes, heavy at time of observation.
- **75:** continuous fall of snowflakes, heavy at time of observation.
- **76:** ice prisms (with or without fog).
- **77:** snow grains (with or without fog).
- **78:** isolated star-like snow crystals (with or without fog).
- **79:** ice pellets, type (a) (sleet, U.S. definition).
- **80:** rain shower, slight.
- **81:** rain shower, moderate or heavy.
- **82:** rain shower, violent.
- **83:** shower of rain and snow mixed, slight.
- **84:** shower of rain and snow mixed, moderate or heavy.
- **85:** snow shower, slight.
- **86:** snow shower, moderate or heavy.
- **87:** slight showers of snow pellets or ice pellets, type (b), with or without rain or rain and snow mixed.
- **88:** moderate or heavy showers of snow pellets or ice pellets, type (b), with or without rain or rain and snow mixed.
- **89:** slight showers of hail, with or without rain or rain and snow mixed, not associated with thunder.
- **90:** moderate or heavy showers of hail, with or without rain or rain and snow, mixed, not associated with thunder.
- **91:** slight rain at time of observation, thunderstorm during preceding hour but not at time of observation.
- **92:** moderate or heavy rain at time of observation, thunderstorm during preceding hour but

not at time of observation.
    - **93:** slight snow, or rain and snow mixed, or hail, at time of observation with thunderstorm during the preceding hour but not at time of observation.
    - **94:** moderate or heavy snow, or rain and snow mixed, or hail, at time of observation with thunderstorm during the preceding hour but not at time of observation.
    - **95:** thunderstorm, slight or moderate, without hail, but with rain and/or snow at time of observation.
    - **96:** thunderstorm, slight or moderate, with hail at time of observation.
    - **97:** thunderstorm, heavy, without hail but with rain and/or snow at time of observation.
    - **98:** thunderstorm combined with dust storm or sandstorm at time of observation.
    - **99:** thunderstorm, heavy, with hail at time of observation.

v) total cloud amount (**TCA**)
w) low/middle cloud amount (**LMCA**)

The codes for the total and low/middle cloud amounts (Table 15) are from the COADS data (Slutz et al. 1985). For the total cloud amount, codes 0 to 9 show the fraction, in oktas, of the celestial dome covered by all clouds. For the low/middle cloud amount the codes show the fraction, in oktas, of the celestial dome covered by all the low clouds and, if no low clouds are present, the fraction covered by all the middle clouds.

Table 15: Cloud amount codes.

Code Definition

- **0:** clear
- **1:** 1 okta or less, but not zero.
- **2-6:** 2-6 oktas.
- **7:** 7 oktas or more, but not 8 oktas.
- **8:** 8 oktas.
- **9:** sky obscured or cloud amount cannot be estimated.

If the data arriving at the DAC use tenths to describe cloud cover, the convention in Table 16 will be used to convert from tenths to oktas and the original data units will be noted using the codes in Table 17.

Table 16: Relationship between tenths and oktas.

tenths oktas

- **0:** 0
- **1:** 1
- **2,3:** 2
- **4:** 3
- **5:** 4
- **6:** 5
- **7,8:** 6
- **9:** 7

- **10:** 8

Table 17: Cloud amount conversion units.

Code Definition

- **1:** oktas
- **2:** tenths

x) cloud height (**ZCL**)

Cloud height is recorded using the standard 0-10 synoptic code. Table 17 shows the height ranges and codes for measurements in feet or meters.

Table 18: Cloud height codes, adapted from table 9 of the COADS data documentation (Slutz et al. 1985) .

Approximate height of lowest cloud base
CodeFeetMeters

Code	Feet	Meters
0:	0-149	0-49
1:	150-299	50-99
2:	300-599	100-199
3:	600-999	200-299
4:	1000-1999	300-599
5:	2000-3499	600-999
6:	3500-4999	1000-1499
7:	5000-6499	1500-1999
8:	6500-7999	2000-2499
9:	>=8000 or no clouds	>=2500 or no clouds
10:	indicates that the cloud height cannot be estimated because of darkness or for other reasons.	

y) low cloud type (**LCT**)

Table 19: Low cloud type codes extracted from the COADS data documentation (Slutz et al. 1985). The codes show observed characteristics of clouds of the types stratocumulus, stratus, cumulus, cumulonimbus, and their variations.

Code Definition

- **0:** no stratocumulus, stratus, cumulus, or cumulonimbus.
- **1:** cumulus with little vertical extent and seemingly flattened, or ragged cumulus other than of bad weather, or both.
- **2:** cumulus of moderate or strong vertical extent, generally with protuberances in the form of domes or towers, either accompanied or not by other cumulus or by stratocumulus, all having their base at the same level.
- **3:** cumulonimbus the summits of which, at least partially, lack sharp outlines but are neither clearly fibrous (cirriform) nor in the form of an anvil; cumulus, stratocumulus, or stratus may also be present.
- **4:** stratocumulus formed by the spreading out of cumulus; cumulus may also be present.
- **5:** stratocumulus not resulting from the spreading out of cumulus.
- **6:** stratus in a more or less continuous sheet or layer, or in ragged shreds, or both, but no stratus fractus of bad weather.
- **7:** stratus fractus of bad weather (generally existing during precipitation and a short time before and after) or cumulus fractus of bad weather, or both (pannus), usually below altostratus or nimbostratus.
- **8:** cumulus and stratocumulus other than that formed from the spreading out of cumulus; the base of the cumulus is at a different level from that of the stratocumulus.
- **9:** cumulonimbus, the upper part of which is clearly fibrous (cirriform), often in the form of an anvil; either accompanied or not by cumulonimbus without anvil or fibrous upper part, by cumulus, stratocumulus, stratus, or pannus.
- **10:** low clouds not visible, owing to darkness, fog, blowing dust or sand, or other similar phenomena.

z) middle cloud type (**MCT**)

Table 20: Middle cloud type codes extracted from the COADS data documentation (Slutz et al. 1985). The codes show observed characteristics of clouds of the types altocumulus, altostratus, and nimbostratus.

Code Definition

- **0:** no altocumulus, altostratus, or nimbostratus.
- **1:** altostratus, the greater part of which is semi-transparent; through this part the sun or moon may be weakly visible, as through ground glass.
- **2:** altostratus, the greater part of which is sufficiently dense to hide the sun or moon, or nimbostratus.
- **3:** altocumulus, the greater part of which is semi-transparent; the various elements of the cloud change only slowly and are all at a single level.
- **4:** patches (often in the form of almonds or fishes) of altocumulus, the greater part of which is semi-transparent; the clouds occur at one or more levels and the elements are continually changing in appearance.

- **5:** semi-transparent altocumulus in bands, or altocumulus in one or more fairly continuous layers (semi-transparent or opaque), progressively invading the sky; these altocumulus clouds generally thicken as a whole.
- **6:** altocumulus resulting from the spreading out of cumulus (or cumulonimbus).
- **7:** altocumulus in two or more layers, usually opaque in places, and not progressively invading the sky; or opaque layer of altocumulus, not progressively invading the sky; or altocumulus together with altostratus or nimbostratus.
- **8:** altocumulus with sproutings in the form of small towers or battlements; or altocumulus having the appearance of cumuliform tufts.
- **9:** altocumulus of a chaotic sky, generally at several levels.
- **10:** middle clouds not visible, owing to darkness, fog, blowing dust or sand, or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds.

aa) high cloud type (**HCT**)

Table 21: High cloud type codes extracted from the COADS data documentation (Slutz et al. 1985). The codes show observed characteristics of clouds of the types cirrus, cirrocumulus and cirrostratus.

Code Definition

- **0:** no cirrus, cirrocumulus or cirrostratus.
- **1:** cirrus in the form of filaments, strands, or hooks, not progressively invading the sky.
- **2:** dense cirrus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a cumulonimbus, or cirrus with sproutings in the form of small turrets or battlements, or cirrus having the appearance of cumuliform tufts.
- **3:** dense cirrus, often in the form of an anvil, being the remains of the upper parts of cumulonimbus.
- **4:** cirrus in the form of hooks or of filaments, or both, progressively invading the sky; they generally become denser as a whole.
- **5:** cirrus (often in bands converging towards one point or two opposite points of the horizon) and cirrostratus, or cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil does not reach 45 degrees above the horizon.
- **6:** cirrus (often in bands converging towards one point or two opposite points of the horizon) and cirrostratus, or cirrostratus alone; in either case, they are progressively invading the sky, and generally growing denser as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered.
- **7:** veil of cirrostratus covering the celestial dome.
- **8:** cirrostratus not progressively invading the sky and not completely covering the celestial dome.
- **9:** cirrocumulus alone, or cirrocumulus accompanied by cirrus or cirrostratus, or both, but cirrocumulus is predominant.
- **10:** high clouds not visible, owing to darkness, fog, blowing dust or sand, or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds.

bb) quality control flags (**flag**)

The quality control flags (Table 22) are single alphabetic characters for each data value. Only those variables with a *qcindex* have flag values (the *qcindex* is an integer pointer to the flag for a selected variable), i.e. not all meteorological variables are quality controlled.

Table 22: Definitions of WOCE quality control flags.

Flag Definition

- **A:** Original data had unknown units. The units shown were determined usuing a climatology or some other method.
- **B:** Original data were out of the range bounds outlined (Table23).
- **C:** Time data are not sequential or date/time not valid.
- **D:** Data failed T>=Tw>=Td test. In the free atmosphere, the value of the temperature is always greater than or equal to the wet-bulb temperature, which in turn is always greater than or equal to the dew point temperature.
- **E:** Data failed resultant wind recomputation check. When the dataset includes the platform's heading, course, and speed along with the platform relative wind speed and direction, a program recomputes the earth relative wind speed and direction and compares the computed values to the reported earth relative wind speed and direction. A failed test occurs when the wind direction difference is > 20 degrees or the wind speed difference is >2.5m/s.
- **F:** Platform velocity unrealistic. Determined by analyzing latitude and longitude positions as well as reported platform speed data.
- **G:** Data are greater than 4 standard deviations from the COADS climatological means (da Silva et al. 1994). The test is only applied to pressure, temperature, sea temperature, relative humidity, and wind speed data.
- **H:** Discontinuity found in data
- **I:** Interesting feature found in data. More specific information on the feature is contained in the data reports. Examples include: hurricanes passing station, sharp sea water temperature gradients, strong convective events, etc.
- **J:** Data are of poor quality by visual inspection, DO NOT USE.
- **K:** Data suspect/use with caution - this flag applies when the data look to have obvious errors, but no specific reason for the error can be determined.
- **L:** Oceanographic platform passes over land or fixed platformmoves dramatically.
- **M:** Known instrument malfunction.
- **O:** Original units differ from those listed in the convers_variable units attribute. See quality control report for details.
- **P:** Position of platform or its movement are uncertain. Data should be used with caution.
- **Q:** Questionable - data arrived at DAC already flagged as questionable/uncertain.
- **R:** Replaced with an interpolated value. Often done prior to arrival at the DAC. Flag is used to note condition.
- **S:** Spike in the data. Usually one or two sequential data values (sometimes up to 4 values) that are drastically out of the current data trend. Spikes occur for many reasons including power surges, typos, data logging problems, lightning strikes, etc.
- **T:** Time duplicate
- **Z:** Data passed evaluation.

Table 23: Range Bounds used in determining the use of flag B.

Variable	Lower Bound	Upper Bound	Units	Other
time	1-1-1980	12-31-1999		
latitude	-90	90	degrees	
longitude	0*; -180W*	359.99*; +180E*	degrees	
platform heading	0	359.9	degrees	
platform course	0	359.9	degrees	
platform speed	0	15	m s-1	research vessels
wind direction	0	360	degrees	
wind speed	0	40	m s-1	
pressure	950	1050	mb	Sea level
air temperature	-10	40	deg. Celsius	
wet bulb temperature	-10	40	deg. Celsius	
dew point temperature	-10	40	deg. Celsius	
sea temperature	0	35	deg. Celsius	
relative humidity	0	100	percent	
specific humidity	0	48	g kg-1	
rain rate	0	150	mm hr-1	
radiation	0	1400	W m-2	

**At the request of the WOCE Data Committee, all WOCE files (version 300) contain longitude units in the (+E/-W) 180 degrees convention. An example of the WOCE ASCII file is located in Appendix 1. The RVSMDC *standard* longitude units are from 0-359.99 degrees East. All data that are not included in WOCE have the 0-359.99 degrees East units convention.

As an example of the usage of the **flag** variable, assume that a WOCE netCDF file contains only time, latitude, longitude, atmospheric pressure, and air temperature data along with a **flag** variable. Based on Table1, all five variables will be quality controlled and each will have a unique*qcindex*. If the values for the first record of all five variables pass all quality control checks, then the first record of the **flag**variable will contain "ZZZZZ"; i.e. the **flag** variable contains QC flags for each QC variable, in this example 5 flags. However, if the second record contains a non-sequential time, but good latitude and longitude values, a pressure value of 1090 mb, and a temperature that is 6 standard deviations from the climatology, then the second record of**flag** will contain "CZZBG". The *qcindex* allows access to the flags for any variable. For example, the flag for the second record for atmospheric pressure (*qcindex*=4) is a "B" indicating the pressure value is out of bounds.

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3. Global Attributes

The global attributes in the WOCE DAC ASCII files include parameters that apply to all the variables in the file or to the file in general. Again a mix of data and metadata are included.

a) *title*

A descriptive title highlighting the platform name, location, and special instrument characteristics. Often used to title plots of the data from the ASCII file. Ex: "Bridge observations - R/V Vidal Gormaz - PR_14_/04 Cruise"

b) *site*

This attribute will contain either the alphanumeric R/V name or buoy location name.

c) *elev*

Stores the geographic elevation of the site in meters above sea level. This value is zero for ships and buoys.

d) *ID*

Either the ship/platform identification, call sign, or WMO number.

e) *platform*

Instrument system that recorded the data. For example: IMET, PAM, ATLAS, unspecified tower, bridge report, hand held instruments, etc.

f) *facility*

The institution or country that either collected the data or are the primary holder of the data. For example: NOAA, PMEL, WHOI, University of Washington, Chile, etc. Also included is the name of the PI or primary data provider for the original files.

g) *fsu_version*

The current version number or the data in the file.

h) *missing_value*

A missing value of -9999 that is used for all variables.

i) *special_value*

A special value (set equal to -8888) is used to indicate that data were present in the original file, however the data were either:

a) coded and the value listed did not fit the code range (no qcindex for data)

or

b) an overflow value that does not fit the memory space allocated by our internal format.

j) *start date*

The first date of the data in the file. Coded as DD MMM YYYY where
DDDay number (01 to 31)
MMMMonth (JAN,FEB,MAR,APR,MAY,JUN,JUL,AUG,SEP,OCT,NOV,DEC)
YYYYFour digit year (ex: 1992).

k) *end date*

The last date of the data in the file. Coded the same as *start date*.

l) *EXPOCODE*

Identifier for all WOCE cruises created by the WOCE Hydrographic Programme Office and obtained from the WOCE DIU at the University of Delaware. This identifier is appended to help match our data files to other oceanographic data sets.

m) *Release_Date*

Date that QC data set was released by WOCE DAC.

n) *contact_info*

Center for Ocean-Atmospheric Prediction Studies (COAPS), The Florida State University, Tallahassee, FL, 32306-2840, USA.

o) *contact_email*

wocemet@coaps.fsu.edu

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4. References

da Silva, A. M., C. C. Young, and S. Levitus, 1994: Atlas of Surface Marine Data, Volumes 1: Algorithms and Procedures. NOAA Atlas Series, U.S. Dept. of Commerce, NOAA, NESDIS, Data, and Information Service : For sale by the U.S. G.P.O., Supt. of Docs.

Slutz, R.J., S.J. Lubker, J.D. Hiscox, S.D. Woodruff, R.L. Jenne, D.H. Joseph, P.M. Steurer, and J.D. Elms, COADS (Comprehensive Ocean-Atmosphere Data Set) Release 1, pp. 300, CIRES University of Colorado, 1985.

Appendix 1

Sample listing of the contents of a public (version 3.0.0) ASCII file created by the FSU DAC.

```
UNAA.930311014v300.nc

title            :Aurora Australis WOCE Meteorological Data
site             :R/V Aurora Australis
elevation        :0
ID               :UNAA
platform         :Aurora Australis Data Logging System
facility         :Antarctic CRC, Australia. PI: S. Rintoul
fsu_version      :300
startdate        :11 MAR 1993
enddate          :24 MAR 1993
EXPOCODE         :09AR
Release_Date     :14 APR 2000
contact_info     :COAPS, Florida State Univ, Tallahassee, FL 32306-2840, U.S.A.
contact_email    :wocemet@coaps.fsu.edu
missing_value    :-9999
special_value    :-8888
time:ave_period  :900
time:ave_center  :2

Quality Control Flags:
A = Units added.
B = Data out of range.
C = Non-sequential time.
D = Failed T>Tw>Td.
E = True wind error.
F = Velocity unrealistic.
G = Value > 4 s. d. from climo.
H = Discontinuity.
I = Interesting feature.
J = Erroneous.
K = Suspect.
L = Ocean platform over land.
M = Instrument malfunction.
O = Multiple original units.
P = Movement uncertain.
Q = Pre-flagged as suspect
R = Interpolated data.
S = Spike.
T = Time duplicate.
Z = Good data.

 Variable        (qcindex) long_name                     units
cruise_track_code(        )cruise track code
woce_date        (       1)woce date                    YYYYMMDD UTC
woce_time_of_day (       1)woce time of day             HHMMSS.SS UTC
time             (       1)time                         minutes from 1-1-1980 00:00
latitude         (       2)latitude                     degrees
longitude        (       3)longitude                    degrees
PL_HD            (       4)platform heading             degrees
PL_SPD           (       5)platform speed               meters/second
DIR              (       6)ocean relative wind direction degrees true
SPD              (       7)earth relative wind speed    meters/second
TS               (       8)sea temperature              Celsius
```

P	(	9)	atmospheric pressure	hPa
T	(	10)	port air temperature	Celsius
T2	(	11)	starboard air temperature	Celsius
RH	(	12)	port relative humidity	percent
RH2	(	13)	starboard relative humidity	percent
flag	(	)	quality control flags	

cruise	woce_date	woce_time	time	latitude	longitude	PL_HD	PL_SPD	DI
SR_03_/02	19930311	50700.00	6938227	-42.88	147.33	81.5	0.0	312.
SR_03_/02	19930311	52200.00	6938242	-42.88	147.33	81.8	0.0	322.
SR_03_/02	19930311	53700.00	6938257	-42.88	147.33	81.6	0.0	323.
SR_03_/02	19930311	55200.00	6938272	-42.88	147.33	81.9	0.0	322.
SR_03_/02	19930311	60700.00	6938287	-42.88	147.33	81.9	0.0	322.
SR_03_/02	19930311	62200.00	6938302	-42.88	147.33	81.8	0.0	321.
SR_03_/02	19930311	63700.00	6938317	-42.88	147.33	82.0	0.0	321.
SR_03_/02	19930311	65200.00	6938332	-42.88	147.33	82.2	0.0	347.
SR_03_/02	19930311	70700.00	6938347	-42.88	147.33	81.8	0.0	318.
SR_03_/02	19930311	72200.00	6938362	-42.88	147.33	82.0	0.0	333.
SR_03_/02	19930311	73700.00	6938377	-42.88	147.33	82.0	0.0	323.
SR_03_/02	19930311	75200.00	6938392	-42.88	147.33	80.4	0.0	326.
SR_03_/02	19930311	80700.00	6938407	-42.88	147.33	92.4	0.0	311.
SR_03_/02	19930311	82200.00	6938422	-42.89	147.35	171.6	4.6	310.
SR_03_/02	19930311	83700.00	6938437	-42.92	147.37	170.7	1.6	330.
SR_03_/02	19930311	85200.00	6938452	-42.93	147.37	179.3	2.6	314.
SR_03_/02	19930311	90700.00	6938467	-42.95	147.37	189.2	2.8	358.
SR_03_/02	19930311	92200.00	6938482	-42.98	147.37	181.8	3.3	251.
SR_03_/02	19930311	93700.00	6938497	-43.01	147.37	160.5	5.6	291.
SR_03_/02	19930311	95200.00	6938512	-43.05	147.38	155.9	5.7	310.
SR_03_/02	19930311	100700.00	6938527	-43.09	147.41	156.4	5.6	270.
SR_03_/02	19930311	102200.00	6938542	-43.13	147.43	155.1	5.7	278.
SR_03_/02	19930311	103700.00	6938557	-43.17	147.46	155.8	5.9	286.
SR_03_/02	19930311	105200.00	6938572	-43.21	147.49	155.9	5.7	287.
SR_03_/02	19930311	110700.00	6938587	-43.25	147.50	191.5	5.6	297.
SR_03_/02	19930311	112200.00	6938602	-43.29	147.50	192.2	5.5	278.
SR_03_/02	19930311	113700.00	6938617	-43.33	147.48	191.7	5.5	313.
SR_03_/02	19930311	115200.00	6938632	-43.37	147.47	192.3	5.3	300.
SR_03_/02	19930311	120700.00	6938647	-43.41	147.46	192.4	5.8	310.
SR_03_/02	19930311	122200.00	6938662	-43.45	147.45	192.1	5.6	306.
SR_03_/02	19930311	123700.00	6938677	-43.49	147.44	192.5	5.1	238.
SR_03_/02	19930311	125200.00	6938692	-43.53	147.43	192.3	5.0	242.
SR_03_/02	19930311	130700.00	6938707	-43.56	147.42	242.1	4.6	265.
SR_03_/02	19930311	132200.00	6938722	-43.58	147.38	242.3	4.9	251.
SR_03_/02	19930311	133700.00	6938737	-43.60	147.33	243.1	4.4	256.
SR_03_/02	19930311	135200.00	6938752	-43.62	147.28	241.6	4.5	254.
SR_03_/02	19930311	140700.00	6938767	-43.63	147.24	241.3	4.4	256.
SR_03_/02	19930311	142200.00	6938782	-43.65	147.20	242.1	4.2	259.
SR_03_/02	19930311	143700.00	6938797	-43.67	147.15	251.6	4.3	262.
SR_03_/02	19930311	145200.00	6938812	-43.68	147.11	247.1	4.3	267.
SR_03_/02	19930311	150700.00	6938827	-43.70	147.06	239.7	4.1	267.
SR_03_/02	19930311	152200.00	6938842	-43.71	147.02	239.7	3.7	276.
SR_03_/02	19930311	153700.00	6938857	-43.73	146.98	242.8	3.7	269.
SR_03_/02	19930311	155200.00	6938872	-43.75	146.94	241.1	3.6	271.
SR_03_/02	19930311	160700.00	6938887	-43.77	146.90	242.2	3.8	273.
SR_03_/02	19930311	162200.00	6938902	-43.78	146.86	241.6	3.8	287.
SR_03_/02	19930311	163700.00	6938917	-43.80	146.82	234.2	3.9	283.
SR_03_/02	19930311	165200.00	6938932	-43.82	146.78	233.7	4.0	279.
SR_03_/02	19930311	170700.00	6938947	-43.84	146.75	234.8	3.9	280.
SR_03_/02	19930311	172200.00	6938962	-43.87	146.71	233.8	4.9	284.
SR_03_/02	19930311	173700.00	6938977	-43.90	146.66	236.4	4.8	277.
SR_03_/02	19930311	175200.00	6938992	-43.92	146.61	236.6	5.3	283.
SR_03_/02	19930311	180700.00	6939007	-43.94	146.57	237.2	4.8	285.

SR_03_/02	19930311	182200.00	6939022	-43.97	146.53	237.3	4.6	289.
SR_03_/02	19930311	183700.00	6939037	-43.99	146.48	236.7	4.8	285.
SR_03_/02	19930311	185200.00	6939052	-44.01	146.44	237.6	4.9	289.
SR_03_/02	19930311	190700.00	6939067	-44.04	146.39	240.3	5.0	308.
SR_03_/02	19930311	192200.00	6939082	-44.06	146.35	240.4	5.1	298.
SR_03_/02	19930311	193700.00	6939097	-44.08	146.30	240.3	4.6	303.
SR_03_/02	19930311	195200.00	6939112	-44.10	146.26	297.1	4.8	308.
SR_03_/02	19930311	200700.00	6939127	-44.11	146.23	297.8	0.7	310.
SR_03_/02	19930311	202200.00	6939142	-44.11	146.23	288.2	0.0	298.
SR_03_/02	19930311	203700.00	6939157	-44.11	146.23	286.9	0.0	298.
SR_03_/02	19930311	205200.00	6939172	-44.10	146.23	287.7	0.0	295.
SR_03_/02	19930311	210700.00	6939187	-44.10	146.23	284.4	0.0	299.
SR_03_/02	19930311	212200.00	6939202	-44.10	146.24	292.8	0.0	303.
SR_03_/02	19930311	213700.00	6939217	-44.10	146.24	290.5	0.0	299.
SR_03_/02	19930311	215200.00	6939232	-44.10	146.24	291.4	0.0	288.
SR_03_/02	19930311	220700.00	6939247	-44.10	146.24	277.5	0.0	300.
SR_03_/02	19930311	222200.00	6939262	-44.10	146.24	26.5	1.4	303.
SR_03_/02	19930311	223700.00	6939277	-44.07	146.26	27.2	3.8	294.
SR_03_/02	19930311	225200.00	6939292	-44.05	146.28	72.0	3.3	291.
SR_03_/02	19930311	230700.00	6939307	-44.03	146.33	71.0	6.4	294.
SR_03_/02	19930311	232200.00	6939322	-44.01	146.40	331.6	6.2	274.
SR_03_/02	19930311	233700.00	6939337	-44.00	146.41	275.6	3.7	292.
SR_03_/02	19930311	235200.00	6939352	-44.00	146.37	275.0	3.4	298.
SR_03_/02	19930312	700.00	6939367	-44.00	146.33	283.7	3.3	293.
SR_03_/02	19930312	2200.00	6939382	-44.00	146.31	276.5	0.6	290.
SR_03_/02	19930312	3700.00	6939397	-44.00	146.31	279.0	0.0	305.
SR_03_/02	19930312	5200.00	6939412	-44.00	146.31	279.3	0.0	298.
SR_03_/02	19930312	10700.00	6939427	-44.00	146.31	283.8	0.0	298.
SR_03_/02	19930312	12200.00	6939442	-43.99	146.31	282.1	0.0	288.
SR_03_/02	19930312	13700.00	6939457	-43.99	146.31	283.0	0.0	295.
SR_03_/02	19930312	15200.00	6939472	-43.99	146.31	283.8	0.0	287.
SR_03_/02	19930312	20700.00	6939487	-44.01	146.30	195.0	3.4	293.
SR_03_/02	19930312	22200.00	6939502	-44.05	146.29	220.8	5.6	302.
SR_03_/02	19930312	23700.00	6939517	-44.09	146.26	220.1	5.0	294.

Appendix 2

The following links are subroutines that can be used to convert the time values from the WOCE ASCII files to four-digit year, month, day, hour, and minute values (Invtime) and from four-digit year, month, day, hour, and minute values to the time values on the WOCE ASCII files (Convtime). The routine processes individual time values (time stamp), but could be easily modified to handle an entire time array. They are available in FORTRAN, IDL, and C.

FORTRAN
Invtime: http://www.coaps.fsu.edu/WOCE/utils/invtime.f
Convtime: http://www.coaps.fsu.edu/WOCE/utils/convtime.f

IDL
Invtime: http://www.coaps.fsu.edu/WOCE/utils/invtime.pro
Convtime: http://www.coaps.fsu.edu/WOCE/utils/convtime.pro

C
Invtime: http://www.coaps.fsu.edu/WOCE/utils/invtime.c

Convtime: http://www.coaps.fsu.edu/WOCE/utils/convtime.c

The Invtime codes can be acquired electronically from our ftp site via the following commands:

```
ftp wocemet.fsu.edu
login anonymous
cd pub/src
get (invtime.f, invtime.pro, invtime.c)
```

Any problems that occur while using the code can be addressed to wocemet@coaps.fsu.edu.