

J.4 OC_D: Cumulative Database

Purpose of Deliverable

Working with large groups of OC_C processed CNV files can be cumbersome and difficult. An oceanography database is maintained that contains all the CNV values for all surveys done in the program. These rows may differ slightly from OC_C data in having data quality information, outlier corrections, etc. Through the web, the database may be queried to produce a single file on the customer's workstation containing final data, filtered to meet the customer's exact area of interest. Deliverable OC_D is an incremental update used to revise the cumulative database.

Frequency Produced

OC_D is generated at the end of each season directly after certification of OC_C processed CNV files. It is created from OC_C's intermediate validation files.

Prerequisites

Production of this deliverable is dependent on having a certified OC_C product for the year.

Data Flow

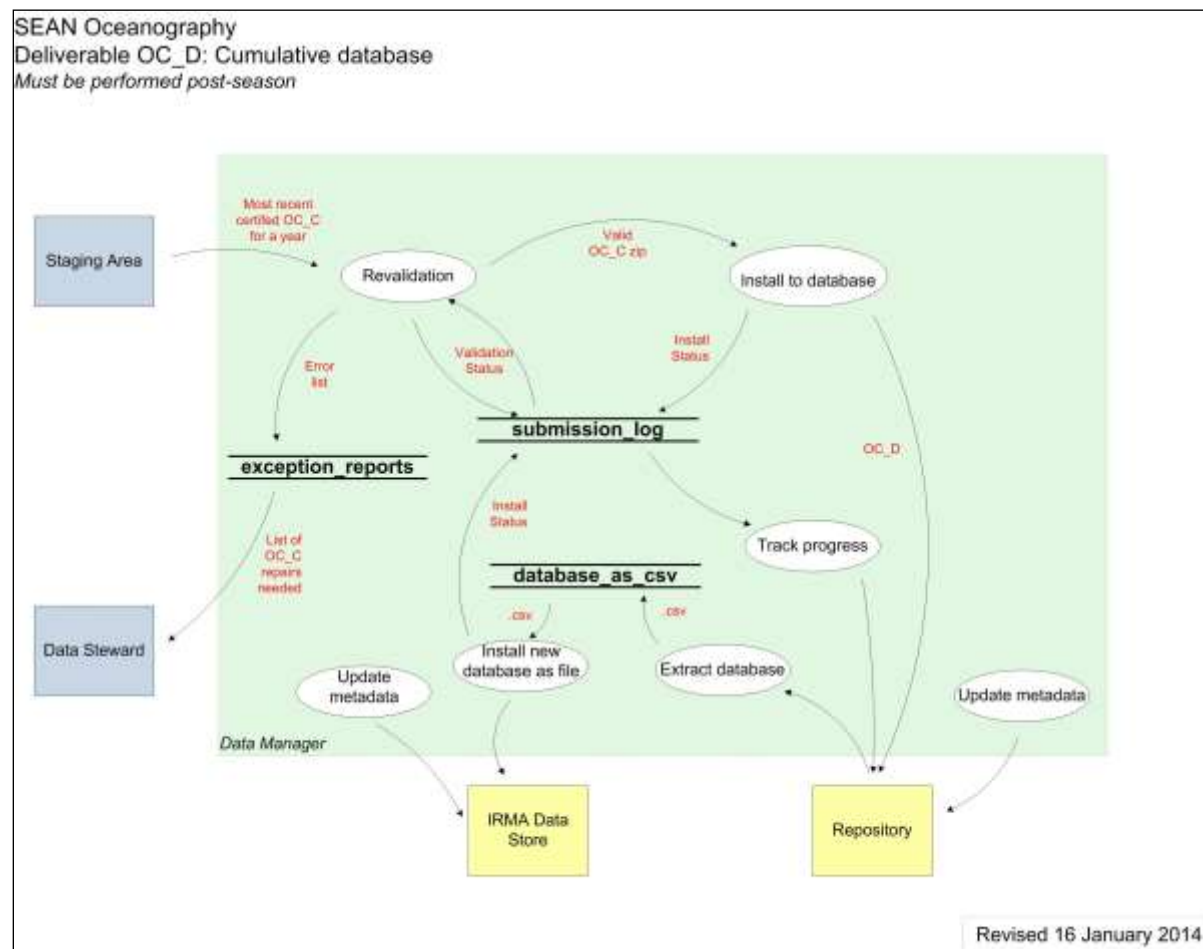


Figure J.4. Data flow required to generate deliverable OC_D: cumulative database.

Deliverable Definition Forms

Form D: Tabular Data Deliverable

<i>Vital Sign:</i> OC Oceanography	<i>Deliverable ID:</i> OC_D	<i>Deliverable Title:</i> Cumulative database
<i>File Format:</i> n/a	<i>Associated software and version:</i> n/a	<i>Revision Date / protocol version:</i> 01-15-2014 / OC-2014.1
<i>Expected Frequency:</i> one submission/year	<i>Likely Dissemination Partners:</i> None: served by SEAN	<i>Submission Unit:</i> YEAR
<i>What purpose does this deliverable serve?</i> Provides binned, calibrated CNV data filtered by parameters directly to customer workstations. This is basically all years of deliverable OC_C recast in a database structure. Individual sensor data in the source CNV file that have negative values (typically due to faulty sensor or SBE data error flag) are treated as NULL in the database.		
<i>Identifiers of relations that compose the tabular deliverable ("relations" are tables or files that provide information that may be represented in a grid format. Each relation listed must be fully defined in its own accompanying Form X):</i> tbl_oc_cast		
<i>Deliverable ID of any other SEAN data products required to create this product:</i> OC_C		
<i>Description and source of any outside data required to create this product:</i> None		

Form X: Relation Definition

<i>Vital Sign:</i> OC Oceanography	<i>Relation Identifier:</i> tbl_oc_cast	<i>Used by Deliverable ID:</i> OC_D																																
<i>Revision date / protocol version:</i> 01-15-2014 / OC-2014.1	<i>Type of Relation:</i> Database Table	<i>Estimated Rows:</i> 370,000+																																
<i>Natural key for this relation:</i> ctd + dump + cast + depth																																		
<i>Purpose:</i> Oceanographic calibrated cast data binned to 1 m levels and expressed in engineering units, to serve as a basis for customer analysis. The table is totally denormalized to facilitate web downloading and direct use by Excel and MS Access.																																		
<i>Identifiers of attributes defined over this relation ("attributes" are columns of the grid. Each attribute must be defined in an accompanying Form Y):</i> <table border="1"> <tr><td>CTD</td><td>CONDUCTIVITY</td></tr> <tr><td>DUMP</td><td>SALINITY</td></tr> <tr><td>OBSERVER</td><td>SIGMA_T</td></tr> <tr><td>CAST</td><td>FLUORESCENCE</td></tr> <tr><td>VESSEL</td><td>OBS</td></tr> <tr><td>STATION</td><td>OXYGEN</td></tr> <tr><td>LATITUDE</td><td>PAR</td></tr> <tr><td>LONGITUDE</td><td>SBE_DATA_FLAG</td></tr> <tr><td>DATE_GMT</td><td>COMMENTS</td></tr> <tr><td>TIME_GMT</td><td>DATA_QUALITY</td></tr> <tr><td>FATHOMETER_DEPTH</td><td>QUALITY_COMMENT</td></tr> <tr><td>TARGET_DEPTH</td><td>TIME_STAMP</td></tr> <tr><td>PRESSURE</td><td>PROTOCOL_ID</td></tr> <tr><td>DEPTH</td><td>USERID</td></tr> <tr><td>TEMPERATURE</td><td>SUBMISSION_NUMBER</td></tr> <tr><td></td><td>CRUISE_YEAR</td></tr> </table>			CTD	CONDUCTIVITY	DUMP	SALINITY	OBSERVER	SIGMA_T	CAST	FLUORESCENCE	VESSEL	OBS	STATION	OXYGEN	LATITUDE	PAR	LONGITUDE	SBE_DATA_FLAG	DATE_GMT	COMMENTS	TIME_GMT	DATA_QUALITY	FATHOMETER_DEPTH	QUALITY_COMMENT	TARGET_DEPTH	TIME_STAMP	PRESSURE	PROTOCOL_ID	DEPTH	USERID	TEMPERATURE	SUBMISSION_NUMBER		CRUISE_YEAR
CTD	CONDUCTIVITY																																	
DUMP	SALINITY																																	
OBSERVER	SIGMA_T																																	
CAST	FLUORESCENCE																																	
VESSEL	OBS																																	
STATION	OXYGEN																																	
LATITUDE	PAR																																	
LONGITUDE	SBE_DATA_FLAG																																	
DATE_GMT	COMMENTS																																	
TIME_GMT	DATA_QUALITY																																	
FATHOMETER_DEPTH	QUALITY_COMMENT																																	
TARGET_DEPTH	TIME_STAMP																																	
PRESSURE	PROTOCOL_ID																																	
DEPTH	USERID																																	
TEMPERATURE	SUBMISSION_NUMBER																																	
	CRUISE_YEAR																																	
<i>Mandatory validation criteria involving multiple attributes:</i> None																																		
<i>Optional validation criteria involving multiple attributes:</i> None																																		

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> CTD	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> CTD #	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Local identification number of the CTD device, as designated in Appendix F.		
<i>Data type:</i>	Varchar(1)	
<i>Maximum length</i>	1	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	9	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be between 1 and 9.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> DUMP	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> DUMP#	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> The sequential number that is incremented each time any CTD memory is cleared. It tracks distinct uses of the CTD to gather a set of consecutive casts.		
<i>Data type:</i>	Varchar(4)	
<i>Maximum length</i>	4	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	0000	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must represent a whole number, zero filled.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> OBSERVER	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Observer	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> The last names of those making the cast.		
<i>Data type:</i>	Varchar(50)	
<i>Maximum length</i>	50	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	any	
<i>Mandatory validation rules for this attribute (in order of application):</i>	None	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> CAST	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Cast#	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Sequential cast number within a particular dump. Casts are integers beginning with zero. They are generated by the CTDs themselves. Because of memory limits in existing equipment, it is rare CAST will ever exceed 15. Cast is part of the primary key, making its representation critical. If its value is below 10, it must be stored only as two digits, employing a leading zero if needed.		
<i>Data type:</i>	Varchar(2)	
<i>Maximum length:</i>	2	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	00	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must represent an integer between 0 and 99.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0 and 15.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> VESSEL	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Vessel	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Name of the vessel used to conduct the survey.		
<i>Data type:</i>	Varchar(24)	
<i>Maximum length:</i>	24	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	Proper	
<i>Mandatory validation rules for this attribute (in order of application):</i>	None	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> STATION	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Station	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Identification number for a unique sampling location. Over time station numbers may be retired. The numbers are never recycled. Stations are always exactly two digits in length, using a leading zero if needed to meet that constraint.		
<i>Data type:</i>	Varchar(2)	
<i>Maximum length:</i>	2	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	00	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must represent a zero-filled integer between 00 and 24.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> LATITUDE	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Latitude	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Decimal latitude in WGS84 datum.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	8	
<i>Required:</i>	no	
<i>Measurement units:</i>	degrees	
<i>Format:</i>	99.99999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 58.0 and 61.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be within 0.05 degrees of identified station.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> LONGITUDE	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Longitude	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Decimal longitude using the WGS84 datum.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	10	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	-999.99999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between -135.0 and -142.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be within 0.05 degrees of identified station.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> DATE_GMT	<i>Used by Deliverable ID:</i> OC_D
<i>Revision date / protocol version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Date	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Date the cast was taken; in the GMT time zone.		
<i>Data type:</i>	date	
<i>Maximum length:</i>	n/a	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a valid date. 2. Must not be a date beyond the current one at moment of validation. 3. Must not be a date before 1992.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> TIME_GMT	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Time	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Time cast was initiated, in Greenwich Mean Time.		
<i>Data type:</i>	time	
<i>Maximum length:</i>	n/a	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must resolve to a valid time.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> FATHOMETER_DEPTH	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Bottom (m)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Depth to the sea floor for this station in meters, expressed as a positive integer.		
<i>Data type:</i>	integer	
<i>Maximum length:</i>	4	
<i>Required:</i>	no	
<i>Measurement units:</i>	meters	
<i>Format:</i>	9999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be an integer between 0 and 9999.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> PRESSURE	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> Pressure (dbar)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Pressure in decibars.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	8	
<i>Required:</i>	no	
<i>Measurement units:</i>	decibars	
<i>Format:</i>	9999.999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 1 and 9999.999.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 1 and 800.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> DEPTH	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 05-12-2010 / OC-2014.1	<i>Default Report Heading:</i> Depth (m)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Depth of this bin in meters, expressed as a positive integer. The first bin is labeled as meter zero. NOTE: sampling mechanics sometimes prevent the first meter (or more) from being recorded. In such cases the missing surface bins are imputed by replicating the readings of the first valid bin up through bin 0 (provided there is a valid bin within 4 m of the surface). A comment explaining this is included on every imputed row. If no valid bin is present for a cast within the first 4 m, no rows are generated and the missing bins in OC_C remain missing in OC_D.		
<i>Data type:</i>	integer	
<i>Maximum length:</i>	4	
<i>Required:</i>	yes	
<i>Measurement units:</i>	meters	
<i>Format:</i>	9999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be an integer. 2. Must be between 0 and 9999.	
<i>Optional validation rules for this attribute:</i>	1. Should be less than 800.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> TEMPERATURE	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> Temperature (C)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Water temperature in degrees Celsius [ITS-90]		
<i>Data type:</i>	Real	
<i>Maximum length:</i>	6	
<i>Required:</i>	no	
<i>Measurement units:</i>	degrees C	
<i>Format:</i>	99.999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between -5.0 and 20.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0.0 and 20.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> CONDUCTIVITY	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol</i> <i>Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> Conductivity (S/m)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Conductivity in Siemens per meter.		
<i>Data type:</i>	real	
<i>Maximum length</i>	8	
<i>Required:</i>	no	
<i>Measurement units:</i>	Siemens/meter	
<i>Format:</i>	9.999999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 0.0 and 10.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0.0 and 5.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> SALINITY	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol</i> <i>Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> Salinity (PSU)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Salinity in practical salinity units.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	6	
<i>Required:</i>	no	
<i>Measurement units:</i>	PSU	
<i>Format:</i>	99.999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 0.0 and 40.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0.0 and 34.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> SIGMA_T	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> Density (kg/m ³)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Density differential in kg/m ³ .		
<i>Data type:</i>	real	
<i>Maximum length:</i>	7	
<i>Required:</i>	no	
<i>Measurement units:</i>	kg/m ³	
<i>Format:</i>	nn.nnn	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 0.0 and 30.0	
<i>Optional validation rules for this attribute:</i>	1. Should be between 15.0 and 27.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> FLUORESCENCE	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Fluorescence (mg/m ³)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Fluorescence, proxy for chlorophyll-a.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	6	
<i>Required:</i>	no	
<i>Measurement units:</i>	mg/m ³	
<i>Format:</i>	99.999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be less than 100.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0.0 and 70.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> OBS	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> Backscatterance (NTU)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Turbidity detected by OBS backscatter sensor.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	7	
<i>Required:</i>	no	
<i>Measurement units:</i>	NTU	
<i>Format:</i>	999.999	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 0.0 and 800.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0.0 and 500.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> OXYGEN	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Dissolved Oxygen (ml/l)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Dissolved oxygen content. Negative values may appear when CTD is used without the DO sensor securely connected.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	6	
<i>Required:</i>	no	
<i>Measurement units:</i>	ml/l	
<i>Format:</i>	nn.nnn	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must not exceed 20.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 2.0 and 14.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> PAR	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-09-2009 / OC-2014.1	<i>Default Report Heading:</i> PAR (uE/m ² * sec)	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Photosynthetically active radiation.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	8	
<i>Required:</i>	no	
<i>Measurement units:</i>	μEinsteins/m ² ·sec	
<i>Format:</i>	nnnn.nnn	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must be a real number. 2. Must be between 0.0 and 3000.0.	
<i>Optional validation rules for this attribute:</i>	1. Should be between 0.0 and 1600.0.	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> SBE_DATA_FLAG	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> DP Error Flag	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Indicates bins with suspect data due to pressure slowdown or reversal as the cast progresses. A nonzero value indicates suspect data, which is excluded from the database. In practice, this column is always 0 since input with other values is always rejected as the database is updated. It is kept here to maintain consistency with OC_C attributes.		
<i>Data type:</i>	real	
<i>Maximum length:</i>	9	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	None	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> COMMENTS	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Comments	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Recorded comments regarding circumstances of this particular cast.		
<i>Data type:</i>	Varchar(512)	
<i>Maximum length:</i>	512	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	None	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> DATA_QUALITY	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Data Quality	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Indicator of the quality of the observation, for determining whether to include it in analyses. The Ocean Data View coding system is observed. This is not recorded in the database during OC_D loading. Instead, it is entered upon subsequent certification of deliverable OC_M: Data Quality. 0 = good, 1 = unknown, 4 = questionable, 8 = bad. The DATA_QUALITY_COMMENT explains why a row is flagged 4 or 8. (See the OC_M entry for detailed explanation of quality codes.)		
<i>Data type:</i>	Varchar(1)	
<i>Maximum length:</i>	1	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	tbl_data_quality	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. If present, must match 0, 1, 4, or 8.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> DATA_QUALITY_COMMENT	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Quality Comment	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Explanation of why data quality was not considered “good.” The source for this attribute is the certified OC_M spreadsheet product for the particular year.		
<i>Data type:</i>	Varchar(512)	
<i>Maximum length:</i>	512	
<i>Required:</i>	no	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	None	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> TIME_STAMP	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Last Updated	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> The date and time this row was most recently inserted or updated in the table. It is used for auditing purposes.		
<i>Data type:</i>	date and time	
<i>Maximum length:</i>	n/a	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	not validated; generated automatically	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> PROTOCOL_ID	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Protocol	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> The formal version of the protocol under which this row was created in the database.		
<i>Data type:</i>	Varchar(10)	
<i>Maximum length:</i>	10	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	SEAN.tbl_protocol.protocol	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must match a protocol value in database table tbl_protocol.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> USERID	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 01-15-2014 / OC-2014.1	<i>Default Report Heading:</i> Updated by	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> The login name used to authorize the process that created/updated this row in the cumulative database. It is restricted to those userids stored in the database table called tbl_submitter. It is used for auditing purposes.		
<i>Data type:</i>	Varchar(20)	
<i>Maximum length:</i>	20	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	SEAN.tbl_submitter.submitter_userid	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must match a submitter_userid in tbl_submitter.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> SUBMISSION_NUMBER	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 04-10-2009 / OC-2014.1	<i>Default Report Heading:</i> Submission#	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> The submission number used to transmit to the network the files from which this particular row came. It is used for several data management purposes, including auditing.		
<i>Data type:</i>	int	
<i>Maximum length:</i>	n/a	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	n/a	
<i>Foreign key to (relation+attribute):</i>	SEAN.tbl_submission_log.submission_number	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must match a submission_number in tbl_submission_number.	
<i>Optional validation rules for this attribute:</i>	None	

Form Y: Attribute Definition

<i>Vital Sign:</i> OC Oceanography	<i>Attribute Identifier:</i> CRUISE_YEAR	<i>Used by Deliverable ID:</i> OC_D
<i>Revision Date/Protocol Version:</i> 12-30-2009 / OC-2014.1	<i>Default Report Heading:</i> Cruise Year	<i>Relation (from Form X):</i> tbl_oc_cast
<i>Purpose:</i> Cruises are aggregated by year defined as the period December through November. For example, casts made in December 2008 and those from April 2009 are all in cruise year 2009. Casts made in October 2008 are in cruise year 2008. Cruise year is derived from DATE_GMT.		
<i>Data type:</i>	Varchar(4)	
<i>Maximum length:</i>	4	
<i>Required:</i>	yes	
<i>Measurement units:</i>	n/a	
<i>Format:</i>	0000	
<i>Foreign key to (relation+attribute):</i>	n/a	
<i>Case:</i>	n/a	
<i>Mandatory validation rules for this attribute (in order of application):</i>	1. Must represent an integer between 1993 and the current year.	
<i>Optional validation rules for this attribute:</i>	None	