



# DATA PRODUCT SPECIFICATION FOR PHYSICAL SAMPLE-OSMOI

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### Signature Page

This document has been reviewed and approved for release to Configuration Management.

OOI Senior Systems Engineer:

A handwritten signature in black ink, appearing to be 'J. C.', written over a horizontal line.

Date: 2014-05-13

This document has been reviewed and meets the needs of the OOI Cyberinfrastructure for the purpose of coding and implementation.

OOI CI Signing Authority: \_\_\_\_\_

Date: \_\_\_\_\_

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## 1 Abstract

This document describes the computation used to calculate the OOI Level 2 Physical Sample data product from the OSMOI instrument. The OSMOI instrument collects and preserves fluid samples continuously, using an osmotic pump to draw sample into a long length of Teflon tubing. Once the instrument is recovered, the long length of tubing is divided into samples integrating the chemistry over one or two day increments. These individual samples are sent out for shore based analyses. This document describes the format of the dataset that will be returned from the analytical facility, including the suite of chemical analytes, the corresponding precision, and the associated sample metadata. The same dataset will be developed in the processing of the physical samples from the RASFL sampler.

## 2 Introduction

### 2.1 Author Contact Information

Please contact Giora Proskurowski ([giora@uw.edu](mailto:giora@uw.edu)) or the Data Product Specification lead ([DPS@lists.oceanobservatories.org](mailto:DPS@lists.oceanobservatories.org)) for more information concerning the computation and other items in this document.

### 2.2 Metadata Information

#### 2.2.1 Data Product Name

The OOI Core Data Product Name for this product is

- PHSSAMP—OSMOI

The OOI Core Data Product Descriptive Name for this product is

- Physical Sample--OSMOI

#### 2.2.2 Data Product Abstract (for Metadata)

The OOI Level 2 Physical Sample--OSMOI core data product is a dataset of the concentrations of a suite chemical constituents in the fluids sampled by the OSMOI.

#### 2.2.3 Computation Name

Not required for data products.

#### 2.2.4 Computation Abstract (for Metadata)

This algorithm describes the format of the OOI Level 2 Physical Sample--OSMOI core data product.

#### 2.2.5 Instrument-Specific Metadata

See Section 4.4 for instrument-specific metadata fields that must be part of the output data.

#### 2.2.6 Data Product Synonyms

Synonyms for this data product are

- Fluid chemistry

#### 2.2.7 Similar Data Products

The remote access samplers (RASFL) also collect physical fluid samples, and the fluids analyzed for a similar suite of chemicals. The format of the two datasets is identical, with any discrepancies between the two analyte suites addressed in the dataset through the use of "n.a." ("not analyzed") in individual data cells.

## 2.3 Instruments

For information on the instruments from which the OOI Level 2 Physical Sample--OSMOI core data product inputs are obtained, see the OSMOI Data Processing Flow document (DCN 1342-00640). This document contains information on instrument classes and make/models; it also describes the flow of data from the instrument through all of the relevant QC, calibration, and data product computations and procedures.

Please see the Instrument Application in the SAF for specifics of instrument locations and platforms.

## 2.4 Literature and Reference Documents

Not applicable.

## 2.5 Terminology

### 2.5.1 Definitions

Not Applicable.

### 2.5.2 Acronyms, Abbreviations and Notations

General OOI acronyms, abbreviations and notations are contained in the Level 2 Reference Module in the OOI requirements database (DOORS). The following acronyms and abbreviations are defined here for use throughout this document.

### 2.5.3 Variables and Symbols

Not applicable.

## 3 Theory

### 3.1 Description

A suite of chemical analytes are measured in off-site laboratories. The results are collated into a single dataset, including sample metadata. This dataset must be digested into the OOI CI.

### 3.2 Mathematical Theory

Not Applicable.

### 3.3 Known Theoretical Limitations

Not Applicable.

### 3.4 Revision History

No revisions to date.

## 4 Implementation

### 4.1 Overview

Results from chemical analysis provided in a spreadsheet format (e.g. .csv).

### 4.2 Inputs

- Spreadsheet with header lines and data

#### Input Data Formats:

The OSMOI is not cabled and does not produce live data. This data product is a delayed data product that results after the sampler has been recovered, the samples analyzed and the results quality controlled.

The full data product will be externally formatted as a spreadsheet (.csv, comma separated value), with individual samples in rows and sample attributes (time, date, chemical concentrations, analytical precision) in columns. There will be header rows describing the data field and the associated units. Although it is expected that these will remain constant, it would be most useful to preserve these header fields in the OOI Level 2 data product.

### 4.3 Processing Flow

The specific steps necessary to create all calibrated and quality controlled data products for each OOI core instrument are described in the instrument-specific Processing Flow documents (DCN 1342-00640). These processing flow documents contain flow diagrams detailing all of the specific procedures (data product and QC) necessary to compute all levels of data products from the instrument and the order in which these procedures.

The processing flow for the Physical Sample computation is as follows:

Step 1:  
Injest .csv datasheet.

### 4.4 Outputs

The outputs are a replication of the provided spreadsheet. The current example spreadsheet has five header lines (parameter, units, method, precision(+/-1s), laboratory) followed by a "sample" line for each sample. Each sample line includes sample information (VentID-Instrument, Start time, stop time, instrument port number, latitude, longitude, depth) followed by the analytical results.

It would be useful to include in the metadata a link to a webpage and or document outlining the analytical methods used in the development of this data product.

See Appendix B for a discussion of the accuracy of the output.

### 4.5 Computational and Numerical Considerations

#### 4.5.1 Numerical Programming Considerations

There are no numerical programming considerations for this computation. No special numerical methods are used.

#### 4.5.2 Computational Requirements

Not Applicable.

#### 4.6 Code Verification and Test Data Set

The code will be verified using the test data set provided, which contains inputs and their associated correct outputs. CI will verify that the code is correct by checking that the output, generated using the test data inputs, is identical to the test data output.

The test dataset provided in the file OSMOI\_Chemdata\_example.csv contains mock data in a format similar to that expected of the final datasets.



**Appendix A**

**Example Code**

Not applicable.

## **Appendix B          Output Accuracy**

The precision of the L2 product varies with the analytical method employed, and is provided for each measurement in the L2 product. We assume that sampling and handling errors are minimized and do not introduce bias into the final results, and as such the measurement accuracies approach, and are best approximated by, the stated analytical precision.

There are no OOI-RSN requirements for the accuracy and precision of the analytical measurements associated with fluid sample collection by the RASFL instrument. However, analysis are performed by standard methodologies by leading practitioners in this line of investigation.

**Appendix C**

**Sensor Calibration Effects**

Not applicable.