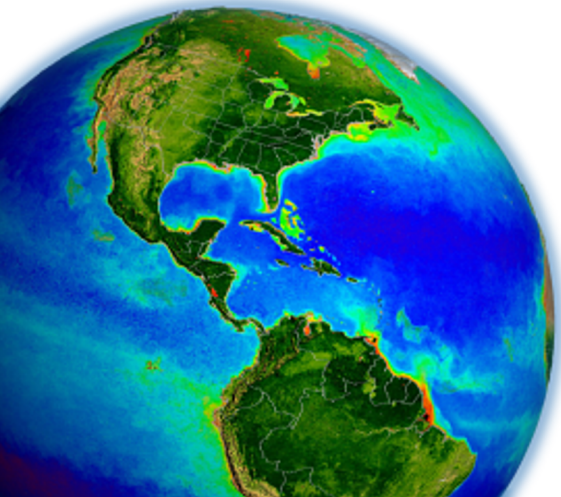


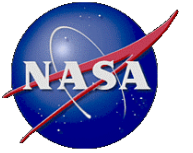
New "Checklist" documents are being designed for commonly submitted data types

### Outline

- 1) Quick overview of SeaBASS metadata
- 2) Briefly describe new requirements & page
- 3) Feedback?

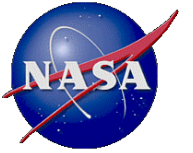
Violeta is spearheading the development of a new algorithm development dataset (i.e., NOMAD) using SeaBASS datasets. With the need to add uncertainties, she has also been leading review of QC standards





New "Checklist" documents will help organize methods and processing details related to protocols best practices

- Inherent Optical Property Measurements and Protocols: Absorption Coefficient (November 2018)
- Beam Transmission and Attenuation Coefficients: Instruments, Characterization, Field Measurements and Data Analysis Protocols (April 2019)
- Protocols for Satellite Ocean Color Data Validation: In situ Optical Radiometry (In Press)
- Best Practices for the Collection and Processing of Ship-Based Underway Flow-Through Optical Data (In Press)
- Measurement Protocol of Absorption by Chromophoric Dissolved Organic Matter (CDOM) and Other Dissolved Materials (DRAFT)
- Noteworthy and Supplemental Topics on Ocean Colour Radiometry Protocols (DRAFT) (led Sanjuan & Craig)

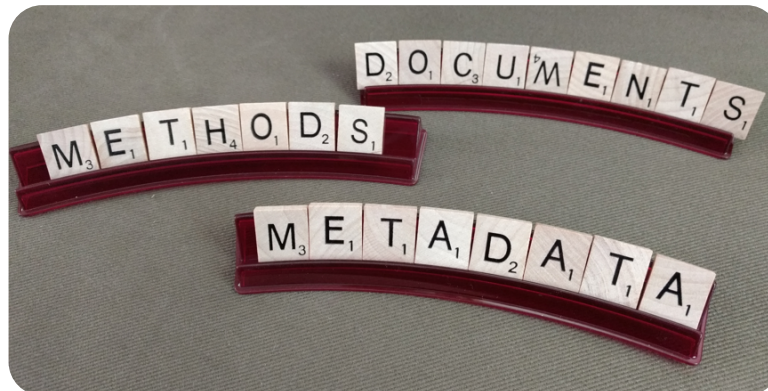


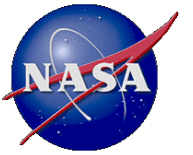
- Protocols updates need to be reflected on SeaBASS submission updates
- Tighter QA/QC in view of PACE cal/val and algorithm development
- Possibility of classification of datasets according to special characteristics (Optically shallow waters, HAB, NOMAD dataset)
- Uncertainty traceability on all validation products
- Measurement uncertainty up to 5%

Updated checklists and reporting requirements come as a result of community updates on measurements protocols as well as PACE mission requirements for validation, algorithm development and NOMAD

### Types of metadata in SeaBASS submissions

1. Metadata headers within data files
  - i. Keyword-value pairs (**machine interpretable**)
  - ii. Comments (**short text**)
  
2. External Documents and Calibration Files
  - i. Explain how raw instrument measurements were collected and processed into your reported values (**open-ended format**)





Existing documentation requirements are written flexibly since there's no one size-fits-all approach

- Should describe **calibration equations and values**, how the instruments were calibrated, and what types of **corrections** and **data analysis** were applied to create your reported values
- **No specific file formats** are required

Due to open-ended format, essential details are often spread out in descriptions, or sometimes not provided...

= often time consuming or difficult to evaluate data quality details

[https://seabass.gsfc.nasa.gov/wiki/data\\_submission\\_special\\_requirements](https://seabass.gsfc.nasa.gov/wiki/data_submission_special_requirements)

For commonly submitted measurements:

- 1) **Checklists** – new documentation templates
- 2) **Special Notes** – reminders & tips
- 3) **Example Submissions**

Goals:

- improve SeaBASS data quality & consistency
- make quality easier to assess
- clarify reporting requirements to reduce unnecessary back and forth during data submission process





- Filter pad absorption (community protocol)
- CDOM absorption (community protocol)
- POC (community protocol draft)
- HPLC and pigments
- Radiometry (community protocol)

**Developed with Field Support Group from Ocean Biology Processing Group, leading community protocols**



### **Sample collection**

- Water bottles, underway
- Filtration vacuum
- Blank filters
- Replicates
- Samples measured fresh, frozen,
- Storage conditions (container, preservation method, temperature)

### **Sample measurement**

- Instrument make, model and accessories
- Instrument calibration, performance tests and maintenance performed
- Measurement method: transmittance, transmittance-reflectance, inside sphere...
- Measurement protocol references (if any)
- Air scans

### **Data analysis**

- Blank and air scans
- Correction or null methods applied
- Beta factor used with reference

**Look at submission examples on SeaBASS website**





### Sample collection

- Niskin bottle, surface pump, bucket...
- Location (coastal, offshore, estuarine, etc.) and depths
- Filtration system: vacuum pump, peristaltic, syringe, vacuum jar, etc.) type of filter and pore size
- Sample storage (e.g. refrigerated, frozen, acidified, etc.) and in what type of bottle (e.g. amber glass, high or low density poly-ethylene (HDPE, LDPE), Nalgene, etc.)

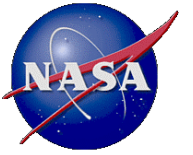
### Sample measurement

- Spectrophotometer used (dual or single beam, waveguide, integrating sphere, etc.), cuvette size (benchtop), effective pathlength (on waveguide)
- Instrument settings: (integration time, scan speed, slit width, smoothing, wavelength range and increment, etc.)
- Samples re-filtered before the spectrophotometric analysis?



### Reporting

- Raw scans of absorbance should be reported for each all measurements. When multiple scans measured, the average absorbance can be reported along with their standard deviation
- Documentation file should be provided describing the methods for collection, filtration, analysis protocols
- Absorption coefficient may be reported after null correction, smoothing, truncated wavelengths, etc. has been applied... Fully documented
- Standardization on variable names for CDOM: wavelength, abs\_ag, abs\_ag\_sd, ag



### **Filter diameter and nominal pore size**

- Make and type (e.g., Whatman GF/F), filter pre-treated?

### **Sampling and processing**

- Method of filtration: filtration volume (volfilt), sample replicates, Standard deviation or % cv of replicates reported

### **Post sampling processing**

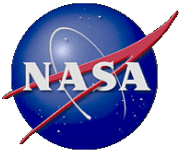
- Acidification step: Mode of application (i.e., fumes vs. solution)
- Drying method and temperature (length of time in oven, desiccator, etc)

### **Elemental analysis**

- Instrument make and model, Calibration standard, Reference material used and performance metric results relative to reference

### **Blank corrections**

- DOC/DON adsorption (“filtrate”) blank correction should be measured and applied (Moran et al. 1999).  
Were samples blank corrected?



Filled out by data submitter

### **Sample collection method**

- Filter type/pore size, Vacuum pressure, Replicates collected, Flash frozen?, Long term storage conditions

Filled out by HPLC Lab

### **Sample measurement and analysis**

- Extraction, solvent, volume added/delivery method, disruption method, time, soak time, clarification method

### **HPLC analytical method**

- Method reference, column temperature, mobile phase, Flow rate, Gradient, wavelengths monitored, spectra collected? If so, what wavelengths, Internal standard used, name

**Instrument:** Make and model, Injector type, Pump type, sample compartment refrigerated?, Heated/thermostatted column compartment? Detector type

**Instrument calibration:** Frequency, Source of standards, Single point or multi-point calibration, How are calibration factors (or response factors. RF) calculated? Is calibration accuracy monitored between calibrations? If so, how and how often? Noise at each wavelength



### **Instrument**

- Model and manufacturer, instrument characteristics including spatial, spectral electrical and physical.
- Report instrument characterization including spectral range, spectral resolution, spectral accuracy, field of view, linearity, cosine response, thermal response, immersion effects
- Calibration: report absolute radiometric calibration for radiance and equation, and absolute calibration for irradiance and equation.

### **Deployment conditions**

- Deployment type: buoy mode, profiler (single cast), profiler (multi cast).
- Deployment strategy, pressure tare, dark readings.

Remember to include "optional" metadata headers: Wind speed, Cloud cover, (Ship heading & SZA)



### Data analysis

- Conversion data counts to engineering units: conversions from raw binary optical data into counts. Apply calibration equation.
- Dark correction: specify the correction scheme used to correct light values for dark values.
- Deglitch shutter data: specify deglitching scheme used for dark values, if any
- Smooth shutter darks: specify, if any.
- Interpolate shutter darks as a function of measurement time to match the number of dark and light data measurements.
- Dark correction of light data
- Temperature correction of light data. Report temperature correction equation.
- Time interpolation if any (better not interpolated). Detail interpolation scheme applied.



**Please refer to SeaBASS website for detailed requirement on submission guidelines for each validation product.**

- Enforced QA/QC is required for algorithm development within PACE for uncertainty estimates.
- Data collection and processing can account for significant error budget.
- SeaBASS will require a full traceability on acquisition methods and data processing to ensure quality standards.

**Submission guidelines open for feedback and suggestions from the community to revisit according to protocols update.**

[https://seabass.gsfc.nasa.gov/wiki/data\\_submission\\_special\\_requirements](https://seabass.gsfc.nasa.gov/wiki/data_submission_special_requirements)