

Demonstration: Assessing MODIS L2 data with In Situ Data –
Calibration of algorithm to derive Chl-a

Objectives

- Upload *in situ* measurements into SeaDAS
- Use SeaBASS data in SeaDAS
- Compare *in situ* measurements with satellite derived measurements
- Calibrate Chl-a algorithm coefficients based on *in situ* measurements



SeaBASS website

https://seabass.gsfc.nasa.gov

File Search:

- Measurement dates
- Location
- Parameters measured (Products)

Click on Perform File Search

The screenshot shows the SeaBASS website search interface. At the top, there is a navigation bar with links for Home, About SeaBASS, Get Data, Contribute Data, Wiki, Lists, and a search bar for articles. The main content area is titled "Search Type:" and has two tabs: "File Search" (selected) and "Validation". Below this, a description states: "The File Search allows visitors to search the bio-optical archive for in situ measurements of apparent and inherent optical properties, phytoplankton pigment concentrations, and other oceanographic and atmospheric data. Search results return a list of matching data files which may be viewed, downloaded, mapped and plotted. Data access and use are governed by the SeaBASS Data Access Policy."

The "General Search Parameters:" section includes instructions to "Modify any of the following parameters to focus and limit your search results." It features two date ranges: "Measured between the dates of 2001-01-01 and 2018-09-15" and "Archived between the dates of 2000-01-01 and 2018-09-15". A "Within the coordinates?" section contains a world map with a blue box highlighting a region in the North Pacific. Below the map are input fields for coordinates: W: -99.49, N: 33.75, E: -79.80, and S: 18.28, along with a "Reset" button.

The "File Search Parameters:" section includes a "Water Depth:" slider set to approximately 100 meters, with a range from 0 to 997 meters. The "Data Type:" is set to "all". "Wavelength Options?" are set to "All". "Include Optically Shallow Measurements?" is set to "No".

The "Products?" section has three radio buttons: "Find files containing any of the selected products" (selected), "Find files where all the specific products entered below were measured in the same cruise", and "Don't filter based on products". Under "Grouped Products:", several checkboxes are visible, with "Chl" checked. The "Specific Products:" section has an empty input field with a plus sign.

At the bottom right, there is a "Perform File Search" button.



SeaBASS – Search Results

Visualize results in different ways:

SeaBASS

Home About SeaBASS Get Data Contribute Data Wiki Lists Search articles... Contact Us

Search Parameters:

Date Measured	2001-01-01 to 2018-09-15
Date Archived	2000-01-01 to 2018-09-15
North	30.94
South	16.17
West	-98.79
East	-79.10
Water Depth	0.0 to 10000
Products	Chl

Share Search Parameters

Total number of files: 144

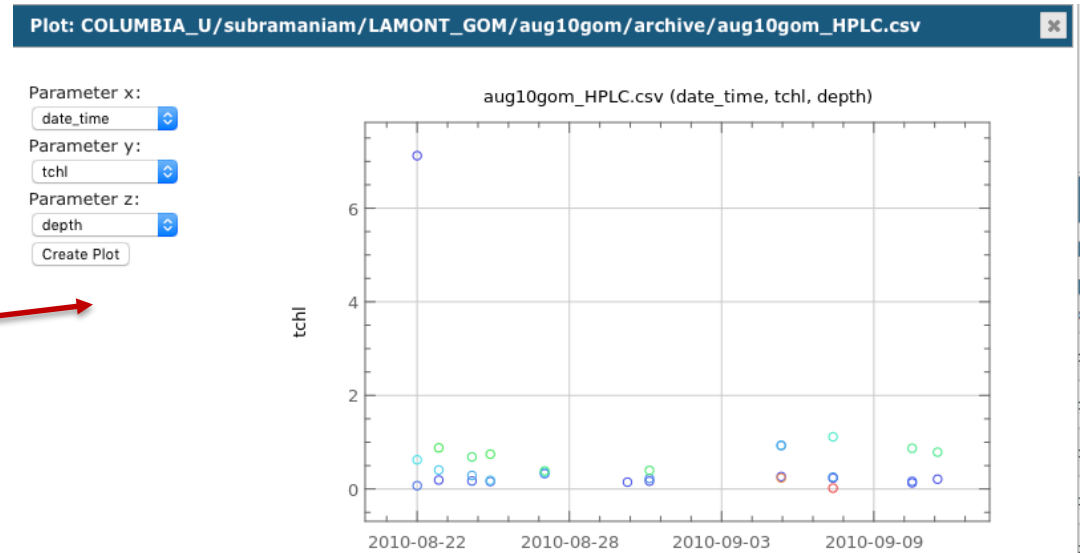
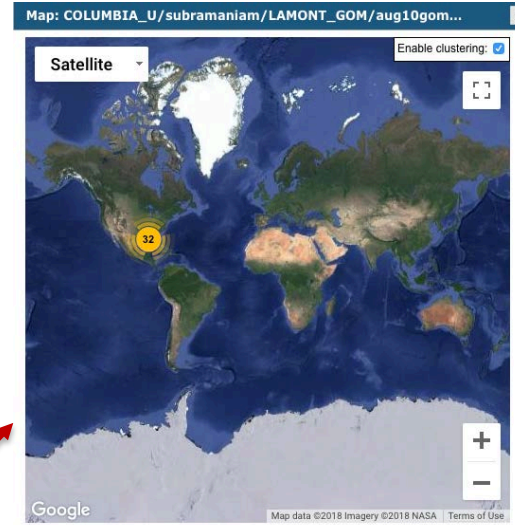
Map All Download All Include all associated files.

Results Download Selection

Show 10 entries Search:

File	Map	Plot	Archive	Documents
BIGELOW/PHINNEY/el0801/archive/el0801mt.txt	map	plot	archive	documents
COLUMBIA_U/subramaniam/LAMONT_GOM/aug10gom/archive/aug10gom_HPLC.csv	map	plot	archive	documents
COLUMBIA_U/subramaniam/LAMONT_GOM/jul11gom/archive/jul11gom_HPLC.csv	map	plot	archive	documents
COLUMBIA_U/subramaniam/LAMONT_GOM/jun15gom/archive/jun15gom_HPLC.csv	map	plot	archive	documents
NASA_GSFC/GEOCAPE/gomex_2013/archive/GEO_CAPE_GOMEX_Pigments.txt	map	plot	archive	documents
NOAA_NESDIS/ondrusek/VIIRS_Validation/VIIRS_2015_foster/archive/JPSS_15_LWN_CHL_sb	map	plot	archive	documents
NRL/cojet_4/archive/HPLC_Cojet4_2001_0.948.txt	map	plot	archive	documents
NRL/cojet_5/archive/01dec03_Cojet5_hplc_0.948.txt	map	plot	archive	documents
NRL/cojet_III/2K/HPLC_CoJet3_Lgssur_CHL-c3_corrected_0.948.txt	map	plot	archive	documents
NRL/cojet_III/2K/HPLC_CoJet3_Ocolor_CHL-c3_corrected_0.948.txt	map	plot	archive	documents

Showing 1 to 10 of 144 entries

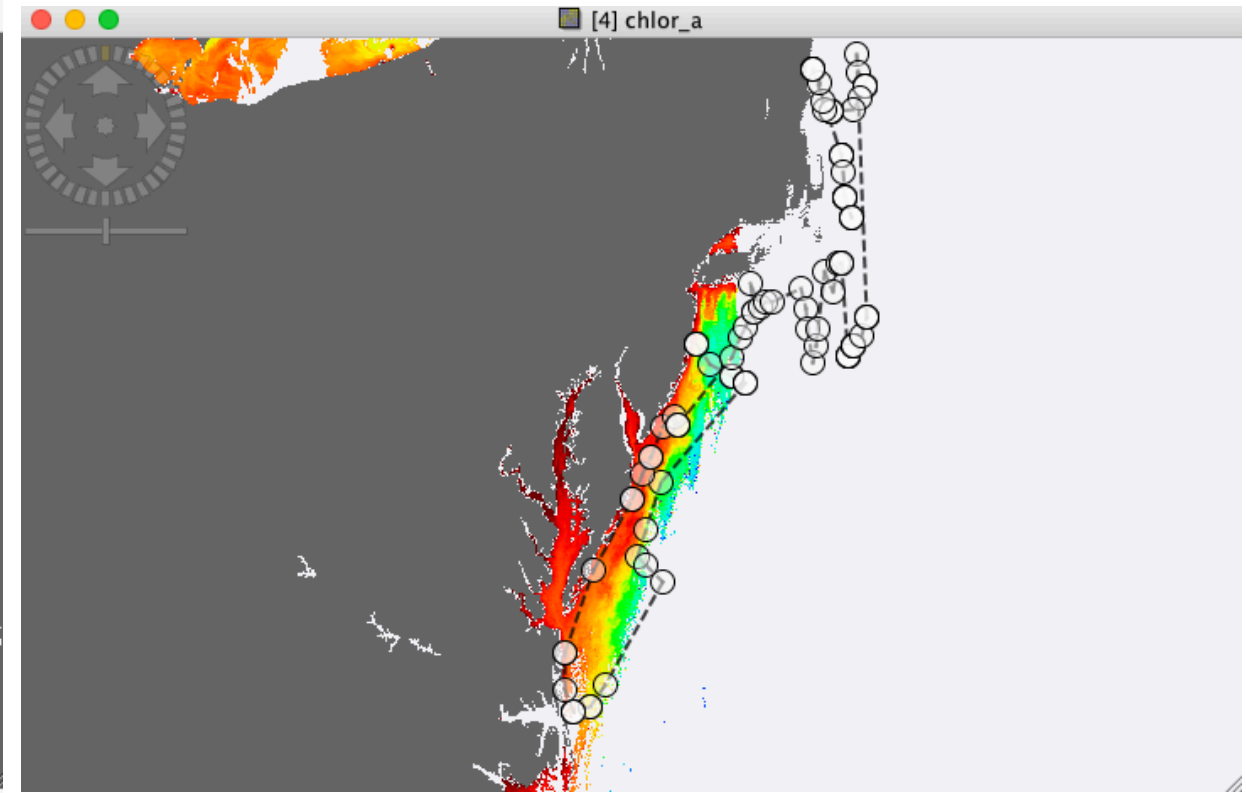
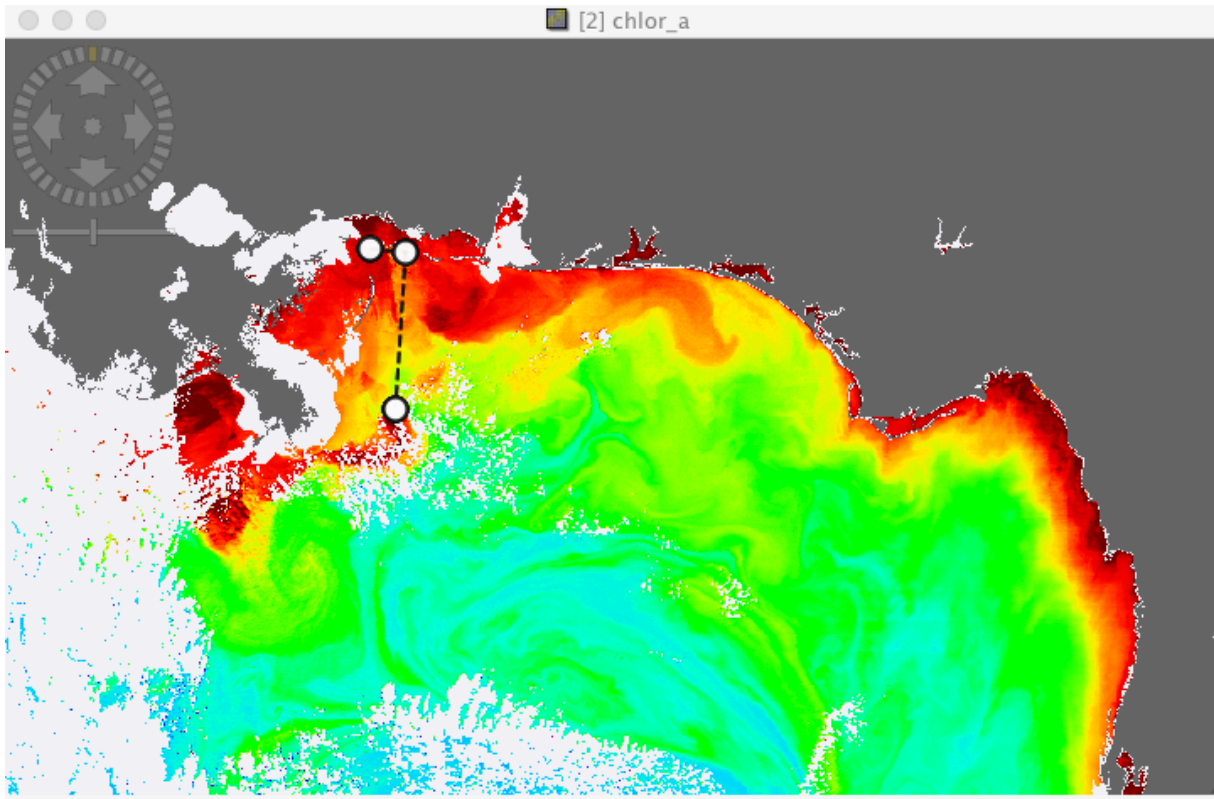


SeaBASS data

- Format is key when uploading *in situ* observations into SeaDAS
- Recommendations:
 - Try not to manipulate data in spreadsheets
 - Use Plain text in text editors
 - Save as tab delimited
 - Downloading data from SeaBASS doesn't guarantee data will upload into SeaDASS. Format needs to be reviewed

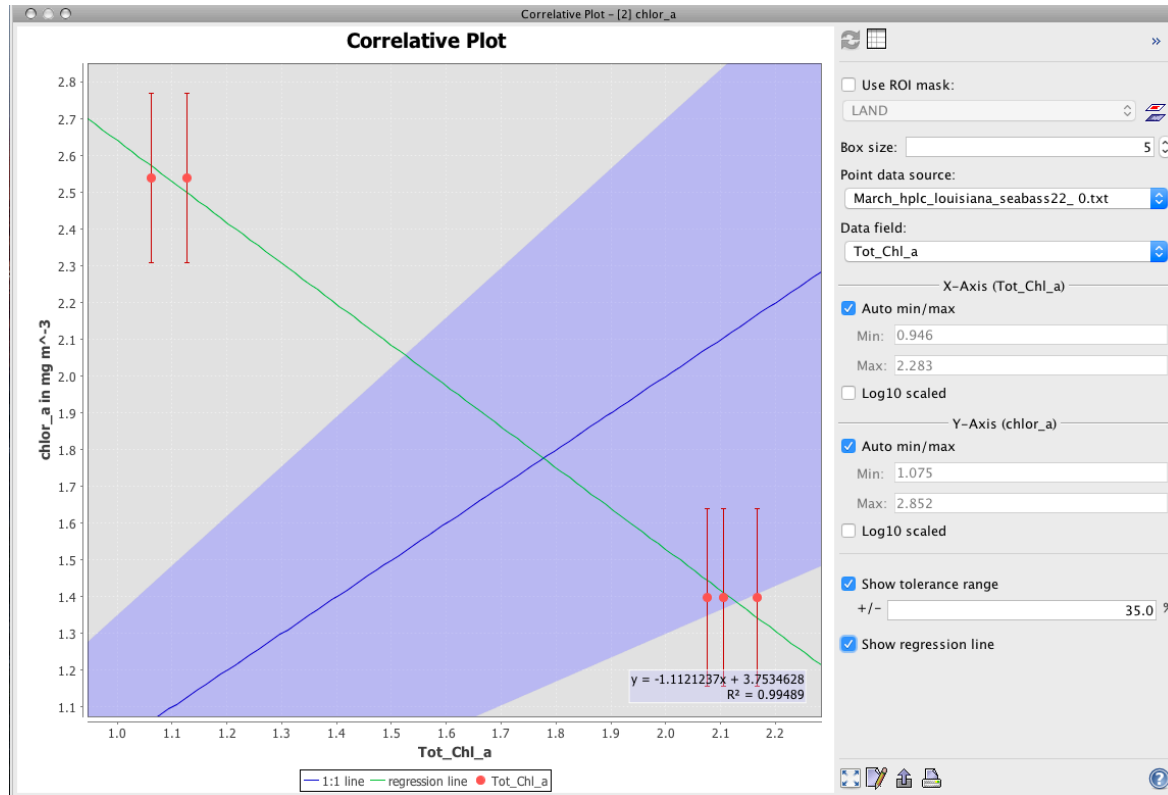
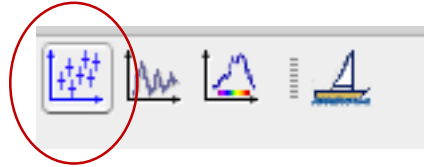


Example for Gulf of Mexico and North East US Coast

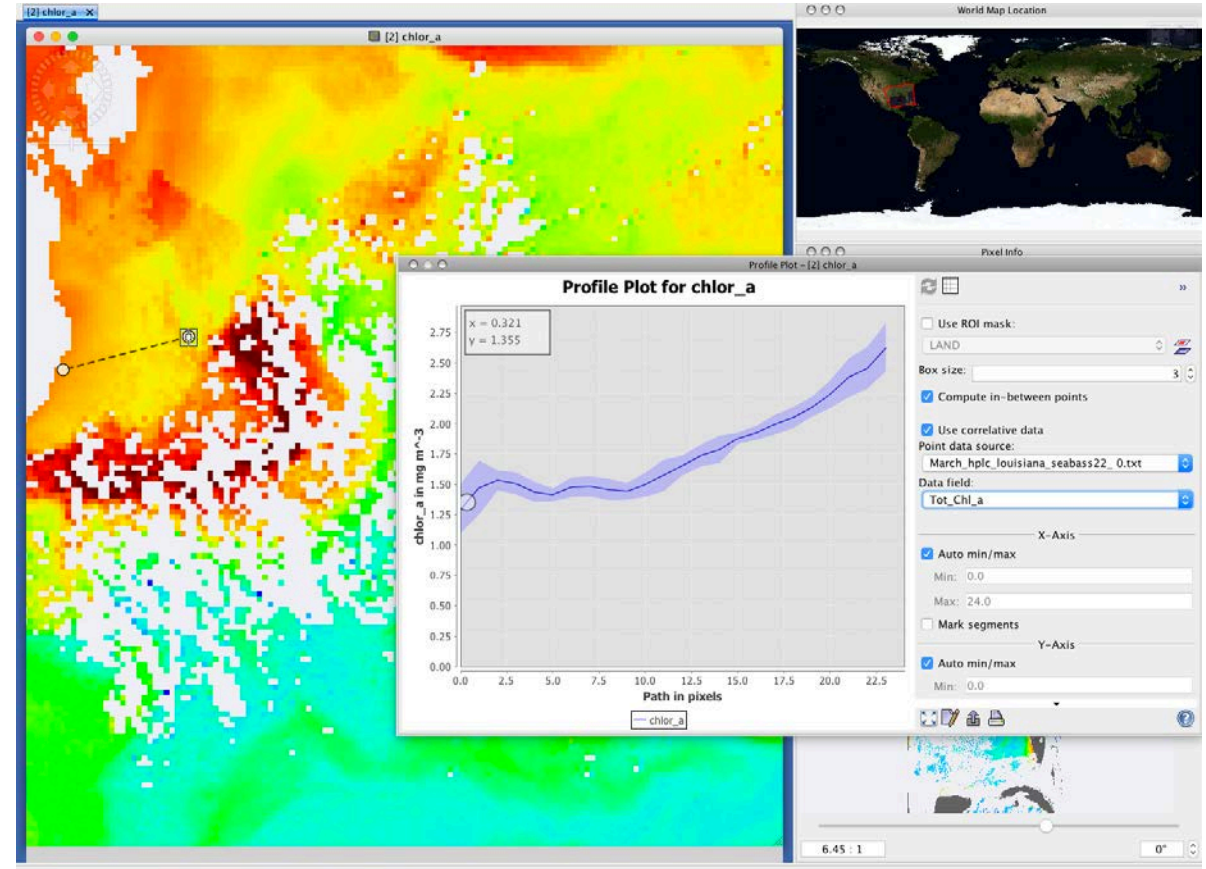


Compare *in situ* obs with satellite derived measurements

- Correlative Plot



- Profile Plot



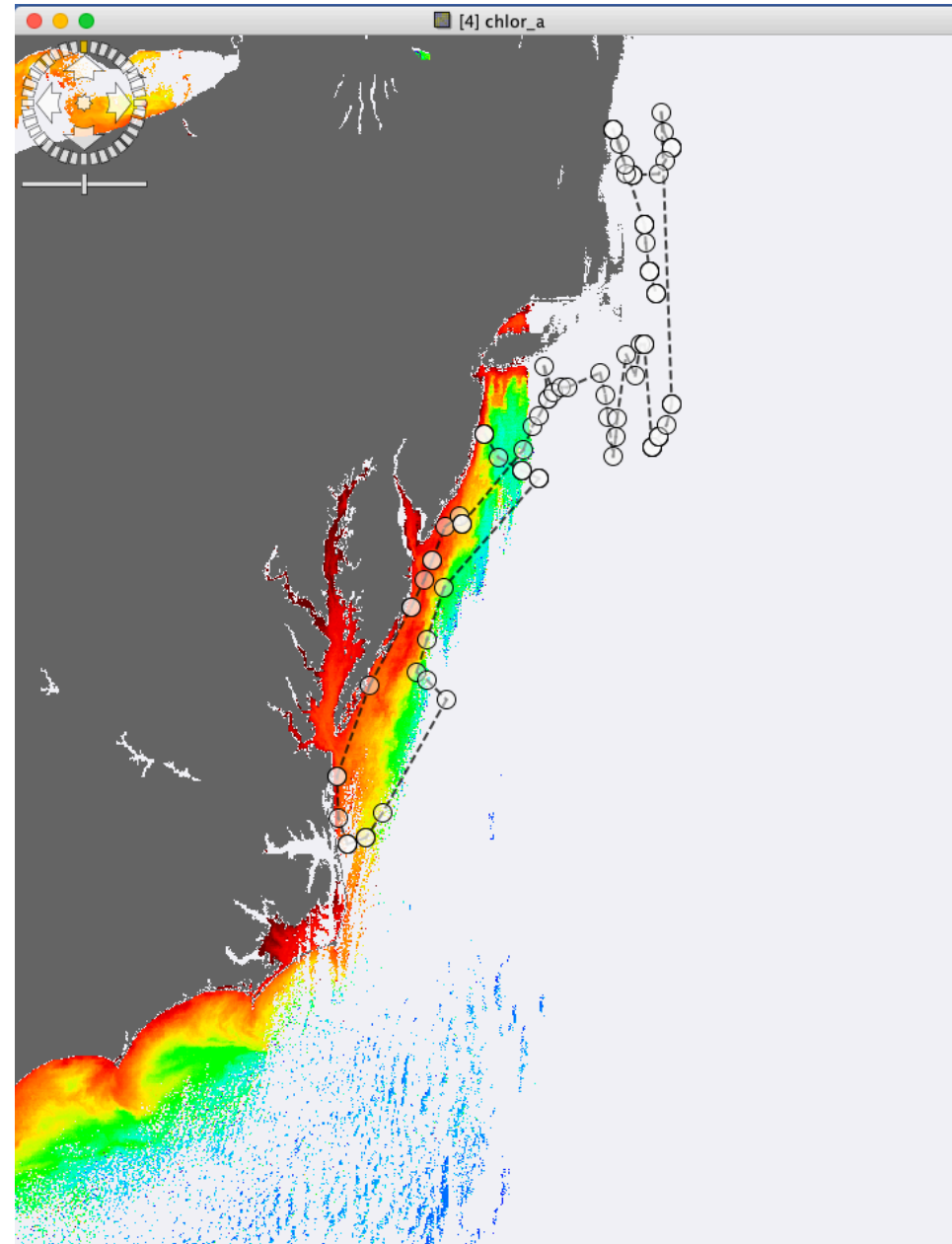
SeaBASS data exercise

- We can work with the following file:

[https://seabass.gsfc.nasa.gov/archive_p
review/NASA_GSFC/CLIVEC/CV5/archiv
e/CV5_OM_pigments_seabass.txt](https://seabass.gsfc.nasa.gov/archive_p
review/NASA_GSFC/CLIVEC/CV5/archiv
e/CV5_OM_pigments_seabass.txt)

- MODIS L2 Data from Ocean Color:

[A2010311183000.L2_LAC_OC.nc](#)



Pixel Extraction

- Data format

DateTime	Name	Lat	Lon
YYYY-MM-DDTHH:MM:SS	text	Degrees	Degrees

DateTime	Name	Lat	Lon
2016-03-17T08:15:00	S01-1	29.253633	-90.6612
2016-03-17T09:15:00	S01-2	29.253633	-90.6612
2016-03-17T10:15:00	S01-3	29.253633	-90.6612
2016-03-17T11:15:00	S01-4	28.9576	-89.760483
2016-03-17T12:15:00	S01-5	28.9576	-89.760483
2016-03-17T13:15:00	S01-6	28.9576	-89.760483
2016-03-17T14:15:00	S01-7	28.9576	-89.760483
2016-03-17T15:15:00	S01-8	28.9576	-89.760483
2016-03-17T16:15:00	S01-9	28.9576	-89.7605
2016-03-18T17:15:00	S01-10	28.644733	-89.218967

The screenshot shows the 'Pixel Extraction' software interface. It features a menu bar with 'File' and 'Help'. Below the menu bar are two tabs: 'Input/Output' and 'Parameters'. The 'Parameters' tab is active, displaying several configuration sections:

- Coordinates:** A table with columns for Name, Latitude, Longitude, and DateTime (UTC). It lists 10 rows of data, including S01-1 through S01-10.
- Allowed time difference:** A checkbox for 'Use time difference constraint' is unchecked. Below it is a numeric input field set to '1' and a dropdown menu for 'Day(s)'.
- Export:** Three checkboxes are checked: 'Bands', 'Tie-point grids', and 'Masks'.
- Window size:** A numeric input field is set to '3', with a '3 x 3' label to its right.
- Pixel value aggregation method:** A dropdown menu is set to 'mean'.
- Expression:** A checkbox for 'Use expression' is unchecked. There is an 'Edit Expression...' button and an empty text input field below.
- Note:** A note states 'The expression might not be applicable to all products.' Below it are two radio buttons: 'Use expression as filter' (unchecked) and 'Export expression result' (checked).
- Sub-scenes:** A checkbox for 'Enable export' is unchecked. To its right is a 'Border size:' label and a numeric input field set to '0'.
- Google Earth export:** A checkbox for 'Export output coordinates to Google Earth (KMZ)' is unchecked.
- Match with original input:** A checkbox for 'Include original input' is unchecked.

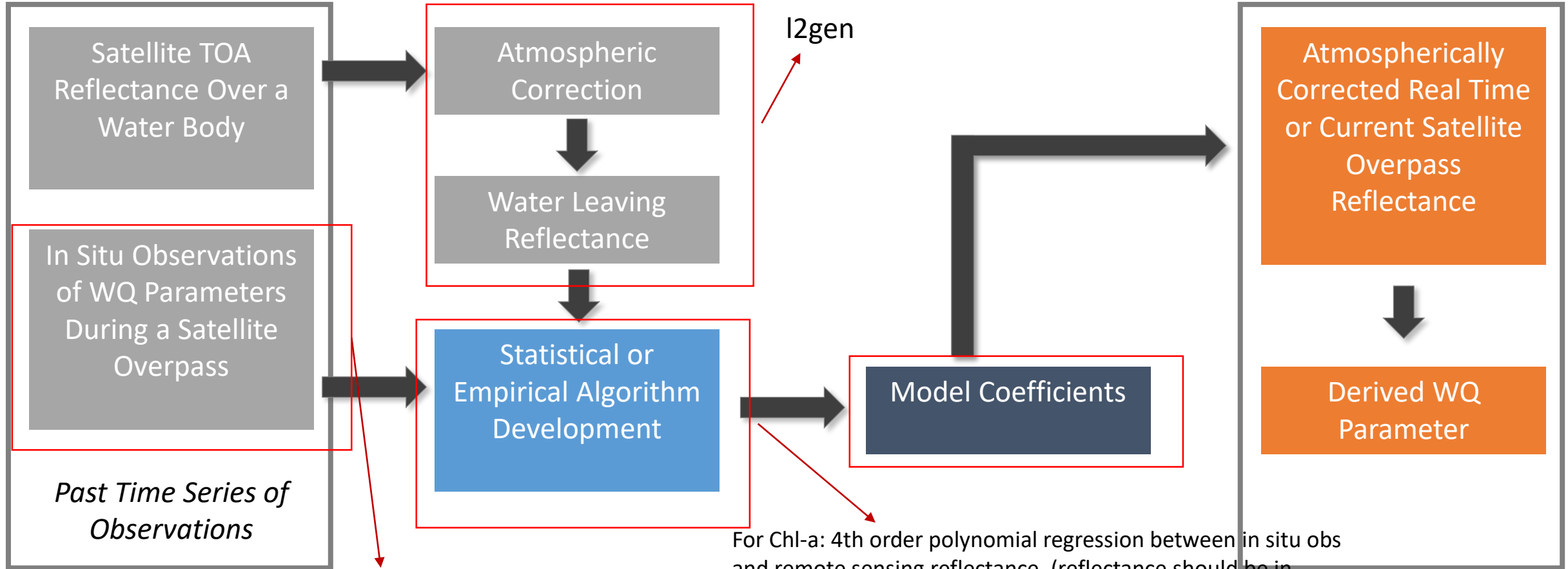


Water Quality Parameters from Remote Sensing Observations

Quantitative Technique

Algorithm Development

Monitoring



Seabass data
or own

For Chl-a: 4th order polynomial regression between in situ obs and remote sensing reflectance. (reflectance should be in particular format such as band ratio)

Check: Hu, C., Lee Z., and Franz, B.A. (2012). Chlorophyll-a algorithms for oligotrophic oceans: A novel approach based on three-band reflectance difference, J. Geophys. Res., 117, C01011, doi:10.1029/2011JC007395





Thank You