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

SeaBASS – Search Results

Visualize results in different ways:

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

SeaBASS data

- Original file downloaded from SeaBASS

- Reformatted dataset

Example for Gulf of Mexico and North East US Coast
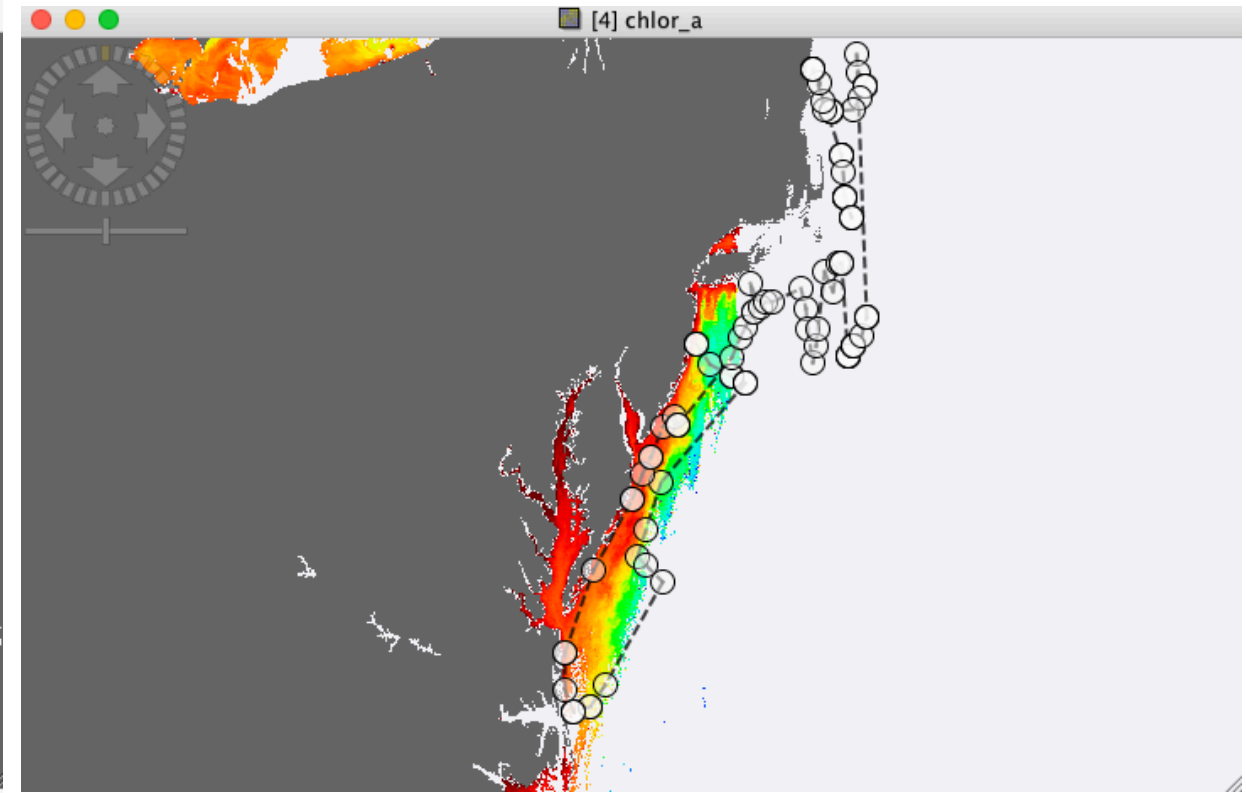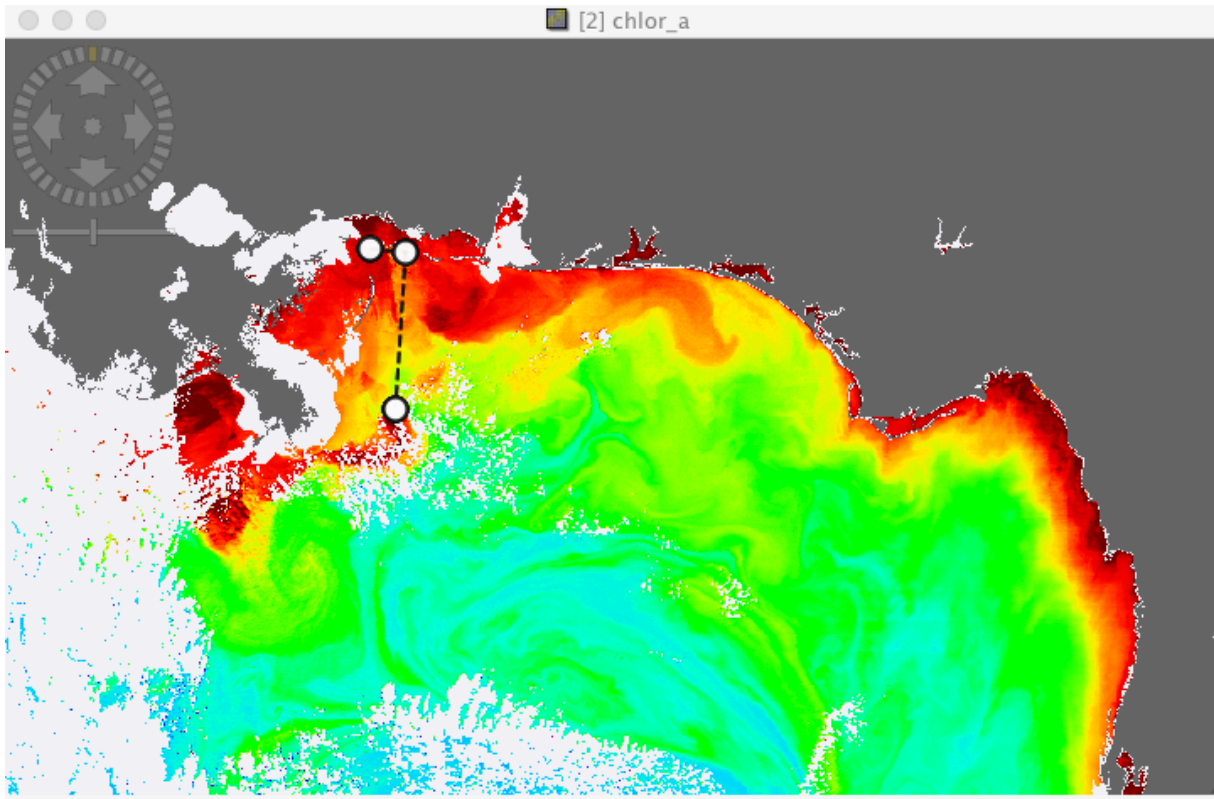
Compare *in situ* obs with satellite derived measurements

- Correlative Plot

- Profile Plot

SeaBASS data exercise

- We can work with the following file:

https://seabass.gsfc.nasa.gov/archive_preview/NASA_GSFC/CLIVEC/CV5/archive/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

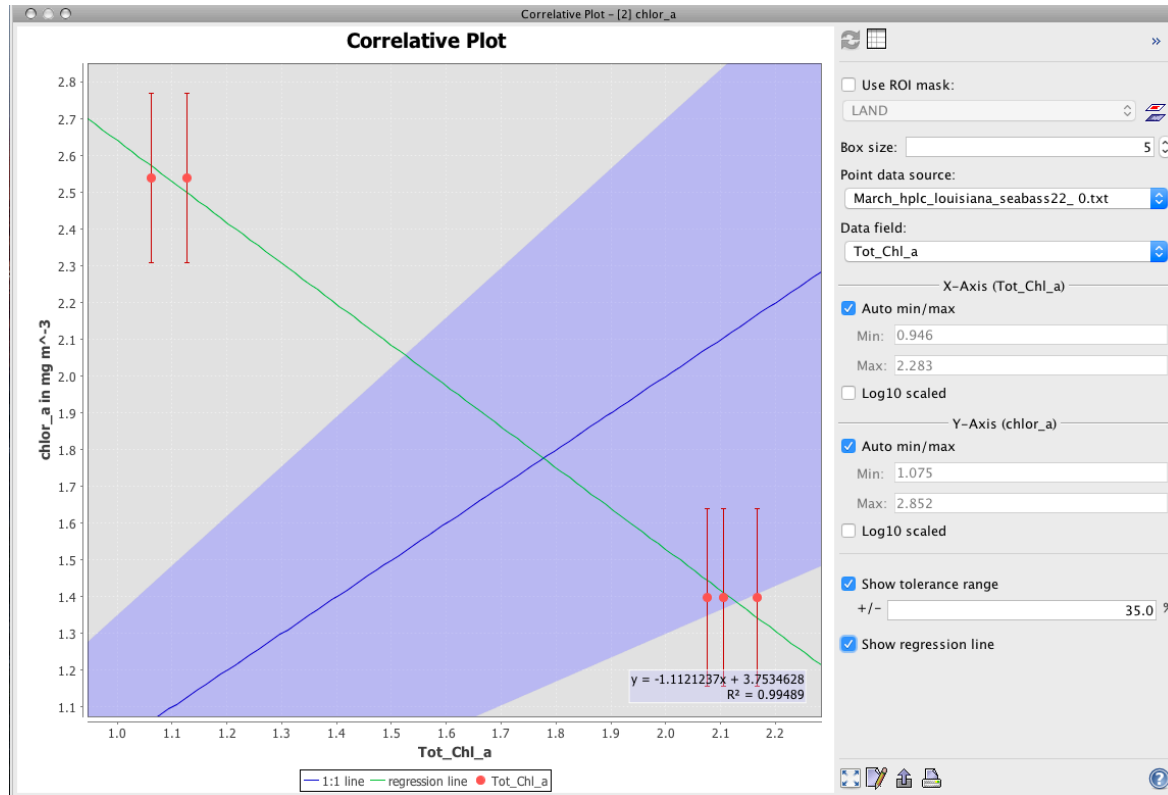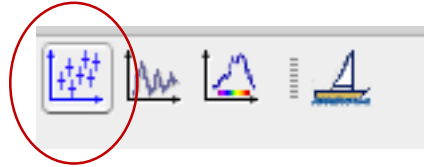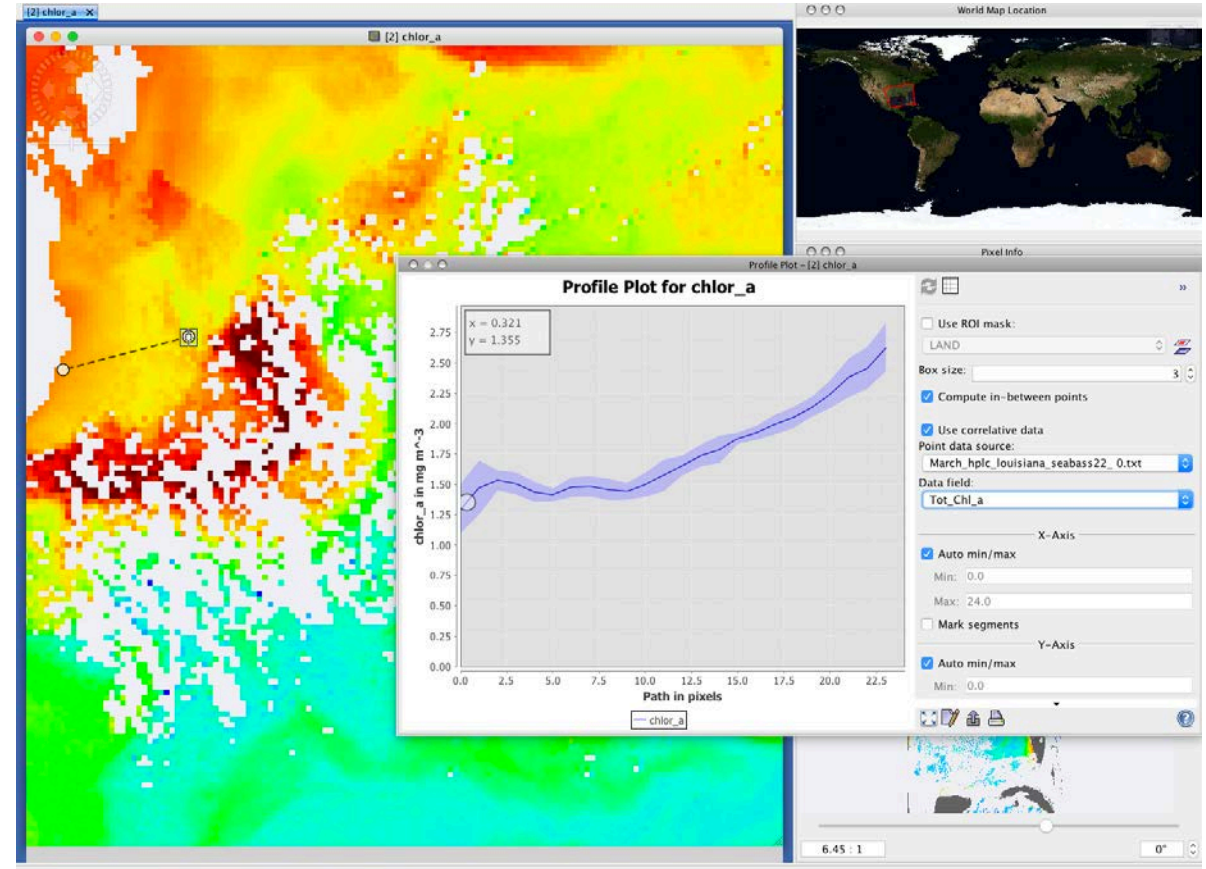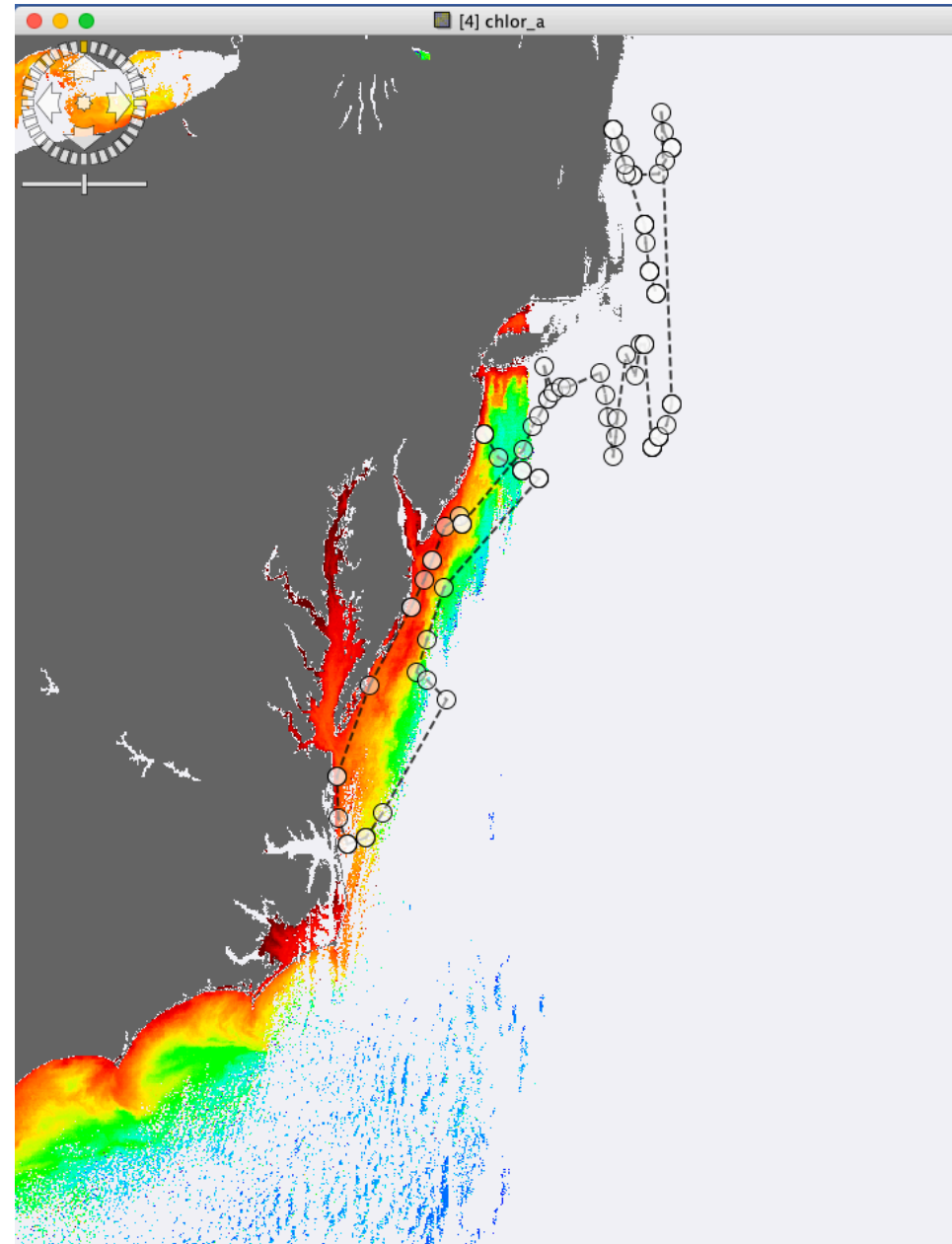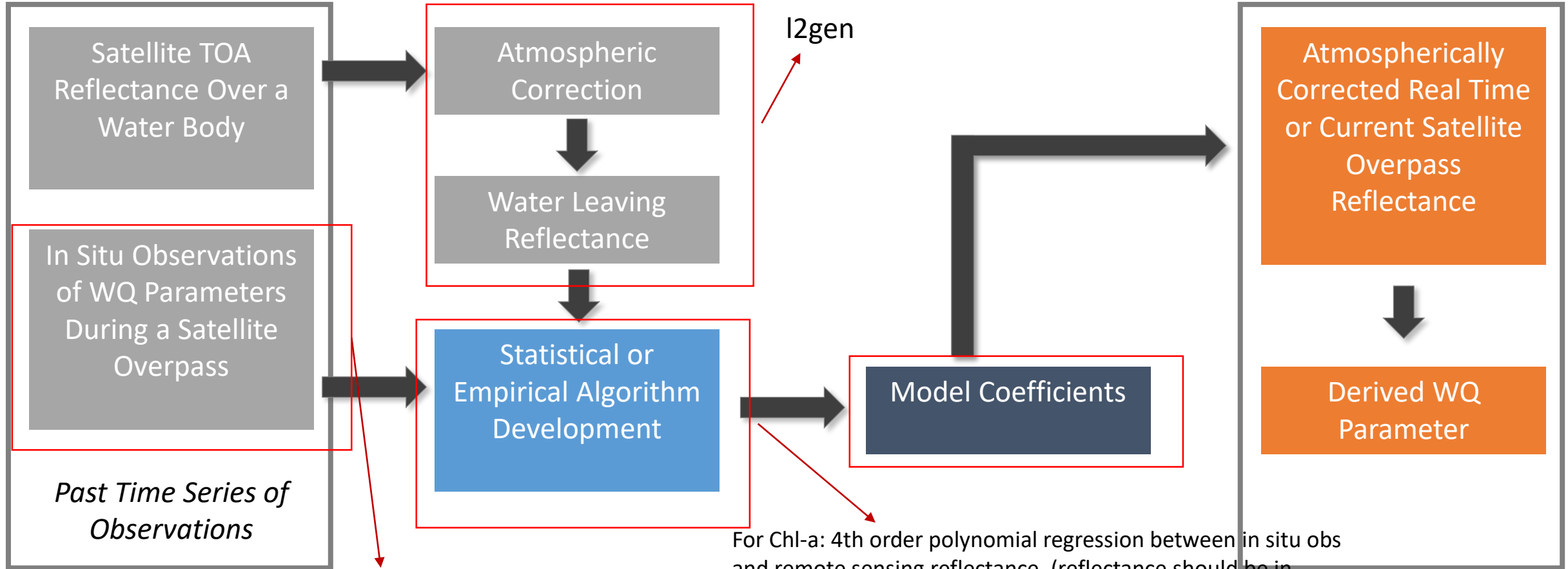| DateTime	Name	Lat	Lon
2016-03-17T08:15:00	S01-1	29.253633	-90.6612
2016-03-17T09:15:00	S01-2	29.253633	-90.6612
2016-03-17T10:15:00	S01-3	29.253633	-90.6612
2016-03-17T11:15:00	S01-4	28.9576	-89.760483
2016-03-17T12:15:00	S01-5	28.9576	-89.760483
2016-03-17T13:15:00	S01-6	28.9576	-89.760483
2016-03-17T14:15:00	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

Water Quality Parameters from Remote Sensing Observations

Quantitative Technique

Algorithm Development

Monitoring

Satellite TOA Reflectance Over a Water Body

In Situ Observations of WQ Parameters During a Satellite Overpass

Past Time Series of Observations

l2gen

Atmospheric Correction

Water Leaving Reflectance

Statistical or Empirical Algorithm Development

Model Coefficients

Atmospherically Corrected Real Time or Current Satellite Overpass Reflectance

Derived WQ Parameter

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