Breakout Workshop:

Remote sensing of optically complex and shallow waters

Zhongping Lee and Dirk Aurin

Background and Practices:

Colleen Mouw: Overview

Antonio Mannino: “New” water

Chuanmin Hu: Floating algae

Yingcheng Lu: Oil spill

Yongxiang Hu: CALIPSO

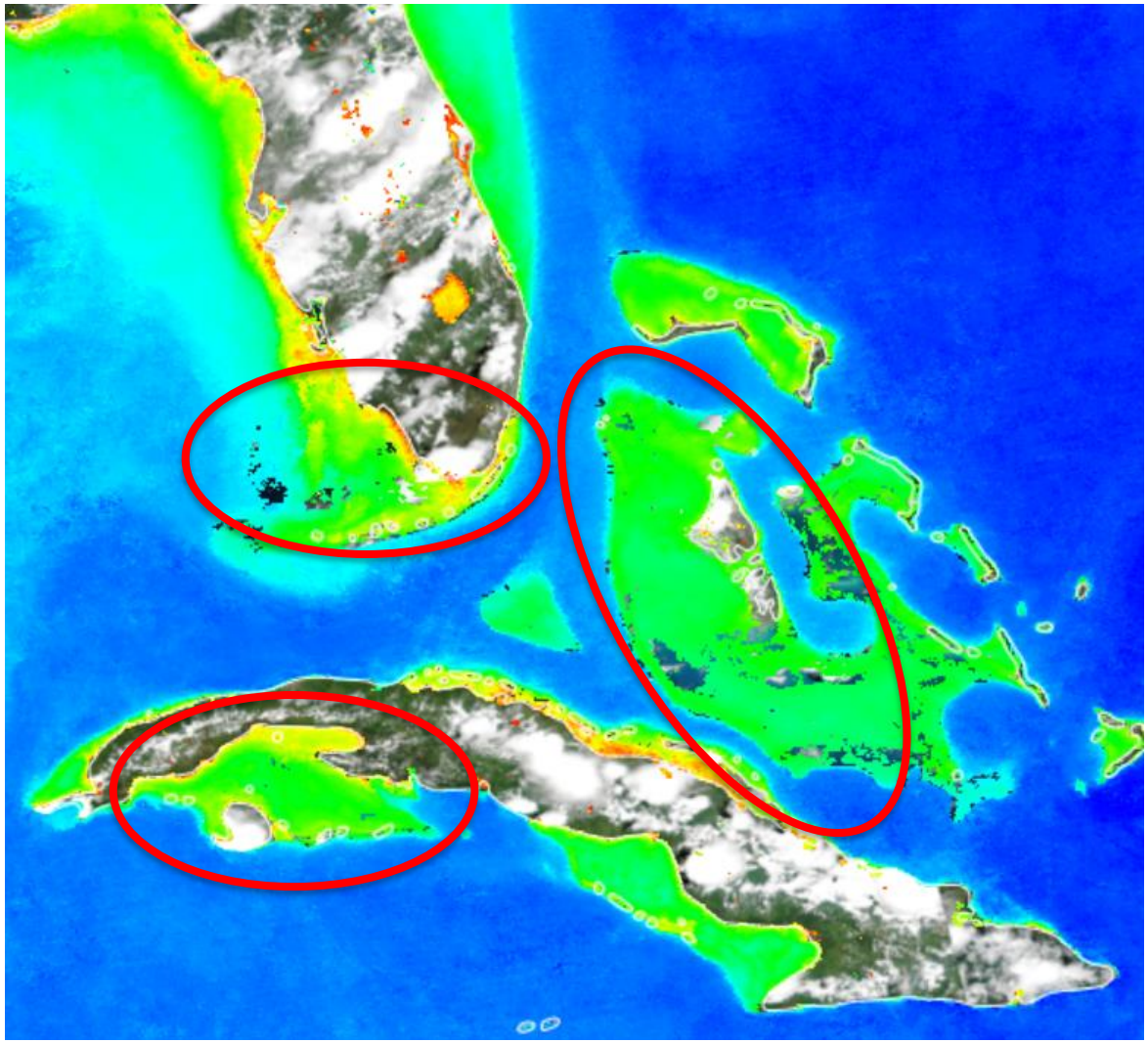
Deric Gray: Multi-wavelength Ocean LIDAR

Rodrigo Garcia: Shallow water

Eric Hochberg: CORAL

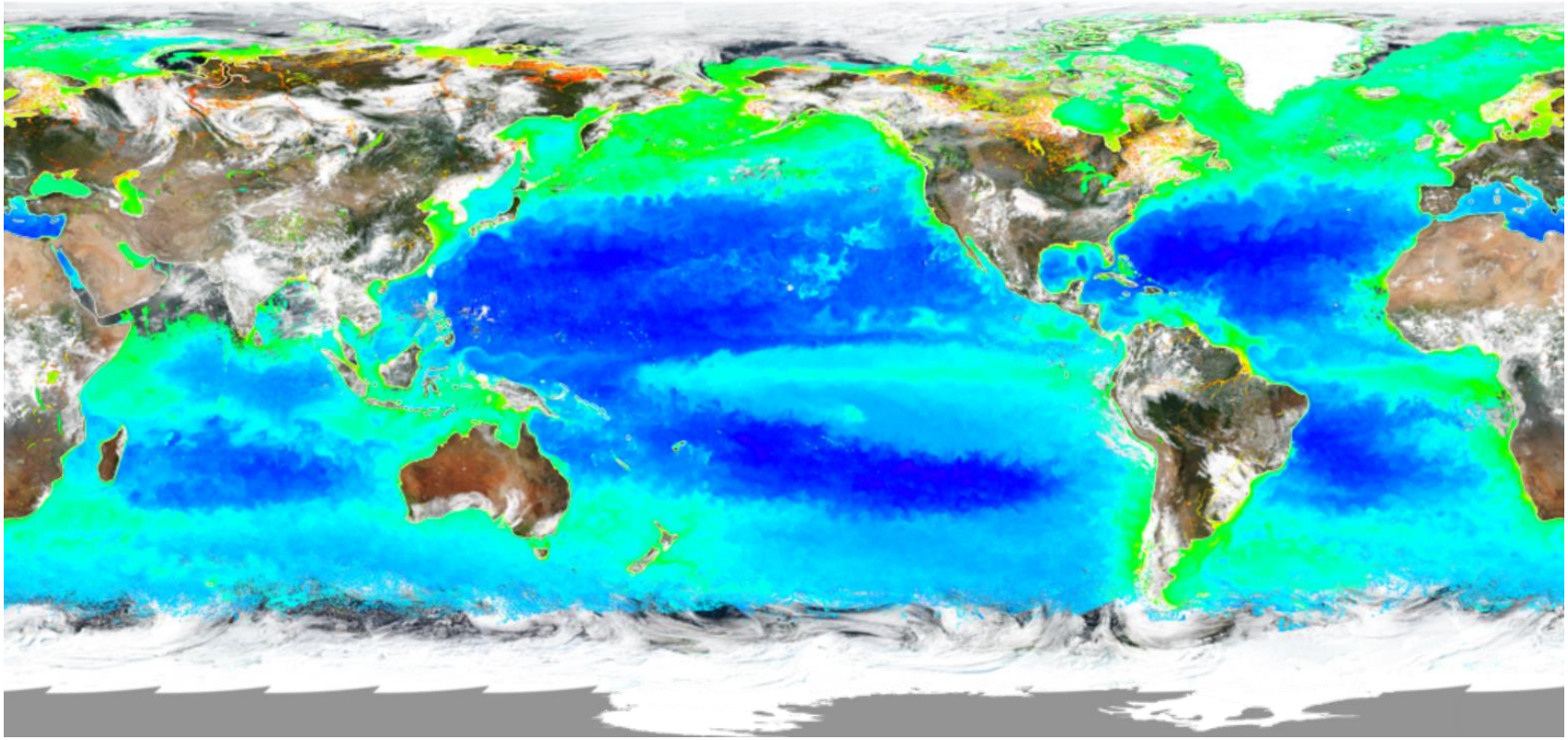
The issues and challenges of shallow water:

wrong information and lack of information

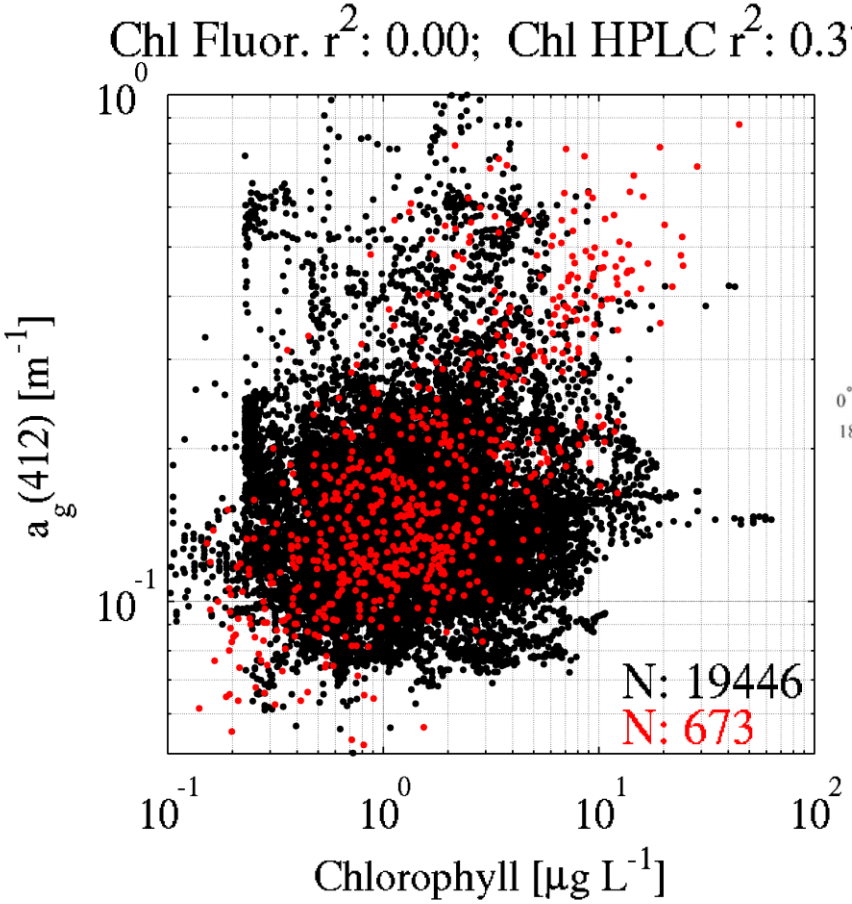


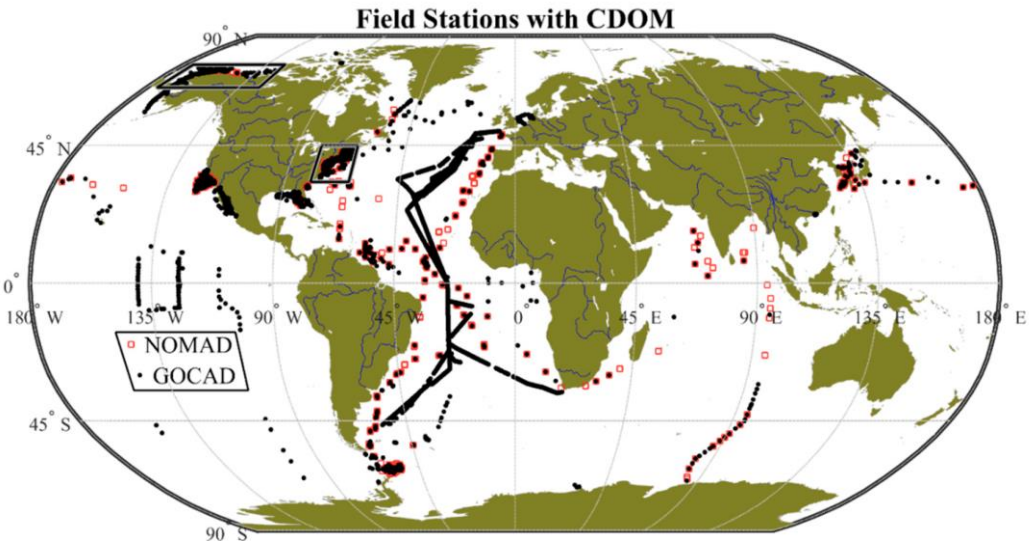
The issues/challenges of deep oceanic water:

NOAA/STAR/OCview



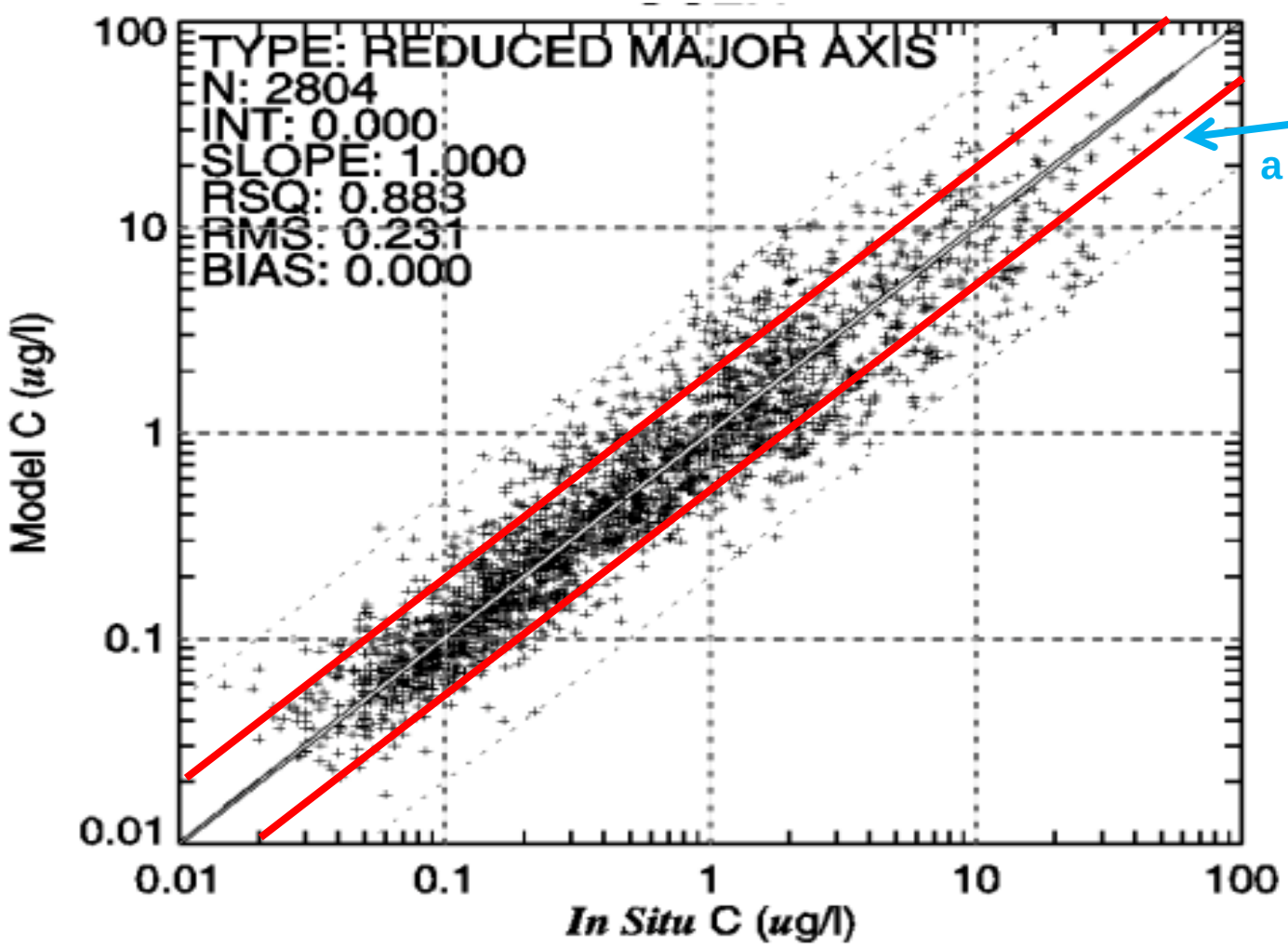
open-ocean also “complex” 。 。 。





Global Ocean Carbon Algorithm Database
(Incidental chlorophyll measurements;
Aurin et al. 2018)

Model C = Fun(Rrs(λ_1)/Rrs(λ_2))



a factor of 2 line

"Chl" from Rrs ratio or Rrs difference == absorption coefficient

(Source:seawifs.gsfc.nasa.gov/SEAWIFS/RECAL/Repro3)

We have an obligation to reduce this variance in the next decade.

“intruders”: green/golden tides, oil spills, ‘new’ water from melted ice …

New technological developments: Lidar, polarimetry

Important capacities or initiatives (the need) to advance ocean color sciences in "complex" waters (environments):

1. **Data (Arctic, polarimetric, high-altitude lakes, spectral library of substrates …)**

Publish data!

2. **Further algorithmic development for <u>all</u> complex waters**

3. **Expand measurements/reporting (e.g., in situ Rrs in UV and NIR, VSF, hyperspectral b_b, to cover high turbidity, profiling ("bloom" below surface), MLD, T, S‰, Lidar data, etc.) – new instrumentation**

4. **"Protocols" to measure/report floating microalgae and oil ..**

5. **"Super" sites (long term and comprehensive measurements)**

6. **Tools for general/systematic studies (e.g., simulation system for Lidar)**

7. **Development, and training, of applications of IOPs**

A Feature Issue in *Applied Optics:*

"Active and Passive Optical Remote Sensing of Aquatic Environment"