NOAA Contributions to the Ocean Colour Radiometry Virtual Constellation (OCR-VC)

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NOAA OCR-VC Activities

- NOAA has numerous related ongoing activities and anticipates contributing in the following areas:
  - Investigating vicarious calibration approaches
  - Inter-calibrating instruments
  - Validating products
  - Inter-comparing sensors
  - Parameterizing algorithms
  - Continuing and augmenting previous investments/prototype programs

On-Orbit Vicarious Calibration for Ocean Color Satellite Sensors

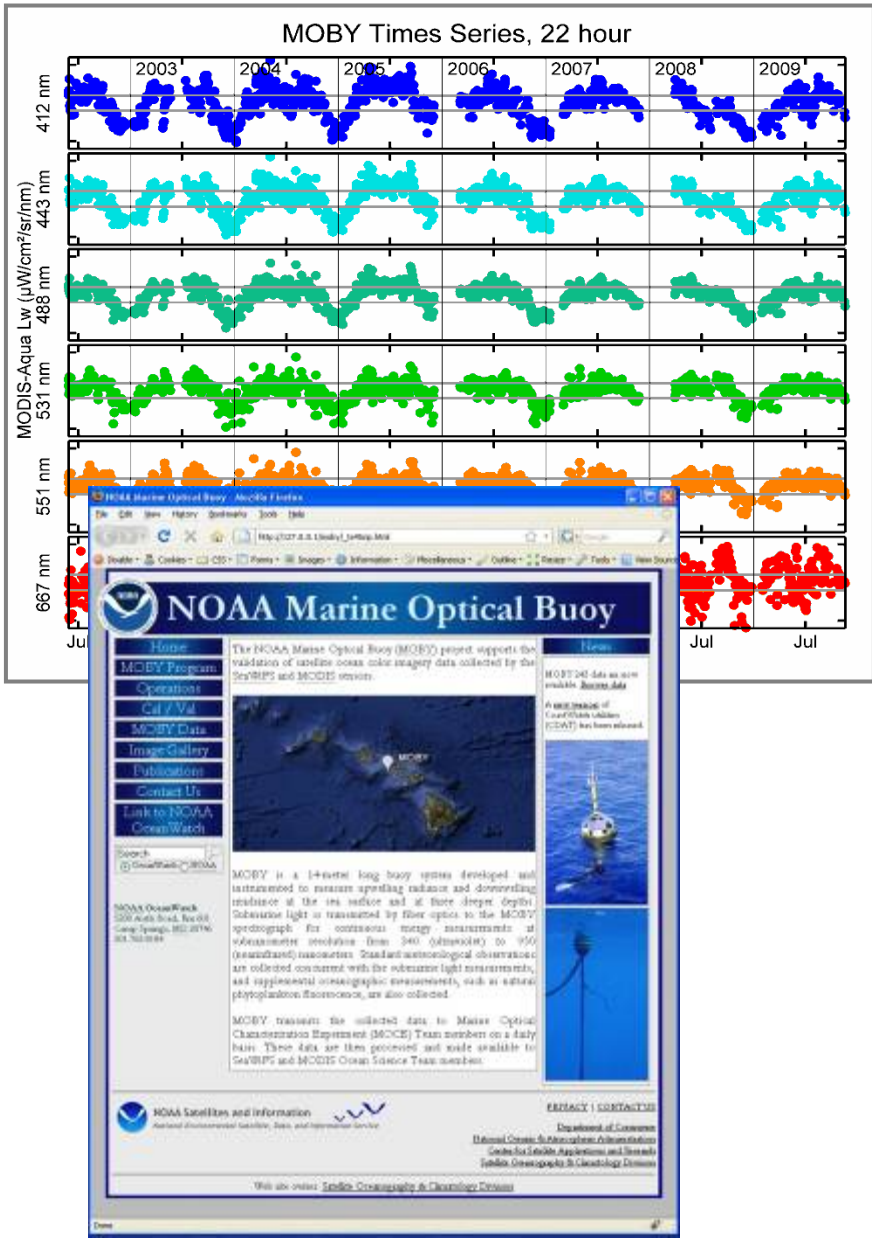
- Vicarious calibration (VC) is necessary to produce accurate satellite ocean color products
- Post-launch VC has been performed for SeaWiFS, MODIS and will also be conducted for MERIS
- VC has been carried out to account for aerosol polarization effects (SeaWiFS) and all SWIR related results (MODIS-Aqua)
- For on-orbit **sensor-to-sensor calibration**, differences in the sensor spectral response functions (i.e., sensor in-band and out-of-band effects) need to be accurately accounted
- In situ vicarious calibration facility for ocean color sensors, such as **MOBY**, is required to provide accurate $nLw(\lambda)$ data
- Current MOBY is > 14 years old, and is aging/failing. New "MOBY" is needed

MOBY Status & Data Access

- MOBY deployment has been sustained though 2010
- MOBY data directly available at NOAA CoastWatch web site since May 2009

  http://coastwatch.noaa.gov/moby/

  - Improved functionality for website is continually being added to provide additional information and make data more easily accessible – revised build forthcoming
  - Spectrally weighted MOBY data for ISRO's OCM-2 are now available
- Funds have been sent to NIST to develop the stray light correction matrix from the 2008 characterization



Joint Polar Satellite System (JPSS)

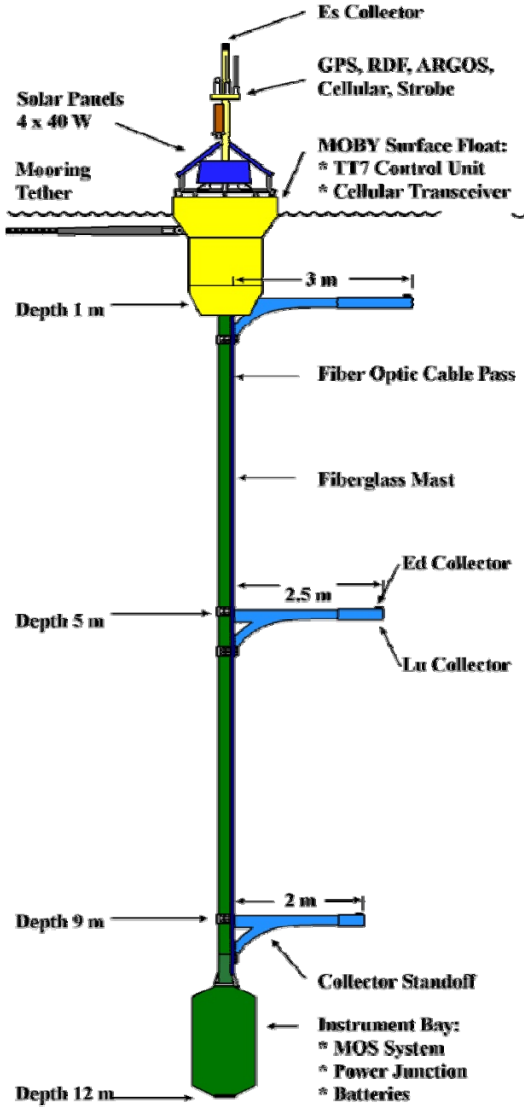
- The NPOESS Program has been reformulated and the Integrated Program Office (IPO) disbanded; now the Joint Polar Satellite System (JPSS)

- Under JPSS, the NOAA/NESDIS Center for Satellite Applications and Research (STAR) will oversee a Data Products and Algorithm Group, including ocean color data products, and applications

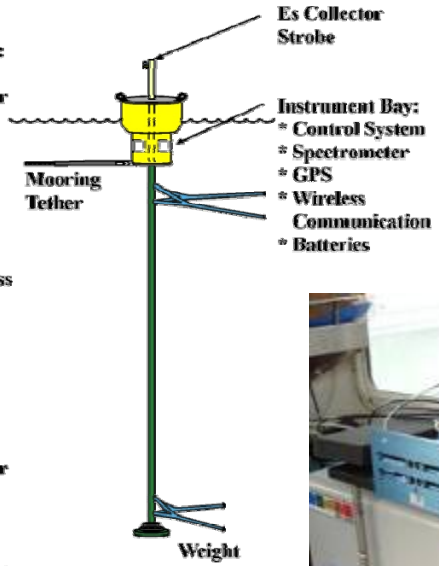
- In this context, the intent is to have MOBY/MOBY-C continuity which will be utilized for vicarious calibration of VIIRS data on the NPP and JPSS-1 platforms

MOBY Continuation (MOBY-C)

MOBY



MOBY-C



MOBY-C can be deployed from smaller ship

Multiple fiber input

- **Goal: Deploy MOBY-C Optics on the existing MOBY infrastructure by end of 2011**
- **Funding for tech refresh from MOBY to MOBY-C under discussion at NOAA/NESDIS**

Unique Benefits of MOBY - C

- Supports vicarious calibration of current and future satellites
- Simultaneous measurements; one instrument provides up to 16 inputs
- High data rate provides less data exclusion
- Geometry minimizes self-shading errors
- Methodology for optimum Lw measurements
- More flexible design; arms can be configured for coastal measurements; thus configurable for a broader range of OC applications
- More portable, more easily deployed, maintained and replicated

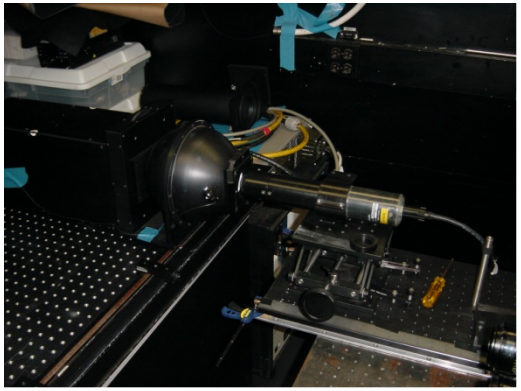
MOBY Distributed Calibration Exercise (MDCE)

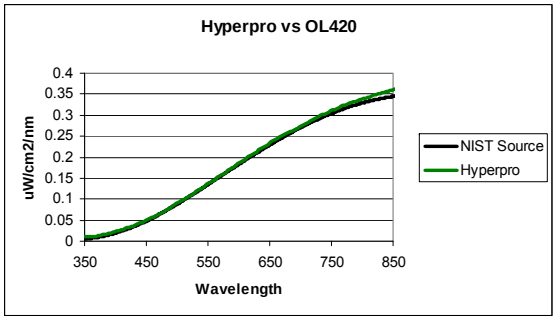
- *What:* Collaborative cross calibration at heritage site in Hawaii. Utilizes MOBY's accuracy, precision, and SI traceable to NIST over 15 years
- *Why:* Supports OCR-VC data
- *Who:* IOCCG/OCR-VC agencies
- *When:* One dedicated ~10 day cruise aboard a NOAA vessel in 2012/3 (August?); pending availability of funding
- *Support:* A limited number of berthings will be available as well as instrument deployment support

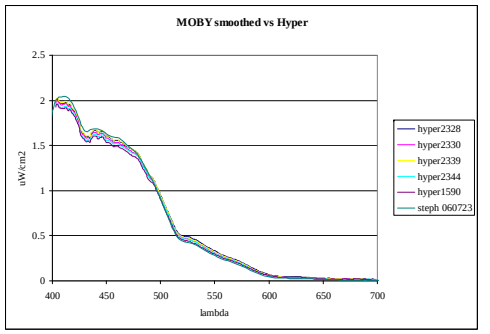
NOAA Ship *Hi'ialakai*

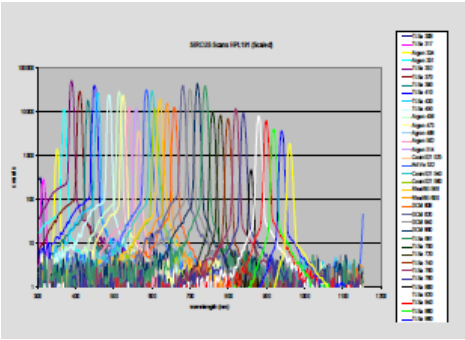
Calibration, intercalibration and error reduction of optical instruments and measurements

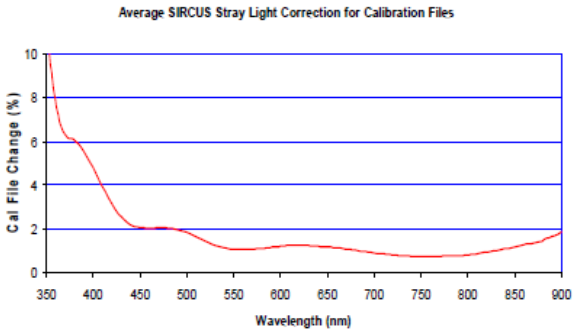
- Conducted inter-calibration of Satlantic Hyperpro and MOBY utilizing MOBY calibration source.
  - Plot showing agreement between source and field instrument
  - MOBY Hyperpro matchup
  - Annual calibration at Satlantic
- Perform Straylight correction of Hyperpro instrument.
  - Strength: increased accuracy and consistency with MOBY
  - Weakness: expensive and difficult.
  - Solution: Developed general straylight correction to apply to all Satlantic Hyperpros.
  - Benefit: Provides calibration traceability to MOBY at other locations.





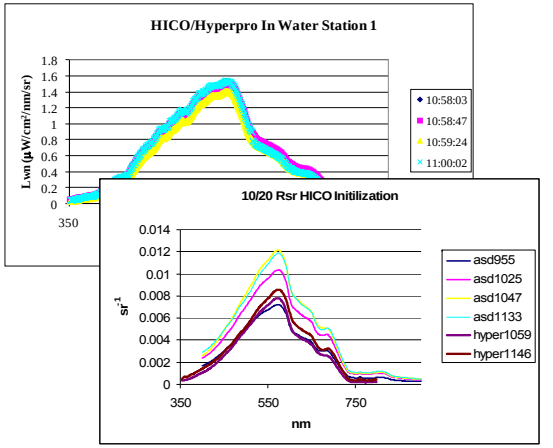


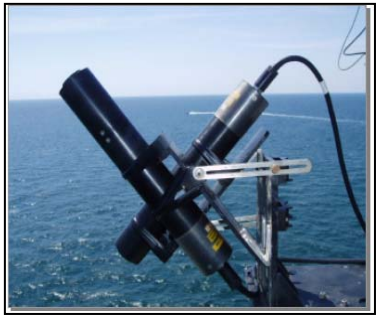


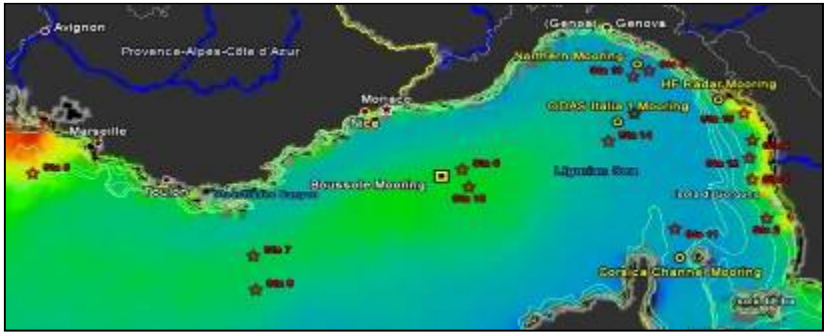


Coastal Optical Characterization Experiment (COCE) Ongoing Field Cal/Val Activities

- Conducted two week HICO initialization and cal/val cruise in collaboration with NRL, October, 2009
- IPO cal/val working group optical above water workshop, August 2010
- Participated in Ligurian Sea Cal/Val Cruise, August-September 2010.

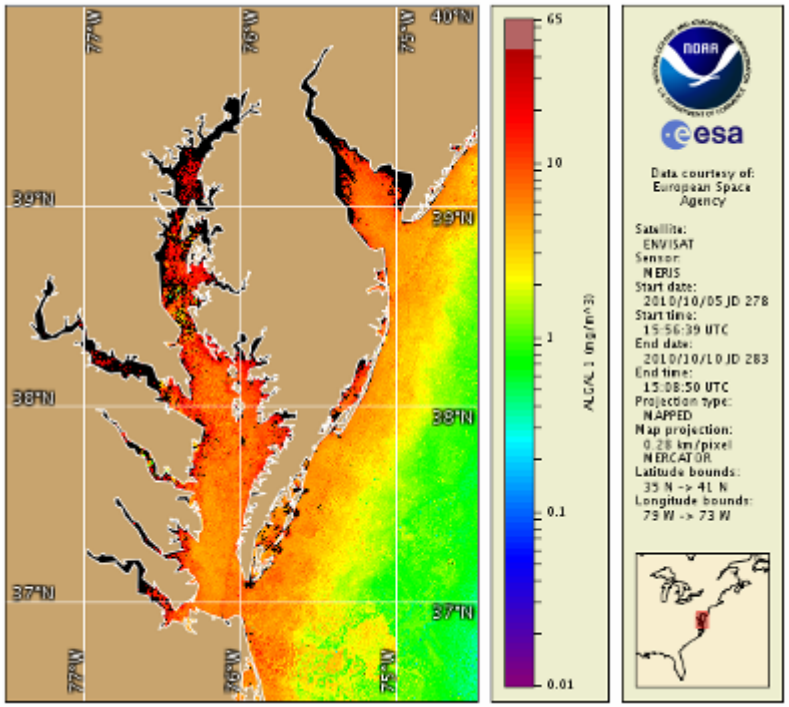






CoastColour Engagement & Support

- NOAA CoastWatch Program, working in partnership with NOAA line office users (e.g., NOS) and Oregon State University, is a Champion User in the ESA CoastColour Project
  - Areas of Interest:
    - Chesapeake Bay
    - Oregon / Washington
    - Central California
    - Lake Erie



OCR Proposal to the NOAA Climate Data Record Program (NCDC)

- Letter of Intent submitted; submission of full proposal was encouraged
- Examine the effect of on-orbit vicarious calibration on satellite-derived ocean color radiometry products in both open oceans and U.S. coastal regions
- Focus on evaluation of the regional ocean color data quality as a function of time, quantifying product uncertainties from both SeaWiFS and MODIS-Aqua
- Evaluate several OCR algorithms, in particular, its atmospheric correction algorithms
- Develop an approach to merge the SeaWiFS and MODIS-Aqua ocean color radiometry products for U.S. coastal regions