Achieving long-term consistency in cross-sensor ocean color data products

IOCS 2023 Breakout Workshop #8

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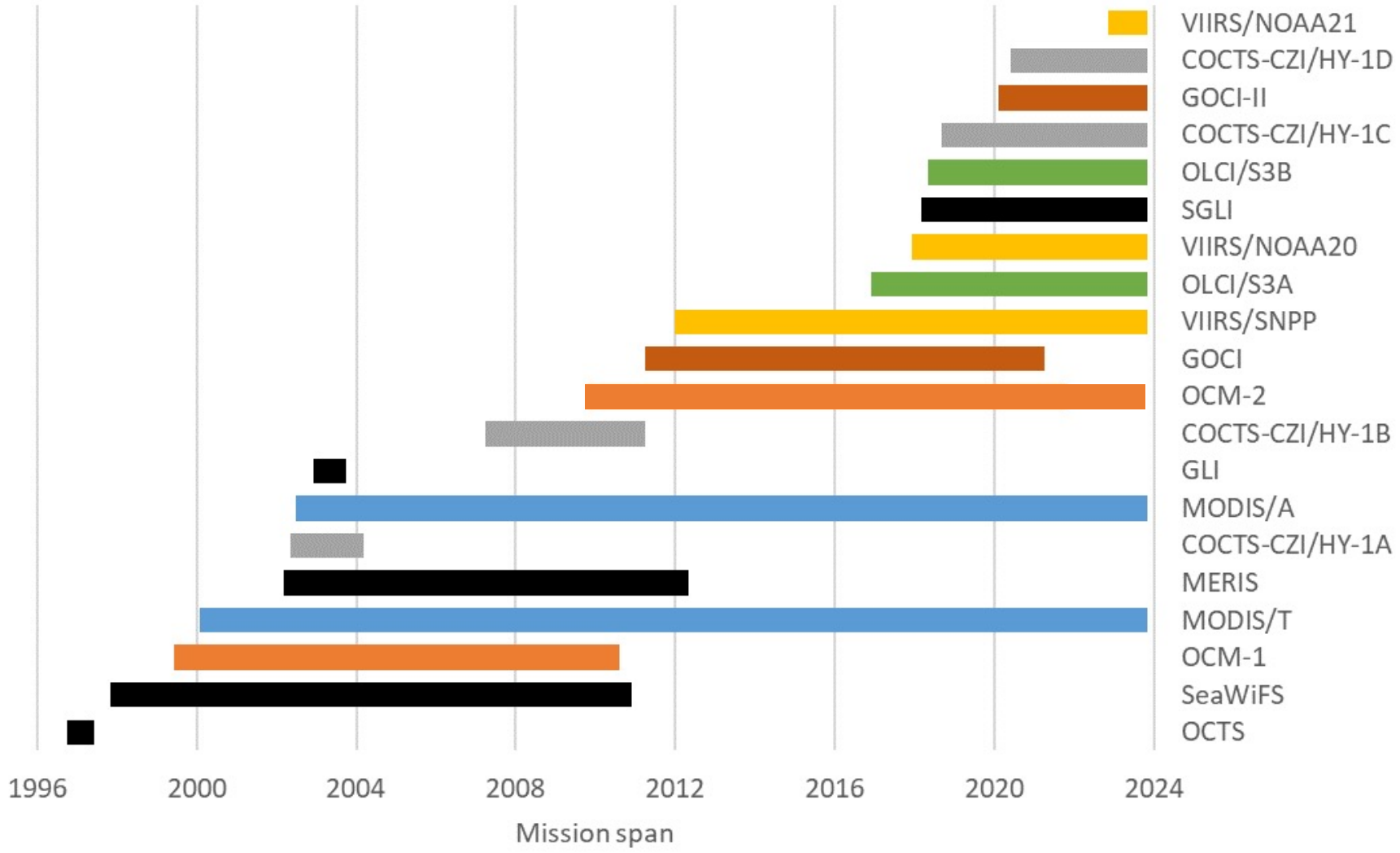
The OCR record [non exhaustive]



Agenda

- Introduction to continuity, merging datasets / workshop goals (Brian Barnes)
- Examples of satellite / *in situ* matchups in framing continuity (Kelsey Bisson)
- Continuity in the context of uncertainties (Frédéric Mélin)
- Seasonal biases in OCR (Amir Ibrahim)
- Merged series datasets for climate investigation (Shubha Sathyendranath)
- A coastal and freshwater perspective (Nima Pahlevan)
- Discussion

Discussion questions

- Which sensor attributes / geometry characteristics are most critical to address when combining data from different sources? How do identified seasonal biases in OCR datasets affect cross-sensor dataset consistency?
- To what extent do cross-sensor discrepancies diminish our ability to assess long-term (climate scale) issues? Are uncertainties associated with time series characterized enough to assess long-term issues?
- Should the community advocate for ‘marathon’ missions (i.e., 20+ year expected life), or can merged products sufficiently capture relevant climatic trends? What criteria should be required to consider a merged-sensor dataset capable of detecting long-term trends?

Input from the community

- Highlight ongoing work to remediate existing seasonal biases
- Coupling geostationary and polar orbiting data for quantification of solar geometry dependence
- Glint contributes to a sampling bias in SVC
- Issues about radiative transfer components in our models
- Trend detection should be applied beyond chlorophyll (phenology, color, composition)
- High latitudes, high cloud cover, coastal regions have less consistency
- Using consistent AC algorithm, flagging, etc. when comparing data from different sensors
- Audience discussion on innovation and longer term / cheap stable mission goals
- Broader exposure of efforts like the TRUTHs mission – SI traceable mission to provide in-flight calibration of EOS

IOCCG Recommendations

- Current approaches to merge datasets for climate assessment primarily consider time and space. Acknowledging geometry (and other factors) as major factors in contributing to continuity – more research is needed in quantifying and correcting discrepancies.
- Community needs to improve description of continuity metrics including reporting of possible extremes (tails), possibly using PDFs.
- Space agencies and distribution services (in collaboration with the community) need to prioritize calculating and distributing uncertainties associated with all products (pixel-based composite), and including propagation through AC and algorithms.
- Consider revising/updating the 2006 IOCCG report on data merging – discuss at next IOCCG committee meeting.
- Advocate for mission design to ensure backwards compatibility to improve confidence in derived trends (Sentinel-3) and ensure overlap between missions