

Surface Energy & Water Fluxes

with presentations by:

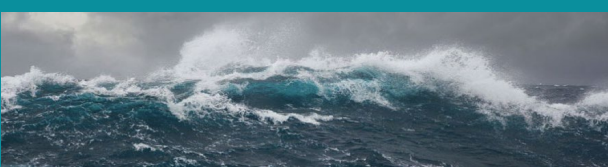
Meghan Cronin (OOPC) – *Air-Sea Flux Activities Going Forward: Observing Air-Sea Interactions Strategy (OASIS) & Extension of Baseline Surface Radiation over the ocean*

Nadia Smith (AOPC), Chris Wilson (JPL) – *NASA PBL Incubation Study Team Report*

Diego Miralles (TOPC) -- *Satellite-based Land Evaporation: Status and Perspectives*

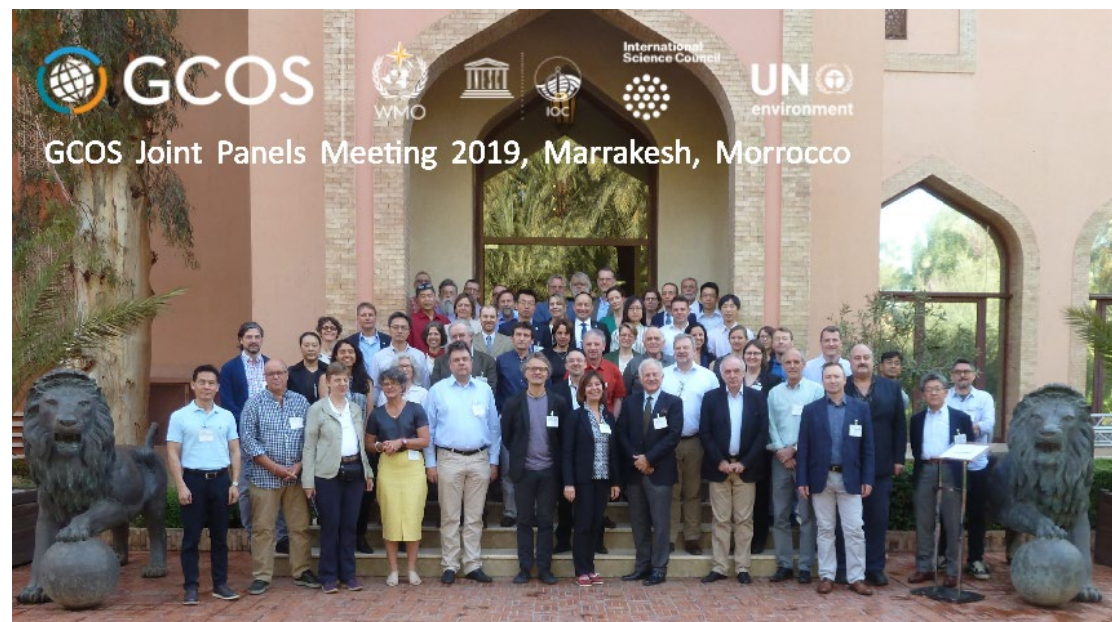
And contributions by: *Maria Hakuba, Johnny Johannessen, Liz Kent, Kobayashi, Christian Lanconelli, Laura Riihimaki, Tim Oakley, and Vito Vitale*





Action Items from 2019: Completed!

- ✓ Caterina Tassone (GCOS) liaison with WCRP to coordinate with existing WCRP ocean & land-base flux groups (WDAC, Surflux Task Team, GEWEX, SOLAS...).
- ✓ Liz Kent (AOPC) and Rainer Hollman (AOPC) will discuss with AOPC feasibility of remotely-sensed humidity & temperature profiles, optimized for surface boundary layer.
- ✓ Bob Weller (OOPC) will work with Christian Lanconelli (BSRN) to set up workshop on a global (ocean & land-based) radiation network, and develop best practices for surface radiation.
- ✓ Matt Palmer (OOPC) will liaison with WMO/WGNE & WCRP/WGCM
- ✓ Meghan Cronin (OOPC) will help coordinate a vision paper for broader community, beyond OceanObs19.
- ✓ Scoping of a SCOR Working Group Proposal for organizing/implementing near-term goals?





Summary of Goals

Goal: Improve accuracy and resolution of satellite-based and hybrid satellite/NWP-based estimates of surface energy and water fluxes

Goal: Improve accuracy and spatial distribution of *in situ* surface energy and water flux measurements and atmospheric profiling capability. Ultimately in the next 5-10 years we would like the Global Ocean Observing System to include Supersites with atmospheric profiling capability over the ocean.

Goal: Improve boundary layer physics in models that couple the ocean, ice, and land surfaces with the atmosphere



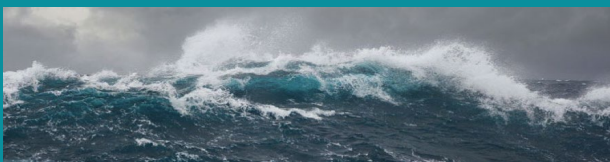
Goal #1 (Satellite Fluxes) Action Items

Action Item: Evaluate existing space-based observing capability for use in studying fluxes (Smith)

Action Item: Characterize the conditions under which satellite observations meet (or fail to meet) surface flux requirements (Smith)

Action Item: Improve methods for combining different satellite and *in situ* observation sources for use in flux studies (Smith)

Action Item: Explore methods to improve subdaily resolution using patchwork of observations from geostationary orbits (e.g., every 15 min) or polar orbiting platforms (e.g., twice a day from each platform)



Goal #2 (*In Situ* Fluxes) Action Items

Extend the Baseline Surface Radiation Network (BSRN) to the Ocean.

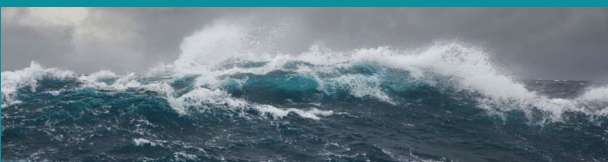
Action Item: Continue Ocean Surface Radiation Best Practice efforts within BSRN & Ocean Best Practice Systems (OBPS). Laura Riihimaki is in both groups and will act as the “bridge”. She is leading a BAMS article on Ocean Surface Radiation Best Practices. Laura and Meghan Cronin will co-lead an OBPS Community Workshop on Surface Radiation Best Practices in September 2021.

Estimation of global surface fluxes will require interoperable satellite and *in situ* measurement of multiple ECVs

Action Item: Coordinate intercomparison experiments to test and validate interoperability between (a) different *in situ* platforms (e.g. shipbased, buoy, uncrewed surface vehicle, fixed tower) and sensors, (b) *in situ* and extrapolated satellite retrievals, and (c) observed and modeled variables. A nearshore tower station may provide a useful starting testbed.

Action Item: Develop land-based and ocean-based Supersites with direct covariance flux and profiling technology used not only for calibration & validation, but also to understand processes and to test and develop models and parameterizations. *Question: Are Supersites = ARM sites? or Global Atmospheric Watch (GAW) stations? Or some other organized program?*

Action Item: Leverage technology development to obtain profiler technology suitable for remote applications (i.e. small, low powered, lower cost...). This technology should first be tested in landbased stations before being used in ocean applications. (Tony Lee. Targeting initial land-based test in late 2021 to 2022 with a passive microwave upward-sounding spectrometer.)



Goal #3 (Modelled Fluxes) Action Items

Action Item: Perform array designs to determine how many supersites are needed within network of reference stations – over land & ocean, where to locate them, initiate through a short-term process study.

Action Item: Improve Community practice for FAIR data, latency, continuity, ...

Action Item: Improve communication through SCOR Working Group #162 Observing Air-Sea Interactions Strategy (OASIS), which includes OOPC, AOPC, and BGC & Bio/Ecosystem GOOS Panel representation. Contact Meghan.F.Cronin@noaa.gov to join the slack workspace. See airseaobs.org.



thank you

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