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Surface Fluxes Task Team and SOLAS update

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Uppsala Universitet

Member of SOLAS SSC and co-chair of Fluxes Task Team





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Surface Flux Task Team Members

[<https://www.earthsystemcog.org/projects/surflux/>]

- Carol Anne Clayson, chair (WHOI, ocean, satellite)
- Anna Rutgersson, co-chair (Uppsala University, ocean/lake, obs)
- Martin Jung (Max Planck, biosphere, obs);
- Jim Edson (WHOI, ocean, obs);
- Pierre-Philippe Mathieu (ESRIN, satellite);
- Peter Gleckler (LLNL, modeling);
- Ronald Buss de Souza (National Institute for Space Research, Brazil, ocean, obs)
- Paul Stackhouse (NASA Langley, radiative fluxes, satellite);
- Diego Miralles (U. Ghent, biosphere, satellite);
- Anton Beljaars (ECMWF, land, modeling);
- Kauhito Ichii (Chiba University, land, obs);
- Petra Heil (University of Tasmania, sea ice, obs, remote sensing, modeling);



Flux Task Team, defined terms of reference

1. Provide a single point-of-contact for surface flux observations and analysis in the WCRP. Communicate with other relevant entities regarding WCRP surface flux activities through work on committees, a website, and other published articles and information.
2. Establish and encourage the publication and use of data, metadata, and documentation standards for global surface flux (ocean, land, or ice and atmosphere) data sets that are consistent with standards and infrastructure used in major climate model intercomparison efforts (e.g., CMIP, ESGF, and Obs4MIPs), thereby facilitating intercomparison of the data sets and their use in evaluation of Earth System models and their components.
3. Establish conventions for intercomparisons of global datasets, and for assessment of the global datasets with available in situ data, making use of established assessments for other components of the Earth system from GEWEX and other WCRP entities.
4. Report to the WDAC and WCRP Core Projects (e.g., GEWEX/GDAP and CLIVAR) on progress, status, and plans for activities overseen by the Task Team.





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SurFlux Task Team: Activities

- Whitepaper nearly completed
- Working with Obs4MIPS to inject non-gridded in-situ flux datasets into the Obs4MIPS project – process going slowly – much interest from the community on this
- Monthly telecons with SurFlux members and guests
- Representatives at GEWEX, CLIVAR, SOLAS, and other meetings; significant contributions to OceanObs paper
- A webpage dedicated to SurFlux has been established on the CoG: <https://www.earthsystemcog.org/projects/surflux/>



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White paper, topics:

Radiative and turbulent fluxes:

Air-sea fluxes.

Land-air fluxes.

Ice-air/ocean fluxes.

Measurement/modeling techniques and uncertainties

In situ measurements

Satellite-derived measurements

NWP analyses and re-analyses

Task Team Structure and Mission, Links to the larger
community

New platforms: challenges/opportunities

- More countries/researchers attempting flux measurements
 - UAVs and AUVs in particular (i.e. land and ocean)
 - Drifting platforms, buoys, and ships
- Need consistent validation, best practices
- SurFlux working with GSOP & others for buoy workshop for international scientists new to these types of measurements



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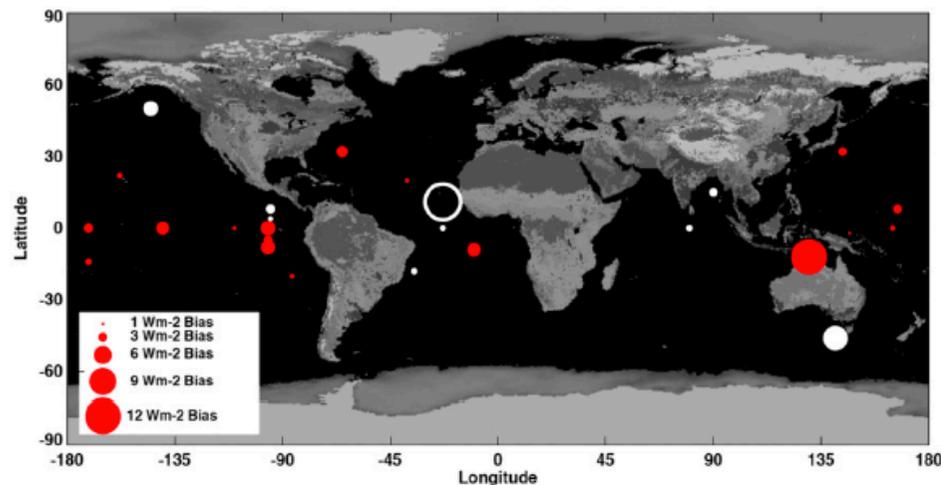
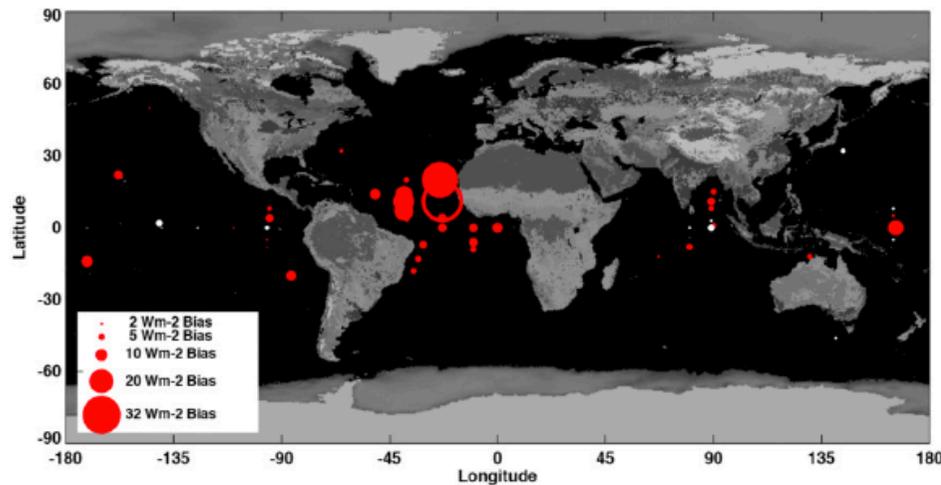
More activities

- Presentations to GSOP, US CLIVAR about SurFlux, discussions about our recommendations/activities
- Review of TPOS 2020 second report
- Identification of issues with radiation measurements over the ocean, subgroup meeting





Radiation subgroup



There is, as well, uncertainty is associated with surface observations. Irradiances measured at buoys might have a larger uncertainty. . . . We, however, do not have a separate uncertainty estimate for irradiances measured at buoys.

Kato et al. (2018)



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Radiation subgroup

- Paul Stackhouse, Christian Lanconelli, Meghan Cronin, Bob Weller, Diego Miralles (so far)
- Addressing radiation measurements from buoys/operational uncertainties/documentation
- FluxNet quality
- Initial goal: best practices document



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Current SurFlux recommendations

- Surface flux networks need to connect water, energy, and carbon measurements to make significant progress
- Ocean radiative fluxes: needs concerted effort to make some radiative measurements over the ocean comparable to BSRN efforts over land.
- For satellite estimations of both radiative and turbulent fluxes, improved BL properties of water vapor and temperature profiles needed
- Air-sea fluxes: New platforms and better intercomparison between methods
- More focus on complex and highly variable areas (coastal zone, ice edge, ...)
- Need to determine how best for limited in situ observations to inform gridded products
- Stronger connection between modeling and observations
- Measurements that are particularly needed for progress:
 - Temperature, humidity, and velocity profiles
 - Flux profiles
 - PBL top & entrainment flux
 - Soil moisture



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Current SurFlux recommendations I

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Current SurFlux recommendations II

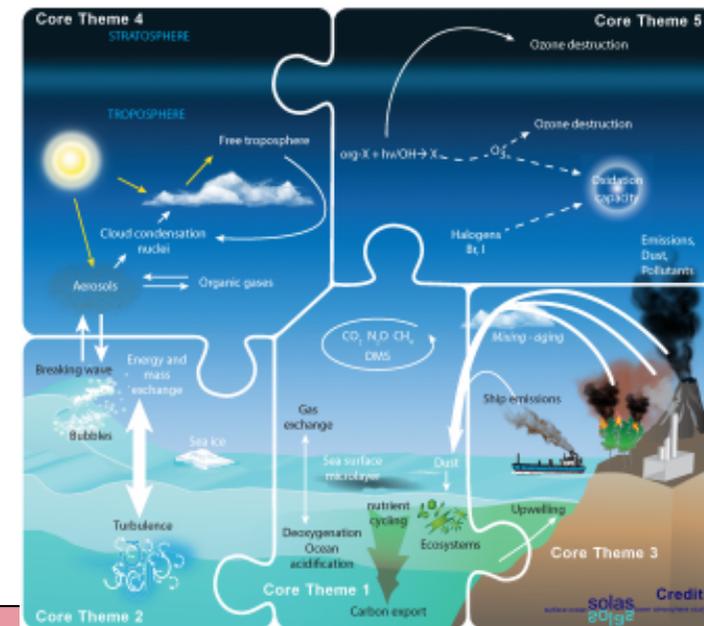
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SOLAS, Surface ocean lower atmosphere

- Since 2004, the Surface Ocean - Lower Atmosphere Study (SOLAS) project is an international research initiative aiming to understand the key biogeochemical-physical interactions and feedbacks between the ocean and atmosphere.
- Achievement of this goal is important to understand and quantify the role that ocean-atmosphere interactions play in the regulation of climate and global change.
- Science and society – shipping
- <http://www.solas-int.org/>





SOLAS (Surface Ocean - Lower Atmosphere Study)

SSC:

Lisa Miller (Canada), SOLAS SSC Chair

Katye Altieri (South Africa)

[Arne Körtzier](#) (Germany)

Philip Boyd (Australia)

Mohd Talib Latif (Malaysia)

Erik van Doorn (Germany)

Maurice Levasseur (Canada)

Cristina Facchini (Italy)

Peter Minnett (USA)

[Laura Gallardo](#) (Chile)

Jun Nishioka (Japan)

Véronique Garçon (France)

Anna Rutgersson (Sweden)

Santiago Gassó (USA)

Alfonso Saiz-Lopez (Spain)

Ilan Koren (Israel)

Parvatha Suntharalingam (UK)

[Guiling Zhag](#) (China)



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SOLAS activities

Development of scientific plan (webpage)

Annual SSC meetings

Summer school 2018, large interest

Scientific conferences (next 2019, May)

Workshops:

- remote sensing and surface fluxes

- shipplumes

- geoengineering

- ...

