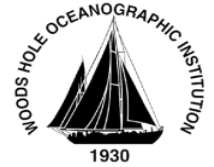
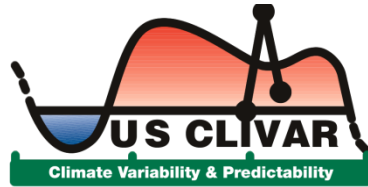
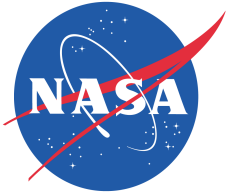


Summary of November 2012 Ocean Synthesis and Air-Sea Flux Evaluation Workshop

Global Synthesis and Observations Panel (GSOP)

Arun Kumar

10 July 2013



**Towards achieving global closure of ocean heat and freshwater budgets:
Recommendations for advancing research in air-sea fluxes through collaborative activities**

CLIVAR/GSOP/WHOI Workshop on Ocean Syntheses and Surface Flux Evaluation
Woods Hole, Massachusetts, 27-30 November 2012

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Sponsor Agencies:

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NOAA Ocean Climate Observations (David Legler)
US CLIVAR (Mike Patterson)
WCRP/CLIVAR GSOP

WCRP Informal/Series Report No. 13/2013
ICPO Informal Report 189/13

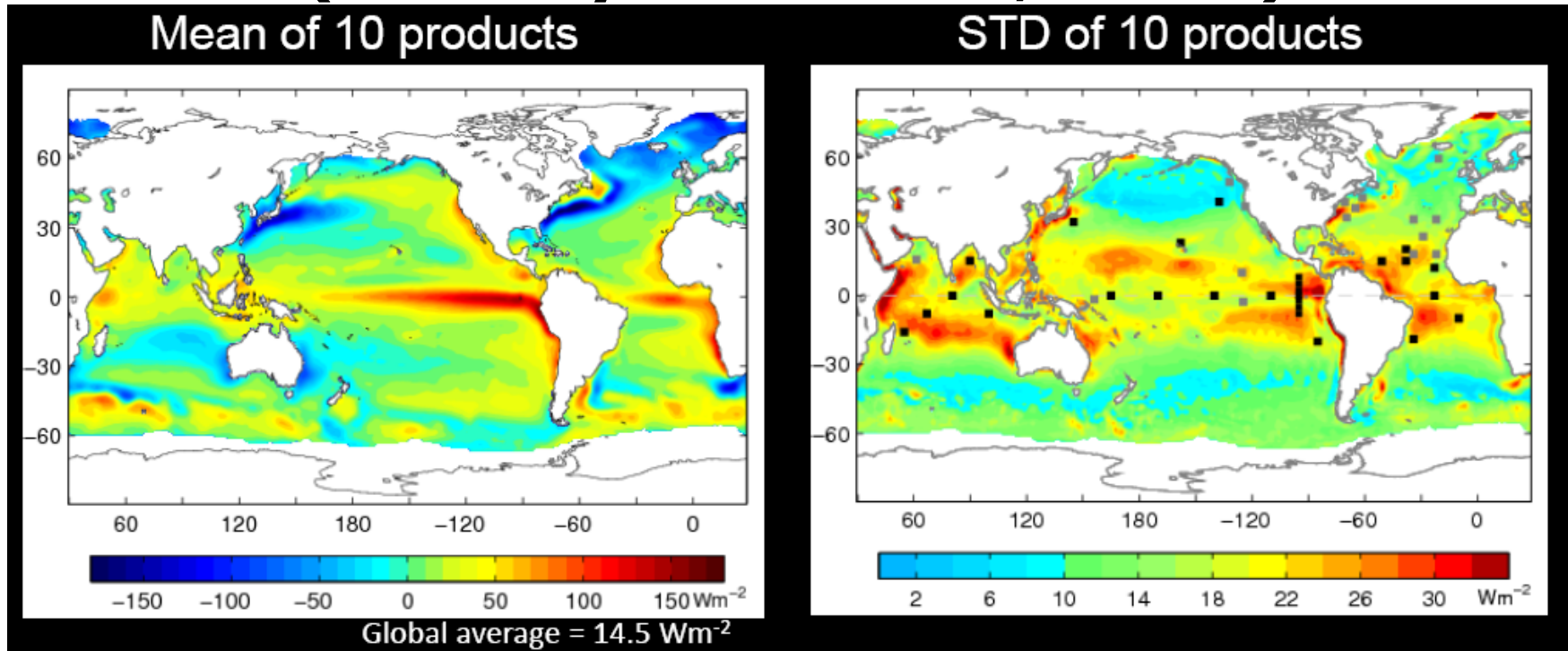
Motivation

- **Surface fluxes is cross-cutting theme (e.g., linking CLIVAR and GEWEX).**
- **WCRP Observation and Assimilation Panel (WOAP) report recommended evaluation of model-based surface fluxes and observation-based estimates.**
- **GSOP: bring together observational flux and assimilation/synthesis communities, for joint product/methods evaluation: (60 participants)**

Objectives

- **Review current state of surface fluxes (heat, freshwater, & momentum) obtained from synthesis & observation-based products;**
- **Discuss gaps and limitations in products with particular reference to balancing global budgets;**
- **Develop requirements/recommendations for future global/regional synthesis activities**

Consistency of regional net heat flux (courtesy of Lisan Yu, WHOI)



- The difference in the 10 mean Q_{net} products is mostly larger than 10 Wm^{-2} (the desired accuracy)
- Buoy observations for Q_{net} are extremely limited.
- The way forward requires close collaboration among the observation, modeling, and synthesis communities, and ocean and atmospheric communities.

Workshop Recommendations

- **Working group to develop strategy for regional heat/salt budget analysis and regional flux assessment using flux buoys and upper ocean heat content from Argo or ocean syntheses. Task team to examine CAGES-like pilot project.**
- **Continue evaluation of surface fluxes and ocean transports from ocean syntheses and identify regions suitable for regional heat/salt budget studies**
- **Further pointwise comparisons of ocean synthesis and atmospheric reanalysis products with flux buoy and OceanSITES measurements, including scaling analysis to estimate uncertainties from spatial/temporal variability.**
- **Ocean synthesis and reanalyses should archive components of the air-sea heat flux i.e. Short and Longwave radiation, and sensible and latent heat fluxes, to enable evaluation.**

Workshop Recommendations

- **Need easier online DB access to daily averaged and higher resolution net heat fluxes, components, and meteorological state variables from mooring sites.**
- **Reference station data (WMO type “84”) should be withheld from reanalyses to allow independent assessment. All data assimilated in NWP should list WMO numbers.**
- **Update Seaflux website (<http://seaflux.org>) with recent data and metadata.**
- **Revive Fluxnews Letter online, to review of surface flux research and datasets.**
- **Enhance interaction with relevant program activities funded by different agencies (e.g., NASA, NOAA, ESA, ...).**

US CLIVAR Context

- **Develop a US CLIVAR activity focusing on evaluation of surface fluxes (follow up on the 'High latitude surface fluxes' WG)?**
- **Coordinate funded surface flux activities across different agencies?**
- **Plug into upcoming US coupled climate and ocean reanalysis activities?**