

Goals of the WG

U.S. CLIVAR established a Working Group on High Latitude Surface Fluxes in 2008, with the particular goal of addressing some of the myriad challenges associated with air-sea and air-ice-ocean exchanges in Arctic, Antarctic, and Southern Ocean regions. The working group activities were motivated by several identified deficiencies in estimates of high latitude surface fluxes (e.g., sensible and latent heat, radiative fluxes, stress, and gas fluxes). Our goals have been to describe the deficiencies in our current state of knowledge about air-sea surface fluxes in high latitudes; estimate the sensitivity of various high-latitude processes to changes in surface fluxes; and estimate the scientific requirements for surface fluxes at high latitudes. Broader community input was to be sought through a workshop.

Activities to date

The working group was formed and goals were refined in 2008/2009. Our early findings were presented at OceanObs09. In 2010 we helped organize the Joint SeaFlux and USCLIVAR High Latitude Working Group Meeting, which provided much wider community input. This meeting confirmed and refined our estimates of accuracy requirements, as well as helping to articulate an assessment of the strengths and weaknesses of the observing system. A summary of the findings from this meeting, as well as the more detailed findings and recommendations from the working group were published in BAMS in 2013. Key recommendations include significantly expanded in situ observation systems in the Arctic and Southern Ocean, limited-duration process studies, improved satellite-flux observing capabilities, improved access to observational and model-derived flux products, and the coordination of flux product intercomparison to improve the utility and interoperability of surface flux estimates. These findings have also been presented at several workshops and conferences (e.g., 2012 CLIVAR GSOP Workshop on Ocean Synthesis and Air-Sea Flux Evaluation in Woods Hole). They also contributed to the report from the above mentioned workshop.

Plans for the next year

Our working group activities have completed with the publication of findings and recommendations in the BAMS article earlier this year. Follow-on activities are emerging under other auspices. Some of the issues raised by the working group are being taken up by the International CLIVAR GSOP and GOOS/GCOS/WCRP Ocean Observation Panel for Climate (OOPC). NASA and NOAA COD have recognized that surface fluxes, including those at high latitudes, are leading source of uncertainty and error in analyses of ocean applications. Coordinated approaches to systematically reduce surface flux uncertainties are being discussed with agency managers. A subset of WG members is also involved in progressing a remote sensing mission to improve global surface fluxes. Finally, the WG recommendations provide an important basis to inform future efforts to address the U.S. CLIVAR research challenge on polar climate.