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Best practices for surface radiation observations from long-term moored buoys

Robert Weller¹, J. Thomas Farrar¹, Sebastien Bigorre¹, Jason Smith¹, James Potemra², and Fernando Santiago-Mandujano²

¹Woods Hole Oceanographic Institution, Woods Hole, United States of America

²University of Hawaii at Manoa, Honolulu, Hawaii, United States of America

The Upper Ocean Process Group of the Woods Hole Oceanographic Institution deploys moorings with surface buoys instrumented with incoming shortwave and longwave radiometers at locations around the world. The procedures used to calibrate the radiometers in the laboratory and to assess their performance at sea are discussed. Some mooring deployments are done during collaborative field experiments and are months to a year in length. Three other sites are being maintained as long-term Ocean Reference Stations (ORS), with sequential one-year deployments being used to collect ongoing time series. The Stratus ORS, located under the marine stratus clouds off northern Chile, has been collecting surface radiation observations since 2000. The NTAS ORS in the western tropical Atlantic has collected surface radiation data since 2001; and the WHOTS ORS north of island of Oahu, Hawaii has collected surface radiation data since 2004. Challenges encountered in making the surface radiation observations are discussed, and the best estimates of observational uncertainties are presented. With this understanding of the accuracies of the observations, comparisons between the buoy observations and surface radiation values from models and reanalyses are shown. Work underway on further improvements to the approaches taken to make surface radiation observations from moored buoy are discussed, and a suggestion for field intercomparisons with other oceanic and land-based surface radiation observing platforms is put forward.