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Ocean-Atmosphere Heat Exchange: Limitations of Currently Available Datasets and Potential for Future Progress (Solicited Talk)

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The flux of heat between the ocean and the atmosphere is a key element of the global climate system, central to variations in the ocean heat budget and variations in surface temperature. Factors determining the heat exchange will be discussed using models and observations with an emphasis on the period 1990-2015. This period include changes associated with the potential warming hiatus and more recently the major El Nino event that developed in 2015. The ability of leading datasets to reliably estimate surface flux changes is limited by a number of factors and these will be discussed in the context of variations in other components of the climate system. Progress towards obtaining more reliable climatological estimates of the heat exchange will also be considered with reference to recent developments using residual techniques and ocean reanalyses in addition to atmospheric reanalysis, remote sensing and ship based datasets. In addition, use of surface meteorological fields to generate ocean model forcing will be examined together with recent developments using high resolution coupled ocean-atmosphere models. Finally, the potential for significant advances in regions of major uncertainty using the growing network of surface flux buoys will be discussed with a focus on two moorings now in place in the Southern Ocean.