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Title: (OA6) Upper Ocean Heat Flux Determined by Newly Developed Ocean Remote Sensing Methods

Abstract: One of the principal goals of global climate research is the prediction of long – term – period changes in Earth's climate. The state of Earth's climate is adjusted by the upper layers of the ocean, where most of the solar energy flux is absorbed. Hence, the dynamic processes in the upper ocean and the heat flux changes play a vital role in the air-sea interaction. This interaction between the ocean and the atmosphere takes place via three primary physical processes: (1) heat transfer by radiative and turbulent fluxes; (2) momentum transfer by the winds; and (3) moisture transfer by evaporation and precipitation. Therefore, understanding the heat, momentum, and moisture fluxes at the air-sea interface is important for comprehending the energy exchanges and the oceanic response. Remote sensing of ocean surface heat fluxes is difficult because (1) uncertainties exist in the heat flux calculation models, and (2) errors exist in the satellite measurements. We successfully developed various methods to determine the ocean surface sensible heat flux, latent heat flux, and net heat flux using altimeter, scatterometer data, and inverse numerical models. The results were favorably compared with in situ data from various ocean experiments. I will introduce and summarize the new methods and results, and describe some of the recent attempts to combine the satellite altimetry and scatterometry with other observations and techniques, and with general circulation models to infer the time varying air-sea interactions, upper ocean responses, and global and regional oceanographic processes.

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