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Upper Ocean Heat Budget During the Hawaii-to-Tahiti Shuttle Experiment

James W. Stevenson and Pearn P. Niiler

Joint Institute for Marine and Atmospheric Research, University of Hawaii, Honolulu, HI 96822

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ABSTRACT

Heat flux, CTD and current profile data from the Hawaii-to-Tahiti Shuttle Experiment are used to study the upper ocean heat budget in order to better understand the seasonal evolution of sea surface temperature (SST) in the central tropical Pacific Ocean between February 1979 and June 1980. The surface heat flux is estimated using bulk formulas and the standard meteorological data taken aboard ship. Upper ocean heat storage is computed from CTD data in such a way (using temperature vertically averaged between the sea surface and fixed isotherm depths) as to filter internal waves. It is found that the surface heat flux plays a large role in the seasonal evolution of SST. A time-latitude correlation coefficient of 0.70 is found between the surface heat flux and heat storage. The seasonal evolution of the vertically averaged temperature whose time rate of change determines storage is very closely correlated with the seasonal evolution of SST.

At 155°W, there is no evidence for a relation between changes of main thermocline depths and changes in SST. Also, we see no feedback from the ocean to the atmosphere through SST governed heat flux. Horizontal heat advection is estimated from Firing *et al.* profiling current meter data. The advection of cold water from the east is important in the 15-cruise (16-month) mean but the data are too noisy to estimate the seasonal evolution of heat advection.

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Headquarters: 45 Beacon Street Boston, MA 02108-3693

DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826

amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718

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