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The Effect of Salinity on Tropical Ocean Models

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ABSTRACT

The effect of horizontal salinity gradients on the tropical ocean circulation has not previously been evaluated. It is shown that there are noticeable differences between the dynamic height field calculated with and without the inclusion of salinity variations. Hence salinity has a significant contribution to the geostrophic velocity field. This conclusion is illustrated by running two identical Indian Ocean models: one initialized using a climatological salinity field while the other has no horizontal salinity gradients. The differences in the temperature and velocity fields after 110 days are of the order of 0.5°C and 10 cm s^{-1} over some regions of the ocean. Further experiments using the same model for data updating studies showed that the absence of salinity data greatly reduces the usefulness of temperature data. It is concluded that for an accurate simulation of the tropical ocean the salinity field needs to be included.

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