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Calculating the Time-Mean Oceanic General Circulation and Mixing Coefficients from Hydrographic Data

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ABSTRACT

The relation between the circulation calculated from averaged hydrographic data (such as the Levitus data), and the actual time average circulation is examined using a CTD dataset which provides both time and space coverage of a region of the Mediterranean Sea. The connection between eddy mixing coefficients calculated from hydrographic data and the eddy fluxes ($\overline{u'T'}$) they are intended to parameterize is also considered.

An inverse model is used to calculate circulation and mixing coefficients from the time average data. Then, the actual time averaged circulation is estimated by averaging six realizations of the instantaneous velocity field, and mixing coefficients are calculated by directly parameterizing the eddy fluxes of heat and salt.

Comparing the results obtained by the different procedures, it is concluded that the horizontal time average circulation can be reliably estimated from averaged and smoothed climatological data, but that it is nearly impossible to obtain physically meaningful mixing coefficient from such data.

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