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Estimates of Global Oceanic Meridional Heat Transport

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ABSTRACT

Estimates of oceanic meridional energy transport for the Pacific, Atlantic and Indian oceans are made using calculated annual mean surface energy fluxes. The surface flux calculations use bulk formulations based on 31-year (1949–79) surface marine observations from the Consolidated Data Set of the U.S. Navy Fleet Numerical Oceanography Center. The results show a northward transport at all latitudes in the Atlantic Ocean, a poleward transport in both hemispheres centered around 10°S in the Pacific Ocean with a northward transport south of 25°S, and a southward transport at all latitudes in the Indian Ocean. When all oceans are taken together, the transport is poleward centered around 5°S with a maximum northward transport at 25°N and a maximum southward transport at 15°S. A sensitivity experiment carried out on the possible errors associated with the surface energy flux shows that the transport in the Pacific Ocean—both in direction and in magnitude—is most uncertain. The transport directions of the Atlantic Ocean and of the Indian Ocean are stable, while the magnitudes of the transports are different.

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