

Decadal trends in ocean evaporation

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Global ocean evaporation has increased during recent warm decades. By using the evaporation time series (1958-present) constructed by the WHOI Objectively Analyzed air-sea Fluxes (OAFlux) project (<http://oaflux.whoi.edu>), I will discuss the decadal pattern of change in ocean evaporation and its relationship with the observed changes in sea surface temperature and near-surface atmospheric circulation. The increase in ocean evaporation is globally non-uniform, with the rate of increase is most pronounced over the global subtropical western boundary currents. Over the open oceans, a hemispheric asymmetry is noted. While enhanced evaporation is observed in the subtropical southern Indian and Pacific Ocean, reduction in evaporation occurs in the subtropical northern Pacific and Atlantic Oceans. It is found that the near-surface wind plays an equally important role as air-sea humidities in determining the pattern of change in evaporation. It is estimated that the ocean evaporation increased by $1.0 \pm 0.4\%$ per decade, and the rate of increase with per degree Kelvin change of temperature is about $6.5\% \text{ K}^{-1}$.

The 54-year time series displays decadal oscillations, with a low in 1977 and a high in 1999. Since 2000, the global averaged ocean evaporation has been trending slightly downward, suggesting a tendency toward the reversal of the upward trend that dictated the decades of 1980s and 1990s. The air-sea conditions associated with the transition will be discussed.