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# Constraining isopycnal and diapycnal dissipation in the SPURS area

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The distribution of salinity and temperature in the ocean is controlled by surface forcing at the air-sea interface in the form of heat- and freshwater fluxes, advection by currents, and internal mixing processes. Here, we use the concept of ‘power integrals’ to relate the surface forcing to the dissipation in the ocean interior. In the global ocean, the density (buoyancy) forcing at the surface is related to the diapycnal dissipation in the interior, while the spiciness forcing is related to isopycnal dissipation. Using a number of remote-sensing derived surface flux products, we show that there is broadly an equipartition between isopycnal and diapycnal dissipation, despite the drastically different length-scales involved in both processes. This result holds true for both the time-mean as well as seasonal, monthly and daily temporal solutions and is robust between different flux products.

During the Salinity Processes in the Upper Ocean Regional Study (SPURS) in 2012-2013, a detailed dataset of salinity, temperature, velocities and microstructure measurements was recorded. This dataset is augmented with satellite-derived sea surface salinity and sea surface temperature data, Argo data, a number of remote-sensing derived surface flux products and three-dimensional ocean velocities and used to construct isothermal, isohaline, isopycnal and iso-spiciness budgets. Akin to the global case described above, the density (buoyancy) forcing at the surface can be related to diapycnal dissipation and the surface spiciness forcing can be related to isopycnal dissipation processes. Here, these relationships are used to diagnose the relative magnitudes of interior dissipation within a control volume. This approach allows new insights into local thermohaline budgets and complements previous budgets produced in the SPURS region.