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Seismic oceanography as a tool to monitor climate change

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Large scale global ocean circulation redistributes heat and freshwater and therefore affects global climate. One of its main forcing mechanisms is the diapycnal mixing in the ocean interior. The energy needed to drive the mixing processes is mainly provided by tides and wind, being transformed into internal wave energy, cascading through a range of smaller scales leading finally into turbulence and molecular dissipation. Water masses in the ocean are stratified and often separated by relatively thin layers with strong gradients in temperature and/or salinity across which heat and mass transfer occur in order to maintain global circulation and stratification. We present several novel tools of 'seismic oceanography' and demonstrate how they may be employed to observe temporal and spatial variation of thermohaline finestructure in the North Atlantic, an important step toward monitoring climate change in the context of ocean dynamics.