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Towed Instrument for Microstructure Ocean Soundings (TIMOS) - An underwater sensor platform for rapid assessment of horizontal turbulence quantities and scales -

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Essential precondition to investigate ocean mixing processes is a stable, vibration-free sensor platform for measuring the microstructure of velocity, temperature and conductivity with high temporal and spatial resolution. For rapid horizontal surveys of turbulence quantities and their lateral scales, a towed underwater vehicle called TIMOS has been developed as a platform for turbulence and microstructure sensors. Measuring turbulent velocity shears and thermal gradients underway, the system yields the dissipation rates of turbulent kinetic energy and the dissipation rates of temperature variance in a selected depth along ship's track. During a cruise in August 2007 in the Baltic Sea, the towing properties of TIMOS were examined under real environmental conditions. Despite disturbing vibrations due to a simple tow arrangement without cable vibration damping elements, a first analysis of the measured data emphasizes that turbulence measurements are technically possible by means of the TIMOS system. The horizontal wavenumber spectrum of turbulent velocity fluctuations matched well with the Nasmyth spectrum. Combined use of TIMOS and a vertically profiling microstructure probe allows a high resolution recording of hydrographic and dynamic properties on vertical and horizontal scales simultaneously.