Variability of particulate seawater properties related to bottom mixed layer-associated internal waves in shallow water on a time scale of hours

Turnewitsch, Robert, Gerhard Graf

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ABSTRACT: To obtain information on relations between internal wave-controlled hydrographic variability in bottom mixed layers (BMLs) and particle-associated BML parameters, depth distributions of density, relative turbidity, relative chlorophyll *a* (Chl *a*), relative phycoerythrin fluorescence (Phyco), total particulate matter (TPM), particulate carbon (PC), and particulate nitrogen (PN) were obtained at a shallow-water site in the southwestern Baltic Sea in July 2001 in the course of a temporally highly resolved 1-d time series. The density distribution showed evidence for a BML and undulations of BML thickness probably caused by near-inertial internal waves. Relative pigment fluorescence in the BML and in the layer above the BML was inversely coupled and related to the wave. Dense transient PC- and PN-depleted TPM clouds, having the highest TPM loads in the BML, occurred on leading wave faces. Leading wave faces and wave backs are suggested to be locations of preferred vertical exchange between adjacent compartments (surface sediment, BML, layer above BML). Different processes control relative turbidity in the BML (decoupled from Chl *a*) and in the layer above the BML (coupled to Chl *a*). Most of the time, spatial variability of the Chl *a*/Phyco ratio was higher within the BML than in the layer above the BML. The Brunt-Väisälä frequency within the layer above the BML was positively and negatively related to the thickness of the BML and the layer above the BML, respectively. The dataset indicates that the BML itself and in coaction with passing internal waves effectively controls the communication between interior water column and sediment.