



Internal tides and the spread of the river plumes in the Trondheim Fjord

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The Trondheim Fjord receives a substantial amount of freshwater during the year, with a mean runoff of $725 \text{ m}^3\text{s}^{-1}$ and a spring flood maximum of up to $6430 \text{ m}^3\text{s}^{-1}$. How this freshwater spreads and mixes with the ambient presents one of the great challenges in understanding the dynamics of fjord circulation. This problem is approached by performing high-resolution numerical simulations of the circulation of the Trondheim Fjord. The model used is the Navy Coastal Ocean Model (NCOM). The fjord system is simulated for different scenarios that include the forcing of river discharges, tides and the effect of background rotation. The simulations show how river plumes in the fjord are affected by topography and the rotation of the earth. Further, the internal tide has in certain cases a great influence at the freshwater flow near the surface. This tide is generated as the barotropic tides interact with stratification and the sill that separates the two outermost basins in the fjord. Higher frequency waves are also formed at this topographic feature, but these waves are poorly represented by the hydrostatic model applied in this study.