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## Analyzing Diahaline Exchange and Mixing in the Baltic Sea

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In this talk we present new insights into the overturning circulation of the Baltic Sea. Based on a state-of-the-art 3D numerical model for the entire Baltic Sea, we analyse the estuarine circulation and water mass transformation in salinity space. State and diagnostic variables are binned to salinity classes and conservatively averaged already during model runtime such that exact budgets for local isohaline volumes can be evaluated. Derived maps in salinity space for entrainment velocities, diahaline diffusive fluxes as well as physical and spurious numerical mixing contributions will be shown. The latter is based on a unique separation and quantification of mixing due to turbulence parameterisations and discretisation errors from the applied numerical advection schemes. Finally it is demonstrated that integration of the different new local diagnostics confirms existing bulk theories (e.g. Knudsen theorem, universal law of estuarine mixing).