



Formation and dispersion of dense water in the western Mediterranean Sea : a focus on small scale processes

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Convection and dense shelf water formation in the western Mediterranean basin feeds thermohaline circulation through the transformation of Atlantic water into deep water masses. During the summer 2012 - summer 2013 period, a huge data set documenting the different phases of convection have been collected in the frame of the HyMeX and MerMex programs. Numerous processes have been documented from the scale of the mixed patch to the mesoscale and submesoscale. This data set is invaluable to test the ability of numerical models to reproduce these processes.

This study uses the SYMPHONIE model at one-kilometer resolution at the scale of the whole western basin. The initial state of the model has been carefully prepared thanks to assimilation of temperature and salinity profiles available in the basin. In a first part, the simulation is validated during the preconditioning, convective and restratification phases. Then the dense water dispersion toward the southern part of the basin is described with an emphasis on the spatial scales of this dispersion. Submesoscale processes are highlighted through the documentation of submesoscale coherent vortices, the existence of which has been proven by observations.