



The NEMO-AROME WMED high-resolution air-sea coupled system: impact on dense water formation

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The North-Western Mediterranean Sea is a key location where intense air-sea exchanges occur, especially during winter when the succession of strong northerly and north-westerly wind boosts the dense water formation. The second Special Observation Period (SOP2) of the HyMeX program, which took place between 1st February and 15th March 2013, was dedicated to the observation of the dense water formation and ocean deep convection processes. During this period, several platforms sampled the area, providing a unique dataset to better identify the coupled processes leading to dense water formation. This study investigates the impacts of the fine scale ocean-atmosphere coupled processes on dense water formation during winter 2012-2013. We developed the coupling between the NEMO-WMED36 ocean model ($1/36^\circ$ resolution) and the AROME-WMED numerical weather prediction model (2.5 km resolution) and ran the high-resolution air-sea coupled system over SOP2. The coupled simulation is compared to an ocean-only simulation forced by AROME-WMED operational forecasts and to air-sea observations collected during the HyMeX SOP2. The results show small differences in term of surface fluxes. Dense water formation is slightly changed in the coupled simulation, whereas fine-scale ocean processes are significantly modified.