

## **HyMeX-Analysis of the simulated Mediterranean sea water budget variability as a function of the horizontal resolution in the Hymex/Med-CORDEX framework**

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This study investigates the sensitivity of the Mediterranean Sea water budget expressed as E-P (E: evaporation; P: precipitation) to horizontal resolution, and its possible physical cause. The water budget variability over the 1989-2008 ERA-interim period was simulated with the WRF (Weather Research and Forecasting) numerical model (Skamarock et al., 2008) for a horizontal resolutions of 50km and 20km. Quantitative comparisons of the various simulations using in-situ (ECA database) and satellite data (GPCP, GSSTF) were performed. The annual mean precipitation over Mediterranean sea for the 1989-2008 period range between 437 mm/yr for WRF 50km and 516 mm/yr for WRF 20km and the Evaporation between 1396 mm/yr for WRF50km and 1460mm/yr for WRF 20km. These values are consistent with previous studies (Mariotti et al.2002, Romanou et al. 2010). The main difference in precipitation is in summer time, in fact we obtain about 40% more precipitation in WRF 20km compared to WRF 50km. For Evaporation, we have +10% in WRF 20km in winter and autumn. The difference between WRF20km and WRF 50km mainly due to the better representation of topography in WRF20km has two major implications: 1) an increase of local and coastal winds induced by orography in winter and autumn time (~1%) like the Mistral with strong effect on the sea surface evaporation. 2) an increase of sea precipitation mainly due to the increase of convective precipitation (+55%) extended along the coasts.