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New insights on the relationship between ocean mesoscale structures and spatio-temporal distribution of precipitation in the western Mediterranean basin during the HyMeX SOPs in 2012-2013

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The Mediterranean area is prone to intense precipitation events. In this study, we investigate the role of the ocean heat content and mesoscale features on the spatio-temporal distribution of the precipitation in the Mediterranean basin. For the HyMeX Special observation periods in 2012-2013 (SOP1 and SOP2), one-year sensitivity experiments were run with the non hydrostatic atmospheric WRF model of the MORCE-MED plateform, using different datasets of sea surface temperature. The sea surface temperature fields are derived from four ocean NEMO-MED companion simulations, made at different resolutions. The horizontal resolution is $\sim$7km and $\sim$2.5km while the vertical resolution is stretched from 1m at the surface to 400m at the bottom sea with 50 z-levels or from 1m at the surface to 130m at the bottom sea with 75 z-levels. The simulations started in 1998 with an ocean at rest and all have the same initial state and boundary conditions. The ocean was forced by the daily ARPERA atmospheric flux and winds. The analysis focuses on the precipitation at sub-basin scales in the western part of the Mediterranean basin. To highlight the ocean impact on the water content and transport in the low atmosphere, the diurnal cycle of precipitation and the contribution of extreme events to the annual precipitation budgets are compared over sea to HOAPS observations and over land to the OHMCV in situ observations.