Impact of SST on heavy rainfall events on eastern Adriatic during SOP1 of HyMeX

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The season of late summer and autumn is favourable for intensive precipitation events (IPE) in the central Mediterranean. During that period the sea surface is warm and contributes to warming and moistening of the lowest portion of the atmosphere, particularly the planetary boundary layer (PBL). Adriatic sea is surrounded by mountains and the area often receives substantial amounts of precipitation in short time (24 hours). The IPEs are a consequence of convection triggered by topography acting on the southerly flow that has brought the unstable air to the coastline. Improvement in prediction of high impact weather events is one of the goals of The Hydrological cycle in the Mediterranean eXperiment (HyMeX). This study examines how precipitation patterns change in response to different SST forcing. We focus on the IPEs that occurred on the eastern Adriatic coast during the first HyMeX Special observing period (SOP1, 6 September to 5 November 2012). The operational forecast model ALADIN uses the same SST as the global meteorological model (ARPEGE from Meteo France), as well as the forecast lateral boundary conditions (LBCs). First we assess the SST used by the operational atmospheric model ALADIN and compare it to the in situ measurements, ROMS ocean model, OSTIA and MUR analyses. Results of this assessment show that SST in the eastern Adriatic was overestimated by up to 10 K during HyMeX SOP1 period. Then we examine the sensitivity of 8 km and 2 km resolution forecasts of IPEs to the changes in the SST during whole SOP1 with special attention to the intensive precipitation event in Rijeka. Forecast runs in both resolutions are performed for the whole SOP1 using different SST fields prescribed at initial time and kept constant during the model forecast. Categorical verification of 24h accumulated precipitation did not show substantial improvement in verification scores when more realistic SST was used. Furthermore, the results show that the impact of introducing improved SST in the analysis on the precipitation forecast varies for different cases. There is generally a larger sensitivity to the SST in high resolution than in the lower one, although the forecast period of the latter is longer.