Impact of SST on the NWP forecast over Adriatic during the exceptional bura outbreak in February 2012

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In February 2012 a strong wind event over the Adriatic Sea lead to extreme air-sea interactions. The extreme event consisted of strong to severe cold wind (bra) event that last over three weeks accompanied by accumulation of snow on the coastline in the beginning of the event. As a result, the sea surface cooled rapidly and mixed throughout the vertical column. The ALADIN System operational forecast used the sea surface temperature (SST) available from the global meteorological model ARPEGE. It was a practical solution for an operational application, since the same source is used also for forecast lateral boundary conditions (LBCs). Here we first compare the SST available from operational global atmospheric models ARPEGE and IFS to in situ measurements, SST analyses and ocean model output. The global models underestimated the SST cooling while the available satellite based observations do not resolve the eastern Adriatic coastline due to numerous islands. Both global models overestimated SST over the Adriatic for up to 10°C when compared to in situ measurements. Afterwards, we run a set of forecasts using the SST from the OSTIA and MUR analyses or the ROMS ocean model forecast. The impact of changing SST field on forecast atmospheric fields is mostly reflected on precipitation. Model forecasts more precipitation using warmer SST. Changes in fluxes of evaporation, heat and momentum through the sea surface reflect the changes in the SST. Too warm SST yields too intense fluxes. Colder SST in the Velebit Channel causes reduced momentum flux that allows stronger bra jets above the open sea away from coastlines.