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# Assessment of Precipitation Forecast Accuracy over Eastern Black Sea Region using WRF-ARW

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Surface topography such as mountain barriers, existing water bodies and semi-permanent mountain glaciers changes large scale atmospheric patterns and creates a challenge for a reliable precipitation prediction. Eastern Black sea region of Turkey is an example. Black Sea Mountain chains lies west to east along the coastline with the average height of 2000 m and the highest point is 3973 m, and from the coastline to inland where there is a very sharp topography change.

For this study we select the Eastern Black Sea region of Turkey to assess precipitation forecast accuracy. This is a unique region of Turkey which receives precipitation throughout whole year with highest amount of annual precipitation. Amount of rain and snow is important because they supply water to the main river systems of Turkey. Climate of Turkey is in general under the influence of both continental polar (Cp) and tropical air flows. Their interaction with the orography causes orographic precipitation. Also Caucasus Mountains, which is the highest point of Georgia, moderates the climate of the southern parts by not letting penetration of colder air from north. Southern part of the western Black Sea region has more continental climate because of the lee side effect of the mountains. In a very short distances, 24 hour total precipitation varies from 138.3 mm to 5.1 mm in a region. Therefore, precipitation forecast is important for operational forecasters and researchers.

Our aim in this study is to investigate WRF precipitation accuracy during 10 extreme precipitation, 10 normal precipitation and 10 low precipitation days by using forecast of two days ahead. Eastern Black Sea stations located along the coastline are used to determine the dates of the events between 2000 and 2003. During this study, three different resolutions with three nested domains are tested to determine the model sensivity to the domain boundaries and resolution. As a result of our tests, 6 km resolution for finer domain was found suitable for our purposes. Also, sensivity tests were conducted for cumulus, PBL and microphysics schemes for single-day runs. Initial conditions of the model have been produced by using ERA-40 and for three extreme days after August 2002 with ERA-Interim data. The precipitation results are compared to both NASA TRMM 3-hourly precipitation data which is converted to 24 hour total precipitation and also ground observation data which are obtained from Turkish State Meteorological Service.

Preliminary results indicate that NASA TRMM 3-hourly precipitation data are not consistent with the surface based observations at 30-42°N latitude bands. Therefore, verification of model simulations was performed by using station data only. Our results show that the model underestimates precipitation of extreme days and overestimates precipitation of normal precipitation days especially on 3 stations (Rize, Pazar and Hopa) which are located on more complex topography than the rest of the domain.