EMS Annual Meeting Abstracts
Vol. 11, EMS2014-267, 2014
14th EMS / 10th ECAC

June 2013 flood case: on the role of potential vorticity banners past orography

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In June 2013 Central Europe was affected by several heavy precipitation episodes causing major floods. In the Czech Republic the extreme precipitation event of June 1 – June 3 2013 was actually quite a difficult one to forecast, regarding both the spatial distribution and amplitude. Besides the high amplitudes in mountain regions, there was a narrow belt of extreme precipitation across the country. The belt was the result of a chain-like effect existing for about 20 hours. We demonstrate here a presence of potential vorticity anomalies linked to the above mentioned permanent renewal of precipitation activity in the area. These anomalies appear in the flow past the Czech-Polish frontier mountain chain Krkonoše; albeit much smaller than the Alps, this chain is the first important orographic obstacle for the northerly flow. We present results of a study showing a high uncertainty of the forecast for this case, pending the quality of initial conditions. It is shown that forecast skill gets improved only when the high resolution analysis describes meso-scale structures of “potential vorticity banners” type and when the model is able to maintain these structures along the forecast. Sensitivity to other model aspects, like horizontal resolution, dynamical kernel and numerical diffusion is also shown.