EMS Annual Meeting Abstracts
Vol. 13, EMS2016-33-1, 2016
16th EMS / 11th ECAC

Verifications of the 14-16 May 2014 extreme precipitation in western Balkans simulated by the Eta model and WRF-NMM: A comparison of bias adjusted equitable threat score and extreme dependency score

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Forecast of rare extreme weather events that can lead to severe material damage and human victims, such as a heavy rain, is one of the most important issues for weather and climate prediction. Equally important issue is the method used in the verification of the skill of numerical models to reproduce these events. The equitable threat score (ETS), which is traditionally used to verify precipitation forecast, is sensitive to the bias and has the disadvantage that tends to zero for rare events. This feature is particularly evident in the events that are rare and extreme. Hence, skill scores that should give a much more useful information than the standard ETS and bias have been developed. This study compares verifications made using two skill scores: the bias adjusted equitable threat score, ETSa (Mesinger, 2008), and the extreme dependency score, EDS (Stephenson et al., 2008). Both scores represent an alternative to ETS for the assessment of skill in deterministic forecasts of rare events and both scores should be presented in conjunction with the frequency bias as a function of threshold. The extreme situation which has been chosen for the comparison of measures of verification is a catastrophic precipitating event occurred in 14-16 May 2014 over the territory of western Balkans when had been observed the record level of precipitation. Numerical simulations of this event are performed with two regional models, the Eta model and the WRF-NMM. The two nonhydrostatic runs are verified against gridded observations of daily precipitation from 92 synoptic stations. Used scores were calculated in the form of cumulative ones for three days of heavy precipitation. Comparison of the two scores is done in order to examine whether we obtained similar values for both skill scores, which would give us a more valid assessment of skill, but also to test similarity which exists in their deffinitions.