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Heat spell and cold spell warnings verification at the Meteorological and Hydrological Service of Croatia

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The future role of national meteorological services is strongly oriented to severe weather warnings. This is particularly relevant due to the increased frequency of extreme events and high impact weather. At the Meteorological and Hydrological Service of Croatia various warnings products are issued: from the general public, Civil protection service and MeteoAlarm to different specialized products, such as heat spells, cold spells, forest fire warnings, etc.

This paper presents heat spell and cold spell warnings forecasting systems that were introduced in our Service in 2014 and 2017, respectively. Due to the frequent hot seasons in the last two decades, but also extreme cold spells, such as the January 2017 episode, this information became highly relevant.

Both systems are based on similar methodology, with thresholds based on climatology, but also with respect to the biometeorological impact studies. Four different warning levels are calculated (green, yellow, orange and red) for four days ahead, for 8 Croatian regions.

Verification results will be presented in this paper, mostly through the contingency tables and related verification scores. Major problems will be discussed: the forecasting system exhibits strong oversensitivity on the temperature thresholds that results in significant noise, and unusual number of missed events. Furthermore, for extremely hazardous situations where lives can be threatened, there is also a significant psychological pressure on the duty forecaster, that can lead to certain overforecasting.

All these results provide a comprehensive insight to the warning forecasting systems, their properties and give a good feed-back to the forecasters, but also a guidance for the improvement of the forecasts.