



Daily maximum winter temperature distributions in Romania and their link to the large-scale atmospheric circulation

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The distributions of maximum winter temperatures recorded at 163 meteorological stations from Romania were analyzed in relationship with large scale atmospheric circulation covering a time interval of 53 years (1961-2013). We applied an unmixing method based on non-negative matrix factorization to the 163 cumulative distributions of daily maximum winter temperatures. Three end-members (EMs) mixing model provided the best approximation of the data set. The first end-member (EM1) corresponds to stations showing positive mean of maximum winter temperatures. Its contribution explaining about 44% of variance dominates the West and South of Romania which suggest that this component represents a South-Western circulation due to Mediterranean and East Atlantic patterns influence. The second end-member (EM2) corresponds to stations with negative mean of maximum winter temperatures. It has the lowest contribution describing only 21% of variance and dominates the North-eastern part of Romania. It suggests that this component is related to North East European anticyclone influence. The third end-member (EM3) is related to stations with slightly positive mean of maximum winter temperatures. Its contributions explaining about 35% are localized mainly on the Carpathian Mountains region. The highly correlation with elevation suggests that this component represents the orography influence. These results are in good agreement with previous studies which showed the highest contribution of extreme high winter temperature index in southern and eastern part of Romania due to East Atlantic Oscillation influence.