

Determination of the areas most exposed to the hail damage in the continental part of Croatia

Damir Počakal i Željko Večenaj

Settled in the mid latitudes of the Northern Hemisphere, Croatia is exposed to the frequent occurrence of severe thunderstorms, especially in the continental part. Therefore, occurrence of hail with a high possibility of doing heavy damage in agricultural production is very frequent. In the 1960s, aiming to protect agricultural production from hail, a hail suppression system was introduced in that area. In this study, we use observed hail and damage data collected in the 1981 - 2012 period along with the hailpad data from 2002 - 2012 period collected on hail suppression stations in the warm parts of the year (from the beginning of May to the end of September). For the spatial analysis of the observed hail and damage data, protected area is divided into 9 km x 9 km quadrants in a way that in every quadrant there is at least one hail suppression station. For each quadrant, a hail threatening index (HTI) as an empirical function of average number of days with hail, number of cases with hail damage (scale from 5 to 100 %) and cases with severe damage (scale from 50 to 100 %) in agriculture is calculated. The purpose of this index is to indicate locations or areas that are most frequently exposed to the crops damage caused by hail. In addition, EOF (empirical orthogonal function) analysis is performed on the kinetic energy data measured by the network of hailpads, in order to determine areas /quadrants with greater average kinetic energy in the period 2002-2012, and hopefully confirm findings revealed by HTI. Results of this study, therefore, reveal the areas that would require additional measures of hail protection (passive or active) and/or use of the agricultural plants more resistant to hail. This map will be useful in defining climatic bounded area in agriculture. Keywords: hail, damage, hail threatening index, EOF