



Drought dynamics and climatic desertification in Moldova

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Abstract. This study is based on commonly accessible surface climate records from 1891 to 2010 and the application of several hydro-climatic indicators including the United Nation Convention to Combat Desertification (UNCCD) Aridity Index (IA), the Radiation Aridity Index (IR) and a newly elaborated Drought Index (ID) for assessing of the risk related to the climatic desertification processes in the Republic of Moldova. Risk is defined as the probability of the hazard and its potential impact. According to the UNCCD classification a large part of Moldova's territory is arid or semiarid with a predicted high frequency of droughts and risk of degradation processes that may cause desertification. However the geographical distribution of sensitivity to these phenomena may be affected to a considerable extent by topographic effects. To produce more accurate predictions, spatially-distributed estimates have been made at high resolution using quantified values of the geographical and topographical factors, derived for a 90 x 90 m gridded surface. The combination of statistical and spatial interpolation from this surface has been implemented to identify and map areas sensitive to climatic desertification (CSAs). The most unfavourable ecological situation exists in the more arid southern and south-eastern regions of the country where in 8 or 9 years out of 10 there is a risk of advancing degradation processes and desertification. In the more highly elevated central and northern parts of Moldova within this study area the risk of climatic desertification is minimal.

The study did not identify a long-term trend toward progressing aridity of the Moldavian territory. Nevertheless the variability of moisture conditions and frequency of severe droughts which contribute to advancing of the degradation processes have increased since 1990. Extreme value analysis was performed to quantify the changes of climatic desertification during the evolution of regional climate beginning from the end 19-th century. Regional climate change is likely to increase climatic desertification risk during the 21'st century.

Keywords: climatic desertification, aridity index, drought, risk assessment