Geophysical Research Abstracts
Vol. 14, EGU2012-11578, 2012
EGU General Assembly 2012

Impact of land-use type on present climate over Romanian territory using RegCM

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Southern part of Romanian territory (Romanian Plain) is one of the most arid area in the country, while representing the main agricultural region with respect to cereal (wheat and maize) crops. Several local studies highlighted the increasing risk for enhanced aridity in three smaller areas in this region: Dobrogea (eastern side), South Moldova Plain (south-east) and Oltenia Plain (south-western part). A tendency for increased temperature and dry spells as well as prolonged periods with significant surface wind speed were identified in the Oltenia Plain. The main driving factors for the above-mentioned changes are both global signal of climate change and local factors. We have investigated these factors, trying to evaluate how present climate conditions would be affected if (a) the cultivated area in the Romanian Plain would be converted to natural vegetation; and (b) a more intensive agriculture would be practiced (i.e. irrigated crops). In this study, we perform a 10 years (2000-2010) simulation using regional climate model RegCM, at a horizontal resolution of 40 km, on a domain covering the entire Romanian territory, using as initial and lateral boundary conditions data from ERA-INTERIM at 0.75x0.75 deg. This larger-scale simulation is further used to provide boundary conditions for two nested experiments at 10 km, centered on a smaller area in the Romanian Plain. The simulations on the smaller domain are characterized in terms of land-use by (a) tall grass (considered as natural vegetation in the absence of crop/cultivated land) and (b) irrigated crop. The effects on the climatic conditions are evaluated with respect to precipitation, air temperature, surface wind speed (changes in spatial distribution, extremes, frequency of threshold values). Further work will assess these effects in the context of climate change scenarios, possibly providing useful information for agriculture planning.