



Precipitation and potential evapotranspiration in Republic of Macedonia in the 21 st century, as a result of climate changes

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The purposes of this paper are to describe predictions on the precipitation and potential evapotranspiration (such as water balance basic components which affect total water needs, soil moisture, surface and ground water, plants etc. and they are important components of climate changes during the 21 st century), for the following characteristic years: 2010, 2025, 2050, 2075 and 2100. Investigations are performed for three sensitivities of climate changes: small, medium and great. The performed analyses refer to 6 climatic models of common atmospheric circulation as follows: HadCM2-scenario used by Hadley Center of the United Kingdom, UKTR-scenario and UKHI-EQ scenario which are used by the Meteorological Service of the United Kingdom, CSIRO1-EQ scenario and CISIRO2-EQ scenario which are used by Australian Scientific Investigation Institute, and CCC-EQ scenario which is used by Canadian Climatic Center. Climate change predictions in the 21 st century are investigated for the following emission scenarios IS92a and IS92c (IPCC 1995). During the investigation of climate changes in the 21 st century the climate models are used according to software package MAGICC SCENGEN (Hulme at all. 1995) as well as CD-MAGICC (version 2.4 dated 2000) published by IPCC (Second Assessment, 1996), by which precipitation and other parameters are analysed which are important for assessment of potential evapotranspiration e.g. mean monthly, annual, seasonal cloudiness mean maximum and minimum air temperatures, wind and air relative humidity. On the basis of the above-mentioned climatic elements, the values of potential evapotranspiration are assessed according to Penman-Monteith (FAO 56) method (Allen R. and all. 1998

and Smith 1996) which is combination of Penman's formula (1948) and modified formula by Monteith (1965). Index R/PET is defined according to the values of precipitation and potential evapotranspiration. This index is applied and analysed for the first time for the territory of Republic of Macedonia and appropriate climatic and agroclimatic districting is made. The R/PET index is analysed using UNESCO classification, (Lozanovski P. and all. 2004) and the values interpreted by De Pauw et al.1999 are used.

The results of the investigation show that during the 21st century in Republic of Macedonia significance changes of precipitation and potential evapotranspiration will happen which will reflect on climate aridity, droughts and desertification, surface and ground water, total water needs and all fields of human life (agriculture, forestry and biodiversity).