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Initial Study of Hydrological Impacts of Regional Climate Change Scenarios

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Studies of T.G. Masaryk Water Research Institute in the area of possible impacts of climate change on hydrological cycle and water resources were formerly based on climate change scenarios developed from results of GCM (General Circulation Model) experiments that were carried out by using HadCM2 and ECHAM4 models. These models were selected for their best suitability for climate conditions in the Czech Republic.

Identical types of the models were therefore used in 2005, when Charles University in Prague prepared regional climate change scenarios for the Czech Republic by using results from RCA and HIRHAM regional climate models, which are based on simulations by HadAM3H and ECHAM4/OPYC Atmospheric-Ocean General Circulation Models (AOGCMs). For these new scenarios, output of the PRUDENCE Project, which is a component of the EU 5th Framework program for Energy, environment, and sustainable development, was used.

The two generations of climate change scenarios were identically derived by using A2 and B2 SRES emission scenarios but the year 2050 as a reference of the former scenarios was replaced in the regional scenarios by results of experiments for the period 2071-2100. The new developments involved in the generation of the regional models include their horizontal resolution of 50 km and their ability to reflect orographic effects in the output.

The paper describes the results of initial studies, which were carried out by using the new scenarios. The scenarios in a form of tables of monthly changes in the air temperature, precipitation and dew point temperature were analysed in terms of their spatial variability on the territory of the Czech Republic and sensitivity of hydrological

response to this variability. The initial studies include also a preliminary comparison of impacts on hydrological conditions and minimum flows of climate changes predicted by the former and new scenarios.