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Robustness of the climate change signal in the hydrological cycle simulated by the coupled model ECHAM5/MPI-OM

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Recently, the new version of the coupled atmosphere/ocean general circulation model of the Max Planck Institute for Meteorology has been used to conduct an ensemble of climate simulations for the 4th assessment report of the Intergovernmental Panel on Climate Change (IPCC). These simulations comprise three control simulations for the past century covering the period 1860-2000, and nine simulations for the future climate (2001-2100). The coupled model was run without flux correction at T63 (about 1.9° or 200 km grid size) horizontal resolution and 31 vertical levels in the atmosphere, and about 1.5° horizontal resolution and 40 vertical layers in the ocean. For the past climate (1860-2000), observed concentrations of CO2, CH4, N2O, CFCs, O3 (tropospheric and stratospheric), and sulphate aerosols (direct and first indirect effect) were prescribed. For the future climate (2001-2100) these concentrations were prescribed according to the three IPCC scenarios B1, A1B and A2. Here, for each scenario three simulations were performed. In our study we will focus on a control period representing current climate from 1961-1990, and on a future period representing a possible climate in the end of the 21st century from 2071-2100. Spatially we will mainly concentrate on a number of large catchments representing the major river systems on Earth in different climate zones. First the simulated hydrological cycle of the control period will be considered to get an idea of the internal variability of the coupled model climate over the different catchments. Then the robustness of the climate change signal will be analysed by comparing the projected changes in the hydrological cycle over the different catchments for the three simulations within each scenario and between the different scenario simulations. Ideally catchments and regions will be identified where the climate change signal in the hydrological cycle is robust, and

where this signal has a larger uncertainty.