



Seasonal changes in the regional hydrological cycle and resulting potential vegetation changes in an aggressive mitigation scenario compared to SRES A1B

H. Huebener (1), I. Höschel (2), J. Körber (2), M. Sanderson (3), T.C. Johns (3), J.-F. Royer (4), D. Salas y Melia (4), E. Roeckner (5), M. Giorgetta (5), E. Manzini (6,7)

(1) Hessian Agency for Environment and Geology, Hessian Centre for Climate Change, Wiesbaden, Germany (heike.huebener@hlug.hessen.de), (2) Freie Universität Berlin, Institut für Meteorologie, Berlin, Germany, (3) Met Office, Hadley Centre, Exeter, UK, (4) CNRM-GAME Meteo-France CNRS, Toulouse, France, (5) Max Planck Institute for Meteorology, Hamburg, Germany, (6) Istituto Nazionale di Geofisica e Vulcanologia, Bologna, Italy, (7) Centro EuroMediterraneo per i Cambiamenti Climatici, (8) Danish Meteorological Institute, Copenhagen, Denmark, (9) Laboratoire de Météorologie Dynamique du CNRS, Université Pierre et Marie Curie, Paris, France, (10) Nansen Environmental and Remote Sensing Center, Bergen, Norway

An aggressive mitigation scenario named E1 was developed in the EU FP6 Project ENSEMBLES, starting from current concentration levels (scenario path of SRES A1B) and leading to an eventual stabilization of CO₂-eq. concentrations at 450 ppm beyond 2100. A set of 10 GCM and ESM was used to simulate climate change until 2100 under the E1 scenario, compared to the baseline A1B scenario. Previous analysis has shown that the ensemble mean warming stays below the 2K-target.

In this presentation, focus will be on monthly and seasonal analyses of changes in the hydrological cycle and resulting potential vegetation changes, represented by biomes. For selected regions (from the 26 Giorgy-Regions) the annual cycles of precipitation, cloudiness and evapotranspiration and related biome changes will be shown. The results will be compared between the two scenarios and particularly vulnerable regions will be identified.

Results will be discussed with special focus on the avoided climate change under the E1 scenario as compared to the A1B scenario. This allows assessing both, profits of keeping the 2K-target and changes that are unavoidable even under the aggressive mitigation path necessary to keep the 2K-target.

Biome changes for both scenarios reflect shifts to a warmer climate but are more pronounced in the A1B scenario compared to the E1 scenario. For example, in North-Eastern Europe, an expansion of Temperate Mixed Forest and Cool Mixed forests is simulated replacing Cool Conifer Forests and Taiga. Further south, in the Mediterranean Basin temperate Mixed Forests are replaced by Xerophytic Woodland, Warm Grassland and Warm Mixed Forest.