



Impact of Climate Change in the Po valley: downscaling high resolution RegCM output by coupling with ChYM hydrological model

E. Coppola (1), F. Giorgi (1), X. Gao (2), L. Mariotti (1,3), B. Tomassetti (3), M. Verdecchia (3)

(1) The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, (2) National Climate Center of CMA, China, (3) CETEMPS, University of L'Aquila, Italy
(coppola@ictp.it / Fax: +39 040 2240449)

The response of the Po River basin in northern Italy to anthropogenic greenhouse gas forcing is evaluated by means of hydrological model simulations coupled with regional climate model (RegCM3) output. Two RegCM3 simulations of 30 years in length for the past (1960-90) and future climate (2070-2100) are performed at a 20 km horizontal resolution for the European domain. The future simulations are performed according to the GHG emission scenario A2 as prescribed by the last IPCC report. A grid-based hydrological model ChYM is coupled off-line with the RegCM3 model. ChYM is run with a horizontal resolution of 1 km for the Po River basin forced with RegCM3 output. A preliminary hydrological model validation is performed using observed time series of Po River discharge. The change of water discharge for the basin in the future climate is evaluated by comparing the A2 scenario with the control simulation.

Increase in precipitation in winter-spring lead to and increase in discharge for winter and early spring for all the whole PO basin as previously found for the Danube and Rhine catchment (Hageman and Jacob, 2007, Climate Change; Graham et al., 2007)

Peak spring flows occurs about one month earlier in the basin as it was also found for the Lule River Basin (Graham et al., 2007, Climate Change)

Reduction up to 70% of the basin discharge is found from May to November mainly in the upper part of the basin. An increase in the river discharge is observed in winter months.