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# Assessment of expected climate change over the eastern Mediterranean region in three simulation experiments with RegCM model

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Results of three regional climate simulations (RCM) of present and future climate conditions over the eastern Mediterranean region (EM) performed with different configurations of the ICTP, (Trieste, Italy) RegCM3 model nested with two AOGCMs are analyzed. The three experiments are performed with different configurations of the RCM with 50 km model domain extending in the meridional direction from northern Africa to southern part of Asia Minor. Boundary conditions for the RCM runs are determined by global climate simulations with the Hadley Center HadCM3 (downscaled with the HadAM3P AGCM) and NASA FVGCM for the recent past (1961-1990) and future (2071-2100) 30 year periods. Results of the RCM experiment are analyzed in comparison to those driven from the lateral boundaries by results of climate simulation with HadAM3H model with a larger 50 km domain performed at the ICTP under the EU PRUDENCE Project using RegCM2. Differences in the cloud parameterization schemes in the HadAM3H and HadAm3P may be significant over the areas over and to the south of the EM. Observed sea surface temperature and ice concentration data are used in the HadAM3H, HadAM3P simulations.

Application of the multi-GCM strategy of the analysis allowed evaluation of uncertainty of results as well as the effects of the model internal variability (MIV). Evaluation of the climate change trends in mean seasonal distributions of precipitation, 2m air temperature and 10 m wind fields was performed. Some minor differences in the simulation results indicate a significant role of the MIV especially over the northern part of the domain. The RCM simulations agree however in their estimates of the ma-

jor details of the expected climate change trends for the XXI century over the central and southern parts of the region. According to the SRES A2 scenario during winter season a 2 ºC - 3 ºC (3 ºC - 4 ºC) temperature increase is simulated over the southern (northern) part of the EM region. A 2.5 ºC – 4.5 ºC (over the northern part) temperature increase is predicted for the spring season. Significant warming (3 ºC - 5 ºC) is simulated over the whole EM region for summer season. Somewhat lower mean seasonal temperature increases are predicted for the autumn season. A significant precipitation decrease (of about 10-30 % of model produced precipitation) is predicted for winter season in all the A2 experiments (no change in winter precipitation is predicted over northern Africa however). During spring also significant precipitation decrease is consistently simulated by the experiments for the northern part of the region. During spring season no reliable results of the precipitation trend over the region is obtained. A significant decrease in summer precipitation amounts over the coastal zone of Asia Minor may be expected. The results also indicate significant relative humidity increase during the summer season over the central EM. A precipitation increase is predicted for the central EM for autumn. Similar though less significant climate change trends are simulated for the region in the experiments based on the B2 scenario for the anthropogenic emission of non-water vapor greenhouse gases.

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