



Climate change impact on future heating and cooling needs in Zagreb

Lidija Cvitan, Mirta Patarčić, and Renata Sokol Jurković

Meteorological and hydrological service, Research and development division, Zagreb, Croatia (cvitan@cirus.dhz.hr)

The commonly used degree-days method is implemented to investigate climate change impact on future heating and cooling needs in Croatian capital city of Zagreb. Two temperature parameters were analysed for the whole particular season, that is, heating degree-day (HDD) for the heating season (October-April) and cooling degree-day (CDD) for the cooling season (May-September). To assess heating and cooling parameters in future climate, a subset of nine regional climate models from the EU-ENSEMBLES project was used. The assessment was done for two future periods: 2011-2040 (P1) and 2041-2070 (P2) when all models follow A1B greenhouse gases emission scenario. Horizontal resolution of each model was 25 km. Future projections of heating and cooling parameters for Zagreb station were determined by using simulated 2-m air temperatures from the grid point which is closest to the station.

In order to evaluate the temperature simulations against observations, temperature biases (model minus observations) averaged over three periods over the year (January-April, May-September and October-December) and all months for the 1961-1990 control period were determined. For the same control period, nine present day simulations of heating and cooling degree-days were also calculated. Comparison of the degree-day simulations with temperature biases over the control period helped in detecting the simulations that are closest to the observations (i.e. the most realistic simulations). For P1 and P2 future climates, projected degree-day trends are shown for the most realistic simulations as well as the range of degree-day changes that could be expected based on all considered simulations. For both future periods the most realistic simulations show decreasing HDD trends and increasing CDD trends. For CDD, the magnitude of the trend is four to five times larger in P2 than in P1, while for HDD the P1 and P2 trend magnitudes differ less.