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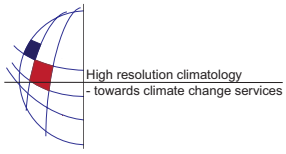


# Regional climate modelling of 2m temperature and precipitation changes in future climate over Europe

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The Regional Climate Model (RegCM3) has been used to assess 2m temperature and precipitation change and variability over Europe. RegCM3 was forced with coupled ocean-atmosphere model (ECHAM5 and MPI-OM). Dynamical downscaling of three ensemble members was performed for present climate (period P0:1961-1990) and future climate (period P1:2011-2040, period P2:2041-2070) under the IPCC A2 scenario. Regional model domain covered central and southern Europe and small part of northern Africa. RegCM3 horizontal resolution was 35km.

The P0 period was verified against CRU dataset for all seasons. The analysis of climate change was focused on changes in annual cycle, seasonal means and variability between two future periods and present climate. Student's t-test was used to assess statistical significance of changes in mean climate.

RegCM3 exhibits cold bias in all seasons except in winter when warmer temperatures are seen over most of Europe. In summer, model is too dry over central and eastern Europe and in the Mediterranean region, while wet bias is seen in northern part of the domain. In other seasons wet bias is extended further south, and dry bias is seen only over the Alps and in coastal regions in the Mediterranean area.

In future climate, warming is strongest in summer and over Mediterranean region, particularly over the Iberian peninsula. In winter and spring, warming is dominant in northeastern part of the domain. The amplitude of warming is higher for maximum than for minimum temperatures. Climate change signal is stronger in P2 than in P1. In spring and summer in P1, precipitation will increase in eastern and decrease in western part of the domain. In autumn, precipitation will increase in southern part of the domain, while in winter changes in precipitation are very small with decrease in the Mediterranean coastal regions, and increase over France. In the second period (P2), decrease in southern and increase in northern part of the domain is seen in all seasons except in summer, when precipitation will decrease in western Europe and in the Mediterranean, with very small changes in central and northeastern Europe.