Climate Change Impacts on Turkish Vegetation

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The Mediterranean has been identified as a potentially vulnerable hotspot under climate change. In Turkey, climate change projections consistently predict large temperature rises over the 21st century. With 9% of GDP and 25% of employment coming from agriculture, climate change has the potential to significantly affect both the Turkish economy and living standards. Relatively little work has been undertaken to estimate the effects and risks of climate change in Turkey, and many European studies cover do not include the whole of Turkey in their domain and so are of limited use for policy-makers.

The Dynamic Global Vegetation Model LPJ-GUESS was parametrised to represent Turkish vegetation. Climate forcings were derived by interpolating meteorological data from over 600 stations from 1975-2010 to a 1km resolution. Soil depth and soil texture data from field measurements were also interpolated to a 1km grid. The model was benchmarked against vegetation type and remotely sensed biomass and tree cover data.

Future climate conditions were calculated using the outputs from a set of regional model simulations. In particular the HadRM3P regional climate model was used to downscale five members of a perturbed physics ensemble of global climate projections obtained using HadCM3 general circulation model and the SRES A1B scenario. A delta change factor approach was then used in conjunction with the observed climate data to assess the impact on vegetation structure and ecological processes to the year 2100 using LPJ-GUESS. The resulting changes to productivity, vegetation structure and hydrology are discussed. Eventually these results will be combined with complementary studies concerning wildfire and erosion to produce a risk map for informing policy-makers.