



## **Cooling effect of anthropic land-use on Central European summer**

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This study shows that in summer the anthropic land use produces a cooler climate in Central Europe. In fact, over the Balkan Peninsula anthropic land use modifies the surface energy balance by increasing evapotranspiration, while over central-western Europe, cooling is mostly due to cloudier sky conditions. In this analysis the diagnostic PNV (Potential Natural Vegetation) model VERDE (VEgetation Reconstruction by Diagnostic Equilibrium), recently developed by the authors, is off-line coupled to the regional climate model RegCM (Regional Climate Model, ICTP, Italy) and implemented in the European and Mediterranean region. The coupling consists in the iteration of a two-step procedure, which is composed of a multi-annual model simulation and of the subsequent computation by VERDE of the PNV corresponding to the simulated climate. In the first iteration RegCM adopts the present land-use (which over Europe is dominated by crops and farming, with hardly any natural vegetation). The procedure is iterated until when PNV and model climate are consistent. The equilibrium PNV consists mainly of shrubs in the Mediterranean and deciduous broadleaf forest in central Europe. The effect of the anthropic land use on climate is given by the difference between the first and the last iterations of the procedure. These results shows that a) considering reforestation as a tool for climate change mitigation at regional European scale remains a controversial issue and b) increasing farming might have reduced past warming signal at regional scale, though historical records of land-use evolution make this effect likely small for Europe during the 20th century.