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Forestation effects on soil temperature across the European continent.

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Land-Use and Land Cover Changes (LULCC) play a fundamental role in land-atmosphere interactions, since they mainly regulate the exchange of latent and sensible heat between the ground and the upper air, while they control the amount of shortwave radiation absorbed by the ground. In this study, we make an attempt to investigate the biogeophysical effects of extreme land cover changes on soil variables, such as soil temperature and soil moisture. In particular, we analyze a multi-model ensemble of nine different regional climate model simulations, which had been performed over the Euro-CORDEX domain in the frame of the WCRP CORDEX Flagship Pilot Study LUCAS (Land Use and Climate Across Scales). We compare two idealized experiments: a maximally forested (called FOREST) and a fully grassed Europe (called GRASS). According to our results, the soil temperature response to forestation varies among the climate models. They show a profound seasonality and dependence by latitude. In winter, the magnitude of soil temperature changes is considered weak, showing a warming in high latitudes (around +1°C on average) and a weak cooling over the Mediterranean region. During the summertime, in contrast, soil temperatures are higher in the GRASS experiment, especially in Central and Southern Europe (ranging from +1°C to +3°C depending to the model), underlying the essential role of soil moisture in determining the land-atmosphere feedbacks during the summer. In our contribution, we will present in detail the role of forest and grass characteristics and its effects on seasonal soil conditions across Europe[DR1].