

The impact of different levels of deforestation on near-surface climate

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Large-scale deforestation has spatially diverging impacts on near-surface climate. The purpose of this GCM study is to investigate these patterns taking into account the differences in initial tree cover of deforested areas (among other factors). Knowing how temperature changes in response to a certain degree of deforestation, also referred to as forest sensitivity, can help us understand better the effects of different levels of deforestation. To quantify these effects an idealized deforestation experiment (deforest-globe) as part of CMIP6 is used. The current study concentrates only on one model – CESM2, which has proved to be able to accurately represent the spatial patterns of temperature changes caused by deforestation as compared to observations. Some of the main findings show an increased influence of initial tree cover on forest sensitivity in boreal forests, whereas in the tropics the spatial patterns were modulated mostly by differences in the latent heat flux masking the potential impact of initial tree cover on forest sensitivity. This study builds further on exploring the non-linear behaviour of forest sensitivity, which can help us better manage afforestation efforts as a prominent negative carbon emission approach.