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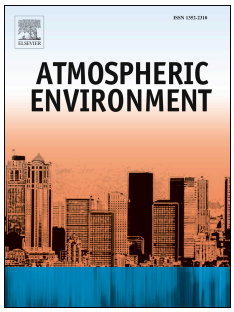

Impact of LULCC on the emission of BVOCs during the 21st century

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Impact of LULCC on the emission of BVOCs during the 21st century

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Abstract

Land-use and land-cover change (LULCC) is one of the key drivers of anthropogenic climate change. In addition to greenhouse gases such as CO_2 or CH_4, LULCC affects also the emission of other carbon trace gases such as biogenic volatile organic compounds (BVOCs). We investigate the impact of changing LULCC on the emission of isoprene and monoterpenes during the 21st century using seven different land-use projections, applying the dynamic vegetation modelling framework LPJ-GUESS. Climate change, and atmospheric CO_2-concentration are based on the RCP2.6 scenario. The different LULCC-scenarios explore the impact of different land-based climate change mitigation strategies (such as afforestation and avoided deforestation, or bioenergy). We show that the increase of land area under crops or grassland would lead to a significant decrease of BVOC emissions, with a strong negative correlation between the fraction of managed global land area and the emission of isoprene and monoterpenes. But the choice of crops is important, especially for the bioenergy scenarios in which increasing fractional cover leads to decreasing BVOC emissions in our simulations; use of woody bioenergy crops can reverse this decrease. The strong impact of LULCC on the global and regional emission of BVOCs implies the need to include the impact of these changes in projections of atmospheric composition and air quality.

Keywords: