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Anthropogenic land cover change in the last millennium - assessing its extent and consequences for climate

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Anthropogenic climate change is generally thought to have begun with the industrial revolution, when man started to effectively alter the composition of the atmosphere by emissions from fossil fuels. Human impact on environment, however, started much earlier: Thousands of years ago, land was already transformed for use in agriculture and cattle husbandry. The effect of these early human activities on climate is currently subject of a heated debate. We present the first steps of a comprehensive study that aims at estimating the effect of anthropogenic land cover change on climate for the last millennium. Main focus is on the quantification of global land use change for the time period before AD 1700 where data is scarce. A simple method is presented that consistently estimates the extent of crop and pasture areas since AD 800 on a geographically explicit basis using population census data. This land use reconstruction can be used to assess human impact on the environment in pre-industrial times at high spatial and temporal resolution and will be made available to public. We present first applications of the reconstruction: (a) in a carbon balance model to estimate historic changes of soil and vegetation carbon and (b) in a complex climate model to quantify changes in radiative forcing.