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Simulation of the 19th and 20th century climate with ECHAM5-HAM

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Climate simulations with an atmospheric general circulation model driven with natural and anthropogenic forcings have been carried out from 1870 to 2000. The atmospheric GCM ECHAM5 is interactively coupled to the atmospheric aerosol module HAM, while the SSTs are based on data from the Hadley Center dataset. Aerosol emissions are taken from the National Institute for Environmental Studies (NIES), and include SO2 and black carbon from fossil fuel combustion as well as black carbon from biomass burning. Other forcings included in the simulations are changes in greenhouse gases, DMS, solar output and volcanic activities. Global simulations will give a general overview of the climate evolution since the mid-nineteenth century, and will allow the definition of limits to further regional simulations. Sensitivity experiments are carried out, in order to understand better the impact of the the different forcings on the climate since the mid-nineteenth century. Results are discussed with particular emphasis on the hydrological and radiation conditions under different forcings.