



## **Climate response of aerosol emissions from specific economic sectors**

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Specific economic sectors or source regions emit a wide variety of air pollutants which influence climate and air quality. This includes emissions of greenhouse gases, chemical species which affect the oxidation capacity of the atmosphere and the concentrations of ozone and methane, and aerosol particles or aerosol precursors. Regional climate respectively weather controls transport and removal of pollutants, chemical transformation pathways, particle formation rate and sink processes as well as emissions from natural sources. Interactions between aerosols and trace gases modify their global and regional distributions. Thus, climatic and environmental impacts are not only controlled by amount and chemical composition of pollutant emissions but in addition also by their interactions and the local meteorological conditions in the source region. For the development of mitigation strategies to minimize adverse conditions attributed to climate change and air pollution we need a better understanding of the role of source location, impact of interactions and feedbacks and of the influence of climate change on the chemical composition of the atmosphere.

In this study we used the atmospheric general circulation model ECHAM5 of the Max Planck Institute for Meteorology coupled to a mixed layer ocean. The model includes an aerosol-cloud microphysical scheme and accounts for the direct, semi-direct and indirect aerosol effects. We performed a number of simulations to explore the climate response due to different pollutants and source types. A focus is put on the question

whether climate sensitivity and hydrological sensitivity depend on the type of forcing.