



Europe in 2050, a regional air quality and climate perspective

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The impacts of climate policies on air quality are twofold. First, climate policies imply energy efficiency measures and other technical measures that will have an impact on a wide range of human activities, emissions, and, in turn, on air quality. Second, air quality is sensitive to climate change (which affects physical and chemical properties of the atmosphere) and long range transport of background pollution. Measures designed to mitigate climate change and their effectiveness will thus have both direct and indirect impacts on air pollution.

To quantify changes in air pollution in Europe resulting from climate policies at the 2050 horizon, we designed a comprehensive modelling system that captures the external factors considered to be most important for air quality and which relies on the latest set of air pollution and climate scenarios. Climate simulations rely on the recent Representative Concentrations Pathways (RCP) of IPCC whereas air quality modelling is based on the emissions produced in the framework of the more recent Global Energy Assessment. In both cases, we explored two scenarios that are consistent in the climate and air quality models in terms of policy measures: a reference in which climate policies are absent and a mitigation scenario which will limit global temperature rise to within 2 degrees Celsius by the end of this century.

The results are presented in terms of indicators that are relevant regarding the impact of air pollution on health and vegetation. Furthermore attention is given to the de-convolution of the respective contribution of changes in European emissions, hemispheric background concentrations and climate conditions. A synthetic indicator is designed to quantify the respective impact of each compartment. This new indicator allows isolating the net effect of climate change on air quality, as well as the contributions of anthropogenic emission changes and long range transport.