PRIMEQUAL
Programme de recherche interorganisme pour une meilleure qualité de l'air

SALUT'AIR: Assessing Long Term Air Quality Mitigation Strategies in the Face of Long Range Transport and Climate Change

Coordinateur : Bertrand Bessagnet - INERIS

Climate change, long range transport of pollutants and surface air quality share multiple interaction pathways. Tailoring efficient air quality mitigation strategies over the long term requires taking into account such external factors that can be neglected for short term projections. We designed, developed and implemented a new regional air quality and climate modelling system to account for the possible penalties of climate change and long range transport of pollutants on European air quality. In order to ensure its relevance for environmental policy making, this modelling system is embedded in a quantitative cost-benefit analysis framework.

The development of the modelling system provided an opportunity to investigate individual components of the suite. A breakthrough in terms of regional climate modelling was achieved by carefully documenting and improving the performance of the dynamical downscaling and by exploring bias correction techniques. Interactions between vegetation, climate, and air were also investigated.

The regional air quality and climate modelling suite allowed proposing an assessment of European air quality in 2050. We highlighted the dominating influence of mitigation of anthropogenic emissions of pollutants in Europe. But the penalty brought about by climate change on ozone pollution was also confirmed, and the large impact of long range transport at the 2050 horizon was emphasized. For particulate matter, long range transport is less important; the impact of climate change is significant but also uncertain.

Thanks to the use of air pollutant emission projections based on emission factors reflecting the current legislation, we could assess the costs of climate mitigation and air quality legislation. We point out the economic benefit of climate policies for air quality legislation due to a low carbon economy requiring fewer (end-of-pipe) technological measures against air pollution. The total cost of mitigation (air and climate) remains however higher under the mitigation than under the business as usual pathway.

The analysis of air and climate modelling results within a monetised health impact assessment framework allowed assessing expected sanitary benefits. It is important to highlight that the expected monetised sanitary benefits almost compensate the costs, showing the air quality co-benefit of investing in climate mitigation.