Geophysical Research Abstracts
Vol. 15, EGU2013-823, 2013
EGU General Assembly 2013

Implications of alternative assumptions regarding future air pollution control in RCP-like scenarios

Clifford Chuwah (1,2,3), Twan van Noije (1), Detlef van Vuuren (2,4), Wilco Hazeleger (1,3), Achim Strunk (1), Sebastiaan Deetman (2), Angelica Mendoza Beltran (2), and Jasper van Vliet (2)

(1) Royal Netherlands Meteorological Institute, De Bilt, The Netherlands, (2) Netherlands Environmental Assessment Agency, Bilthoven, The Netherlands, (3) Wageningen University, Wageningen, The Netherlands, (4) Utrecht University, Department of Geosciences, Utrecht, The Netherlands

Estimation of future emissions of short-lived trace gases and aerosols from human activities is a main source of uncertainty in projections of future air quality and climate forcing. The Representative Concentration Pathways (RCPs), however, all assume that worldwide ambitious air pollution control policies will be implemented in the coming decades. In this study, we therefore explore the consequences of four alternative emission scenarios generated using the IMAGE integrated assessment model following the methods used to generate the RCPs. These scenarios combine low and high air pollution variants of the scenarios with radiative forcing targets in 2100 of 2.6 W/m2 and 6.0 W/m2 (the high air pollution variants assume no improvement in emission factors, representing a hypothetical upper end of emission levels). Analysis using the global atmospheric chemistry and transport model TM5 shows that climate mitigation and air pollution control policy variants studied here have similar large-scale effects on the concentrations of ozone and black carbon; the impact of climate policy, however, has a stronger impact on sulphate concentrations. Air pollution control measures could significantly reduce the warming by tropospheric ozone and black carbon and the cooling by sulphate already in 2020, and on the longer term contribute to enhanced warming by methane. These effects tend to cancel each other at the global scale. According to our estimates the effect of the worldwide implementation of air pollution control measures on the total global mean direct radiative forcing in 2050 is +0.09 W/m2 in the 6.0 W/m2 scenario and -0.16 W/m2 in the 2.6 W/m2 scenario.