



## Influence of the North Atlantic Oscillation on air pollution transport

T. Christoudias (1), A. Pozzer (1,2,4), J. Lelieveld (1,2,3)

(1) Cyprus Institute, Nicosia, Cyprus, (2) Max Planck Institute of Chemistry, Mainz, Germany, (3) King Saud University, Riyadh, Saudi Arabia, (4) now at Abdus Salam International Center for Theoretical Physics, Trieste, Italy

We examined the influence of the North Atlantic Oscillation (NAO) on the atmospheric dispersion of pollution by computing the emission, transport and removal of idealized insoluble gaseous and water-soluble aerosol tracers, tagged by the continent of origin. We simulated a period of 50 yr (1960–2010), using the ECHAM5/MESSy1 atmospheric chemistry (EMAC) general circulation model. The model accounts for anthropogenic, biogenic and biomass burning sources, removal of trace gases through OH oxidation, and precipitation, sedimentation and deposition of aerosols. The model is shown to reproduce the observed spatial features of the NAO, moisture transports and precipitation. During high NAO phase seasons the axis of maximum westerly North American trace gas transports extends relatively far to the north and east over Europe. The NAO phase is significantly correlated with North American insoluble gas and soluble aerosol tracer concentrations over the northwestern Atlantic Ocean and across northern Europe, and with European trace gases and aerosols over Africa and north of the Arctic circle. We find a strong anti-correlation between the phase of the NAO and European pollutant gas concentration over western and central Europe.