

Introduction – Motivation

North Atmospheric Oscillation (NAO) Major recurring variability pattern in Northern Hemisphere

We investigate

- Influence on pollution transport pathways
- Impact on pollutant surface concentration

Modelling study:

- Emission, transport and removal of gas/aerosol pollution over last 5 decades

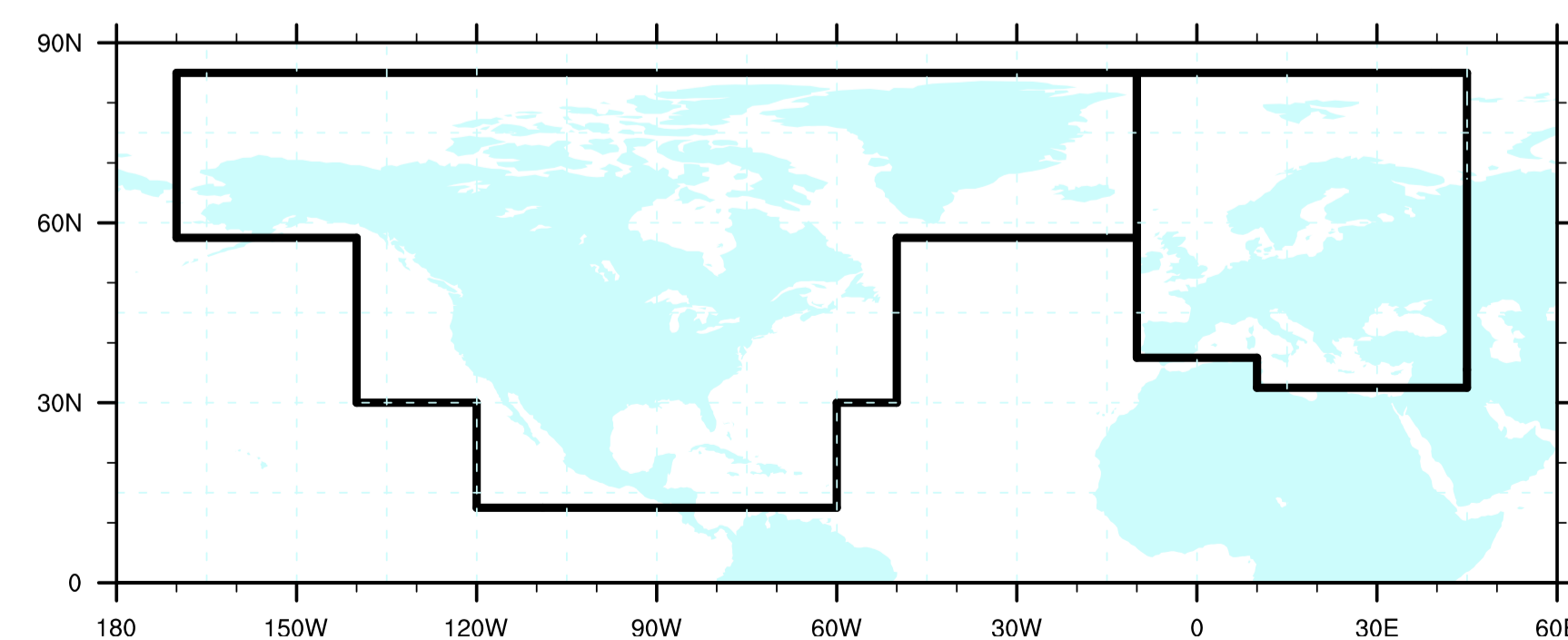
Model Setup

EMAC (ECHAM5/MESSy) Global Climate Chemistry Model:

- T42L19 Resolution: $\sim 2.8^\circ \times 2.8^\circ$, 19 hybrid layers
- 50 years: 1960 – 2010
- Realistic boundary conditions (AMIP)

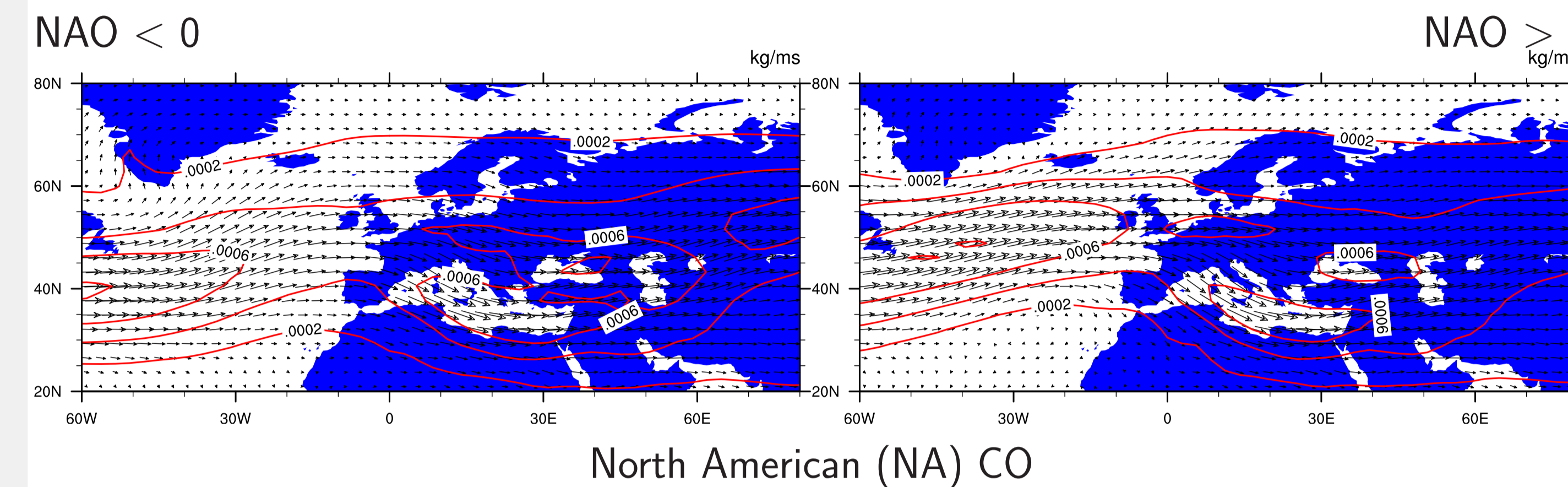
Pollution:

- Anthropogenic EDGAR-4/CIRCE
- Biogenic GEIA
- Biomass Burning GFED 3.1
- Idealized insoluble **gaseous CO** (OH oxidation)
- **Water-soluble aerosols** (Precipitation, sedimentation, deposition)
- Tagged by continent of origin (NA/EU):

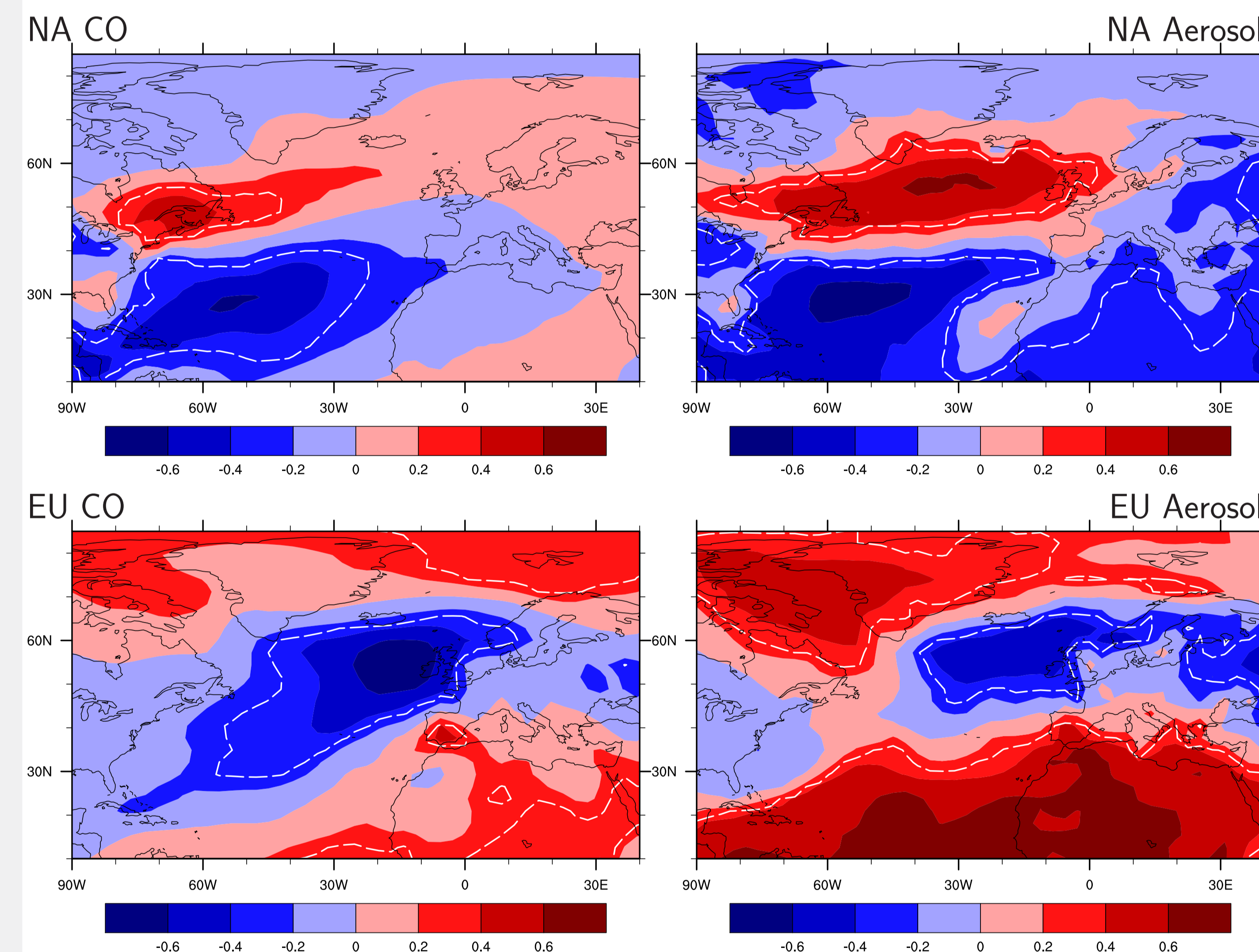


Results

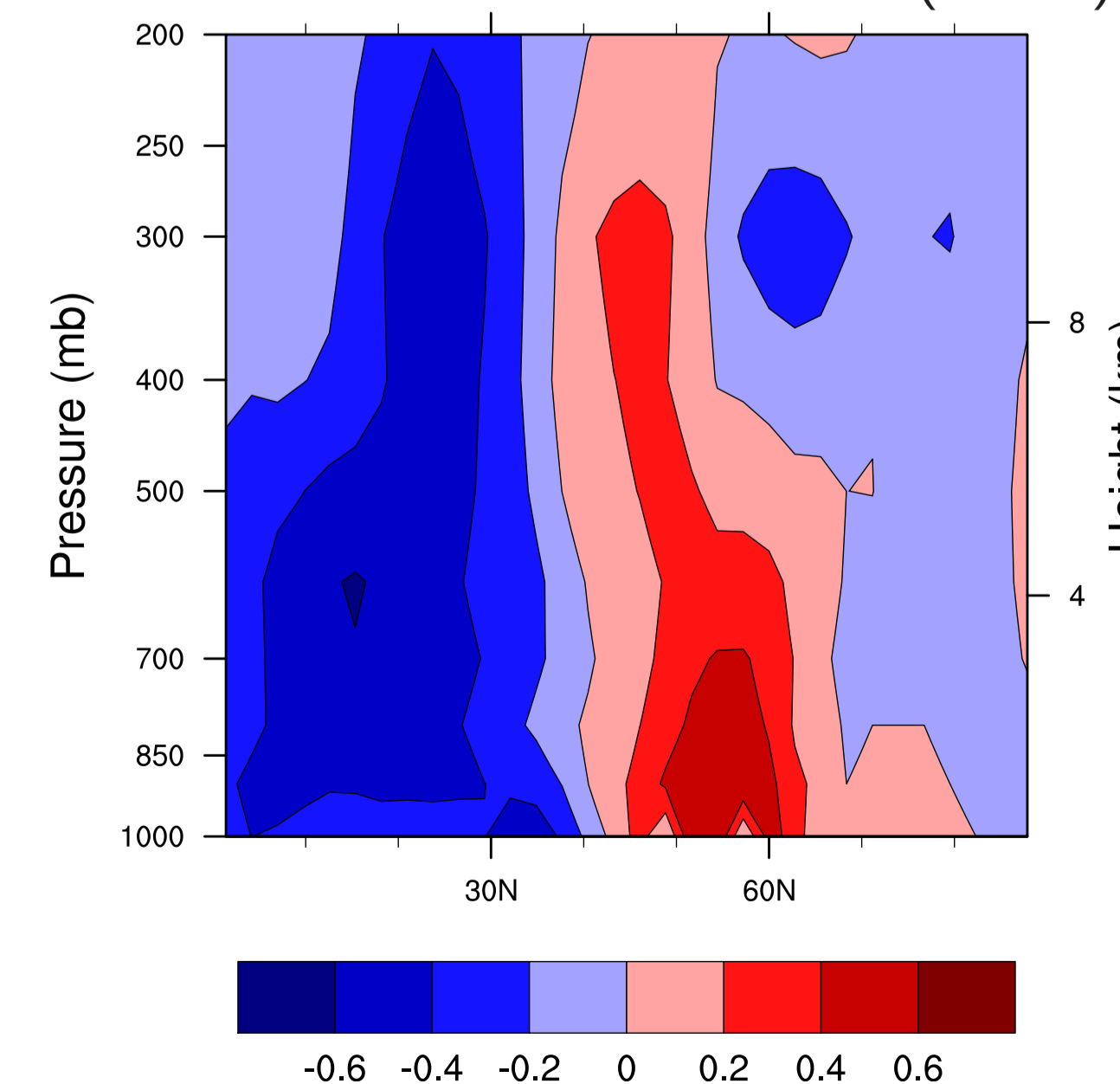
Vertically Integrated Transport



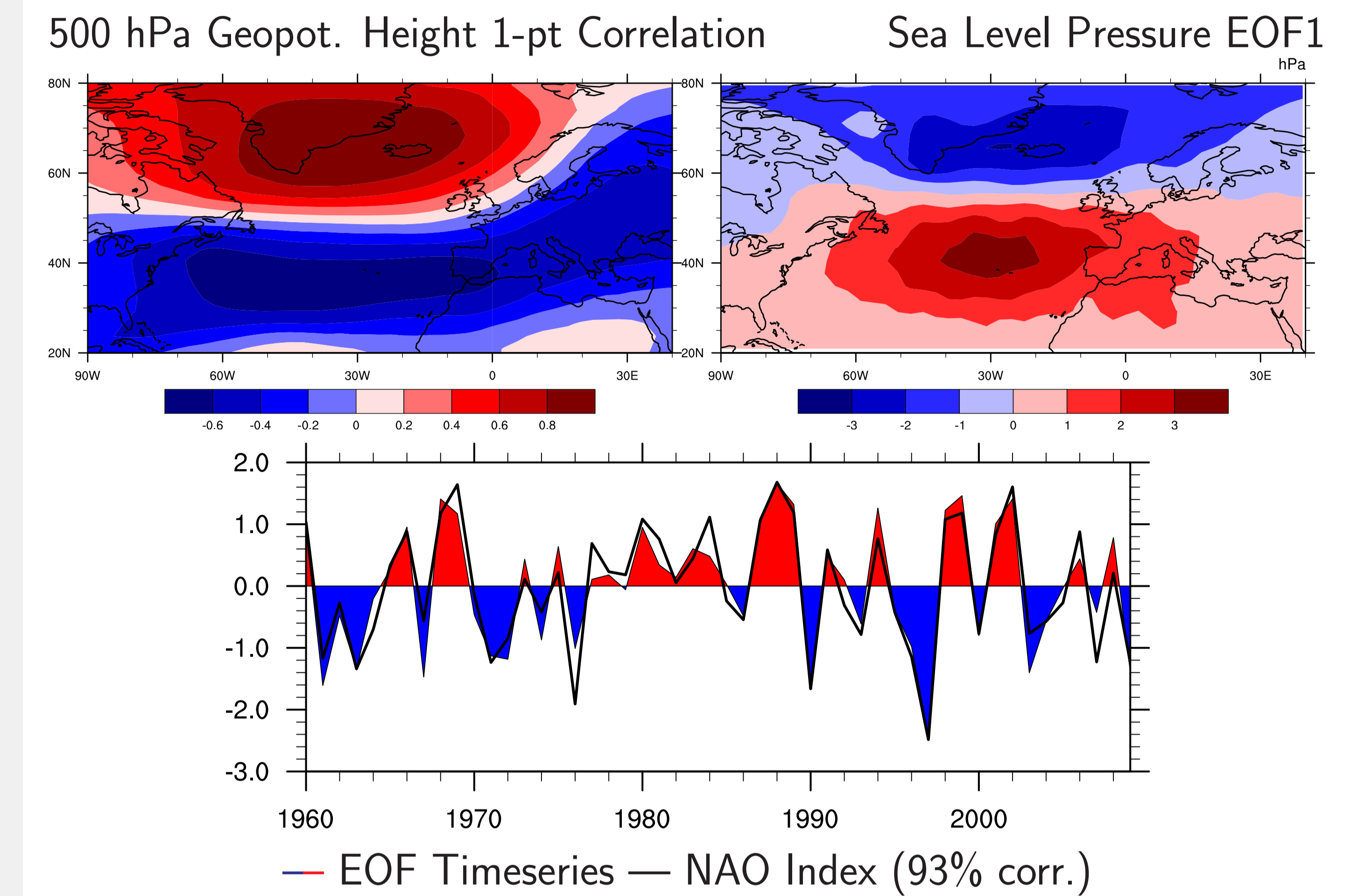
NAO index – Surface Concentration Correlation



NA Aerosol Meridional Profile (30°W)



Modelled North Atlantic Oscillation



Conclusions

NAO phase

- Shifts axis of NA gas transport far over NW Europe
- Correlated with gas/aerosol surface concentrations originating in
 - NA over NW Atlantic Ocean and N Europe
 - Europe over Africa and north of Arctic circle
- Anti-correlated with EU pollutants over Western and Central Europe

Acknowledgements

The research leading to these results has received funding from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013)/ERC grant agreement no. 226144.

