Geophysical Research Abstracts,
Vol. 11, EGU2009-9102, 2009
EGU General Assembly 2009

Trend Analysis of Nitrogen Deposition to Baltic Sea and its sub basins

V.S. Semeena and Bartnicki Jerzy
Norwegean Meteorological Institute, Air Pollution, Oslo, Norway (semeenav@met.no)

Since the beginning of last century, Baltic Sea has changed from a clear-water sea into a eutrophic marine environment. Eutrophication is the major problem in the Baltic Sea. Excessive nitrogen and phosphorus loads coming from land-based sources within and outside the catchment area of the bordering countries of the Baltic Sea are the main cause of the eutrophication in the sea. Even though a major part of nitrogen(75%) and phosphorus load(95%) enter the sea via rivers or as water-born discharges, 25% of the nitrogen load comes as atmospheric deposition. Numerical models are the best tools to measure atmospheric deposition into sea waters. We have used the latest version of the Unified EMEP model - which has been developed at the EMEP/MSC-W (Meteorological Synthesizing Centre - West of EMEP) for simulating atmospheric transport and deposition of acidifying and eutrophying compounds as well as photo-oxidants in Europe- to study the trends in atmospheric deposition of nitrogen into Baltic Sea for the period 1995-2006. The model domain covers Europe and the Atlantic Ocean. The model grid (of the size 170×133) has a horizontal resolution of 50 km at 60o N, which is consistent with the resolution of emission data reported to CLRTAP. Approximately 10 of these layers are placed below 2 km to obtain high resolution of the boundary layer which is of special importance to the long range transport of air pollution.

EMEP model has been thouroughly validated (Fagerli et.al.[1], Simpson et.al.[2], Simpson et.al.[3]) The contribution of deposition of nitrogen into Baltic Sea from each of the bordering countries of the Baltic Sea and the deposition trends for the period 1995-2006 has been analysed and the results will be presented.

References:

[1]. Fagerli H., Simpson D. and Aas W.: Model performance for sulphur and nitrogen compounds for the period 1980 to 2000. [In:] L. Tarras´on, (editor), Transboundary Acidification, Eutrophication and Ground Level Ozone in Europe. EMEP Status Report 1/2003, Part II Unified EMEP Model Performance, pages 1-66. The Norwegian Meteorological Institute, Oslo, Norway, 2003.

[2]. Simpson D., Butterbach-Bahl K., Fagerli H., Kesik M. and Skiba U.: Deposition and Emissions of Reactive Nitrogen over European Forests: A Modelling Study. Atmos. Environ., 2006, 40(29), 5712[U+2011]5726.

[3]. Simpson D., Fagerli H., Hellsten S., Knulst K. and Westling O.: Comparison of modelled and monitored deposition fluxes of sulphur and nitrogen to ICP-forest sites in Europe. Biogeosciences, 2006, 337-355.