

Simulation and Analysis of the DMS and Sulfate during the C-SOLAS SABINA Campaign.

Atif Taoussi¹, Jean-Pierre Blanchet¹ PhD, Maurice Levasseur² PhD, Anne-Lise Norman³ PhD

¹ UQAM (Montreal), ² University of Laval (Quebec City), ³ University of Calgary (Calgary),

Abstract:

Oceanic Dimethyl Sulfide (DMS) is the main natural source of sulfur in the atmosphere. Sulphated aerosols derived from atmospheric DMS play an important role in cloud microphysics, precipitation, clouds, albedo and radiative balance. To achieve these objectives, a comparison was made between simulations of the North Aerosol Regional Canadian Model (NARCM) and the measurements taken during the SABINA (Study of the Air-Sea Biogeochemical Interactions in the North Atlantic) which took place in Northwest Atlantic Ocean in the spring, summer and fall of 2003. Two experiments were conducted with and without anthropogenic sources from eastern North America. The results of these simulations were compared with observations made during the SABINA cruise in order to validate the model and extend the regional analysis of North Atlantic observations. These showed that NARCM simulations for DMS and sulphate can be compared to SABINA observations only if anthropogenic and oceanic emissions are taken into account simultaneously. On the other hand, above the boundary layer, near the mainland, the emission of anthropogenic sulphate dominates whereas near Greenland, the emission of oceanic DMS dominates. Model validation and analysis of natural aerosols from DMS are essential for assessing the influence of anthropogenic sulphate aerosols on the climate.