



Observations and modelling of enhanced AOD at Spitsbergen – long-range transport of biomass burning emissions from Alaska fires in July 2015

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In the scope of the IAREA project (<http://www.igf.fuw.edu.pl/iAREA>) several measurement campaigns were undertaken at Svalbard in order to assess the variability of absorbing aerosols in this region during spring and summertime 2014-2016.

During the summer campaign of 2015 a significant increase of aerosol concentrations and AOD were observed at NyAlesund station from 9 to 15 of July. This episode was connected with the long range transport of smoke plum emitted from biomass burning at Alaska.

A tropospheric chemistry model GEM-AQ (Global Environmental Multiscale Air Quality) was used to analyse the pathways and vertical distribution of the biomass burning aerosol observed over Svalbard. The core of the model is based on a weather prediction model with environmental processes (chemistry and aerosols) implanted on-line and are interactive (i.e. providing feedback of chemistry on radiation and dynamics). Aerosol module includes 5 size-resolved types of aerosols: sulphates, black carbon, organic carbon, sea salt and mineral dust. Aerosol mass is distributed into 12 logarithmically spaced bins. Anthropogenic emissions developed by NILU in the ECLIPSE project were used for this study. Biomass burning emissions were applied using daily GFAS fields obtained from the Copernicus Services.

We will present the GEM-AQ model results and comparison with available measurement. The GEM-AQ model correctly reproduced the inflow of polluted air masses and sharp increase of AOD values. PM10 analysis showed elevated concentration values up to 700 hPa level, with the maximum reaching 35 ppb at 900 hPa. Model analysis showed over Svalbard shows transport of a thick layer with enhanced extinction above the planetary boundary layer.