Geophysical Research Abstracts
Vol. 15, EGU2013-12492, 2013
EGU General Assembly 2013

Reconciling light extinction measurements from in situ/remote sensing and ground/space

Matthias Tesche (1), Narges Rastak (1), Paul Glantz (1), Hans-Christen Hansson (1), Ilona Riipinen (1), and Robert Charlson (2)

(1) Stockholm University, Institute for Applied Environmental Science, Stockholm, Sweden (matthias.tesche@itm.su.se), (2) Department of Atmospheric Sciences, University of Washington, Seattle, WA 98195, USA

Aerosols play an important role in the Earth's climate system. This is especially relevant for the vulnerable and clean Arctic, where even slight changes in aerosol size or concentration have large effects on the radiative budget and cloud cover. To assess aerosol microphysical and optical properties, in-situ measurements are performed at Mt. Zeppelin, Svalbard, since the early 1990s. Hygroscopic aerosols dominate in the marine atmosphere and the growth is highly sensitive to relative humidity. Characterization of dry aerosols imposes uncertainties in the validity of the measurements for real atmospheric (i.e. ambient/humid) conditions. Microphysical models are used to account for this effect on aerosol optical properties.

In this study we investigate whether it is possible to reconcile particle light extinction coefficients derived from humidifying dry in-situ measurements at Zeppelin station and ambient observations with the lidar aboard the CALIPSO satellite. The study focuses on measurements performed in 2008. Suitable satellite data coverage at high latitudes around Svalbard favours a systematic comparison.

A comparison of ambient extinction coefficients measured by CALIPSO and humidified extinction coefficients from the in-situ measurements could be performed for 57 suitable cases in 2008. Most comparisons agree to a factor of one to five with a majority not exceeding a factor of two. This is a surprisingly good finding when considering the efforts necessary to come up with comparable quantities. CALIPSO extinction coefficients are generally larger than the ones derived from the humidification of in-situ measurements.