# The Arctic Haze season of 2013 in Ny-Ålesund, Spitsbergen from remote sensing perspective

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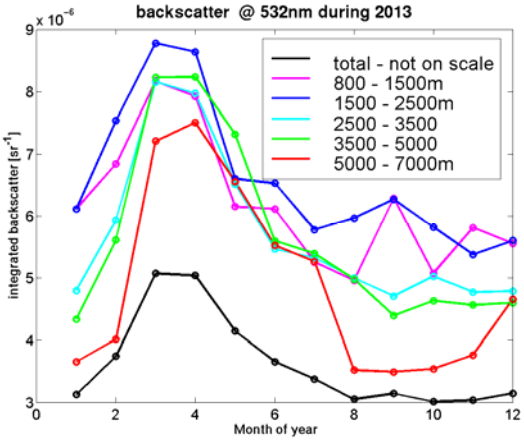
The occurrence of increased aerosol loads in the otherwise clean Arctic environment in spring-time is called Arctic Haze. An overview about this phenomenon was given by Quinn 2007. However, pollution pathways (Stock et al. 2014) and the importance of natural versus anthropogenic sources (Warneke et al 2009) remain open.

The village of Ny-Ålesund in the European Arctic (78.9N, 11.9 E) has an active aerosol research community for many years, both from in-situ and remote sensing instruments. In this presentation the Arctic Haze season of 2013 as observed by lidar ("3+2+2" Raman Lidar, homogeneous and cloud screened data set, MPL) and sky radiometry (Prede) will be discussed.




. Figure 1. Seasonal distribution of aerosol backscatter in Ny-Ålesund.

Figure 1 shows the seasonal variation of the layer integrated aerosol backscatter coefficient at 532nm derived from KARL lidar. The black curve gives the integrated aerosol backscatter coefficient from 800m to 7km altitude divided by factor 8 for better visibility. It can be seen that in Feb. the aerosol load starts to rise and shows a maximum during Mar and April. This is the haze season. From May towards Aug a slow decrease in backscatter can be observed. Fall and early winter are the cleanest months in Ny-Ålesund.

In detail it can be seen from Fig. 1 that the aerosol occurs earlier at low altitudes below 3.5km and lasts longer in altitudes above – (max. for green and red lines only in April).

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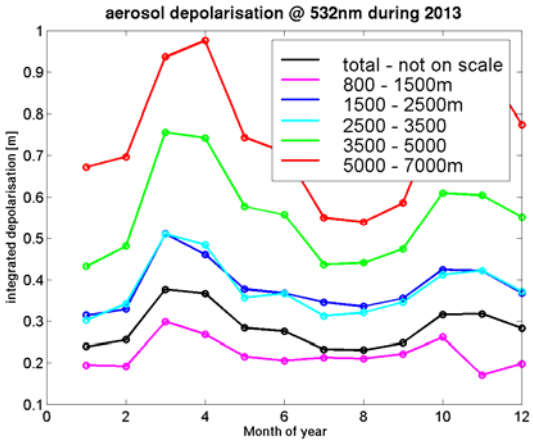


Figure 2. Seasonal distribution of aerosol depolarisation in Ny-Ålesund.

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The aerosol depolarisation is depicted in Fig. 2. It can be seen that in higher altitudes generally the depolarisation is larger, probably due to the existence of sub-visible clouds. Moreover the depolarisation is larger at the max. of the haze season (March and April). As the depolarisation is an intensive quantity, which does not depend on the aerosol concentration, this indicates a different origin of the aerosol.

In this presentation further properties of Arctic Haze as e.g. the lidar ratio (ratio between aerosol extinction to aerosol backscatter) will be discussed and the season of 2013 will be compared to data from previous years.

Quinn, P.K et al. (2007), *Tellus B*, ***59***, 99-114, doi: 10.1111/j.1600-0889.2006.00238.x

Stock, M. et al. (2014), *Tellus B*, **66**, 21450, http://dx.doi.org/10.3402/tellusb.v66.21450

Warneke, C. et al. (2009) Geo*Phys. Res. Lett.* **36**, L02813, doi:10.1029/2008GL036194.