



## Sources of light-absorbing aerosol in arctic snow and their seasonal variation

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Two data sets consisting of measurements of light absorbing aerosols (LAA) in arctic snow together with suites of other corresponding chemical constituents are presented; the first from Siberia, Greenland and near the North Pole obtained in 2008, and the second from the Canadian arctic obtained in 2009. A preliminary differentiation of the LAA into black carbon (BC) and non-BC LAA is done. Source attribution of the light absorbing aerosols was done using a positive matrix factorization (PMF) model. Four sources were found for each data set (crop and grass burning, boreal biomass burning, pollution and marine). For both data sets, the crops and grass biomass burning was the main source of both LAA species, suggesting the non-BC LAA was brown carbon. Depth profiles at most of the sites allowed assessment of the seasonal variation in the source strengths. The biomass burning sources dominated in the spring but pollution played a more significant (though rarely dominant) role in the fall, winter and, for Greenland, summer. The PMF analysis is consistent with trajectory analysis and satellite fire maps.

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