



Mixing of anthropogenic dust and carbonaceous aerosols in seasonal snow on snow albedo reduction in 2014 China survey

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Anthropogenic dusts produced from the affected by human activities derived from the industrial areas and carbonaceous aerosols (black carbon and organic carbon) deposited into snow or ice core via wet and dry deposition play key roles to the regional and global climate. Recently, a China survey was performed to measure the concentrations of insoluble light-absorbing particles (ILAP) in seasonal snow across northern China in January and February of 2014. The results indicate that the higher concentration of NO_3^- and SO_4^{2-} and heavy metals of Zn, Pb, Cd, Ni, and Cu are likely to be attributed to enhanced local industrial emissions due to human activities. The emissions from fossil fuel combustion and biomass burning are likely to be important for the chemical elements in the seasonal snow with long-range transport, while medium enrichment factors of Mg, Ca, and Al were predominantly associated with soil dust, which is the most important natural source. There are large ranges of the BC and AD in seasonal snow over northeast China because of the anthropogenic emissions, which are caused by human activities. In addition, although the values of the snow albedo by model simulations are little higher in the visible to near-infrared wavelength than that during the China survey, the surface snow albedo by field campaign measurements have good agreement with the model simulations in the visible wavelength.