

Snow and Arctic Air Chemistry

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In the last decade, it has become evident from detailed observational and chemical transport modelling studies that the winter Arctic air mass is polluted with suspended particulate matter and gases from mid-latitudinal industrial sources. The lack of precipitation and relatively smooth underlying snow surface means that pollutants are much longer lived in this air mass than in those in more temperate climes.

Furthermore, snow, in the atmosphere or on the ground, is likely to play an important role in the chemical/physical pathways of these substances through the atmosphere from source to sink. For instance, ice crystals in the lower atmosphere may promote chemical reactions of gaseous compounds that would not otherwise take place (analogous to stratospheric ozone destruction by polar stratospheric clouds). The Arctic snowpack appears to be a sink for organochlorine pesticides deposited from the atmosphere in winter and then a source in summer when they volatilize back into the atmosphere. This paper explores the potential role of the ice phase in tropospheric chemistry of the polar region.

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