



Poleward transport of Saharan dust initiated by a Saharan cyclone.

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To enhance the understanding of the role of Saharan mineral dust in the Arctic climate system, this study focuses on dust emission and poleward transport associated with an intense Saharan cyclone that occurred over North Africa in early April 2011. Satellites observations at high spatio-temporal resolution are used in this study in order to characterize qualitatively (using MSG-SEVIRI and CALIPSO/CloudSat) and quantitatively (using MODIS and OMI) the dust activity over North Africa associated with the Saharan cyclone as well as the transport of dust toward the northern pole. Beside the observations, a simulation at high resolution is performed using the MesoNh model in order to estimation the dust load transported northward and to evaluate the dust deposition north to 60°N and its impact on the Albedo. In this study, we identify in new and important mechanism for the transport of dust over long distances toward the northern pole: the poleward migration of Saharan cyclones, in which the dust is transported toward the Arctic following a newly identified path; across the Northern Atlantic Ocean around the Icelandic Low. This path is to be added to the two preferable paths mentioned in previous studies i.e. through transport across Northern Europe and across the Atlantic Ocean around the Bermuda High.

Key words: Arctic, North Africa, dust storm, dust deposition, surface albedo.