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The microphysics of Antarctic clouds with the DARDAR satellite products

Constantino Listowski (1), Julien Delanoë (1), Tom Lachlan-Cope (2), Amélie Kirchgaessner (2), and John King (2)

(1) LATMOS, Guyancourt, France (constantino.listowski@latmos.ipsl.fr), (2) British Antarctic Survey, Cambridge, UK

In Antarctica, surface radiation biases of several tens of watt per square meters calculated in mesoscale high-resolution models point to major problems in the simulation of the cloud phase, and more particularly of the supercooled water. Antarctic cloud phase needs to be correctly represented in both regional and global atmospheric models, to improve operational forecast, and climate predictions. Because of the remoteness of the continent, of the harsh environment to which every ground or aircraft operation is exposed to, observations are sparse. Satellite observations appear as a crucial complement. DARDAR satellite products were developed in order to take advantage of both radar (CloudSat/CPR) and lidar (CALIPSO/CALIOP) measurements which are used seamlessly to retrieve cloud properties at a horizontal resolution of 1.7x1.4 km and a vertical resolution of 60 m. We will present results of the analysis of Antarctic cloud thermodynamic phase using the most recent DARDAR products v2.1.1 over the period 2007-2010. We investigate the monthly evolution of the thermodynamic phase of clouds in different regions of interest, as well as seasonal trends of the thermodynamic phase continent-wide. We also highlight correlations between cloud cover and the Southern Annular Mode in specific regions, as well as demonstrate some correlations of the cloud cover anomaly with meridional atmospheric transport anomaly.
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