Black Carbon and Light-absorbing impurities in the Antarctic Peninsula

Raul Cordero	extsuperscript{1}, Alessandro Damiani	extsuperscript{1,2}, Sarah Feron	extsuperscript{1,3}, Alia Khan	extsuperscript{1}, Jose Jorquera	extsuperscript{1}, Edgardo Sepulveda	extsuperscript{1}, Juan Carrera	extsuperscript{1}, and Penny Rowe	extsuperscript{1}

	extsuperscript{1}Universidad de Santiago de Chile, Department of Physics, Santiago, Chile (raul.cordero@usach.cl)
	extsuperscript{2}Center for Environmental Remote Sensing, Chiba University, Chiba, Japan
	extsuperscript{3}Department of Earth System Science, Stanford University, Stanford, USA

Assessing the albedo response due to light-absorbing impurities (LAI) in coastal snowpacks has become of great interest in the light of the 'Antarctic greening'. Reductions in the albedo (triggered by a change in air temperature or by the LAI deposition) can also enhance feedback mechanisms; as the albedo drops, the fraction of absorbed solar energy increases, which leads to additional albedo drops.

Here we assess the presence of Black Carbon (BC) and LAI in coastal snowpacks in the Antarctic Peninsula. The BC-equivalent content was assessed by applying the meltwater filtration (MF) technique to snow samples taken at 7 locations in the Antarctic Peninsula, from latitude 62\textdegree{}S to latitude 67\textdegree{}S. BC-equivalent concentrations exhibited significant geographical differences, but were found to be generally lower than 5 ng/g (in the range of those reported for the Arctic Ocean and Greenland). Moreover, the Angstrom coefficients were found to be particularly high at the northern tip of the Antarctic Peninsula, likely due to the snow algae presence. After the onset of melt, red snow algae bloom, significantly affecting the surface albedo, as shown by our measurements.