



GLACIOCLIM-SAMBA: A Terre Adelie / Wilkes Land Antarctic surface mass balance observatory

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While local measurements at hundreds of sites are now available (e.g. Magand et al., in prep) to verify how large-scale models reproduce the spatial distribution of the surface mass balance (SMB) of Antarctica, few field observations yet make it possible to verify current intra- and inter-annual variability and trends of the SMB in the models, and to evaluate the processes that relate this variability with that of climate. It is a major aim of the GLACIOCLIM-SAMBA observatory (<http://lgge.obs.ujf-grenoble.fr/~christo/glacioclim/samba/>), initiated in 2004, to provide such observations in the Terre Adélie and Wilkes Land area.

Recognizing that the largest absolute changes (and thus contribution to sea-level) of Antarctic SMB are expected where the current mean SMB is largest, that is in the coastal regions, SAMBA is largely focused on ice sheet margin. To sample spatial scales compatible with the scales resolved by models used to predict climate and SMB changes, a 150 km accumulation stakes line is being set up from the coast near the French Dumont d'Urville station, towards to Antarctic plateau in the general direction of the Italy/France Concordia station. Ground penetrating radar survey will provide snap-shot SMB interpolation along the stakes line. A blue ice stretch at the coast is being monitored by a 50-stake ablation network. Three 50-stakes networks are being set up near Concordia station to relate coastal and plateau SMB variability and change. An automatic weather station (AWS, including radiation) deployed at the coast, and the D-10, D-47 and DCII Antarctic Meteorological Research Center (<http://amrc.ssec.wisc.edu/>) AWSs, provide meteorological information to relate ob-

served SMB and climate. Italian meteorology and radiation programs at Concordia, planned micrometeorology special campaigns at the margin, and precipitation monitoring at both sites, should help decipher the processes that relate SMB and climate variability.

As a summary of results on the existing observatory as of Jan; 2005: i) The first year mean SMB along a 50 km stakes line was ~ 60 cm water equivalent (we), which qualifies 2004 as a very high accumulation year in the Terre Adélie area; ii) Spatial variability along the stakes line is high, ranging from 16 to 125 cm (we), confirming the need for spatial sampling consistent with the scales resolved by climate models; iii) At the coastal blue ice, ablation occurs in summer only while the winter SMB is close to 0.

The SAMBA observatory is scheduled to operate for at least 10 years, hopefully more if successful, with main support by the French (IPEV) and Italian (PNRA) Polar Institutes. The French ministry of research and Institut National des Sciences de l'univers (Climate Change and Cryosphere and ORE-GLACIOCLIM programs) also contribute support. All SAMBA observations will be distributed and freely available on the internet as soon as the observatory is fully operational and validated.