Geophysical Research Abstracts,
Vol. 11, EGU2009-6156, 2009
EGU General Assembly 2009


# Signature of Antarctica wind conditions in the ENVISAT altimetric echo shapes

S. Parouty (1), B. Legrésy (2), F. Rémy (2), and F. Blarel (2)

(1) Université Paul Sabatier, Toulouse, France, LEGOS/OMP, France (soazig.parouty@legos.obs-mip.fr), (2) CNRS; LEGOS, F-31400 Toulouse, France

We are interested in the way winds affect the Antarctica ice sheet surface. Indeed, some specific ice surfaces such as blue ice (Van den Broeke and Bintanja, 1995) or megadunes fields (Frezzotti et al., 2002) are known to be created under given wind conditions. Besides that, the shape of the altimetric echoes from satellite observations are affected by changes in ice surface properties (Partington at al. (1989), Rémy et al. (1991), Legrésy et al. (1998), Lacroix et al. (2007)), which are mainly the surface roughness and micro roughness, the stratification of the ice sheet upper layers and the grains size. We are thus studying how changes in wind conditions induce variations in the altimetric echo shapes.
For this purpose we compare winds given by reanalysis or analysis of global climate models (NCEP/NCAR, NCEP/DOE and ECMWF) and different parameters (namely the height measurement, the backscatter coefficient, the leading edge width and the trailing edge slope) describing the altimetric echo shape from the altimeter onboard ENVISAT during a five year period from january 2003 to december 2007. This altimeter covers about 80% of the Antarctic ice sheet and provides us with observations in two different frequencies (Ku and S bands) which are complementary when it comes to studying surface properties (Legrésy et al. (1998)). Using the altimetric parameters we manage to retrieve winds with a fairly good agreement in the wind magnitude (+/- 0,6m/s), and in the reconstruction of interannual variability. The obtained relationship between altimetric parameters and wind speed is not unique for the whole ice sheet, showing the existence of locally different impacts of winds on the surface properties to which the radar altimetric measurements are sensitive. As we used three global climate models to recompose wind variations, we are able to assess to which one it is possible to get closer using our observations, and explain differences between the winds we compute and the winds from these global climate models for selected regions.