

## **Fracture evolution on Wilkins Ice Shelf, Antarctica**

A. Humbert, Inst. of Geophysics, Univ. of Muenster

M. Braun, ZFL, Univ. of Bonn

D. Gross & R. Müller, Division of Solid Mechanics, Darmstadt Univ. of Technology

Wilkins Ice Shelf is located on the south-western Antarctic Peninsula, a region that has shown significant changes in environmental conditions as e.g. extraordinary air temperature raise, ocean warming, and change in the precipitation pattern. Since the beginning of the 1990's Wilkins Ice Shelf has shown numerous break-up events in irregular intervals. Most prominent have been the events on 28/29 February, 30/31 May and in June/July 2008.

Regular image acquisitions of TerraSAR-X and ENVISAT ASAR during IPY and specifically targeted data takes have resulted in an unprecedented documentation of these break-up events. We utilize this unique image database in order to improve the understanding of fracture evolution.

Fractures on ice shelves are at the early stage just a few meters wide, although tens of kilometres long. The detection of the initial state of fractures and its propagation allows inferences of the axis of the principal stresses which caused the fracture. We compare the signature and chronological sequence of fracture evolution between high-resolution TerraSAR-X scansar & stripmap-mode images and of the ENVISAT ASAR image mode time series.

As a consequence of the break-up events that Wilkins Ice Shelf experienced in 2008, the mechanical load along the ice front is changed and the internal stresses become redistributed. Subsequent fracture development was captured by TerraSAR-X. Additionally, we discuss fracture formation caused by iceberg collision and thus compressive stress.