



Re-Processing of ERS-1/-2 SAR data for derivation of glaciological parameters on the Antarctic Peninsula

Peter Friedl (1), Kathrin Höppner (1), Matthias Braun (2), Rainer Lorenz (1), and Erhard Diedrich (1)

(1) German Aerospace Center (DLR), German Remote Sensing Data Center (DFD), Oberpfaffenhofen, Germany (peter.friedl@dlr.de), (2) Institute of Geography, University of Erlangen, Erlangen, Germany

Climate Change, its polar amplification and impacts are subject of current research in various thematic and methodological fields. In this context different spaceborne remote sensing techniques play an important role for data acquisition and measurement of different geophysical variables.

A recently founded Junior Researchers Group at the German Aerospace Center (DLR) is studying changing processes in cryosphere and atmosphere above the Antarctic Peninsula. It is the aim of the group to make use of long-term remote sensing data sets of the land and ice surface and the atmosphere in order to characterize changes in this sensitive region. One aspect focuses on the application of synthetic aperture radar (SAR) data for glaciological investigations on the Antarctic Peninsula. The data had been acquired by the European Remote Sensing (ERS-1 and ERS-2) satellites and received at DLR's Antarctic station GARS O'Higgins. Even though recent glaciological investigations often make use of modern polar-orbiting single-pass SAR-systems like e.g. TanDEM-X, only ERS-1 (1991 – 2000) and its follow-up mission ERS-2 (1995 – 2011) provided a 20 years' time series of continuous measurements, which offers great potential for long-term studies.

Interferometric synthetic radar (InSAR) and differential interferometric synthetic radar (DInSAR) methods as well as the intensity tracking technique are applied to create value-added glaciological SAR-products, such as glacier velocity maps, coherence maps, interferograms and differential interferograms with the aim to make them accessible to interested scientific end-users. These products are suitable for glaciological applications, e.g. determinations of glacier extent, and grounding line position, glacier and ice-stream velocities and glacier mass balance calculations with the flux-gate approach.

We represent results of case studies from three test sites located at different latitudes and presenting different climatic and glaciological conditions in order to do first parameter adjustments for the processing. The subsequent aim of the entire project is to re-process the entire 20 years' ERS SAR archive for the Antarctic Peninsula.