# PERMAFROST MONITORING AND MODELLING

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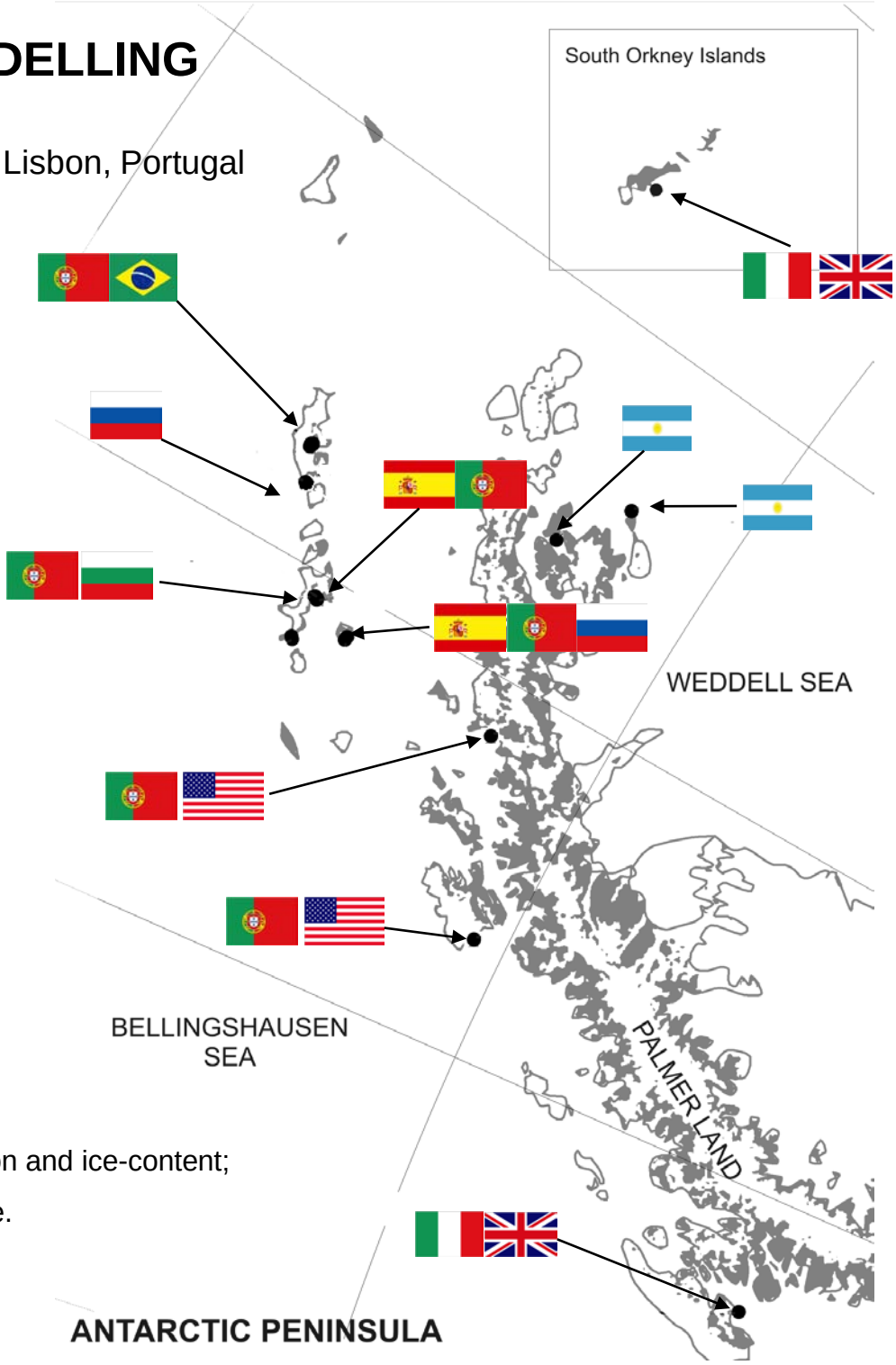


**Methods**

- Permafrost and active layer monitoring (boreholes, CALM sites);
- Electrical Resistivity surveying and monitoring;
- Geomorphological mapping and monitoring;
- GIS modelling of spatial distribution of permafrost.

**Objective**:

- Detect the thermal state of permafrost, characterize spatial distribution and ice-content;
- Model spatial distribution and force changes following climate change.

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# SNOW COVER DETECTION USING SAR (Antarctic Peninsula region)

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M. Ramos – University of Alcalá de Henares, Spain
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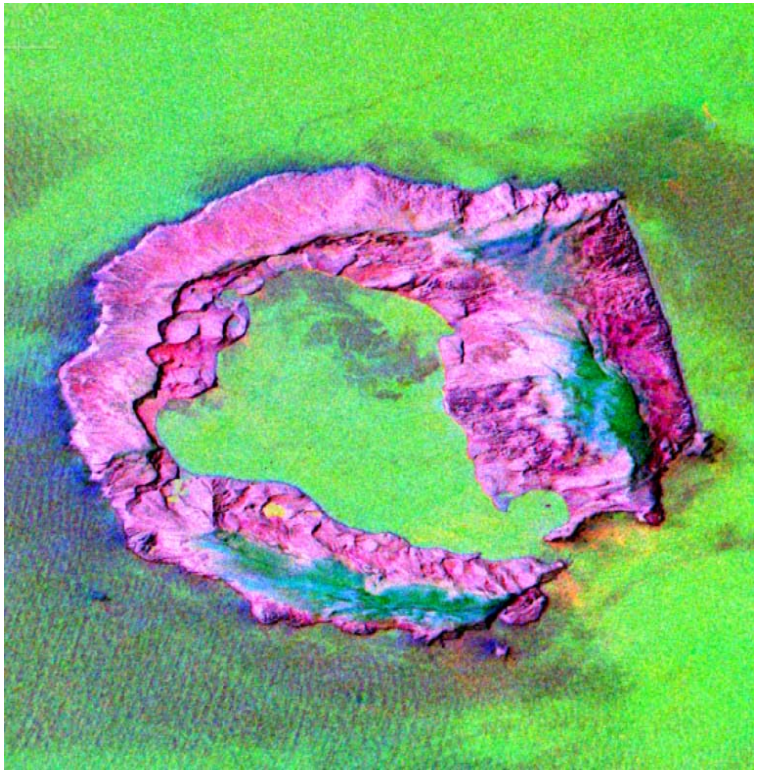


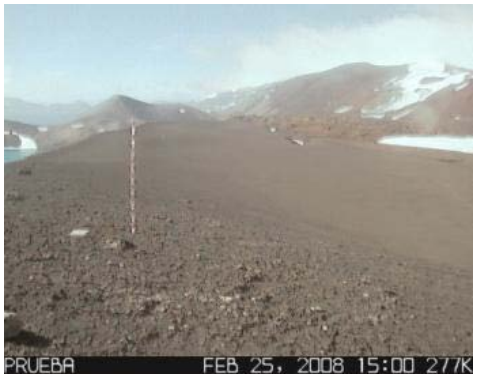
Image Envisat ASAR, ESA Category 1 SNOWCHANGE

**Methods**

- ERS, ENVISAT ASAR and TERRASAR-X Spotlight mode imagery
- Ground truthing at permafrost monitoring sites (time-lapse cameras) and snow pit surveys.

**Objective**:

- Snow cover mapping and snow controls on permafrost distribution.





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# GROUND DEFORMATION ASSESSMENT USING SAR INTERPHEROMETRY (South Shetlands, Antarctic Peninsula)

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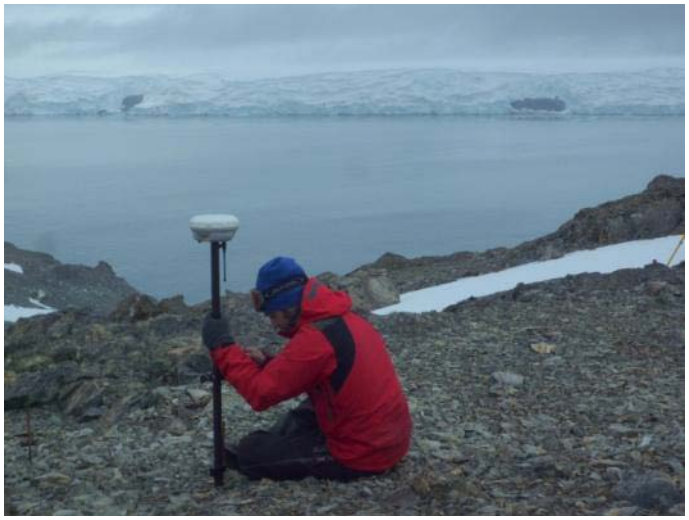
A. Kaab – University of Oslo, Norway



**Methods**

- DINSAR using ERS, ENVISAT and TERRASAR-X imagery
- Ground truthing at rockglacier and solifluction sites with geodetical monitoring (DGPS)

**Objectives**:

- Assess the accuracy of DINSAR to evaluate terrain deformation in the Maritime Antarctic environment;
- Identify areas of varying deformation rates;
- Characterize deformation of rockglaciers.

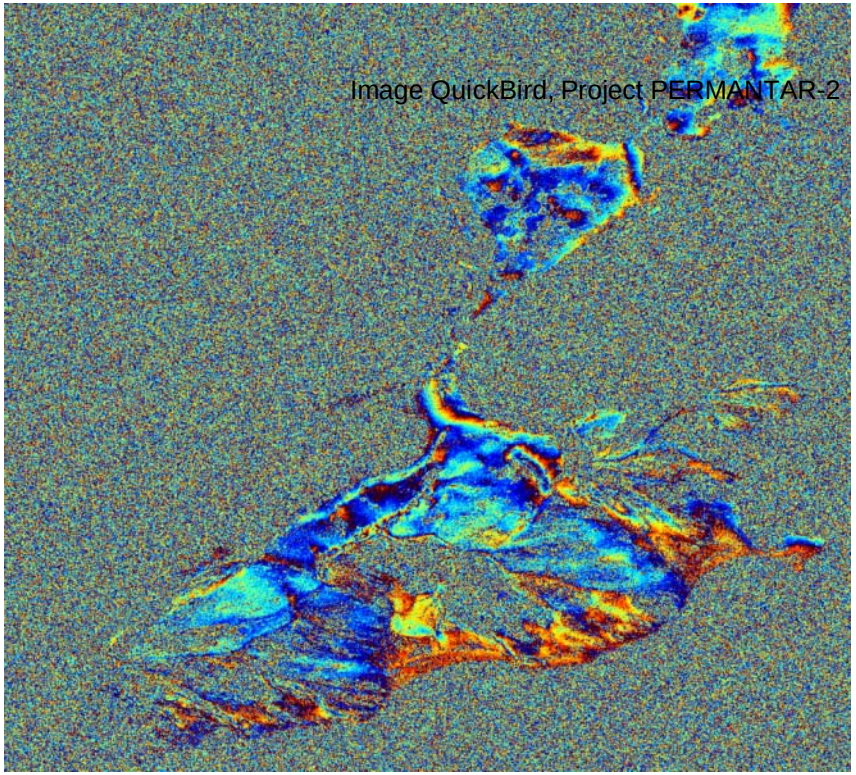



Image TerraSAR-X, DLR, Project LAN1272

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# GEOECOLOGICAL MAPPING USING HIGH RESOLUTION IMAGERY (Antarctic Peninsula region)

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C. Schaefer – Univ. Viçosa, Brazil
J. Bockheim – University of Wisconsin-Madison, USA
A. Caselli – University of Buenos Aires, Argentina

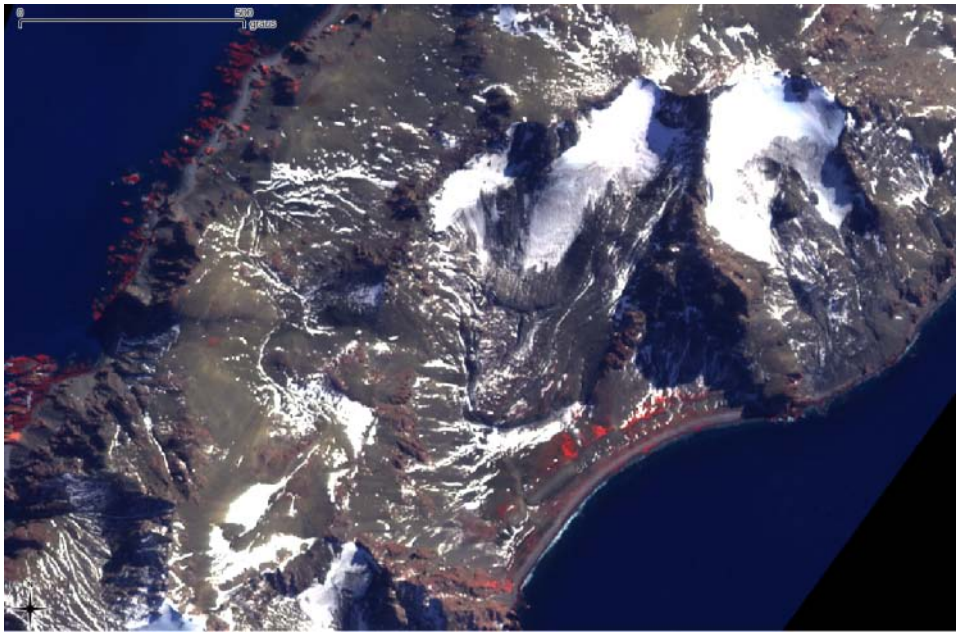

Image QuickBird, Project PERMANTAR-2

**Methods**

- QuickBird imagery, aerial photos.
- Ground truthing using DGPS for automatic image classification.

**Objective**:

- Map geoecological units in the terrain and identify controling factors.
- Evaluate permafrost and active layer conditions.
- Spatial and temporal modelling of the changing permafrost environment.

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# LANDSCAPE DYNAMICS USING HYPERSPECTRAL IMAGERY (Antarctic Peninsula region)

**P. Pina** – CERENA/Technical University of Lisbon, Portugal

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J. Martin-Herrero – University of Vigo, Spain

C. Schaefer – Federal University of Viçosa, Spain

R. Jana – INACH, Chile

**Methods**

- Helicopter based hyperspectral camera (200 bands, 400-1000nm)
- QuickBird and TERRASAR-X imagery
- Ground truthing using DGPS for automatic image classification.

**Objective**:

- Map landscape units dynamics with a finer discrimination (different soils and rocks, lichens and mosses, snow and ice).
- Clarify roles of snow patches on erosion, sediment and nutrient trapping and redistribution, and on ground temperatures.

Image QuickBird, Project SNOWCHANGE/CRIOSSOLOS

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# OTHER ACTIVITIES – MAPPING POLYGONAL NETWORKS IN THE ARTIC (Adventdalen – Svalbard, 78ºN)

**P. Pina** – CERENA/Technical University of Lisbon, Portugal
G. Vieira, C. Mora – CEG/University of Lisbon, Portugal
H. H. Christiansen – UNIS, Norway
T. Barata – University of Coimbra, Portugal

Aerial photo, Project ANAPOLIS

**Methods**

- Aerial photos (6 and 20 cm) and WorldView imagery.
-Ground truthing using DGPS for ice-wedges validation.
- Vegetation mapping
- Soil sampling

**Objective**:

- Detailed geometrical and topological mapping correlated with soil (permafrost) features for understanding the processes of creation and evolution of this type of patterned ground.
- Use terrestrial networks features as analogues for comparison with polygonal terrains on Mars.