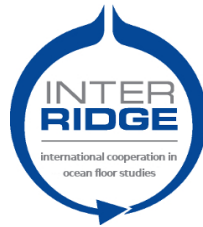
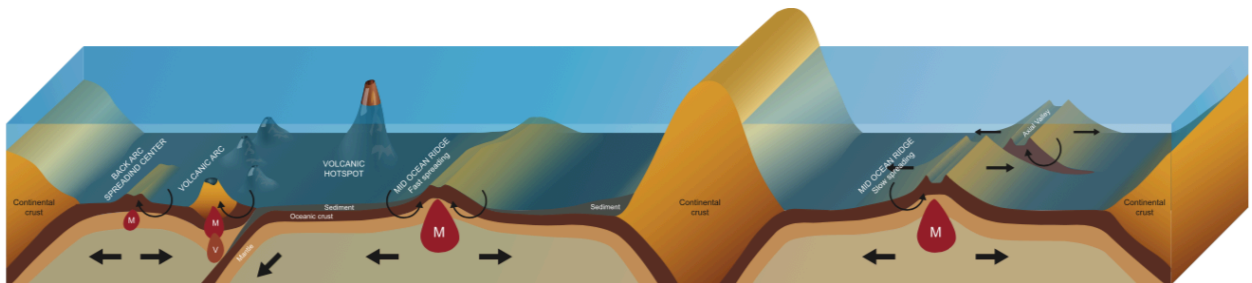


4th InterRidge Theoretical Institute



Hydrothermalism in 4D: current challenges and emerging issues



N. Le Bris/V. Domien 10.3389/fmars.2018.00531

18-21 November 2019, Banyuls-sur-Mer, France



7) Preliminary results of the morphostructural analysis of Mount Orca submarine volcano

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It is important to study in depth the morphostructural characteristics involved in underwater volcanism in order to understand the evolution of these volcanic centers with respect to their tectonic environment. Particularly, this study focuses on the Mount Orca submarine volcano, which is located at the Bransfield Strait (Antarctica), facing King George Island, and whose volcanic build reaches 650m high over a platform at 1340m deep, although the tectonic framework of the area is quite interesting, the interaction between three plates (Nazca, Scotia and Antarctic), the structural system that controls volcanism is unknown, mainly due to technological limitations or difficulty of access.

This work presents a preliminary characterization of the morphology and structures associated with this underwater mount, through the digital elevation models obtained during the ANTARXXVI campaign with an EM 122 multibeam ecosystem and analyzed with CARIS Easy View and ArcMap 10.3, with the In order to identify different events and tectonic processes within the strait, their relationship with the activity of the different plates involved and how they have influenced volcanism in the area. In-depth knowledge of the morphostructural characteristics of this submarine volcano will better understand the volcanic location in the oceanic crust and its relationship with the tectonic environment.

This project was carried out thanks to INGEMMET and the BAP Carrasco crew during the ANTARXXVI campaign.

Preliminary results of the morphostructural analysis of Orca Seamount

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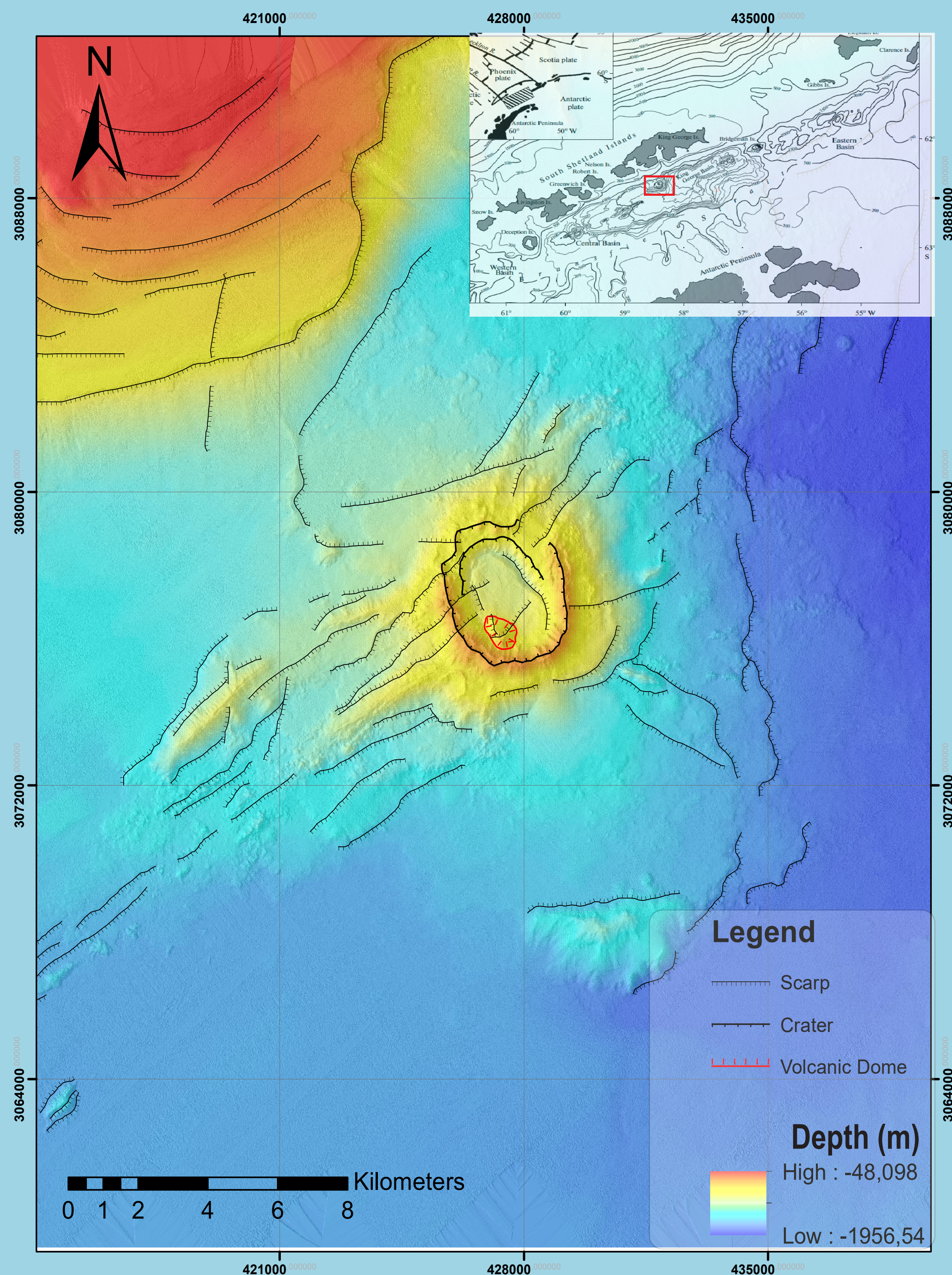
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Bathymetric model of Orca Seamount made for this work through the data obtained during the ANTAR XXVI campaign. This seeks to highlight the main morphostructural characteristics identified.

Methodology and current state

In order to fulfill the objective of the project, a series of steps will be followed: first, modeling at a resolution of one meter the data obtained during the Antar XXVI campaign, with this information carry out a physical volcanology work (calculation of erupted material, eruptive event identification, etc.) and identify lineaments and structures that may be controlling volcanism. A second step corresponds to the realization of surface textural maps, through backscatter images and sediment analysis. Third step, an isotopic analysis of a crater dome rock sample in order to identify the origin of the molten material, if it has a mantle or cortical signature.

Through this study, it is expected to identify at what stage of transitioning from a back-arc basin to a pure rift system is the Bransfield Strait and how the morphostructural characteristics of this submarine mount reflects the tectonic conditions of the region.

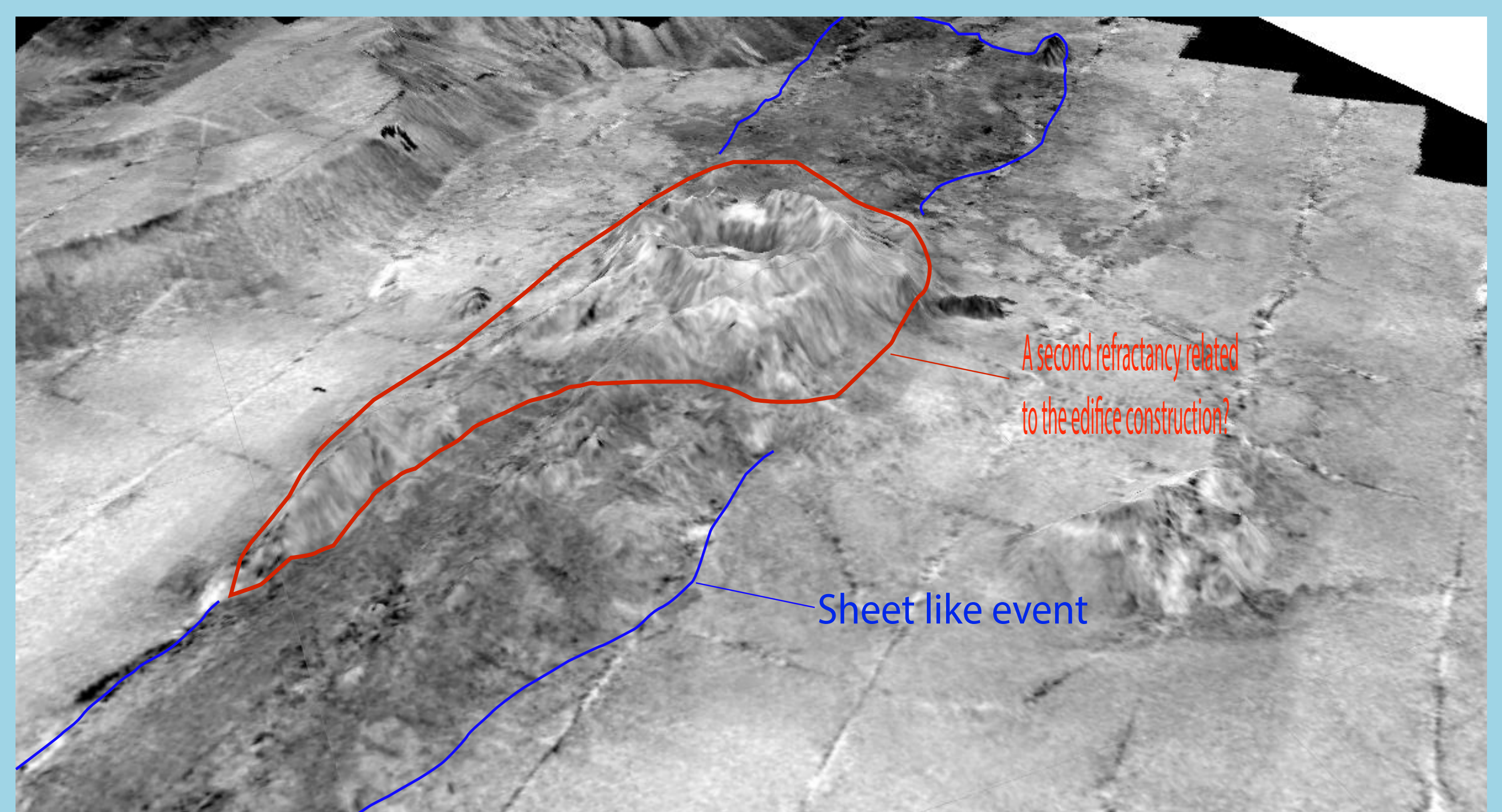
Work is currently being done on steps 1 and 2 simultaneously by teams in Chile and Peru.

Referencias

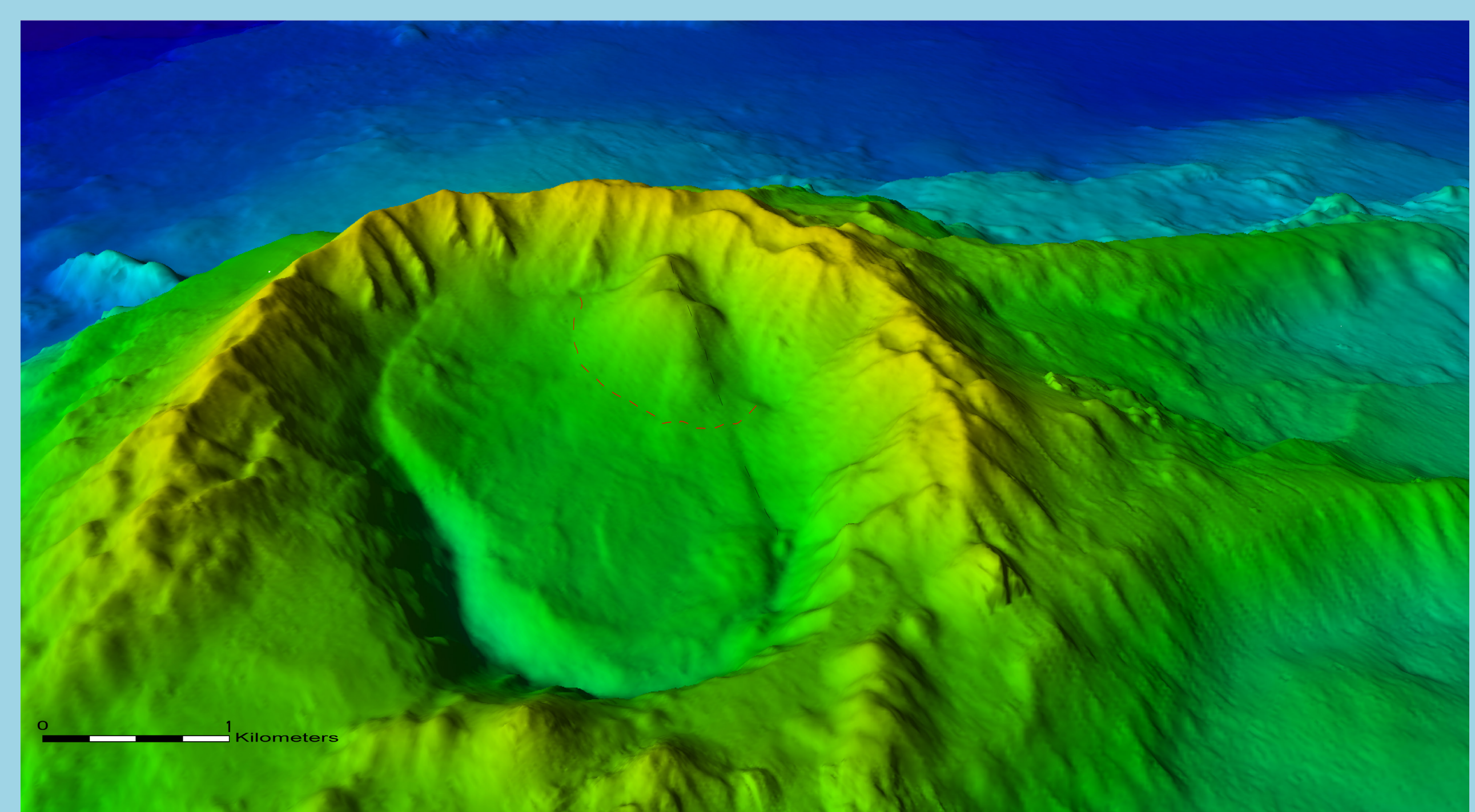
Pelayo, A., & Wiens, D. (1989). Seismotectonics and relative plate motions in the Scotia Sea region. *Journal Of Geophysical Research*, 94(B6), 7293. doi: 10.1029/jb094ib06p07293
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Objectives

This work presents a preliminary characterization of the morphology and structures associated with Mount Orca, which is located at the Bransfield Strait (Antarctica), facing King George Island, and whose volcanic edifice reaches 650m high over a platform at 1340m depth. The data to build the digital elevation model and backscatter image was obtained during the AN-TARXXVI campaign with an EM 122 multibeam ecosystem and analyzed with CARIS easy view and ArcMap 10.3, with the idea to identify different events and tectonic processes within the strait, their relationship with the activity of the different plates involved and how they have influenced volcanism in the area.



Preliminary backscatter image of Orca Seamount, showing differences in surface sound reflectivity. As a first approximation we can see 2 different units associated with the volcano structure. Need more processing to properly indicate what these differences mean.



1 meter resolution image of Orca Seamount crater, view from north to south. Highlighting dome-like structure inside the crater cut by a strong lineament.

Special thanks

This project is a collaboration between the Volcanic Risk Research Center -Ckelar Volcanes, of Universidad Católica del Norte, and the Geological, Mining and Metallurgical Institute of Peru (INGEMMET). Special recognition to the entire crew of the B.A.P Carrasco and all the researchers who were part of the ANTAR XXVI campaign.