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Community – based Improvement of the Digital Bathymetric Model "LEPLAC" in Southeastern Brazil

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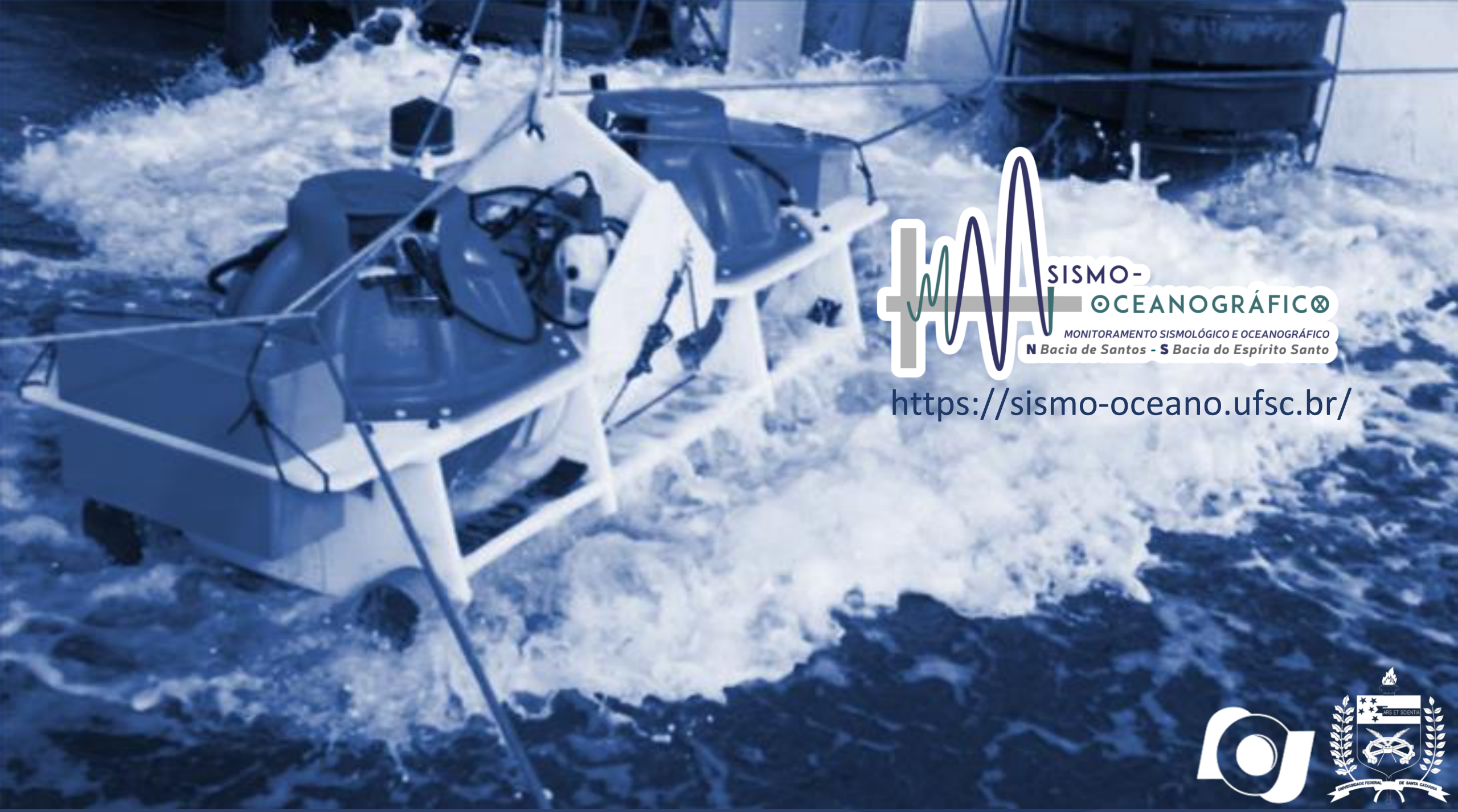
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Motivation

OBS Project:
Seismological and oceanographic monitoring of a segment in the southeast margin of Brazil: north of Santos basin to South of Espírito Santo basin.

- Create yet another use for the high-resolution bathymetric data collected by the geophysical surveys conducted by the OBS Project, based on the motto “Collect Once, Use it Many Times” (IHO, 2008);
- Repay the support provided by the Brazilian Navy to the geophysical and oceanographic surveys carried out by the project.

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Objectives

OBS Project:
Seismological and oceanographic monitoring of a segment in the southeast margin of Brazil: north of Santos basin to South of Espírito Santo basin.

- Evaluate the vertical quality of the Digital Bathymetric Models “LEPLAC” and “SRTM15+ V 2.0”, in order to choose one to be used by the OBS Project (MDT LEPLAC)
- Contribute to improving the understanding of the boundary conditions of the data used by the OBS Project.

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Methodology

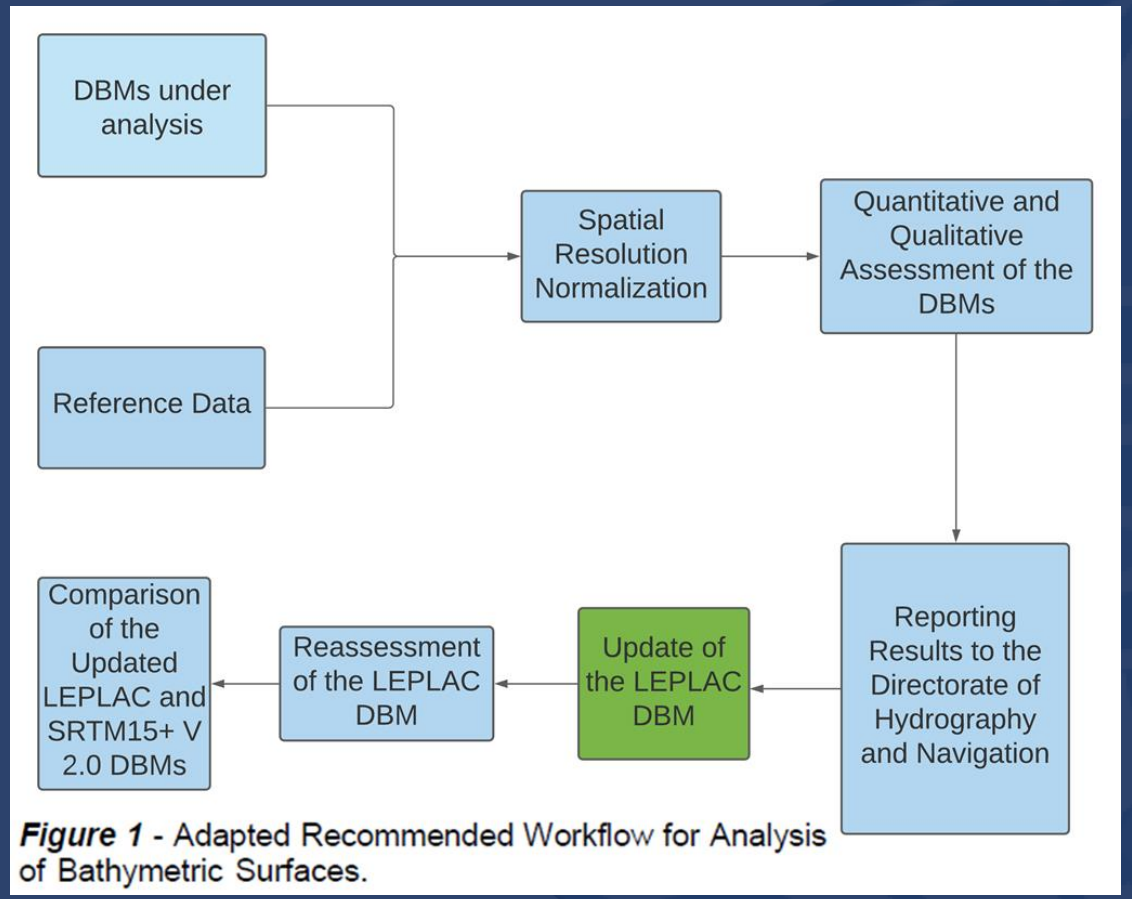

Figure 1 - Adapted Recommended Workflow for Analysis of Bathymetric Surfaces.

Limitations:

- Pixel size (900m);
- Distribution of reference data;
- Reference data wasn't classified according to NORMAN 25.

Reference Data

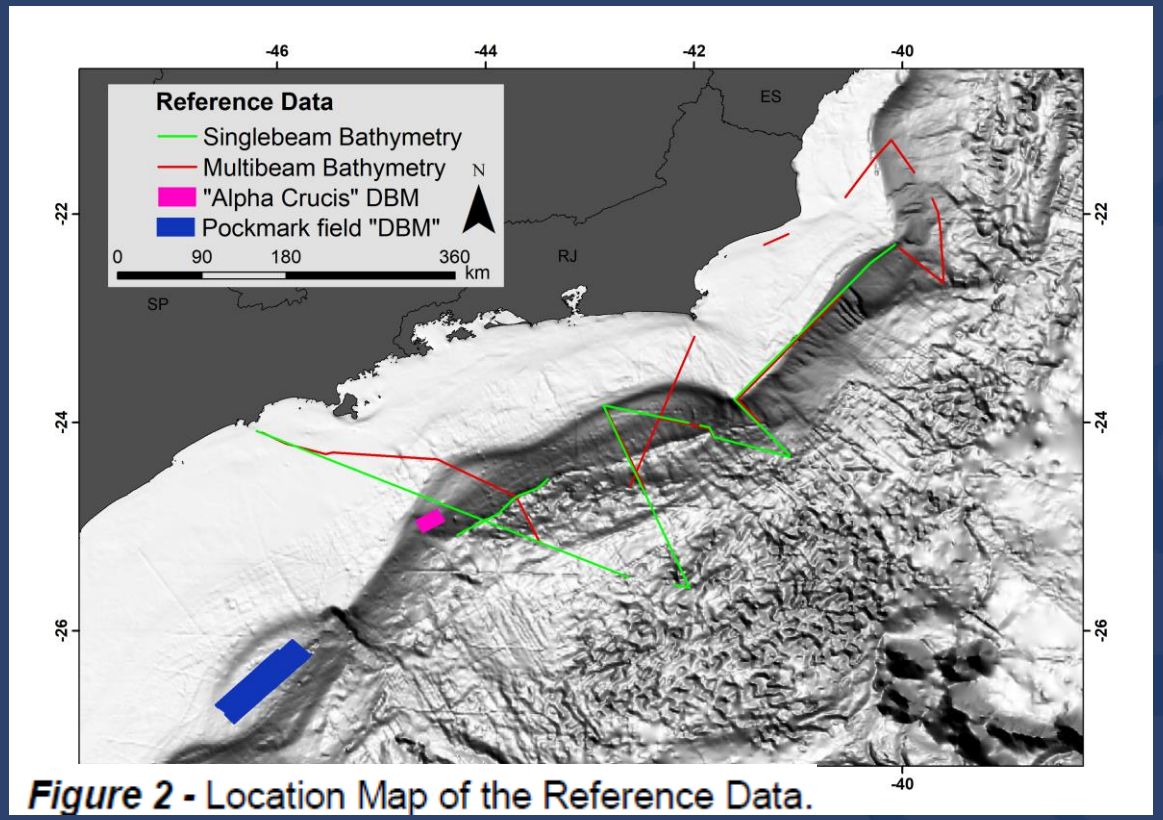

Figure 2 **-** Location Map of the Reference Data.

Table 1 **-** Spatial Resolution of the Dataset Used in the Present Work.

Data	Spacial Resolution (m)
LEPLAC	900
SRTM15+ V 2.0	400
Multi-beam (OBS)	50
Single-beam (OBS)	100
Apha Crucis DBM	50
Pockmark Field DBM	30

Cruzeiro 01 – **Julho de 2019** (Instalation of Ocean Bottom Seismometer & Oceanographic Mooring Lines, hydrographic and mono channel seismic data acquisition - **Alpha Crucis Vessel**

Multibeam echosounder – RESON/SEABAT 8160 - fixed to the hull of the vessel

Central Frequency: 50kHz.

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Results

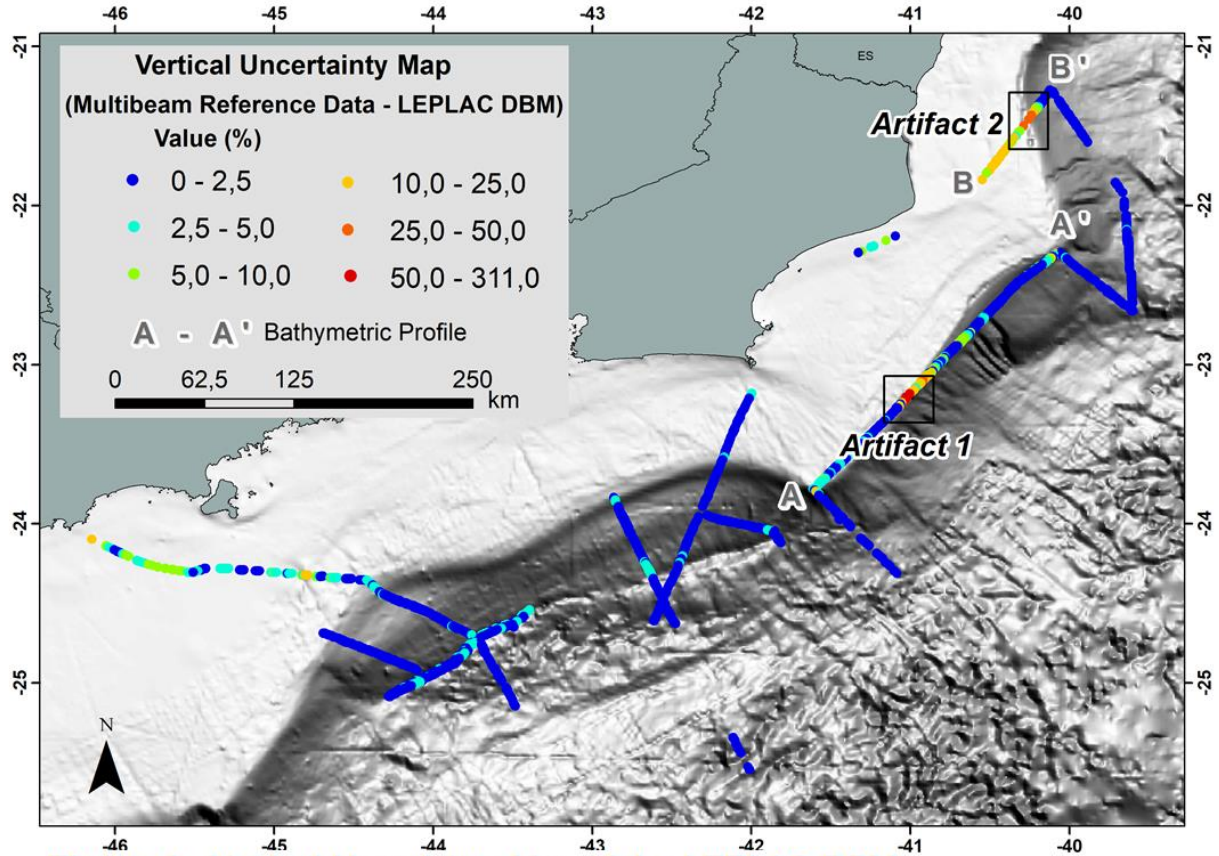

Figure 4 - Vertical Uncertainty Map of the LEPLAC DBM and identified Artifacts

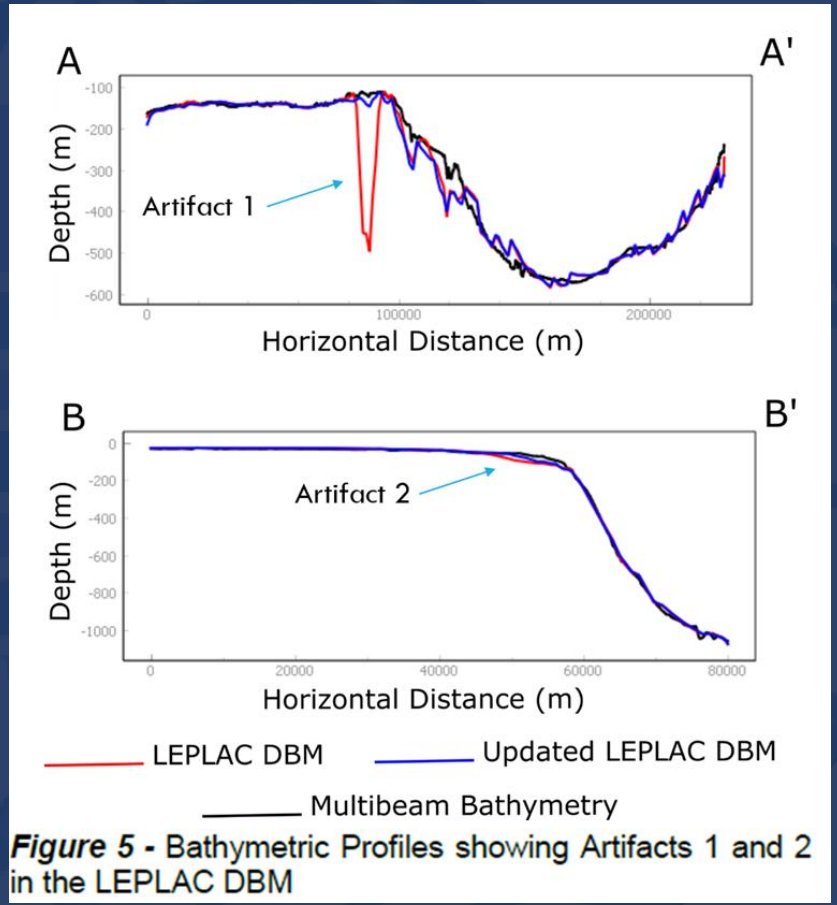

Figure 5 - Bathymetric Profiles showing Artifacts 1 and 2 in the LEPLAC DBM

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Results

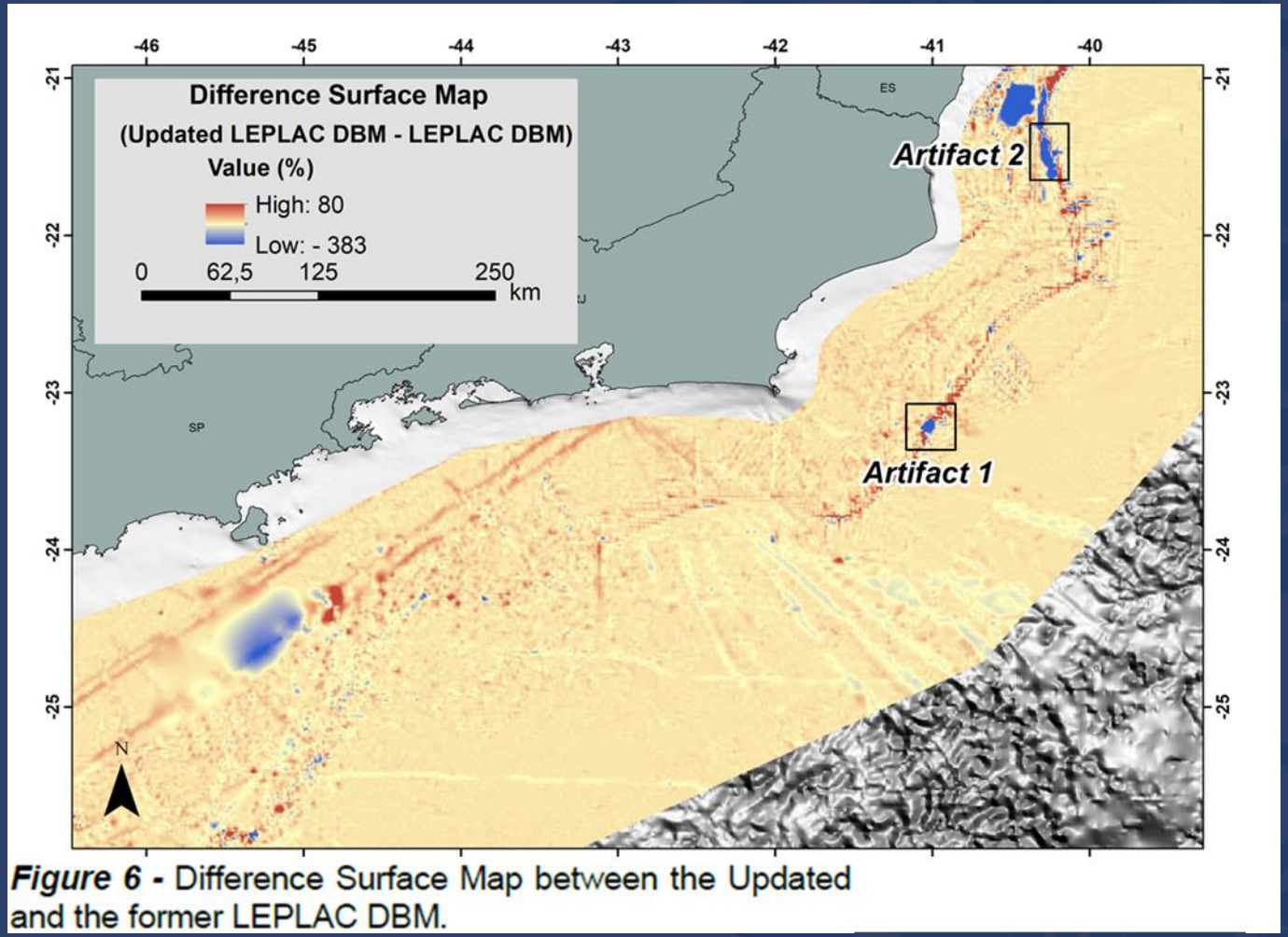

Figure 6 **-** Difference Surface Map between the Updated and the former LEPLAC DBM.

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Conclusions

Objectives:

- Evaluate the vertical quality of the Digital Bathymetric Models "LEPLAC" and "SRTM15+ V 2.0", in order to choose one to be used by the OBS Project (MDT LEPLAC);
- Contribute to improving the understanding of the boundary conditions of the data used by the OBS Project.

Conclusions:

- The LEPLAC DBM is of much better accordance to the reference data than the SRTM15+ V 2.0 and is currently the data used by the OBS Project;
- Despite most of the vertical uncertainties between reference data and the LEPLAC DBM lays around 0.4%, two regions of spurious data were found in the model;
- After communicating the foundings to the LEPLAC team of the DHN, the two regions were classified as DBM artifacts and had it's depths immediately corrected;
- A new version of the LEPLAC DBM was generated by the LEPLAC team of the DHN and cordially sent back to our research team.

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Thank you!

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Project funded by Petrobras based on special participation, in accordance with Law No. 9,478, of August 6, 1997, which establishes for the National Agency of Petroleum, Natural Gas and Biofuels (ANP), among others, the attribution of stimulating the research and the adoption of new technologies for the sector. Project funded with funds destined to comply with the Research & Development (R&D) clause by Petróleo Brasileiro S.A. – PETROBRAS, Law No. 12,351, of December 22, 2010. Process No. 2015/00515-6.

Project funded by the Brazilian Navy, Petróleo Brasileiro S.A. (PETROBRAS), and the Brazilian Oil Regulatory Agency (ANP) - Cooperation Term SIGITEC 2018/00451-6 and 2018/00452-2.

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