

The challenge of creating cartography of zones of extreme conditions; case of Chilean Antarctica

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Abstract:

The significance here derives from the challenge of obtaining cartography with details that make possible multiple uses, among which there are: logistics support, scientific research, and rescue operations planning, to name some examples.

The older analogue methodologies, such as photo-mechanical processes, involving tracing with wax-coated sheets, have come to be replaced by GIS technology, in which completely different resources are used; these include digital terrain models, also panchromatic or multi-spectral satellite images. These resources, used together, make it possible to create cartography in extreme areas within antarctic territory claimed as Chilean, by means of a compilation of data at office-based workshops.

For this work, the cartography already made at 1:500,000 and 1:250,000 scales was assessed. The Antarctic Peninsula has a considerable extent, so the 1:100,000 scale was selected for the cartography, to which the measure of precision applied was that of +/-50 horizontal meters and +/-20 vertical meters, according to PAIGH, MGCP and NMAS tests. 30 meters is the resolution for images. For the digital terrain models, the tests of the USGS were used.

In the identification of the field features portrayed in the digital antarctic cartography, methods that had also been included in the analogue cartography continued to be used; among these are: field grading performed on aerial photographs, also the supporting material from various sources, such as those of other cartographic services of the state. In addition to the above, the line of the international boundary is validated through the National Office for Frontiers and Boundaries of the State (DIFROL).

Once the cartography is obtained, it is enriched with geographic names through which a recovery of historic data has been performed of significance for Chilean sovereignty. Among the texts used, one can highlight the book “*Valientes Muchachos, vivencias en la Antártica Chilena en 1947*” (“...experiences lived in Chilean Antarctica in 1947”) by the author Captain Arturo Araya Arce, first edition of 1947, Chile, and the book “*Terra Australis, diario de la primera expedición Antártica Chilena*” (“...diary of the first Chilean antarctic expedition”), by Eugenio Orrego Vicuña, first edition of 1948, among many of the books, reports, navigation logs, historical accounts, etc., that were studied for the denominations of geographic features, using for these the working methodology established by the National Committee for Antarctic Geographic Names (CNNGA) of Chile.

As a result, the prototype for the publication of antarctic cartography with better details has been obtained, at 1:100,000 scale. This facilitates the finding of strategic locations, providing evidence and records for research studies in terrestrial ecology, bio-diversity, fauna tracking, locating flora and the detection of hazardous locations, planning expeditions and rescue missions, among others. This demonstrates the diverse uses, achieving the objective of using the means available for various aims. The progress made and projected in cartographic publications can be seen in Figure N.º 1.

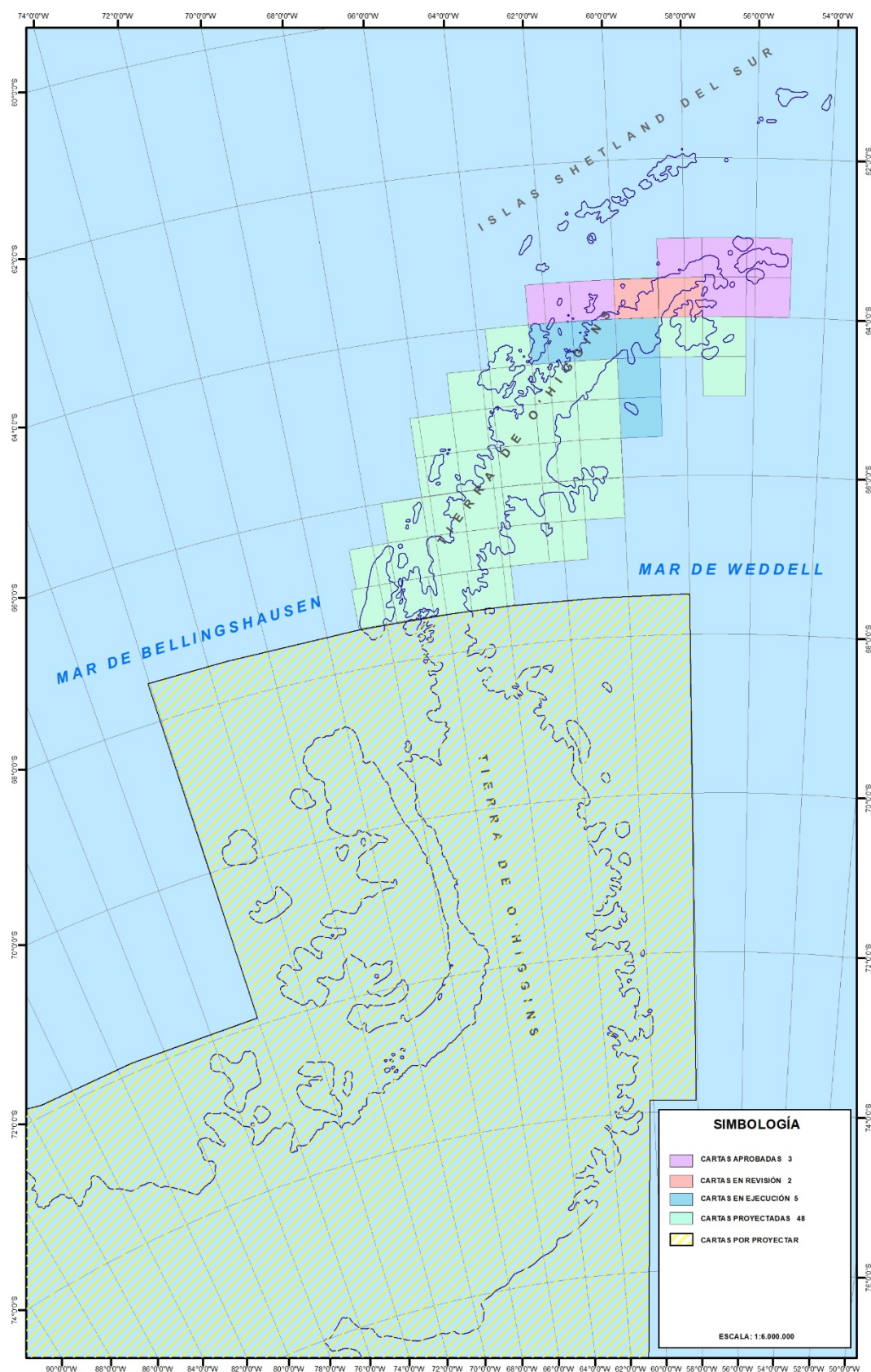


Figure 1. Graphic scheme for planning map production, Antarctic Chilean Territory, at 1:100,000 scale, Military Geographic Institute of Chile.

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