the trapping of coarse sediment into canyon heads. Furthermore, such storms create a generalised resuspension of fine sediment over most of the continental shelf, which is subsequently exported to other areas by currents and down canyon flows. A succession of large coastal storms occurred from December 2008 to March 2009 for which the most outstanding in situ observations will be presented. High concentrations of organic pollutants have been found in both deep slope and rise sediments and in organisms living there, which is likely related to transfers from shallow to deep due to DSWC and large coastal storms. The occurrence and impact of similar processes in other margin areas, such as the Patagonian margin, is certainly worth investigating.

MORPHOSTRUCTURE OF THE WESTERN SECTOR OF THE NORTH SCOTIA RIDGE 7-03

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Introduction

The North Scotia Ridge (NSR) is the submerged morpho-structural expression of the Scotia plate northern edge. It is constituted by the Tierra del Fuego continental margin, isla de Los Estados, Burdwood (BB), Davis and Aurora banks, and the Georgias islands shelf (Parker et al., 1996; Barker, 2001; Giner-Robles et al., 2003; Pandey et al., 2010). About 40 Ma these blocks were grouped forming a continental link between Tierra del Fuego and Antarctica. Afterwards, with the development of the Scotia plate, the blocks drifted towards the east to their actual position (Barker, 2001; Pandey et al., 2010). Several authors have established that the actual movement of the South America - Scotia plate boundary is left-lateral (Forsyth, 1975; Pelayo and Wiens, 1989; Giner-Robles et al., 2003; Thomas et al., 2003; Smalley et al., 2007). In the Tierra del Fuego region, the plate boundary is represented by a mostly transtensional fault system known as Magallanes-Fagnano (Lodolo et al., 2002, 2003, 2006, Tassone et al., 2008; Menichetti et al., 2008). Towards east, the boundary is located in the Malvinas trough, at the north of the BB and it would be transpressive (Cunningham et al., 1998; Giner-Robles et al., 2003; Bry et al., 2004). The change of the tectonic regime (transtensional to the W to transpressional to the E) would occur at 63.5 ºW (Lodolo et al., 2003; Yagupsky et al., 2003).
As part of a study of the evolution of the SW Atlantic continental margin, we analyze and describe the morpho-structure of the western sector of the North Scotia Ridge (Figs. 1 and 2).

Sources and methods

One hundred sixty eight unpublished multi-channel seismic lines were integrated with seismic sections taken from literature (Platt and Philip, 1995; Yagupsky et al., 2003; Bry et al, 2004; Lodolo et al., 2006; Tassone et al., 2008). In addition, single-channel seismic lines available on the web (GeoMapApp, GeoDas), bathymetric (GEBCO) and gravimetric data (Sandwell and Smith, 2009) were also used.
The metodology consisted in the recognition of the acoustic basement in the seismic lines. Then, the points of the top of the acoustic basement between 0.5 and 3.5 seconds two-way travel time (twtt) every 0.5 seconds were drawn in the map. The points with the same twtt were connected in lines (isobaths). The bathymetric data was used to assist the interpolation between lines, specially when the distance between two nearest lines was considerable.The lines were interpreted by using the Kingdom software suite (version 8.2). The lines taken from the published data and from the Web (in image

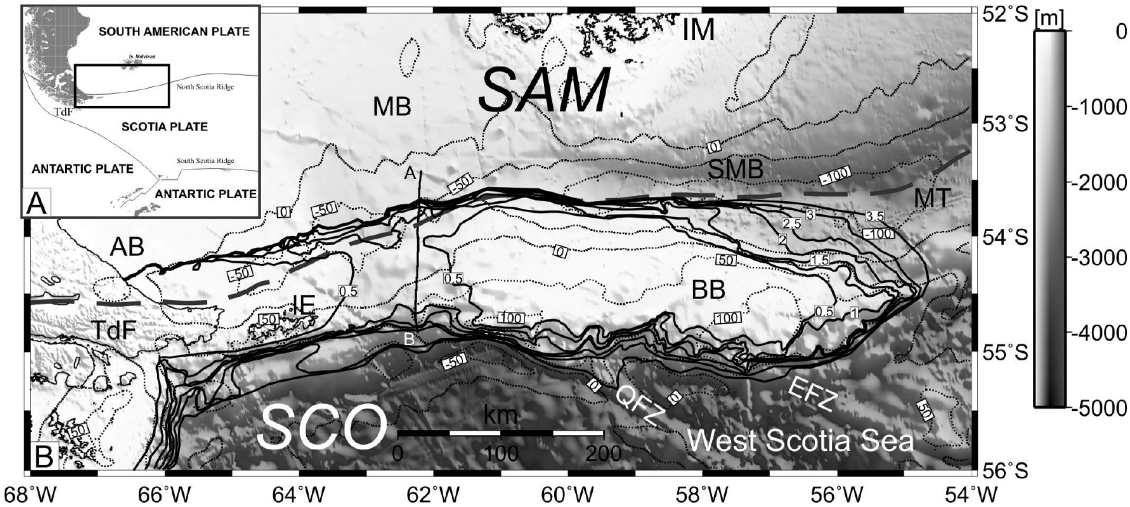

Fig. 1 - A) Map with the location of the main tectonic plates. B) Bathymetric map of the studied region with the contours lines of the gravimetric anomalies every 50 mGal (dotted lines), and the twt isobaths of the acoustic basement every 0.5 seconds (solid lines). Plate boundary (segmented lines) from PLATES Project (www.ig.utexas.edu/research/projects/plates/). A-B segment indicates the location of the seismic section of Figure 2. Used abbreviations: AB, Austral (Magallanes) Basin; BB, Burdwood Bank; EFZ, Endurance Fracture Zone; IE, isla de Los Estados; MB, Malvinas Basin; MT, Malvinas Trough; QFZ, Quest Fracture Zone; SAM, South American plate; SCO, Scotia plate; SMB, South Malvinas Basin; TdF, Isla Grande de Tierra del Fuego.

format) were converted into Segy format with Image2segy software (Farran, 2006), which runs under MatLab. The seismostratigraphic units recognized in the foredeep (Fig. 2) were obtained by correlating seismic lines and published results (Yagupsky et al., 2003; Tassone et al., 2008).

Western edge of the North Scotia Ridge. Geophysical interpretation.

In Fig. 1, the distribution of the isobaths of the top of the basement clearly defines the structural highs that constitute the NSR. These highs are oriented WSW-ENE to W-E (with a break at ~62 °W), and have sharp limits as indicated by the proximity of the isobaths. This is particularly evident between 60 °W and 66 °W, where these highs border the Austral and Malvinas basins. More gentle slopes are located in the extreme eastern of the BB. The 0.5 seconds isobaths, unlike the others, allow recognizing two units. The first, located to the east, extends from the isla Grande de Tierra del Fuego to the isla de Los Estados. The other unit, located to the west, corresponds to the BB.

In the seismic lines over the structural highs of the NSR a notable contrast in the sedimentation infill has been recongnized (Fig. 2, see also Fig. 2 of Kimbell and Richards, 2008). Over the southern flank of these structural highs, the sedimentation is very reduced. This can be visualized by the good correlation between the isobaths and the bathymetry (Fig. 1). On the other hand, the important sedimentary infill of the Austral and Malvinas basins (Galeazzi, 1996; Tassone et al., 2008) has partially covered the northern flank of these structural highs (Fig. 2). This can be seen specially near the northern shore of isla de Los Estados where there is no correlation between the isobaths and the bathymetry (Fig. 1).

The gravimetric anomalies (Fig. 1; Smith and Sandwell, 2009) are distributed along E-W-trending belts and range from -150 mGal to 150 mGal. The distribution is characterized by a positive belt over the southern edge of the NSR, and a parallel negative belt which coincides with the Malvinas Trough and the northern edge of the NSR. In the eastern sector, over the BB, Bry et al. (2004) and Kimbell and Richards (2008) correlated this high-low pattern with the overthrust of the BB over the South America plate southern edge. The relative high level of the BB generates a positive anomaly, while the downwards flexure of the South America plate explain the negative anomaly. Instead, offshore of Tierra del Fuego, Lodolo et al. (2003) correlated the gravimetric minima with the sedimentary fill of pull-apart basins (Tassone et al., 2008; Esteban et al., 2009) developed along the Magallanes-Fagnano system fault.

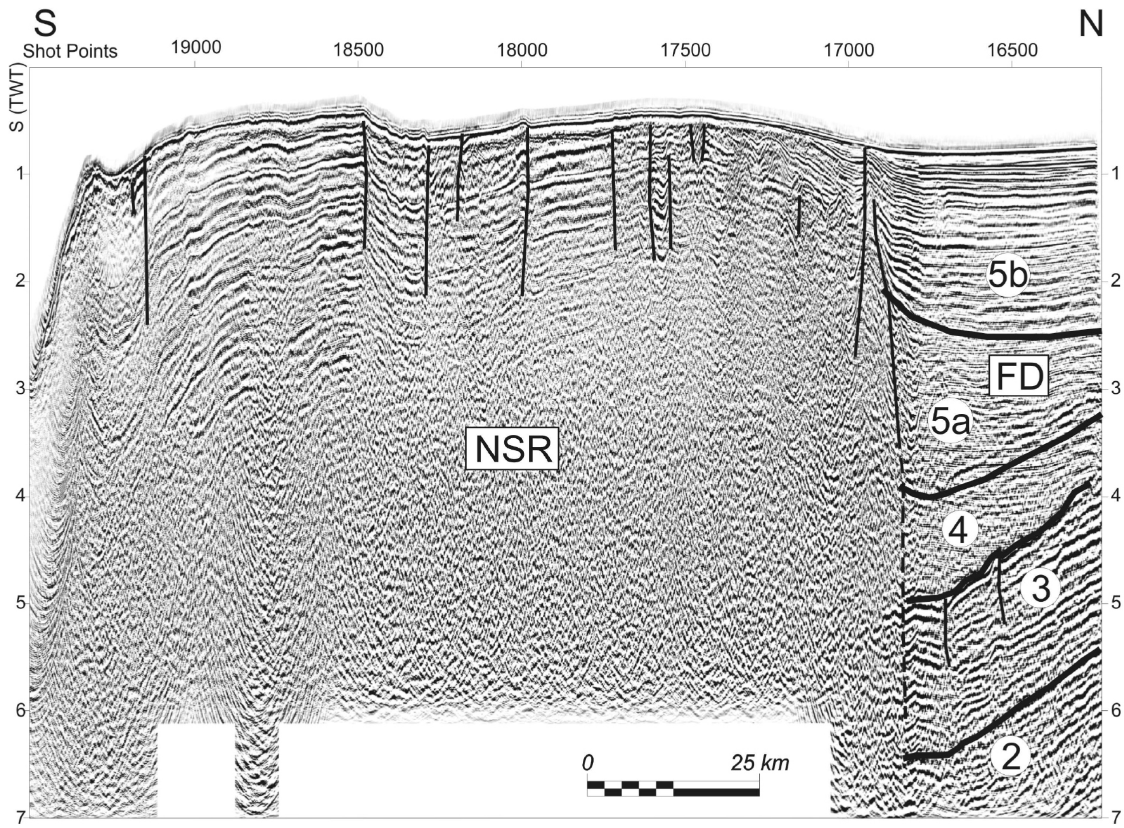

Fig. 2 - S-N multichannel seismic section. Location in Fig. 1. NSR: North Scotia Ridge. FD: Malvinas Foredeep. Nomenclature of the seismic units recognized in the foredeep follows Yagupsky et al. (2003) and Tassone et al. (2008).

The N-S seismic section in Fig. 2 is located in the central part (~62 ºW) of the studied area (Fig. 1). In general, the bathymetry is flat (less than 600 m), except for the southern edge, where there is a steep slope (up to 2000 m). In the seismic section, two sectors can be distinguished. The first, from the SPs 16800 to the north, is characterized by a shallow acoustic basement (less than 2 s twt), a minimal sedimentary fill, strong multiples and numerous vertical faults (some exceed 2 s twt). The basement is seismically homogeneous, with poor lateral continuity and moderate amplitude, resulting in a chaotic arrangement. Between SPs 18000 and 18500, a small basin limited by faults can be recognized. To the north, levels of folded reflector can be seen and would correspond to the fold-and-thrust belt (SPs 17500 to 17000; Lodolo et al., 2003; Bry et al., 2004; Fish, 2005; Tassone et al., 2008). In contrast, the northern sector (SP 16800 to the south) corresponds to the Malvinas basin foredeep and the important sedimentary fill observed was correlated with published seismic lines (Yagupsky et al., 2003; Tassone et al, 2008). The five seismic units (units 2, 3, 4, 5a and 5b of Tassone et al., 2008) span from Middle-Late Jurassic to Holocene, and include syn rift (unit 2), sag and foredeep (units 3 and 4), and foreland (5a and 5b) tectonic phases.

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