

## **Final project report**

<i>Project ID</i>	2004/3.04
<i>Title</i>	Revision of the maps of the main interpreted seismic unconformities in the Victoria Land Basin (VILMAP)
<i>Principal investigator</i>	Chiara Sauli
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<i>Duration</i>	2 years
<i>Assigned funding</i>	17.000,00 Euro

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### **Activities and results**

The VILMAP project was a two years research project, planned to up-date the seismic stratigraphic maps of the western Ross sea that were published in 1995. At the time OGS, played a role in the Ross Sea Regional Working Group of the Antarctic Offshore Acoustic Stratigraphy programme (ANTOSTRAT), promoting collaboration among the scientific community, and achieving the production of the Seismic Stratigraphic Atlas of the Ross Sea with thematic maps of the main regional seismic sequences and unconformities (Brancolini et al., 1995).

The target of the project was the revision of the previous interpretation of multichannel seismic data recorded in the Victoria Land basin (western Ross sea), by integrating more recently acquired seismic and geological data (Cape Roberts well sites), and further detailed information from strategic reprocessing of some chosen seismic profiles.

The previous interpretation was re-viewed in order to improve knowledge of the distribution, geometries and ages of the sedimentary sequences that fill the VLB depocenter. The stratigraphic analysis of the external shapes, the geometric relationships and internal characters of these sedimentary sequences contributes to better constrain the regional tectonic and sedimentary history of the region, enhancing the understanding of the glacial and associated paleoclimatic processes over the past 35 Ma.

The re-evaluation of the seismic stratigraphy, a better age control for the sedimentary sequences by linking of the sedimentary units in the Victoria Land basin to the Cape Roberts drill sites, and the preparation of a digital data base of interpreted sedimentary units were successfully achieved.

A prime output of the project is the production of new digital seismic stratigraphic maps for the major sedimentary sequences in the Victoria Land basin. The digital format enable easy updating of the maps in the future.

The VILMAP project was included in the frame of an IPY proposal named ROSSMAP (Ross Sea Digital Geophysical and Geological Maps, Antarctica) aimed to produce a new series of digital seismo-stratigraphic and structural maps for the whole Ross sea region.

The results of the research provide an up to date synthesis of the tectonic and sedimentary history of the Vilmapi basin, at regional scale, from late Cenozoic to present, and their relationship with major Antarctic and global, large time-scale, wide climatic, geological and geodynamic changes.

The maps are an important instrument to unravel the glacial processes, related to the past climate changes, such as advances and retreatments of the Antarctic Ice Sheets, as recorded by the seismic sediments deposited on the continental margins. Since polar regions represent the cool engine of the global climatic system, it is a key point to improve understanding of the sedimentary and associated glacial and paleoclimatic processes around Antarctica, to reconstruct past climate evolution and environmental changes of the area.

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### **Products**

#### **A – papers in scientific magazines**

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## Programma Nazionale di Ricerche in Antartide (PNRA)

### B – book chapters

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### C - proceedings of international conferences

1. Antarctic Sedimentary Basins: Keys to Understanding Glacial Processes, Workshop to establish an integrated Seismic Stratigraphy for the Ross Sea, Antarctica Trieste, Italy, 18-20 June 2007. In Eos, Vol. 88, No. 39, 25 September 2007

### D – proceedings of national meetings and conferences

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### E – thematic maps

1. C. Sauli, N Wardell. (2007) Report to PNRA on the completion of the VILMAP project (ref. Pdr 3.4 Settore 3 Geofisica – PEA 2004/2005).

### F – patents, prototypes and data bases

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### G – exhibits, organization of conferences, editing and similar

1. Sauli C. and Wardell N. (2004): Revision of the maps of the main interpreted seismic unconformities in the Victoria Land Basin. Poster presentato al Workshop di Pontignano (Siena, 28-31 Agosto 2004), Frontiers and Opportunities in Antarctic Geosciences.
2. Sauli C., "Revision of the maps of the main seismic unconformities in the Victoria Land Basin" (PNRA/Vilmap project) (presentazione poster). Geitalia 2005, Quinto Forum Italiano di Scienze della Terra, Spoleto 21 - 23 settembre 2005.
3. Sauli C., "Analysis of cenozoic sequences and glacial features in the Victoria Land Basin (Antarctica)" (presentazione poster) European Geosciences Union General Assembly 2006, Vienna, Austria, 02 – 07 April 2006.
4. Sauli C., "Mapping results of the seismic data re-interpretation in the Western Ross Sea (Antarctica)" (presentazione poster) 2nd SCAR Open Science Conference, Hobart Australia, July 12th – 14th 2006.
5. C. Sauli, M. Busetti, L. De Santis, L. Sormani, and N. Wardell, Coastal glacial valley system in the Wood Bay (western Ross Sea, Antarctica), U.S. geological Survey and The National Academies; USGS OFR-2007-1047, Extended Abstract 121.
6. S.A. Henrys, C. Sauli, T.J Wilson, C.C. Sorlien, B.P. Luyendyk, N. Wardell, P.J. Bart, F. Davey, R. Granot, C.R. Fielding and R. Group. ROSSMAP: Ross Sea Digital Geophysical and Geological Maps. Isaacs Santa Barbara Agosto-Settembre 2007.

### H - formation (PhD thesis, research fellowships, etc.)

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## Research units

#### *Interpretation research unit:*

Giuliano Brancolini	OGS
Laura De Santis	OGS
Christopher C. Sorlien	UCSB
Bruce P. Luyendyk	UCSB
Stuart Henrys	Inst. Geol. Nucl. Sciences – Wellington NZ
Chiara Sauli	OGS

#### *Reprocessing research unit:*

Nigel Wardell	OGS
Riccardo Geletti	OGS
Christopher C. Sorlien	UCSB
Sauli Chiara	OGS

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