Final project report

| Project ID | 2002/2.06 |
|---------------------------------------|---|
| Title | Broadband seismology in the Scotia Sea Region |
| Principal investigator Institution | Dr. Marino Russi Istituto Nazionale di oceanografia e di Geofisica Sperimentale - OGS |
| Email | mrussi@ogs.trieste.it |
| Duration | 2 years |
| Assigned funding | 103291,00 Euro |

Activities and results

All the activities to be performed in Antarctica included in the PEA 2002 and PEA 2003 were completed by the end of the 2003-2004 Antarctic campaign except those related with the Antarctic Seismographic Argentinean Italian Network data acquisition, which continued throughout 2004, with the collaboration of the Argentinean personnel charged with the seismograph operation in the Antarctic bases. During the biennium, in addition to the standard operation of the existing stations (Ushuaia, USHU, and Orcadas (ORCD)) the project personnel installed two new seismographic three component broad band stations at Jubany Base (JUBA, South Shetland Is) and Estancia Despedida, (DSPA, Tierra del Fuego, Argentina). The network functionality as a whole has been good both during 2002 and 2003 with the exception of USHU station that worked intermittently.

The most important activities performed during the 2002-2003 campaign have been the satellitar communication tests using INMARSAT satellitar terminals at Base Orcadas in view of the replacement of the Reftek recorder, used for the acquisition from the date of first installation (1997), with new equipment capable of recording and transmitting real time data to the OGS, the Instituto Antartico Argentino and the european seismological data centre ORFEUS.

The recording equipment was then updated during the following campaign, when also a check of the integrity and redeployment of the seismometer to computer signal cable (250 m in length) was performed. As a security measure was also installed a spare signal digital cable. An Inmarsat terminal was installed to allow remote retrieval of relevant events during the whole year.

In Italy the recorded dat have been analyzed with the cooperation of the Università di Trieste personnel participating to the project 2004/2.7. A detailed study has been conducted using the waveform data recorded during the 7.5 magnitude arthquake occurred on August 4, 2003 whose epicentre has been located on the bottom of the Scotia Sea at about seventy miles from Orcadas base. The study has been focused mainly on the analysis of the most relevant aftershocks to gain information on the generating mechanisms. Retrieval of some relevant events recorded at Estancia Despedida has been carried out by INMARSAT satellite phone from the OGS. The same technique was used to retrieve the data of the most significant events of the Orcadas seismic series. Extensive testing of Guralp equipment allowing internet remote control and recovery of the data was performed as a preparation to its installation at the ASAIN sites using satellite lines provided for free by the Argentine partner. Argentine researchers were hosted at the OGS on the basis of formal agreements for scientific collaboration with the Instituto Antartico Argentino (IAA) and the Universidad Nacional de Laplata (UNLP, Argentine) to be trained in the use of broad-band seismometers also actively contributing to the advanced processing of ASAIN data.

Products

A – papers in scientific magazines

- 1. Guidarelli, M., Russi, M., Plasencia Linares, M.P. and Panza, G.F., 2003. The Antarctic Seismographic Argentinean-Italian Network and the Progress in the Study of Structural Properties and Stress Conditions in theScotia Sea Region. Terra Antartica Reports, 9, 25-34.
- 3. Guidarelli, M., Placencia Linares, M.P., Russi, M., and Panza G.F., 2004. Lithospheric structures and regional seismicity in the Scotia Sea area: a review, Bollettino di Geofisica Teorica ed Applicata, 45, supplement 2 GEOSUR, 84-87.
- 4. Placencia Linares, M.P., Bukchin, B.G., Guidarelli, M., Russi, M., and Panza, G.F., 2004. The 4 August 2003 earthquake recorded by ASAIN network in Antarctica and Tierra del Fuego, Bollettino di Geofisica Teorica ed Applicata, 45, supplement 2 GEOSUR, 87-91.
- 5. Russi, M., Plasencia Linares, M.P., Guidarelli, M., 2004. Further developments of the ASAIN network in Antartica and Tierra del Fuego, Bollettino di Geofisica Teorica ed Applicata, 45, supplement 2 GEOSUR, 92-95.

B – book chapters

- C proceedings of international conferences
- D proceedings of national meetings and conferences

E – thematic maps

F – patents, prototypes and data bases

1. Antarctic Seismographic Argentinean Italian network recordings database

G - exhibits, organization of conferences, editing and similar

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

1. Dr. Milton Plasencia from Universidad Nacional de La Plata (Argentina)has developed at the OGS a one year grant financed by the Miramare International Centre for Theoretical Physics.

Research units

Date: Trieste, April 04, 2010

Notes