



REPÚBLICA ARGENTINA

INFORME NACIONAL PRESENTADO A LA
ASOCIACIÓN INTERNACIONAL DE SISMOLOGÍA Y
FÍSICA DEL INTERIOR TERRESTRE –IASPEI–

XXIV ASAMBLEA GENERAL DE LA
UNIÓN GEODÉSICA Y GEOFÍSICA
INTERNACIONAL – UGGI –

Perugia, Italia, 2 – 13 julio de 2007

ARGENTINA REPUBLIC

NATIONAL REPORT PRESENTED TO THE
INTERNATIONAL ASSOCIATION OF SEISMOLOGY AND
PHYSICS OF THE EARTH'S INTERIOR –IASPEI–

XXIV GENERAL ASSEMBLY OF THE
INTERNATIONAL UNION OF GEODESY AND
GEOPHYSICS – IUGG –

Perugia, Italy, 2 – 13 July, 2007

**COMITÉ NACIONAL DE LA UNIÓN GEODÉSICA Y
GEOFÍSICA INTERNACIONAL**

**NATIONAL COMMITTEE OF THE INTERNATIONAL UNION
OF GEODESY AND GEOPHYSICS**

BUENOS AIRES. ARGENTINA
2007



Union Géodésique et Géophysique Internationale
International Union of Geodesy and Geophysics

REPÚBLICA ARGENTINA

COMITÉ NACIONAL DE LA UNIÓN GEODÉSICA Y
GEOFÍSICA INTERNACIONAL
(CNUGGI)

ARGENTINA REPUBLIC

NATIONAL COMMITTEE OF THE INTERNATIONAL UNION OF
GEODESY AND GEOPHYSICS

The main function of the IUGG National Committee is representing the Union in Argentina.

It is chaired by the Military Geographic Institute Director, and assisted by two Vice Presidents, a General Secretary and a Secretary Assistant.

The current (2007) head staff is as follows:

President:	<i>Cnl. VGM Eng. Alfredo Augusto Stahlschmidt</i>
Executive 1st Vicepresident:	<i>Dr Corina Risso</i>
2nd Vicepresident:	<i>Dr Nora Sabbione</i>
General Secretary:	<i>Surv. Rubén Carlos Ramos</i>
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International Union of Geodesy and Geophysics
Union Géodésique et Géophysique Internationale



Union Géodésique et Géophysique Internationale
International Union of Geodesy and Geophysics

**Comité Nacional
de la Asociación Internacional de Sismología y
Física del Interior Terrestre**

**Argentinean National Committee
of the International Association of Seismology and
Physics of the Earth's Interior**

Nora Cristina Sabbione

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TREASURER

2004 – 2007



International Union of Geodesy and Geophysics
Union Géodésique et Géophysique Internationale



- ◆ *Currently, the Argentinean National Committee of IASPEI (CNIASPEI) has 22 Members whose nationality is Argentinean.*
- ◆ *Most of them carried their research work on Seismology, Applied Geophysics and related sciences at different national institutes, centres, laboratories and universities.*
- ◆ *Some of them are temporarily abroad, working at foreign institutes, centres, laboratories and universities.*
- ◆ *The present National Report has been organised in order to include the activities listed according to institute and to some individual researchers.*

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Institutions

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ARGENTINEAN NATIONAL REPORT 2003-2007

XXIV IUGG GENERAL ASSEMBLY

Perugia (Italy), July 2 - July 13, 2007

1.- INSTITUTION: INSTITUTO NACIONAL DE PREVENCIÓN SÍSMICA - INPRES –
SECRETARÍA DE OBRAS PÚBLICAS - MINISTERIO DE PLANIFICACIÓN
FEDERAL, INVERSION PÚBLICA Y SERVICIOS

Mission: The aim of this organisation is to do studies, basic and applied research of Seismology and Seismic Engineering. These investigations are destined for seismic risk prevention by means of the establishment of norms that optimally allow the stability and permanence of the civil structures existent in the seismic zones of Argentina. The studies conducted by INPRES have improved the knowledge of seismic danger in the country as well as the dynamic processes occurring in the upper mantle and crust.

2.- SPECIFIC ORGANISATION:

The INPRES is a centralised organism that belongs to SECRETARÍA DE OBRAS PÚBLICAS DEL MINISTERIO DE PLANIFICACIÓN FEDERAL, INVERSIÓN PÚBLICA Y SERVICIOS. Its central office is in the city of San Juan in the province with the same name. It is the national organism in charge of the execution of the National Policy for seismic prevention, whose mission was stated above. In order for these studies to be carried out, the INPRES is provided with a national chain of seismological stations and a national chain of accelerographs, and with the structure laboratory.

The personnel are listed below:

I) SCIENTIST AND TECHNICAL TEAM

College professionals	25
Technicians	20
Support team	3

II) GENERAL TEAM

College professionals	6
Support team	18

3.- MAIN WORK DONE BETWEEN 2003 AND 2007

3.1 Work done or in progress

1. Participation in CFAG points remeasurement of the points CFAG (continuously measured over the year), Palo y Mogote, located in Sierra de Pie de Palo in the frame of the CAP project, with high-precision measurements using GPS equipment in order to detect earth's crust movements. INPRES, July 19th to August 1st, 2003.
2. Topographical elevation of the fault area La Laja, which has a proximity of 5000 points, with the aim of obtaining a topographical map to be able to mold the deformations originated by the tectonics in the area where the earthquake of January 15th of 1944 took place. This earthquake had a 7.4 Richter magnitude. INPRES, June-July, 2003.
3. Professionals from INPRES, held lectures in the subject of Seismology, as part of the Seismo-resistant Structure Engineering Master, Engineering Faculty, National University of San Juan. December 2002- April 2003.
4. Production of Seismic Bulletin (2001). Data base taken from the following sources: INPRES, United States Geological Survey (USGS) and the Seismological Service of the University at Chile. INPRES, 2002.
5. Topographical elevation of the fault area Blanquitos, Talacasto and San Juan, framed in the research project of the active fault areas in the province of San Juan, Argentina. INPRES, September 2003.

6. Seismic operation in the province of Catamarca conducted by the INPRES on the occurrence of the 9th-July- 2004 earthquake, in order to register the principal event to compare the seismic activities with the local tectonic model, September- December 2004.
7. Elaboration of the Seismology-Seismotectonic and focal parameters chapters for the general report on the 7th -September- 2004 Catamarca's earthquake, to be published by INPRES.
8. A professional from INPRES held lectures in the subject of Seismology, as part of the Seismo-resistant Structure Engineering PhD, University of Mendoza, Argentina, May - July 2005.
9. Elaboration of the Seismic Bulletin (2002- 2003). Data base taken from the following sources: INPRES, United States Geological Survey (USGS) and the Seismological Service of the University at Chile. INPRES, 2005
10. Seismic operation in the northwest region of the province of Cordoba, conducted by INPRES, in order to register the seismic activity and micro seismic existent in the area, November 2005 - December 7th, 2005.
11. Seismic operation in the region of Barrancas-Lulunta in the province of Mendoza, conducted by INPRES in order to register the earthquake that occurred in that area on August 5th, 2006.
12. Elaboration of the Seismology-Seismotectonic and focal parameters chapters for the general report on the 5th -August- 2006 Mendoza's earthquake.
13. Participation of a professional of INPRES in Neotectonics workshop organised and developed within the Andean Multinational Project (PMA). Mendoza, July 1st - July 7th, 2006.
14. Elaboration of the Seismic Bulletin (2004). Data Base taken from the following sources: INPRES, United States Geological Survey (USGS) and the Seismological Service of the University at Chile. INPRES, 2006.
15. During the year 2006 there was an advance in the doctoral thesis "Tectonica Cuaternaria y Sismicidad actual en el Sistema de Precordillera oriental y Bolsón de Matagusanos entre los 31° a 32° de latitud sur y 68° a 69° de longitud oeste (Provincia de San Juan, Argentina)", which is part of a project that is being developed in INPRES. The advancements are:
 - A. Text updating and inclusion of the observations done in the trench profiles by the director of the thesis, Dr. Carlos Costa.
 - B. Preparation of focal mechanism of the 1944 earthquake with epicenter in La Laja area.
 - C. Information obtained by the paleoseismology about the 1944 earthquake from the trench done in the scarp's fault named Fault La Laja N° 2.
 - D. Idealisation of tectonic models that refer to the three areas under study in the thesis, based on the superficial seismic analysis in the map obtained by satellite plus the focal mechanism of the 1944 earthquake and other mechanisms under study.
 - E. Production of the thesis report on Neotectonics and Seismology by the stated index.
16. During the year 2006 there was an advance in the doctoral thesis "Actividad tectónica cuaternaria y sismicidad del Valle del Rodeo, Iglesia, entre los 30°- 30° 30' de latitud sur y 6°- 69° 30' de longitud oeste", which is part of a project done by INPRES according to the following:
 - A. The interpretation of the satellital images and aerial photos was completed and organised for their further processing in a digital map where modern deformations and structural features were represented.
 - B. Campaigns were carried out in the eastern area of the thesis, i.e. the eastern side of Arroyo Colola- Iglesia
 - The piece of work was focused on the observation and analysis of the natural trenches already discovered, and on the search for new ones.
 - Using these field observations, deformational areas were defined acting at quaternary and terciary-quaternary levels.
 - Based on field exploration and detailed pictures taken in natural trenches, profiles were built through a graphic programme. The dispositions of the different levels, the structural characteristics, the deformation areas and the stratigraphical units were defined in this procedure.
 - Lithological identification and description of quaternary sediments were done to compare the different stages of evolution linked to the surface rupture.
 - C. The writing of the observations done during the field visits, the trench interpretations as well as the corrections and suggestions done by the director of the thesis, Dr. Carlo Costa, are still in progress.

3.2. National Seismic Network

It is composed of the National Seismological Stations Network, which has 50 stations and the National Accelerograph Network which has 140 installed accelerographs, both networks with equipment distributed all over the country.

4.- PUBLICATIONS

- "El terremoto del 28 de mayo de 2002, La Rioja, Argentina". Araujo M., Millán M. y Pérez A. 8^{vo} Congreso Internacional de la Sociedad Brasileña de Geofísica y 5^{va} Conferencia Latinoamericana de Geofísica, 14 al 18 de septiembre de 2003, Rio de Janeiro, Brasil.

- "Modelling of Andean Backarc (30° -36° S) Crustal Earthquake Waveforms Using a Portable Regional Broadband Seismic Network". Alvarado, P., Araujo M. et al. "Tópicos de Geociencias: Un volumen de estudios sismológicos, geodésicos y geológicos", 2004, EFU Editorial, 53-93, pp.334, ISBN 950-605-340-5.

- "Deformation Partitioning Flat Subduction Setting: The Case of the Andean Foreland of Western Argentina (28° S-33°S)". Siame L., Araujo M. et al.. "Tectonics" 2005, vol. 24, TC5003.

- "Last Destructive Earthquakes Occurred in La Rioja, 05/28/2002, and in Catamarca, 09/07/2004, Argentina: In the Noroccidental Pampean Ranges". Araujo M., Pérez A. y Millán M., Sexto Simposio de Geodinámica Andina, Barcelona, España, 12 al 14 de septiembre de 2005.

- "Avances del Proyecto CHARGE en el Último Año". Alvarado, P., Beck S., Araujo M. et al. Presentado en la IASPEI General Assembly, Santiago de Chile, 2 al 8 de octubre de 2005. Trabajo realizado dentro del marco del proyecto CHARGE, en donde el INPRES y la Universidad de Arizona, junto con otras instituciones, participan bajo convenios de colaboración.

- "The Lithospheric Structure of the Sierras Pampeanas Region of Argentina". Beck S., Alvarado, P., Araujo M. et al. Reunión de la Sociedad Geofísica Americana, Salt Lake City, Utah, 16 al 19 de octubre de 2005.

- "El sismo del 5 de agosto de 2006, en Mendoza, Argentina". Araujo M. y Pérez A. XII Reunión de Tectónica –San Luis- Argentina, 18 al 20 de octubre de 2006.

- "Análisis del Campo de Esfuerzos Durante el Cuaternario en los Depósitos Lacustres del Área Acequión, San Juan, Argentina. Perucca L.y Pérez A. XII Reunión de Tectónica –San Luis- Argentina, del 18 al 20 de octubre de 2006.

- "El Sistema de Fallamiento El Tigre entre el Río Jáchal y el Cerro Negro de Iglesia (Provincia de San Juan)". Pérez I. y Costa C., XII Reunión de Tectónica –San Luis- Argentina, 18 al 20 de octubre de 2006.

- "Actividad Cuaternaria en el Área de La Laja, Provincia de San Juan y su Relación con el Terremoto de 1944. Pérez I. y Costa C., XII Reunión de Tectónica –San Luis- Argentina, 18 al 20 de octubre de 2006.

5.- CONGRESSES.

1º) 8^{vo} Congreso Internacional de la Sociedad Brasileña de Geofísica y 5^{va} Conferencia Latinoamericana de Geofísica, 14 al 18 de septiembre de 2003, Rio de Janeiro, Brasil.

2º) Segundas Jornadas de Ciencias de la Tierra, en la Facultad de Ciencias Exactas Físicas y Naturales de la Universidad Nacional de San Juan, Argentina, 26 -27 de junio de 2003.

3º) 6º ISAG, Sexto Simposio de Geodinámica Andina, a realizarse en Barcelona, España, entre los días 12 al 14 de septiembre de 2005.

4º) IASPEI General Assembly, realizada en Santiago de Chile, Chile, entre los días 2 al 8 de octubre de 2005.

5º) Reunión de la Sociedad Geofísica Americana, Salt Lake City, Utah, Estados Unidos, entre los días 16 al 19 de octubre de 2005.

6º) XII Reunión de Tectónica, San Luis, Argentina, del 18 al 20 de octubre de 2006.

7º) Taller de Neotectónica, organizado y desarrollado dentro del Proyecto Multinacional Andino (PMA). Mendoza, Argentina, 1-7 de julio de 2006.

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ARGENTINEAN NATIONAL REPORT 2003-2007

XXIV IUGG GENERAL ASSEMBLY

Perugia (Italy), July 2 - July 13, 2007

1.- INSTITUTION: UNIVERSIDAD NACIONAL DE LA PLATA
FACULTAD DE CIENCIAS ASTRONÓMICAS Y GEOFÍSICAS
DEPARTMENT OF SEISMOLOGY AND METEOROLOGICAL INFORMATION

MISSION: Among the different branches of Astronomy and Geophysics, the principal objectives of the "Facultad de Ciencias Astronómicas y Geofísicas" (FCAG) are: research, teaching, scientific-technical assistance required by other groups, and divulgation. According to this, the activities of the Seismology and Meteorological Information Department are described in this report.

The staff's aim is to obtain, keep and send data from records of seismological stations, and research on several seismological topics as tectonic and volcanic seismicity, surface waves dispersion, and seismic attenuation.

2.- SPECIFIC ORGANISATION

Facilities

Pavilion-lodge of seismological station LPA. Enclosure-lodge Mainka seismograph. 5 offices (100 m²) located in the central building of this College. 12 personal computers.

Instruments

2 horizontal mechanical components (Mainka 450kg), deactivated in December, 1991
3 short period seismometers United Electro Dynamics Benioff UED, 2 horizontal component model 1101, and 1 vertical component model 1051.
3 long period seismometers W.F.Sprengnether, Instruments Inc. Co., 2 horizontal components, and 1 vertical component model 201.
4 seismic amplifiers (3 for long period and 1 for short period), a motor amplifier, and pen's control, Kinematics Systems.
2 three simultaneous component drum recorders, with accessory UED, models: 273 and 275.
1 digitiser controlled by PC with A/D converter of up to 16 channels, amplifiers and filters for three sensors. Designed and constructed in the FCAGLP, in operation as digital broadband seismograph.
1 portable short period one component seismometer Geotech model 18300 - S13
1 Helicorder recorder, with built-in amplification of solid state and thermosensitive paper register Geotech model RV-301.
1 LE-3Dlite three directional 1Hz geophone.
1 portable A/D converter of 3 channels, 16 bits of continuous register or by triggering, designed and made in the Department of Volcanology, National Museum of Natural Sciences, CSIC, Madrid and the Institut Cartografic de Catalunya, Barcelona, Spain.
1 portable A/D converter of 3 channels, 12 bits of register by triggering designed and made in the Department of Electronics of the College of Astronomical and Geophysical Science, UNLP.
1 GPS Trimble Navigation for time control.
1 digital seismograph Teledyne-Geotech, made up of 1 portable data acquisition system PDAS100, 4 broadband accelerometers BB13, and a GPS Trimble Navigation.
1 CMG-3ESP compact triaxial weak-motion Geotech seismometer with a high-quality digitiser module with full 24-bit resolution DM24 S3 and a GPS.

Personnel

4 researchers.
5 specialised technicians.

3.- MAIN TASKS PERFORMED DURING THE 2003 – 2007 PERIOD

Stations

LPA Seismological Station

The Seismology and Meteorological Information Department has the LPA Seismological Station that belonged to the international network of standardised stations WWSSN (VELA), 1962-1996. This station at the moment is maintained by FCAGLP, and seismological codified information is sent to United States Geological Survey for its publication in the EDR from 1967. The final interpretation of seismological registers has been sent to the International Seismological Centre, Great Britain, for its publication in the Bulletins of the International Seismological Centre since 1923.

TRWA Seismological Station

This station has 3 Teledyne-Geotech broadband accelerometers BB13, a GPS Trimble Navigation, and a portable A/D conversor registering since 1998.

DSPA Seismological Station

This station has a CMG 3T broadband sensor, GPS Trimble Navigation, and an A/D conversor registering since 2002.

TRVA Seismological Station

This station has a CMG 3T broadband sensor, GPS Trimble Navigation, and an A/D conversor registering since 2005.

Teaching activities

The researchers of this Department teach three subjects belonging to the curricula of Geophysics: General Geophysics (1st year), Introduction to Geophysics (3rd year) and Seismology (4th year),

Projects

Seismic Modelling with broadband data of earthquakes

Secretariat for the Technology, Science and Productive Innovation - SEYCIP. Joint project of investigation within the framework of cooperation SETCIP-MAE. 2002-2003.

Director: Jose M. Carcione (Istituto Nazionale di Oceanografía e di Geofísica Sperimentale – OGS), Italy.

Director: Dra. Nora C. Sabbione (Facultad de Ciencias Astronómicas y Geofísicas, FCAG), Argentina.

Seismological Signal Analysis in Argentine and Scotia Sea.

La Plata National University. 11/G068. 2002 - 2005.

Director: Nora C. Sabbione

Volcanology Deception.

Argentine Antarctic Institute. DNA. 2001 - 2004.

Director: Dr. Alberto Caselli. Department of Geological Sciences. FCEN. UBA.

Broadband Seismology in Scotia Sea region.

Programma Nazionale di Ricerche in Antartide (PNRA) Italia. 2004-2006

Director: Dr. Marino Russi. Istituto Nazionale di Oceanografía e Geofísica Sperimentale (OGS) Trieste, Italy.

VOLUME, VOLcanoes: Understanding subsurface mass moveMEnt

European triannual Project financed by the European Commission in the 6th Program Frame of Sustainable Development, Global Change and Ecosystems. FP6-2004-Global-3.

Participation of G. Badi as investigator of associated country.

Monitoring, Analysis and Interpretation of Tectonic and Volcanic Seismological Activity. Towards the Prevention of Natural Catastrophes.

La Plata National University. 11/G088. 2005 - 2009.

Director: Dra. N. Sabbione

POLENET, Cortical Structure of the South Shetland Area by the Analysis of Receiving Functions in Permanent Seismic Broadband Stations.

National plan of I+D, BOE 9-Dec-2005 of the Ministry of Education and Science of Spain.

Director: Dr. J. Almendros, Univ. of Granada, Spain.

Participation of G. Badi as investigator of associated country.

Sis-VolteDEC, Seismo-volcanic Monitoring, Surface Structure and Crust Modeling of Deception Island University of Granada, Spain. 2005 - 2008. CGL2005-07589-C03-02.

Main researcher: Jesus Ibáñez Godoy, Univ. of Granada.

Participation of G. Badi as investigator of associated country.

Extension of Seismological Monitoring Network and Determination of Seismic Hazard in Tierra del Fuego.

Secretariat of Science, Technology and Productive Innovation of the Ministry of Education, Science and Technology. Call: "Federal Projects of Productive Innovation", P.F.I.P.. Resolution N° 1888/05.

EXPTE S.C.T.I.P. N° 0839/05. 2006-2007

Director: Dra. N. Sabbione

Technical Assistance

Copahue (UBA): Copahue Volcano - Province of Neuquén, Argentina.

Technical assistance, analysis and data processing of volcanic seismology

Antarctica Surveys Participation

Summer 2004 - Base Argentina Orcadas, Orcadas Islands. Seismological instruments actualization

Summer 04/05 - Base Española Gabriel de Castilla, Deception Island, South Shetland Island. Seismic marine experiment with ground and oceanic bottom register for tomography and cortical structure of the island

Summer 2005 - Base Esperanza (ESPZ), Argentina. Seismograph installation with real time link via Internet with IAA and OGS. Installation of SeisComP for data connection and conversion in real time from stations ASAIN with ORFEUS Data Centers (<http://www.orfeus-eu.org>).

Summer 2005 - Base Orcadas (ORCD), Argentina. Beginning of real time link via Internet with IAA and OGS. Installation of SeisComP for data connection and conversion in real time from stations ASAIN with ORFEUS Data Centers (<http://www.orfeus-eu.org>).

Summer 06/07 - Base Española Gabriel de Castilla, Deception Island, South Shetland Island. Seismic experiment with ground registering for tomography and cortical structure studies of the island

Summer 2006/7 - Base San Martín, Argentina. Seismograph Installation of SMAR station (68°07' S lat. , 67°06'W long.) that will have, in a near future, a real time link via Internet with IAA and OGS. Installation of SeisComP for data connection and conversion in real time from stations ASAIN with ORFEUS Data Centers (<http://www.orfeus-eu.org>).

Research Activities

- Noise analysis in LPA seismological station in order to know its level and spectral distribution, using a three components digital broadband accelerometer (0.05 - 16 Hertz.).

- Dispersion curves determination from Rayleigh waves group velocity for earthquakes with centers in Chile, Peru, Ecuador and Bolivia, registered in the LPA_{dig} station.

- Study of characterisation and temporary evolution of the seismicity on Deception Island, Antártida, an active volcano, in order to contribute to the knowledge of the present state of its activity.

- Seismicity characterisation registered in ORCD station. Application of different techniques for the study of surface waves and lithospheric modelling.

- Doctoral Thesis: With digital seismological data provided by the INPRES, a comparative study of seismic attenuation is being done in the center-west region of the country. This study includes the determination of hypocenters and the determination of attenuation parameters for different waves according to different methods in order to know the tectonics of the region and to contribute with studies of seismic risk.

- Seismicity study of Tierra del Fuego Island and adjacent zones, compilation of existing bibliography from geologic and geophysical studies.

4.- PUBLICATIONS

Guidarelli, M., Russi, M., Plasencia Linares, M.P., Panza, G.F. 2003. The Antarctic Seismographic Argentinean-Italian Network, and the progress in the study of structural properties and stress conditions in the Scotia Sea region. *Terra Antarctica Reports*, vol. 9.

Sabbione, N., Rosa, M. L., Osella, A. 2003. Análisis preliminar de ondas superficiales aplicado al modelado cortical en las Sierras Pampeanas, Argentina. *Geoacta* 28. pp. 49-60. ISSN 0326-7237

Sabbione, N. 2004. Implementación de la Red de estaciones sismológicas de la Universidad Nacional de La Plata. Aplicaciones al estudio del riesgo sísmico. Doctoral Thesis, S-11, pp. 1-140. Inv 10781. Biblioteca de FCAG.

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Plasencia Linares, M.P., Bukchin B.G., Guidarelli G., Russi M., 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*, vol. 45, n.2 supplement, 3-02.

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Sabbione, N., Connon, G., Hormaechea, J., Rosa, M. L. 2006. Estudio de sismicidad en la Provincia de Tierra del Fuego, Argentina. Geoacta (in press).

Caselli, A. T., G. Badi, A. L. Bonatto, C. L. Bengoa, M. R. Agosto, A. Bidone y J. Ibañez, 2007. Actividad sísmica y composición química fumarólica anómala debido a posible efecto sello en el sistema volcánico, Isla Decepción (Antártida). Sent to Revista de la Asociación Geológica Argentina.

Congresses, Symposiums and Scientific Meetings

V Argentine Symposium and I Latin American Symposium on Antarctic Investigations. Buenos Aires, Argentina, 30th August - 3rd September, 2004. Two oral expositions.

GeoSur2004. Buenos Aires, Argentina, 22nd - 23rd November, 2004. One poster and 2 oral expositions.

American Geophysical Union. 2005. AGU Fall Meeting. One oral exposition.

IASPEI General Assembly. Santiago, Chile, October, 2005. Two posters and 3 oral expositions.

X International Meeting, "Volcán de Colima". Colima, México, 16th - 20th January, 2006. Three posters.

XXIII AAGG Scientific Meeting. Bahía Blanca, Argentina. August, 2006. Two posters and 1 oral exposition.

Courses

IASPEI Training Course

Professor: Tim Ahern, IRIS DMC; Dmitry Storchak, International Seismological Centre; Johannes Schweitzer, Norsar; Anne Sheehan, University of Colorado, Boulder; Robert Herrmann, Saint Louis University, Kiyoshi Suyehiro, Univ. of Tokyo, Japan

9th-13th October, 2005

Department of Geophysics, University of Chile. 30 hours.

Física De Volcanes

Professor: Jesús M. Ibañez Godoy, UGR; Javier Almendros, UGR.

17th May – 12th June, 2006.

Faculty of Sciences, University of Granada, Spain. 60 hours.

Managing Waveform Data and Related Metadata for Seismic Networks

Organised by: IRIS, CERESIS, IASPEI, USP.
10th-14th July, 2006
University of San Pablo, Brazil. 45 hours

Análise Sismológica
Professor: Martín Heinz Salvador Schimmel. Institut of Earth Science Jaume Almera, Barcelona, Spain.
5th - 9th February, 2007
University of San Pablo, Brazil

Função do Receptor e Estrutura Crustal
Professor: Jordi Julià Casas. University of South Carolina, Columbia SC, USA
12th -16th February, 2007
University of San Pablo, Brazil

5.- ADDRESS :

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ARGENTINEAN NATIONAL REPORT 2003-2007

XXIV IUGG GENERAL ASSEMBLY

Perugia (Italy), July 2 - July 13, 2007

1.- INSTITUTION: UNIVERSIDAD NACIONAL DE LA PLATA
FACULTAD DE CIENCIAS ASTRONÓMICAS Y GEOFÍSICAS
DEPARTMENT OF APPLIED GEOPHYSICS

Mission: The Department of Applied Geophysics supports multidisciplinary research and educational activities in the study of different geophysical exploration problems such as: seismic modelling, processing and inversion, ground water flow, contaminant dispersion, electromagnetic wave propagation and electrical methods. This interdisciplinary group is formed by geophysicists, mathematicians, physicists and geologists.

2.- SPECIFIC ORGANISATION:

The Department is housed on the campus of the Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, one of the most important Argentine state universities. Financial support for the research activities of the group is provided by several institutions such as CONICET (the national research council of Argentina), the Agencia Nacional de Promoción Científica y Tecnológica, the European Union, and some university funds. It has fourteen personal computers, six printers, two workstations and remote access to high performance IT resources.

The whole research and teaching staff is composed of two Professors, one Associate Professor and nine Assistant Professors, three Doctoral Fellows working also as Teaching Assistants, five more Teaching Assistants, two Undergraduate Students and one Administrative Official. However, this report briefly describes the general activities performed only in topics of interest of the Subcommittee of Seismology and Physics of the Earth's Interior (IASPEI) by the following members:

Dra. Patricia M. Gauzellino (Assistant Professor),

Dr. Danilo R. Velis (Assistant Professor),

Dra. Claudia L. Ravazzoli (Assistant Professor).

3.- MAIN WORK DONE BETWEEN 2003 AND 2007

3.1 Work done or in progress.

Investigations and developments of advanced techniques for modelling, processing and inversion in geophysics of exploration have been carried out since 2003.

The principal aim has been to analyse the seismic response in isotropic and anisotropic media as the basis for a quantitative estimation of parameters. In addition, mathematical algorithms have been implemented with new concepts for statistical analysis and data segmentation of data, wavelet estimation, deconvolution, geotomography, depth reflexion seismic and groundwater flow. The results of these projects enable us to find specific problem solutions in exploration and extraction of natural resources, including hydrocarbons, minerals, water, etc. This also enhances the interaction between academy and industry.

4.- FIELD WORK: Exploration Geophysics, modelling of seismic wave propagation in complex media, inverse problem, theoretical rock physics.

Collaboration with other institutions

Our Department is related to the following renowned institutions through different joint research activities:

- Department of Mathematics, Purdue University, Indiana, USA.
- Department of Earth and Ocean Sciences, University of British Columbia, Vancouver, Canada.
- Osservatorio Geofisico Sperimentale, Trieste, Italy.
- Department of Mathematics, Seoul National University, Seoul, South Korea.
- Instituto de Cálculo, Universidad de Buenos Aires, Argentina.
- Centro de Transferencia Tecnológica, Repsol Y.P.F., Argentina.
- Universidad Federal de Río de Janeiro, Brazil.
- Universidad Tecnológica Nacional, Argentina.
- Department of Physics, University of Alberta, Edmonton, Canada.

5.- PUBLICATIONS (2003 – 2007)

C.L. Ravazzoli, J.E. Santos, J. M. Carcione, Acoustic and mechanical response of reservoir rocks under variable saturation and effective pressure. *Journal of Acoustical Society of America (JASA)*, Vol.113, p. 1801-1811, (2003). DOI: 0.1121/1.1554696.

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J.E. Santos, C.L. Ravazzoli, J.M. Carcione, A model for wave propagation in a composite solid matrix saturated by a single phase fluid. *Journal of Acoustical Society of America*, 115(6), p. 2749-2760, (2004).

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C. L. Ravazzoli and J.E. Santos, A theory for wave propagation in porous rocks saturated by two-phase fluids under variable pressure conditions. *Bolletino di Geofisica Teorica ed Applicata*, vol. 46/4 (2005). ISSN 0006-6729 Published in: Technical Report Series ISC-04-05-MATH, Institute for Scientific Computation, Texas A&M University, April 2004. (www.isc.tamu.edu/iscpubs/iscreports.html).

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N. Maltagliatti y C.L. Ravazzoli, Análisis comparativo de métodos de estimación espectral para la determinación de profundidad al basamento magnético en exploración geofísica. *Mecánica Computacional*, Vol. 24, pp. 3131-3147, (Ed. Axel Larrateguy), MECOM 2005, Buenos Aires, (2005). ISSN 1666-6070.

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F. I. Zyserman, P. M. Gauzellino and J. E. Santos, Dispersion analysis of a nonconforming finite element method for the Helmholtz and elastodynamic equations. *International Journal for Numerical Methods in Engineering*, Vol. 58, #8, pp. 1381-1395, (2003).

F. I. Zyserman and P. M. Gauzellino, Calculating numeric dispersive properties of FEM's for 2D and 3D elastic wave equation. *Mecánica Computacional*, Vol. 22, pp. 1554-1568, (2003).

F. I. Zyserman and P. M. Gauzellino, Study of the numerical dispersion of FEMs for the viscoacoustic equation. *Journal of Applied Geophysics*, Vol. 55, p. 279—289, (2004).

F. I. Zyserman and P. M. Gauzellino, Dispersion analysis of a nonconforming finite element method for the three dimensional scalar and elastic wave equations. *Finite Element in Analysis and Design*, Vol. 41#13, p. 1309-1326, (2005).

P. M. Gauzellino and Angel Queizán, Mínimos cuadrados empleando conceptos del álgebra lineal, *EMCI 2005, AM11*, (2005).

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M. A. Jamilis Ricaldoni, F. Wasylyszyn, P. M. Gauzellino and A. F. Queizán, Implementación computacional de un algoritmo de optimización para el cálculo de superficies de revolución, *Mecánica Computacional* - ISSN: 1666-6070, Vol. 24, pp. 3119-3130, (2005).

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P. M. Gauzellino, A. Queizán, J. Herskovits, F. Spath, Determinación de los parámetros de campo para la adquisición 3D de datos sísmicos. Approved to be published in *Geoacta*.

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Book Chapters

C.L.Ravazzoli, Analysis of reflection and transmission coefficients in three-phase sandstone reservoirs. *Journal of Computational Acoustics*, vol. 9(4) 2001, 1437-1454, in chapter "Wave Propagation Theory" of *Theoretical and Computational Acoustics '99* (CD-ROM), World Sci. Publ. Singapur (2004). ISBN 981-238-447-2.

6.- CONGRESSES

D. S. Cersósimo, C. L. Ravazzoli, R. García Martínez, Inversión sísmica de un modelo teórico calculado sobre un horizonte sísmico utilizando redes neuronales. 3er. Convención Técnica de la ACGGP, "La inversión en el conocimiento geológico", Bogotá, 29/09 al 02/10/04.

J. G. Rubino, C. L. Ravazzoli and J. E. Santos, Modeling and Inversion of Sonic P and S Wave Velocities at the Mallik 5L-38 Gas Hydrate Research Well. Expanded Abstract (4 pages) approved for oral exposition in EAGE/EAGO/SEG International Conference and Exhibition, Saint Petersburg 2006, Russia, 16 - 19 October, 2006.

J. E. Santos, J. G. Rubino and C. L. Ravazzoli, Modelling the Reflection Coefficients and Slow Wave Mode Conversions at the Top and Bottom of a Gas-hydrate Bearing Interval. Expanded Abstract (4 pages) Society of Exploration Geophysicists, International Exposition and 76th Annual Meeting, New Orleans, 1 - 6 October, 2006.

Velis*, D.R., 2006, Parametric Sparse-spike Deconvolution and Acoustic Impedance Recovery, 76th Ann. Mtg.: Soc. Expl. Geophysics, 2141-2144, New Orleans, USA.

Velis, D.R. and Badi, Gabriela and Gianibelli, Julio César and Cesanelli, Andrés, 2006, El nuevo plan de la carrera de Geofísica de la FCAyG-UNLP, Comisión permanente de planes de estudio de Geofísica: XXIII Reunión Científica de la Asociación Argentina de Geofísicos y Geodestas, Bahía Blanca, Argentina.

Velis*, D.R., 2005, Segmentation of Well Log Data, 9th International Congress: Brazilian Geophys. Soc., P298, Salvador, Brazil.

Rubino*, J.G. and Velis, D.R., 2004, Simulated Annealing para la localización de terremotos, *Mecánica Computacional*, **23**, 3091-3102, XIV Congreso sobre Métodos Numéricos y sus Aplicaciones (ENIEF'04), San Carlos de Bariloche, Argentina.

Zanca*, G. and Velis, D.R., 2004, Tomografía de refracción 2-D para la determinación de capas someras, XXII Reunion Científica de la Asociación Argentina de Geofísicos y Geodestas, Buenos Aires, Argentina.

Rubino*, J.G. and Velis, D.R., 2004, Localización de eventos sísmicos: un problema de optimización no-lineal: XXII Reunión Científica de la Asociación Argentina de Geofísicos y Geodestas, Buenos Aires, Argentina.

Velis*, D.R., 2003, Segmentación estadística de series de tiempo, *Mecánica Computacional*, **22**, 1518-1526, XIII Congreso sobre Métodos Numéricos y sus Aplicaciones (ENIEF'03), Bahía Blanca, Argentina.

XIII Congreso sobre Métodos Numéricos y sus Aplicaciones, ENIEF 2003. Bahía Blanca, 4-7 November, 2003.

XXII Reunión Científica de Geofísica y Geodesia, Buenos Aires, Argentina, 6-10 September, 2004.

3a. Jornada de Informática y Educación, P. Gauzellino, D. F. Amiconi, A. F. Queizán, Resolución de un sistema de ecuaciones no lineales convirtiéndolo a un sistema de ecuaciones diferenciales ordinaria, Villa María, Córdoba, 11-12 November, 2004.

XII EMCI Nacional y IV EMCI Internacional, Educación matemática en carreras de ingeniería, Mínimos cuadrados empleando conceptos del álgebra lineal. P. M. Gauzellino y A. Queizán, San Juan, Argentina, 19-22 April, 2005.

VIII Congreso Argentino de Mecánica Computacional, MECOM 2005, Buenos Aires, Argentina, November 2005.

International Association of Seismology and Physics of the Earth Interior (IASPEI) General Assembly, M. L. Rosa, N. C. Sabbione, P. M. Gauzellino, Rayleigh Wave Velocity Inversion in Sierras Pampeanas, Argentina, International Association of Seismology and Physics of the Earth Interior, Santiago, Chile, 2-8 October, 2005.

Encuentro Científico del International Center for Earth Sciences, ICES, Malargue, Argentina, 21-25 November, 2006.

XXIII Reunión Científica de Geofísica y Geodesia, Bahía Blanca, 14-18 August, 2006

V Congreso Argentino de Enseñanza de la Ingeniería, V CAEDI, L. Beltrachini, A. F. Queizán, P. Gauzellino, Integración de Romberg. Aplicación en el control de un sistema. Vol. I, pp. 319-325. Mendoza, Argentina, 6-8 September, 2006.

XIV Congreso sobre Métodos Numéricos y sus Aplicaciones, ENIEF 2003, Santa Fé, Argentina, 7-10 November, 2006.

7.- COURSES :

“Introducción a la Programación”. Postgraduate program in Computational Mechanics (Dra. Patricia M. Gauzellino), Facultad de Ingeniería, UNLP.

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ARGENTINEAN NATIONAL REPORT 2003-2007

XXIV IUGG GENERAL ASSEMBLY

Perugia (Italy), July 2 - July 13, 2007

1.- INSTITUTION: UNIVERSIDAD NACIONAL DE SAN JUAN
FACULTAD DE CIENCIAS EXACTAS, FÍSICAS Y NATURALES

NAME: Patricia Alvarado

4.- FIELD WORK : Seismology, Tectonics, Geophysics

5.- PUBLICATIONS :

Alvarado, P. and Beck, S., (2006). Source Characterisation of San Juan (Argentina) Crustal Earthquakes of 15 January 1944 (Mw 7.0) and 11 June 1952 (Mw 6.8). *Earth and Planetary Science Letters* 243, 615 – 631, doi:10.1016/j.epsl.2006.01.015.

Fromm, R., **Alvarado, P.**, Beck, S., and Zandt, G., (2006). The April 9, 2001 Juan Fernandez Ridge (Mw 6.7) Tensional Outer-rise Earthquake and its Aftershock Sequence. *Journal of Seismology*, doi: 10.1007/s10950-006-9013-3.

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Alvarado, P., Castro de Machuca, B., and Beck, S., (2005). Comparative Crustal Seismic Study of the Western and Eastern Sierras Pampeanas Region, Argentina, (31°S). *Revista de la Asociación Geológica Argentina* 60 (4), 787-796.

Barrientos, S., Vera, E., **Alvarado, P.** and Monfret, T., (2004). Intraplate Seismicity in Central Chile. *Journal of South American Earth Sciences* 16, 759-768.

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Valenzuela, A., **Alvarado, P.** y Malberti, A., (2003). Una propuesta didáctica para conocer la estructura interna de la Tierra. *Revista de la Asociación Española para el Estudio de las Ciencias de la Tierra*, AEPECT 11 (1), 54-59.

6.- CONGRESSES :

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- Subduction Zones: An Integrated View, held by PhD. George Zandt (University of Arizona, USA).
- Orogenic Systems, held by PhD. George Zandt (University of Arizona, USA).
- Trust Belt and Synorogenic Sediments, held by PhD. Peter De Celles (University of Arizona, USA).
- Regional tectonics, held by PhD. Mihai Ducea and PhD. George Gehrels, (University of Arizona, USA).
- Active Tectonics, held by PhD. Susan Beck, (University of Arizona, USA).
- Physics of the Earth, held by PhD. Clement Chase (University of Arizona, USA).
- Inverse Problems, held by PhD. Randall Richardson (University of Arizona, USA).

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ARGENTINEAN NATIONAL REPORT 2003-2007

XXIV IUGG GENERAL ASSEMBLY

Perugia (Italy), July 2 - July 13, 2007

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5.- PUBLICATIONS :

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ARGENTINEAN NATIONAL REPORT 2003-2007

XXIV IUGG GENERAL ASSEMBLY

Perugia (Italy), July 2 - July 13, 2007

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“ESPECTRO DE ACELERACIÓN SÍSMICA EN BUENOS AIRES POR EFECTO DE SISMOS DE GRAN MAGNITUD DEL LITORAL CHILENO O DEL OESTE ARGENTINO” - Juan S. CARMONA, Nora C. SABBIONE, Roberto M. PINCIROLI, Raquel L. PALAU – INGENIERIA ESTRUCTURAL – Year 13, Nr. 33, December 2005- ISSN-1667-1511- Buenos Aires, Argentina.

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7.- COURSES : CONFERENCES AND REPORTS

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