

### **Summary of skills:**

Dr. Maria Sachpazi received her Bachelor Degree in Physics in 1984, a Master of Science degree in Geophysics from the University of Paris VII, France in 1986 and a doctoral degree in Seismology in I.P.G. Paris in 1991 on the use of high resolution local arrays of digital three component seismographs for earthquake location and characterization of upper crustal heterogeneity.

She then joined the Instituto Jaume Almera in Barcelona, Spain, as a Post-Doctoral scientist (EEC funding) working on deep seismic reflexion refraction projects for 2 years.

In 1995 she accepted a research position at the Geodynamics Institute of National Observatory of Athens (GI-NOA).

She published over 40 articles in peer-reviewed Journals.

More than 850 citations. H-value 16.

Multilingual in 4 languages.

### **Positions held**

Researcher, Geodynamics Institute of NOA 1995-1998.

Assistant Researcher, Geodynamics Institute of NOA 1998-2002.

Senior Researcher, Geodynamics Institute of NOA 2002-2006

Research Director, Geodynamics Institute of NOA 2006-present

Depute Director of Geodynamics Institute of NOA December 2013-present

### **Scientific Skill**

-Development of a structural approach to crustal heterogeneity in active regions such as geothermal fields, volcanoes and earthquake faults.

-High-resolution deep penetration reflection and refraction sounding.

-High-resolution earthquake monitoring with dense offshore and onshore arrays.

-Teleseismic receiver-function methodology with dense broad band arrays for the exploration of structure and seismogenic processes of the Hellenic Subduction

### **Research projects/International Collaborations**

Participant to European projects in the frame of

-REUSIS (REUNION VOLCANO DEEP STRUCTURE STUDY),

-ETNASEIS (ETNA VOLCANO DEEP STRUCTURE STUDY) (EEC, EVOP)

-Participant to STREAMERS project (EEC funding to NOA) consisting of the study of the deep structure of the Mediterranean sea by the aid of artificial sources (airgun) and earthquakes using both marine and land station (1993-1995)

### **Scientific responsible for more than 20 research projects (since 1995) some of which are referred below:**

-**Seiscan** and **Seiscanex** (EEC funding) with the objectives to extend the accessibility and use of old paper seismic records by image archiving and digital translation to SEG-Y through the provision of Work based training and development tools. (1998-2004) Other Partners : Southampton Oceanography Centre England (coordinator), Ecole et Observatoire des Sciences de la Terre Universite Louis Pasteur, Strasbourg , Facultat de Geologica, University of Barcelona, Osservatorio Geofisico Sperimentale di Trieste

-**SEISGREECE Hellenic-French**-project. MCS reflection and refraction onshore-offshore study (Cyclades, North Aegean Trough and Gulf of Korinth)

- **3F-Corinth** project (EEC funding) consisting of deployment of OBS in the Gulf of Corinth aiming to “better understand fluid transfer in and around fault zones and through carbonated reservoirs” (2000-2002) Others Partners: Institut Francais du Petrole (coordinator) Schlumberger, Institut de Physique du Globe de Paris, National Technical University of Athens, Universite de Lieges, University of Patras, UMR Geoscience Azur, Enterprise oil, Instituto Nazionale di Geofisica, ITALY, Geoforschungszentrum Postdam, Armines, Ecole Nationale des Ponts et Chaussees

-**Anatolia** (Hellenic Ministry of civil defense funding) with the objective “Seismotectonic investigation of the N.Aegean trough by using land and marine seismographs”(2000-2002) in collaboration with University of Lisbonne Prof. Mendes Victor.

-**Deep Seismic Imaging of Active Continental Extension in the Gulf of Corinth** (Co-PI) NSF funding with the objective to determine the mode of deformation in the Gulf of Corinth rift by the use of seismic reflection profiles received by a 6 Km marine stramer (US vessel R/V MAURICE EWING) and an array of land seismometers (2001-2005 ) Other Partners: University of Hawaii, Prof Brian Taylor (Principal Investigator), Institut de Physique du Globe de Paris

-**MEDUSA** Multi-disciplinary Experiment for Dynamic Understanding of Subduction under the Aegean sea (2006-2009) in collaboration with MIT, Prof. Leigh Royden Principal Investigator (funded by NSF).

The objective of the project is the study of the structure of the Hellenic subduction system by quantifying relationships among slab density and geometry, subduction rate, density of subducted lithosphere and dynamic interactions between the slab and the surrounding mantle. Two onshore arrays have been deployed in collaboration with Stephane Rondenay as dip lines of the Hellenic slab, one through northern Greece and the other through Peloponnesus and Attiki aiming at seismic imaging of the subducted slab with body waves from distant earthquakes.

-**EGELADOS** (funded by University of Bockum) with the objective to investigate the southern part of the Hellenic subduction zone with the installation of an amphibian temporary broadband seismic network Others partners: GFZ Potsdam, TU Istanbul, Ruhr-University Bochum, University of Thessaloniki, TEI of Crete. (2006-2010)

-**Europa** proposal with collaboration of IFM-GEOMAR, SALVADOR programme for deployment of OBS between Peloponnesus and Crete to detect and study local micro-earthquakes and transients of the mega-thrust subduction boundary (2006-2008)

-**Thales was Right (EEC funding)** Transients in the Hellenic and Antilles Locii of Earthquakes of European Subductions: Water Activity, Structure and Seismic Risk Illuminated by Geophysical High-Technology (2006-2010) It is a four years interdisciplinary study consisting of dense active seismic studies as well as passive seismic studies, and modeling of subduction processes leading towards large earthquakes

-**Geo-Seas** EEC funding (2009-2013) with the objective to establish a Pan-European infrastructure for management of marine and ocean geological and geophysical data The project has up to 27 european partners.

-**ULYSSE** (Upper Lithosphere -Subduction Exploration) seismic study on the SW segment of the Hellenic subduction zone in order to image the seismogenic portion of the subduction mega-thrust fault at depths of 10-50 km with the IFREMER's vessel (N/O Pourquoi Pas? ) towing the large airgun source and the 4.5 km streamer. Coincident multi-channel reflection seismics and refraction seismics including two 250 km long transects crossing the subduction

zone were carried out. For the refraction investigation 25 Ocean-Bottom Hydrophones and Seismometers, OBH/S were provided by our German colleagues of IFM-GEOMAR.

### **OCEANOGRAPHIC EXPEDITIONS : Multichannel reflection seismic and/or Ocean Bottom Seismometers**

1993 N/O LE NADIR STREAMERS MCS and offshore-onshore in Ionian and Aegean seas (co-PI)

1993 N/O MARION-DUFRESNE FOURNASEIS MCS, OBS and offshore-onshore study of La Réunion hotspot island (participant)

1997 N/O LE NADIR\* SEISGRECE MCS, OBS offshore-onshore study in Ionian and Aegean seas and Gulf of Corinth (co-PI)

2001 US RV MAURICE EWING MCS offshore and onshore study in the Gulf of Corinth (co-PI)

2008 and 2009 N/O "AIGAIO" Hellenic oceanographic vessel deployment of 20-35 OBS (PI)

2012 N/O "Pourquoi Pas" IFREMERS :MCS, OBS offshore study of the western Hellenic subduction (co-PI)

### **Selected publications (peer-reviewed international journals):**

-Hirn A., **Sachpazi M.**, and Nercessian A., 1989: Elements for a model of the geothermal field of Milos from seismological data. *Geothermics* 184, 579-595.

-**Sachpazi M.**, and Hirn A., 1991: Shear wave anisotropy across the geothermal field of Milos, Aegean Volcanic arc. *Geophys. J. Int.* 107, 637-685.

-Hirn A., Jiang M., Sapin M., Diaz J., Nercessian A., Lu T.Q., Lepine J.C., Shi D.N., **Sachpazi M.**, Pandey M.R., Ma K., and Gallart J., 1995: Seismic anisotropy as an indicator of mantle flow beneath the Himalayas and Tibet. *Nature* 375, 571 -574.

-Hirn A., **Sachpazi M.**, Siliqi R., S.Mc Bride, F. Marnelis and the STREAMERS/PROFILES group, 1996: A traverse front with coincident normal incidence and wide angle seismic. *Tectonophysics* 267, 57-71.

-Avedik F., Hirn A., Renard V., Nicolich R., Olivet J.L., **Sachpazi M.**, 1996: Single-bubble" marine source offers new perspectives for lithospheric exploration. *Tectonophysics* 264, 35-49.

-**Sachpazi M.**, Hirn A., Loukoyannakis M. and STREAMERS group, 1996: A Traverse of the Margin of the Ionian Basin to the Hellenides: Coincident Seismic and Earthquake Location Survey. *Bulletin of the Geological Society of Greece* 6, 46-54.

-**Sachpazi M.**, Hirn A., Nercessian A., Avedik, F., Mc Bride J., Loukoyannakis S.M., and the STREAMERS/PROFILES group, 1997: A first coincident normal incidence wide angle approach to study the extending Aegean crust. *Tectonophysics* 270, 301-312.

-Hirn A., Nicoloch R., Gallart J., Laigle M., Cernobori L., Acaino F., Avedik F., Bianca M., Diaz J., Lepine J.C., Metton G., Monaco C., Nercessian A., Petronio L., Pau S., Romanelli M., Gallares V., Sapin M., Marson I., **Sachpazi M.**, and Vedova B., 1997: Roots of Etna volcano in faults of great earthquakes. *Earth and Planetary Sciences Letters* 148, 171-191.

- Papadopoulos G., **Sachpazi M.**, Panopoulou G., and Stavrakakis G., 1998: The volcano seismic Crisis of 1996-1997 in Nisyros, SE Aegean Sea, Greece. *Terra Nova Letters* 148, 171-191.
- Gallart J., Driad L., Charvis Ph., Sapin M., Hirn A., Diaz J., de Voogd B., and **Sachpazi M.**, 1999: Perturbation to the lithosphere along the hotspot track of La Reunion, from an offshore-onshore seismic transect. *J. Geophys. Res.*, 2895-2908.
- Clement Ch., Hirn A., Charvis P., **Sachpazi M.**, and Marnelis F., 2000: Seismic structure and the active Hellenic subduction in the Ionian islands. *Tectonophysics* 329, 141-156.
- Laigle M., Hirn A., **Sachpazi M.**, and Roussos N., 2000: North Aegean crustal deformation: an active fault imaged to 10 km depth by reflection seismics. *Geology* 28(1), 71-74.
- Sachpazi M.**, Hirn A., Clément Ch., Laigle M., Haslinger F., Kissling E., Charvis Ph., Hello Y., Lépine J. C., Sapin M., and Ansorge J., 2000: Western Hellenic subduction and Cephalonia transform: local earthquakes and plate transport and strain. *Tectonophysics* 319, 301-319.
- Kontoes C., Briole P., **Sachpazi M.**, Veis G., Elias P., Sykiot, O., Remy D., Kotsis I., 2000: Displacement field and fault model for the September 7, 1999 Athens earthquake inferred from ERS2 satellite radar interferometry. *Geophys. Res. Ltrs.* 27(24), 3989.
- Sachpazi M.**, Kontoes Ch., Voulgaris N., Laigle M., Vougioukalakis G, Sikioti O., Stavrakakis G., Baskoutas J., Kalogeras J., and Lepine J. Cl., 2002: Seismological and INSAR signature of unrest at Nisyros caldera, Greece. *Journal of Volcanology and Geothermal Research* 116, 19-33.
- Laigle M., Hirn A., **Sachpazi M.**, and Clément, C., 2002: Seismic coupling and structure of the Hellenic subduction zone in the Ionian Islands region. *Earth and Planetary Sciences Letters* 200, 243-253.
- Sykioti O., Elias P., Briole P., **Sachpazi M.**, Paradissis D., Kontoes Ch., and Kotsis, I., 2003: Ground deformation at Nisyros volcano (Greece) detected by ERS2 SAR differential interferometry. *International Journal of Remote Sensing* 24(1), 183-188.
- Sachpazi M.**, Clement C., Laigle M., Hirn, A., and Roussos, N., 2003: Rift structure, evolution, and earthquakes in the Gulf of Corinth, from reflection seismic images. *Earth and Planetary Sciences Letters* 216(3), 243-.257.
- Clément C., **Sachpazi M.**, Charvis P., Graindorge D., Laigle M., Hirn A., and Zafiroopoulos G., 2004: Reflection-refraction seismics in the Gulf of Corinth: hints at deep structure and control of the deep marine basin. *Tectonophysics* 391, 97-108.
- Laigle M., **Sachpazi M.**, and Hirn A., 2004: Variation of seismic coupling with slab detachment and upper plate structure along the western Hellenic subduction. *Tectonophysics* 391, 85-95.
- Zelt B.C., Taylor B., Weiss J.R., Goodliffe A.M., **Sachpazi M.**, and Hirn A., 2004: Streamer tomography velocity models for the Gulf of Corinth and gulf of Itea, Greece. *Geophys. J.Int.* 159, 333-346.
- Pi Alperin J.M., Marthelot J.M, Galve A., **Sachpazi M.**, Taylor B., Laigle M., Hirn A., 2004: Seismic refraction imaging of the southern Corinth Rift shoulder at Derveni. *Geoscience* 336, 251-257

-Zelt B.C., Taylor B., **Sachpazi M.**, and Hirn A., 2005: Crustal velocity and Moho structure beneath the Gulf of Corinth, Greece. *Geophys. J. Int.* 162, 1-12.

-**Sachpazi M.**, Galvé A., Laigle M., Hirn A., Sokos E., Serpetsidaki A., Marthelot J.-M., Pi Alperin J.M., Zelt B., and Taylor B., 2007: Moho topography under central Greece and its compensation by Pn time-terms for the accurate location of hypocenters: the example of the Gulf of Corinth 1995 Aigion earthquake. *Tectonophysics* 440, 53-65.

-Suckale J., Rondenay S., **Sachpazi M.**, Charalampakis M., Hosa A., and Royden L., 2009: High-resolution seismic imaging of the western Hellenic subduction zone using teleseismic scattered waves. *Geophys. J. Int.* 178(2), 775-791.

-Grad M., Tiira T., and ESC Working Group (**M.Sachpazi** among other authors), 2009: The Moho depth map of the European Plate. *Geophys. J. Int.* 176, 279-292.

-Gesret A., Laigle M., Diaz J., **Sachpazi M.** and Hirn A. The oceanic nature of the African slab subducted under Peloponnesus: thin layer resolution from multiscale analysis of teleseismic P-to-S converted waves. *Geophys. J. Int.* 2010 Vol 183 2 pp 833-849

-Taylor, B., Weiss, J. R., Goodliffe, A. M., **Sachpazi, M.**, Hirn, A. and Laigle, M., 2011. The structures, stratigraphy and evolution of the Gulf of Corinth rift, Greece. *Geophys. J. Int.*, , 185, 1189–1219.

-Gesret, A., Laigle, M., Diaz, J., **Sachpazi, M.**, Charalambakis, M. and A. Hirn, 2011. Slab top dips and kinks, resolved by teleseismic converted waves in the Hellenic and Lesser Antilles subductions. *Geophys. Res. Lett.*, 38, L20304,doi:10.1029/2011GL048996..

-Pearce, F.D., Rondenay, S., **Sachpazi, M.**, Charalampakis M., and Royden L.H., 2012. Seismic investigation of the transition from continental to oceanic subduction along the western Hellenic Subduction. *J. Geophys. Res.*, Vol. 117 DOI: 10.1029/2011JB009023.

-M. Laigle, A. Hirn, M. Sapin, A. Bécel, P. Charvis, E. Flueh , J. Diaz , J.-F. Lebrun , A. Gesret, R. Raffaele, A. Galvé, M. Evain , M. Ruiz, H. Kopp , G. Bayrakci, W. -Weinzierl , Y. Hello, J.-P. Viodé, **M. Sachpazi** , J. Gallart , E. Kissling, and R. Nicolich: 2013 Seismic structure and activity of the central Lesser Antilles subduction from an integrated approach : similarities with the Tohoku forearc. *Tectonophysics* Vol. 603 pp 1-20

-Laigle M. Becel A, de Voogd B., **Sachpazi M.**, Bayrakci G , Lebrun J.F., Evain M., and the Thales Was Right Working group 2013 Along-arc segmentation and interaction of subducting ridges with the Lesser Antilles Subduction forearc crust revealed by MCS imaging. *Tectonophysics* Vol 603 pp 32-54

### **Manuscripts prepared, in circulation among co-authors for submission**

- **Sachpazi M.** et al. High-resolution seismic imaging of the anatomy and physiology of the Hellenic subduction slab and large earthquakes. Submission to « Nature » January 2014

-Laigle, **M. M. Sachpazi** et al. High-resolution imaging of seismic structure and activity: physiology of the Aegean plate overriding, accreting, and extending over the Hellenic subduction. Submission to « Nature » January 2014

-**Sachpazi M.**, M. Laigle, E. Flueh, M. Charalampakis, J. Diaz, A. Galvé, A. Gesret, E. Sokos , A. Pirentis, P. Petrou, R. Nicolich and A. Hirn. A pilot Ocean Bottom Seismometer and land

array location of earthquakes in the pre-seismic context of the 2008, M=6.9 Methoni megathrust earthquake of the Hellenic subduction and RF imaging of the interplate discontinuity. Submission to "Tectonophysics" February 2014

-**Sachpazi M.** et al. Seismic imaging of Aegean Moho topography relation with surface extension and faulting and Hellenic slab heterogeneity. Submission to Geology, February 2014

-Gesret, A, **M. Sachpazi** et al., Heterogeneity in the Aegean lower lithosphere under the Moho and above the Hellenic slab top, from high-resolution tight coverage receiver-function analysis Sub-Moho. Submission to Geophysical Journal International, March 2014