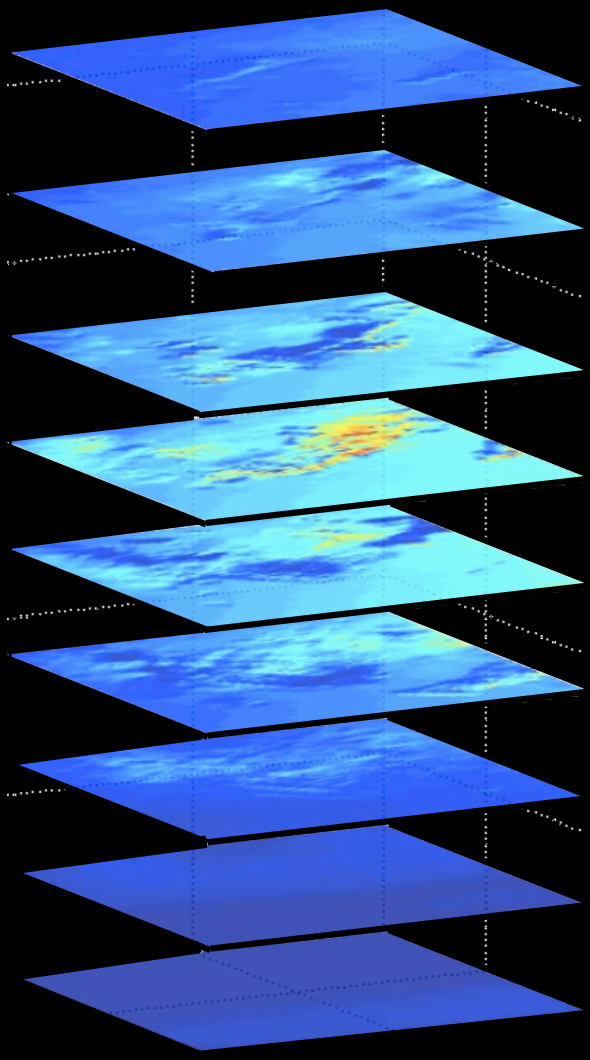
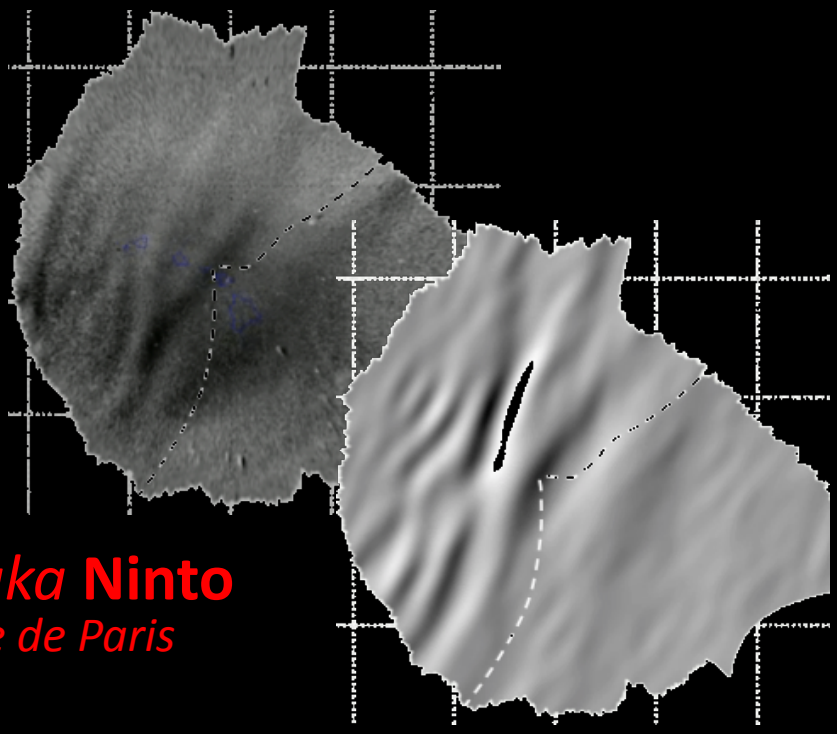




Giovanni Occhipinti *aka* **Ninto**
Institut de Physique du Globe de Paris
ninto@ipgp.fr

To save the planet & your ink, don't print this page

Giovanni Occhipinti *aka* Ninto

Born on **October 25, 1976,** Nationality: Italian
Associate Professor @ Université Paris Diderot (Paris 7)

Institut de Physique du Globe de Paris – UMR 7154
Planetology & Space Science Laboratory
38 rue Hélène Brion
75205 PARIS Cedex 13
France

telephone: +33.(0)6.58.49.47.83
e-mail: ninto@ipgp.fr
webpage: http://www.ipgp.fr/~ninto

Position, Fellowships & Visiting

2008 – present **Associate Professor, Université Paris Diderot (Paris 7)**
2012 – present **PES *"Prime d'Excellence Scientifique"***

Mars 2015 **HDR *"Habilitation à Diriger des Recherches"***

April-July 2012/13 **Invited Professor @ ERI-Tokyo.**

June-July 2009 **Invited Scientist @ ETH-Zurich.**

2007 – 2008 **JPL/Caltech** post-doctoral fellowships @:

Jet Propulsion Laboratory, NASA
Ionospheric and Atmospheric Remote Sensing Group
Pasadena, CA 91109, US

California Institute of Technology (Caltech)
Seismologial Laboratory
Pasadena, CA 91125, US

2005 – 2006 **ATER** (teaching fellowship) @ **Université Paris Diderot (Paris 7)**

2002 - 2005 Doctoral fellowship **MIR/ONERA** @:

Institut de Physique du Globe de Paris
Laboratoire de Géophysique Spatiale et Planetaire
Paris, FRANCE

Office National d'Etudes et Recherches Aérospatiales
Departement d'Electromagnetisme et Radar
Palaiseau, FRANCE

Peer Review

Ninto actively partecipates to the review process of several journals (*JGR, GRL, Radio Science, Treatise of Geophysics, EPS, GJI, Scientific Reports,* etc…) reviewing around 33 papers from 2007, with an expertise on ionospheric detection of natural hazard (Earthquakes, tsunamis, volcanic eruptions, explosions, etc..), as well as seismological coupling between the solid Earth and the fluid envelopes (ocean, atmosphere, ionosphere), ionospheric monitoring techniques (GPS, OTH-radars, Doppler sounders, altimeters) and ionospheric tomography.

Editor referee contacts:

Eric Calais (*GRL*) ecalais@geologie.ens.fr
Bob Lysac (*JGR-Space Physics*) bob@fields.space.umn.edu
Hiroo Kanamori (*Treatise on Geophysics*) hiroo@gps.caltech.edu
Jean Virieux (*GJI*) Jean.Virieux@obs.ujf-grenoble.fr

Publications (available on www.ipgp.fr/~ninto - students are underline)

G. Occhipinti & F. Aden-Antoniow, Ionospheric Magnitude, *Under Preparation.*

Occhipinti, **G.**, The Seismology of Planet Mongo: the 2015 Ionospheric Seismology Review, ***AGU Books****, Geodynamics*, ed. G. Morra, D. Yuen, S. Lee, S. King, *Accepted.*

Shuanggen Jin, **Giovanni Occhipinti**, Rui Jin, GNSS ionospheric seismology: Recent observation evidences and characteristics, Earth Science Review, 147 (2015), 54-64, doi:10.1016/j.earscirev.2015.05.003.

Roy, C., **G. Occhipinti**, L. Boschi, J.-P. Molinie, Mark Wieczorek, Effect of ray and speed perturbations on Ionospheric Tomography by Over-the-horizon radar: A new method, **J. Geophys. Res.**, doi:10.1002/2014JA020137

Bourdillon, A., **G. Occhipinti**, J.-P. Molinie, V. Rannou, HF radar detection of infrasonic waves generated in the ionosphere by the 28 March 2005 Sumatra earthquake , **J. Atmo. Sol.-Terr. Phys**., 109, 75-79, doi.org/10.1016/j.jastp.2014.01.008. 2014

Occhipinti, G., L. Rolland, P. Lognonné, S. Watada, From Sumatra 2004 to Tohoku-Oki 2011: The systematic GPS detection of the ionospheric signature induced by tsunamigenic earthquakes, **J. Geophys. Res.**, 118, doi:10.1002/jgra.50322. 2013

Kherani, E. A., Lognonné P., Hébert H., Rolland L., Astafyeva E., **Occhipinti G.**, et al., Modelling of the total electronic content and magnetic field anomalies generated by the 2011 Tohoku-Oki tsunami and associated acoustic-gravity waves, ***Geophys. J. Int.***, Dec, Volume 191, Issue 3, p.1049-1066, (2012) DOI: 10.1111/j.1365-246X.2012.05617.x

Occhipinti, **G.**, Chapter 2, Tsunami Detection by Ionospheric Sounding: New Tools for Oceanic Monitoring. Book: Tsunami - A Growing Disaster, Edited by Mohammad Mokhtari, ISBN 978-953-307-431-3, 244 pages, Publisher: InTech, Chapters published December 16, 2011 under CC BY 3.0 licenseDOI: 10.5772/922

Coisson, P., **G. Occhipinti**, P. Lognonné, J.P. Molinie, L. Rolland, Tsunami signature in the ionosphere: simulation of OTH radar observations,***Radio Science***, doi:10.1029/2010RS004603. 2011

Occhipinti, G., P. Coisson, J.J. Makela, S. Allgeyer, A. Kherani, H. Hébert, and P. Lognonné, Three-dimensional numerical modeling of tsunami-related internal gravity waves in the Hawaiian atmosphere ,***Earth Planets Space***, Special Issue Tohoku, 63, 2011.

Makela, J.J., P. Lognonné, H. Hébert, L. Rolland, S. Allgeyer, A. Kherani, **Occhipinti, G.**, E. Astafyeva, P. Coisson, A. Loevenbruck, E. Clévédé, M.C. Kelly, J. Lamouroux, Imaging and modeling the ionospheric airglow response over Hawaii to the tsunami generated by the Tohoku earthquake of 11 March 2011, ***Geophys. Res. Lett.***, 38, L00G02, doi:10.1029/2011GL047860. 2011.

Houlié, N., **G. Occhipinti**, T. Blanchard, N. Shapiro, P. Lognonné, M. Murakami, New approach to detect seismic surface waves in 1Hz-sampled GPS time series, ***Scientific reports***, 2011.

Occhipinti, **G.**, T. Farge, P. Doray and P. Lognonné, Nostradamus: the Radar that wanted be a Seismometer, ***Geophys. Res. Lett.,*** doi:10.1029/2010GL044009, 2010.

Rolland, L., **G. Occhipinti**, P. Lognonné, A. Loevenbruck, The 29 September 2009 Samoan tsunami in the ionosphere detected offshore Hawaii, ***Geophys. Res. Letter,*** doi:10.1029/2010GL044479, 2010.

Garcia, R. F., P. Drossart, G. Piccioni, M. Lopez-Valverde, **G. Occhipinti**, Gravity waves in the upper atmosphere of Venus revealed by CO2 Non Local Thermodynamic Equilibrium emissions, ***J. Geophys. Res.*****,** doi:10.1029/2008JE003073, 2009.

Occhipinti, **G.**, A. Kherani , P. Lognonné, "Geomagnetic dependence of ionospheric disturbances induced by tsunamigenic internal gravity waves", ***Geophys. J. Int.***, doi: 10.1111/j.1365-246X.2008.03760.x, 2008.

Nobile, C., M. Lind, F. Miro, M. Tourret, **G. Occhipinti**, S. Dogniaux, S. Amigorena and C. Hivroz, Cognate CD4+ T cell-dendritic cell interactions induce migration of immature dendritic cell through dissolution of their podosomes, ***Blood***, Apr 2008; 111: 3579 - 3590.

Occhipinti, **G.**, A. Komjathy, P. Lognonné, "Tsunami detection by GPS: how ionospheric observation might improve the Global Warning System", ***GPS World.***,50-56, Feb. 2008.

Occhipinti, **G.**, P. Lognonné, A. Kherani, H. Hebert, "*3D Waveform modeling of ionospheric signature induced by the 2004 Sumatra tsunami", **Geophys. Res. Letter,** 33*, L20104, doi:10.1029/2006GL026865, 2006.

Lognonné, P., R. Garcia, F. Crespon, **G. Occhipinti**, A. Kherani, J. Artru-Limbin, *"Seismic waves in the ionosphere"*, ***European Journal of Physics****. 37,* 4, 2006*.*

Lognonné, P., J. Artru, R. Garcia, F. Crespon, V. Ducic, E. Jeansou , **G. Occhipinti**, E.Helbert, G. Moreaux, "*Ground based GPS tomography of ionospheric post-seismic signal during Demeter: the SPECTRE project*", ***Planet. Space Science, Demeter special issue,*** *54,* 528-540 *,* 2006*.*

Artru, J., P. Lognonné, **G. Occhipinti**, F. Crespon, R. Garcia, E. Jeansou, M. Murakami, "*Tsunami detection in the ionosphere", **Space Research Today,** 163*, 23-27, 2005.

Selected Meetings

G. Occhipinti, *"From Sumatra 2004 to Tohoku 2011: what we learn about tsunami detection by ionospheric sounding* **IUGG 2015**, Prague (*oral presentation*).

Roy, C., **G. Occhipinti**, *et al.*, Effect of ray and speed perturbations on Ionospheric Tomography by Over-the-horizon radar: A new method. **IUGG 2015**, Prague (*oral presentation*).

G. Occhipinti, F. Aden-Antoniow, *et al.*, M_i: No Magnitude, No Glory, **IUGG 2015**, Prague (*oral presentation*).

G. Occhipinti, F. Aden-Antoniow, *et al.*, M_i: No Magnitude, No Glory, **AGU fall meeting**, San Francisco, December 2014 (*oral presentation*).

G. Occhipinti, *"From Sumatra 2004 to Tohoku 2011: what we learn about tsunami detection by ionospheric sounding* **Geophysics of Slab Dynamics**, 2012, Jeju Island, Korea. (*invited oral presentation) >>* https://www.youtube.com/watch?v=9oK-um_4xMo

G. Occhipinti, *"From Sumatra 2004 to Tohoku 2011: what we learn about tsunami detection by ionospheric sounding",* **International workshop on GNSS Remote Sensing for Future Missions and Sciences** August 7-9, 2011, Shanghai, China. (*invited overview lecture)*

G. Occhipinti, *"Seismic and Tsunami signatures in the ionosphere: what we learn from Sumatra 2004 to Samoa 2009",* **IGARSS 30th Anniversary**, Honolulu, July 2010 (*invited overview lecture)*

G. Occhipinti, & P. Lognonné, *"Ionospheric disturbances induced by tsunamigenic internal gravity waves: Observation and modeling",*
AGU joint assembly, Toronto, May 2009 (*oral presentation)*

G. Occhipinti, P. Lognonné, A. Komjathy, A. Kherani, F. Crespon, A. Mannucci,
"Tsunami in the ionosphere ? a pinch of gravity with a good plasma sauce !",
COSPAR 2008, Montreal, July 2008 (*invited oral presentation*)

G. Occhipinti, P. Lognonné, A. Komjathy, A. Kherani, F. Crespon, A. Mannucci,
"Can Ionospheric Sounding Help Tsunami Warning Systems ?", ",
AGU fall meeting, San Francisco, December 2007 (*oral presentation*)

G. Occhipinti, P. Lognonné, A. Kherani, H. Hebert,
"*The indian ocean tsunami 2004 in the ionosphere : observations and modelling",*
AGU fall meeting, San Francisco, December 2006 (*oral presentation*)

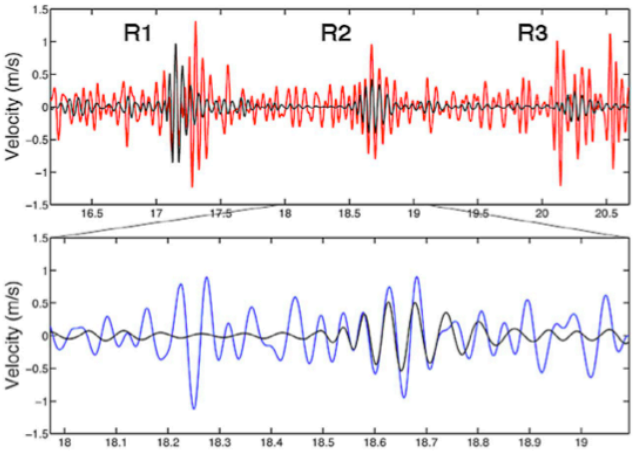
G. Occhipinti, P. Lognonné, E. A. Kherani, H. Hebert, *"3D Modelling of ionospheric tsunami signature induced by the 2004 Sumatra event"*, **EGU General Assembly 2006**, Wien, April 2006 (*oral presentation)*

Summary of Research Interests

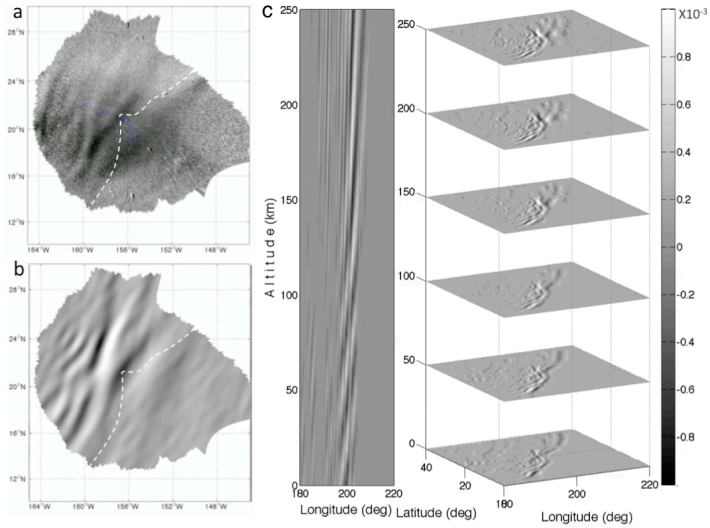
The catastrophic seismic events of the last decades push the necessity to explore new techniques for source estimation, oceanic tsunami tracking, as well as tsunami warning systems. Observations of the Rayleigh wave signature in the ionosphere by Doppler sounder and OTH radar are able to measure lithosperic proprieties, sounding the atmosphere at 200 km of altitude [Occhipinti *et al.*, 2010]. After Sumatra (26 December, 2004), the successful tsunami detection by altimeters validates, supported by observations and modeling, the possibility to detect tsunamis by ionospheric sounding [Occhipinti et al., 2006, 2008a,b].

Today, the recent tsunamigenic earthquake in Tohoku (11 March, 2011) strongly affirms the potentiality of ionospheric sounding to visualize the vertical displacement of the ground and ocean: the Japanese GPS network GEONET imaged the source-extent only 8 min after the rupture; it also visualizes the radiation pattern and Rayleigh waves over the entire Japan, including the oceanic region overlooking the rupture [Occhipinti *et al.*, 2013]; in the far field, the airglow camera located in Hawaii showed the internal gravity wave forced by the tsunami propagating in a zone of 180x180 km^2 all around the island [Occhipinti et al., 2011].

The principal aim of my work is to explore and highlight the actual capabilities and the potential improvements introduced by *Ionospheric Seismology* to improve our vision of the Earth.



Detection of Rayleigh waves signature in the ionosphere by Doppler sounder (red) and OTH radar (blue) after the Sumatra event (28 March, 2005, M 8.6) and modeling (black) by normal modes.



Airglow observation (a) and modeling (b & c) of the atmospheric internal gravity waves induced by the Tohoku tsunami (2011, M 9.3). The airglow camera is located in Hawaii and is showing the ions O^+ density variation.

Numerical and analytical modeling by different techniques in order to reproduce the ionospheric perturbation induced by Earthquakes and tsunamis is my favorite way to explore the coupling between the solid Earth and its fluid envelopes: ocean, atmosphere, ionosphere.

Close to the *Ionospheric Seismology*, I also explore new methodology for 3D ionospheric tomography in order to improve the knowledge of the ionospheric background. The developed method is mainly based on the use of OTH radar, fully taking into account the effect of speed and ray-path variation in the propagation of EM waves [Roy et al., 2013]. The methodology is also applicable to different techniques, *as* GPS-TEC with ground and on-boarded stations, Ionosondes, and the SuperDarn network. The main objective of the joint inversion of different instruments is to maximize the vertical resolution as a function of the sounding properties of the instruments for global and local high-resolution ionospheric tomography.

More details @ https://www.dropbox.com/sh/5wfkx240kdpd378/AAAGMKoaVswoMyKwpHsj9OWQa?dl=0

Selected Seminars

>> IONOGLOW: The Ionospheric Tsunami Watcher after Tohoku 2011. ***JAXA****, Japan, February 2015*

>> From Sumatra 2004 to Tuhoku-Oki 2011: how the idea of a Ionospheric Tsunami Watcher Satellite is growing, ***ISRO,*** *India, May 2014.*

>> From Sumatra 2004 to Tuhoku-Oki 2011: what we learn about Earthquake & Tsunami detection by ionospheric sounding, ***ERI****, Tokyo and* ***Hokkaido University****, Sapporo, Japon, 2013.*

>> Mi: Ionospheric Magnitude, ***ERI****, Tokyo, Japon, 2013.*

>> Earthquakes and Tsunamis flirting with the ionosphere… a summertime gossip !!
ETH-Zurich, July 2009**.**

>> Tsunami detection ? A pinch of gravity with a good plasma sauce !!.
ENS, February 2009. *http://www.geologie.ens.fr/spiplabocnrs/spip.php?article74*

>> Interaction entre Tsunami & Ionosphere…
Géophare, ***Univ. Lausanne****, December 2008.* http://www3.unil.ch/wpmu/geophare/occhipinti/

>> The 2004 Indian Ocean Tsunami in the ionosphere: Observation and Modelling.
Caltech, Pasadena, 2007. http://www.seismolab.caltech.edu/pastseminars.html

>> Tsunami detection: a pinch of gravity with a good plasma sauce. **INGV**, Rome, 2007.

>> Can ionospheric remote sensing help Tsunami Warning System. **JPL**, Pasadena, 2007.

Students *(selection)*

2014-2015 – Aurelien Bablet (M2 Student)
"Ionospheric Airglow Observation and Modeling of the Queen Charlotte tsunami (Mw 7.7)"
>> Results presented at the IUGG 2015 and one paper under preparation together.

2013-2014 – Florent Aden-Antoniov (M1 Student)
"Seismic Magnitude Estimation by Over-The-Horizon Radar Ionospheric Monitoring"
>> Oral talk at the AGU 2014 end IUGG 2015 and one paper under preparation together:
Occhipinti & Aden-Antoniow (Under Preparation) – See Publications

2011-2014 – Corinna Roy (Ph.D student @ IPGP/ONERA)
"3D Ionospheric Tomography by Over-The-Horizon Radar"
Defended date: 27 November 2014 // Today Post-doc @ Univ. Cal. Berkeley
>> Directed the main paper of her PhD:
Roy et al. (2014) – See Publications

2008-2012 – Pierdavide Coisson (Ph.D student @ IPGP/US-NRL)
"Tsunami detection by OTH radar and Airglow" (Co-director with P. Lognonné)
Today researcher @ IPGP
>> Directed the 2 main papers of his PhD:
Coisson et al. (2011) and Occhipinti, Coisson et al. (2011) – See Publications

2008-2010 – Lucie Rolland (Ph.D student @ IPGP)
"Source inversion from ionospheric TEC measurement" (Co-director with P. Lognonné)
Today researcher @ GéoAzur
>> Directed the first paper of her PhD:
Rolland et al. (2010) – See Publications

2008 – Anna Sacarabany (Master 2 – ENS)
"Wind effect into the propagation of gravity waves in the neutral atmosphere"
Today working @ TOTAL

2006 - Tristan Harmel (Master 2 Remote Sensing – Paris 6)
"Tsunami detection in the ionosphere by OTH radar"
Today Post-doc @ Lab. d'Oceanographie de Villefranche.

Major Projects *(Selection)*

2014-2016 **PNTS-INSU & CNES** *"SI-EuroTomo*", **Principal Investigator.**

2013-2015 **PUMA-CNES** *"On-borded Airglow CCD camera" (technical project),* **Prin. Inv.**

2010-2013 **PNTS-INSU** *"Tomographie de l'ionosphère et detection des Tsunamis*", **Prin. Inv.**

2010-2012 **R&T-CNES** *"Ionospheric Seismology by Radio-Occultations*", **Principal Inv.**

2010-2011 **Campus Spatial de Paris P7** *"Tsunami Imaging by Airglow",* **Principal Inv.**

2008-2011 **US-NRL** *"Tsunami Imaging by OTH-radar and Airglow",* **Co-Investigator.**

2009-2010 **CNES** *"Atmospheric dynamic by Venus Express/VIRTIS "*, **Co-Investigator.**

2010-2013 **MASCOTH** *"Moyen d'Applications Scientifiques & Civiles OTH"*, **Co-Inv.**

2009-2012 **NASA-ROSES** *"Tsunami Imaging Using GPS Measurement"*, **Co-Investigator.**

2005-2007 **ANR CAT-TEL** *"IONONAMI"*, **Co-Investigator.**

Teaching and Academic Responsibilities *(selection)*

Propagation of Electro-Magnetic waves in the Ionosphere (I and II year of Master degree)
Programming & Modeling by MATLAB (II and III year of Bachelor degree)
Prospection Geophysic Field Trip (II year of Master degree)
General Geophysics (I year of Bachelor degree)
Ionospheric Seismology (II year Master degree)

Responsible of the UFR-STEP Website
Responsible of the Licence 3 (Third year)
Responsible of the Radar Instrumental Park of the IPGP

UOLTER-PROJECT / Atelier Geo, experimental project to create a no-profit student start-up inside the IPGP in order to give to the students the possibility to explore the prospection-geophysics business without any personal economical risk, and giving them a real professional experience supported by the technical and theoretical knowledge of the IPGP.

Research Referees

Barbara Romanowicz (reviewed my HDR)
Institut de Physique du Globe de Paris
Phone: +33.(0)1.83.95.75.73
Email: barbara@ipgp.fr

Attila Komjathy (expert on my field)
NASA – Jet Propulsion Laboratory
Phone: +1 (818) 393 6828
Email: attila.komiathy@jpl.nasa.gov

Kosuke Heki (expert on my field & reviewed my HDR)
Hokkaido University
Phone: +81 11 706 3826
Email: heki@mail.sci.hokudai.ac.jp

Philippe Lognonné (PhD supervisor)
Institut de Physique du Globe de Paris
Phone: +33.(0)1.57.27.53.05
Email: lognonne@ipgp.fr

Hiroo Kanamori (reviewed my HDR)
Caltech – Seismological Laboratory
Phone: +1 (626) 395-6914
Email: hiroo@gps.caltech.edu

Gilbert Auffray (worked for as science collaborator)
Office National d'Etude et Recherche Aereospatial
Phone: +33.(0)1.69.93.62.77
Email: gilbert.auffray@onera.fr

Shingo Watada (collaborator)
Earthquake Research Institute
Phone: +81 03 58 41 57 76
Email: watada@eri.u-tokyo.ac.jp

Edouard Kaminski (dir. teaching department @ IPGP)
Institut de Physique du Globe de Paris
Phone: +33.(0)1.83.95.74.11
Email: kaminski@ipgp.fr

About my work…

> *“Paroles de scientifiques experts en risque climatiques ?”*, *À Live*, **France Inter**
February 2015. *http://www.franceinter.fr/emission-a-live-paroles-de-scientifiques-experts-en-risques-climatiques-jeff-mills*

> *“Pout-on prevoir les tsunamis ?”*, *Au tour de la question*, **RFi**
December 2014. *http://www.rfi.fr/emission/20141229-peut-on-prevoir-tsunamis/*

> *“Ninto contre les tsunamis, un chercheur dans les nuages”*, **Liberation**
November 2014. *http://www.ipgp.fr/~ninto/Liberation_10nov2014.JPG*

> Interview @ *Science in Action**, BBC,** “Learning from the Japanese earthquake”*
March 2013. *http://www.bbc.co.uk/programmes/p0153h4n*

> Interview @ *La Tête au Carré**, France Inter***
Avril 2010. *http://www.franceinter.fr/em/lateteaucarre/89932*

> *“Des chercheurs veulent améliorer l’alerte au tsunami en scrutant l’atmosphère”*, **Le Monde**
November 2006. *http://www.ipgp.fr/~ninto/LeMonde_16nov2006.JPG*

> *“Tsunamis vus du ciel”*, **L’Express**
November 2006. *http://www.ipgp.fr/~ninto/L_EXEPRESS_N2889.JPG*

MISCELLANEOUS

*Ninto plays a role in science divulgation as a reporter in the science radio-shows **La Tête au Carré (France Inter)**, as well as **Recherche En Cours (Radio Aligre)**. He also contributes to public events connected to science at the IPGP and develops many art-projects at the borderline between Art & Science.*

Some of them are visible at http://www.youtube.com/user/NintoDifraact