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POSITION & FELLOWSHIPS

2008 – present **Assistant Professor, Université Denis Diderot (Paris VII)**

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

Jet Propulsion Laboratory
Ionospheric and Atmospheric Remote Sensing Group
4800 Oak Grove Drive
Pasadena, CA 91109, US

Caltech Seismologial Laboratory
1200 E. California Blvd.
Pasadena, CA 91125, US

2005 – 2007 **ATER**: (teaching fellowship) **Université Paris 7**

2002 - 2005 Doctoral fellowship **MIR/ONERA** at:
Institut de Physique du Globe de Paris
Office National d'Etudes et Recherches Aérospatiales

ACCADEMICS DEGREES

2006 PhD. Institut de Physique du Globe de Paris, France
2002 M.S. in Physics , Università di Bologna, Italy

PH.D THESIS

Supervisor: Prof. Philippe Lognonné
Ph.D thesis: Multi-parameters observations and modelling of the ionospheric signature of the great Sumatra earthquake

SKILLS

KNOWLEDGE Seismology, Ionospheric and Atmospheric science, Plasma physics, Remote sensing, Data analysis, OTH Radar, Global Positioning System.

COMPUTER Unix, Linux, Macintosh and Windows platforms;
Languages : Fortran 77 and 95, Matlab, Latex.
Graphic tools: Photoshop, Illustrator, Powerpoint, etc….

LANGUAGES Italian (mother tongue), French (fluent), English (fluent)

PAPERS

G. Occhipinti and P. Lognonné,
"Seismic waves in the venusian atmosphere"*,* ***Geophys. Res. Letter****, in preparation.*

N. Houlie, **G. Occhipinti**, N. Shapiro, P. Lognonné and M. Murakami,
"Surface waves detection by GPS :application to the 2003 September 25th, Hokkaido earthquake", ***Geophys. J. Int.***, under review.

G. Occhipinti, 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.

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

G. Occhipinti, 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.

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

P.Lognonné, 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*.*

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

Recent Abstracts

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*)

RECENT SEMINARS

-The 2004 Indian Ocean Tsunami in the ionosphere: Observation and Modelling.
DIX Seminars of Seismological Lab., **Caltech**, Pasadena, may 2007

-Tsunami detection: a pinch of gravity with a good plasma sauce.
General Seminars, **INGV**, Rome, mars 2007

-Can ionospheric remote sensing help Tsunami Warning System.
ARTS Seminars, **JPL**, Pasadena, mars 2007.

Summary of Research Interests

The principal aim of my work is the coupling between the solid Earth and the atmosphere with attention to model and detect surface wave signatures in the ionosphere induced by both Rayleigh waves and tsunamis. These perturbations are modelled by 1D normal modes theory, to reproduce the acoustic waves coupled with Rayleigh waves, or by 3D finite-difference propagator of internal gravity waves (IGWs), for the ocean-atmosphere coupling. In the latter the 3D approach is imposed by the bathymetry dependence. Finally, the neutral-plasma coupling is done using the acoustic waves and IGWs as a forcing term in a 3D ionospheric model.

Today my principal interest is focalised on the effect of extended source in the ionospheric signature and in the propagation itself. In essence, more realistic methods to model the ground displacement (like SE or HOPT) must be coupled with atmospheric propagation of seismogenic acoustic waves. A similar approach has been done for the tsunami-IGW coupling and gave interesting results *[Occhipinti et al. 2006]*. For the tsunami propagation the effect of extended-dynamical source can induce primary improvement to better reproduce the GPS and altimetric data (displacement and TEC).

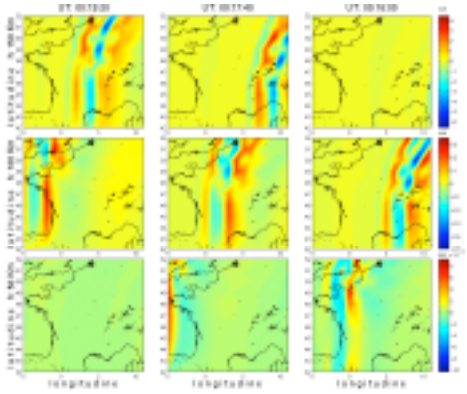

Fig.1: Post-seismic perturbation induced in neutral atmosphere by the Izmit Earthquake (Turkey, 1999). Three different heights (50, 100 and 150 km, from bottom to top) and three times (from right to left) are shown.

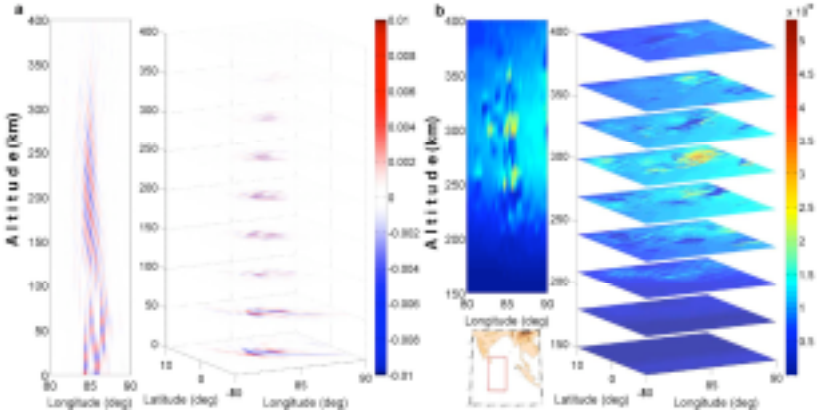

Fig.2: Tsunami-generated IGWs (**a**) and the response of the ionosphere to neutral motion (**b**) to the Sumatra tsunami. In **a** the normalized vertical velocity ($u\sqrt{\rho_0}$) is shown in order to put in evidence the perturbation at all altitudes. In **b** the electron density is represented. The vertical cut in **a** and **b** is shown at –1° of latitude.

My work involves different aspects of the Earth-atmosphere coupling: the theoretical seismology, in order to compute the post-seismic perturbation in the neutral atmosphere, as well as the plasma physics to compute the answer of ionosphere to this perturbation. Finally, a part of my work is concentrated on the detection of the ionospheric signature of surface waves (Rayleigh and Tsunami) by remote sensing (GPS, altimeters, OTH Radars).

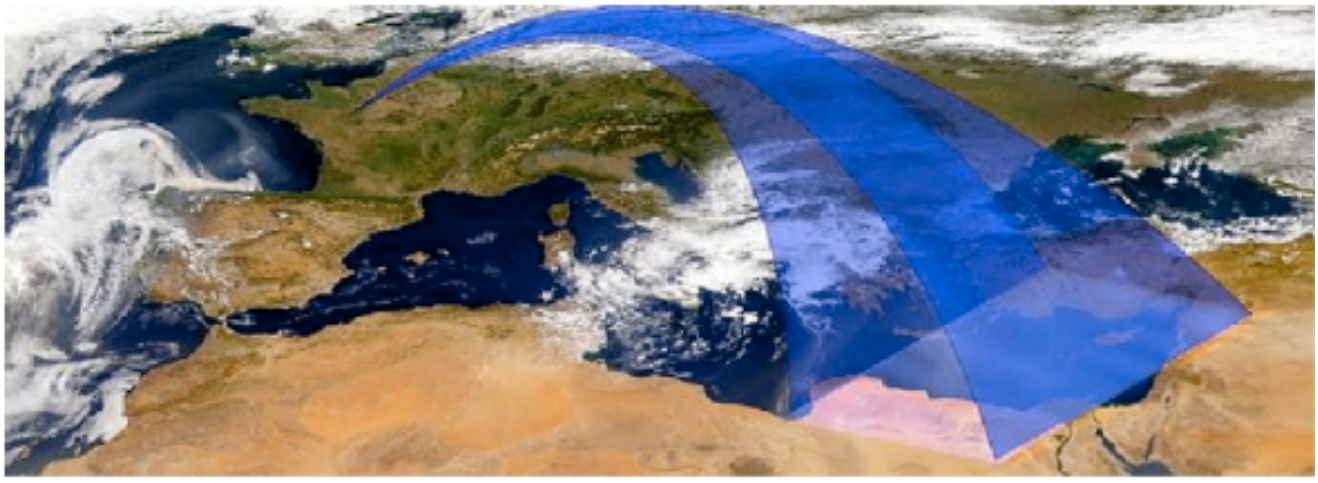

Fig.3: OTH Radar Nostradamus (artistic view)

The modelling of post-seismic perturbations is also a useful tool in the planetary science. The difficulties to study the Venus seismology can be, *i.e.*, overcame observing the Venus atmosphere and ionosphere. Indeed the spectrometer VIRTIS, boarded in ESA's Venus express satellite, would be able to measure by airglow the temperature variation in the Venus atmosphere. Using adiabatic approach, these atmospheric measures compared with synthetic data will provide interesting information on the internal structure of the planet.

The instrumental part of my work is based on the using of the Nostradamus, which is a experimental sky-wave HF radar made by ONERA under the sponsorship of the French Ministry of Defence. Nostradamus is a new concept of Over-The-Horizon radar constituted of a monostatic surface array that allows an azimuthal coverage of 360 degrees and an elevation beam forming capability to sound the entire European continent.

In order to model the Doppler answer of the OTH radar to ionospheric perturbations induced by surface waves, I developed, in ray theory approximation, a code of electromagnetic wave propagation in a 3D heterogeneous plasma covering an ellipsoidal Earth (WGS84). This tool models the radar answer to ionospheric perturbations; moreover, it could be exploited as a direct problem in the ionospheric tomography by OTH radar (work in process). The ionospheric tomography interests several domains of external geophysics such as the space meteorology but it is for us a good method of offshore tsunami detection. For that, we hope that it will be integrated in the warning system network.

REFERENCES

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