Curriculum Vitae of Mustapha Meghraoui

BORN: January 22, 1956.
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EDUCATION:
Bachelor of Science, University of Algiers (1978)
Doctorat 3ème Cycle in Active Tectonics, University Paris 7 (1982).
PhD - Doctorat d'Etat in Seismotectonics and Paleoseismology, University of Paris 11, Orsay (1988).

https://ites.unistra.fr/recherche/equipes/da/da-perso/mustapha-meghraoui

POSITIONS HELD:

- Researcher at the Geophysical Centre of Algiers, CRAAG Observatory, Algeria (1988 – 1994)
- Associate Researcher in Seismotectonics, Univ. Paris 11 and Cergy, France (1994-1995).
- Research Fellow in Paleoseismology, Royal Observatory of Belgium (1995-1996).
- Research Fellow in Active Tectonics, National Research Council of Italy (1996-1999).
- Senior Researcher in Seismotectonics and Active Tectonics at the Institut de Physique du Globe de Strasbourg, France (since 1999).

SCIENTIFIC CONTRIBUTION:

1. Seismotectonics and palaeoseismological study along the El Asnam thrust fault (associated with M 7.3 earthquake in 1980, Algeria) which is among the first analyses of thrust-related surface faulting and folding in the Mediterranean regions.
2. Pioneering works in the identification of active faults in intraplate Europe and the Rhine graben with development of palaeoseismic studies in regions with low-level of seismicity. In particular, combining the use of micro-topography, shallow geophysics and trenching in active faulting studies.
3. Development of earthquake geology, palaeoseismic and archaeoseismic studies in different tectonic domains (North African Atlas, North Anatolian fault, East Anatolian fault and Dead Sea fault) and comparison between regions with slow active deformation and regions with fast seismic slip release.
4. Conceptual framework in the understanding of the long-term faulting behavior in earthquake-prone regions, coastal tectonics and seismic sources of tsunami. Studies of faults in regions with the potential for large or moderate earthquakes and related physical characteristics.

MAIN SCIENTIFIC PROJECTS

A. RELIEF: **Coordinator** of the project Reliable Information on Earthquake Faulting, « Large Earthquake Faulting and Implications for the Seismic Hazard Assessment in Europe, The 1999 Izmit-Duzce Earthquake Sequence (Mw 7.3 - 7.1, Turkey) ", EC contract EVG1-2002-00069. Initiation December 2002.

B. APAME: **Coordinator** of the project entitled « Archeo-Paleoseismology for the protection of cultural sites in the Middle East », European Commission project INCO-MED, contract ICA3-CT2002-10024. Initiation March 2003.

C. Projet European Space Agency (ESA) - Catégorie 1 N° 2532 « **Crustal deformation along major continental faults : A combined study in paleoseismology, archeoseismology and space geodesy** ». Crédit images SAR de la zone euro-méditerranéenne en cours (depuis 2004). Coordonateur du projet.

D. Tsunami in the Mediterranean area, **Partner** of the projet **TRANSFER** (Tsunami Risk ANd Strategies For the European Region, Contract no.: 037058; Paleotsunamis along the Algerian coastline: Analysis of their traces, return period and effect). Initiation in April 2006.

E. IGCP 601 project, UNESCO – IUGS, "**Seismotectonics and seismic hazards in Africa**"; this is a 6-year project (2011 – 2016) that aims to prepare the seismotectonic map of Africa with also the support of the Organisation of African Geological Surveys (OAGS).

F. PALET: This ANR (Agence Nationale de la Recherche) project is dedicated to "**Paleoseismology and paleotsunamis of the NE Japan subduction zone and relationships with the 2011, M9 Tohoku earthquake: Constraints on the seismic cycle**". The project goes from October 2011 to March 2013.

G. European Projet ASTARTE (FP7-ENV) "**Assessment, STrategy And Risk Reduction for Tsunamis in Europe**", programme ENV.2013.6.4-3: Coasts at threat in Europe: tsunamis and climate-related risks. Partenaire du projet au sein des participants CNRS et responsable du Work Package 2 (Recurrence of Tsunami in the NEAM region). Novembre 2013 à avril 2017.

H. Projet CNRS-INSU « **Active Deformation and fault interaction in northern Africa** » in cooperation with the Research Centre of Astronomy and Geophysics of Algiers and the Geological Survey of Tunisia (Office National de Mines).

I. IGCP 659 project, UNESCO – IUGS, "**Seismic hazard and risk in Africa**"; this is a 5-year project (2018 – 2022) that aims to prepare regional seismotectonics and seismic hazards of Africa with also the support of the African Seismological Commission (AfSC) and IASPEI.

https://igcp-project-659.oaka.fr/

SELECTED PEER REVIEWED PUBLICATIONS (since 2014)

Bibliometric index considering Thomson Reuters ISI WEB of Sciences Publications: Update May2021

h-index:	**39**
Sum of the Times Cited:	3913
Sum of Times Cited without self-citations:	3519

Meghraoui, M., A. Harbi and H. M. Hussein, 2014, Preface to the special issue "Seismotectonics and Seismic hazards in North Africa", *J Seismol.* 18, 2, 203-204, DOI 10.1007/s10950-014-9424-5.

Cetin, E., Z. Cakir, **M. Meghraoui**, S. Ergintav and A. M. Akoglu, 2014, Extent and distribution of seismic slip on the Ismetpaşa segment of the North Anatolian Fault (Turkey) from Persistent scatterer InSAR, *G-Cubed - Geochem. Geophys. Geosyst.* 15, 7, 2733 - 3106, July 2014, DOI:10.1002/2014GC005307.

Cakir, Z., S. Ergintav, A. M. Akoğlu, R. Çakmak, O. Tatar, and **M. Meghraoui**, 2014, InSAR velocity field across the North Anatolian Fault (E. Turkey): Implications for loading and release of interseismic strain accumulation, *J. Geophys. Res. Solid Earth,* 119, doi:10.1002/2014JB011360.

Meghraoui, M., and K. Atakan, 2014, The contribution of paleoseismology to earthquake hazard evaluations, in *Earthquake hazard, risk and disasters*, book edited by M. Wyss, Chapter 10, 237-271, Elsevier, London.

Meghraoui, M. Paleoseismic History of the Dead Sea Fault Zone. In Encyclopedia of Earthquake Engineering. 2015.

Shipton, Z. K., **M. Meghraoui** and L. Monro, 2016, Seismic slip on the west flank of the Upper Rhine Graben (France-Germany): Evidence from tectonic morphology and cataclastic deformation bands, Geol. Soc. London, Special Publication, Eds. Landgraf, A., Kuebler, S., Hintersberger, E. & Stein, S. (eds) Seismicity, Fault Rupture and Earthquake Hazards in Slowly Deforming Regions. Geological Society, London, Special Publications, 432, http://doi.org/10.1144/SP432.12

Meghraoui, M., P. Amponsah, A. Ayadi, A. Ayele, B. Ateba, A. Bensuleman, D. Delvaux; M. El Gabry, R.-M. Fernandes, V. Midzi, M. Roos, Y. Timoulali, 2016, The Seismotectonic Map of Africa, *Episodes Vol. 39, no. 1, DOI:10.18814/epiiugs/2016/v39i1/89232*

Meghraoui, M., P. Amponsah, A. Ayadi, A. Ayele, B. Ateba, A. Bensuleman, D. Delvaux, M. El Gabry, R. Fernandes, V. Midzi, M. Roos and Y. Timoulali (2016). Seismotectonic Map of Africa, Scale 1: 10 000 000, Commission for the Geological Map of the World, 1st Edition 2016, (Available: http://ccgm.org/en/29-afrique).

Kariche, J., **M. Meghraoui,** A. Ayadi and M. S. Boughacha, 2017, Stress change and fault interaction from a two century-long earthquake sequence in the central Tell Atlas (Algeria), *Bull. Seism. Soc. Amer.,* Vol. 107, No. 6, pp. 2624–2635, December 2017, doi: 10.1785/0120170041.

Kariche, J., **M. Meghraoui**, Y. Timoulali, E. Cetin, and R. Toussaint, 2018, The Al Hoceima earthquake sequence of 1994, 2004 and 2016: Stress transfer and poro-elasticity in the Rif and Alboran Sea region, *Geophys. J. Int.* (2018) **212,** 42–53, doi: 10.1093/gji/ggx385

Soumaya, A., N. Ben Ayed, M. Rajabi, **M. Meghraoui**, D. Delvaux, et al.. 2018. Active Faulting Geometry and Stress Pattern Near Complex Strike-Slip Systems Along the Maghreb Region: Constraints on Active Convergence in the Western Mediterranean. Tectonics, American Geophysical Union (AGU), 37 (9), pp.3148–3173.

Kharrat, S., A. Harbi, **M. Meghraoui** and S. Bouaziz, The Tunisian Homogenized Macroseismic Database (Second Century to 1981): First Investigations. Seismological Research Letters (2018) 90 (1): 347-357. https://doi.org/10.1785/0220180237, 2018.

Salama, S., **M. Meghraoui,** M. El Gabry, S. Maouche, M. H. Hussein, and I. Korrat, 2018, Paleotsunami deposits along the coast of Egypt correlate with historical earthquake records of eastern Mediterranean, *Nat. Hazards Earth Syst. Sci.,* 18, 2203–2219, https://doi.org/10.5194/nhess-18-2203-2018

Dikbaş, A., H. Serdar Akyü, **M. Meghraoui**, M. Ferry, E. Altunel, C. Zabcı, R. Langridge, C. Ç. Yalçıner, 2018, Paleoseismic history and slip rate along the Sapanca-Akyazı segment of the 1999 İzmit earthquake rupture (Mw=7.4) of the North Anatolian Fault (Turkey), *Tectonophysics* 738–739 (2018) 92–111, https://doi.org/10.1016/j.tecto.2018.04.019

Meghraoui, M., 2018. Earthquake faulting and their implications for the seismic hazard assessment along the plate boundary in north Africa. In: Kallel, A. (Ed.), Recent Advances in Environmental Science from the Euro-Mediterranean and Surrounding Regions, Advances in Science, Technology and Innovation, https://doi.org/10.1007/978-3-319-70548-4_15.

Meghraoui, M., P. Amponsah, P. Bernard and B. Ateba, 2019, Active Transform Faults in the Gulf of Guinea: Insights from geophysical data and implications for the seismic hazard, *Canadian Journal of Earth Sciences* 56: 1398–1408 (2019) dx.doi.org/10.1139/cjes-2018-0321

Nemer, T., and **Meghraoui, M**., 2020. A non-active fault within an active restraining bend: The case of the Hasbaya fault, Lebanon, J. Struct. Geol. 136, DOI.org/10.1016/j.jsg.2020.104060

Bahrouni, N., Masson, F., **Meghraoui, M.** et al., 2020. Active Tectonics and GPS data analysis of the Maghrebian Thrust Belt and Africa-Eurasia plate convergence in Tunisia, *Tectonophysics*, Elsevier, 2020, DOI.10.1016/j.tecto.2020.228440⟩

Bahrouni, N., **Meghraoui, M.** , Hinzen, K., Arfaoui, M., Mahfoud, F. 2020. The damaging earthquake of 9 October 859 in Kairouan (Tunisia): Evidence from historical and archeoseismic investigations, *Seismological Research Letters*, 2020, DOI.10.1785/0220190258⟩

Henrion, E., Masson, F., Doubre, C., Ulrich, P., **Meghraoui, M.**, 2020. Present-day deformation in the Upper Rhine Graben from GNSS data, *Geophysical Journal International* 223, 599–611, DOI.10.1093/gji/ggaa320

Meghraoui, M., Hinzen, K., & Malik, J., 2021, *Paleoseismology, Archeoseismology and Paleotsunami Studies*, Encyclopedia of Geology (2nd Edition), Eds.Scott Elias & David Alderton, ISBN: 9780081029084, Academic Press, 636 - 655.

Gasperini, L., Stucchi, M., Cedro, V., **Meghraoui, M.,** Ucarkus, G., Polonia, A., 2021. Active fault segments along the North Anatolian Fault system in the Sea of Marmara: implication for seismic hazard. Mediterranean Geoscience Reviews. https://doi.org/10.1007/s42990-021-00048-7

Meghraoui, M., Toussaint, R., Aksoy, E., 2021, The slip deficit on the North Anatolian Fault (Turkey) in the Marmara Sea: insights from paleoseismicity, seismicity and geodetic data, Mediterranean Geoscience Reviews, https://doi.org/10.1007/s42990-021-00053-w

Meghraoui, M., Yıldırım, C., Zabcı, C., Akyüz, S., Ergintav, S., 2021, The 20th anniversary of the Eastern Marmara Earthquakes: active tectonics of continental strike-slip faults, Mediterranean Geoscience Reviews, https://doi.org/10.1007/s42990-021-00056-7

Bagdi-Issaad, S., **Meghraoui, M.,** Nedjari, A., 2021, Active folding in the Tenes region (Tell Atlas, Algeria): modelling the 1922 earthquake fault-related fold (Mw 6.2), J Seismol., https://doi.org/10.1007/s10950-021-10005-4

CONSULTANCY AND EXPERTISE

- Consultant, in May 2003, Feb. 2004, June 2005, Sept. 2009, control panel for the Institute of Safety and Risk Sciences (Austrian Government, Vienna) for Seismic Hazard Assessment of the Temelin Nuclear Power Plant site (Czech Republic).
- Consultant, in Feb. 2006, control panel for the Institute of Safety and Risk Sciences (Austrian Government, Vienna) for Seismic Hazard Assessment of the Krsko Nuclear Power Plant site (Slovenia Republic).
- Consultant and member of the advisory board for the Algerian Ministry of Environment following the Zemmouri Earthquake (Algeria, Mw 6.8), June 2003 to June 2004.
- Consultant, April 2006, for KEYOBS S. A. on "Seismic hazard assessment associated with the railway line Djelfa – Bou Medfaa, Algeria".
- Consultant, in Nov. 2009, Feb. 2011, Jan. 2012 for *Résonances Ingénieurs-Conseils SA (Carouge, Switzerland)* for seismotectonics and seismic hazard assessment of dam projects in Algeria.
- Consultant in March and April 2016 for Dar El Handassah S.A. (Cairo – Beirut) for Transjordan Water Canal of Wadi Araba.
- Consultant in July 2017 for « *Global offshore & onshore geotechnical and survey services* » (FUGRO - Turkey) on the Tlemcen – Maghnia (northwest Algeria) high-speed railway engineering project.

Scientific Society Member & Responsabilities

- President (elected) of the African Seismological Commission (2018 – 2020)
- Vice-Président of the European Center of Geodynamics and Seismology (E.C.G.S., Luxembourg) from 2002 to 2012.
- Membre of the Working Group of the International Lithosphere Program on "Great Earthquakes of the Late Holocene" (Contemporary Dynamics and Deep Processes), and II-5 "Earthquake Recurrence Model".
- Co-president of the Working Group on "Geologic records of past earthquakes » of the European Seismological Commission (ESC). Co-president of the Working WG6 sur l'évaluation de l'aléa sismique dans la zone euro-méditerranéenne.
- Member of the Editorial Board of the scientific journal **Annals of Geophysics** (from 1990 to 2006)
- Member of the Editorial Board of the scientific journal **Natural Hazards** (from 2002 to 2009)
- Member of the Editorial Board of the scientific journal **Arab Journal of Earth Sciences** (from 2015)
- Member of the Editorial Board of the scientific journal **Euro-Mediterranean Journal for Environmental Integration** (from 2014)
- Member of the "American Geophysical Union" (AGU)
- Member of the European Geoscience Union" (EGU),
- Member of North African Group of Earthquake and Tsunami studies (NAGET) – ICTP Trieste
- Member of the RASMER network (Réseau Algérien des Sciences de la Mer)
- Advisor of the Institute of Risk Research, Federal Ministry of Agriculture, Forestry, Environment and Water Management of Austria, for Nuclear Site Seismic Hazard Assessment in neighbouring countries. From 2002 to 2007

Honours

- Honour award « Citoyen d'honneur - Freeman» of the city of El Asnam (now Chlef, Algeria) in 1984, for the scientific contribution following the 10/10/1980 earthquake (Mw 7.3).
- « Merit Award » from the Italian Ministry of the Intérieur for the scientific contribution following the September-October 1997 seismic sequence in the Umbria-Marche.
- « Honour Award » from the Aristotle University of Thessaloniki (5th International Symposium on the Eastern Mediterranean Geology, 2006, Greece) for the work on the active and seismogenic faults of the Eastern Mediterranean regions.
- « Honour Award » from the Geological Society of Turkey (61st Geological Congress of Turkey, 24-28 March 2008) for the contributions on active tectonic studies in Turkey.