First National Conference on Disaster Risk Management
Algiers 22 – 23 October 2018

The challenge of earthquake disaster mitigation in northern Algeria
Learning from past catastrophes and seismotectonic experience

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How can we contribute to the mitigation and reduction of earthquake disasters?

- Understanding the origin of earthquakes: Faults
- Our past experiences in seismotectonics
- New studies and knowledge: Prevision
- Earthquake faulting and seismic hazard assessment
- Our contribution to the mitigation of seismic risk
Earthquake Generation

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Plate Tectonics & Plate Boundary

4 – 6 mm/yr.
Major Earthquakes (Mw > 5) of Northern Algeria
(Rothé, 1950; Benouar, 1994)
El Asnam Earthquake
10 October 1980
Ms 7.3

- Fault = 40 km
- Hypocentre = 8 km
- $M_o = 5.6 \times 10^{26}$ dyne.cm

- Severe damage in Chelif plain
- Earthquake folding
1980 El Asnam Earthquake Fault
Earthquake Damage
Zemmouri-Boumerdes Earthquake
21 may 2003

- $M_w = 6.8$
- Fault = 50 km
- Hypocentre = 7 km
- $M_o = 2.86 \times 10^{26}$ dyne.cm
- N 54° 47°SE, 88 rake (NEIC)
- Severe damage 30 km east of Algiers
- Coastal uplift along 60 km
Seismicity and fault at 5 - 20 km depth
(Ayadi et al., JGR 2008)
Fault, Earthquakes and Prevision

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North Africa Seismicity and Tectonics
Paramètres de l’aléa sismique :
- Biskra 16/11/1869, I = IX
- Batna 16/03/1924, I = IX
- Hodna 12/02/1946, I = IX
- Asla 13/03/1948, I = VIII

Rothé, 1950; Roussel, 1973
Benhallou, 1985
Benouar, 1994
Meghraoui, Thèse d’Etat 1988
Seismic Hazard: Earthquake parameters

- Seismic catalogue (hist. + inst.)
- Inventory of active faults
- Earthquake rupture (Mmax)
- Strain – slip rate
- Recurrence time (Mmax)
- Seismic zoning

- Attenuation law
- Acceleration-GMPEs-PGA-DGA
- Site effect

Rothé, 1950; Benhallou, 1985; Benouar, 1994

Ayadi & Bezzeghoud, 2014
Fig. 3 — Views of the port of Jijeli before and after the earthquakes of August 1856.

L’Illustration (1856)
Priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030

Our contribution to the mitigation of Earthquake Disasters

- Improve understanding of earthquake disaster risk
- Develop seismic hazard assessment (scenario, hybrid models)
- Promote regional platforms for disaster risk reduction with periodic reviews
- Strengthen international cooperation and global partnership
Recommendations

Inventory of active and seismogenic faults

Detailed study of each seismic event with $M > 5$

Develop spatial geodesy (GPS, InSAR)

Complete the seismicity catalog (historical, instr. paleo-seismology, archeo-seismology)

Seismic monitoring, prevision, warning system
Remerciements

Tahar Melizi (Délégué aux Risques Majeurs)
Djillali Benouar (Prof. USTHB)

Collaborateurs

A. Ayadi, A. Harbi & S. Maouche (CRAAG)
J. Kariche & S. Bagdi-Issaad (USTHB – IPG Strasbg)
S. Belabbes (UNOSAT-UNITAR)
Y. Bouhadad (CGS), A. Nedjari (USTHB)
K. Aoudia (ICTP), F. Doumaz (INGV)
Z. Cakir, E. Cetin (ITU), Y. Hemdane (RASMER)
M. Bezzeghoud (Univ. Evora), D. Benouar (USTHB)