First National Conference
on Disaster Risk Management
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The challenge of earthquake disaster mitigation in northern Algeria

Learning from past catastrophes and seismotectonic experience

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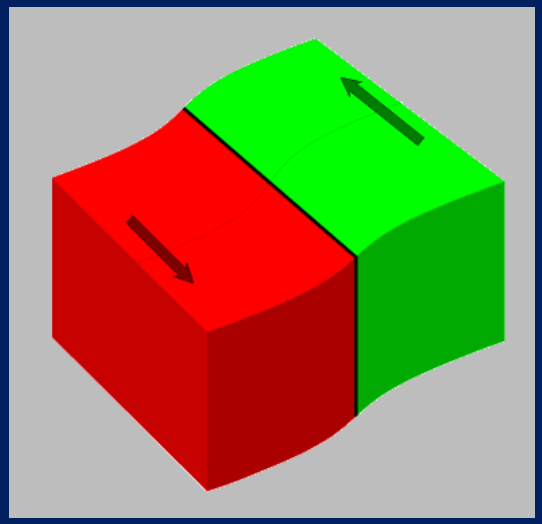
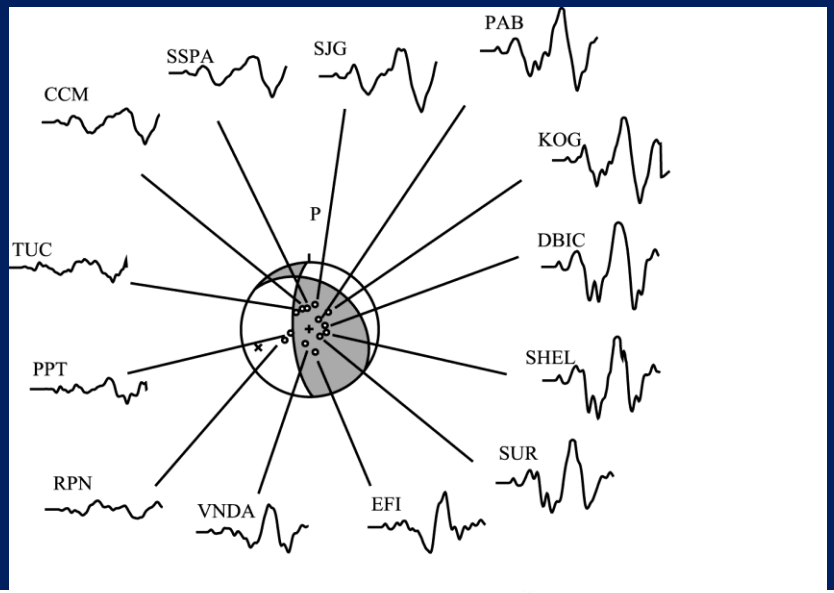
How can we contribute to the mitigation and reduction of earthquake disasters ?

- 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





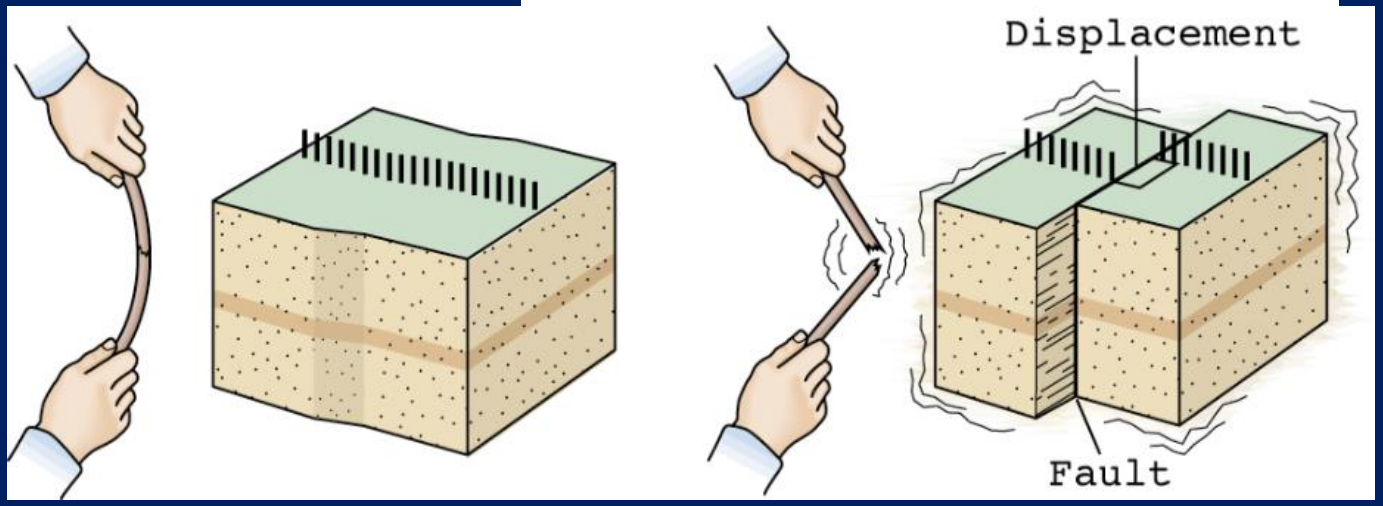
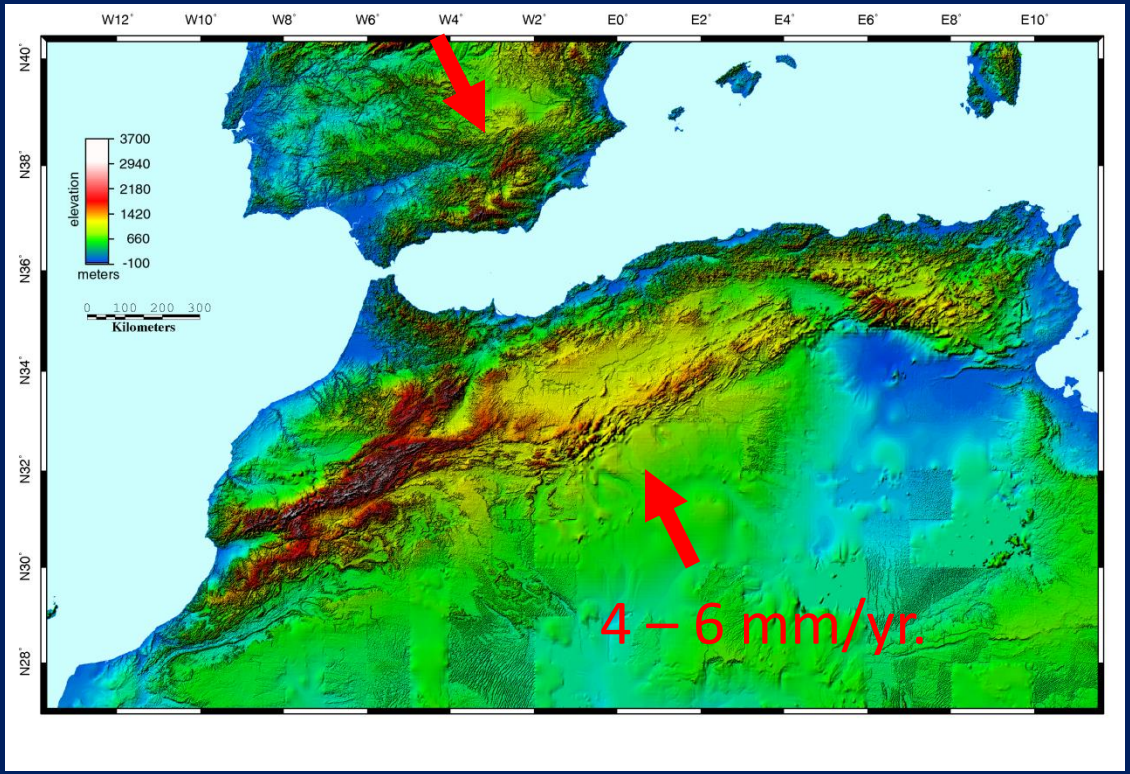
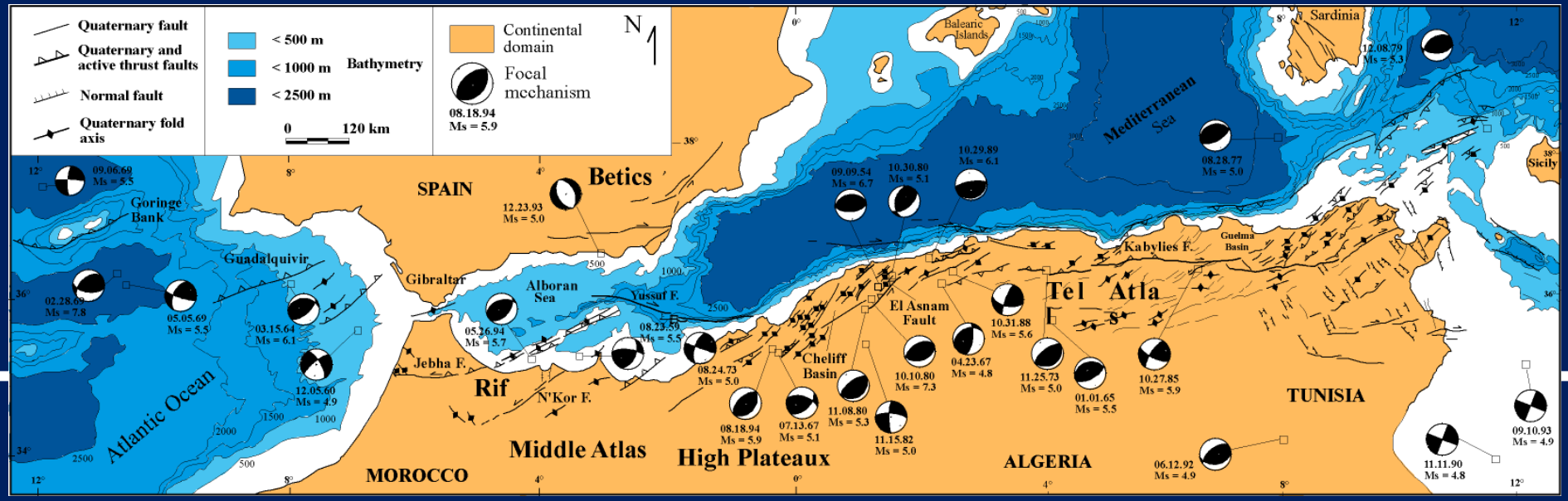
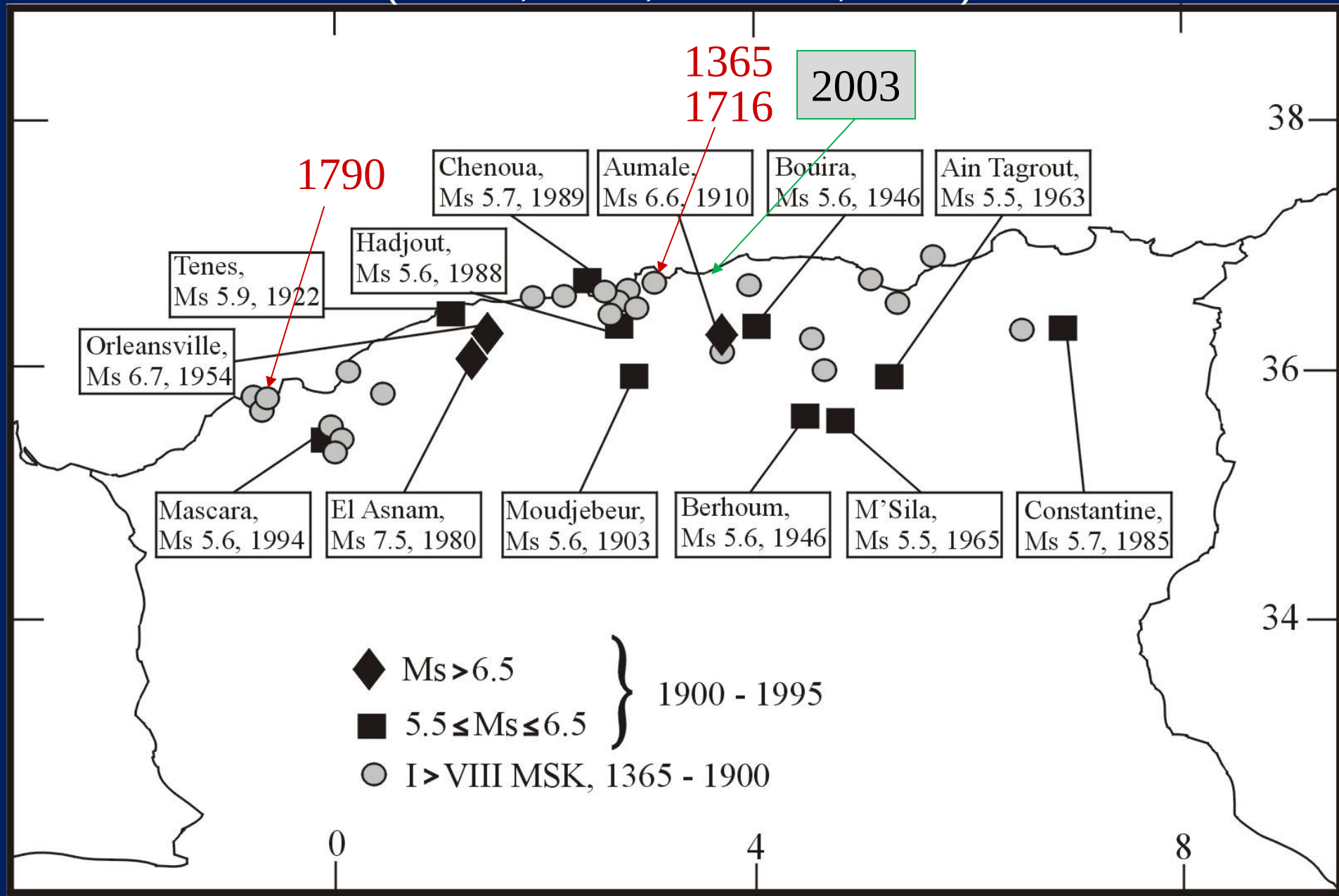


Plate Tectonics & Plate Boundary



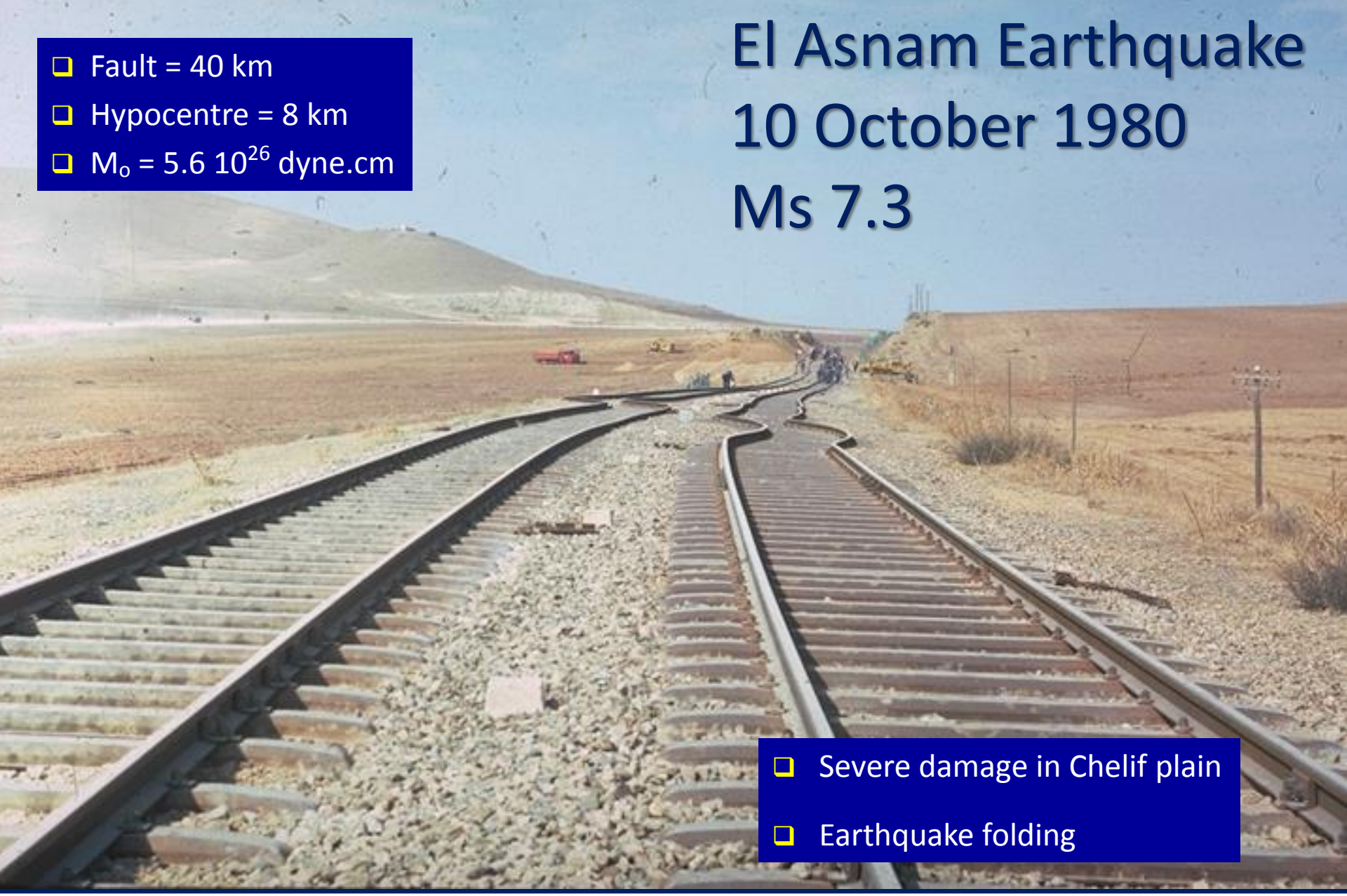


Major Earthquakes (Mw > 5) of Northern Algeria (Rothé, 1950; Benouar, 1994)



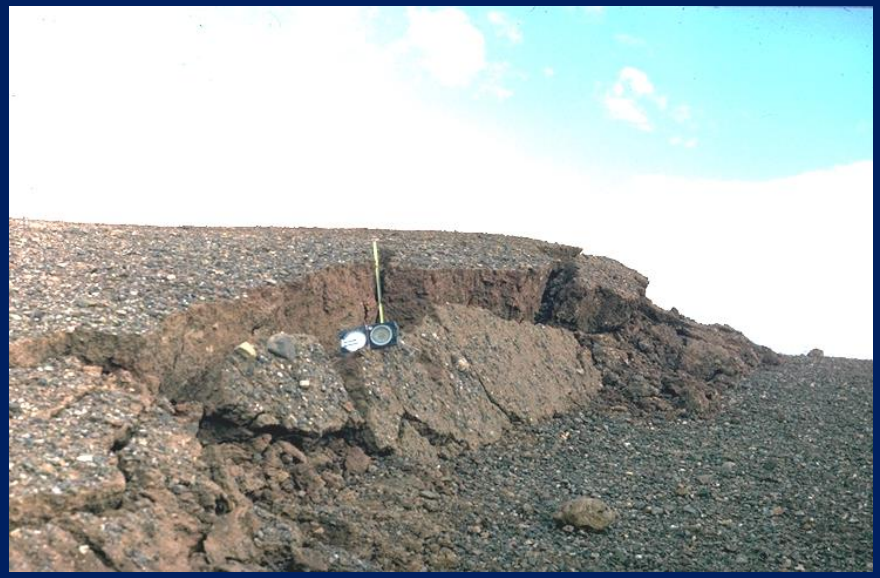
El Asnam Earthquake
10 October 1980
Ms 7.3

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



- Severe damage in Chelif plain
- Earthquake folding

1980 El Asnam Earthquake Fault



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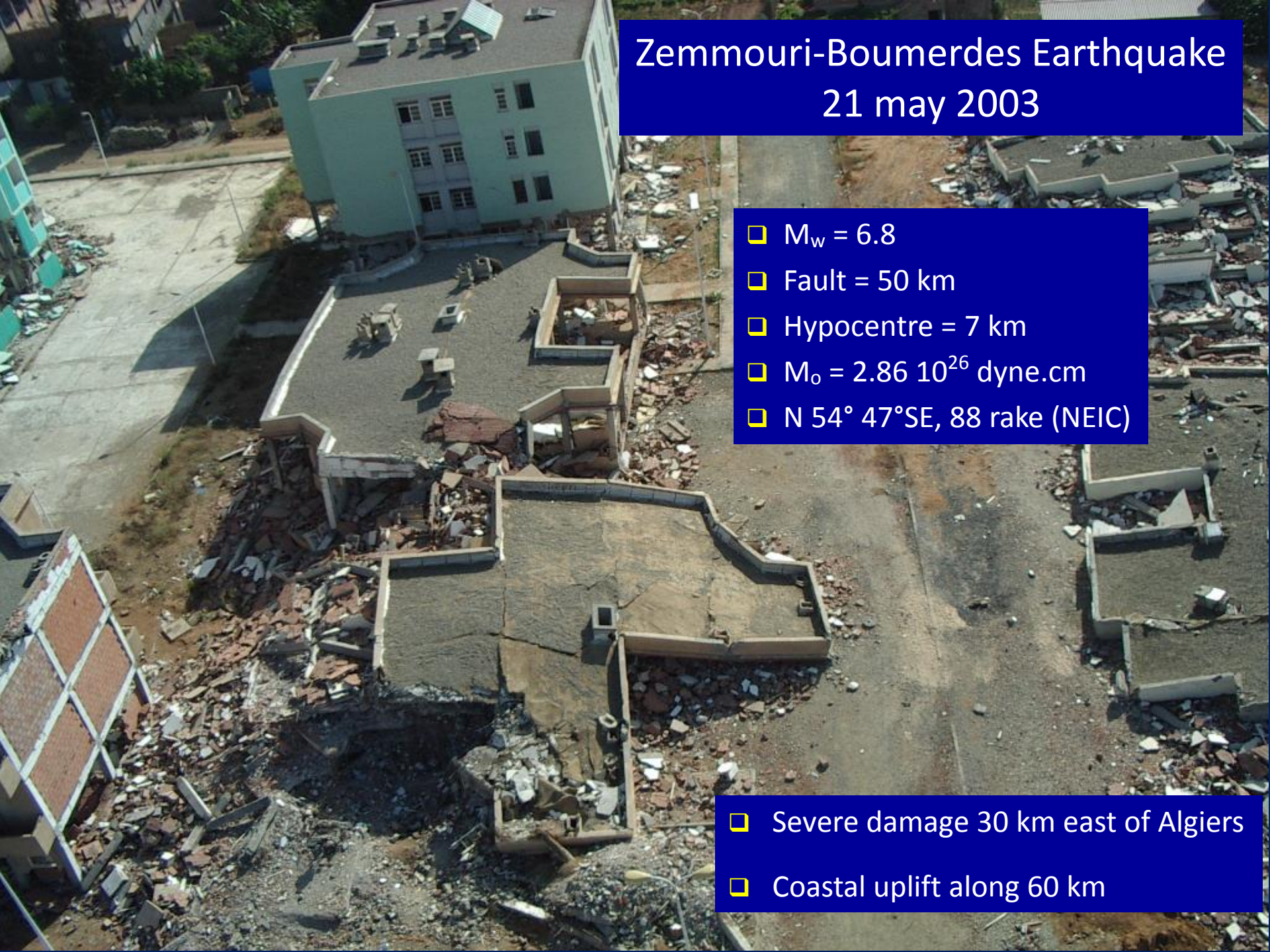
Earthquake Damage



Zemmouri-Boumerdes Earthquake 21 may 2003

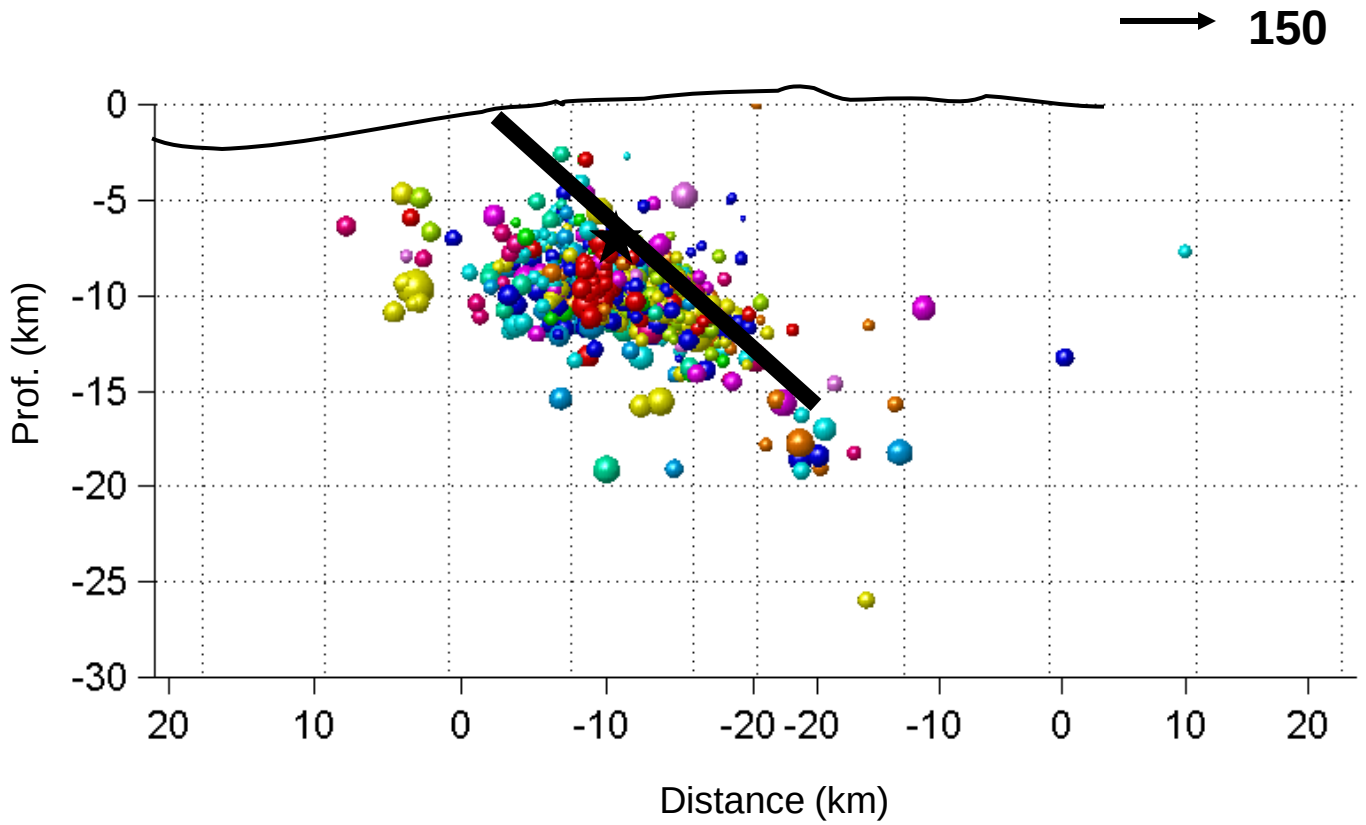
- M_w = 6.8
- Fault = 50 km
- Hypocentre = 7 km
- M_o = 2.86 10^{26} dyne.cm
- N 54° 47°SE, 88 rake (NEIC)

- Severe damage 30 km east of Algiers
- Coastal uplift along 60 km

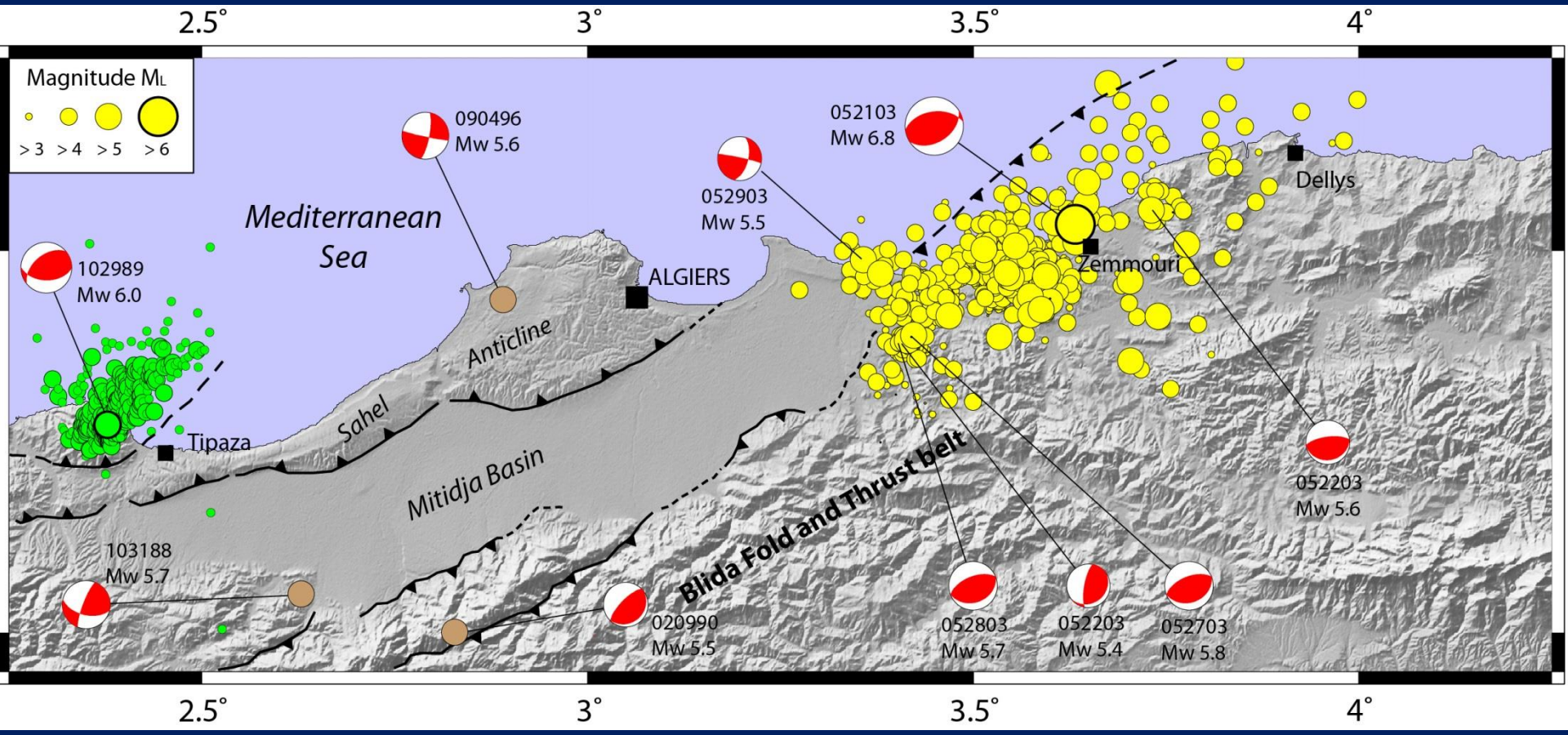

3
37°
37°
36.8°
36.
36.8°
8°
36.6°
36.
36.6°
6°

❑ Seismicity and fault at 5 - 20 km depth

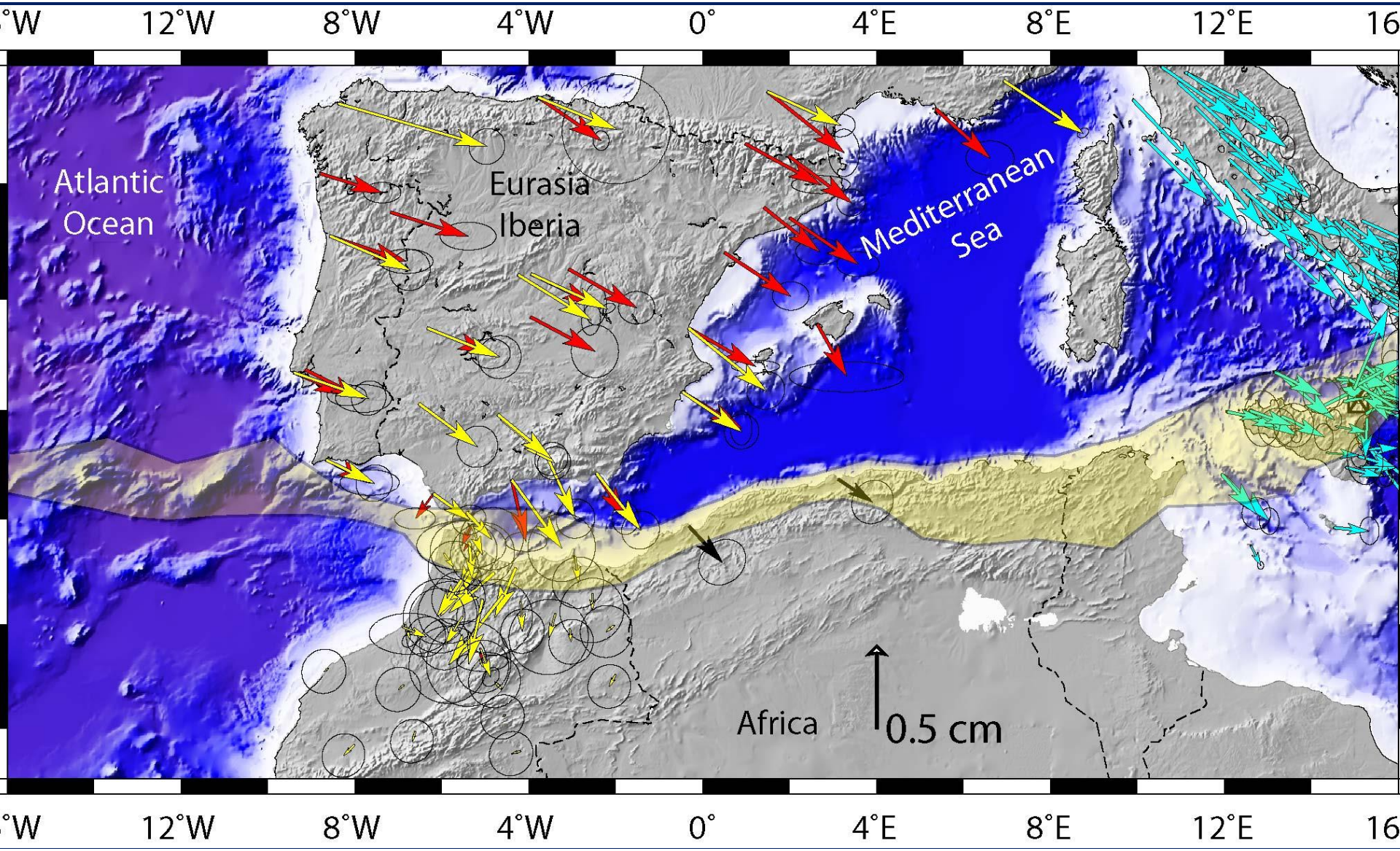
(Ayadi et al., JGR 2008)

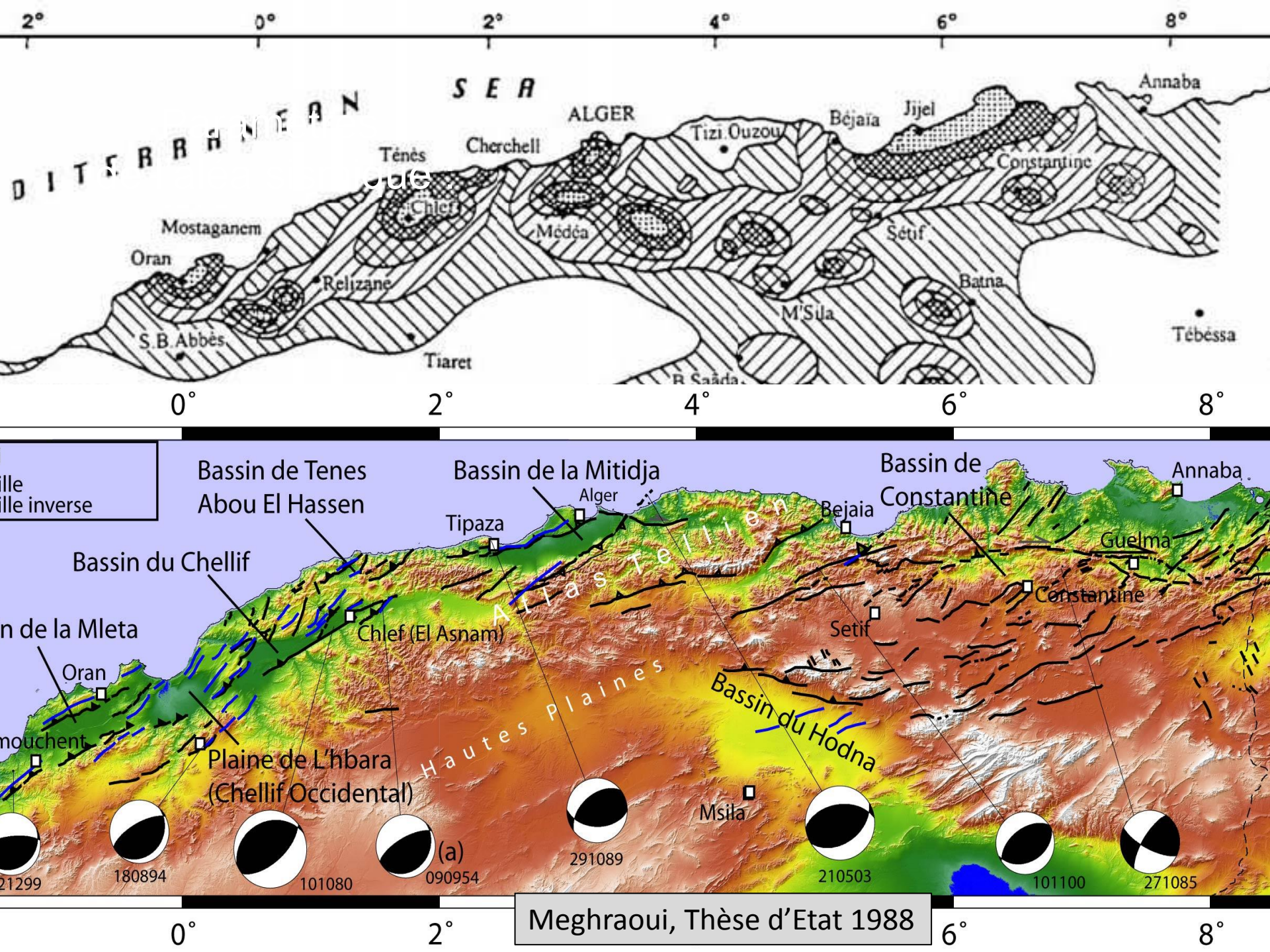


Fault, Earthquakes and Prevision



North Africa Seismicity and Tectonics



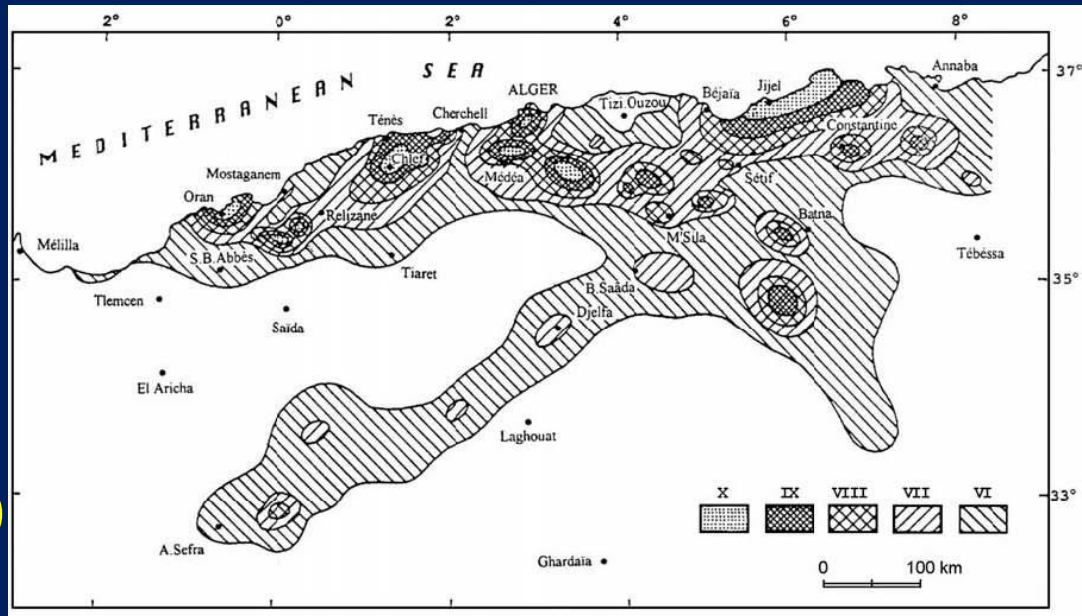


Meghraoui, Thèse d'Etat 1988

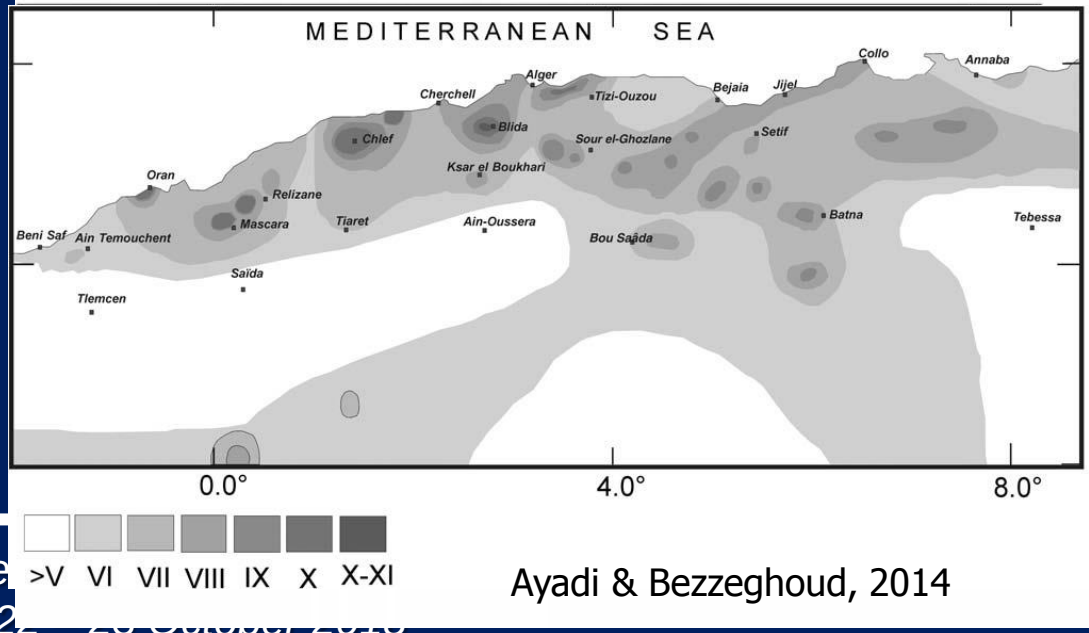
Seismic Hazard:
Earthquake parametres

- Seismic catalogue (hist. + inst.)
- Inventory of active faults
- Earthq. 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

1856 Jijel Earthquake and Tsunami

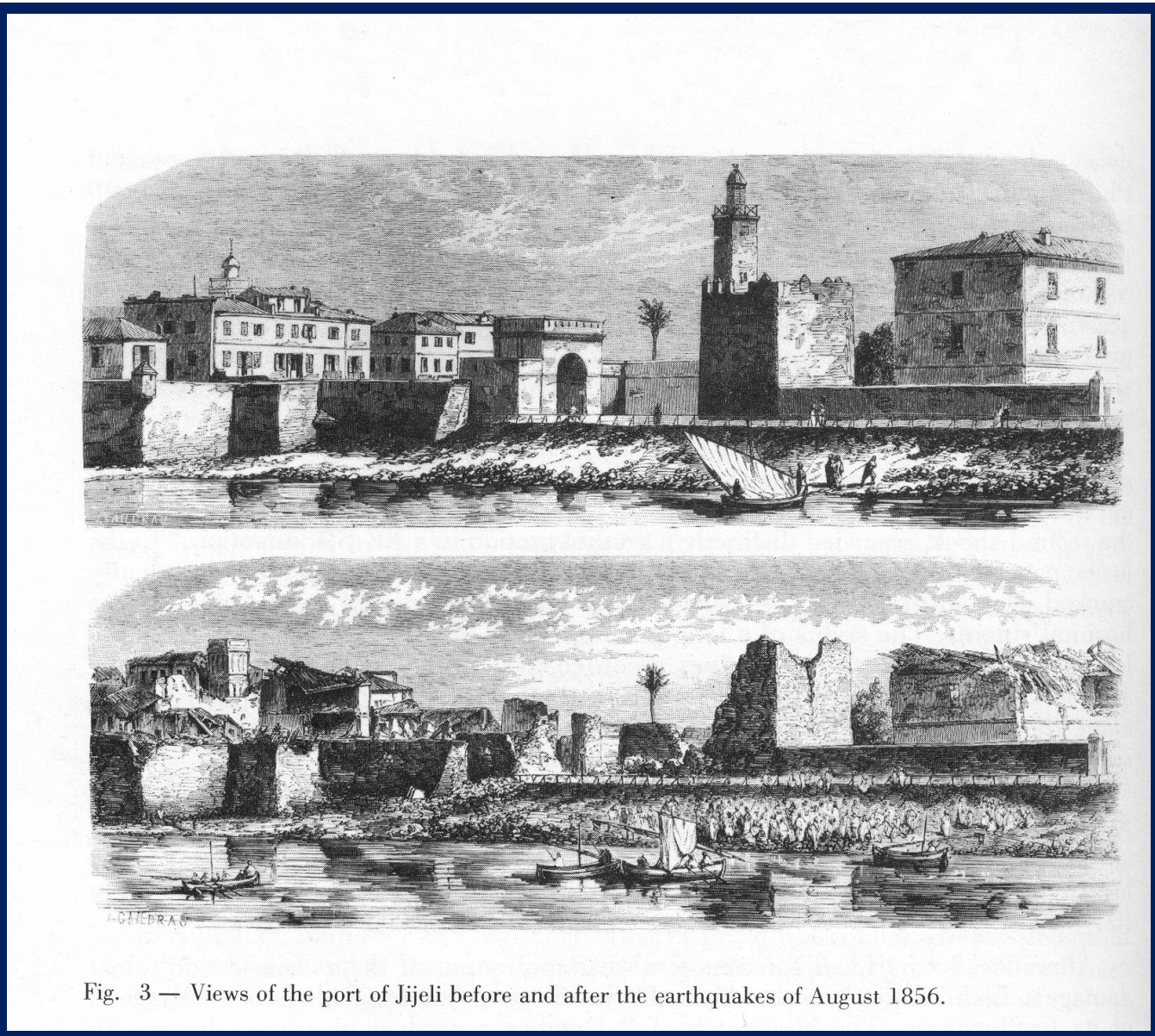


Fig. 3 — Views of the port of Jijeli before and after the earthquakes of August 1856.

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

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