



PROSPECTIVE TOWARDS REALISTIC SEISMIC HAZARD IN AFRICA

by
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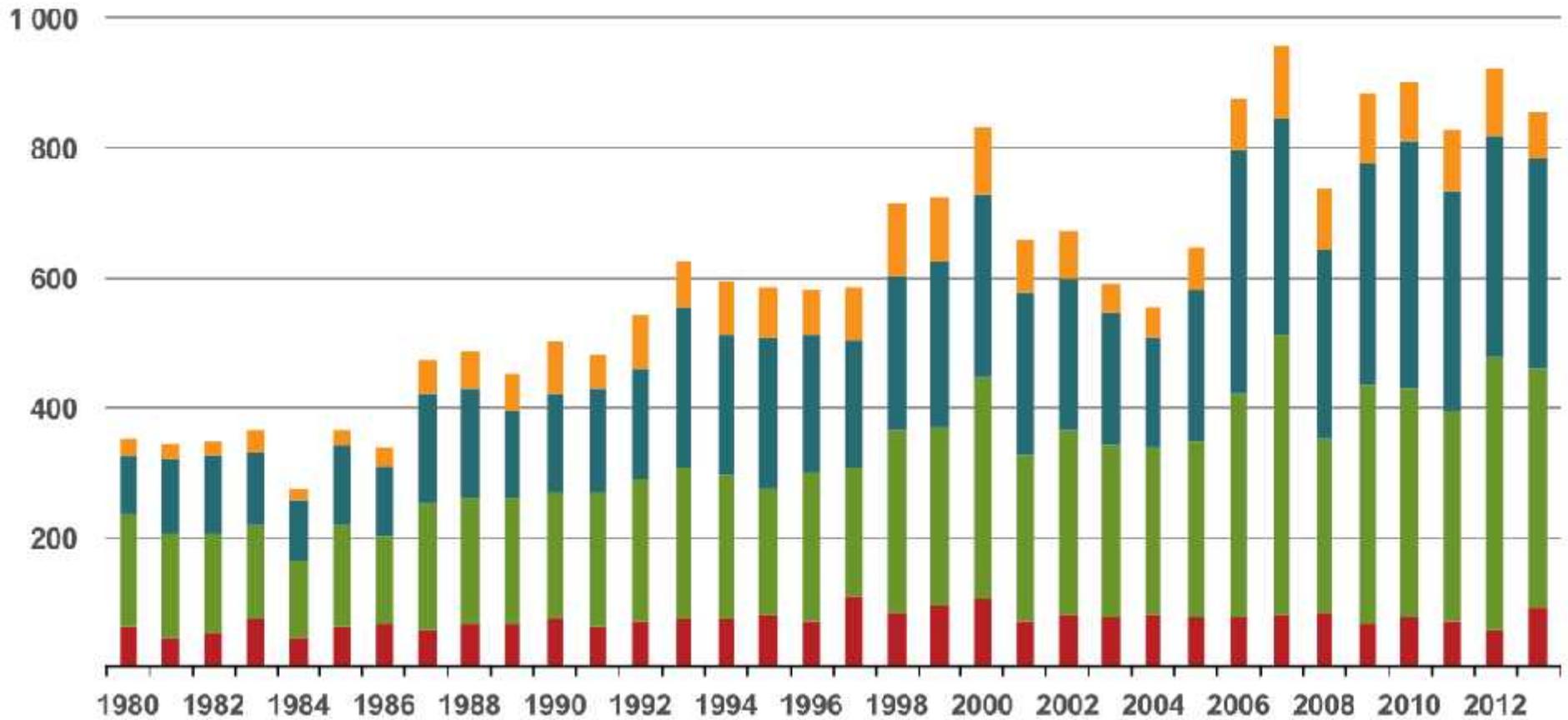
Source: Munich Re, NatCatSERVICE, 2016

- **Geophysical events**
(Earthquake, tsunami, volcanic activity)
- **Meteorological events**
(Tropical storm, extratropical storm, convective storm, local storm)
- **Hydrological events**
(Flood, mass movement)
- **Climatological events**
(Extreme temperature, drought, forest fire)
- **Loss events**
- **Selection of catastrophes**



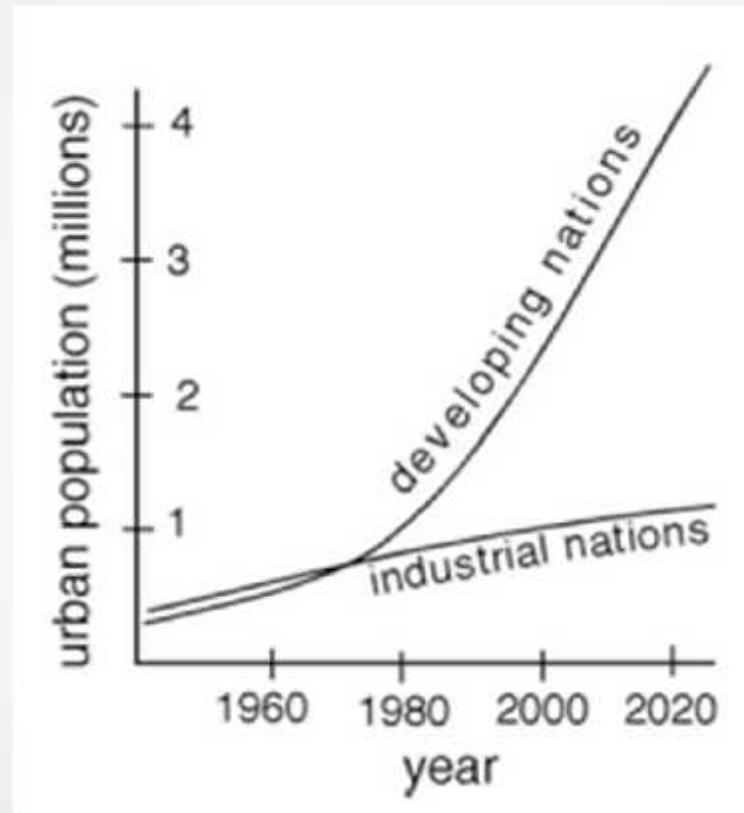
- Geophysical ●
- Meteorological ●
- Hydrological ●
- Climatic ●

Number



Consequences of urbanization

Urbanization in developing nations is rapid, but is flat in industrial nations.



(Figure from Bilham, 2004)

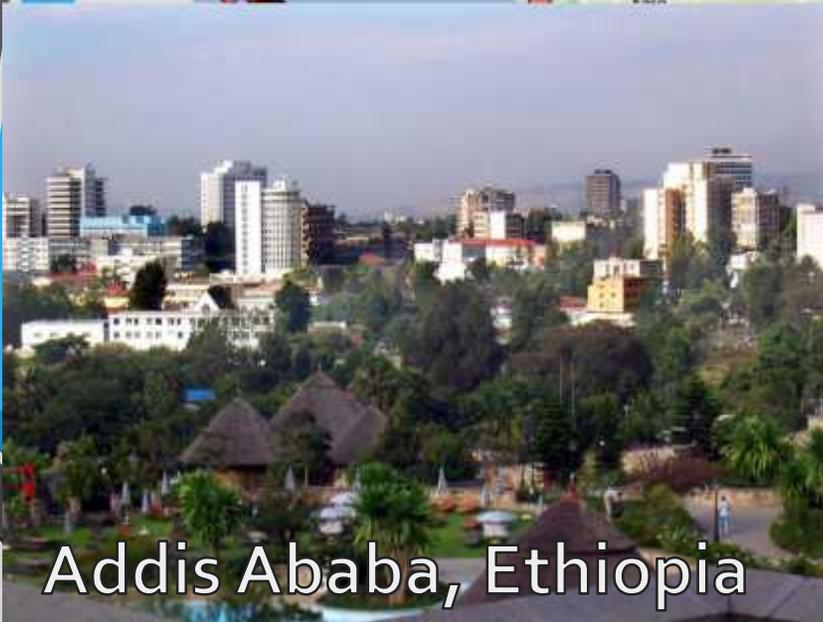
"By the year 2025 more than 5500 million people will live in cities - more than our entire 1990 combined rural and urban population."

(from Roger's Bilham web-page)

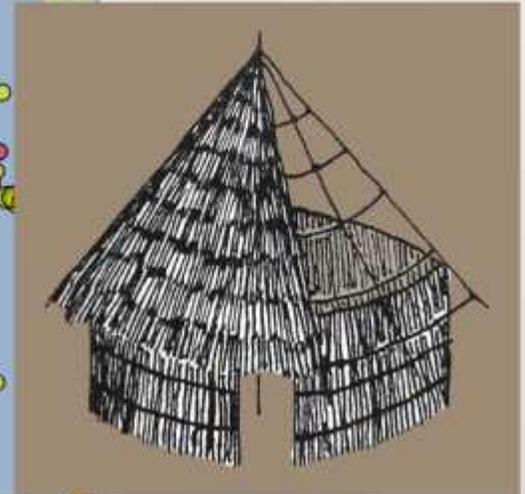
Earthquakes do not kill people, buildings



Accra, Ghana



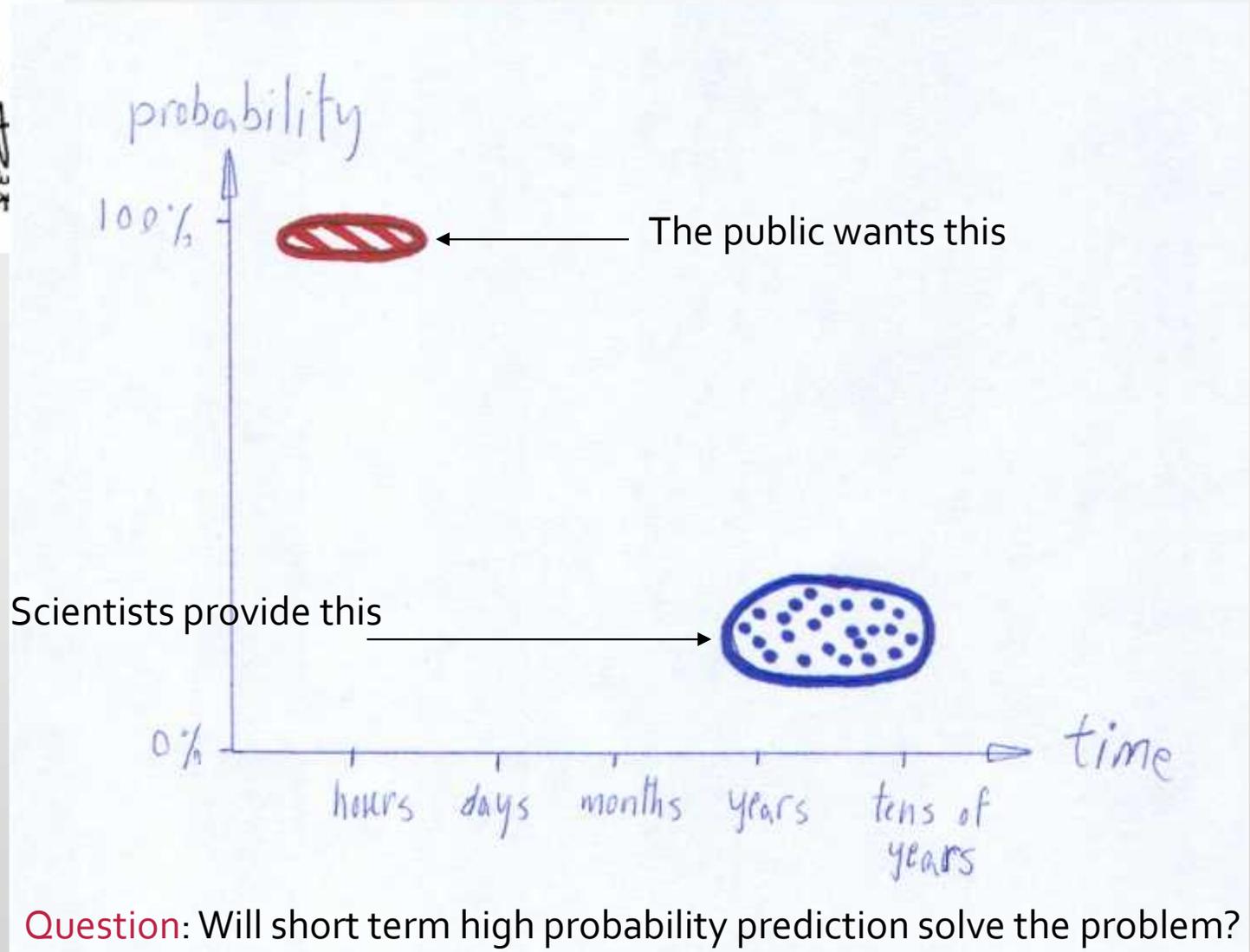
Addis Ababa, Ethiopia





But what about prediction?

Short term vs. long term prediction



Scientists provide this

The public wants this

Question: Will short term high probability prediction solve the problem?

Lesson from the Hurricane Harvey example:

It is possible to make high probability short term predictions for hurricanes, as was done in the case of hurricane Katrina. Still an estimated 1800 people were killed in New Orleans and neighboring areas.





Disaster Risk Management Cycle



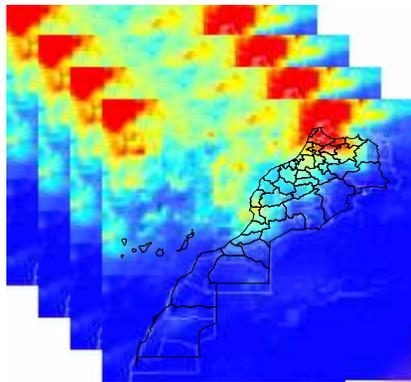
Source: Australian Development Gateway



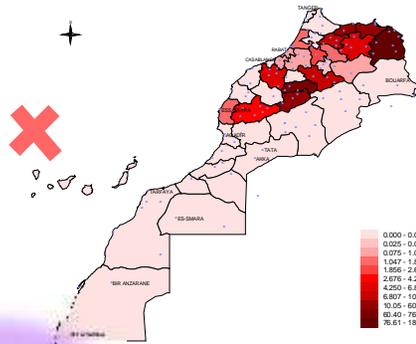
قابلية التضرر Vulnerabilities

Hazards

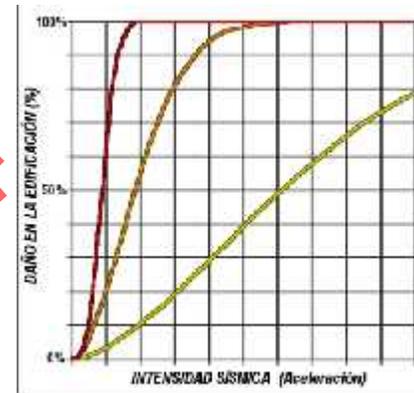
Drought, flood, landslide, earthquake



Exposure
(Building, Agriculture, industry..)



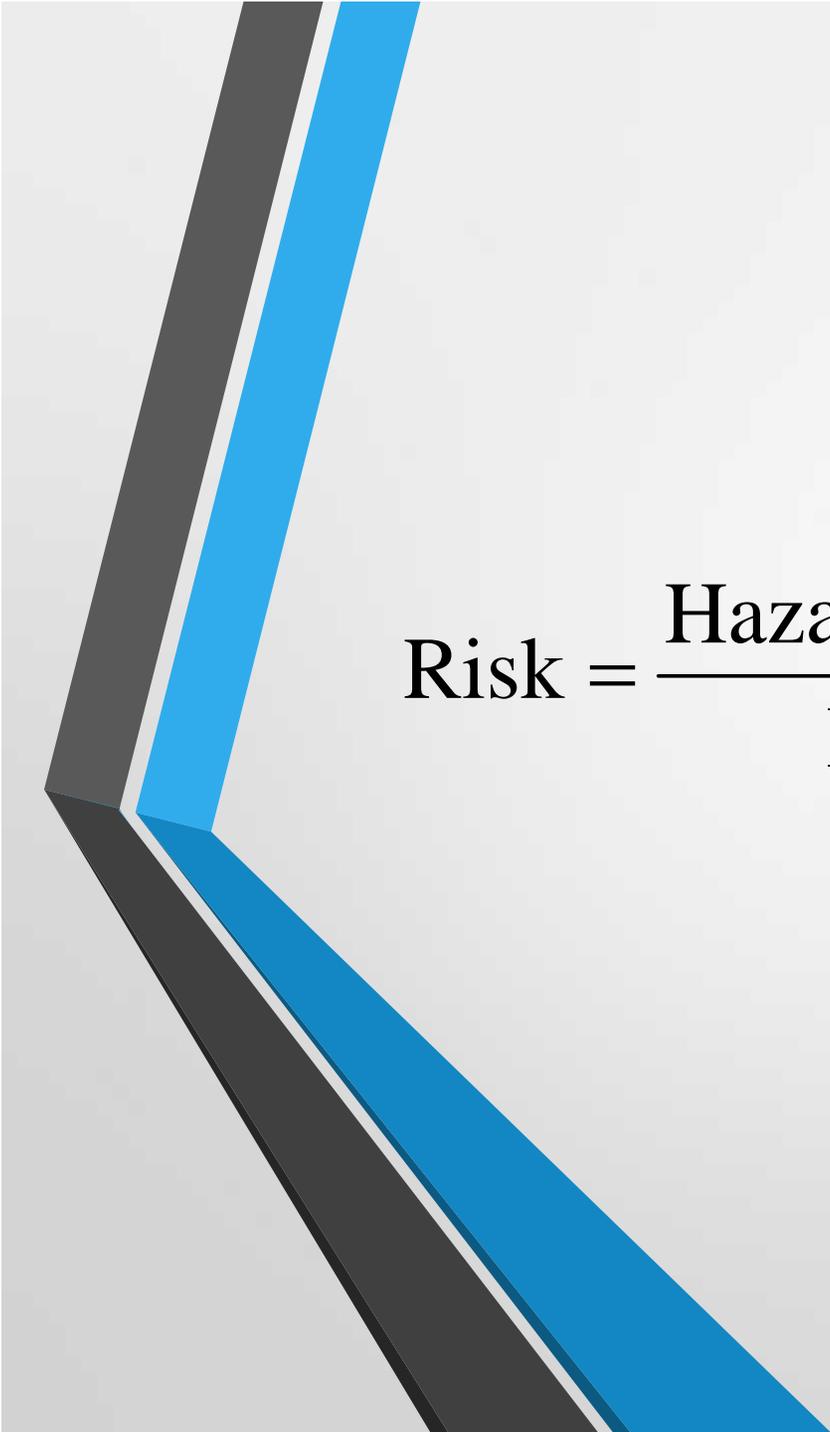
**دوال قابلية التضرر
Vulnerability functions**



(
(Probable Losses
USD)

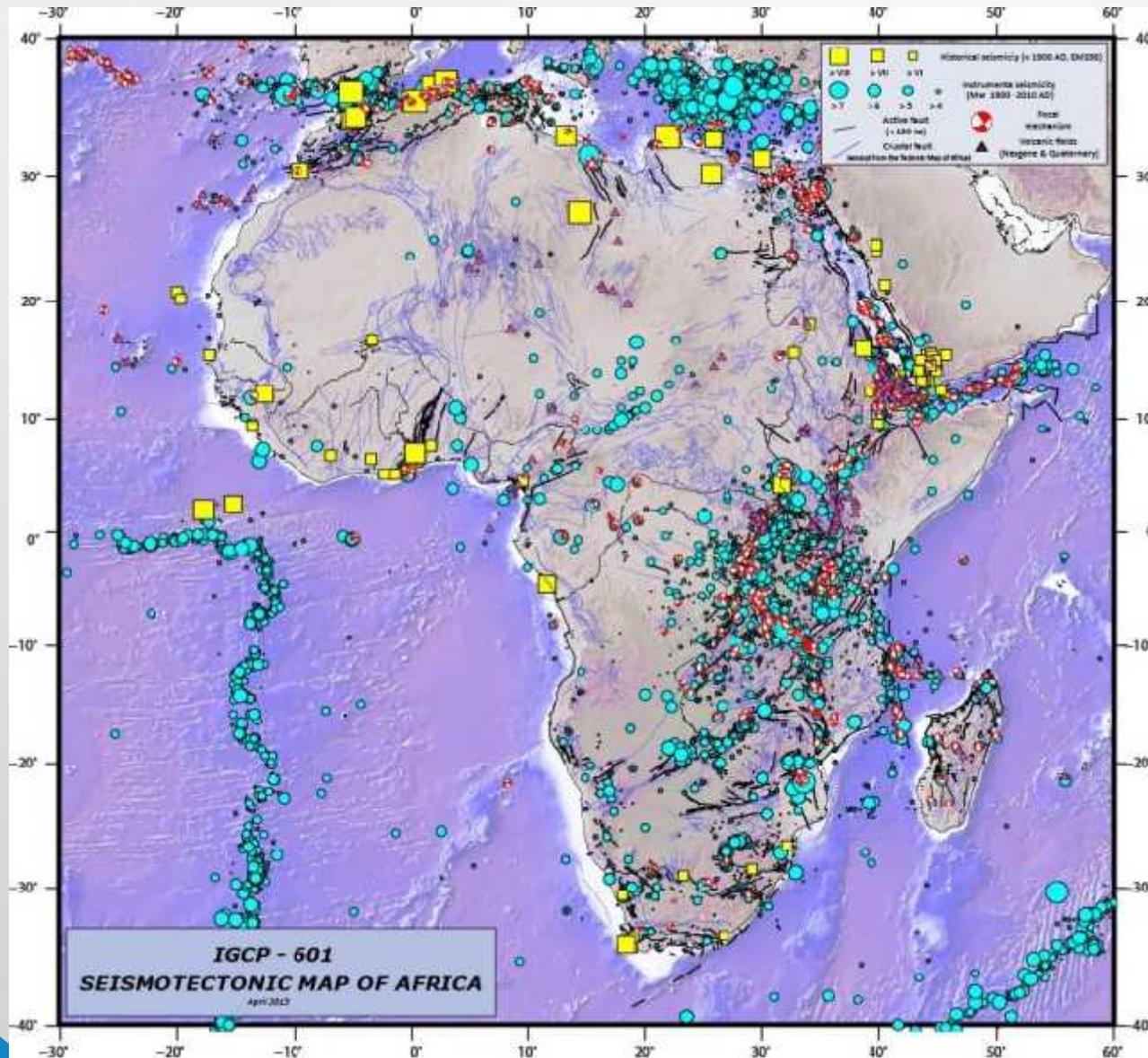


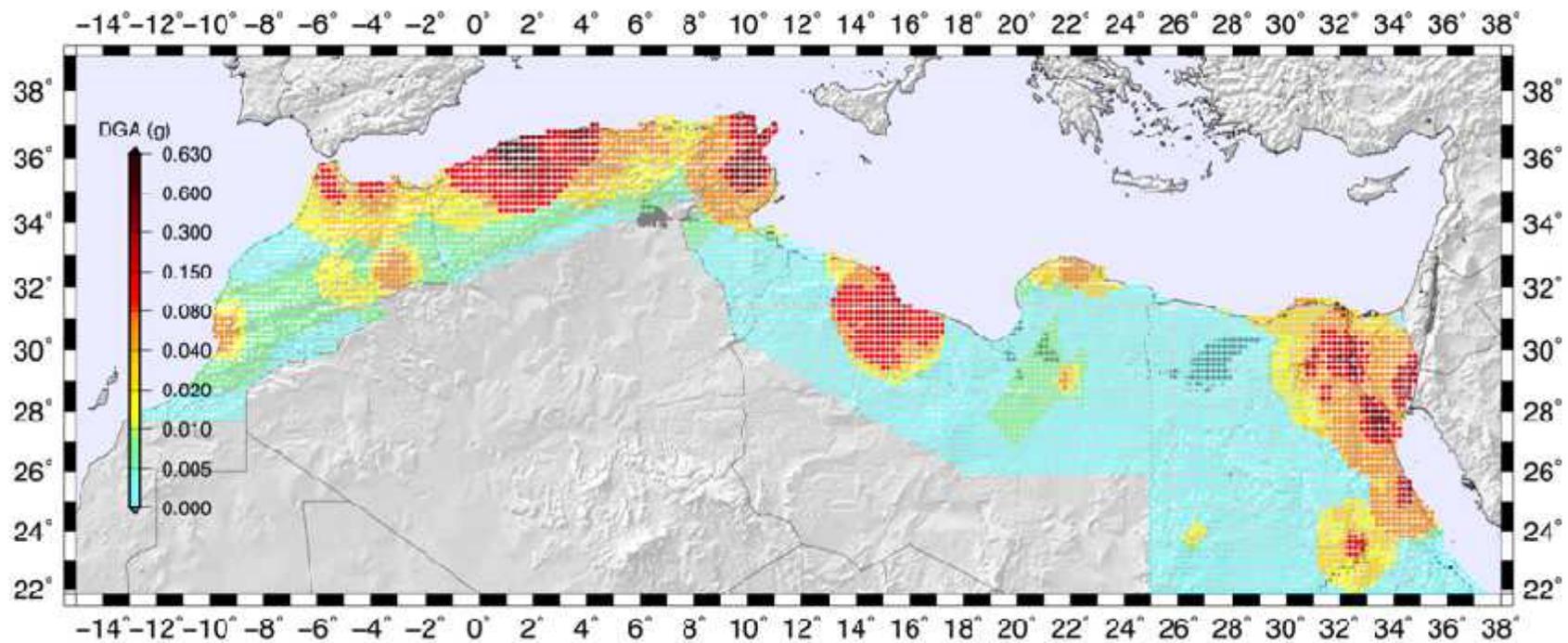
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التكاليف

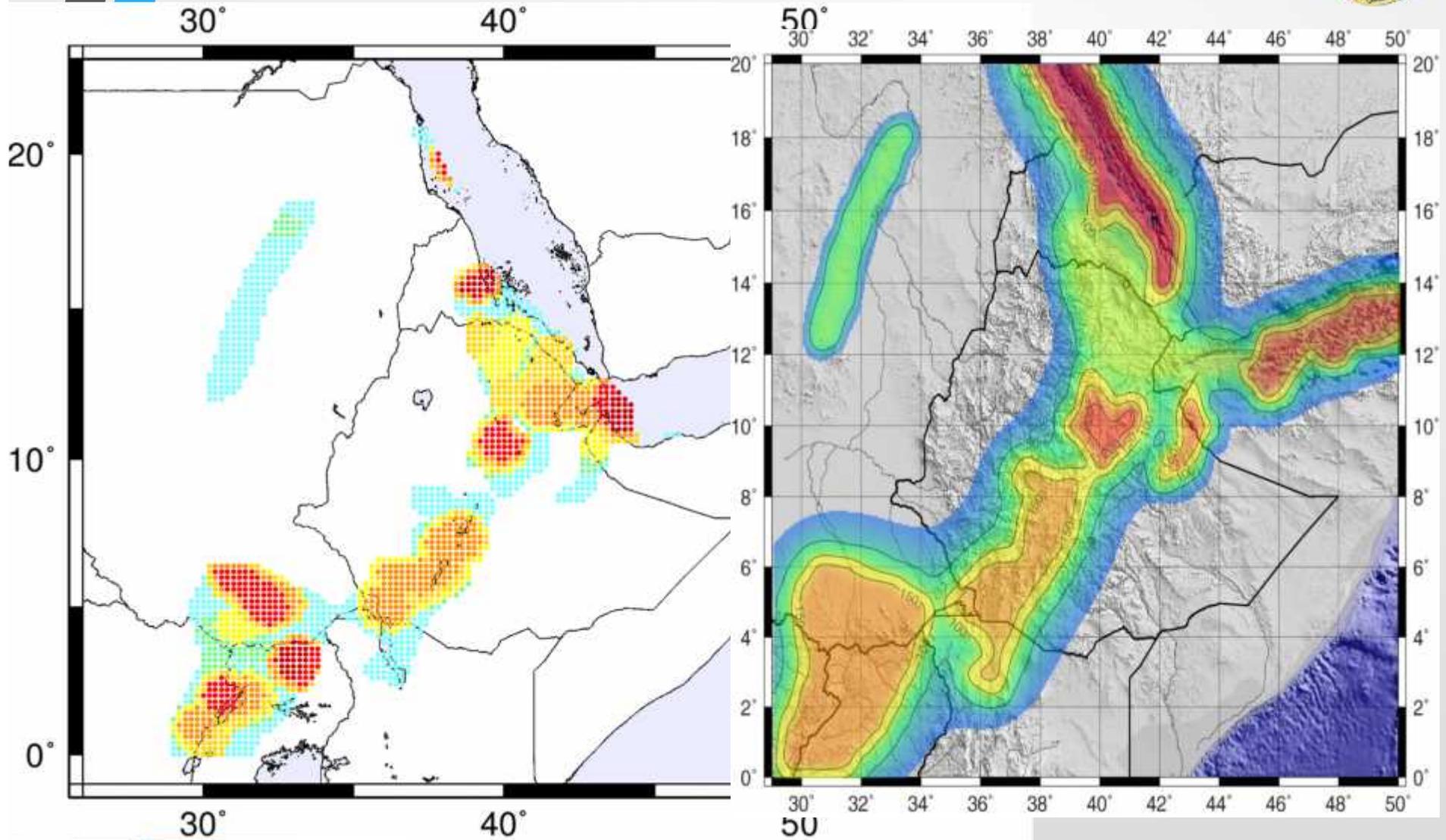

$$\text{Risk} = \frac{\text{Hazard} * \text{Vulnerability}}{\text{Management}}$$

Earthquake losses

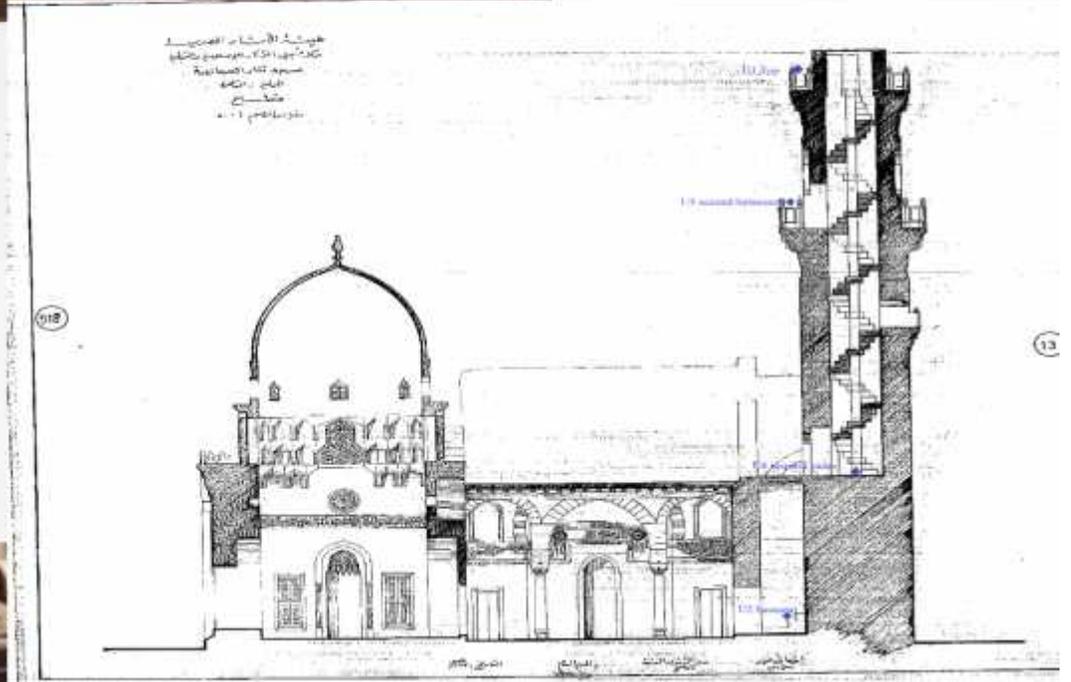
EQ	Magnitude	Victims	Losses (U.S.\$)	Ex-PGA
Agadir 1960	5.9 (Mw)	~ 14 000	900 million	-
El Asnam 1980	7.3 (Ms)	~ 5 000	2 Billion	-
Cairo 1992	5.8 (Mw)	~ 560	3.5 - 4 Billion	-
Al Hoceima 1994-2004	5.9 (Ms) 6.4 (Mw)	~ 628	80 Million 400 Million	- +0.14 g
Zemmouri 2003	6.8 (Mw)	~ 2278	5 Billion	+0.30 g

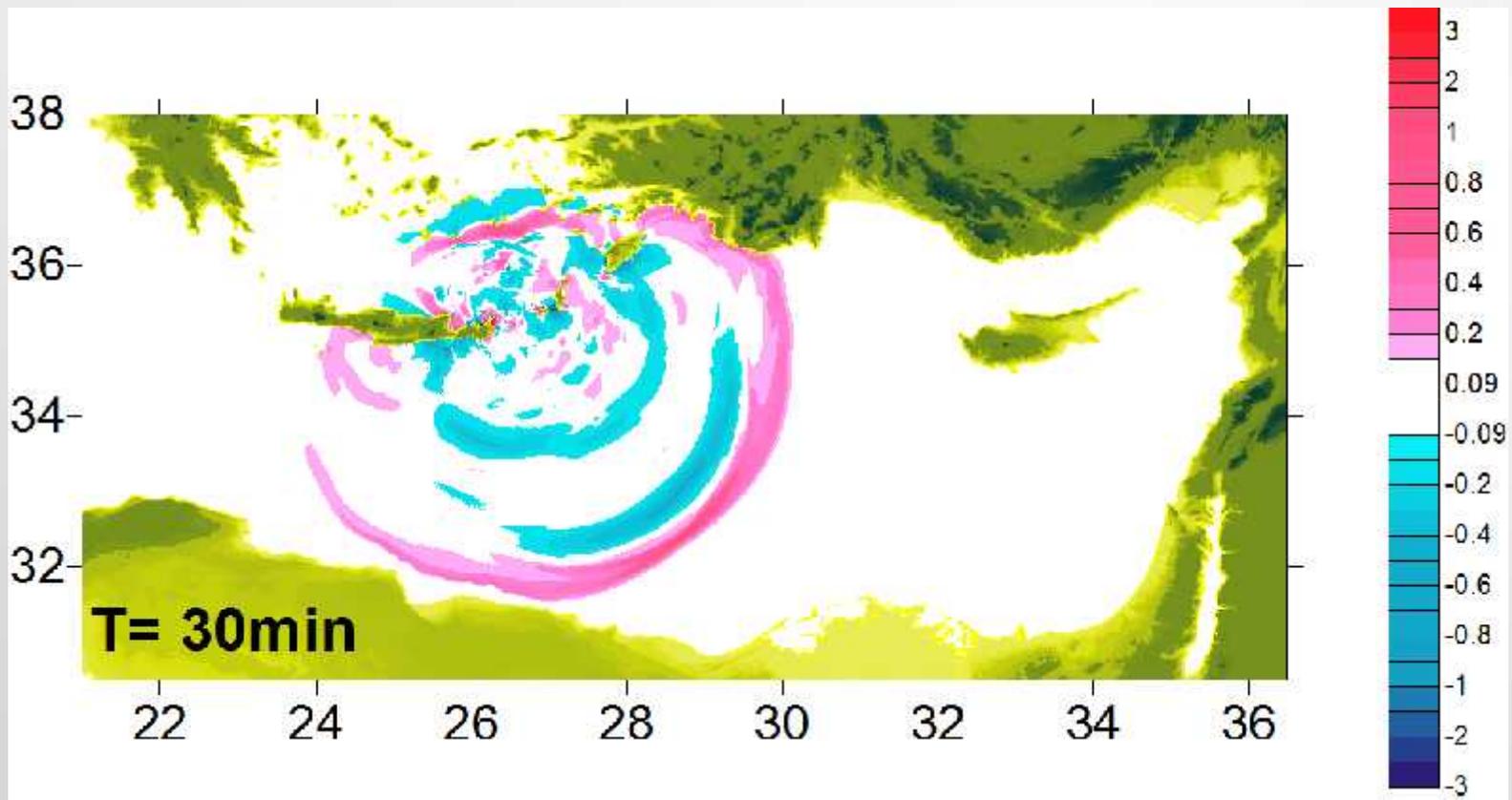


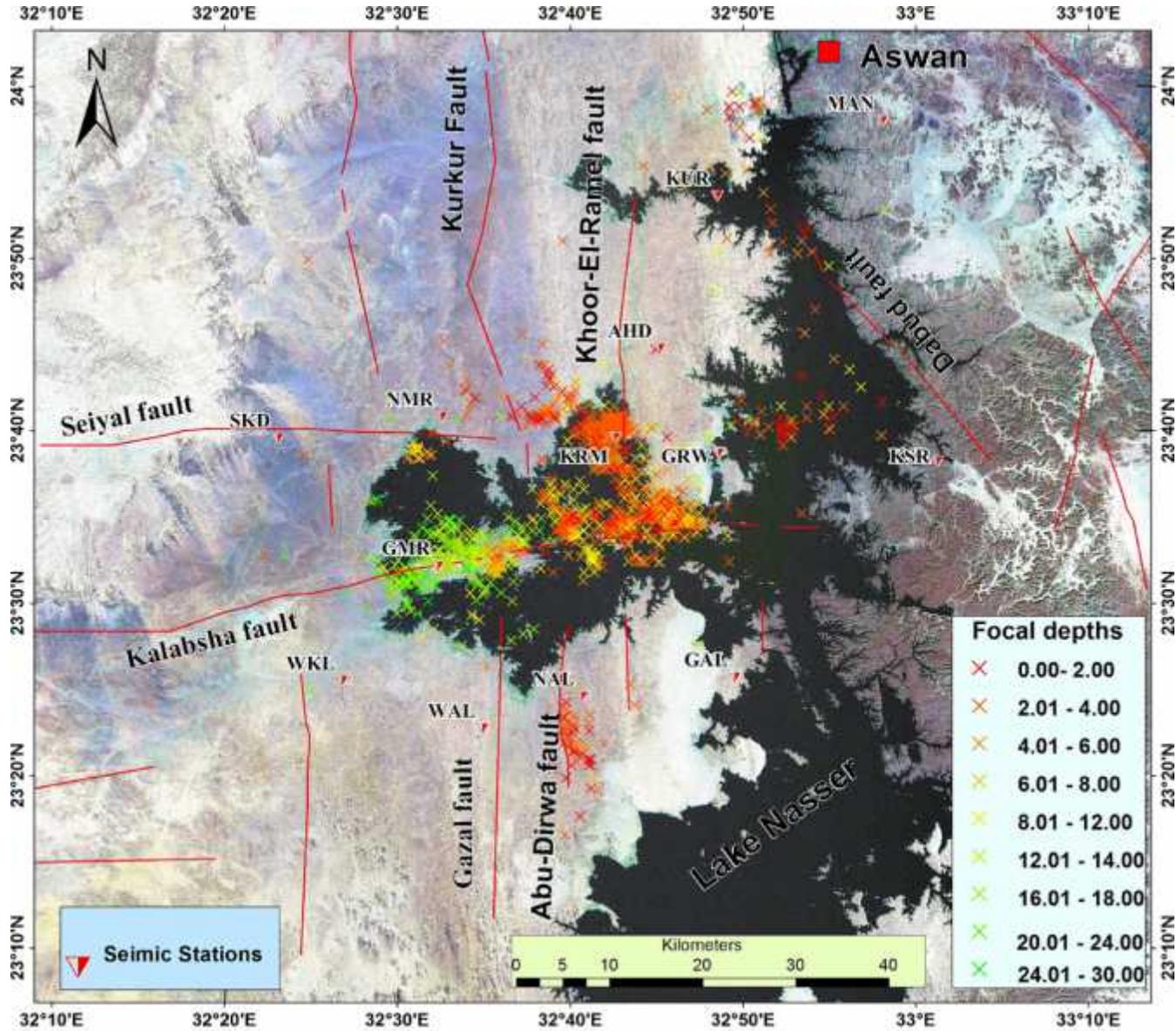


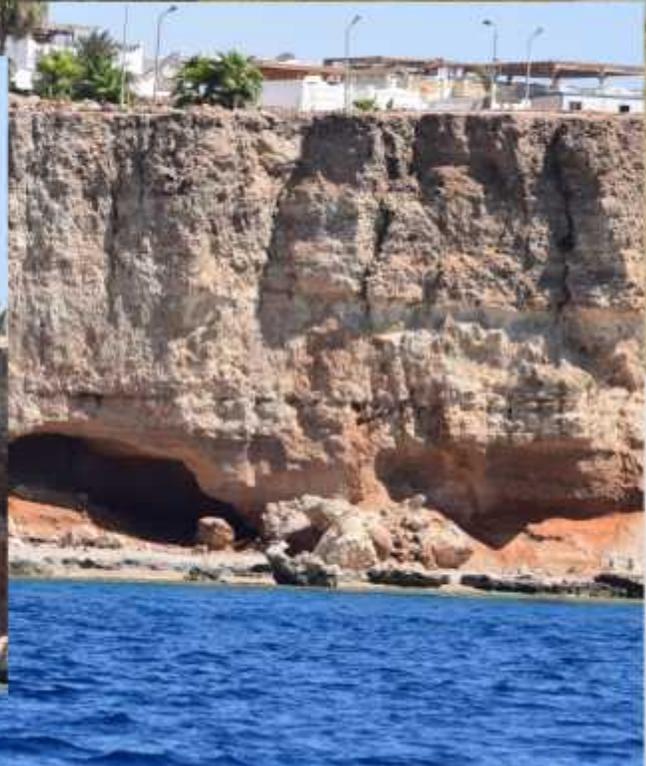


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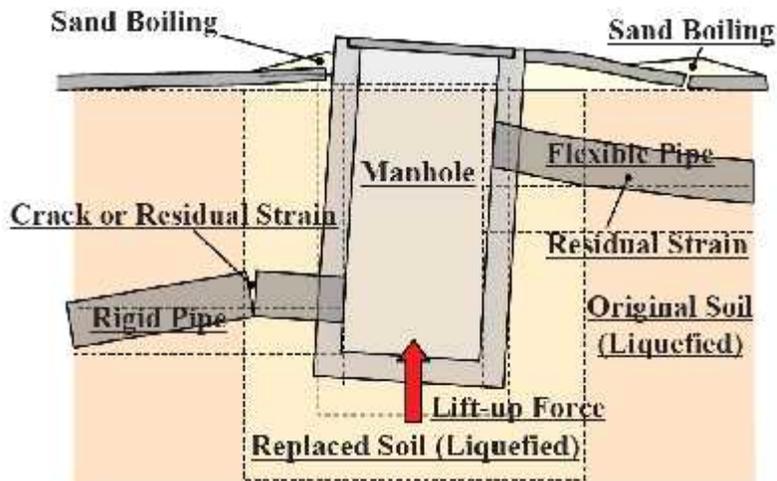


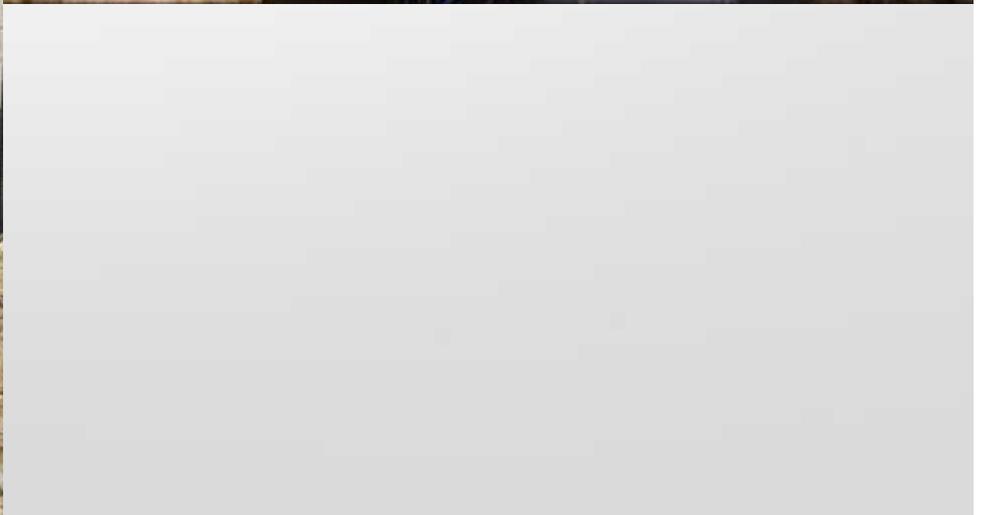
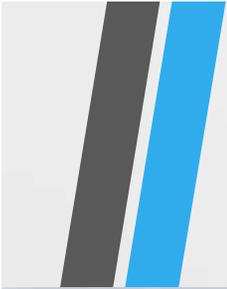


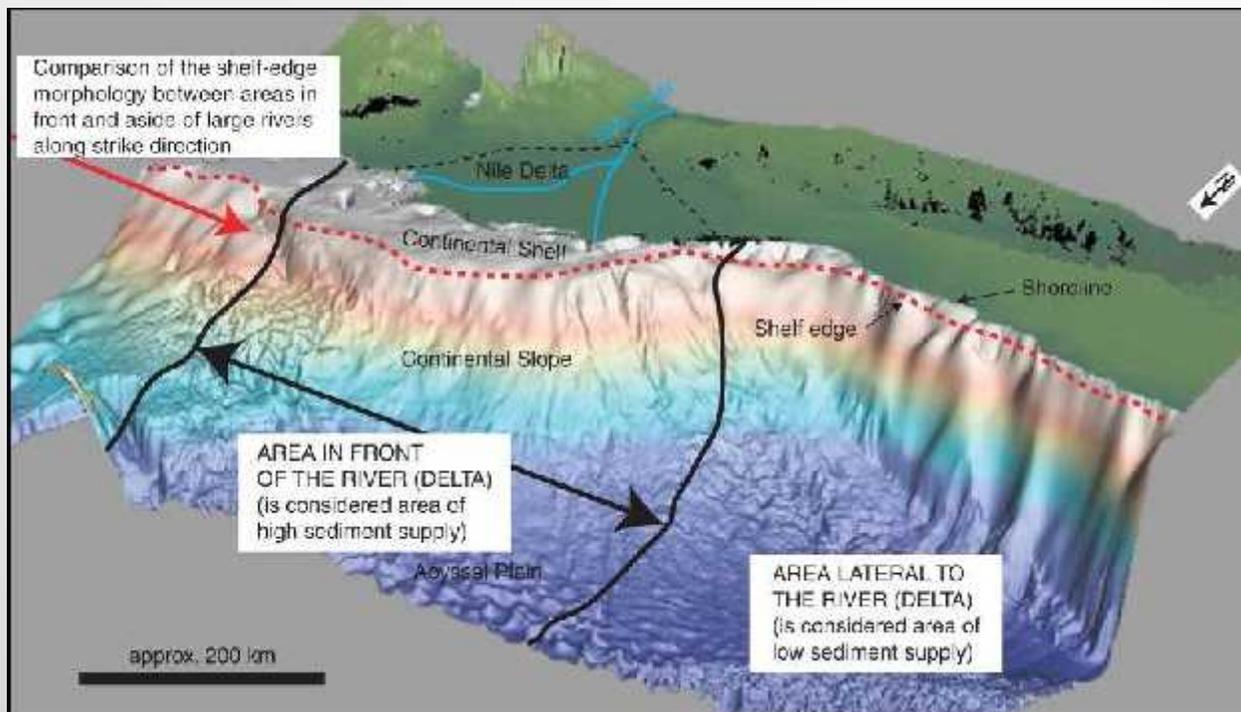


The Damage of Sewerage Structures

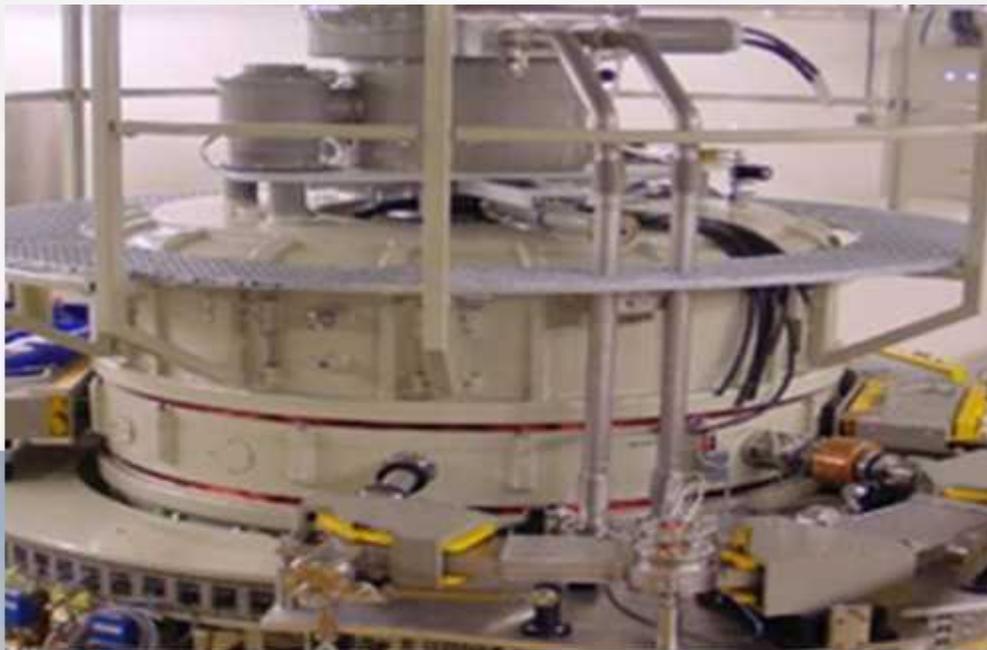
Failure Mode (notice : this is only concept)



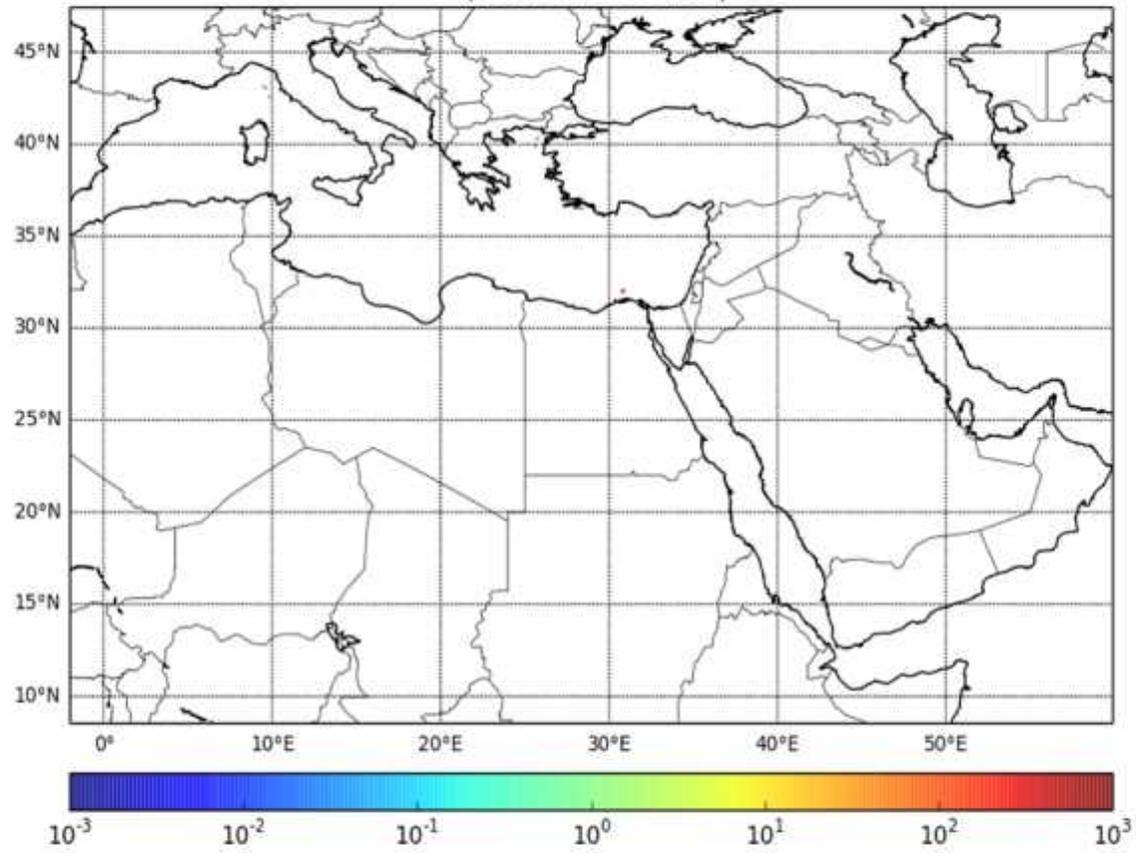




Olariu and Steel, 2009



(2015-07-05 01:00)







وزارة البحث العلمي

المعهد القومي للبحوث الفلكية و الجيوفيزيقية

عين ترصد السماء و أذن تسمع خفقات الأرض