

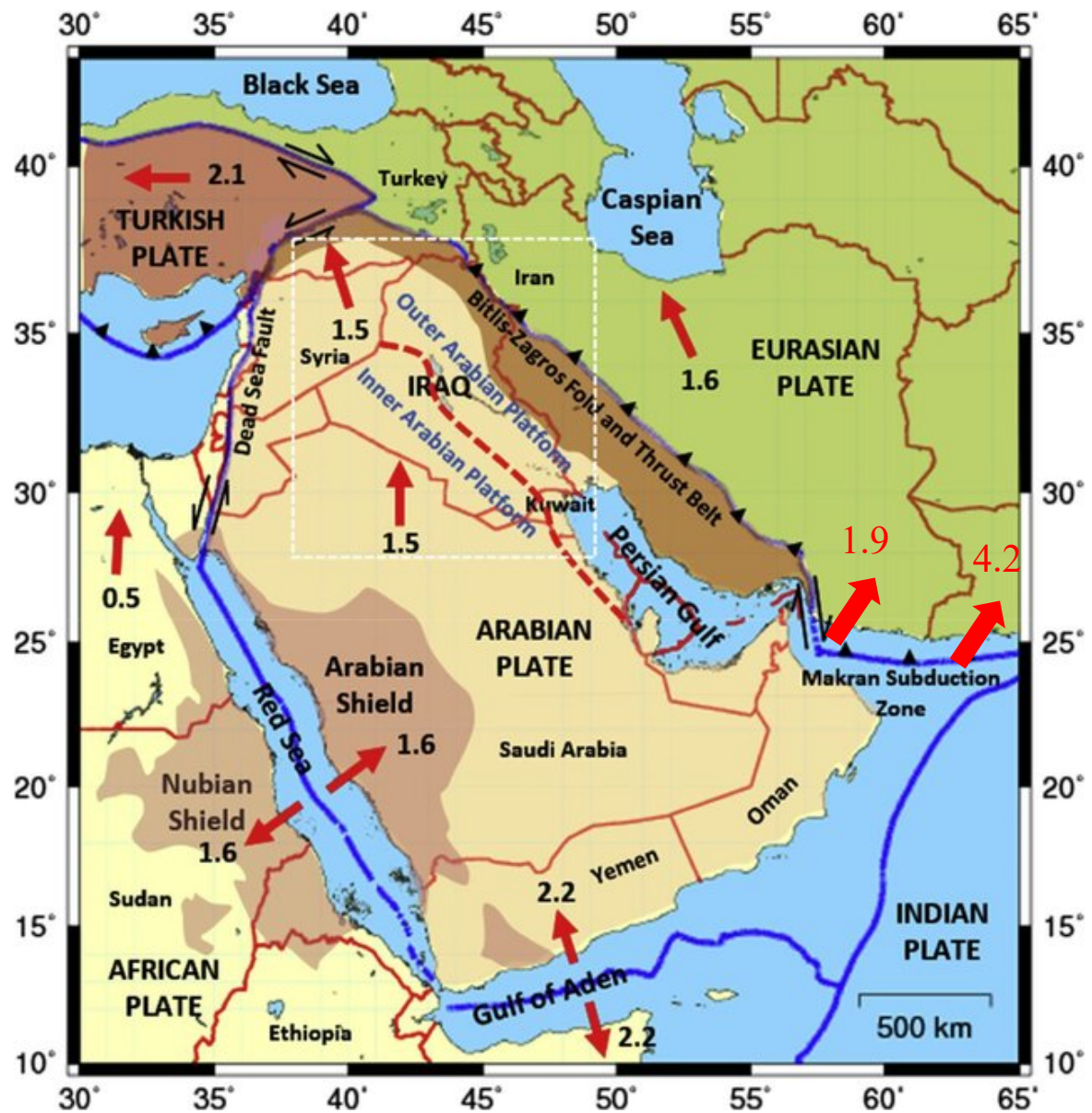


The Possibility of Atypical Tsunami Occurrences in the Persian Gulf (?)

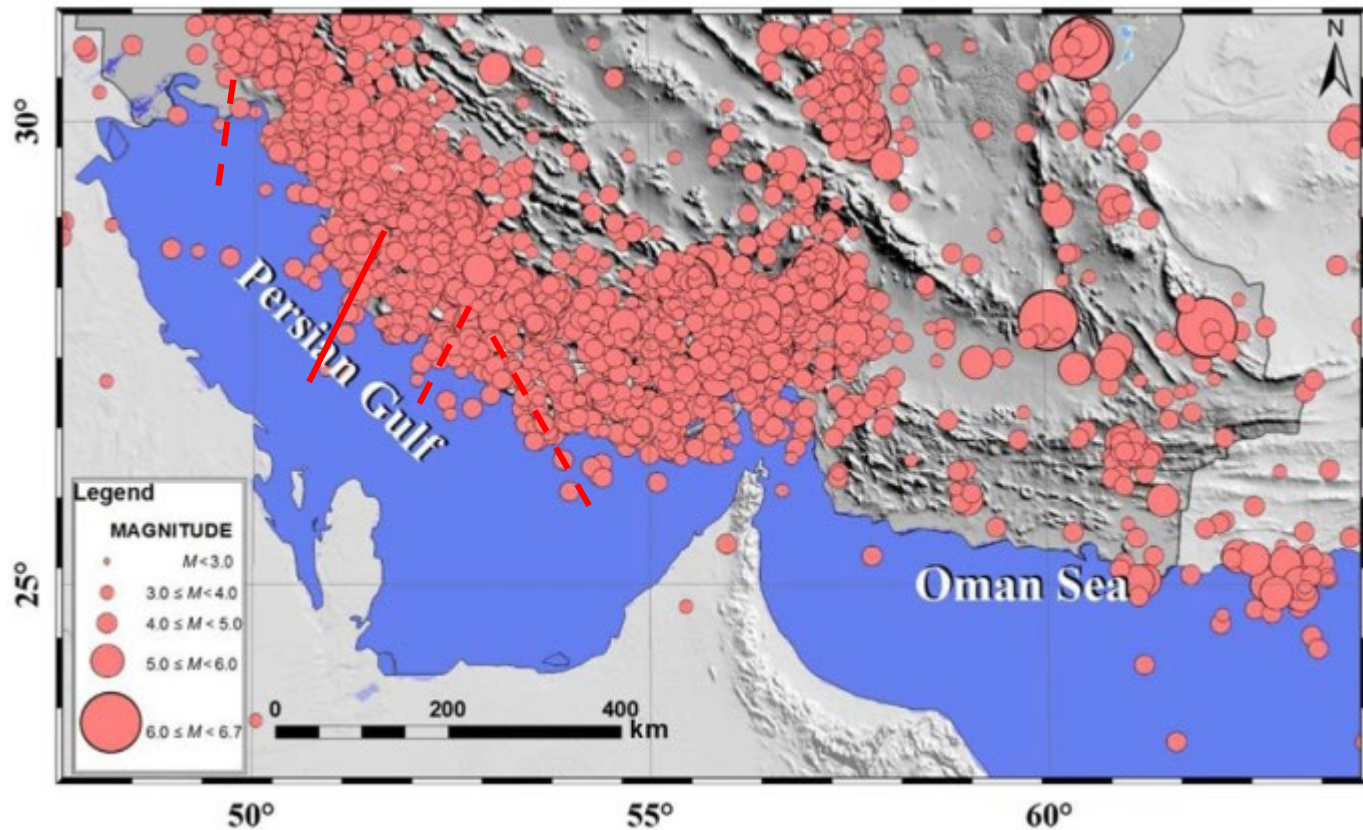
Abdolmajid Naderi Beni

Iranian National Institute for Oceanography and
Atmospheric Science

Persian Gulf is an epicontinental shallow water body that was formed as a foreland basin due to convergence of the Arabian and Eurasian plates.



Zagros Mountains at the northern coast of the Persian Gulf is highly seismic. Comparing to the Makran Subduction Zone the frequency of seismic activity in Persian Gulf is higher whereas the magnitude of the earthquakes is low to medium. It seems that the Persian Gulf is safe for tsunami due to the shallow depth of the water body and lack of crustal fault with capability to generate tsunami.



Seismicity of the Persian Gulf and coastal areas of Makran (1964–2000)
Soltanpour (2015)

The Possibility of Atypical Tsunami Occurrences in the Persian Gulf (?)

Despite the apparent safe condition of the Persian Gulf for Tsunami hazard, there are some historical evidence of tsunami occurrence in 1008 AD in Siraf ancient port with fatality and damage.



In March 2017, destructive waves hit the northern shores of the Persian Gulf in Bandar-e Dayyer, west of Siraf. Can we link the Siraf event in early 17th century to meteo-tsunami?



Mehr Agency

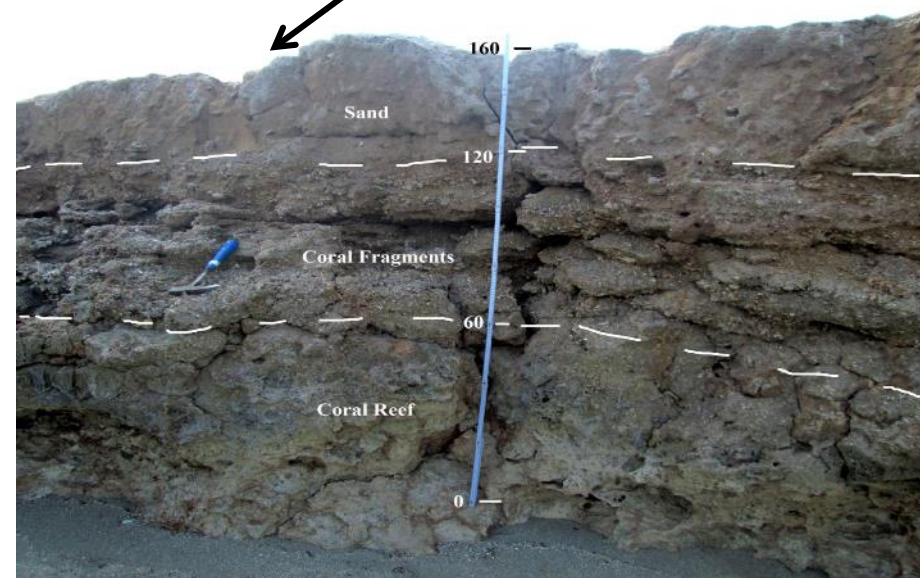
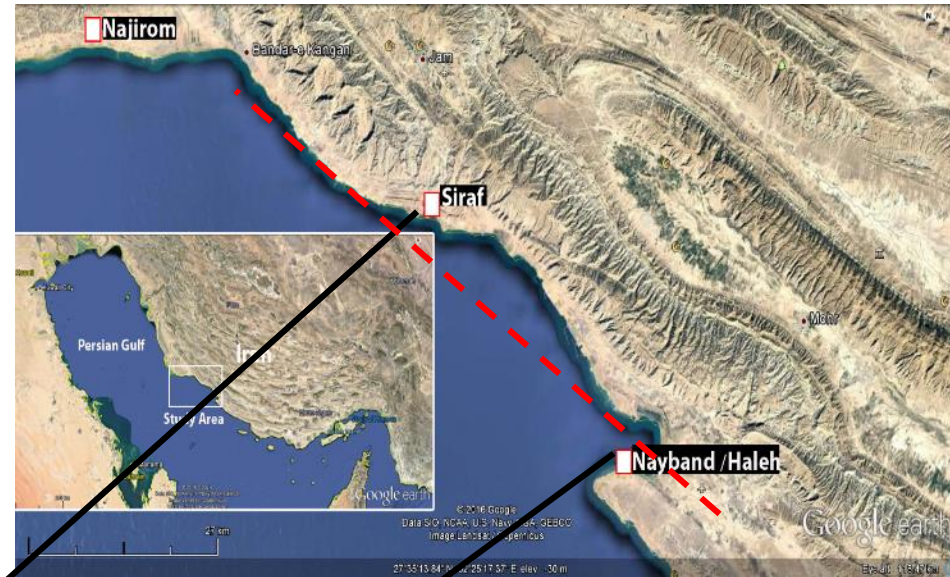
The Possibility of Atypical Tsunami Occurrences in the Persian Gulf (?)



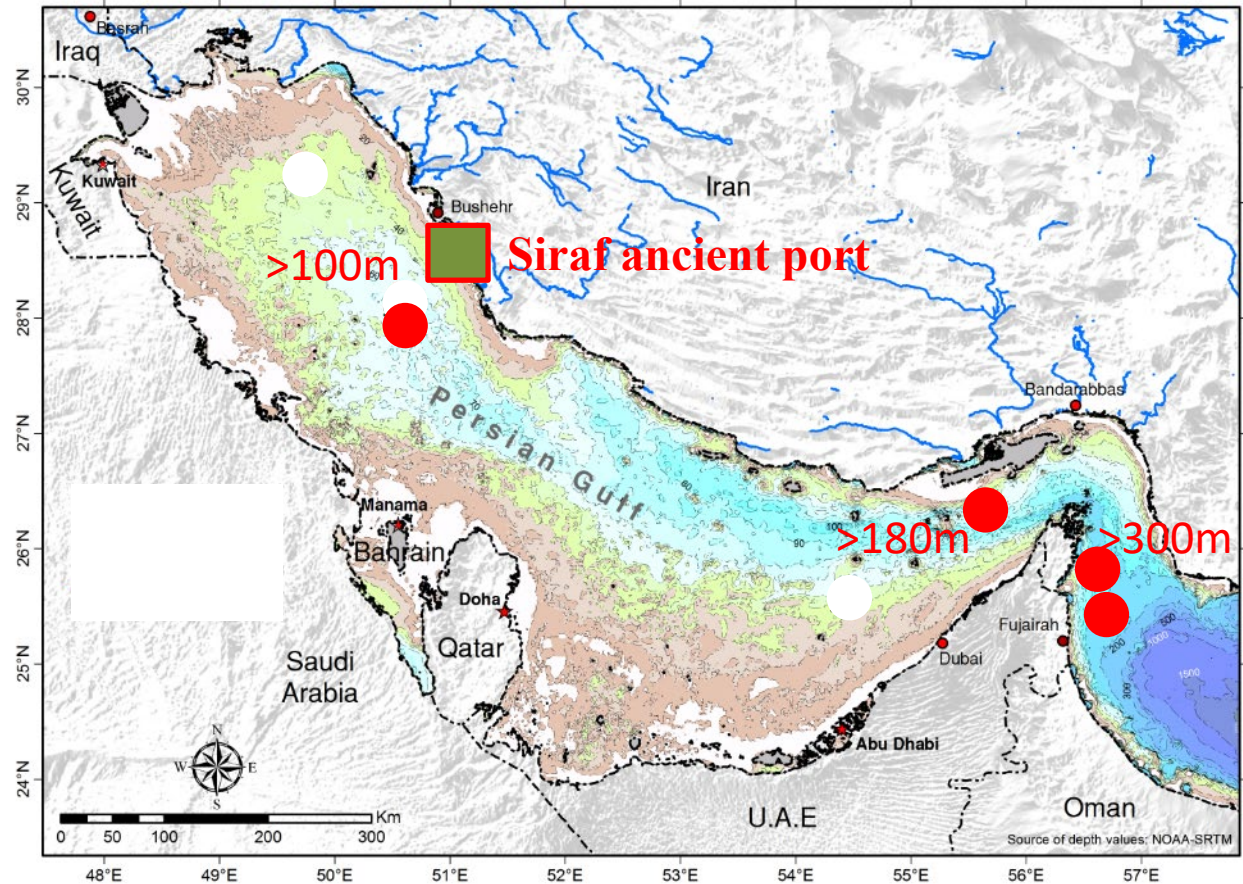
Coastal cliffs with evidence of failures are in southern coast of cape of Nayband, 40km south of Siraf. Was coastal cliff failure responsible for the early 11th century event in Siraf?



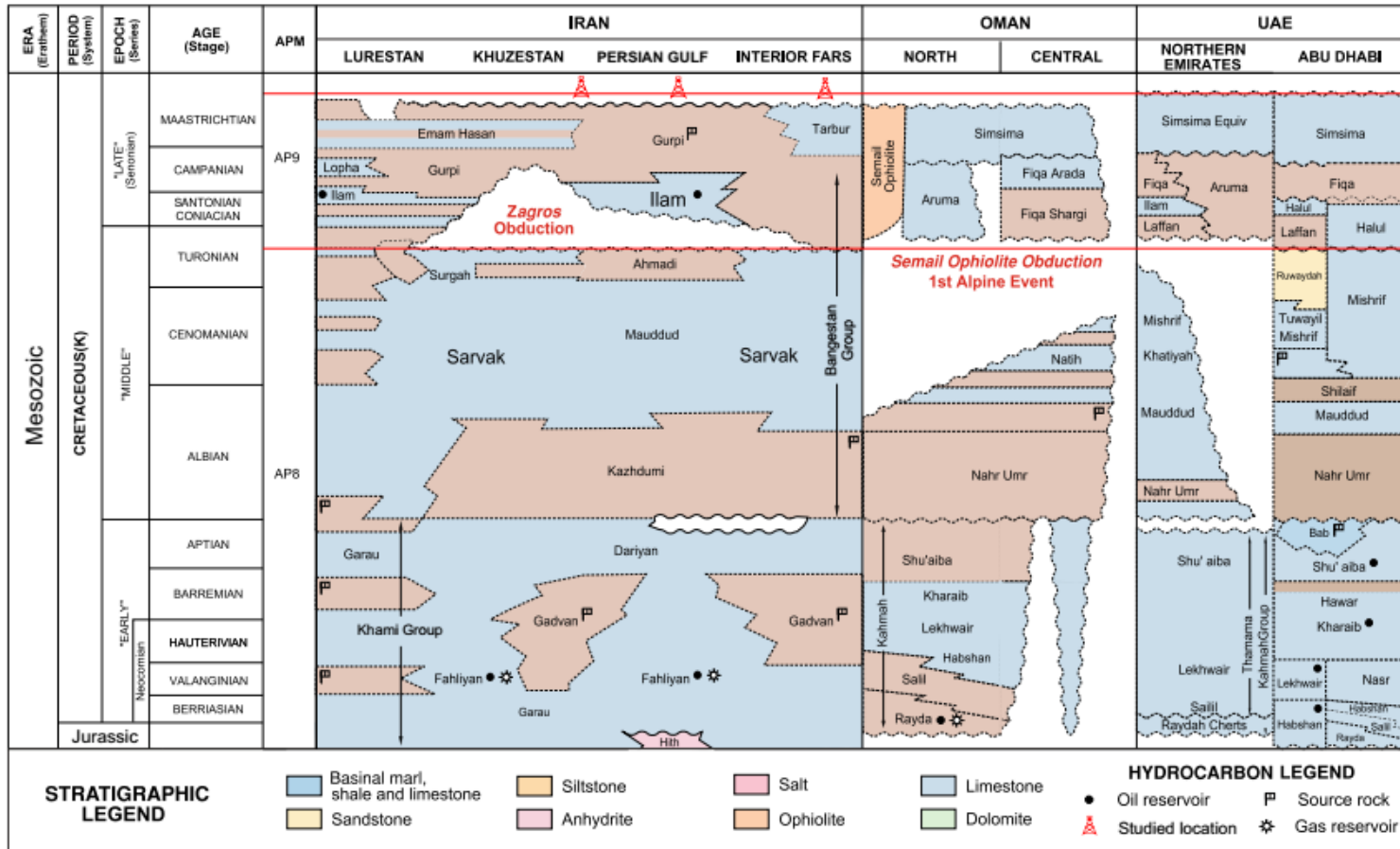
Field survey in coastal area of Siraf and Nayband showed that the Siraf ancient port is subsiding while Nayband coastal area is uplifting. Is there a coastal fault here and is this fault responsible for the historical earthquake?



The bottom topography of the Persian Gulf is very complicated due to its epicontinental nature. There is not any detailed hydrographic map of the PG. However, some circle shape depressions have been detected in some areas of the Persian Gulf such as in front of Siraf and in the strait of Hormuz. Are these depressions sink holes and can the collapse of the sea floor generate tsunami waves?



The Possibility of Atypical Tsunami Occurrences in the Persian Gulf (?)

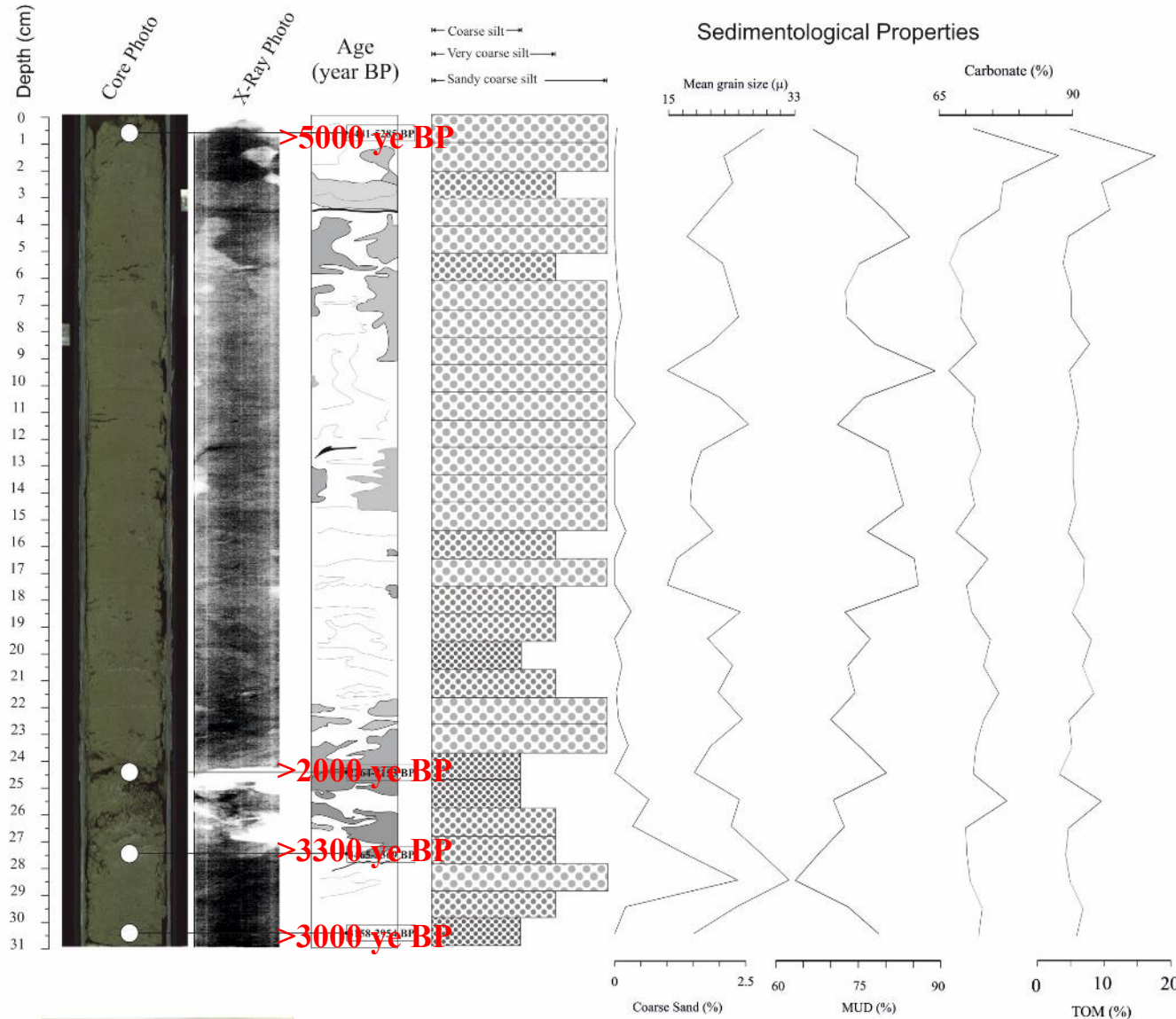
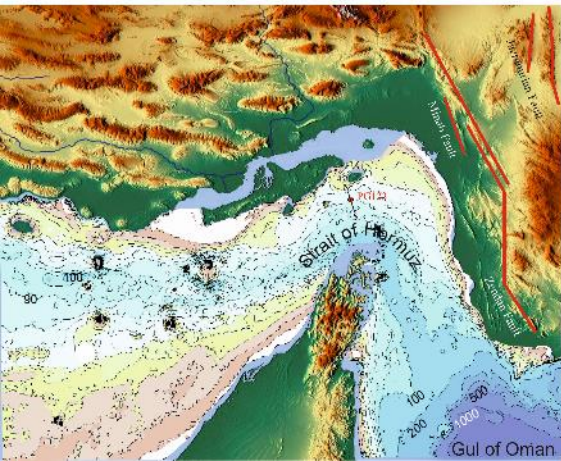
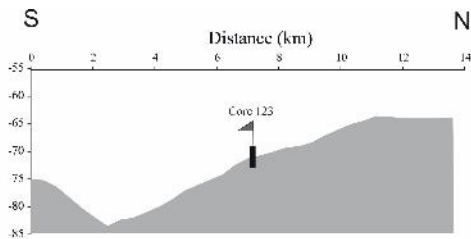


Stratigraphy of the Cretaceous successions in different parts of the Persian Gulf (Mehrabi et al., 2015).

The vast and thick limestone, anhydrite and salt formations in the Persian Gulf are susceptible for karstification and collapse.

The Possibility of Atypical Tsunami Occurrences in the Persian Gulf (?)

Agitation of bottom sediments of the Strait of Hormuz. The evidence of earthquake and liquefaction? Submarine landslide? Or collapse?



Conclusion

- 1- Although, theoretically, Persian Gulf is not susceptible for having tsunami, paradoxically, there are some historical accounts on tsunami-like waves at least in Siraf ancient port in the early 11th century.
- 2- the occurrence of meteo-tsunami in 2017 in Dayyer, Iran, shows that the Persian Gulf is susceptible for receiving tsunami-like waves from climatic sources .
- 3- Sedimentological, geomorphological and archaeological evidence show that submarine and coastal landslides could be considered as other sources of tsunami in the Persian Gulf.
- 4- Formation of submarine sink-holes and sea floor collapse due to karstification processes should be taken in considerations as a possible source of tsunami in the shallow basin.

Proposition

According to the vast investment in coastal areas of the Persian Gulf and rapidly development of the coastal area in terms of urban and industrial development, considering any natural hazard that threatens the infrastructures is vital, even the possibility of the threats is low. Apart from meteo-tsunami that is local, other geological sources such as sea floor collapse and landslides could threaten all the coastal areas.

It is suggested that scientists from the rim countries of the Persian Gulf work on the possible evidence of past tsunami-like events in the framework of a joint project.