Geophysical Research Abstracts
Vol. 16, EGU2014-10951, 2014
EGU General Assembly 2014

Tsunamigenic seismic sources characterization in the Zagros fold and thrust belt. Implications for tsunami threat in the Persian Gulf

José A. Álvarez-Gómez (1), Laura Martínez Parro (1), Íñigo Aniel-Quiroga (2), Mauricio González (2), Sultan Al-Yahyai (3), Jara Martínez (2), Fernando Méndez (2), Ana Rueda (2), and Raul Medina (2)

(1) Universidad Complutense de Madrid, Geodinámica, Madrid, Spain (jaalvare@geo.ucm.es), (2) Environmental Hydraulics Institute IH Cantabria, Universidad de Cantabria, C/Isabel Torres no. 15, Parque Científico y Tecnológico de Cantabria, 39011 Santander, Spain, (3) Meteorological Department, Directorate General of Meteorology and Air Navigation. Ministry of Transport and communication, Sultanate of Oman

Although in the recent history of the Persian Gulf there is no register of relevant tsunamis, there are some historical events that could have generated destructive tsunamis and where historical descriptions of flooding are present. In 978, 1008 and 1871 destructive earthquakes occurred in the northern area of the Persian Gulf. These events where greatly felt by the population, killing hundreds of people, and generating flooding according to descriptions. One problem regarding the historical register is the scarce population in the area of the Zagros coast. In the present, the seismic activity of the area is very high, occurring frequently earthquakes of magnitude greater than 6, specially at the southeastern edge of the Zagros. The active Zagros fold-thrust belt lies on the northeastern margin of the Arabian plate, on Precambrian (Pan African) basement. This is a young (Pliocene) fold-thrust belt currently undergoing 10$\pm$4 mm yr^{-1} shortening and thickening as a result of collision of the Arabian and central Iranian plates. As part of the Alpine–Himalayan mountain chain, extends for more than 1500 km in a NW–SE direction from eastern Turkey to the Minab–Zendan–Palami fault system in southern Iran. This belt results from the closure of the Neo-Tethyan ocean due to a northeast-dipping subduction below the Iranian microcontinent. The subsequent collision beginning in the Neogene between the Arabian Plate and the Iranian Block. The orientation of the fold-and-thrust belt changes along the Zagros Zone from NW-SE strikes towards the northwest, to E-W strikes towards the east, in the Strait of Hormuz. The north–south plate convergence is accommodated in the NW of the Zagros by a combination of NW–SE-trending folds and thrusts, and right-lateral motion along NNW-SSE strike-slip faults. This style of strain partitioning is not present in the east of the Zagros, where east-west-oriented thrusts and folds take up the shortening. We used the tectonic mapping of Berberian (1995) and Blanc et al. (2003) to estimate the maximum earthquake based on the maximum mapped active fault length. A maximum length of 110 km is obtained. According to the scaling relations of Blaser et al. (2010) or Wells and Coppersmith (1994) it is equivalent to an M 7.75 earthquake. We simulate the tsunami wave propagation generated using the COMCOT model (based on the shallow water equations). This worst case earthquake could generate destructive tsunamis with Maximum Wave Elevations above 1.5 meters, which implies run-up elevations $\sim$ 3 – 4 meters.