Geophysical Research Abstracts
Vol. 21, EGU2019-5839, 2019
EGU General Assembly 2019


# Active thrust-wrench tectonic interference offshore SW Iberia (Eurasia - Nubia plate boundary, NE Atlantic): potential seismogenic and tsunamigenic source of the 50 years old 1969 Mw 7.9 earthquake

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The Gulf of Cadiz domain, along the Eurasia - Nubia plate boundary in NE Atlantic, has been recently recognized as a key area for the occurrence of thrust-wrench tectonic interference (Terrinha et al., 2009). Along this specific segment, the general dextral transcurrent kinematics that characterizes this plate boundary, between the Azores and the Strait of Gibraltar (Azores-Gibraltar Fracture Zone), gives place to a tectonically diffuse accommodation scenario involving large scale strain partitioning along two main active fault systems: a) a NW verging thrust system; and b) a WNW-ESE right-lateral strike-slip fault system (SWIM fault system).

Thrust-wrench tectonic interference occurs at places where active faults from both these systems intersect, such as in the Horseshoe abyssal plane where the 1969 Mw 7.9 earthquake (Fukao, 1973) is thought to have occurred. This year (2019) marks the 50th anniversary of this big earthquake, regardless, its tectonic seismogenic source and its potential capacity for generating tsunami remain largely unknown. One critical problem is the apparent lack of congruence between local seismic data (e.g. epicentre distribution at depth, Geissler et al., 2010) and mapped active tectonic structures (based on seismic reflection profiles and multi-beam swath bathymetry), besides the absence of any bathymetric expression of potentially implicated active structures.

In the present work, we use analogue modelling results of active thrust-wrench fault interference to show that different fault rupturing scenarios implied by the investigated tectonic-structural pattern are congruent with earthquake magnitudes in the order of the one ascribed to the 1969 event in this location. Furthermore, we evaluate the tsunamigenic potential of these scenarios, through the use of non-linear shallow water numerical modelling to address the induced tsunami hazard (expressed in terms of maximum tsunami wave heights distribution, tsunami energy patterns, and waveforms at selected coastal locations). We further compare the obtained results with the previously reported tsunami data for the 1969 event, exploring the ensuing overall consequences in terms of regional seismogenic - tsunamigenic hazards.

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Acknowledgements:

Publication supported by FCT- project UID/GEO/50019/2019 - Instituto Dom Luiz. Duarte also benefits

from an FCT Researcher Grant (IF/00702/2015).