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TSUNAMIGENIC STRUCTURES IN THE GULF OF CADIZ AND THE WORKFLOW FOR TSUNAMI HAZARD ASSESSMENT

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The southwestern margin of the Iberian Peninsula, which includes the Gulf of Cadiz, is characterized by a present-day active deformation mainly driven by the NW-SE trending convergence (3.8-5.6 mm.yr-1) between the Nubia and Eurasia plates. The SW Iberian margin is a seismogenic area characterized by low to moderate magnitudes (Mw ≤ 5.5). In addition, this area hosts some of the largest earthquakes occurred in Western Europe, such as the 1st of November 1755 Lisbon Earthquake and tsunami (Mw ≥ 8.5). The active fault structures can be classified in two main families: a) WNW-ESE trending dextral strike-slip faults, and b) NE-SW trending thrusts faults. To characterize the seismogenic and tsunamigenic potential of each fault system, we develop several tsunami models. The workflow involves the following tasks: 1. Interpretation of the seismic profiles (in time) defining the traces of main active faults; 2. Mapping the trace of the faults using multibeam bathymetry; 3. Mesh of the fault surface and their respective horizons to generate a 3D model of the subsurface for each fault; 4. Conversion of the 3D model from time-to-depth assigning a velocity value (i.e. from available velocity models of the area) to the interval between horizons; 5.Defining the specific attributes for each fault, such as Length, Width, Depth, Strike, Dip and Rake; 6. Determine the maximum magnitude and slip for each fault. The maximum magnitude should be compatible with the length and the width previously defined, so we use the Leonard (2014) scaling-law; 7. Finally, the tsunami simulations for each fault have been run using "Tsunami-HySEA" software. We run two simulations for each fault, the first one considering the fault as an inclined planar surface and the second simulations used the 3D mesh.

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INTRAPLATE LATE QUATERNARY TECTONIC ACTIVITY OF THE MARIÁNSKÉ LÁZNĚ FAULT (CHEB BASIN, CZECH REPUBLIC) DOCUMENTED ON A SITE WITH SURFACE FAULT COMPLEXITY

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Mariánské Lázně fault (MLF) is a NW-SE striking, morphologically pronounced structure in western Bohemian Massif (Czech Republic), which controls the eastern limit of the Cheb-Domažlice graben. The northern segment of the MLF limits the Cenozoic Cheb basin on the east, which is superimposed on the western part of the NE-SW trending Eger Rift. The Cheb basin is well-known for present-day earthquake swarm seismicity (max. ML=4.6), Quaternary volcanism and mantle-derived CO2 emanations. We carried out 3D paleoseismic survey at the Kopanina site to decipher Quaternary tectonic activity of the MLF. We excavated 4 fault-crossing, 3 fault-parallel trenches, and 6 hand-dug microtrenches, which was preceded and accompanied by geophysical survey to extend geological information obtained from trenches laterally and more to the depth. The 2D and 3D geophysical survey included electric resistivity tomography and ground penetration radar. The trenches revealed a complex geology and deformation probably as a result of right-lateral transpression during Late Quaternary. The MLF seems to be expressed here by several fault splays active during different geological times. The youngest observed faulting occurred during two earthquakes of suggested minimum magnitude Mw=6.3–6.5 and displacing Holocene deposits of the age interval 5.3-1 ka BP. The latter earthquake occurred around 1000 years ago. First attempt to analyse the catalogues of historic earthquakes to match a recorded historic event suggests 998 AD with assessed M6.2 with epicentre near Chomutov (70 km from the trenching site). So it is a historical event and the youngest geologically proved surface faulting in central Europe reported so far, and crucial for re-assessment of seismic hazard.