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Human losses and damage expected in future earthquakes in Faial Island - Azores applying the QLARM tool.

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QLARM (http:// qlarm.etzh.ch) is a second generation tool to estimate building damage and human losses due to earthquakes, developed jointly by WAPMERR and the Swiss Seismological Service. In 2009 WAPMERR distributed 76 earthquake alerts in real time. The tool can be used to calculate expected human losses in future earthquakes in countries where it has been calibrated.

In the last thirty years, the Azores islands were struck by several earthquakes with the following being the most important ones. The 1980 Terceira island earthquake Mw7.2 caused 61 deaths, hundreds of injuries and buildings were heavily damaged. The 1998 Faial island earthquake, Mw 6.1, caused 8 deaths a few hundred injuries and in some settlements buildings were heavily damaged. Faial Island was also affected by the 1926 and 1958 earthquakes. The latter event occurred during an eruption and caused heavy damage to the building stock but there were no fatalities and only few injuries.

To estimate human losses and buildings for future likely earthquakes in Faial and in the rest of the Azores we need to calibrate QLARM and establish the following parameters: a) distribution of population by settlement; b) distribution of building stock and population into vulnerability classes of the EMS-98 classes, and c) attenuation function and soil amplification. Because of the special tectonic environment we paid special attention to the attenuation relation. Damage and human losses are obtained from 1) vulnerability models pertinent to EMS-98 vulnerability classes, 2) building collapse rates pertinent to Faial is derived from the validation of past earthquakes that occurred on the island, and 3) casualty matrices pertinent to EMS-98 vulnerability classes.