

OGS-CRS project proposal to PhD Position

Title: Selected events in NE Italy: GMP, ShakeMap and update of the OGS OASIS Database.

After the strong earthquake of magnitude $M=6.4$ occurred in Friuli in 1976, the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS, Italian National Institute for Oceanography and Experimental Geophysics) started to operate the Northeastern Italy (NI) Seismic Network. Since that time, OGS has installed stations in NE Italy, from Garda Lake to the border with Slovenia. In 1994 the network was substantially improved with the installation of digital good-quality acquisition system. Data from the network are available on the OASIS database (<http://oasis.crs.inogs.it>), the OGS archive system, where waveforms and information concerning the seismological sites are stored.

Since the new digital period of the OGS Seismometric Network, a large number (more than 50) of events of magnitude higher than 4.0 occurred in the NE Italy and border region.

In this context, the OGS is looking for a PhD position to include in the CRS Dept., which is the reference for the seismic monitoring of Northeastern Italy. The candidate will update the OGS OASIS database including the waveforms and the strong ground motions parameters of selected event, with the revision of metadata (site characterisation). Starting from the sites with more recordings, new geophysical data will be acquired to define the soil class and the site response of the OGS network, defining the V_s profile and the fundamental frequency. ShakeMaps will be generated for those earthquakes ($M_I > 5.0$) occurred in NE Italy when the OGS stations were operative and the extracted PGM values could improve the estimation of the ground motion. The candidate will utilize the configurations proposed by Michellini et al. (2008) and validated for Italy while the PGM observations will be retrieved from available databases: OASIS (Priolo et al., 2015), ITACA (Luzi et al., 2008; Pacor et al., 2011) and ESD (Ambraseys et al., 2004). The ShakeMaps for the 1998 Bovec event was already generated by Moratto et al. (2009) utilizing the signals retrieved from ESD but the integration with the OGS data could improve the accuracy of the final results. Further, the comparisons with the ShakeMaps proposed by Moratto et al. (2011) who utilized the synthetic seismograms for the same earthquake can be useful to validate the shaking in NE Italy. Finally, the candidate will compare predictions from probabilistic seismic hazard maps and the recorded strong ground motion for the selected events.

Expected Results

1. updating the OGS database OASIS with revision of the metadata (site characterization);
2. strong-motion parameters (PGA, PGV, Arias Intensity, Housner Intensity) for selected events;

3. shakemap for selected events
4. comparison between observed data and predictions from probabilistic seismic hazard maps for five selected events in the NE Italy.

References:

- Ambraseys, N.N., Smit, P., Douglas, J., Margaris, B., Sigbjornsson, R., Olafsson, S., Suhadolc, P.,
- Luzi, L., S. Hailemichael, D. Bindi, F. Pacor, F. Mele, and F. Sabetta (2008), ITACA (ITalian ACcelero-metric Archive): A Web Portal for the Dissemination of Italian Strong-motion Data, *Seismological Research Letters*, 79(5), 716–722. Doi: 10.1785/gssrl.79.5.716
- Michelini, A., L. Faenza, V. Lauciani, and L. Malagnini (2008). ShakeMap implementation in Italy, *Seism. Res. Lett.* 79, 688–697.
- Moratto, L., Costa, G., Suhadolc, P., 2009. Real-time generation of ShakeMaps in the Southeastern Alps. *Bull. Seismol. Soc. Am.* 99, 2489–2501.
- Moratto, L., Suhadolc, P., Costa, G., 2011. ShakeMaps for three relevant earthquakes in the South-eastern Alps: Comparison between instrumental and observed intensities. *Tectonophysics*, 509, 93–106.
- Pacor, F., R. Paolucci, L. Luzi, F. Sabetta, A. Spinelli, A. Gorini, M. Nicoletti, S. Marcucci, L. Filippi, and M. Dolce (2011), Overview of the Italian strong motion database ITACA 1.0, *Bull Earthquake Eng*, 9(6), 1723–1739. Doi: 10.1007/s10518-011-9327-6
- Priolo E., G. Laurenzano, C. Barnaba, P. Bernardi, L. Moratto, A. Spinelli (accepted). OASIS - The OGS Archive System of Instrumental Seismology. *Seism. Res. Lett.*, 86 (3), 978–984 + esupp, doi: 10.1785/0220140175.