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Empirical Green's Function Technique for Accelerogram Synthesis: The Problem of the Use for Marine Seismic Hazard Assessment

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Abstract : Instrumental seismological researches in water areas are complicated and expensive, that leads to the lack of strong motion records in most offshore regions. In the same time the number of offshore industrial infrastructure objects, such as oil rigs, subsea pipelines, is constantly increasing. The empirical Green's function technique proved to be very effective for accelerograms synthesis under the conditions of poorly described seismic wave propagation medium. But the selection of suitable small earthquake record in offshore regions as an empirical Green's function is a problem because of short seafloor instrumental seismological investigation results usually with weak micro-earthquakes recordings. An approach based on moving average smoothing in the frequency domain is presented for preliminary processing of weak micro-earthquake records before using it as empirical Green's function. The method results in significant waveform correction for modeled event. The case study for 2009 L'Aquila earthquake was used to demonstrate the suitability of the method. This work was supported by the Russian Foundation of Basic Research (project № 18-35-00474 mol_a).

Keywords : accelerogram synthesis, empirical Green's function, marine seismology, microearthquakes
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