An investigation of methods for Fault Displacement Hazard Assessment for offshore studies

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The expected surface displacement in the aftermath of an earthquake is an important issue to consider, among others, for pipeline damage. While estimates of permanent ground deformation after an earthquake event is often performed nowadays through the acquisition of Interferometric Synthetic Aperture Radar (InSAR) scenes, this method is only applicable to onshore regions.

In this work we explore possible methodologies for fault hazard assessment to be applied in offshore regions.

Methods to estimate the surface rupture hazard for faults of known location and geometry are reviewed, such as the Okada equations available in the Coulomb3 software. However since fault data may be lacking or scarce in offshore areas we also explore the availability of methods to estimate a probabilistic surface rupture assessment, to be applied within the same framework of Probabilistic Seismic Hazard Assessment studies. A simple application of both methods is presented in a hypothetic case study where an early warning system for pipeline damage inspection is required.