



Earth Observation space techniques for seismic hazard mitigation and plate dynamic studies

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A new approach based on Earth Observation (EO) space techniques, GNSS (Global Navigation Satellite System) and SAR (Synthetic Aperture Radar), and on geophysical and seismological methods, is being implemented, under the support of Italian Space Agency. This approach overcomes the difficulties encountered in usual seismic hazard estimates, based on the traditional probabilistic approach, and opens new routes in the modelling and understanding of the dynamics of Italian fault zones, which show unique characteristics, such as shallow normal faulting. Synergic use of GNSS and Geophysical Forward Modelling (GFM) deformation maps at the national scale and pattern recognition approaches complement the information gained from purely statistical analyses of earthquake historical records. In such a way the rules of seismic hazard estimate in terms of observational data and of sound physical methodologies are established, also considering state of the art lithosphere-asthenosphere structures. Both GNSS and SAR techniques, at the smaller spatial scale of the seismogenic zones, coupled with expressly developed models for post-seismic and interseismic phases within proper inversion and assimilation schemes, allow us to retrieve the deformation style and stress evolution within the seismogenic zones, providing the tools for establishing warning criteria based on deterministic grounds, once completed with earthquake scenarios based on rigorous forward models. Both at the national scale of Italy, and at the scale of selected seismogenic zones, the potential impact of the new approach with respect to traditional schemes is portrayed.