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Testing geospace technologies for alerting large earthquakes: An integrated approach of space and ground observations

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The most recent catastrophic earthquakes (Nepal 2015, Japan 2011, Haiti 2010, China 2009, Pakistan 2007 and Sumatra 2004) claimed thousands of lives and caused extensive economic losses in the affected region. The science community is seeking new ideas in the development of earthquake hazard mitigation scheme. We are proposing a scheme requiring interdisciplinary which has the latest Geo-space and remote sensing technology based on multi platform data observations. A new multi-sensory approach of analyzing atmospheric and ionospheric signals and the search for pre-earthquake physical phenomena, which is being developed using geospace sensing techniques and ground data segments. This new approach is still in an early stage of testing and is based on data fusion of satellite thermal observations (LEO, GEO) in conjunction with GPS/TEC (GNSS) and ground multi parameter (seismicity patterns, gas content) continuous measurements. The proposed methodology uses existing satellite sensors and ground observations in one integrated Sensor Web framework defined by the Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) concept. Our initial test results show that simultaneous satellite and ground measurements, used as an integrated web, could provide earthquake short-term alert capabilities (several days) for major earthquakes by combining the information from multiple space born platforms. The significance of initial prospective testing of short-term alerts is discussed within the framework of the latest M 7.9 earthquake in Nepal and major activities in 2012-14.

Biography

Dimitar Ouzounov is an Associate Professor at Chapman University. He works as a Research Scientist in geo-physics, satellite earth observations, and geo-computing. He conducts research on utilizing near-space earth observations for studying geodynamics processes. He contributed in validation of the new geophysical theory of lithosphere-atmosphere-ionosphere coupling in relation to earthquake processes. He has coordinated international initiatives on utilizing space-borne and ground observations for earthquake hazard risk assessments. He has won multiple NASA grants and has published more than 150 papers. He teaches satellite applications in natural hazards at Chapman University. He is a Keynote speaker at international conferences.

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