The ESA Geohazard Exploitation Platform

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Earthquakes represent one of the world's most significant hazards in terms both of loss of life and damages. In the first decade of the 21st century, earthquakes accounted for 60 percent of fatalities from natural disasters, according to the United Nations International Strategy for Disaster Reduction (UNISDR). To support mitigation activities designed to assess and reduce risks and improve response in emergency situations, satellite EO can be used to provide a broad range of geo-information services. This includes for instance crustal block boundary mapping to better characterize active faults, strain rate mapping to assess how rapidly faults are deforming, soil vulnerability mapping to help estimate how the soil is behaving in reaction to seismic phenomena, geo-information to assess the extent and intensity of the earthquake impact on man-made structures and formulate assumptions on the evolution of the seismic sequence, i.e. where local aftershocks or future main shocks (on nearby faults) are most likely to occur.

In May 2012, the European Space Agency and the GEO Secretariat convened the International Forum on Satellite EO for Geohazards now known as the Santorini Conference. The event was the continuation of a series of international workshops such as those organized by the Geohazards Theme of the Integrated Global Observing Strategy Partnership. In Santorini the seismic community has set out a vision of the EO contribution to an operational global seismic risk program, which lead to the Geohazard Supersites and Natural Laboratories (GSNL) initiative. The initial contribution of ESA to suuport the GSNL was the first Supersites Exploitation Platform (SSEP) system in the framework of Grid Processing On Demand (GPOD), now followed by the Geohazard Exploitation Platform (GEP).

In this presentation, we will describe the contribution of the GEP for exploiting satellite EO for geohazard risk assessment. It is supporting the GEO Supersites and has been further expanded to address broader objectives of the geohazards community. In particular it is a contribution to the CEOS WG Disasters and its Seismic Hazards Pilot and terrain deformation applications of its Volcano Pilot.

The geohazards platform is sourced with elements – data, tools, and processing– relevant to the geohazards theme and related exploitation scenarios. For example, platform provides access to large SAR data collections and services to support SAR Interferometry (InSAR), in particular the Persistent Scatterer Interferometry (PSI) and Small Baseline Subset (SBAS) techniques, to provide precise terrain deformation. The GEP includes data coming from the ENVISAT ASAR and ERS archives, already hosted in the ESA clusters and in ESA's Virtual Archive and further extended to cover the requirements of the CEOS Pilot on Seismic Hazards. The GEP is gradually accessing Sentinel-1A data alongside with EO data from other space agencies with an interest in the geohazard exploitation platform. Further to this, the platform is intended to be available in the framework of the European Plate Observing System (EPOS) initiative, in order to help its users exploit EO data to support solid Earth monitoring and geophysical and geological analysis.