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Integrated application of Remote sensing and Cultural heritage : the EO4GEO project scenarios

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EO4GEO is an Erasmus+ Project aiming at applying innovative solutions for education and training actions. EO4GEO will define a long-term and sustainable strategy to fill the gap between supply of and demand for space/geospatial education and training. The general project strategy will be implemented by: creating and maintaining an ontology-based Body of Knowledge for the space/geospatial sector; developing and integrating a dynamic collaborative platform; designing and developing a series of curricula and a rich portfolio of training modules directly usable in the context of Copernicus and other relevant EO programs; conducting a series of training actions, to test and validate the approach, for selected scenarios in three sub-sectors: 1) Integrated Applications, 2) Smart Cities, 3) Climate Change. ISPRA will contribute to the sub-sector Integrated Applications through the implementation of four case studies selected considering geo-hazard risk scenarios affecting different categories of exposed elements: i) landslide on linear infrastructure and transportation network (Petacciato village, CB); ii) instability events affecting Cultural Heritage, (Baia Archaeological Park, NA); iii) subsidence in urban area (Como city), iv) co-seismic ground deformation (Mt. Etna). The geo-hazard risk scenarios have been selected considering data availability and stakeholders interest; geo-hazard experts and final users (both public and private) will be involved during the scenario's implementation. Here we present the preliminary results concerning one of the listed case studies, slope instability affecting Cultural Heritage site: the Baia Archaeological Park (Naples). This area is located close by the Phlegrean Fields caldera, representing a unique example of volcanic-related subsidence with unrest cycles characterized by intense ground uplift and down lift; it extends exactly along the inner side of the western sector of the volcanic building of Baia. The particular location of the site, along the steep internal slopes of the volcano, required a strong control over the area development with massive terracing works. The instability phenomena seem to be related to the very high acclivity values of top sector of the slope favoring the activation of modest collapse phenomena as well as by ordinary management and maintenance of the area (e.g. invasive vegetation, absence of drainage systems). Preliminary InSAR analysis were performed exploiting ERS and COSMO Sky-Med datasets; the first dataset show ground lowering phenomena, highlighting that subsidence affected areas close Phlegrean Fields during that period (1993 – 2003). The deformation rates (5-10 mm/yr) recorded in the investigated time interval are consistent with the general down lift cycle, while time series show some small uplift events. Forthcoming InSAR data processing will take into consideration the most recent SENTINEL-1 data, allowing us to assess the instability phenomena evolution of the area in a recent

time interval. In the general scope of the EO4GEO project ISPRA will develop all the case studies fostering the uptake of EO data, services and standardized methodologies of analysis. Available EO data provided from different satellite missions, both European and international (e.g. Sentinel from Copernicus program, COSMO-Sky-Med from ASI), will be tested to evaluate their effectiveness and efficiency in the field of geo-hazard monitoring and risk assessment.