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Development of a monitoring platform for slope instability and sliding prevention : preliminary results

G. Drakatos (1), D. Paradissis (2), D. Anastasiou (2), P. Elias (3), A. Marinou (2), K. Chousianitis (1), X. Papanikolaou (2), V. Zacharis (2), P. Argyrakis (1), K. Papazisi (2), and K. Makropoulos (1)

(1) National Observatory of Athens, Institute of Geodynamics, Athens, Greece, (2) Dionysos Satellite Observatory – Higher Geodesy Laboratory, School of Rural and Surveying Engineering, National Technical University of Athens, (3) Institute for Space Applications and Remote Sensing, National Observatory of Athens

Land sliding, as a consequence of slope instability, constitutes a natural catastrophe resulting mainly from geological cause often followed by disastrous impact on both the natural and man-made environment. The reasons causing land slides can vary from purely geological factors, to other relevant or not natural catastrophes, urban or residential expansion, tourist growth in areas under inappropriate geological background, or even a combination of the aforementioned causes The respective consequences, also span a wide range of negative impacts, both for the man-made (e.g. destruction of transportation infrastructure, constructions and urban or sub-urban areas) and the natural environment. Unfortunately, prevention of land slides is still largely ineffective adding to an inefficient and inadequate addressing of the problem, mainly due to the lack of systematic monitoring of such regions and due to the fact that “treatment” overwhelms “prevention”.

Recent developments in Global Navigation Satellite Systems (GNSS), Satellite Geodesy and satellite differential interferometry (DinSAR), have established these fields as fully equipped, from a scientific and engineering perspective, to act –either as autonomous techniques or in conjunction– as prevention and/or early warning systems. Such state-of-the-art technology was implemented, in a project undertaken by the Institute of Geodynamics Dionysos Satellite Observatory/Higher Geodesy Laboratory and the Institute for Space Applications and Remote Sensing, in order to evaluate the potential of monitoring slide stability and the assessment of hazard evaluation. Therefore, for the first time in Greece, an attempt was made to develop a monitoring platform for slope instability and sliding prevention at two of the most hazardous, regarding soil instabilities, regions of Peloponnese, namely Sellas and Chalkio (in Messinia and Korinthia respectively). GPS campaigns were carried through, cGPS stations were installed and a network of artificial corner reflectors was established, providing a combination of satellite data, which were in turn analyzed and integrated. In the current study, all relevant activities regarding data collection/acquisition and respective processing are presented, followed by the induced (still preliminary at this point) results.