



Monitoring of lateral spreading phenomena along the north-west coast of Malta using the GPS technique

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The north-west coast of Malta displays excellent examples of lateral spreading phenomena, with implications of landslide hazard. The geological formations provide the ideal conditions for the occurrence of this type of landslide since the Upper Coralline Limestone, being a brittle formation, overlies the Blue Clay, the latter being a deforming mass of a softer type of material. This situation is further aided by the different hydrogeological conditions since the limestone is permeable allowing the infiltration of water, whereas the Blue Clay retains water, leading to unstable conditions.

Three field sites have been selected after performing field observation and consulting aerial photos to conduct detailed field investigation, namely geomorphological mapping at a scale of 1: 2500 and monitoring of the landslides using the GPS technique. The three sites include Il-Prajjet, Rdum id-Delli and Ghajn Tuffieha Bay, and provide the best examples of lateral spreading phenomena in Malta from a scientific point of view. Besides the sites also present issues of hazard and risk with regards to the location of a popular tourist attraction and a coastal tower built for defence purposes in 1637.

A GPS network has been installed in September 2005 at the three field sites to determine any displacement in the landslides and the state of activity of lateral spreading. Twenty four benchmarks have been installed in the unstable areas and at each field site a reference point has been set up in a fixed and stable area. Static relative positioning technique has been used to achieve the highest accuracy. Two GPS surveys are scheduled for April and September 2006. Comparing the baselines between the benchmarks and reference points measured in each survey, any displacements caused

by lateral spreading can be quantified for each benchmark with millimeter accuracy.