



On the application of TOPSAT for the rapid assessment of landslide impacts

D.N. Petley, S.A. Dunning and N.J. Rosser

International Landslide Centre, Durham University, Durham, United Kingdom
(d.n.petley@durham.ac.uk / Phone: +44-191 3341909)

TOPSAT is a new micro-satellite system that has been designed and built by a consortium led by Qinetiq Ltd to provide low cost, high resolution images of the Earth. TOPSAT has four spectral bands, consisting of a pan band with a spatial resolution of 2.5 m and RGB bands with a spatial resolution of 5.0 m. The image size is 17 km x 17 km. A key feature of TOPSAT is the potential for the satellite to deliver data directly to a mobile ground station immediately after an image has been obtained. As such it is potentially an extremely useful tool for the determination of the impact of natural disasters such as floods, landslides and earthquakes.

In this study, the capabilities of TOPSAT have been tested in the context of two landslide events, courtesy of Qinetiq and the Topsat team. First, an image was collected of the Hattian Bala area of Kashmir in October 2006. The area of this image is that of a large valley-blocking landslide that was triggered in the October 2005 Kashmir earthquake. Since emplacement of the landslide debris a lake has been impounded behind the landslide dam. The image was collected to allow assessment of the state of the lake, of the adjacent slopes and of the landslide scarp itself, with a particular focus on change as a result of the 2006 South Asian monsoon rainfall. The second example is from North Korea, where the aftermath of Typhoon Bilis tracked across the centre of the country in July 2006. Widespread damage in the form of both floods and landslides was reported, but had proven difficult to verify.

In both cases both multispectral and pan data were collected. The imagery proved capable of allowing assessment of the damage in both cases, including the occurrence and reactivation of landslides; flood damage; the destruction of buildings; the construction of new structures; and, in the case of Hattian, the height of the lake.

Thus, TOPSAT has proven to be an effective tool in the valuation of damage associated with natural hazard events. The comparatively low cost, the potential for the acquisition of images immediately after an event, and the potential for delivery of that data directly to a mobile receiving station in the affected area means that it represents a substantial improvement in the capacity for disaster response.