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Erosion processes of the collapsed mass of the gigantic landslide of Mt. Bawakaraeng, Sulawesi, Indonesia in 2004 revealed by multi-temporal satellite images

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On March 26, 2006, a gigantic landslide occurred on the caldera wall of Mt. Bawakaraeng, Indonesia. This paper quantitatively shows the temporal change in gully erosion and sediment yield from the huge amount of the deposit of the landslide by analyzing satellite images. Firstly, the landslide buried the original river channel completely. In the next year, gully erosion dominated the entire landslide deposit, and parts of the gully bed were found to have eroded by up to 60 m. The total amount of sediment discharged from the landslide deposit was estimated to be 36 million m3. In the second year after the landslide, the severe widespread degradation almost ceased and river bed aggradation started to occur in some places. The total amount of discharged sediment drastically decreased and was estimated to be 8.3 million m3. In the third year, the total amount of sediment discharge declined further. On the other hand, satellite-derived DEMs showed that the width of gullies has increased. The drastic decrease in sediment discharge might have occurred because of the reduction in the erosive force applied by water flow whose depth was inevitably reduced as a result of the widening of gully channels.