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Preliminary Study of Ground Movement in Prone Landslide Area by Means of MAI InSAR A Case Study: Ciloto, West Java, Indonesia

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Ciloto is one of the most prone landslide hazard areas in Indonesia. Several landslides in 2012 and 2013 had been recorded in Ciloto and damaged infrastructure around the area. Investigating the history of ground movement along slope area before the landslide happened could support the hazard mitigation in the future. Considering to an efficient surveying method, space-borne SAR processing is the one appropriate way to monitor the phenomenon in past years.

The purpose of this study is detecting ground movement using multi-temporal synthetic aperture radar images. We use 13 ALOS PALSAR images from 2007 to 2009 with combination Fine Beam Single (FBS) and Fine Beam Double (FBD) polarization to investigate the slow movement on slope topography. MAI (Multiple Aperture Interferometry) InSAR method is used to analyze the ground movement from both line-of-sight and along-track direction. We split the synthetic aperture into two-looking aperture so that along-track displacement could be created by the difference of forward-backward looking interferograms.

With integration of both methods, we could more precisely detect the movement in prone landslide area and achieve two measurements produced by the same interferogram. However, InSAR requires smaller baseline and good temporal baseline between master and slave images to avoid decorellation. There are only several pairs that meet the condition of proper length and temporal baseline indeed the location is also on the agriculture area where is mostly covered by vegetation.

The result for two years observation shows that there is insignificant slow movement along slope surface in Ciloto with -2 - -7 cm in range looks or line of sight and 9-40 cm in along track direction. Based on geometry SAR , the most visible detecting of displacement is on the north-west area due to utilization of ascending SAR images.