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Potential Deep Seated Landslide Mapping from Various Temporal Data – Benchmark, Aerial Photo, and SAR

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Landslide is always not hazard until mankind development in highly potential area. The study tries to map deep seated landslide before the initiation of landslide. Study area in central Taiwan is selected and the geological condition is quite unique, which is slate. Major direction of bedding in this area is northeast and the dip ranges from 30-75 degree to southeast. Several deep seated landslides were discovered in the same side of bedding from rainfall events. The benchmarks from 2002 $\sim$ 2009 are in this study. However, the benchmarks were measured along Highway No. 14B and the road was constructed along the peak of mountains. Taiwan located between sea plates and continental plate. The elevation of mountains is rising according to most GPS and benchmarks in the island. The same trend is discovered from benchmarks in this area. But some benchmarks are located in landslide area thus the elevation is below average and event negative. The aerial photos from 1979 to 2007 are used for orthophoto generation. The changes of land use are obvious during 30 years and enlargement of river channel is also observed in this area. Both benchmarks and aerial photos have discovered landslide potential did exist this area but how big of landslide in not easy to define currently. Thus SAR data utilization is adopted in this case. DInSAR and SBAS sar analysis are used in this research and ALOS/PALSAR from 2006 to 2010 is adopted. DInSAR analysis shows that landslide is possible mapped but the error is not easy to reduce. The error is possibly form several conditions such as vegetation, clouds, vapor, etc. To conquer the problem, time series analysis, SBAS, is adopted in this research. The result of SBAS in this area shows that large deep seated landslides are easy mapped and the accuracy of vertical displacement is reasonable.