**A COMPARISON OF L-BAND AND C-BAND SAR IMAGERY PERFORMANCE FOR THE STUDY OF CO-SEISMIC MOTIONS IN SOUTH-EAST ASIA**

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**ABSTRACT:** On 5-May-2014 a Mw6.3 earthquake occurred on Phayao fault in Chiangrai province in northern Thailand. We reported the result of InSAR analysis of a pair of C-band Radarsat-2 images to investigate the co-seismic motion of this earthquake. The two images of descending path were acquired on 22 March 2014 and 10 May 2014 and were processed with definite orbit. Certain deformation is revealed over the urban area of the province but the expected deformation pattern of earthquake on a strike-slip fault in the epicenter region is not present. Part of this is attributed to the viewing geometry where the approximately 45o strike of Phayao fault makes right-looking radar system in descending orbit less sensitive to the co-seismic motion. More significantly, however, the generated coherence map of pre- and post-earthquake image shows that most of the area decorrelate over the period of 49 days. This is in contrast with research results on co-seismic motion with C-band SAR images from Envisat or ERS-1/2 satellite over deserts or semi-arid areas where coherence is maintained for a much longer time. Rapid decorrelation is thus a major limiting factor of C-band SAR data in tropical areas such as south-east Asia. The potential of longer wavelength radar to mitigate decorrelation problem is demonstrated by InSAR result of 24-March-2011 Mw6.8 Tarlay earthquake on Nam Ma fault in north-east Myanmar from L-Band ALOS-PALSAR images. Coherence map of the PALSAR image pair acquired from descending orbits shows strong correlation over a comparable time interval (45 days). The co-seismic deformation field is clearly observed, leading to the estimation of fault slip and eventually the recurrence period, an important parameter in earthquake study. The two events of Tarlay and Chiangrai earthquake show that SAR system employing long wavelength radar is more preferable for applications in tropical areas.