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Present-day crustal deformation in Mindoro Island, Philippines derived from PS-InSAR and GPS data

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Mindoro Island has been proposed to be the product of ancient arc-continent collision between the Palawan microcontinental block at the Eurasian plate and the Philippine mobile belt. This island is also a transition zone from subduction along the Manila trench to a strike slip fault system. Abundant earthquakes are clustered in the northern Mindoro belonging to the Manila subduction system while seldom earthquakes are discovered in central and southern island. However, the mechanism of transition from subduction to strike slip in Mindoro Island is still unclear. In order to comprehend the characteristics of crustal deformation in the island, 8 continuous GPS observations from 2010 to 2015 and multitrack ALOS/PALSAR images from 2007 to 2011 are adopted in this area. In this study, we use the Bernese software v.5.0 to process the GPS data and the Stanford Method for Persistent Scatterers (StaMPS) for PSInSAR. The GPS horizontal velocity field relative to the station JOSE under ITRF2014 indicates that the relative motion changes northward from NNW-trend at rates of $\sim$3 mm/yr in southern island to WNW-trend at rates of $\sim$30 mm/yr in northern island. It also shows an apparent counterclockwise rotation causing by the collision-induced rotation. The averaging rotation rate is about 10.5° $\pm$ 2.4°/Myr derived from the asymmetric portion of the velocity gradient tensor. The major velocity difference ($\sim$27 mm/yr) between the northern and southern island indicates an internal strain results from the motion of unknow structures in Mindoro. The northern island was mainly characterized by a WNW-ESE extension at a rate of $\sim$180 nstrain/yr while the southern Island shows strike slip type at a rate of $\sim$5 nstrain/yr. The line of sight (LOS) velocity field from PSInSAR shows that the differences of velocity ($\sim$10 mm/yr) in the southern island are parallel to the NNW-SSE trend of the central mountain range which may be the locations of left-lateral strike-slip fault system. Following, we will further characterize the modern crustal deformation in the Mindoro Island in detail using these GPS and PSInSAR results to clarify the present-day mechanism of transition from subduction to strike slip system. In addition, because the Taiwan mountain belt is also located at the transition from subduction to collision, the comparison between these two islands is very useful for us to understand the tectonic process of the transition zone.