Geophysical Research Abstracts
Vol. 15, EGU2013-1963, 2013
EGU General Assembly 2013

GPS Observation of Crustal Deformation in the Manila Subduction Zone and Philippine Fault System

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The Manila Trench is located at the convergent boundary wherein the Sunda plate subducts eastward underneath the Philippine Sea plate. The convergence rate gradually decreases southward from about 91 mm/yr in the NW direction at the northwestern tip of Luzon to 55 mm/yr north of Mindoro. The oblique convergence has resulted in the Philippine Fault, a primary left-lateral strike-slip fault with a fault length of about 1200 km. The Philippine Fault is likely to consume most of accumulated strike-slip motion along the plate boundary. On the other hand, the thrust-slip motion is possibly taken up by seismic or aseismic fault slip on the plate interface along the Manila subduction zone. A continuous GPS array composed of 30 stations has been established in the Luzon area since 2008, including 4 stations on the islands between Taiwan and Luzon. For studying the strain partitioning along the central segment of the Philippine Fault, 56 survey-mode GPS sites were set up in 2008-2009. The continuous and survey-mode GPS data in Luzon are processed together with that from the Taiwan Continuous GPS Array and International GNSS Service (IGS) sites in the Asia-Pacific region. The derived velocity field and crustal strain rates are utilized to study the characteristics of crustal deformation along the Manila subduction zone and the Philippine Fault system. Preliminary observation results from the GPS array and their tectonic implications will be presented.