GPS and ocean-bottom seafloor measurements for Manila trench

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The Manila trench offshore Luzon Island is a possible place where the present system is effectively applicable to determine whether or not its plate interface is locked and would produce large tsunamis in the future. There are two ideas that this trench is inactive (Defant et al., 1988) or active (Taylor and Hayes, 1980), neither of the ideas cannot be supported by definite evidence. We thus propose to establish GPS network and ocean-bottom crustal deformation observation. We have developed a system that combines techniques of an acoustic ranging and kinematic GPS to monitor seafloor crustal movements. In our system the position of a seafloor transponder is determined by using a ship. Our target accuracy with the system is 2-3cm in location to detect plate motions in at least one year. We measure travel times of ultrasonic signals between a ship and transponders, and the ship location is determined by kinematic GPS. A joint use of overland GPS and ocean-bottom crustal deformation can improves significantly the coupling condition along the subduction plate boundary along the Manila trench.