Taiwan is located at the converging zone of the Eurasia Plate and the Philippine Sea Plate. The ongoing orogeny leads to tectonic motions at rates up to 7 cm/year. The tectonic motions create vertical displacements and mass changes that may be detected by repeated gravimetric and GPS measurements. A joint Taiwan-France project (AGTO) was initiated in 2006 to study the orogeny of Taiwan using gravimetry and GPS. AGTO uses gravimeters (FG5) from France and from Taiwan (Ministry of the Interior), and permanent GPS receivers deployed by Academia Sinica and other Taiwanese agencies. Ten gravity-GPS sites along an east-west transect across southern Taiwan have been selected for gravity and GPS measurements, which are used to analyse vertical movements and mass transfers due to orogeny. The gravity changes collected over 2006-2010 at most sites can be explained by the vertical movements from GPS, but large environment-induced gravity effects lead to significant conflicts between the gravimetric and GPS results. For example, typhoon Morakot (August 2008) caused large landslides that led to 50-μGal change at AG3 and 24-μGal change at AG6. Here orogeny-induced gravity changes are significantly interrupted. With river sediment data and satellite images from FORMOSAT-2 before and after Morakot, such gravity changes were modelled. Experience of modelling gravity effects due to ocean loading, local hydrological and atmospheric at the Hsinchu superconducting site was used to develop models to account for the non- orogeny gravity effects at the AGTO sites.

Keywords: absolute gravity, GPS, orogeny, superconducting gravity, typhoon Morakot