



## **A new gravity field of Taiwan from multi-sources: Revelations of new tectonic features**

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We present a new gravity field of Taiwan, which will be of both regional and international interests for such scientific applications as geoid modeling, better understanding of ocean currents (Kuroshio) as well as the Earth lithosphere structure. The new gravity field is derived from: (i) three airborne gravity surveys, at altitudes of 5000 m and 1500 m; (ii) offshore shipborne gravity surveys in areas about 50 km around the major tide gauge stations of Taiwan and offshore islands with cm GPS positioning accuracy; (iii) about 4300 point gravity values on Taiwan evenly spaced at 1.5-2 km with the accuracy of 0.03 mgal; and (iv) marine gravity from retracked altimeter data. A novel method of the downward continuation (assisted by DTM) is used to reduce the airborne gravity. The data analysis revealed the achieved accuracy of gravity observations from the kinematic surveys of about 2-3 mgals with spatial resolution ranging from ~200 m to 6 km. With different weights applied for different gravity datasets, the least-squares collocation was used to form the grids of the Free-air and Bouguer gravity anomalies. Despite the principal pattern of new gravity field agree well with existing ones, much higher spatial resolution is achieved. The positive values of the Bouguer anomalies extend from the oceanic plate to the center of the Central Range, with an uncharted feature in the Hsueshan Range. A gravity high exists at the northern Taiwan due to the Tatun and Chilung volcanoes. A continuous, northeast-oriented gravity low lies over the Ilan Plain extending to the Okinawa Trough. A pronounced gravity high stretching from the Peng-Hu Island in the Taiwan Strait to western Taiwan is associated with the Peikang Basement High. The thick sediment over the Ho-Ping Ocean Basin results in a large gravity low. In the western and northeastern coastal plains and the waters northwest of Taiwan, the anomalies are mostly negative due to presence of large sedimentary basins. A distinct, circular low in central, western Taiwan is the result of the westward thrust of Paleogene rocks over Neogene units.