

Structure of Baan Pong Basin, Hang Dong District, Chiang Mai Province, Based on Joint Gravity Interpretation and Geologic Field Observations

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Abstract

Two previous studies of surface geology of the study area in Baan Pong and Nam Phrae sub-Districts, Hang Dong District, Chiang Mai Province in the Northern Thailand have been interpreted differently. The Chiang Mai geologic map released by the Department of Mineral Resources in 2007 showed the study area is covered dominantly by upper Paleozoic sedimentary rocks. On the other hand, a drafted geologic map made in summer 2012 displayed the surface geology of the study area is younger consolidated and semi-consolidated basin deposits lying unconformably on the upper Paleozoic sedimentary rocks. To confirm exists of the basin deposits and study the basin structure using a geophysical method, 226 gravity stations have been acquired along major and local roads as a grid pattern with a spacing of approximately 200 m. All gravity data have been processed and corrected to produce a Complete Bouguer Anomaly map. Gravity lows located at the center of study area respond low-density materials of young sediments. The anomaly lows are bounded by gravity highs of Paleozoic sedimentary and metamorphic basement rocks. The surrounding anomaly highs confirm the Baan Pong - Nam Phrae area is a basin, here called Baan Pong Basin, which is isolated from the greater Chiang Mai Basin. Interpretations from two gravity-density cross-section models show the Baan Pong Basin was formed as an asymmetric graben structure with the unconsolidated sediments of approximately 150-250 m thick. The eastern and western margins of the basin are controlled by normal faults with changes of fault dipping due to a clockwise rotation process. Field observations suggest folded and thrust features appeared on Tertiary sediment quarries may be associated with a compressional inversion tectonics of rotating and uplifting which have occurred after the opening of an original Baan Pong Basin. Another set of normal faults cut through all geologic features may be related to the latest tectonics extension in the study area. Consequently, joint interpretations of 2D gravity models combined with geologic field observations can give the better image of the structure and evolution of Baan Pong Basin.