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Preliminary Gravity Survey of Western Bhutan.

Duba, K.¹ and Mickus, K.²

¹Department of Geology and Mines, Ministry of Economic Affairs, Thimphu, Bhutan

²Department of Geosciences, Missouri State University, Springfield, MO 65897 USA

Bhutan lies within the eastern quarter of the Himalaya orogeny which is an expression of the ongoing collision between India and Asia. This Cenozoic collision has emplaced early Proterozoic through Paleocene sediments into southern Bhutan through a series of large, south vergent thrust sheets. The Himalayan orogenic belt has been divided into four tectonostratigraphic zones which are bound by major structures. Within the study area these include the Lesser and Greater Himalayas. The tectonostratigraphic zones have traditionally been identified by changes in metamorphic grade but recent studies have used neodymium isotopes and detrital zircons to identify and map the Greater and Lesser Himalayan strata. In order to constrain the crustal structure of western Bhutan, the first detailed (spacing between 0.5 and 1 km) gravity survey was conducted in November and December of 2015 and January, 2016. This survey will complement the more widely spaced (5 km or greater) of Hammer et al. (2013). Approximately 1100 gravity stations using a Lacoste and Romberg model G gravity meter and differential GPS methods were collected along major roads in western Bhutan and tied to the absolute gravity station at the Department of Geology and Mines in Thimphu. Numerous local base stations were established in order to minimize instrumental drift. The data were processed into complete Bouguer gravity anomalies using 2.67 gm/cc as a reduction density, mean sea level as a datum and available DEM models for terrain corrections. The data will be analyzed using map methods (e.g., derivatives and wavelength filtering) and two-dimensional modeling in order to determine the crustal structure of western Bhutan. This study is part of a three year project to collect more than 3000 data points throughout Bhutan and will provide the necessary data in order to help constrain the crustal structure of the Himalayan orogeny in Bhutan.

