Along-strike variations of terrestrial and satellite gravity measurements along the Himalayan arc

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The along-strike segmentation of the Himalayan arc is now well established from various observations, including topography, exhumation rates and seismic activity. Over the last decades, several gravimetric campaigns have been performed in the Himalayas to decipher the deep structure of this orogen. However most of these studies focused on individual sections across the belt are difficult to combine to obtain an overall picture of the mountain range. Thus the question of lateral variability of crustal structures in the Himalayas remains unanswered. In the past five years, we carried out gravity measurements in central and western Nepal and in Bhutan. Together with previously available data, we gather a terrestrial gravity dataset that is now covering more than 1800 km of the Himalayan arc. By combining these data with the satellite gravity gradients provided by the GOCE mission (Gravity Field and Steady-State Ocean Circulation Explorer), we obtain a first image of along-strike gravity changes in the Himalayas, which suggest east-west variations in the shape of the underthrusted India plate, especially between Nepal and Bhutan and in Northwestern India.