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New crustal and lithospheric mantle structure of Alaska from geoid, elevation and thermal inversion analysis further constrained by 3D gravity modelling

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We investigate the lithospheric structure of Alaska and the lateral crustal density variations using a two-step approach. First, we calculate the crustal and mantle lithosphere thicknesses from joint geoid and elevation modeling combined with thermal analysis further constrained by available seismic data. We then compute the 3D gravity effect of the resulting lithospheric structure to separate the measured Bouguer anomaly into its regional and local components. The thickest crust (> than 40 km) is observed in the Brooks Range, Wrangell Mountains and the Alaska Range, while thinnest crust is located in the Aleutian Range and Chugach Mountains (< 30 km). In addition, moderate crustal thickness (in the range of 32 to 36 km, in average) is obtained underneath the Yukon-Tanana basin, the Kuskokwim Mountains, Ahklum Mountains, the Yukon-Kuskokwim Coastal Lowland and in eastern Alaska. The LAB depth map shows that the deepest LAB is located in the western Brooks Range (> 180 km) while the shallowest ($\sim$ 80 km) is observed along the continental side of the Yakutat Block. The obtained residual gravity anomalies highlight lateral average crustal density variations which we discus in terms of crustal structure. Positive residual anomalies delineate the high density crustal rocks of the accreted Wrangellia and Composite terrains while negative values are associated with the sedimentary rocks of the Sadlerochit Mountains.

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