



The characteristics of mantle lithosphere buoyancy revealed from the northern Manila subduction zone to the active collision in Taiwan region

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It has been widely studied on the complexity tectonic structure in the active Taiwan orogenesis, since the converging between the Philippine Sea plate (PSP) and the Eurasian plate (EU) along with the Manila subduction zone extended from the Philippine to offshore the southern Taiwan and the Ryukyu subduction zone in the east. Considering the separate contribution of the crust and the mantle lithosphere to the topography, we try to examine the mantle lithosphere buoyancy (Hm) behavior from the northern Manila subduction zone to the active collision in Taiwan region. In this study, we present several Hm profiles across the northern Manila subduction zone and the Taiwan island. In order to calculate the Hm, the crust structures are constrained by the forward gravity modeling, in which the density is provided from the multi-channel seismic data and on land seismic data (thanks to the Taiwan Integrated Geodynamic Research (TAIGER) project). The result shows that the Hm across the northern Manila subduction zone displays apparent undulations, and undulates more drastic approaching the north end of the subduction zone. It implies that the plate coupling between the PSP and the EU here is weak. The Hm across the southern Taiwan undulates still, but the amplitudes are smaller with relative gentle undulations. This reflects the contribution from the slab underneath while the initial collision occurs in south Taiwan. Into the central Taiwan, the Hm pattern behaves undulating mild comparing with that across the subduction zone because the slab structure effects not obvious. Besides, the Hm in the central Taiwan primarily is affects by both the thickening crust and high elevation caused by the strong lateral external compression stress.