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The significance and tectonic evolution of Huatung basin

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The Huatung basin (HB), located between the Philippine Sea plate (PSP) and the South China Sea (SCS), has likely existed near tectonically-active plate boundaries since the early Cenozoic. It may record SCS evolution from the SCS rifting phase to today, and is a key region to understand the broad geodynamic interactions between the SCS and PSP. A left-lateral shear plate boundary between the SCS and PSP followed the Gagua ridge and was active before 56 Ma. A slight compressive component along the Gagua ridge might have occurred from 40 to 30 Ma, giving rise to the topographic uplift of Gagua ridge and adjacent ridges with possibly some underthrusting of the PSP below the HB. A significant compressive episode also occurred along a second fracture zone around 23 Ma ago. The Manila trench inception occurred along the PSP-SCS plate boundary before the end of SCS spreading, involving the subduction of the younger SCS beneath the older HB. Later the intra-oceanic Luzon arc formed and collided in a sub-parallel fashion with the Eurasian continent around 5-6 Ma ago to form Taiwan. The PSP/EU motion was oblique with respect to this plate boundary during SCS opening. However, we have no direct evidence of the HB age (early Cenozoic or early Cretaceous) and if the PSP underthrusted below the HB. We propose to carry a deep seismic refraction survey and dredge sampling of basement units to clarify this problem. This work is supported by the Chinese National Natural Science Foundation (contracts 91958212, 41730532, 41576070 and 41676043).