

The South China Sea oceanic domain at the end of spreading

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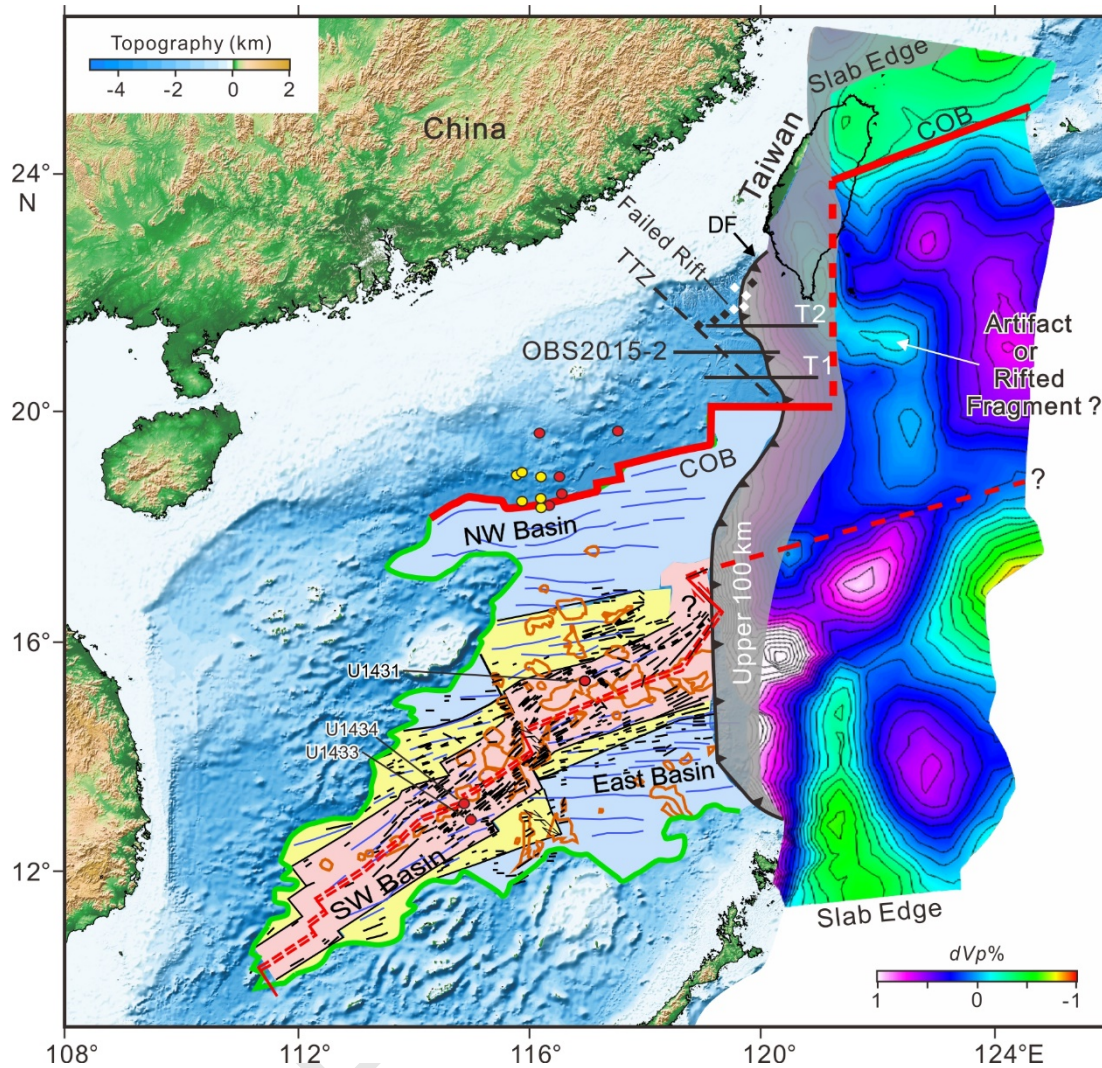
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The South China Sea (SCS) oceanic domain is critical to understand the formation and evolution of the SCS. The wide-angle refraction profiles collected in the northeastern South China Sea (SCS) show that the crust is a 12 to 15 km-thick thinned continental crust intruded by post-rifting volcanics with a high velocity layer at the base of the lower crust interpreted as underplating (e.g. Liu et al., 2018). Based on magnetic anomaly maps and the resulting localization of magnetic lineations C12 (?) and younger and on the interpretation of MCS and wide-angle seismic profiles, the location of the boundary between thinned continental and oceanic crust (COB) is proposed. The unfolded Manila slab attached to the SCS along the Manila trench extends 400-500 km to the east of the Manila trench. Mid-slab positive dVp values generally correspond to oceanic domains while negative values correspond to thinned continental domains, giving for the first time a complete picture of the geographical extension of the SCS at the end of spreading. The northern COB (red line in the Figure) separates a thinned continental crust with slightly negative dVp values to the north that reconstructs below the western Ryukyu subduction zone from a >300 km wide area to the south with positive dVp values corresponding to typical oceanic crust. Amongst the numerous consequences of the new location of the COB, we show that, at the end of the SCS opening, the thinned continental crust identified at the northeastern SCS stepped 400 km northwards from 20°N to 24°N, implying the existence of a north-south portion of Eurasian margin near 122°E prior to Taiwan collision. In the future, we plan to better define the COB (where it is presently defined by a green line (Sibuet et al., 2016), in particular in the southern SCS. This research was granted by the Natural Science Foundation of China (91428204, 41730532, 41674092 and 41676043).

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The South China Sea oceanic domain at the end of spreading (Liu et al., 2018). The SCS oceanic domain has been delimited by pink, yellow and light blue areas, which were characterized by N055°, N075° and N085° seafloor spreading directions, respectively. The unfolded Eurasian-SCS (Manila) slab with its tomographic velocity dV_p , is attached to the SCS along the Manila trench and extends 400-500 km east of the Manila trench. The N-S grey shadow mask (<100 km width) corresponds to crust correction artifacts and was not interpreted. Major tectonic features are underlined. The green line is the continent-ocean boundary (COB), which delimits the typical oceanic domain. The newly established COB appears as a red line (instead of the green line) and has been extended in the unfolded Manila slab. The extinct spreading ridge (ESR) in the East basin is from Zhao et al. (2018). Outside the oceanic domain, the remaining parts of the SCS are continental and thinned continental domains. The eastern extension of the ESR appears as a red thick dashed line. Locations of wide-angle seismic profiles T1, T2 and OBS2015-2 in black. Manila trench, black line with triangles; DF, Deformation front; TTZ, Taiwan transfer zone.