

Supplementary Information

In the supplementary material we provide 4 typical seismic profiles across the Dangerous Grounds and their horizon geological interpretations, which help to understand the division of sedimentary units and establish regional stratigraphic framework.

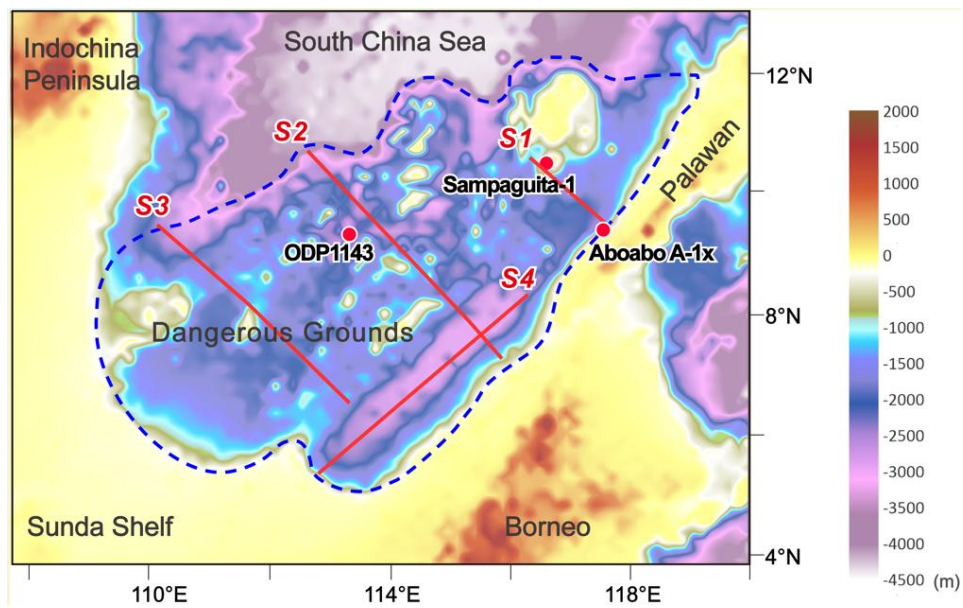


Figure S1. Location map of the supplementary typical seismic profiles. The solid red lines are the seismic sections. The red dots are the drilling sites.

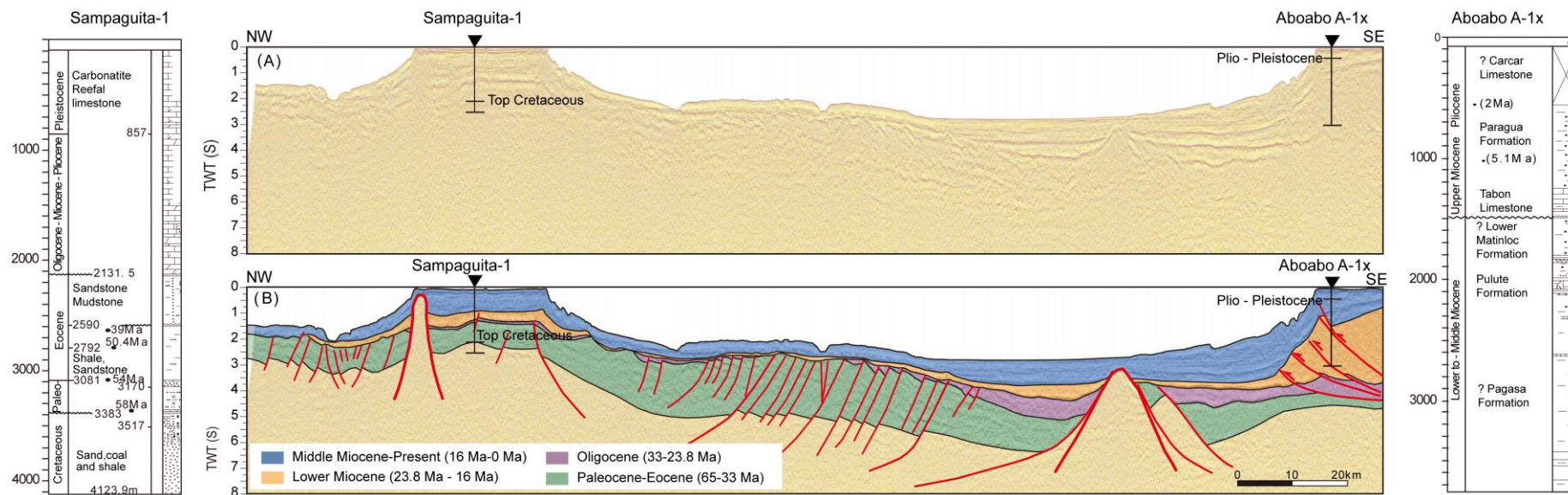


Figure S2. Profile S1 and the geological interpretation, section from Tong et al. (2019). Seismic profile S1 is located in the east of the Dangerous Grounds, crossing two drilling sites: Sampaguita-1 and Aboabo A-1x. The sedimentary units from top to bottom include the Middle Miocene-Present (16-0 Ma), the Lower Miocene (23.8-16 Ma), the Oligocene (33-23.8 Ma), and the Paleocene-Eocene (65-33 Ma).

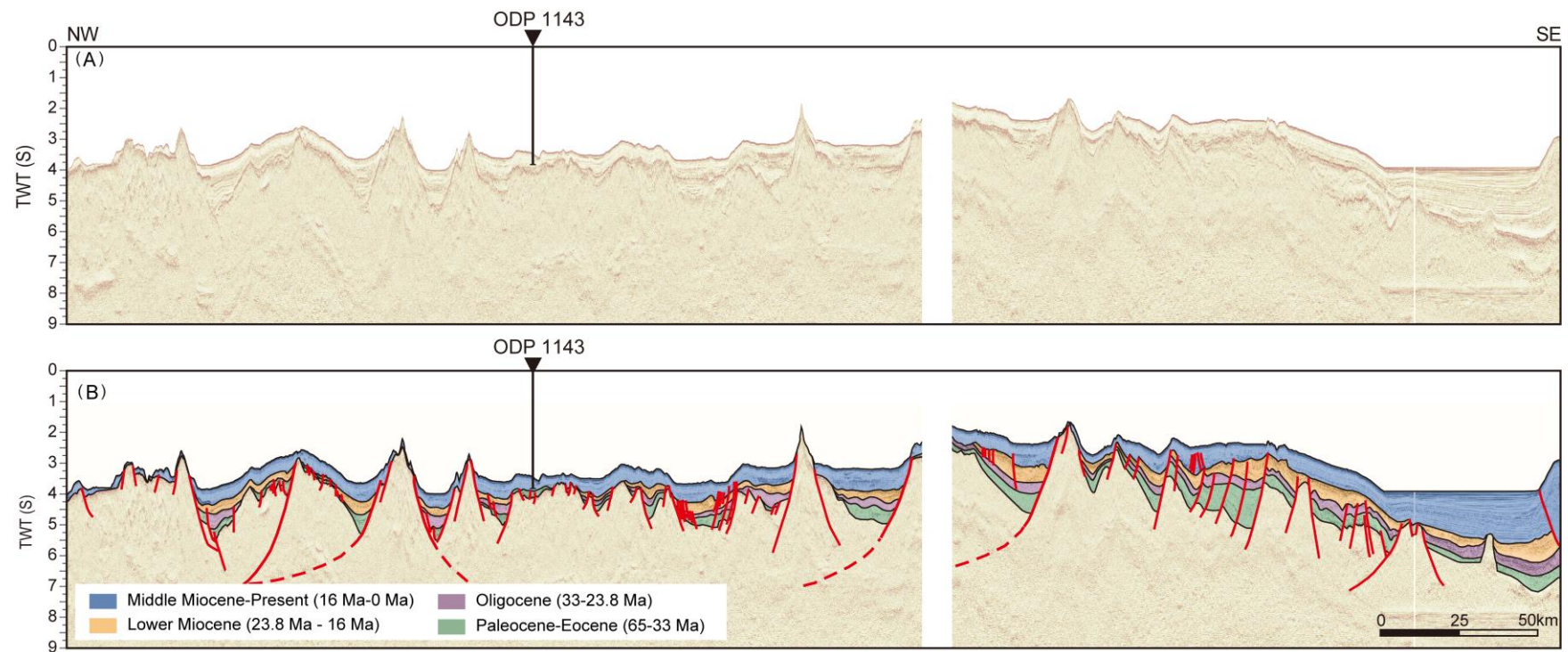


Figure S3. Profile S2 and the geological interpretation. Seismic profile S2 is located in the middle of the Dangerous Grounds, crossing the ODP1143 drilling site. The sedimentary units from top to bottom include the Middle Miocene-Present (16-0 Ma), the Lower Miocene (23.8-16 Ma), the Oligocene (33-23.8 Ma), and the Paleocene-Eocene (65-33 Ma).

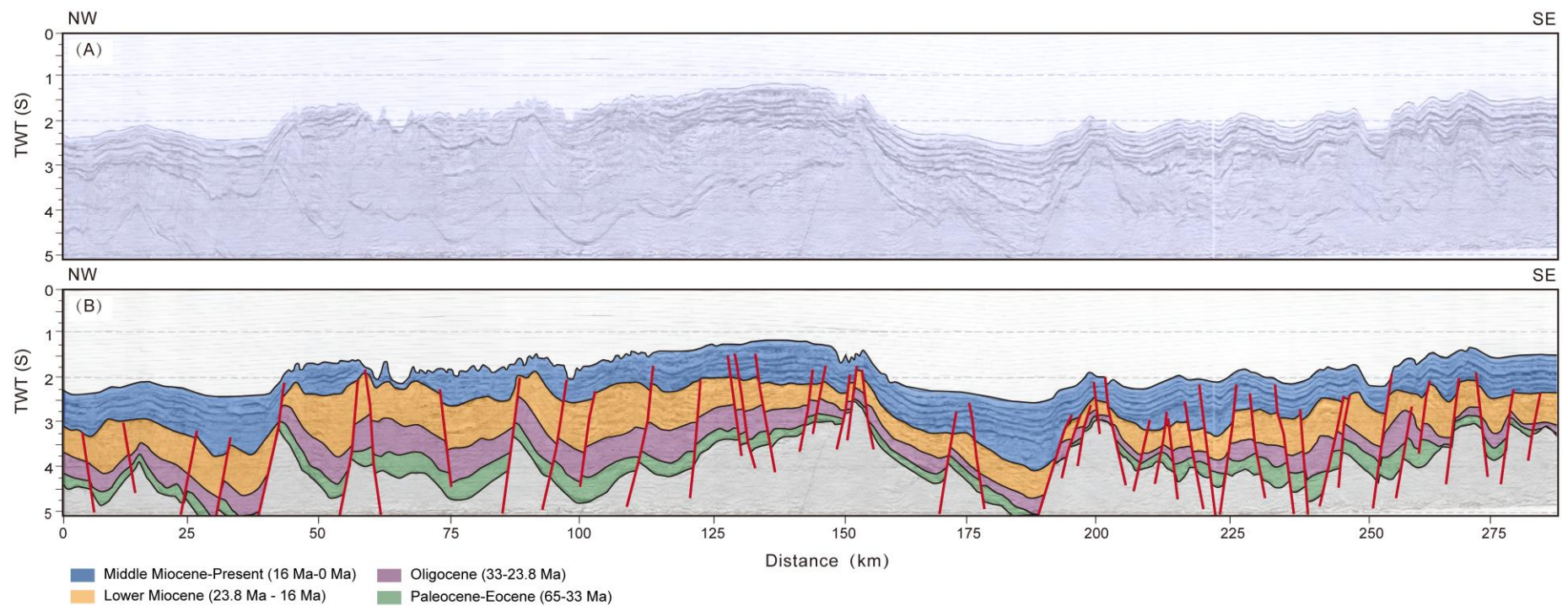


Figure S4. Profile S3 and the geological interpretation, section from Sun et al. (2011). Seismic profile S3 is located in the west of the Dangerous Grounds. The sedimentary units from top to bottom include the Middle Miocene-Present (16-0 Ma), the Lower Miocene (23.8-16 Ma), the Oligocene (33-23.8 Ma), and the Paleocene-Eocene (65-33 Ma).

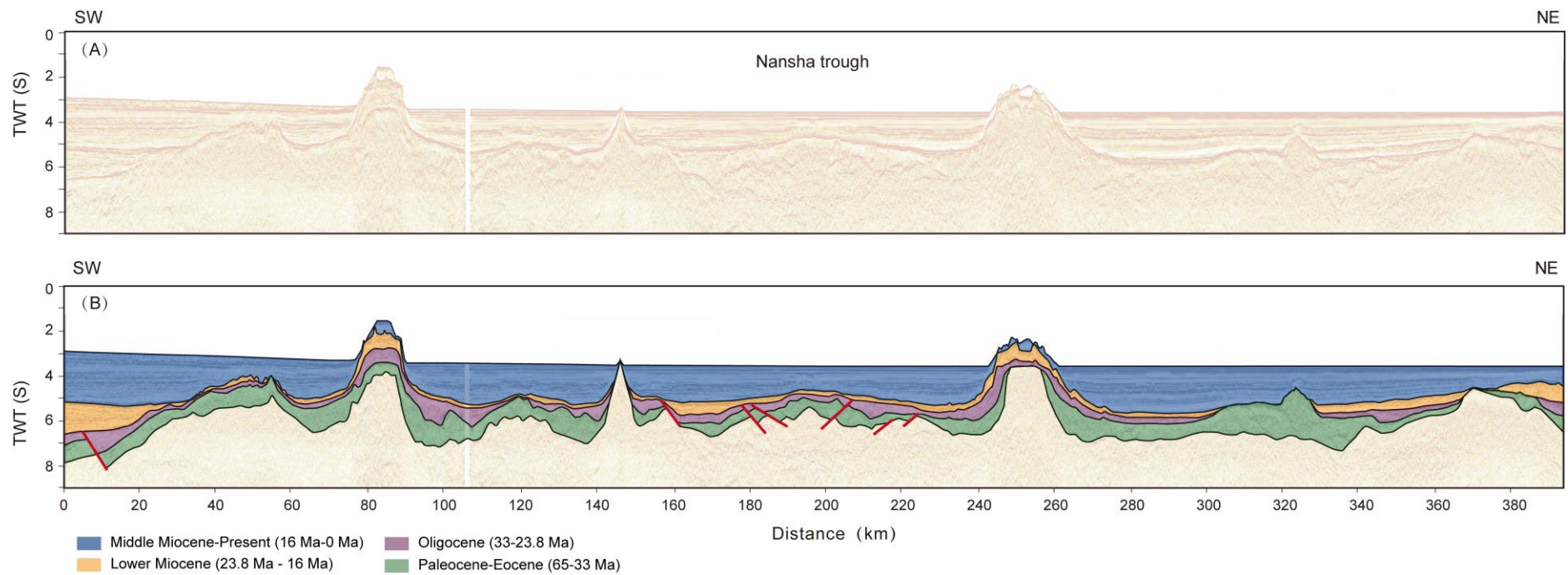


Figure S5. Profile S4 and the geological interpretation, section from Guo et al. (2024). Seismic profile S3 is located in the southern part of the Dangerous Ground, parallel to the Nansha Trough. The sedimentary units from top to bottom include the Middle Miocene-Present (16-0 Ma), the Lower Miocene (23.8-16 Ma), the Oligocene (33-23.8 Ma), and the Paleocene-Eocene (65-33 Ma).

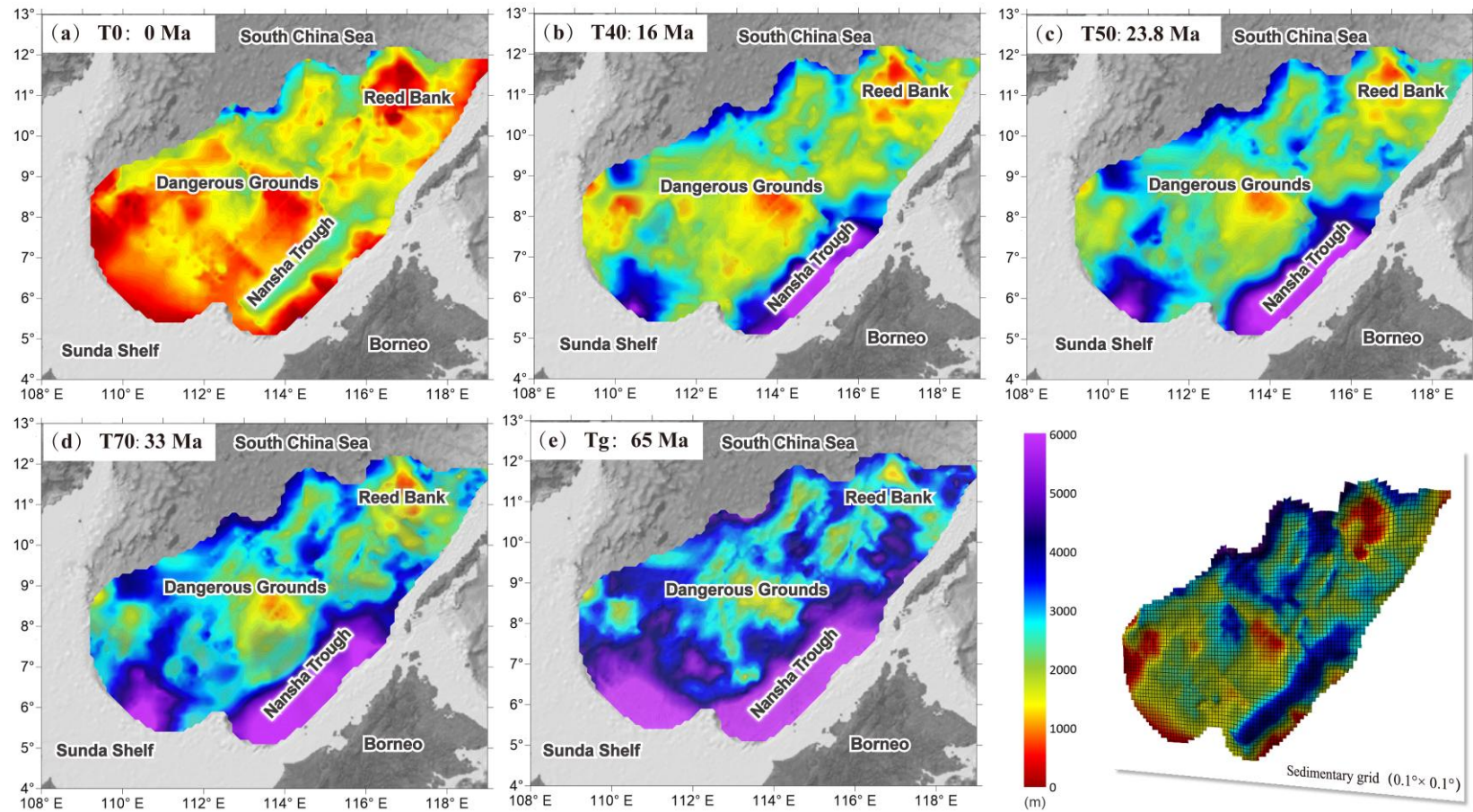


Figure S6. The grid data model ($0.1^{\circ} \times 0.1^{\circ}$) of the Dangerous Grounds and the depth contour maps of sequence boundaries for T0 (0 Ma), T40 (16 Ma), T50 (23.8 Ma), T70 (33 Ma), and Tg (65 Ma).