

Carbonate Imaging with Magnetotellurics in a Shallow-Water Environment, South Yellow Sea, China

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Complex structure distribution and wide-spread Meso-Paleozoic carbonate strata have limited the use of the seismic investigation in the South Yellow Sea, China. To figure out the carbonate strata distribution, we conducted magnetotelluric data acquisition in the Central Uplift of the South Yellow Sea Basin at a water depth of ~20 m. Novel receivers with a smaller size and a lower center of mass has been developed to reduce the instability caused by the shallow water motions. Magnetic fields associated with the ocean motions, mainly tides and gravity waves, have been identified and segmentation multi-station processing was applied to the data. We have conducted 1-D and 2-D inversions to derive the resistivity models. Significantly elevated resistivity zone has been obtained at depths between 3 and 8 km. Combining the seismic data, drilling well and local geology, we have concluded that the marine carbonate strata at the Central Uplift holds a thickness of over 7 km which starts from the Indo-Chinese unconformity surface at a depth of ~ 650 m and extends to the metamorphic basement at a depth of ~ 8 km.

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