



Recognition of relict Mesozoic Dongsha Basin in the northern margin, South China Sea and its implication

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The Pearl River Mouth Basin (PRMB) is dominated by NE-trending rift architecture produced mainly during Cenozoic Era. It comprises a series of grabens built up with thick Paleogene and thick Neogene sediments, up to 12000 m, and dividing basement highs composing Yanshanian granitic rocks. Though previously considered as one constituent part of PRMB in the southeast, Dongsha Basin displays major differences in sedimentary architecture and tectonic framework.

Firstly, Dongsha Basin is characterized by a prominent angular unconformity, interpreted as a spectacular planation or rough erosion surface which separates the sediment column into two distinct parts. It is interpreted with accumulating seismic and drill data that the underlying strata comprise Early Cretaceous terrestrial, Jurassic marine and possibly Triassic sedimentary rocks totaling to 4~9 km thick, whereas the overlying strata are very thin (usually 0.5~1 km in whole) composing mainly Neogene sediments. The major sedimentary hiatus between them corresponds to the Late Cretaceous to mid-Miocene Epoch, well during the rifting to spreading process when the PRMB developed.

Secondly, unlike the PRMB, the Dongsha Basin has suffered considerably less extension except its boundary areas, and actually remained as a relatively stable block though Cenozoic Era. Moreover, there are a few compressive open fold structures within the buried Mesozoic strata over the central Dongsha Basin. These folds trend in NNE and are characterized mostly by few minor growing upthrust faults with offsets in the order of few tens to hundreds meter. The upthrust faults dipped mostly southeastward against the northwestward subduction of paleo-Pacific plate as postulated in other previous study. The blind folds featured more like back-thrust growth tectonics, formed a broad NNE-SSW trending belt, obviously oblique to the trend of northern margin of the South China Sea and the PRMB as well.

In a few recent models, the most prominent angular unconformity seen widespread over the southern margin of the South China Sea has been interpreted as formed during the Oligocene-Miocene subaerial or submarine erosion process due to its elastic flexural bulging led by gravity load of Palawan-Crocker sedimentary wedge or its collision with Borneo. However, in viewpoint of the significant similarities of Liyue Basin (Reed Bank) and its southwest adjacent waters to Dongsha Basin in their sedimentary architecture, the angular unconformity and open folds underneath, the underlying folded strata there are preferably interpreted as Mesozoic. In fact, Mesozoic sedimentary rocks have been dredged over several sites south nearby the Liyue Basin. Thus, a wide domain of Mesozoic sedimentation might be reconstructed spanning both the conjugated margins.