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Quantification of extension (β) and Miocene uplift of the Gunsan Basin in the Yellow Sea, offshore Korea

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The Gunsan Basin is a Mesozoic-Cenozoic sedimentary basin on the Yellow Sea between China and Korea. Its rifting and uplift is regarded due to large-scale interaction between the Pacific, Eurasian and Indian plates. An estimate of the amount of extension that has taken place can be obtained from a number of methods. Knowledge of the strain rate history or total stretch factor is important as a basis for predicting the geothermal gradient and heat flow history of basin sediments, as well as in showing the role of rift structures in accommodating basin sediments. To analyze extensional factor (β) of the Gunsan Basin, this study uses two methods; 1) calculation from domino-style normal faulting within the brittle upper crust and 2) comparison of tectonic subsidence curves with modeled post-rift thermal subsidence curve. From first method, the extension factors (β) of the Gunsan Basin are calculated to 1,19, 1,24 in the Central sub-basin and 1,15 in the SW sub-basin. Compared with the modeled post-rift thermal subsidence curve, the tectonic subsidence curves of the Gunsan Basin are broadly progressing to ranging from 1,1 to 1,3. Both analysis shows that the extension factor (β) of the Gunsan Basin is on ranging 1,1 – 1,3. It is comparable with extension factor (β) of adjacent sedimentary basins rifted in similar time which are the Bahai Basin (pull-apart basin type) and the East China Sea Basin (back-arc basin type), for basin type and rifting processes. The Miocene uplift is a wide tectonic event which is confirmed from many Cenozoic basins in east Asia region. To analyze the amount of the uplift in the Gunsan Basin, this study estimated the eroded thickness of domino-style normal faulting block from time-depth conversion of 2D seismic reflection data. It is evaluated to 507,98 m, which could be the minimum amount of the uplift.