The evolution of the Cretaceous Jinan Basin in South Korea and the age and tectonic setting for the volcanic rocks in it

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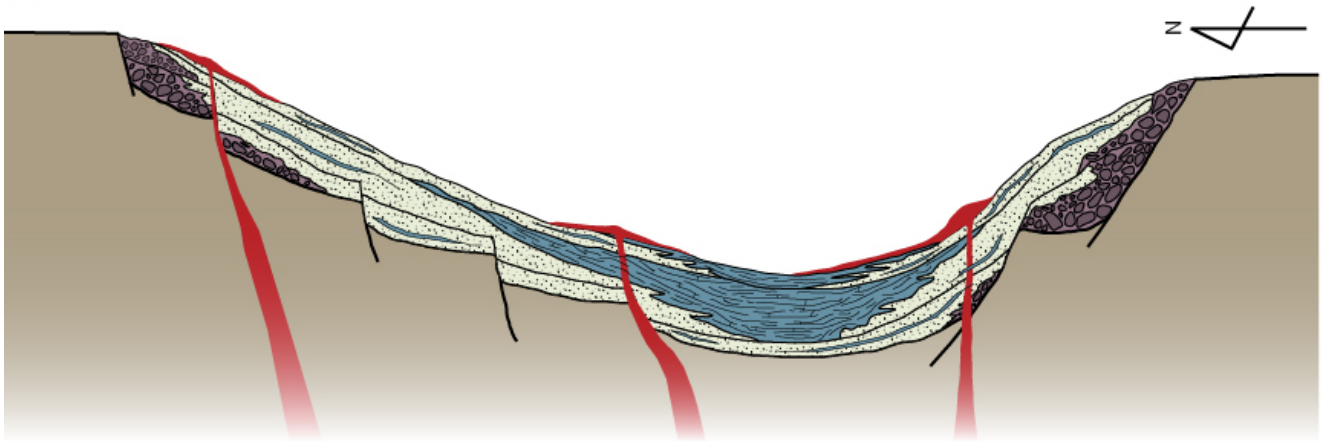
The Jinan Basin is one of the Cretaceous pull-apart basins in the South Korea. It locates along the Yongdong-Gwangju fault system and consists of non-marine sediments with volcanic and pyroclastic rocks. The sinistral strike slip movement which formed the Cretaceous pull apart basins was occurred by the collision between Siberian and Manchuria blocks at ca. 130~100Ma. LA-MC-ICPMS age dating on the zircons from sedimentary and igneous rocks indicates followings. The sedimentation in the Jinan Basin had started at least from 97.7Ma and continued until 89.47Ma. During the sedimentation, basaltic andesite extruded at 90-92 Ma and later rhyolitc and andesitic magma intruded the Jinan Basin at 90-89 Ma and 85-84 Ma respectively. Later the Jinan Basin uplifted to form Noryeong mountain range due to the compression which was related with dextral strike slip fault movement. This fault movement is expected to be caused by the collision between Indian plate and Eurasian plate at ca. 55~25Ma. AFT(Apatite Fission Track) age from sediments in the Jinan Basin is approximately 68Ma. Due to the formation of Noryeong mountain range, the *Coreoleuciscus splendidus* was differentiated into two species, these two species of *Coreoleuciscus splendidus* have the same ancestors at around 38Ma. These data indicate that the Noryeong mountain range including the Jinan Basin are expected to have uplifted at around 68-38Ma. Rhyolitic volcanic rocks in and around the Jinan Basin are plotted on the VAG (Volcanic Arc Granite) field and basaltic to intermediated volcanic rocks are plotted on the CAB (Calc-Alkaline Basalt) and WPB (WIthin Plate Basalt) fields in the tectonic discrimination diagrams. There was a roll back of subduction zone toward Pacific ocean at ca. 100 Ma. These data suggest that the igneous rocks in the Jinan Basin formed by the mantle upwelling due to extension caused by the roll back of subduction zone. The upwelling asthenospheric mantle supplied heat which caused the felsic magma by the melting of the lithospheric mantle and crust which had been contaminated by crustal material supplied from subducting sediment or ocean before roll back of the subduction zone. The upwelling asthenospheric mantle was also melted to form basaltic magma. The deep faults formed by sinistral strike slip movement around the Jinan Basin at the Cretaceous, gave the path toward surface for the magma at deep depth.

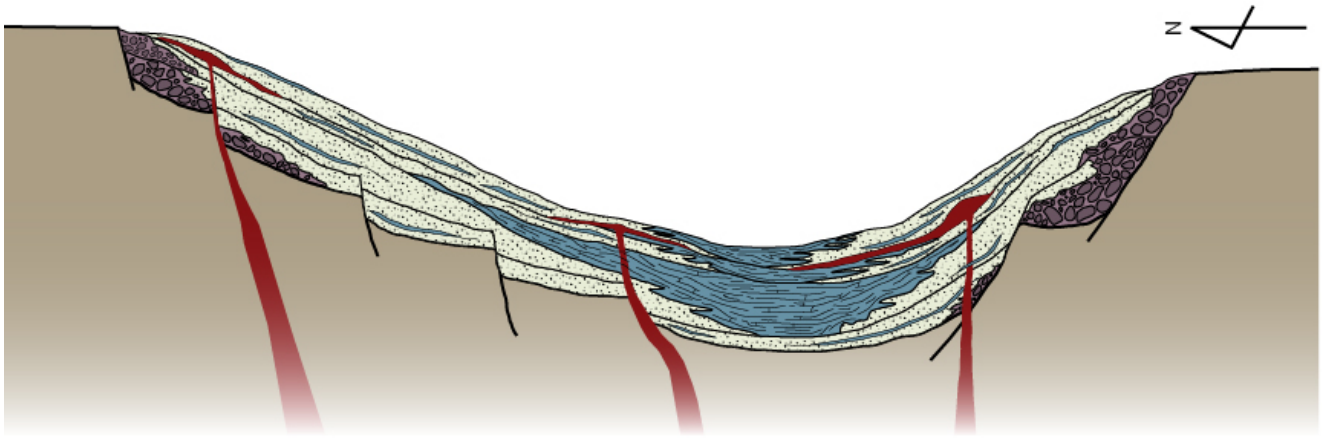
Keywords: Jinan Basin, pull-apart basin, Igneous rock, Cretaceous

(a) ca. 97 ~90 Ma.



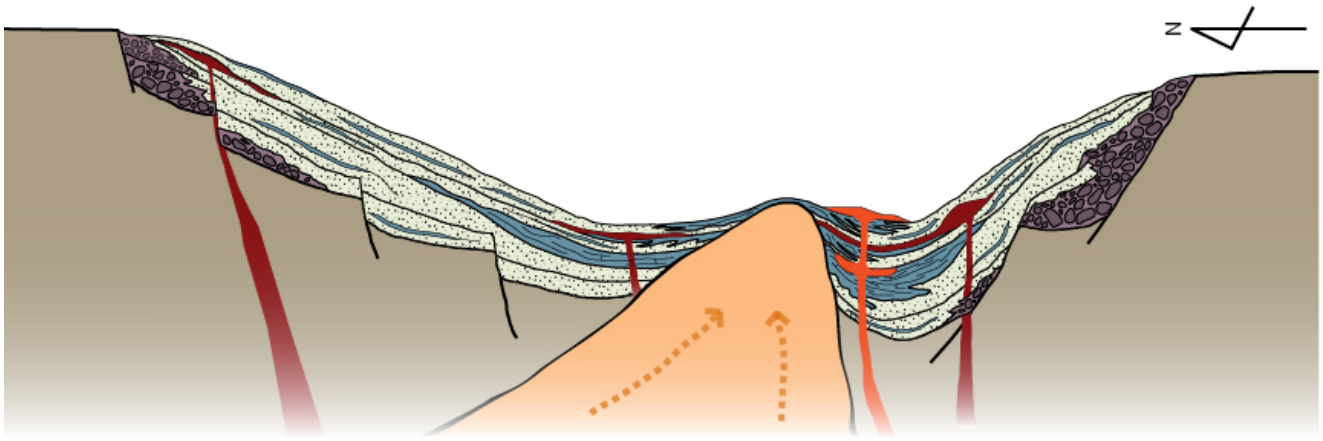
Deposition of lower part sedimentary rocks in the Jinan Basin(97~92 Ma) with extrusion of basaltic andesite(92~90 Ma)

(b) ca. 90 ~89 Ma.



Deposition of upper part sedimentary rocks on the lower part sedimentary rocks and basaltic andesite extrusive volcanic rocks

(c) ca. 89 ~84 Ma.



Intrusion and extrusion of rhyolite(ca. 89Ma) with late intrusion of andesitic volcanic rocks(ca. 84Ma)

Intrusive andesitic volcanic rocks
Rhyolite
Basalt and basaltic andesite
Conglomerate
Sandstone
Shale or mudstone

