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The Time Characteristic and Evolutionary Process of Lengjiaxi Group and Banxi Group, Which Are the Important Components of the Jiangnan Orogen

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1. The maximum sedimentary age of Lengjiaxi Group is about 862Ma, and the minimum one is about 822Ma. Lengjiaxi Group and the stratum in the same age belong to Neoproterozoic, while they are important parts of Jiangnan Orogen instead of Greenville Orogen (1.3Ga~1.0Ga);

2. The structure attribute of Lengjiaxi Group locating in the north of Jiangnan Orogen belongs to recycled orogen, and the prototype basin is peripheral foreland basin. The source comes from the southwest and belongs to sediment of active continent. By combining the fold basement-Lengjiaxi Group and the age of stratum in the same era with the uplap-Banxi Group and the age of stratum in the same era, the evolutionary model of the west section of Jiangnan Orogen is established as follows (Fig. 1):

①. Before 862Ma, the Cathaysia landmass dives to Yangtze landmass, which forms continental island arc in one side of Yangtze landmass. Meanwhile, the active island arc diving to Yangtze landmass exists in the west edge for ages. The South China Ocean has not been closed during this period.

②. At 862Ma~822Ma, the Cathaysia and Yangtze landmass begin to accept the sediment of peripheral foreland basin, the Lengjiaxi Group and stratum in the same era also begin to deposit, and the source may come from the recycled orogen in the northwest.

③. At 822Ma~802Ma, the Cathaysia landmass continues diving to Yangtze landmass, and this period belongs to Jinning-Sipu Movement (Wuling Orogeny). At almost 822Ma, the peripheral foreland basin closes and the sediment of Lengjiaxi Group and stratum in the same era end.

④. After 802Ma, the island arc diving to Yangtze

landmass exists in the northwest edge, which may lead to mantle convection and form into mantle plume. The upwelling huge heat energy of the mantle plume eventually results in the isolation of Cathaysia and Yangtze landmass, South China rift basin forms, and they begin to receive the sediment of Banxi Group and stratum in the same era covering above Lengjiaxi Group.

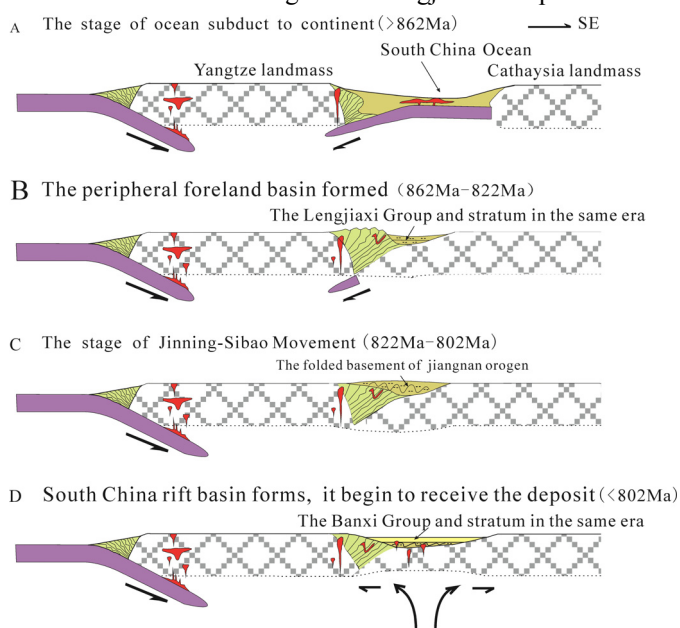


Fig. 1 The evolution process of the west part of Jiangnan orogenic belt

3. From Sipu Group in Guizhou to Lengjiaxi Group in Madiyi area, northwest of Hunan, the crust component in Neoproterozoic increases sharply while older crust component has obvious reduction (Fig. 2). From Madiyi area to Lengjiaxi Group in Linxiang area, respectively in the northwest and northeast part of Hunan, the fragment of

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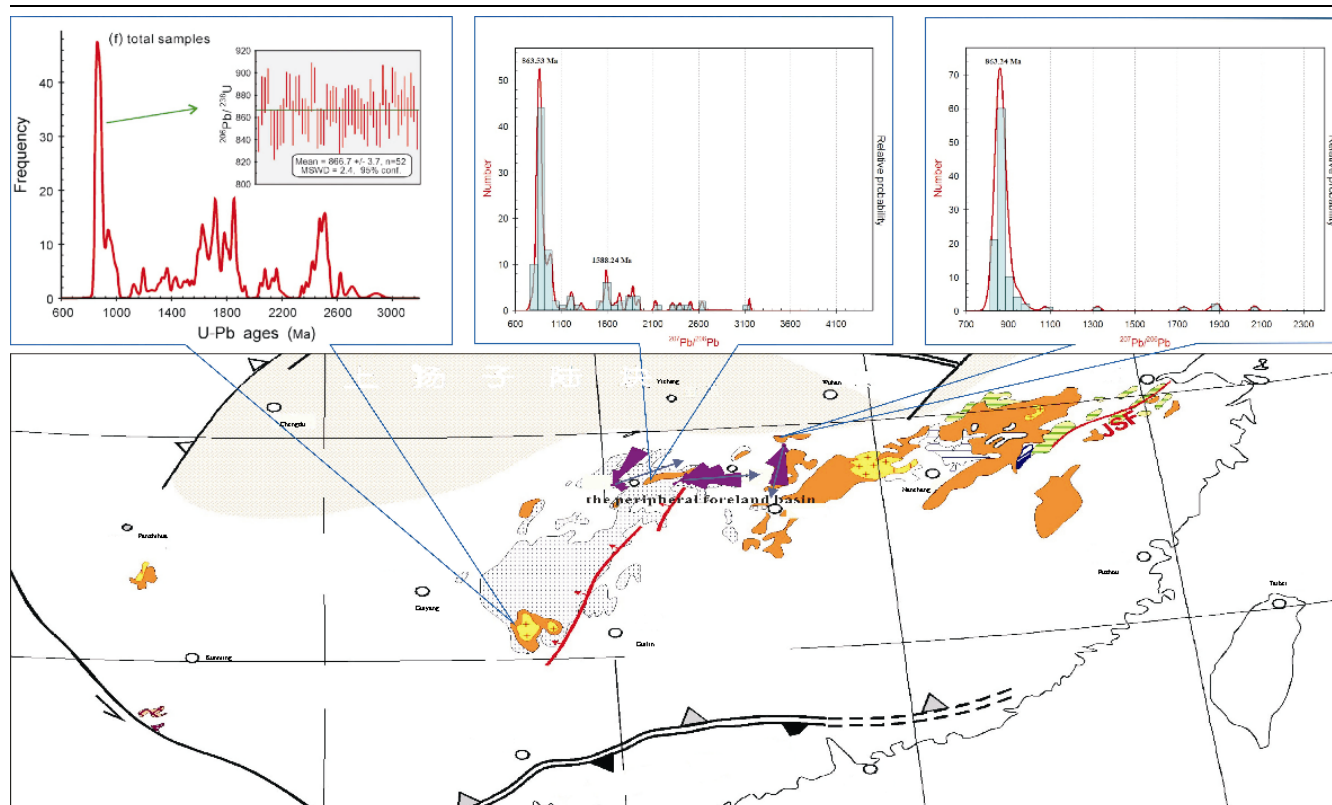


Fig. 2 Distribution of histograms and relative probability plots of detrital zircon U-Pb ages in the west and south part of Jiangnan orogenic belt

ancient basement complex reduce obviously (Fig. 2), and the reason may be that the old basement has not been denudated or that the basement of continental crust not developed in source region.

Therefore, by combining the evolutionary process of Jiangnan Orogen, it can be inferred that the collision of Cathaysia and Yangtze landmass tends to be southwest

direction, more continental crusts will be developed; island arc or newborn magmatic arc can be simply developed if it tends to be east direction. Subduction between continent and continent or ocean happens in the west and south section, and the subduction within the ocean takes place in the east section.