Tectonic basement of South China

L. SHU, W. ZHU, Y. SUN AND X. ZHOU

Department of Earth Sciences, Nanjing University, 210093 Nanjing, Jiangsu Province; P. R. CHINA (Lsshu2003@yahoo.com.cn)

Our researches on pre-Mesozoic rocks of South China suggest that a Precambrian continental block had ever occurred in the Wuyishan-Wugongshan-Nanling-Yunkaidashan region according to middle-high grade metamorphic rock assemblages, structural deformational styles and newer data of isotopic ages. This oldland, with the oldest isotopic age of 2100 Ma, named the Cathaysian Oldland, is characterized by large scale of schist, gneiss and migmatic rocks dated at 1800Ma to 1200 Ma, which consist of a continental crustal basement. About 1100−900Ma, the Cathaysian Oldland collided with the Yangzi continental plate to form the Shaoxing-Jiangshan-Dongxiang-Pingxiang Suturing Zone. Not long time, about 800 Ma, the Cathaysian Oldland was dispersed into three blocks with different striking and distinct outline, that is, the NEE striking southeastern Zhejiang-northwestern Fujian block, the sub-N-S-striking central Jiangxi-southern Jiangxi block and the NE striking Yunkaidashan block, respectively. The Sinian-Early Paleozoic sedimentary materials with a large thickness were filled among these three blocks, which, together with three blocks,. consist the tectonic basement of Late Mesozoic (mainly Cretaceous) volcanic-intrusive complexes. Study proposes that this Old-land had subjected to three phase tectonic-thermal events at least, that is, Luliang event (1800−1600Mha), Jinning event (1100−900Ma) and Caledonian event (420−400Ma). The tectonothermal event during Silurian-Middle Devonian time is a strong compressure-thinckening work to form the South China Caledonian folding-orogenic belt marked by numerous granitic bodies, folded greenschist facies metamorphic and mylonitic rocks. This ancient tectonic framework constrains large scale of Mesozoic tectonic-magmatism, difference of magmatic compositions and distributrion.

Acknowledgements

This study was supported by National Natural Science Foundation of China (Nos. 40132010,40172067, 40372092).

Apatite fission track and (U-Th)/He thermochronometers contraints on the development of two high elevation passive margins

F. M. STUART[1], C. PERSANO[2,1], M.L. BALESTRIERI[3] AND P. BISHOP[2]

[1]SUERC, Rankine Avenue, East Kilbride G75 0QF, UK (f.stuart@suerc.gla.ac.uk)

[2]Dpt. Geography & Geomatics, Centre for Geosciences, University of Glagow, Glasgow G18 8QQ, UK (cpersano@geog.gla.ac.uk; pbishop@geog.gla.ac.uk)

[3]CNR, Instituto di Geoscieze e Georisorse, Via Moruzzi, 1 Pisa, Italy (balestrieri@igg.cnr.it)

Apatite fission track (AFT) and (U-Th)/He thermochronometers are used to constrain continental rifting and escarpment development of the high elevation Eritrean and south-eastern Australian passive margins.

AFT and (U-Th)/He data have been determined from four coast perpendicular traverses. Along both margins the He and AFT ages at the present coast broadly correspond to the time of sea-floor spreading and they increase approaching the foot of the escarpments. On the plateau, He and fission track ages are much older than breakup time and the track length distributions indicate that denudation has been slow and constant since at least mid-Mesozoic times.

The combination of AFT ages, track length distributions and He ages indicates that both margins were rapidly eroded by in-situ excavation of a pre-existing plateau rather than parallel escarpment retreat. A comparison of the measured He ages from the coastal plain with He ages predicted by a forward model indicates that the main phase of denudation in the Eritrean margin started at around 15 Ma, closer to the initiation of seafloor spreading in the Red Sea than previously thought. In the south-eastern Australian case, the forward modelling suggests that denudation was enhanced at 120 Ma, some 35 Myr before sea-floor spreading, in agreement with the hypothesis that magma-poor margins evolve more slowly than magmatic ones.

The comparison of the Eritrean and eastern Australian margins indicate that they evolved in much the same way, despite differences in climate, lithology and modes of rifting. This study suggests that the primary control on syn-rift denudation is exherted by the topography.