In the past two decades much progress has been made by Chinese geologists in the study of early Precambrian geology. This includes the compilation of a metamorphic map of China and extensive investigations on regional geology and geochronology. There is a vast amount of Chinese language literature on this subject, but few works have been printed in English. The present moderately sized volume of 331 pages (16 x 24 cm format; English language of course) aims at giving an up-to-date review of Precambrian crustal evolution. The book is primarily concerned with distribution, lithostratigraphy, geochronology, petrotectonic assemblages, structure, deformation, petrogenesis, metamorphism and Proterozoic biological evolution.

Except for the first and last chapters (Introduction and Concluding remarks), the bulk of the book is divided into four chapters (chapters 2 and 3 authored by J. Bai and F. Dai and chapters 4 and 5 authored by X. Huang) describing the Archean, early Proterozoic, mid-late Proterozoic, and Sinian crusts. The Sinian is equivalent to the Pan-African or the Brionverian in west Gondwana. Each chapter begins with a useful map of the distribution and key crustal features. The authors have admirably put together the principal characteristics of Precambrian terranes in China, and attempted to interpret their evolution in terms of a plate tectonic framework.

China is composed of three major Precambrian cratons (or platforms as preferred by the authors), namely, the North China (or Sino-Korean), Tarim and Yangtze, which have been welded together by Phanerozoic mobile belts. Some outstanding features of the Chinese Precambrian include: (1) the presence of very old zircons and rocks (ca. 3.8 Ga), (2) widespread distribution of late Archean high pressure (10–14 kb) granulite belts, although no Phanerozoic granulites occur in China, (3) the dominance of high grade granulite–gneiss belts over lower-grade greenstone–granite terranes in the Archean, (4) deposition of extensive BIF’s in the late Archean (2.9–2.5 Ga) but not in the middle Proterozoic as in other parts of the world, (5) cratonisation completed by ca. 1.7 Ga, (6) occurrence of late Precambrian blueschist belts, (7) development of aulacogens and emplacement of anorogenic magmatic rocks (anorthosite and rapakivi granites) in the middle Proterozoic (ca. 1.6 Ga), (8) uninterrupted sedimentation (e.g. the Jixian section) during a lengthy 1 Ga time interval from 1.8 to 0.8 Ga, and (9) record of a twin association of global diamictites, including at least two periods of glaciogenic tillites and a soft-bodied metazoan fauna (Ediacara) at 600 Ma.

Although the authors are fully aware of the complicated multi-phase deformation of the Archean terranes, the entire Precambrian crust is, curiously, regarded and always treated as divisible stratigraphic units — such as groups, subgroups and formations. This concept has been implanted in China for the last four decades, and it seems to persist still. The Archean of China is dominated by high-grade granulite–gneiss terranes, of which the rocks are commonly folded into large-scale interference patterns and complicated by shearing and reworking. They were produced in lower to middle crustal conditions and many rocks have an igneous heritage, hence stratigraphic division does not seem quite appropriate. The book would become more useful if the key characteristics had been more carefully compared with, and distinguished from, the Precambrian terranes of the world’s classic localities. It is also a pity that some of the important and peculiar features have not been sufficiently documented. To name just a few: (1) the occurrence of abundant “high pressure” granulites in North China is very unusual in the world, but this important “discovery” has not been backed up by more detailed and authoritative P–T determinations; and its important implications have not been underlined in the book; (2) the occurrence of middle Proterozoic komatiites (ca. 1.6–1.4 Ga), if real, should have a special significance in terms of global mantle melting processes. It should have been better investigated, but the fragmentary geochemical and petrographic data summarised herein are not convincing enough for komatiite identification; (3) Precambrian blueschists are very rare in the world. If the extensive glaucophane schist belt in China was indeed formed in the Proterozoic (pp. 128, 298), strong arguments must be presented to convince the reader. However, such a
Proterozoic timing appears to be based on the authors' own hypothesis. One of my major concerns is the very controversial assignment of Archean ages on some important terranes. For example, the authors indicate that the basement under a large part of the Yangtze craton (particularly the Sichuan Basin), the Songliao Basin in NE China and the Junggar Basin in Xinjiang (NW China) are composed of Archean rocks (see Fig. 3.1, p. 88). This is in contradiction to the current knowledge based on many recent isotope tracer investigations of granite rocks emplaced therein. Nd isotope data indicate that the Songliao Basin and much of NE China and the Junggar Basin, both belonging to the Central Asian Orogenic Belt (or the Altai Tectonic Collage), are underlain by young Phanerozoic rocks. Moreover, the authors consider the Dabie and Hong'an terranes in east-central China, celebrated for their coesite-bearing UHP metamorphic rocks, as Archean or early Proterozoic (pp. 88, 119, 125, 208), and regard the collision between the North China and South China platforms and formation of high-pressure metamorphic rocks as an event of late Proterozoic time (pp. 213, 298). It appears to me that the significant progress made by the international and Chinese communities on the Dabie and Su-Lu UHP terranes in the last decade has been totally ignored. In addition, the Kangding Group of the Yangtze craton in Sichuan province was assigned as Archean based on a highly imprecise and questionable Pb–Pb isochron age of 2957 ± 304 Ma (1σ). To my knowledge, the only proven case for Archean rocks in the Yangtze craton is from the granitic gneiss of the Konling Group (p. 146), but regrettably, the available zircon age data have not been properly summarised. I should mention that from an extensive compilation of Nd isotope data, it is concluded that the bulk basement of SE China (Yangtze and Cathaysia combined) appears to be Proterozoic (Chen and Jahn, 1998). Archean rocks represent at most isolated blocks with very limited extent.

Concerning some other deficiencies of the book, there are numerous typo errors and missing references. Exactly 200 entries are found in the reference list. This is unusually short for a book of this nature. In reality, the authors have quoted at least twice that amount of published papers but many have not been listed in the bibliography. I was annoyed when so often I failed to find cited references in the reference list. I then carefully checked the references. To my surprise, in the first 40 pages of the book I found 59 missing items. Yes, 59. In addition to the missing references, other errors include a misplaced figure. Fig. 2.17 (p. 80) is supposed to be a map for the Kangdian greenstone belt; instead, it is a page of four maps (structural, lithological, metamorphic and aeromagnetic) of the Wutaishan–Taihangshan region. In Fig. 5.8 (p. 286) a paleogeographic map of four cratons is shown but it is not mentioned to which period this map corresponds.

It is admitted that precise age determination and proper interpretation of age data are vital to the understanding of Precambrian crustal evolution. However, this is not sufficiently well demonstrated in this book. There is also a minor blemish in reporting age data — which are often quoted with face values without uncertainties, or simply of questionable quality with large error limits. Reporting of insignificant figures appears from time to time. One extreme example of such problem is found in p. 71 for an age and a Nd isotope composition: 2599.16 ± 41.49 Ma, instead of 2599 ± 41 Ma, and εNd = 2.4063 ± 0.3721, instead of 2.4 ± 0.4. At times interpretation of age data leaves much to be desired. Two most important Archean orogenies in China are in question. The authors placed the Qianxi orogeny at 2.9–3.0 Ga and the Wutai orogeny at 2.3–2.4 Ga. It is not clear on what basis that the authors arrived at this conclusion, yet abundant reliable age data indicate 2.5 Ga for both. The Archean evolution in China started at ca. 3.8 Ga, but the most important zircon age work documenting the oldest zircons (for sure) and rocks (less sure) in China by Liu et al. (1992) and Song et al. (1996) have not been mentioned.

Despite the above criticism, the book is written in a succinct and clear manner. It is certainly the most valuable source of information, in the English language, about Chinese Precambrian terranes. It should serve as an essential reading for those who are interested in the problem of continental evolution in general and in the Precambrian of China in particular. For the price tag of 248 DM, it is more suitable for the libraries than for private bookshelves.

References


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