

**ISOCHRON DATING OF LOW-TEMPERATURE HP/UHP ECLOGITES:
ISOTOPE DISEQUILIBRIUM AND EFFECTS OF REE-RICH INCLUSIONS**

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The Hong'an Block and Tongbaishan in central China underwent HP/UHP metamorphism at temperatures (700 to 500 °C) lower by 50 to 150 °C than that of the Dabie and Sulu terranes. We analyzed trace element and Sr - Nd - O isotopic compositions on minerals in order to gain better insight into the controversial geochronology in these regions.

The results: (1) Trace element distribution patterns suggest that garnet and omphacite in many cases are out of chemical equilibrium, and the presence of high-temperature LREE-rich mineral inclusions (e.g. epidote) in garnet and omphacite has contributed to isotope disequilibrium. (2) Sm - Nd isotope analyses yielded no isochron ages for the Hong'an and Tongbaishan eclogites. (3) Rb - Sr isotope analyses gave mixed results; in some cases, coexisting minerals are completely out of isotope equilibrium, and in others, isochron relationship is established, yielding ages from 210 to 225 Ma for Hong'an and 183 to 253 Ma for Tongbaishan. The pattern of Rb - Sr isotope disequilibrium appears to be independent of the petrological and O-isotope temperatures. (4) In contrast to the unequilibrated Sm - Nd isotopic systems, oxygen isotopes of the Hong'an eclogite minerals seem to have attained isotope equilibrium or near-equilibrium. Oxygen isotope temperatures are comparable with petrological temperatures. However, this is an apparent feature due to mass balance constraints. (5) Whole-rock $\delta^{18}\text{O}$ values show a large variation from +10 ‰ to -8 ‰, suggesting that their protoliths have undergone very different processes of water-rock interaction. In view of the overall geochronological information, we conclude that the HP/UHP metamorphism in the Hong'an Block took place in the Triassic at about 220 - 230 Ma, as observed in the Dabie and Sulu terranes. The significance of published Paleozoic dates (450 to 300 Ma) for the Xiong'dian eclogite is not clear. However, any hypotheses advocating two periods of UHP metamorphic events for the same tectonic unit or in the same locality are not constrained by the geochronological data.