# Geochemistry of the Lower Cambrian black shales in South China and their palaeoenvironmental significance

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The Lower Cambrian black shale sequence occurs on the Yangtze Platform in South China along an arc-parallel linear belt extending more than 1600 km. These organic-rich black shales may have formed in various marine environments and typically contain high amounts of molybdenum, nickel, vanadium, and a number of other economically important metals. The study of these black shales has not only paleoceangraphic implication but also economic significance.

We dated these black shales using step-wise leaching Pb-Pb methods and obtained a Pb-Pb isochron age of 536±39Ma for the Xiuning black shales, 531±24 Ma for the Zunyi black shales, and 521±54 Ma for the Ni–Mo sulfide ores in the lower part of the Niutitang black shale sequences. The Re-Os isotope dating of the Niutitang black shales yielded an isochron age of 535±11Ma. These age dates suggest the deposition of the black shales post-date the Precambrian/Cambrian transition at least 6-10 Ma later.

The redox-sensitive trace metals, such as Mo, V, U, Re and Mn, in black shales can yield powerful information linked to local or global paleoceanographic variability. Concentrations of the redox sensitive elements and their ratios such as Th/U, V/(V+Ni), and V/Cr have indicated that the depositional environments for the lower Cambrian Niutitang Formation in south China were mostly anoxic and euxinic, although their redox degrees may vary from one place to another, and occasionally suboxic or dysoxic environment may have also occurred in short periods during the depositions of the black shales.

# Silurian collisional suturing onto the southern margin of the North China Craton: Detrital zircon geochronology constraints from the Qilian Orogen

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The Qilian Orogen of north western China records mid-Paleozoic collisional suturing of arc and continental blocks onto the south western margin of the North China Craton and holds the key to understand the geological evolution of the western China, composed of South Qilian Belt, Central Qilian Block and North Qilian Belt.

North Qilian Belt is divided into Hexi-Corridor Basin, North Qilian Island-arc and North Qilian Suture zone from North to South, representing the conjunction between Central Qilian Bloc and North China Craton. Silurian strata from the retroarc foreland basin (Hexi-Corridor Basin) mark the transition from ocean closure and northward subduction to the initiation of collision suturing. Detrital zircons were analysed from the western and eastern parts of the basin and show a spectrum of ages from Archean to Paleozoic with major age concentrations at around 2.5 Ga, 1.6 Ga, 1.2 Ga, 0.98 Ga, 0.7 Ga and 0.45 Ga. Special ages of each potential sources including North China Craton, Yangtze Craton, Tarim Craton and Central Qilian Bloc has been discussed in order to correlate with those of samples. Archean age grains are derived from the North China craton, whereas the Central Qilian Bloc, which lies to the south provides the likely source for the bulk of the Proterozoic detritus. Paleozoic grains are restricted to early Silurian samples from the western part of the basin and are considered to have been derived from the magmatic arc related to ocean closure and ultimate collision of the Central Qilian Belt with the North China Craton. The relationships outlined in the model could also reflect diachronous closure of the basin from east to west.

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