

## Provenance of early sedimentary sequences in the Tethyan Yunnan, SW China: Age and Hf isotope of early Archean zircons

F. CHEN<sup>1</sup>, B.-X. LIU<sup>1</sup>, S.-Q. LI<sup>1</sup> AND W. SIEBEL<sup>2</sup>

<sup>1</sup>CAS Key Laboratory of Crust-Mantle Materials and Environments, University of Science and Technology of China, Hefei 230026, China

<sup>2</sup>Institut für Geowissenschaften, Universität Tübingen, 72074 Tübingen, Germany

This study presents U-Pb ages and Hf isotopic composition of detrital zircons from Cambrian to Ordovician sedimentary rocks exposed in the Tethyan belt of western Yunnan, SW China. This orogenic belt belongs to the eastern Tethyan belt in SW Asia. It is composed of several microcontinents or continental block of different affinities.

The early Paleozoic sedimentary rocks, collected from the Baoshan block, contain detrital zircons of different crystallization ages ranging from about 3800 Ma to 550 Ma (<sup>207</sup>Pb/<sup>206</sup>Pb age), but mostly clustering around 1.0 Ga and 2.4 Ga. About 10% zircon grains yield <sup>207</sup>Pb/<sup>206</sup>Pb ages older than 3.0 Ga Ma, indicating significant sedimentary source(s) of early Precambrian crustal material. Initial ε<sub>Hf</sub> values of the detrital zircons vary from -34 to +15, while TDM values of zircons, calculated from Lu-Hf isotopic composition, range from about 1.0 Ga to 4.0 Ga with peaks around 1.8 Ga and 2.8-3.0 Ga. Their Nd isotopic composition of whole-rocks (TDM values from 1.8 Ga to 2.5 Ga) also imply significant put-in of old crustal material.

The Baoshan block is considered as the northern part of the Sibumasu microcontinent in the eastern Tethyan orogenic belt. From the analytical results of detrital zircons above, we propose that the sedimentary sources of the early Paleozoic sequences in the western Yunnan originated from Archean and Paleoproterozoic terrains most likely in India and NW Australia.

## A study of the column bioleaching of Xianshan uranium ore

GONGXIN CHEN<sup>1,2\*</sup>, JINHUI LIU<sup>1</sup> AND ZHANGXUE SUN<sup>1</sup>

<sup>1</sup>East China Institute of Technology, Fuzhou 344000, China  
(\*correspondence: gxchen@ecit.edu.cn)

<sup>2</sup>China University of Geosciences, Beijing 100083, China

The samples of uranium ore were obtained from the U mine at Xianshan, Jinagxi Province (China). Quantitative chemical analysis showed that the uranium ore had a mediate carbonate content (CO<sub>2</sub>~1.42%), that pyrite was the most important sulphur mineralization (~1.43%) and that the principal components were silicates. The most common uranium mineralization in the vein, pitchblende, appears as UO<sub>2</sub>. The particle size of the ore is less than 10mm. Acidithiobacillus ferrooxidans, Leptospirillum ferrooxidans and Acidithiobacillus thiooxidans isolated from the mine waters of the Xianshan uranium deposit were used in this bioleaching experiment.

The column was made of PVC with 300cm height and 80cm diameter. Once the column was fully charged, it was irrigated with 20g/L H<sub>2</sub>SO<sub>4</sub> about 20 days to reach the correct degree of acidity, after which the inoculum was introduced and irrigation continued until the end of the experiment. Sample volumes of liquid were extracted periodically and the pH and redox potential (Eh) were measured. The U<sub>3</sub>O<sub>8</sub>, Fe<sub>Total</sub>, and Fe<sup>2+</sup> content were also analyzed.

Mixed bacteria play an important role in the leaching process. In 120 days, the recovery of pyrite leaching is about 70%, and of uranium is up to 90%. Acid consumption is very low, about 6.8%. Results also show that U leaching and pyrite leaching are closely related during bioleaching. With the increase of pyrite leaching recovery, uranium leaching recovery is also increased. Due to some pyrite in U mine, biological leaching have good benefit to extract U from the ore compared with those traditional leachings such as heap leaching with acid and stirring tank leaching with MnO<sub>2</sub>.

This study is financially supported by Foundation of Jiangxi Educational Committee for Youths (GJJ11155).