



## Causes of long-term landscape evolution of the Dongyao Au-Mine, Wutai Mountains, China

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The Dongyao gold mine is located close to the central Lijiazhan-Dacaoping shear zone of the Wutai Mountains in the north Chinese province Shanxi. The area is part of the Wutai-Granite-Greenstone Belt, which belongs to the Trans-North-China Orogen of the North-China Craton. Fission-track data of apatite and zircon are used to reveal the thermal, and exhumation history of the area. Samples were taken to cover the tectonic evolution as well as the different stages of mineralization. Combining structural and thermochronological data exhumation paths for different crustal blocks were revealed. At around 400 Ma the area experienced temporary rapid cooling of 50 °C followed by a time of tectonic quietness. In that period of tectonic and/or erosional quietness, about 400 - 160 Ma, the area was exhumed with a rate of 3 m/Ma. In that phase a reduction of a possibly existing relief is considered. A second exhumation phase of about 1000 m in Late Jurassic (Yanshan Epoch) might be caused by the progressing subduction of the Pacific Plate beneath the Eurasian plate. The second exhumation phase is associated with a change in the stress direction causing the transition from WNW-ESE orientated block faulting to N-S block faulting. Fault movement caused an offset of at least 150 m between adjacent blocks. A second stage of less tectonic and/or erosional activity covers the Upper Cretaceous. Typical exhumation rates are of 3 m/Ma. Since 50 Ma the exhumation slightly accelerated, which might be related to the collision of the Indian plate with the Eurasian plate.

Comparing zircon fission-track data of mineralized and non-mineralized samples clearly showed that the Au-mineralization has been formed at a temperature above 240 °C and at a time older than 400 Ma. Nevertheless, there is evidence of a low-temperature hydrothermal alteration related to the block faulting activity in the Mesozoic.