

Rb-Sr geochronology of the Dushiin Ovoo Formation, South Mongolia

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Southern Mongolia forms a large portion of the Central Asian Orogenic Belt (CAOB). The geology and tectonic evolution of this area has been a focus of many researchers and mineral explorers due to the presence of world-class porphyry copper systems but age relationships of some key units remain poorly constrained. The Dushiin Ovoo Formation is a volcano-sedimentary unit widely distributed in southern Mongolia and associated with the mineralized porphyry systems, including Mandakh, Bronz Fox and Kharmagtai. Whilst the mineralized porphyritic intrusives have been well studied, the age and nature of the host volcanogenic rocks has not been well established. The aim of this study was to accurately date the Dushiin Ovoo Formation, which is co-magmatic with the Shuteen pluton, using Rb-Sr isotopic methods. Multiphase plutonic magmatism (Shuteen pluton) associated with porphyry-style copper mineralization and hydrothermal alteration of host volcanic rocks (Dushiin Ovoo Formation) occurs in the Shuteen area. The Shuteen pluton has well defined Rb-Sr whole rock isochron age of 321 ± 9 Ma with SrI of 0.70388 [1], whereas the Dushiin Ovoo andesites yielded 336 ± 24 Ma with SrI of 0.70376-0.70394 [2]. Rb-Sr mineral age dating analysis was carried out in the University of Vienna, Austria by isotope dilution method, using Rb and Sr spikes. Rb-Sr mineral ages of 319 ± 20 Ma (SrI 0.70397), 315.85 ± 0.02 Ma (SrI 0.70397), and 319 ± 0.03 Ma (SrI 0.70396) were measured for volcanic rocks from the Dushiin Ovoo Formation and represents the crystallization age of the andesitic magma. Based on these results we could conclude that the correlation of timing between volcanic and plutonic activity is short, the Shuteen pluton intruded just after the eruption of the Dushiin Ovoo volcanic rocks, because the ages and initial ratios are consistent with each other within error. Our results provide tighter age constraints on the Dushiin Ovoo Formation which further constrains the timing of intrusion of the mineralized Shuteen pluton ($<315.8 \pm 0.02$ Ma but >299 Ma) which was the result of subduction magmatism within the Gurvansaikhan terrane, southern Mongolia.

[1] Iizumi & Batkhishig (2000) *Ann. Meet. GSI*, 319. [2] Batkhishig *et al.* (2010), *Jour. Asian Earth Sci.* **37**, 399–411.