Petrogenesis of Plutonic bodies of Tsagaan Tsahir Uul, Mongolia: Implication to tectonic evolution

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Geochemical and geochronological investigations have been carried out for the Baidrag batholith, and other associated small intrusions of Tsagaan Tsahir Uul area, Bayanhongor, central Mongolia to characterize their petrogenesis and tectonic evolution.

Mongolia is situated at the central part of Central Asian Orogenic belt and it has very complicated geological structures dominated by folding, faults, thrusts and napes. Geological structures, geodynamic settings and tectonic evolution of Mongolia are poorly studied.

So this work describes petrogenesis of plutonic bodies and tectonic evolution of Tsagaan Tsahir Uul area using various results of geochemical and geochronological investigation, to contribute to the study of geology and geodynamic setting of Mongolia.

The Tsagaan Tsahir Uul area situates at the central part of Mongolia and composed of Proterozoic metamorphic rock, Proterozoic granitic body and Late Permian diorite stock (Fig 1.). The granitic pluton is, intruded by NE striking lamprophyre dike, NS striking quartz porphyry dike, and cut by several longitudinal auriferous quartz veins.

The granitic pluton has experienced deuteric alteration. Mineral chemistries changed to some extent, but the chemical compositions of rock are thought to have been almost retained except some highly altered ones.

Mineral assemblages as well as the other chemical characteristics including 87Sr/86Sr initial ratio and Oxygen isotopic composition indicate that the granitic pluton has definitely S-type affinity.

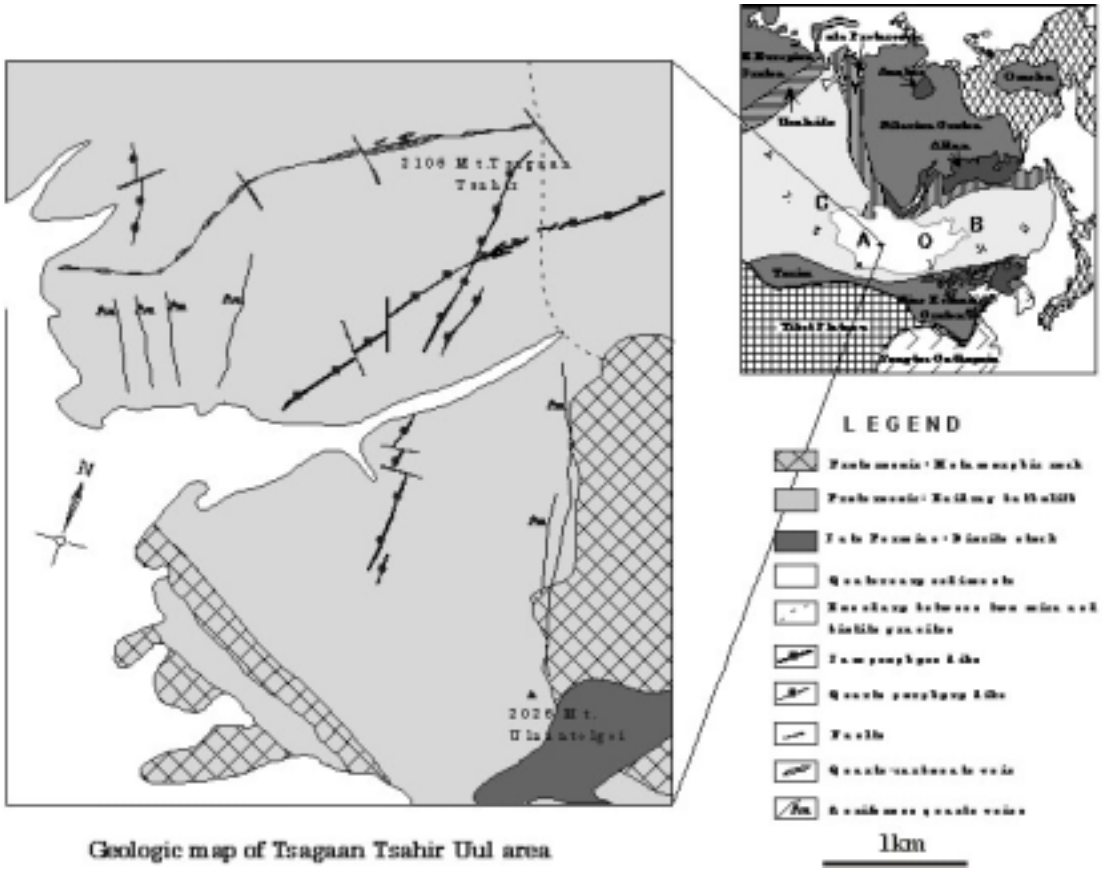
Geochemical features of lamprophyre dike and diorite stock are similar to each other, that they might have been formed in same tectonic environment.

Geochemistry and stable and radiogenic isotopic composition of these bodies indicate that they have I-type characteristics. Mineral chemistry and geochemistry of lamprophyre dike show similar characteristics with Calc Alkaline Lamprophyre.

Chemical compositions, especially trace elements suggest that part of the parental materials of the granitic pluton is subduction related products similar to Archean TTG suite. Another part of parent materials could be Archean to Proterozoic sediments. The granitic batholith might have been formed at the subduction environment between Baidrag Archean microcontinent and Bayanhongor oceanic plate.

Lamprophyre dike and diorite stock are products of Andean type subduction followed by collision during Late Paleozoic to Early Mezosoic in the Bayanhongor belt.

The Tsagaan Tashir Uul area was under subduction environment when granitic pluton intrudes, then it has changed from Andean type subduction to collision in the Late Paleozoic.



Geologic map of Tsagaan Tsahir Uul area