^{40}Ar-^{39}Ar dating of Proterozoic basaltic and granitic rocks in the Nepal Himalaya and their comparison with those in Singbhum area, peninsular India

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Although origin of the metamorphic rocks in the Lesser and Higher Himalaya are believed to be Proterozoic sedimentary and igeneous rocks, there are a few reports of dating of Proterozoic age. We have reported the Middle Proterozoic ^{40}Ar-^{39}Ar ages of about 1.5-1.7 Ga for the Dowar Khola Dolerite from the Siwalik Belt of Sub-Himalaya and the Kabeli Khola Granite in the Lesser Himalaya, both in Nepal (Sakai et al. 2000, Takigami et al. 2002a, 2002b) (**Figure 1**). In this paper, we deal with several age data of both Proterozoic rocks and their country rocks, and discuss on the process how these rocks were incorporated into the Himalaya on the basis of field research and new age data on the Singbhum Complex in peninsular India.

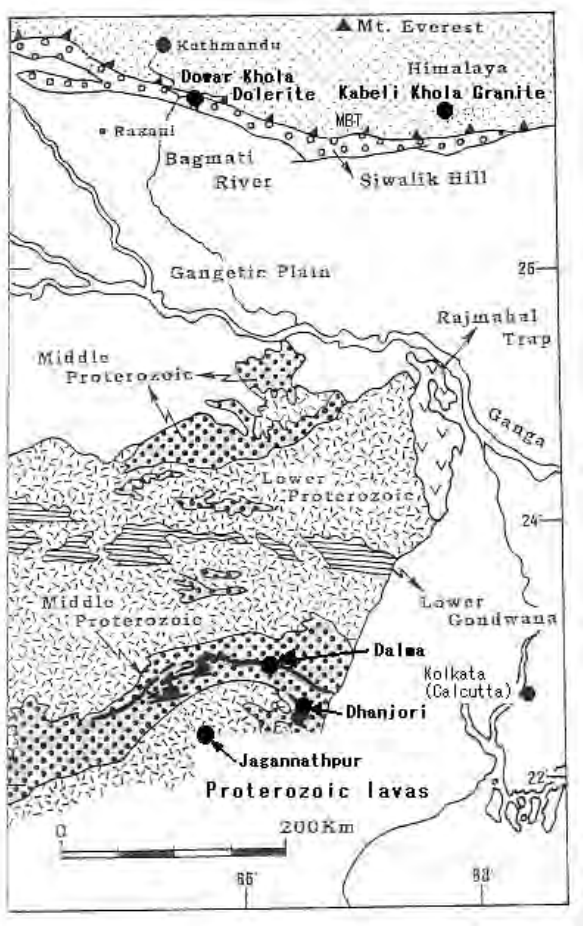

FIGURE 1. Locality map of Dowar Khola Dolerite, Kabeli Khola Granite and correlative Proterozoic lavas in Singbhum area , peninsula India

The Bagmati Group and Dowar Khola Dolerite are distributed in the Siwalik hill about 30 km SE from Kathmandu (**Figure 1**) and are composed of aeolian and lacustrine beds, and dolerite sills, respectively. A thin slice of the Siwalik Group is tectonically sandwiched in the thrust sheets of schuppen zone. The ^{40}Ar-^{39}Ar ages of dolerite are 1741±11 Ma and 1679±4 Ma which are plateau-like ages of 800-1100 °C(about 50-60% ^{39}K) (**Figure 2**). Detrital muscovite separated from micaceous shale of the lacustrine beds shows a ^{40}Ar-^{39}Ar plateau age of 1744±9 Ma (about 98% ^{39}Ar). Moreover, U-Pb chime age of detrital monazite separated from quartzite and Nd-Sm model age for the dolerite show their ages of 1.75-1.8 Ga and 1.6+-0.2 Ga, respectively. These results demonstrate that the dolerite is about 1.7 Ga and detrital grains of the group were supplied from granitic rocks of about 1.8 Ga.

The Kabeli Khola Granite is distributed in the Lesser Himalaya, 115 km SE from Mt. Everest (**Figure 1**). The granite body exposes in the tectonic window of the crystalline nappe, called as Taplejung Window. Ages of 960-1300C (about 86% ^{39}K) are 1.59-1.68 Ga, although ^{40}Ar-^{39}Ar age spectrum of muscovite from the Kabeli Khola Granite in the center of the window indicates the pattern of degassing of Ar (**Figure 3**). This result indicates that the rock has never undergone metamorphism higher than about 350 °C and the original age is older than 1.68 Ga. Moreover, ^{40}Ar-^{39}Ar age at 1200 °C for muscovite from augen gneiss, to the north of Kabeli Khola Granite, is about 1.42 Ga. As Ar gas has been considered to be degassed from the feature of age spectrum, the original age of this muscovite may be older than 1.42 Ga.

In peninsular India, 400-500 km to the south of the Bagmati Group, there are Proterozoic lavas (Dalma, Dhanjori and Jagarnathpur lavas) extending large area (**Figure 1**). K-Ar ages of these lavas were reported to be about 1.6Ga and Rb-Sr age of gabbro intruded into the Dalma lava is 1.6 Ga. Accordingly, the age of these lavas are considered to be 1.5-1.6 Ga (Acharyya 2003). Judging from the occurrence of doleritic rocks and quartzose sandstone from a drill-well at Raxaul to the south of Siwalik hill (**Figure 1**) and seismic profile of the Gangetic Plain, the Dowar Khola Dolerite and the Bagmati Group are considered to have been scraped from supra-continental rocks of subducting Indian subcontinent and accreted to the Asian continent as an accretionary prism. The Kabeli Khola Granite and its cogenetic granitic rocks are likely to be converted into augen gneiss like as Ulleri augen gneiss after strong deformation by advancement of metamorphic nappe.

We had a chance to investigate the Dalma, Dhanjori and Jagarnathpur Lavas and Singbhum Granite in 2003, and collected their samples for the purpose of ^{40}Ar-^{39}Ar dating, Rb-Sr dating, Nd-Sm dating and geochemical studies. In this paper, we would like to refer to some preliminary ^{40}Ar-^{39}Ar dating results.

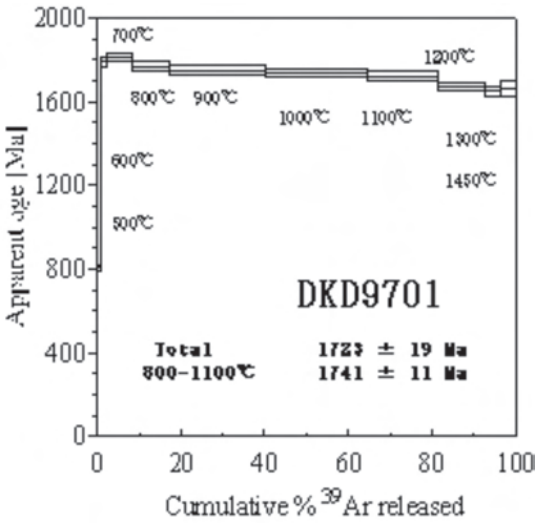

FIGURE 2. Age spectrum of ^{40}Ar-^{39}Ar dating for Dowar Khola Dolerite

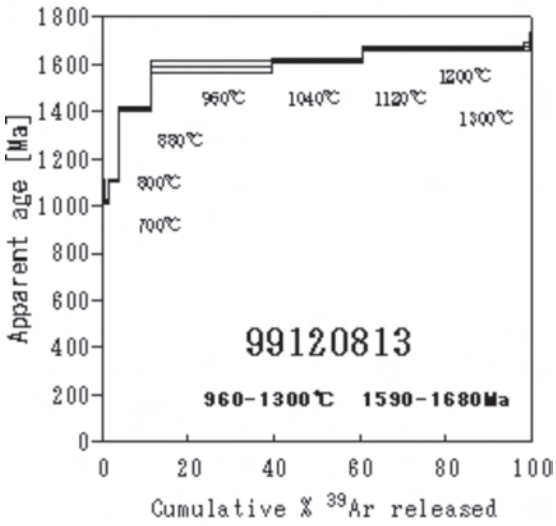

FIGURE 3. Age spectrum of ^{40}Ar-^{39}Ar dating for Kabeli Khola Granite

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