

⁴⁰Ar-³⁹Ar AGES AND PALEOMAGNETIC DATA FOR
METAMORPHIC AND IGNEOUS ROCKS FROM
MAHANADI AND GODAVARI GRABENS,
EAST INDIA (ABSTRACT)

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Age dating and Paleomagnetic studies were performed on metamorphic and igneous rocks collected from Mahanadi and Godavari Grabens, Eastern Ghats in India, in order to estimate the paleo-position of the Indian plate that was a part of Gondwana up to early Cretaceous.

⁴⁰Ar-³⁹Ar datings were performed for three biotites separated from gneisses and a granite of the Mahanadi Graben, seven biotite and whole rock samples from a granite, a khondalite, a charnockite and dolerites of the Godavari Graben. From five samples, ⁴⁰Ar-³⁹Ar plateau ages of about 500–580 Ma were obtained. These ages are consistent with K-Ar and ⁴⁰Ar-³⁹Ar ages reported for metamorphic and granitic rocks from East Antarctica (e.g. Y. TAKIGAMI *et al.*; Recent Progress in Antarctic Earth Science, ed. by Y. YOSHIDA *et al.*, Tokyo, Terra Sci. Publ., 61, 1992).

One biotite sample separated from a gneiss in the Mahanadi Graben shows a plateau age of 677.0 ± 6.4 Ma which had not been reported in the East Antarctica by the K-Ar and ⁴⁰Ar-³⁹Ar methods. This result may represent that the Pan-African Orogeny had not affected the Mahanadi Graben. However, further investigations should be done to clarify it. Age spectra of dolerite dike samples show features of excess Ar, which might be derived from old basement rocks.

In the paleomagnetic studies, AF and Thermal demagnetizations of natural remnant magnetization (NRM), thermomagnetic analyses, magnetic hysteresis analyses were carried out for these samples. A synthetic result indicates that the samples from 2 sites have meaningful NRM's for paleomagnetism. Their NRM directions consist with each other taking α_{95} values into consideration, and may simultaneously magnetize at 544 Ma which is obtained by ⁴⁰Ar-³⁹Ar dating. The virtual geomagnetic pole position (latitude 36.4°S, longitude 166.6°E) was derived from the mean NRM direction (declination -53.1° , inclination 11.4°). The paleo-position of Indian plate at 544 Ma supports previous results reported from East India.

(Received March 13, 1995; Revised manuscript received April 25, 1995)