

FAUNAL TURNOVER OF THE MIOCENE MAMMALIAN FAUNAS OF SUB-SAHARAN AFRICA AND THE MIDDLE MIOCENE PALEOENVIRONMENTAL CHANGE

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In evolutionary paleontology of terrestrial biotas, the Miocene is the most important age especially for evolution of hominids and mammalian faunas. The modern mammalian fauna appeared from the end of this age in Eurasia. In Sub-Saharan Africa, the assemblage of the late Miocene mammalian faunas was very poor, and these faunas were represented by only few faunas. Therefore, this incompleteness of the late Miocene East African faunas, it is very difficult to analyze faunal turnover of Sub-Saharan mammalian faunas and compare with Eurasian and Sub-Saharan faunas of this age.

The paleontological contribution of the Japan and Kenya joint expedition to the Samburu Hills, northern Kenya covered this gap of mammalian evolution in Sub-Saharan Africa.

In this work, the Miocene mammalian faunas in Sub-Saharan Africa is examined the half-life (Kurtén 1959, 1972, 1988) of each faunal assemblages (sets).

Assemblage of the mammalian faunas from early Miocene was comparatively stable and had long half life in Sub-Saharan Africa on the basis of the results of this work.

However, mammalian assemblage changed drastically at the middle Miocene (Astaracian) in Sub-Saharan Africa.

A great number of early to middle Miocene mammalian taxa were extinct and the modern mammalian taxa appeared in this period. The half life of middle and late Miocene mammalian faunas is shortened compared with the early Miocene faunas in the East Africa. This geological event of faunal turnover occurred by the immigration and divergence of open land taxa.

It is evident that the rise of open land taxa is related to the environmental change for the plateau phonolite and basalt volcanism in the middle Miocene East Africa (Pickford 1981) and the worldwide warm and arid event (savannitisation) of continental temperate zone in the middle to late Miocene (Liu 1988). In the middle Miocene (16 Ma) Pacific region, it has been proposed that the tropical event is recognized from shallow marine faunas of the Southwestern Japan (Tsuchi 1986). African and Eurasian land connection was also established before the middle Miocene (16 Ma±) (Bernor *et al.* 1987).

The Astaracian faunal turnover in Sub-Saharan Africa is considered to be caused by immigration and diversity of open country mammalian taxa and that was related to the worldwide middle Miocene warm event and the plateau volcanism in middle Miocene East Africa. Furthermore, the Pleistocene and modern taxa and their direct ancestors of Sub-Saharan Africa appeared from the late Miocene faunas of East Africa. It has been made clear that the Namurungule Fauna is the forerunner of the modern Sub-Saharan mammalian fauna of savanna environments.

As mentioned before, the Hominid Fossil was found from the Namurungule Formation (late Miocene) of northern Kenya. The savannitisation in the Sub-Saharan Africa began in middle Miocene. The origin of hominid bipedalism seems to be closely related to the environmental change from forest to open land (Foley 1984). Human evolution in East Africa is accelerated by the savannitisation of Sub-Saharan Africa which commenced earlier than that of Eurasia and continued throughout the Neogene.