

CONCLUSION

After the Lower Miocene, upheaval of central region of Central Honshu resulted in terrestrial deposition upon low relief of basement rocks in Tokai district during Late Miocene and Pliocene time. The Seto porcelain clay, Yadagawa and Tokoname Formations of Seto Group containing abundant plant remains, were deposited during Late Miocene and Early Pliocene time. In northwestern Kwanto and northern Fossa Magna regions, gradual uplift following deposition of the marine Early and Middle Miocene brought on shallow marine and terrestrial environments in the central region of Central Honshu during Late Miocene and Pliocene time, due to eastward and northward regression of the sea. The Itahana, Yagii, Daido and Akima plant-bearing sediments in Kwanto region and the Sashikiri, Bodaira, Chausuyama and Ohoka plant-bearing sediments in northern Fossa Magna region were deposited on this spread land area. Continuous upheaval in the mountainous terrain took place a violent volcanism in the north-western margin of Kwanto district and the Kabutoiwa upland lake was formed in the area.

The eight major and six small floras from the Late Neogene in central Hoshu are divided into six groups on the basis of their geologic occurrence, composition, paleoecology and age.

Early Late Miocene forest is composed of the evergreen and deciduous broad-leaved trees, accompanied abundantly with conifers. Laurels and evergreen oaks luxuriantly grew mainly on lowland, while the deciduous broad-leaved trees such as beeches and conifers formed a slope forest. The assemblages from the Seto porcelain clay Formation representing a flora of this stage are confirmed to be the Mixed Broad-leaved Evergreen and Coniferous forest or the Mixed Broad-leaved Evergreen and Deciduous forest. The annual mean temperature on lowland in this stage is estimated as about 13°C in Tokai district.

In the middle Late Miocene, the deciduous broad-leaved trees with some evergreen broad-leaved ones were widely distributed on lowland. The evergreen broad-leaved plants were represented by tree species in Kwanto region, while they were by shrub species in northern Fossa Magna region. The middle Late Miocene forest of Central Honshu belongs to the Mixed Mesophytic forest; the mean annual temperature was between 12°C and 13°C.

In the latest stage of the middle Late Miocene the evergreen broad-leaved species disappeared in the central Honshu; the forest was composed almost of the deciduous broad-leaved trees such as oaks, maples, hickory and silverbell-tree. This forest represents the Mixed Broad-leaved Deciduous forest. The mean annual temperature was 11–12°C in Kwanto region.

In the latest Miocene of about 6 Ma, the lowland forests were characterized by many conifers and warm broad-leaved trees of laurels and warm ferns such as *Woodwardia*. The forest in the northern Fossa Magna region represents the Mixed Broad-leaved Evergreen and Coniferous forest, while the forest in the southern Tokai region may belong to the Notophyllous Broad-leaved Evergreen forest. The mean annual temperature was 13°C in the northern Fossa Magna region and probably about 14°C in Tokai region.

During the end of Late Miocene to early Pliocene time, the Ohoka and Ootani floras together with the other minor floras from the Akima and lower Yadagawa Formations are mostly composed of the deciduous broad-leaved species which are rich in riparian element. It was suggested that the lowland in Central Honshu was covered by the Mixed broad-leaved deciduous forest.

In middle Pliocene time, the mountain forests were composed of many kinds of plants, which are the deciduous broad-leaved trees and some conifers. These forests represent the Mixed Mesophytic forest. Estimated mean annual temperature on lowland in the western Kwanto area is about 12.5°C.

Climate of central Honshu on lowland during Late Miocene to Pliocene time estimated both from the floristic and physiognomic analyses shows a temperate aspect with a fluctuation between 10°C and 13°C. Early Late Miocene temperature showing nearly 13°C gradually decreased toward the end of the Pliocene with two warming intervals during the latest Miocene in about 6.5-6 Ma and the middle Pliocene in about 3.5 Ma.

Gradual lowering temperatures with the warming intervals since Late Miocene time are observed in central Honshu of Japan; the climatic changes during the Late Neogene well consistent with those of the Northeastern Pacific region.