



Miocene fossil plants from Bukpyeong Formation of Bukpyeong Basin in Donghae City, Gangwon-do Province, Korea and their palaeoenvironmental implications

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The Tertiary sedimentary basins are distributed along the eastern coast of Korean Peninsula. The northernmost Bukpyeong Basin is located in Donghae City, Gangwon-do Province, Korea. The Bukpyeong Basin consists of Bukpyeong Formation and Dogyeongri Conglomerate in ascending order. The geologic age of Bukpyeong Formation has been suggested as from Early Miocene to Pliocene. In particular, Lee & Jacobs (2010) suggested the age of the Bukpyeong Formation as late Early Miocene to early Middle Miocene based on the fossils of rodent teeth. Sedimentary environment has been thought as mainly fresh water lake and/or swamp partly influenced by marine water. Lately, new outcrops of Bukpyeong Formation were exposed during the road construction and abundant fossil plants were yielded from the newly exposed outcrops.

As a result of palaeobotanical studies 47 genera of 23 families have been found. This fossil plant assemblage is composed of gymnosperms and dicotyledons. Gymnosperms were Pinaceae (e.g., Pinus, Tsuga), Sciadopityaceae (e.g., Sciadopitys) and Cupressaceae with well-preserved Metasequoia cones. Dicotyledons were deciduous trees such as Betulaceae (e.g., Alnus, Carpinus) and Sapindaceae (e.g., Acer, Aesculus, Sapindus), and evergreen trees such as evergreen Fagaceae (e.g., Castanopsis, Cyclobalanopsis, Pasania) and Lauraceae (e.g., Cinnamomum, Machilus). In addition, fresh water plants such as Hemitrpa (Lytracae) and Ceratophyllum (Ceratophyllaceae) were also found.

The fossil plant assemblage of the Bukpyeong Formation supported the freshwater environment implied by previous studies. It can be suggested that the palaeoflora of Bukpyeong Formation was oak-laurel forest with broad-leaved evergreen and deciduous trees accompanying commonly by conifers of Pinaceae and Cupressaceae under warm-temperate climate.