Eocene fossil woods from South China and their paleoclimatic implication

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Two new Eocene dicotyledonous wood species, *Paraphyllanthoxylon hainnaensis* sp. nov. and *Paraphyllanthoxylon maomingensis* sp. nov. are described from Changchang Basin and Maoming Basin, South China respectively. The genus *Paraphyllanthoxylon* was first established by Bailey (1924) to describe angiosperm fossil woods from the Upper Cretaceous of Arizona, USA. Bailey selected *Paraphyllanthoxylon* as the genus name to indicate its affinity to genera *Bridelia* and *Phyllanthus* of the section Phyllanthoideae of Euphorbiaceae. Bailey's diagnosis of this genus included a distinct combination of anatomical characters: indistinct well-defined growth rings, diffuse-porous wood, solitary or radially grouped vessels, simple perforation plates, abundant tyloses, septate fibers, and heterocellular multiseriate rays. As the two types of fossil woods under study show the complete suite of those diagnostic characters, they are assigned to *Paraphyllanthoxylon.* Nevertheless, they are similar but not identical to any *Paraphyllanthoxylon* species described previously and hence, two new species are established. Not only does this discovery provide important fossil evidence for research on the phytogeographic history of this genus, but also contributes to our scant knowledge of Palaeogene wood in China.

Great similarity exists between *P. hainanensis* and the woods of some genera in the *Glochidion* group of the Euphorbiaceae, subfamily Phyllanthoideae, such as subtribe *Flueggeinae*, *Antidesma*, *Bischofia*, *Bridelia*, *Hymenocardia*, *Neowawrea*, *Spondiathus*, and *Uapaca. P. hainanensis* also resembles Neogene wood *Bischofia.javanice* discovered in Hubei, China and Neogene wood *Bischofia palaeojavanica* collected in India. Extant *Bischofia* species are universally distributed in South and South-East Asia, Australia and Polynesia. They exist mainly in South-West, Central, East and West of China as well as Hainan Island. The species of *Bischofia*, the main species of tropical and sub-tropical evergreen rainforest, grow in humid gully of low latitude mountain and sapling is hydrophytic with good shade tolerance. *P. hainanensis* was collected in the coal-bearing series of the Changchang Formation, in which abundant aquatic plants such as *Nelumbo* and *Salvinia natans* L. are also discovered. Thereby, we deduce that the climate of Changchang Basin is warm and humid during Eocene and the Euphorbiaceae trees grow in the lowland rain forest near lake basin.