A Big Earth Data Platform for Three Poles

**Late Eocene sclerophyllous oak from Markam Basin, Tibet, and its biogeographic implications**

1、Description

Sclerophyllous evergreen broad-leaved forests, mainly made up of sclerophyllous oak, Quercus section Heterobalanus (Øerst.) Menitsky, Fagaceae, represent the most typical forest type in the Hengduan Mountains. Their distribution pattern is closely related to the growth and formation of the Qinghai-Tibetan Plateau (QTP). The oldest fossil record of Quercus sect. Heterobalanus so far discovered is from the middle Miocene of the Gazhacun Formation in Namling County, southern Tibet. However, our recent discovery of leaf fossils from the upper Eocene of Lawula Formation in Markam Basin, southeastern Tibet, illustrates that their origin is nearly 20 Myr older than previously assumed. By integrating the results from geometric morphometrics, geographical range expansion, and ecological niche shifts of this section in what is now the QTP and the Hengduan Mountains, we infer that the leaves of Quercus sect. Heterobalanus were already adapted to cool and dry conditions in some local regions no later than in the late Eocene. Then, with the growth of the QTP and late Cenozoic global cooling, the expansion of cooler and drier habitats benefited the spread and development of this section and their leaves exhibited morphological stasis through stabilizing selection. Based on published fossil records and recent discoveries, we argue that Quercus sect. Heterobalanus appeared in the subtropical evergreen and deciduous broad-leaved mixed forests of the southeastern margin of what is now the QTP no later than in the late Eocene. Some taxa spread westwards along the Gangdese Mountains and later the Himalaya, and others spread eastwards and southeastwards, gradually becoming a dominant group of species in the Hengduan Mountains. This dispersal route is contrary to the previous “northwards hypothesis” of this section, and further supports the hypothesis of an East Asian origin for Quercus section Ilex Loudon.

2、Keywords

Theme：Macrofossils,Paleoclimate Reconstruction  
Discipline：Palaeoenvironment  
Places：Tibetan Plateau  
Time：Eocene-Oligocene

3、Data details

1.Scale：None

2.Projection：

3.Filesize：20.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：60.0 | - |
| west：90.0 | - | east：130.0 |
| - | south：30.0 | - |

5、Time frame:2021-01-01 16:00:00+00:00--2021-07-02 03:59:59+00:00

6、Reference method

References to data:

SU Tao. Late Eocene sclerophyllous oak from Markam Basin, Tibet, and its biogeographic implications. A Big Earth Data Platform for Three Poles, doi:10.1007/s11430-020-9826-42022

References to articles:

7、Supporting project information

Second Tibetan Plateau Scientific Expedition Program

8、Data resource provider

name: SU Tao  
unit:   
email: sutao@xtbg.org.cn