

## **Paleoenvironmental reconstruction of a lake deposit from the early Eocene Wutu coal mine, Shandong Province, East China**

**Thierry Smith<sup>1</sup>, Cheng-Sen Li<sup>2</sup>, Ya Li<sup>2</sup>, Qian-Qian Zhang<sup>2</sup>,  
Jian Yang<sup>2</sup>, Jean-Yves Storme<sup>3</sup>, Pieter Missiaen<sup>4,1</sup>,  
Annelise Folie<sup>1</sup>, Sandrine Ladeveze<sup>1</sup>, Johan Yans<sup>3</sup>**

<sup>1</sup> Royal Belgian Institute of Natural Sciences, Rue Vautier 29, B-1000 Brussels, Belgium

<sup>2</sup> Institute of Botany, Chinese Academy of Sciences, Xiangshan, Beijing 100093, China

<sup>3</sup> Faculté Univ. Notre Dame de la Paix, rue de Bruxelles 61, B-5000 Namur, Belgium

<sup>4</sup> Fellow FWO Vlaanderen, Ghent Univ., Krijgslaan 281-S8, B-9000 Ghent, Belgium

The Wutu coal Mine in East China is famous for its diversified and well-preserved early Eocene mammal fauna that represents one of the best early Paleogene reference fauna in Asia. It has yielded numerous specimens of modern placental mammals that coexisted with primitive mammals. Although some authors even proposed a late Paleocene age for the Wutu Formation based on the presence of some primitive mammals with North American affinities such as neoplagiaulacid multituberculates and carpolesiid plesiadapiforms, it is now widely accepted to be of early Eocene age, based on the diversified mammal association of 51 species many including derived taxa belonging to modern orders.

The site has been revisited in the scope of a Sino-Belgian bilateral cooperation program in order to date the deposits more precisely and to reconstruct the paleoenvironment. The new specimens collected come from coal layers 5 and 7 of the Middle coal-bearing Member of the Wutu Formation about 250–280 meters deep. Among them are a skull of the perissodactyl-like ungulate mammal *Olbitherium* and the oldest *Prunus* endocarps. But the most important results come from three borehole cores of the Wutu Formation and the underlying deposits, representing a total thickness of about 500 meter. Thin sections indicate that these sediments were deposited in a lacustrine environment. Palynological analysis suggests a cooler climate than that in other early Eocene localities of supposedly similar age and latitude in Western Europe and North America. Carbon isotope analysis performed on the bulk organic matter from the Wutu sediments allows to determine the age of the deposits more precisely and to reconstruct the evolution of the lake through time.