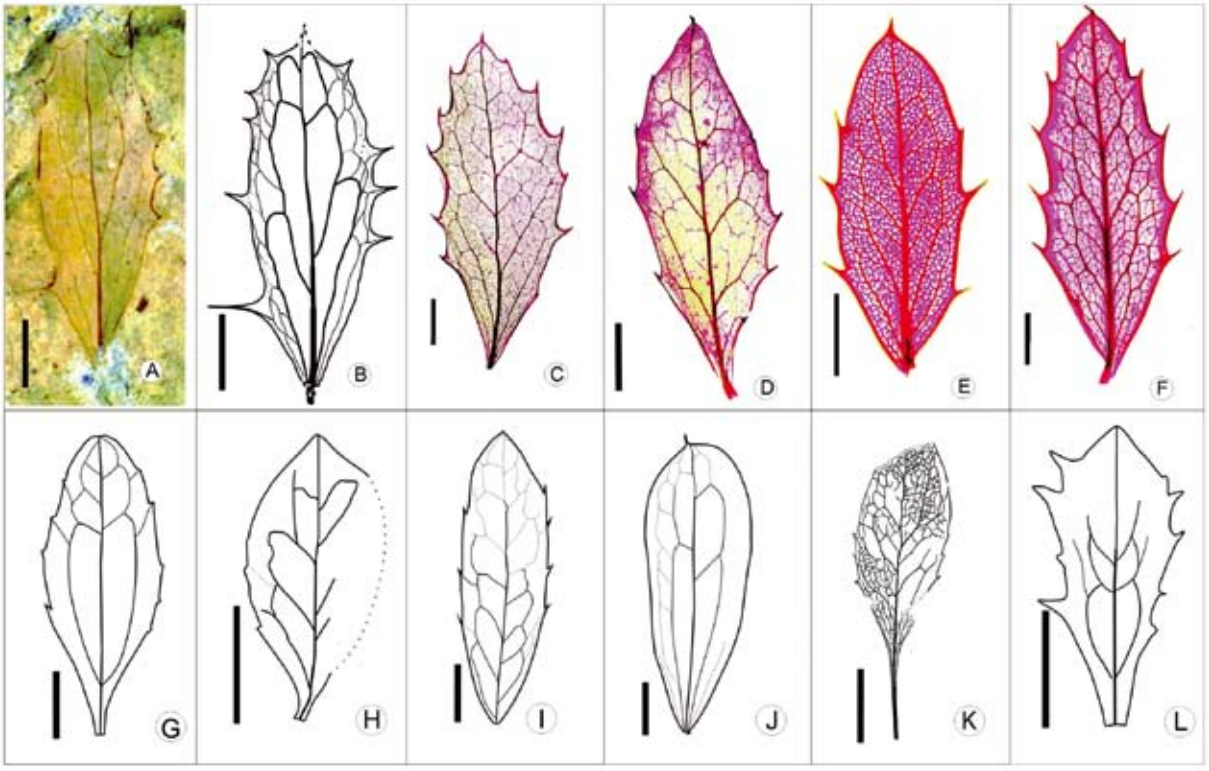
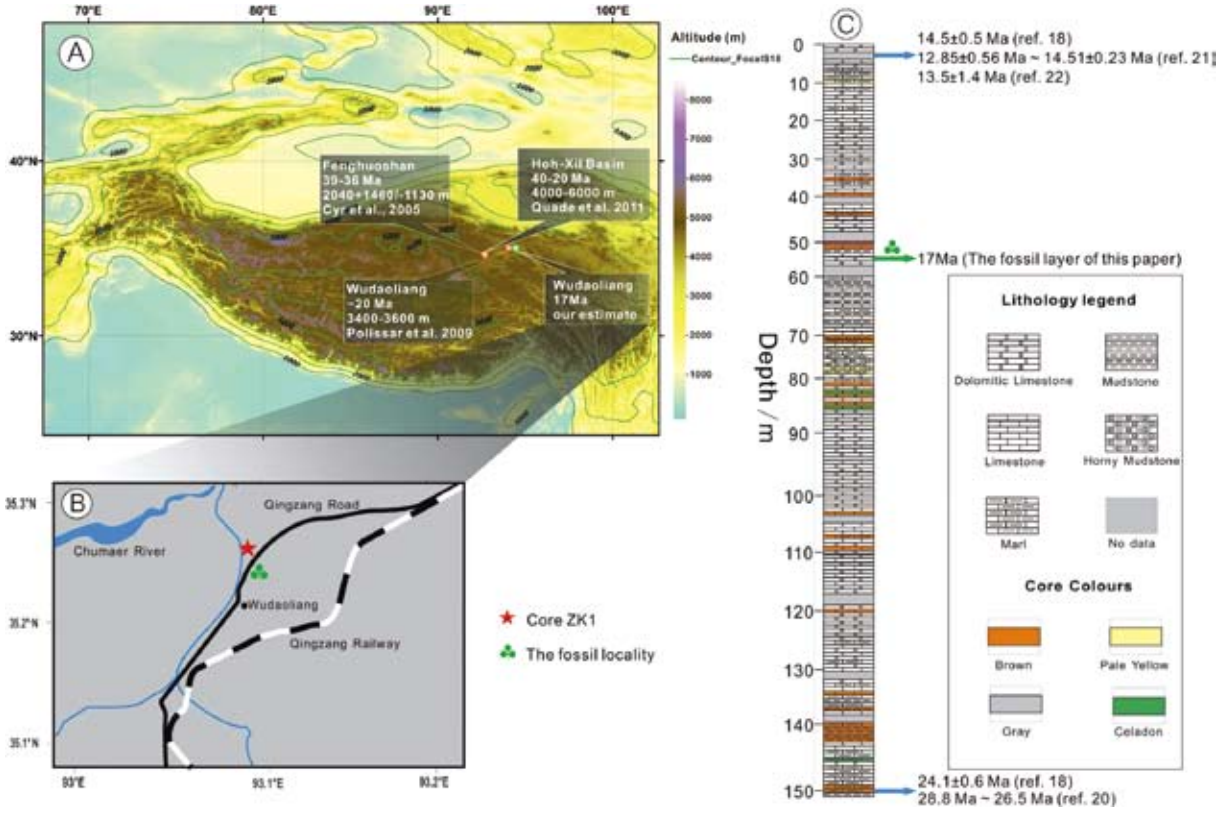
Scientists Use Palaeobotanical Evidence to Estimate Early Miocene Elevation in Northern Tibet

The area and elevation of the Tibetan Plateau over time has directly affected Asia's topography, the characteristics of the Asian monsoon, and modified global climate — but in ways that are poorly understood. Charting the uplift history is crucial for understanding the mechanisms that link elevation and climate irrespective of time and place. While some palaeoelevation data are available for southern and central Tibet, clues to the uplift history of northern Tibet remain sparse and largely circumstantial.

Lately, researchers from the CAS Institute of Botany and the CAS Institute of Vertebrate Paleontology and Paleoanthropology teamed up with scientists from the U.K., Austria and India to report a new early Miocene barberry (*Berberis*) leaf fossil from Wudaoliang in the Hoh-Xil Basin in northern Tibet, at a present altitude of 4611 ± 9 m, whereas its nearest living species (*B. asiatica*) is confined to altitudes of 914–2450 m. Considering the fossil and its nearest living species probably occupied a similar or identical environmental niche, the palaeoelevation of the fossil locality, corrected for Miocene global temperature difference, is estimated to have been between 1395 and



Leaf architecture of extant (C–F) and fossil (A, B, G–L) *Berberis*.



Map showing the fossil locality (A, B) and the stratigraphical section of the Wudaoliang Group (C).

2931 m, which means the Northern Tibet has been uplifted ~2–3 km in the last 17 million years.

It provided a case study to estimate the palaeoaltimetry of Northern Tibet during the early Miocene based on Biological evidence, as well as a comparator for geophysical models and geochemical evidence, which will deepen our understanding of the orogenesis of the whole Tibetan Plateau.

This finding contradicts previous hypotheses which suggest northern Tibet had reached or exceeded its present elevation prior to the Miocene. A reviewer from *Scientific Reports* commented: "The paper by Bin SUN (et al.) is an elegant contribution on past distribution of *Berberis*, and – more importantly – to the debate on the development of the Tibetan Plateau through time. ...There remains little doubt that the reported fossil leave belongs to *Berberis*, and that it was found well outside the altitudinal range known for *B. asiatica*, its nearest living relative. This finding enables the researchers to make important, credible new palaeoelevation estimate for the northern Tibetan Plateau during the early Miocene. Following from this, the northern rim of the plateau was uplifted at a later time than anticipated in existing works."

Their work has been published in *Scientific Reports* (http://www.nature.com/articles/srep10379). This study was supported by the Ministry of Science and Technology of China, the National Natural Science Foundation of China, the State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany and the State Key Laboratory of Loess and Quaternary Geology, Institute of Earth Environment, Chinese Academy of Sciences.