



Applications of High-Precision Geochronology in Evolution

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Date: 6 November 2015 (Friday)

Time: 3:00 pm

Venue: Conference Room, 3/F, Mong Man Wai Building



Abstract

EARTHTIME (www.earth-time.org), led by Dr. Sam Bowring of MIT, is an international scientific initiative aimed at sequencing Earth history through the integration of high-precision geochronology. As an active participant of EARTHTIME, one of my central goals is to apply high-precision geochronology for understanding biological evolution, extinctions, catastrophes, and climate changes. Two of my research projects are listed as below: (1) The age of the Jehol Biota. The fossils of the Jehol Biota are magnificent, exquisitely preserved and extraordinarily diverse. The discovery of the feathered dinosaurs in NE China has led to intense exploration efforts, and the fossils of the Jehol Biota are now known to include a diverse assemblage of plants, invertebrates and vertebrates. These findings have greatly influenced our understanding of the bird origins, the evolution of feathers and flight and the timing of placental mammal radiation. I have established a high precision and high resolution age calibration of the whole Jehol Biota in the classic and less-studied fossil outcrops. The results provide important constraints on the interpretation of the significant fossil within, and improve our understanding of Cretaceous ecosystems in general. (2) When did the first flowers bloom? After decades of controversy and conflicting evidence, most paleobotanists now accept an Early Cretaceous origin for angiosperms. However, the recent discoveries of *Schmeissneria* and *Xingxueanthus* from NE China suggest that the origin of angiosperms could be predate the Early Cretaceous. My age result for these samples provides evidence that the origin of angiosperms is ~40 Ma earlier than previously thought and several hypotheses regarding evolution of atmospheric CO₂ should be reappraised.

~ All are Welcome! ~