# Abrupt climate changes in Taiwan

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## The Issues

Evidence of abrupt climate change such as Younger Dryas Cold Event and Dansgaard-Oeschger Warm Events comes mainly from ice-core data, especially, of Greenland Ice Cores. Here we report updated results of our investigation of the changes in Taiwan.

## The Approach

In this study, carbon-isotope compositions of samples taken from peat-bog cores of Toushe basin (Fig. 1) were measured to investigate the impact of Younger Drays Cold Event on Taiwan's climate. Toushe basin is a recently desiccated small lake (Fig. 1).


★ 23°49'N , 120°53E , 650m ASL ~ 1.75 Km²(~1.49Km D)

Fig. 1 Lake Toushe. Modified after Kuo and Liew (2000)

## Results And Discussion

$\delta^{13}C_{PDB}$ values of the peat-bog core samples are plotted vs. sampling depth in Fig. 2 $\delta^{14}C$ ages and the ranges of $\delta^{13}C_{PDB}$ values of $C_3$ and $C_4$ plants are also shown. The most outstanding feature of Fig. 2 is the different (highly $^{13}C$ enriched) $\delta^{13}C_{PDB}$ values of samples at depths between about 600 to 700 cm. $^{14}C$ ages of these samples fall between ~10,100 and ~111,00 ybp. The results also indic-ate that the changes in the values are completed in decades or less. It appears that abrupt climate change so prominent in the Gleanland ice-core data also occurs in Taiwan and that Younger Dryas Cold Event is probably a global cooling event, except maybe in the Antarctic Regions.

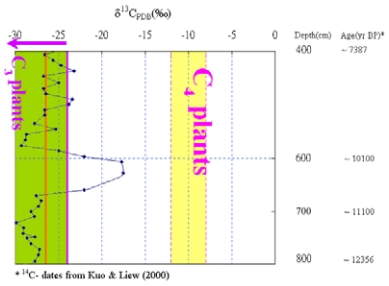


Fig.2 $\delta^{13}C_{PDB}$ values of the samples analysed.

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# Mantle-derived components in Xiangshan uranium deposit, Jiangxi, China

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The Xiangshan uranium deposit, located within Jiangxi-Hangzhou Mesozoic volcanic belt in eastern China, is the biggest uranium deposit so far reported in China. The predominant lithology occurred in the mining district is Jurassic rhyolite with K-Ar age of about 150 Ma. The large-scaled crustal extension took place in the region after rhyolite eruption, and resulted in the formation of Cretaceous fault basins and the intrusion of mantle-derived basic dykes of about 120 Ma. Uranium ore bodies usually occur in faults within rhyolite. The dominant mineral assemblage of the ore includes uraninite, pyrite, quartz, fluorite and calcite with homogenization temperature about 150-250°Ê. The U-Pb age determined on uraninite is about 120 Ma, consistent with intrusion of the dykes.

Helium, argon isotopic composition in fluid inclusions of pyrites, and carbon isotope of calcites are measured in this study. $^{3}He/^{4}He$ ratios varies between 0.1 Ra and 2.4 Ra, $^{40}Ar/^{36}Ar$ ratios falls in the range of 328-700, and ‰$^{13}C$ values are –3.3‰ to –7.7‰. Together with previous data, some conclusions can be draw as follows.

(i) Ore-forming fluid of the deposit was dominantly meteoric groundwater, uranium in the fluid mainly originated from the hosted rhyolite. (ii) Helium, argon and carbon isotope data indicate there existed a mantle end-member in ore-forming fluid. $CO_2$, transporting uranium in the form of $UO_2(CO_3)_2^{2-}$ in ore-forming fluid, are mostly mantle-derived. (iii) The crustal extension happened at about 120 Ma constrained the upwelling of mantle-derived $CO_2$, thus constrained the mineralization age of the Xiangshan uranium deposit.