A Remarkable Climate Shift Around 1700~1500 a BP and It's Significance in The Climate Prediction of The Coming 500 Years

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A striking climate shift around 1700~1500 a BP was extracted from the proxy indicator of $\delta^{18}O$ in peat cellulose from Jinchuan (Hong et al, 2000) (NE China) and Hongyuan (Xuhai et al, in press) (SW China). Temperature was seen to arise around 1700~1500 a BP and then decrease abruptly in about 10~20 years around 1500 a BP. The humidity indictor of$\delta^{13}C$ in peat cellulose both in Hongyuan and Jinchuan indicates a decrease around 1700~1500 a BP. After this period, China suffered a 500-year cold and dry period around 1500~1000 a BP. This typical climate character has also been detected in Dunde Ice core (SW China), GISP2, North Atlantic etc. world widely.

The recent 200 years (200~0 a BP) witnessed a similar climate character to that of the period of 1700~1500 a BP, with an increase in temperature and a decrease in humidity. Numerical evidences have documented the quasi-1500-yr periodicity punctuated throughout the Holocene. Climate in the period of 200~0 a BP can be recognized as a reoccurrence of that in the period of 1700~1500 a BP. To correspond the quasi-1500-yr periodicity, the coming 500 years (2000~2500 a AD) is supposed to be cold and dry similar to the climate conditions in the period of 1500~1000 a BP. Such a prediction has also been widely simulated out by thermohaline circulation (THC) models, the atmosphere general circulation models (AGCM) and so on.

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Complexation of trace metals, and origin and effects of strong ligands in Swiss Lake and river waters

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Free ionic concentrations and complexation of Cu, Zn, Cd, Co and Ni are determined by a set of indirect techniques with ligand-exchange and voltammetry in Swiss lakes and rivers, as well as in FA and HA solutions. The trace metals are mostly bound in strong organic complexes at their natural concentrations in freshwater. A class of very strong ligands (L_1) with low concentration governs the metal speciation at the ambient level of lake and river waters. Complexation of Cu, Ni, Co or Cd was stronger in productive zones, indicating that the strong ligands are linked to biological activities. The specific stronger ligands with recent biological origin are only present at low concentrations in freshwater and represent only a small fraction of DOC. Fulvic and humic acids are likely to play a role as weaker ligands and to be more important in systems with high DOC, relatively high colloidal or metal concentrations, especially if DOC mostly originates from soil or wetland. In systems with high biological productivity and relatively low DOC, such as eutrophic lakes, the specific ligands are probably more relevant. The natural ligands affect not only the metal bioavailability, but also the metal transport and transformation in natural waters, such as adsorption and sedimentation.

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