Rapid Climatic Change in OIS 3: Evidence from Coupling Deep Sea (Bengal Bay) and Ancient Lake (NW Yunnan) Sedimentary Records

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OIS (Oxygen Isotope Stage) 3 is an interstadial time which shows many millennial climatic change signals differing from both cold glacial maxima and warm interglacial ones. The records from the distal Bengal Fan and the ancient lacustrine deposits of Yunnan (China) offer a new evidence to confirm it.

A peculiar rhythmic interbedded sequence consisting of two kinds of deep-sea sediments is displayed with core MD77190 from the Bengal Fan (07°41’0”N,87°49’6”E, 3742m water depth). One of the sediments is rich in planktonic skeletons, opal and organic carbon and another not. It is believed that such a sequence results from allochthocyclic control and is of great importance for mirroring the climatic evolutionary features in the area under study.

According to the distribution and alternation of those sediments and their variability in micropaleontology and chemistry, two phases and five subphases can be recognized for OIS 3 and early OIS 2. The most significant turning point lies at 37-35kaBP, dated by correlating to SPECMAP and reckoning on average sedimentation rate, which divides the rhythmic record into two phases: the low warmer phase (59-37kaBP) and the upper cooler phase (37-21kaBP). The former may be mainly controlled by prevailing SW Indian monsoon while the later influenced to a certain degree by increasingly strong NE monsoon. The other key points for the regional climatic change are at 59ka, 53ka, 42ka, 29ka and 21ka.

The record from the Napahai, a plateau lake silted up (3500m above sea level) of the northwestern Yunnan near the Tibet plateau, shows also the encouraging results. Most signals extracted from pollen, grain-size, $CaCO_3$ and C_{org} content, susceptibility and other proxy documents can be correlated with the above marine record. An essentially synchronous variability existing in the continental and oceanic sediments may be a rule measuring exactly the Indian paleomonsoon.

Most cool and warm episodes detected in the records can be well associated with Heinrich and Dansgaard-Oescheger events found in the Greenland ice core and North Atlantic sediment. It is left for future work to find whether or not a sensitive heat transfer system exists for the teleconnection over the North Atlantic, Northeast Indian Oceans and other regions.