Discovery of glacial-interglacial Indian summer monsoon dynamics

Precipitation carried by the Indian summer monsoon (ISM) is significant for the living environment of the areas occupying nearly half population of the world including southwestern China. Through decadal multi-discipline efforts, Professor An Zhisheng's international group in the Institute of Earth Environment of Chinese Academy of Sciences successfully reconstructed the changing history of the ISM during the Pleistocene (2.6 Ma) based on an analysis of a 666-m long lacustrine sediment core drilled from the Heqing Basin on the southeastern fringe of the Tibetan Plateau, and discovered that glacial-interglacial ISM is driven by changes of cross-equatorial pressure gradient (XEPG) modulated by southern-and northern-hemisphere ice volume and air temperature. This dynamics answered a long-standing puzzle of how and why variations occur in ISM at the glacial-interglacial timescales from a novel perspective and provided a new insight into understanding of ISM variability under the background of global warming and also indicated that global warming might increase summer rainfall in southwestern China. This work was published in *Science* as a research article in 2011. Perspectives on the same issue commented "An analysis of ancient lake bed sediments challenges traditional views of Indian monsoon dynamics". *Nature China* also commented "This new insight into ISM is important for our understanding of global climate. It also highlights the potential influence of global warming on monsoon variability".

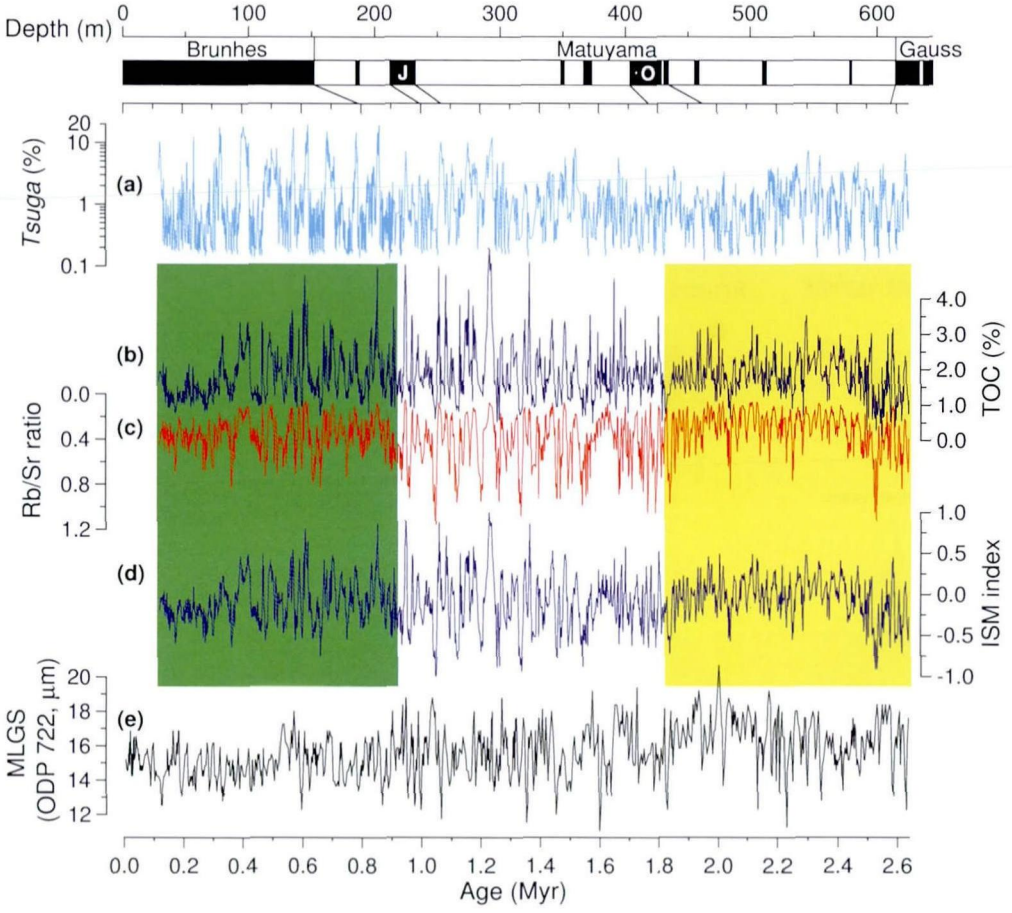

Figure Variations in proxies of sediment core from Heqing Basin