

# Mid-Late Holocene Asian monsoon reconstruction using a sediment core obtained from Lake Rara, western Nepal

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## Abstract

The Asian monsoon is an important component of the Earth's climate system to understand regional and global climate dynamics. Geological proxies have been indicating of gradual decrease of its intensities through

the Holocene that was attributed as changes in insolation in the summer due to the Earth's orbital parameters. Although overall pictures of monsoon reconstructions are consistent among proxies that is stronger summer monsoon at mid-Holocene than the present, the detailed structures are still different from each other. In particular, millennial to centennial structures of monsoon intensities record during the Holocene is still under debate (eg., Overpeck *et al.* 2007). Therefore understanding mechanisms of monsoon required high-resolution paleoclimate records, and hence we present a new sediment core record from Lake Rara, western Nepal (29° 32'N, 82° 05'E). Lake Rara is located at 3,000m above sea level and has a maximum water depth of 168m. Summer climate is controlled by the moist southeasterly monsoon that derives most of the annual precipitation in the region. Thus the lake is one of the ideal locations to reconstruct monsoon variability using various proxies in the sediment. We studied past monsoon intensities using major elements variations in the sediments. The age model of the sediment core is based on <sup>14</sup>C dating on leaves using Accelerator Mass Spectrometry (AMS). Concentrations of major elements were measured by X-ray Fluorescence Analysis (XRF). We then reconstructed temporal variations of the chemical weathering index (CIA) in sediment source area and the degree of bottom-water redox conditions (MnO/Al<sub>2</sub>O<sub>3</sub>) respectively proxies of precipitations and wind strengths at the site. The paper will present evolution and variability of the Asian monsoon during the Mid- to Late- Holocene.

#### References

Overpeck, J. T. and Cole, J. E. (2007) "Lessons from a distant monsoon", *Nature* 445(18): 270-271.

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モンスーンは気候システムの中でも重要な構成要素である。特にアジアモンスーンはその規模が大きく、地域的な環境変化に大きな影響をおよぼす。完新世の夏モンスーン強度は、地球の公転軌道要素変化による北緯 30 度 6 月の日射量減少に伴って弱化しながらも段階的で急激な変動を伴っていることが明らかになってきた。しかしこの数百年から千年規模の変動については復元例によって異なっており議論の余地がある(Overpeck *et al.* 2007)。したがって、モンスーンの変化を感度よく記録していると考えられるネパール・ララ湖堆積物による古気候復元は、これらの問題を解く鍵となると考えられる。本発表ではララ湖堆積物コアの分析結果について報告を行う。