



## Nordenskjöld Lecture

# Asian monsoon-arid environment changes linked to global climate inferred from the continental environmental scientific drilling program in china

### Speaker: Dr. AN, Zhisheng

State Key Laboratory of Loess and Quaternary Geology  
Institute of Earth Environment, Chinese Academy of Sciences

Time: 14 October 2015, 11:00-12:00

Place: Nimbus, Geovetarcentrum, Guldhedsgatan 5A,  
Gothenburg

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### Abstract

Asian monsoon-arid environment is a major component of the earth system, which is influenced, and feedbacks to the global climate changes. History of monsoon-arid environment system variation on tectonic, orbital and millennial time scales since the late Miocene, as well as its connection with global climate, may provide us with better comprehension on natural background trend and dynamics of both regional and global climate and environment change. Continental Environmental Scientific Drilling (CESD) program carried out since the beginning of 21 century, has obtained ~12000 m drilling cores from arid, semi-arid and monsoon regions in China at various time scales. On tectonic time scales, multi-proxies analysis of drilling cores retrieved from Lop



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Nor reveals that there existed a relatively humid period between 7-5 Ma characterized by episodic changes between alternating lacustrine and fluvial-eolian environments, before the developing of modern Taklimakan desert in 4.9 Ma associated with the global climate changes and northwestern Tibetan Plateau growth. The first Indian monsoon variation history over the past 2.6 Ma from continental record has been reconstructed from high quality drilling of the Heqing paleolake basin. The record indicates that Indian monsoon changes are closely associated with the cross-equatorial pressure gradient induced by the ice volume changes of southern and northern hemispheres at glacial-interglacial time scales. The offshore drilling cores documented the anti-phase relationship of the Westerlies and the Asian summer monsoon for both glacial-interglacial and glacial millennial timescales over the last 32 ka. In addition, the dominant Asian summer monsoon circulation has shown its linkages to the changes of insolation, ice volume, atmospheric CO<sub>2</sub>, North Atlantic climate, and lower boundary condition changes in East Asia. In general, Asian monsoon-arid environment changes at different time scales are primarily due to different controlling factors.

## **Short biography of the speaker**

An Zhisheng is a professor of earth system science and global change at the State Key Laboratory of Loess and Quaternary Geology, Institute of Earth Environment, Chinese Academy of Sciences. He is a member of Chinese Academy of Sciences, Fellow of the American Geophysical Union. His research on East Asian monsoon proxies, Asian monsoon-arid evolution history in Cenozoic, and monsoon dynamics has stimulated the boom of the past global change studies in Asia. The paradigm shift from classical Quaternary geology to monsoon dynamics is considered one of his most important contributions to the Earth System Science studies. Through his multidisciplinary research spanning across geology and atmosphere sciences, the "Paleomonsoon Control Theory" has been proposed in 1990s, which has afterwards become a working model in Asian climate change research. Prof. An is also among the first to explore the teleconnection between the climate changes in high-low latitude regions and northern-southern hemispheres. This greatly contributes to the understanding of climate dynamics at the global scale. Prof. An's research has also provided critical insights when taking the strategy and countermeasures facing the challenges of human activity impacts on the environment and climate, particularly, when making policies on the ecological governance and urban dust pollution control in West China. Prof. An was recently awarded an honorary doctorate by the Science Faculty of University of Gothenburg due to his great contribution to Earth Science and our University.

## ***About Nordenskjöld Lecture***

The Nordenskjöld Lecture is the high profile session of the Earth System Science seminar series at the University of Gothenburg, designed to bring the leading world researchers to share their thoughts and perspectives. The lecture honours the memory of Otto Nordenskjöld, the first August Röhss professor of Geography and Ethnography at our university, who organised and led the first Swedish Antarctic expedition 1901-1903.