



INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES (IS-Geo)
KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES (KIGAM)

CUSTOMIZED TRAINING COURSE ON Regional Climatic Change and Paleoclimatic Model in Asia

The International School for Geoscience Resources of KIGAM presents a customized training course on **Regional Climatic Change and Paleoclimatic Model in Asia**. The course will take place at the Ara room of International School for Geoscience Resources of KIGAM in Daejeon (Korea) in **March 12 through March 14, 2014** and will include the following topics:

Title	Date	Instructor
<i>Topic 1. Understanding the Impacts of the Tibetan Plateau on the Asian Monsoon</i>		
Day 1. Mechanical and thermal effects of the Tibetan Plateau on the general circulation and climate	MAR. 12.2014	Dr. Anmin Duan (LASG/IAP/CAS)
Day 2. Multi-scale variability of Asian summer monsoon and related to the Tibetan Plateau	MAR. 13.2014	
<i>Topic 2. Climate Variability in the North Pacific region</i>		
Day 3. Climate Variability in the North Pacific region	MAR. 14.2014	Dr. Masami Nonaka (JAMSTEC)



COURSE INFORMATION

• Agenda

- This course will provide an introduction to our understanding of impacts of the Tibetan Plateau on the Asian monsoon and its multi-scale variability, with emphasis on the recent progresses in data analysis and numerical modelling.
- This course will provide an introduction to ocean and atmosphere variability in the North Pacific region on interannual to decadal time scales.

• Summary

- Theoretical framework of the climate effects of the Tibetan Plateau (TP) was developed to reveal the mechanism responsible for the circulation anomaly due to thermal forcing of the TP. Numerical simulation demonstrated that the thermal effects of large-scale orography is crucial for the formation of South Asian summer monsoon (SASM) because the surface SH of the TIP is the major driving force of water vapor transport required for the genesis of the north branch of SASM and the East Asian summer monsoon (EASM). Influences of the TP on the formation of Asian climate in different seasons are explored, with emphasis on the TP mechanical forcing in winter and the thermal forcing in spring and summer. The atmospheric heat source over the TP, particularly the spring SH source, presents a clear multi-scale variability and contributes largely to the anomalous rainfall pattern over EASM regions. Challenges for further understanding the mechanism of TP forcing in multi-scale variability of Asian monsoon are also discussed.
- North Pacific Ocean circulation, its variability, and its relation with atmospheric variability on interannual to decadal time scales will be covered. Also, basic mechanisms of them will be covered.

• Course Covered

- Four main topics will be covered:
- Theoretical framework of mechanical and thermal forcing of the Tibetan Plateau
- Data analysis and numerical modelling for understanding the climate effect of the Tibetan Plateau
- Multi-scale variability (i.e., mainly on inter-decadal, inter-annual, and intra-seasonal variation) of the Asian summer monsoon related to the thermal forcing of the Tibetan Plateau
- Variation of the thermal effect of the TP and its possible connection with natural variability and anthropogenic forcing.



- Introduction to ocean circulation, its variability on interannual to decadal time scales, and its relation with atmospheric variability in the North Pacific region.
- Introduction to basic mechanisms of ocean variability and ocean-atmosphere interactions.

- **Course Requirements: Prerequisite**

- A basic knowledge in meteorology is required.
- Knowledge of basic dynamics is required.
- Knowledge of basic statistical analysis is required.
- Course language will be English.

- **Who should Attend?**

- This general course is designed for a large audience, mainly for geologists, meteorologists, scientists involved in the study of large-scale mountain effect on climate.
- This general course is designed for scientists or engineers who are interested in but not familiar with ocean and climate interannual to decadal variability.

- **Summary of topic content and learning objectives**

- **Topic 1. Understanding the Impacts of the Tibetan Plateau on the Asian Monsoon**

The role of the mechanical and thermal effects of the Tibetan Plateau upon the general circulation and Asian summer monsoon, together with its multi-scale variability will be overviewed with emphasis on data analysis and numerical simulations by using general circulation model and climate system models. Challenges for further understanding the mechanism of TP forcing in multi-scale variability of Asian monsoon are also discussed.

- **Day 1. Mechanical and thermal effects of the Tibetan Plateau on the general circulation and climate**
 - 10:00-12:00 Introduction to climate effect of the Tibetan Plateau
 - 13:00-14:00 Recent climate change over the Tibetan Plateau
 - 14:00-16:00 Inter-decadal change of the Asian summer monsoon and its possible connection with Tibetan Plateau
 - 16:00-17:00 Inter-annual and intra-seasonal variation of East Asian summer monsoon related to the Tibetan Plateau





- **Day 2. Multi-scale variability of Asian summer monsoon and related to the Tibetan Plateau**
 - 10:00-12:00 Reasons for the variation of thermal forcing of the Tibetan Plateau
 - 13:00-14:00 Uncertainties in estimating the thermal effect of the Tibetan Plateau in data and models
 - 14:00-16:00 Contributions of the Tibetan Plateau and oceanic forcing to the Asian summer monsoon
 - 16:00-17:00 Ongoing and future projects of the Tibetan Plateau study in China

- **Topic 2. Climate Variability in the North Pacific region**

Ocean variability and its interactions with atmosphere in the tropical and midlatitude North Pacific will be overviewed. Also, mechanisms for oceanic and climate variability on interannual to decadal time scales will be discussed. The objective of this course is to obtain basic knowledge about ocean circulation, its variability, and its relation to the atmosphere on those time scales.

- **Day 3. North Pacific climate variability**
 - 10:00-11:00 Ocean circulation and temperature field
 - 11:10-12:10 Tropical Pacific climate variability
 - 13:10-14:00 Relation between the tropical and North Pacific variability
 - 14:10-15:00 Ocean variability in the North Pacific
 - 15:10-16:00 Air-sea interaction in midlatitudes
 - 16:10-17:00 Decadal variability in the North Pacific



About the instructor – Dr. Anmin Duan



Dr. Anmin Duan is a Senior Researcher in the State Key Laboratory of Numerical Modelling for Atmospheric Sciences and Geophysical Fluid Dynamics (LASG), Institute of Atmospheric Physics (IAP), Chinese Academy of Sciences (CAS).

About the instructor – Dr. Masami Nonaka



Dr. Masami Nonaka, Senior Scientist/Team leader, the Climate Variation Predictability and Applicability Research Program, and Application Laboratory, Japan Agency for Marine-Earth Science and Technology (JAMSTEC). My main research topic is ocean and climate variability in the Pacific domain in interannual to decadal time scales. Particularly, I am interested in roles of ocean in climate variability. My recent researches focus midlatitude ocean-atmosphere interaction. While midlatitude ocean has been considered as a slave of the atmosphere, recent studies with high resolution satellite observational data and numerical simulations have revealed active roles of midlatitude ocean, especially in its frontal zones.