



# REVEALING THE SECRETS OF MONSOONS

*An international team of scientists explored new research on the important Asian storms at a workshop sponsored by the Chinese Academy of Sciences and TWAS.*

**B**EIJING –The annual cycle of monsoon storms have for millennia shaped Asia’s culture and economy. In good years, the monsoons soak farm fields and replenish water systems. In bad years, crippling storms wipe out crops, destroy villages and wreak economic havoc. And in the absence of monsoons, there can be deep droughts.

At a workshop sponsored by the Chinese Academy of Sciences [CAS] and TWAS, young scientists from 10 nations heard the latest research into monsoon dynamics and their impacts. And they learned of new forecasting methods that may aid farmers and disaster readiness efforts throughout much of Asia.

In China, India, Thailand and other countries of Southeast Asia, the economy is heavily dependent on agriculture, and agriculture is heavily dependent on the monsoon. Today, however, climate change and other factors may be changing monsoon dynamics. The impacts are uncertain, but they could be felt by up to 60% of the world’s population.

“If flooding occurs, or drought occurs, it’s very serious and very dangerous”, said Bueh Cholaw, deputy director of the CAS-TWAS Centre of Excellence for Climate and Environment Sciences [ICES]. “It can destroy 10% of the gross domestic product of an entire country. That’s why so many young people in developing countries are interested in monsoon science.”

The eight-day “ICES International Training Workshop on Asian Monsoon Variability and Predictability” was held in Beijing from 7 to 15 July 2014. More than 30 young scientists and advanced science students heard presentations from scientists from China and the United States, and a number of them presented their own research at the workshop. They also visited laboratories operated by ICES and the CAS Institute of Atmospheric Physics [IAP], which hosts the Centre, and the University of Chinese Academy of Sciences. ICES is one of five CAS-TWAS Centres of Excellence that received new CAS investments in 2013.

## ADVANCING SCIENCE, BUILDING COOPERATION

“With training like this, we can address common challenges more effectively”, said Cao Jinghua, deputy director general of the CAS Bureau of International Cooperation. “CAS emphasizes cooperation with developing countries, and we



▲ A flood in Bangladesh (Photo: UK Department for International Development (Rafiqur Rahman Raqu)

▼ From left: Bueh Cholaw, Xue Feng and D.M. Hasanthie Sandarekha Dissanayake,





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*Bueh Cholaw*

believe that by working together here, we'll be able to sow the seeds of friendship for future cooperation.”

“At events like this, you can strengthen your scientific knowledge and build your career”, Edward Lempinen, the TWAS public information officer, told the participants. “But you have a responsibility to share this knowledge. When you go home, share it at your universities and institutes, with your colleagues and your students. That way, they become stronger.”

The workshop opening also was attended by IAP Director General Zhu Jiang; ICCES Director Lin Zhaohui; and Xiao Ziniu, deputy director of the China Meteorological Administration Training Centre.

Learn more:  
<http://twas.org/node/6387>

## INNOVATIONS IN MONSOON SCIENCE

In basic terms, a monsoon is a large-scale change in the prevailing wind that shifts with the season – usually spring and autumn – bringing changes in rainfall and temperature. In winter, there is a contrast between the warm ocean and the cold land, so the wind comes from the north. In the summer, it's the reverse. The summer monsoon is often associated with heavy rains and sometimes destructive storms.

Research by Xue Feng and colleagues found that the monsoon's source is deep in the Southern Hemisphere. The interplay of low-pressure atmospheric conditions in Antarctica sends air flowing north to engage with high-pressure systems over Australia and along the eastern coast of Africa. That circulates air across to South and Southeast Asia, where it takes shape as a monsoon.

But there are factors that can temper or amplify the pattern. For example, heavy snow in the Tibetan plateau can reduce the contrast in land-ocean temperatures, Xue said.

From year to year, there can be tremendous variability, and the monsoon itself may be changing because of climate change. “In a warming climate, the water temperature is also increasing”, said Bueh. “So atmospheric energy is also increasing. With increased warming, the variability of the Asian monsoon becomes stronger and stronger.

“This is why people in developing countries and Asian countries are more and more concerned about climate change.”

For the young scientists attending the course, the scientific insights that came during the workshop offered practical benefits.

D.M. Hasanthie Sandarekha Dissanayake works at the Industrial Technology Institute in Sri Lanka. Climate change is a priority area in Sri Lankan science policy, and her institute is opening a climate research unit.

The experienced and expert scientists at the workshop “are very helpful, and we can have collaborations with them”, she said. “This is a good chance to build relationships – that will be very helpful to the efforts in our country.” ■