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WEEKLY EDITION

## International Cooperation

### Space Exploration Needs More Int'l Cooperation

Edited by WANG Xiaoxia

China is willing to work with all countries to strengthen exchanges and cooperation to jointly explore the mysteries of the universe, make peaceful use of the outer space, and promote space technology to better benefit people around the world, Chinese President Xi Jinping said on November 21 in a congratulatory letter to the United Nations/China Global Partnership Workshop on Space Exploration and Innovation.

At the workshop, China issued an action statement on promoting further international cooperation in space technology and exploration, within the framework of the United Nations.

In recent years, China has made remarkable progress in space exploration and regularly carried out missions, including the launches of Chang'e lunar probes, the Mars probe Tianwen-1, solar exploration satellite Xihe, as well as the construction of the country's space station, while a Moon landing is also on the agenda.

These missions have continuously deepened people's understanding of the universe, while space exploration-related technology has comprehensively improved the efficiency of various industries, spinning off into benefits for humans.

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### Chinese Scientists Help Boost Maize Harvest in Kenya

By WANG Xiaoxia

White maize is one of the staple foods of Kenyans, but the country's production can't meet its population growth. In addition the region is facing food shortages due to decreasing production caused by the recent drought in the Horn of Africa, said David Mburu, principal of the College of Agriculture and Natural Resources at Jomo Kenyatta University of Agriculture and Technology (JKUAT).

For Mburu, the bumper harvest of white maize in the agriculture demonstration area of Sino-African Joint Research Center (SAJOREC) is no doubt good news. The harvest means a lot for Kenya and other African countries, he said.

In April 2022, scientists from Chinese Academy of Sciences (CAS) and JKUAT began the trial planting of a local maize variety. Five months later, the maize planted in SAJOREC demonstration area matured at the right time, and its yield is about 50 percent higher than the similar varieties in surrounding areas.

Mburu said, "It is a variety that can grow well in low rainfall areas," adding that the college will do its best to cooperate with SAJOREC to expand the scale of trial planting and conduct in-depth research on drought and insect resistance to further increase the yield.

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David Mburu, principal of the College of Agriculture and Natural Resources at JKUAT, delivers a speech at the ceremony for the harvest of white maize variety. (PHOTO: XINHUA)



GONGGA Contributes to Global Carbon Budget

The photo shows Qiongmumangri peak in the Qinghai-Tibet Plateau. GCP's approval of China's GONGGA, one of the most recent achievements of the second Tibetan Plateau Scientific Expedition and Research, indicates that Chinese scientists have shifted their role from data contributors to leaders in atmospheric inversion systems. (PHOTO: XINHUA)

## Editor's Pick

### Tibetan Plateau Scientific Expedition: Tackling Climate Change, Protecting Eco-environment

By LU Zijian

Developed by researchers taking part in the second Tibetan Plateau Scientific Expedition and Research, the Global Observation-based System for Monitoring Greenhouse Gas (GONGGA) was recently selected as one of the four advanced inversion systems for the global carbon budget calculation by the Global Carbon Project (GCP).

This is one of the most recent achievements of the second Tibetan Plateau Scientific Expedition and Research.

#### What is GONGGA?

GONGGA is an inversion system that can estimate the carbon flux of land and sea at a regional, or even global level and assess the global carbon budget in real time.

The system was designed and operated on China's Tianhe supercomputer, and the generated data was independently evaluated and verified by GCP. The results showed that the error of mean square root of monitoring data and GONGGA's calculation, was the smallest, compared with the growth rate of atmospheric CO<sub>2</sub> observed by the National

Oceanic and Atmospheric Administration of the U.S.

GONGGA also has some features that distinguish itself from other inversion systems. For example, the system adopts a unique optimized framework with double channels, realizing the effective separation and joint assimilation of the error between CO<sub>2</sub> flux and concentration, which could ensure the precision of the inversion calculation.

In addition, the system could be flexibly transformed to a verification platform for the domestically developed Carbon Dioxide Observation Satellite (TanSat), connecting the design, launch and application of TanSat and achieving the effective interaction between the payload index of TanSat and the inversion accuracy of GONGGA.

The approval of GCP indicates that Chinese scientists have shifted their role from data contributors to leaders in atmospheric inversion systems.

Josep (Pep) Canadell, executive director of GCP, said that he appreciates China's contribution to GCP and hopes the country can be more deeply involved with the program.

#### Resource and environment investigation

Initiated in 2017, the second Tibetan Plateau Scientific Expedition and Research has achieved more than just the GONGGA inversion system. Progress has also been made in the investigation of resources and environment.

Yao Tandong, academician of the Chinese Academy of Sciences (CAS) and chief scientist of the Second Tibetan Plateau Scientific Expedition and Research, said that the population carrying capacity still has ten million left, and the carrying capacity of environment, water and land of the Qinghai-Tibet Plateau is more than enough.

Particular research was done to figure out the imbalance features of the Plateau, under the influence of climate change. The Plateau was called Asian Water Tower because many large rivers such as the Yangtze, Yellow and Lancang rivers have their origins there.

According to Yao, global warming caused the reduction of solid state water and increase of liquid state water, resulting in an imbalance that could bring a series of disasters. See page 3

### ITER's First Wall Panel Good to Go

By LIN Yuchen

The enhanced - heat - flux first wall panel for the world's largest nuclear fusion reactor project -- International Thermonuclear Experimental Reactor (ITER), has been produced successfully in China, signifying the country's leading role in the technology, according to China National Nuclear Corporation on November 23.

Designed for sustaining plasma hot

enough in 100 million degrees Celsius, the panel performs substantially better than its original design requirements, and is now suitable for mass production.

"Our Chinese team has made arduous efforts for this first wall panel," said Luo Delong, an official at the Ministry of Science and Technology, adding that in the process, we contributed our Chinese wisdom and strength through multiple technological breakthroughs.

Currently based in France, ITER has been co-funded by seven partners since 2006, when China officially joined the program. Chinese researchers undertook around nine percent of research and construction work.

ITER, also known as the world's largest "Artificial Sun," is expected to generate clean, carbon-free energy to replace fossil fuels once and for all, by imitating the way the sun gives out light and heat via fusion reaction.

### Shenzhou-15: A Leap Forward for China's Space Station

By Staff Reporters

The Shenzhou-15 manned spaceship was launched on November 29, and is expected to wrap up the last stage of the space station construction and launch the first stage of its application and development, according to the China Manned Space Agency.

Shenzhou-15 crew members Fei Junlong, Deng Qingming and Zhang Lu entered the space station and met with the Shenzhou-14 crew on November 30, a historic gathering that increased personnel at the in-orbit space lab to six for the first time.

It takes about five days for the six astronauts to complete the first in-orbit crew rotation in China's space station. The Shenzhou-15 crew will stay in orbit for six months, and they will conduct three to four extravehicular activities and install the Mengtian lab module extended pump sets and exposure payload platform.

Apart from the regular maintenance of the space station, the Shenzhou-15 crew will also carry out more than 40 experiments and tests in the fields of space science, space medicine and space technology.

After the Shenzhou-15 manned spaceship successfully docked with Tianhe module, the space station combination has expanded to its largest configuration with three modules and three spaceships, having a total mass of nearly 100 tons.

During their stay in orbit, the Shenzhou-15 crew will also see the arrival of the Tianzhou-6 cargo craft and Shenzhou-16 manned spaceship. They are projected to return to Earth in May 2023.

## WEEKLY REVIEW

#### Largest In-Kind Contribution Agreement Signed by MOST and SKAO

China's Ministry of Science and Technology and the SKA Observatory (SKAO) signed an in-kind contribution agreement online on December 2, which was SKAO's largest single procurement of in-kind contribution. China is one of the seven initiators of SKAO, and participated in all important moments of the development of SKAO.

#### World's Highest-speed DMU Debuts in UAE

A diesel multiple unit (DMU) developed by CRRC Sifang for the national railway project of the United Arab Emirates (UAE) was unveiled on December 2. The DMU for UAE was designed with an operation speed of 200 km/h, the highest in the world.

#### Nuclear Island Installation of Linglong One Begins

The Linglong One (also known as the ACP100), the world's first commercial onshore small modular reactor, is a multi-purpose pressurized water reactor developed by the China National Nuclear Corporation. The installation of its nuclear island started recently in South China's Hainan province.

#### New Technology Developed to Monitor Cell-cell Contact

A research team from the Chinese Academy of Sciences has developed an intercellular genetic technology to monitor cell-cell contact and to trace cell contact histories by permanently marking contacts between cells, offering technological support for research on embryogenesis and tumorigenesis.

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