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CHINA SCIENCE AND TECHNOLOGY

NEWSLETTER

The Ministry of Science and Technology
People's Republic of China

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IN THIS ISSUE

SPECIAL ISSUE

China's New 5-Year S&T Blueprint

During the 12th Five-year Plan period (2011-2015), China will pick up the pace to implement major S&T projects, making the visionary deployment for basic research and cutting edge technologies, fostering strategic and emerging industries, and enhancing the contribution of S&T activities to the improvement of people's livelihood, said WAN Gang, Chinese Minister of Science and Technology at an annual meeting held on

November 1, 2010 by China Association for Science and Technology.

WAN said during the 12th Five-year Plan period, China will speed up the implementation of major S&T projects, making them a leader of proprietary innovation and system reform. China will optimize the distribution of S&T resources, focusing on systematic innovations, and striving for more significant progresses. Meanwhile, China will make major deployments in the area of clean energy, deep-sea probe, and deep underground exploration. China will also make visionary deployments for basic research and cutting edge technologies in the areas of protein, quantum manipulation, nanotechnology, development/reproduction, stem cells, and global climate change, striving for breakthroughs in core and key technologies, such as proteomics, nanotechnology, and optical communication network. Additionally, China will enhance the capacity building of major national innovation centers and innovation service platforms.

WAN added that China will foster and develop strategic emerging industries, speeding up the pace of traditional industry upgrade using high technology, and strengthening the spin-off and diffusion of high-tech findings in the area of information technology, new materials, and new energy. China also plans to enhance the capacity building of national high-tech parks, and foster high-tech leaders of international competitiveness.

WAN pointed out that China will enhance the contribution of science and technology to the improvement of people's livelihood, speeding up technology innovations in the area of agriculture, promoting the coordinated development of the urban and rural areas, implementing nationwide science and technology projects concerning health, strengthening the R&D in the areas of water environment management, ecological environment protection, environmental pollution control, and infectious diseases control, improving extreme weather and major natural disaster prediction and warning, and enhancing China's disaster mitigation and adaptation capability.

INTERNATIONAL COOPERATION

China-Romania S&T Cooperation Meeting

The 40th China-Romania Science and Technology Cooperation Committee meeting was held on October 18, 2010 in Beijing. CAO Jianlin, Chinese Vice Minister of Science and Technology and Dragos Mihael Ciuparu , Head of Romanian National Authority for Scientific Research, co-chaired the meeting. At the meeting, both sides introduced S&T planning and policies, S&T development, and international cooperation in their respective countries, and exchanged views on further promoting the bilateral cooperation in the area of science and technology. Both sides reviewed the projects implemented since the last session, and adopted a new intergovernmental S&T cooperation program made up of 21 projects, involving agriculture, medicine, materials, physics, mathematics among others. The two sides inked a protocol after the meeting.

CAO Met DOE Undersecretary

CAO Jianlin, Chinese Vice-Minister of Science and Technology, met with Dr. Steven E. Koonin, the visiting undersecretary of the United States Department of Energy, on November 3, 2010. The two sides exchanged views on further strengthening cooperation between the two countries in the area of clean energy and basic research.

CAO briefed the other side of the latest development at China-US Clean Energy Research Center, adding that energy is a major focus of the bilateral cooperation. He stressed that China is willing to strengthen cooperation with the United States in the area of basic research, and suggested that a long-term and stable cooperative tie be built between the national laboratories of two countries, while enhancing exchange and cooperation between scientists, especially young scientists.

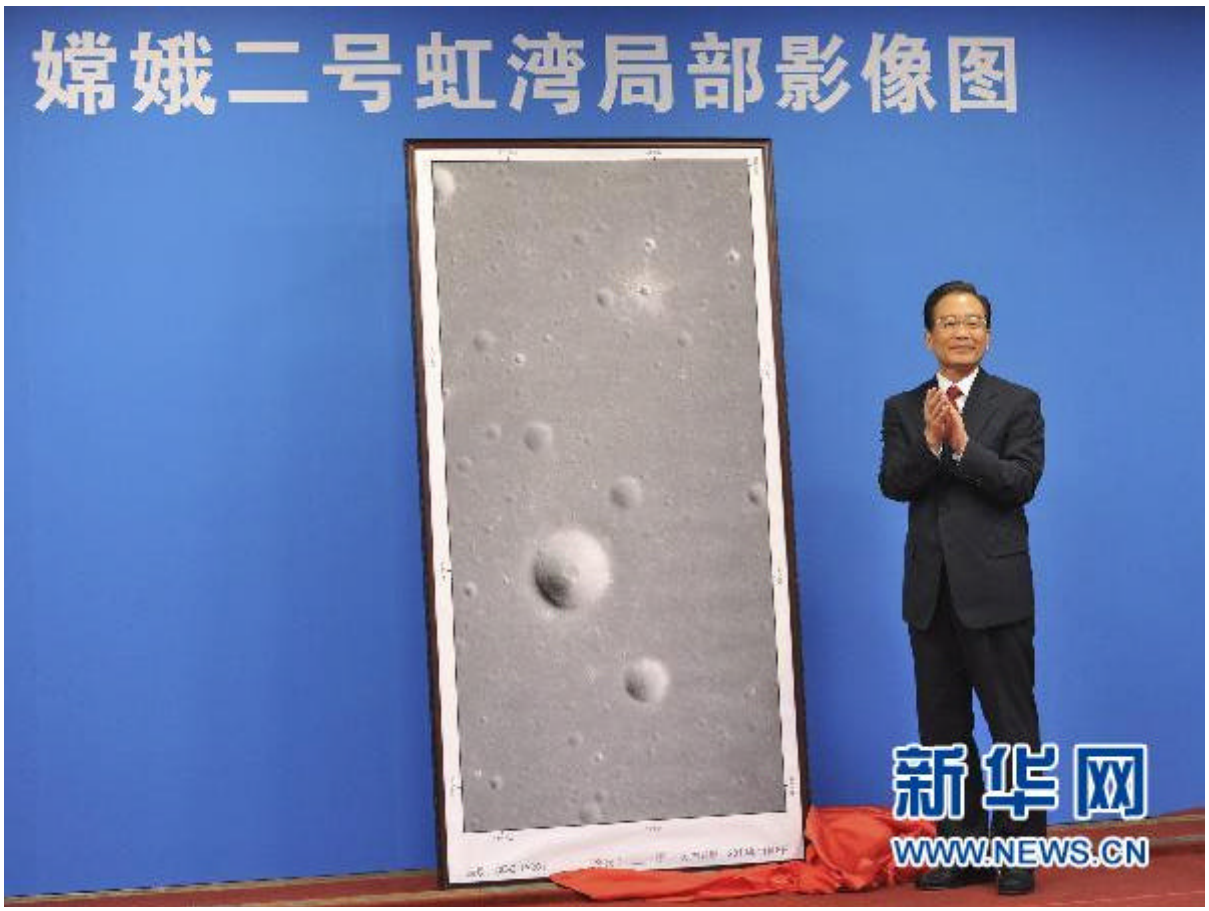
Dr. Koonin briefed CAO of the major functions of Science Office under his leadership, and expressed DOE's willingness to enhance the collaboration with China in the area of high-energy physics, nuclear physics, and other basic sciences.

Joint Combustion Lab

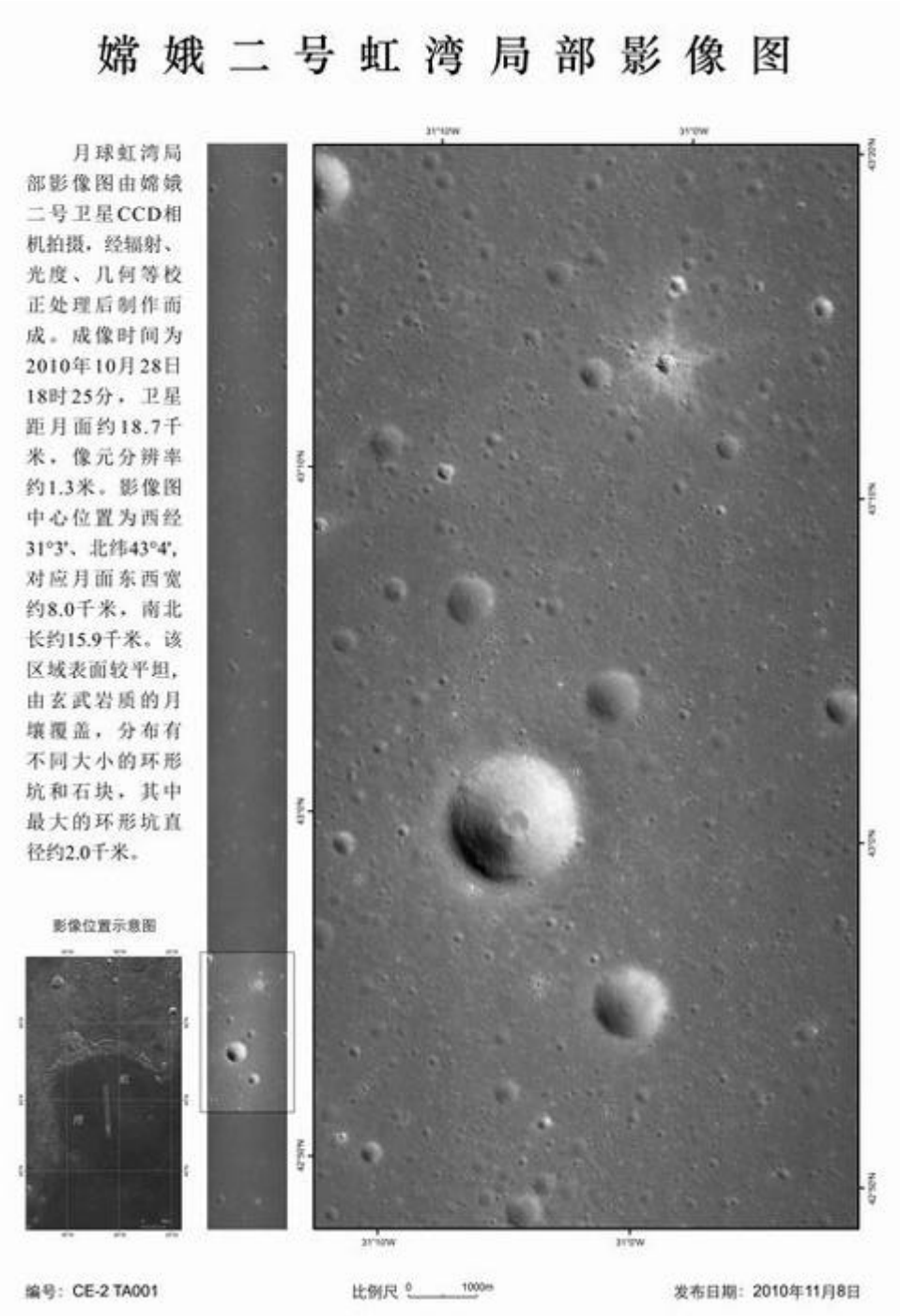
An oxygen-rich combustion lab, co-founded by Zhejiang University and AIR LIQUIDE SA, was inaugurated in the morning of October 28, 2010 at the campus of Zhejiang University. The joint Lab is designed to capture carbon dioxide, work on the basic and applied study of oxygen-rich combustion control and pollutants emission. It is reported that the lab has the state-of-the-art experimental burner able to simulate real industrial processes, including separate and mixed combustion of oil or coal dust. The Lab will develop new gas burning technologies and devices applicable to metallurgical, energy, and power industries. In the future, it will also work on efficient and economic tools for carbon capture and storage, in an attempt to mitigate the impacts of climate warming.

RESEARCH AND DEVELOPMENT

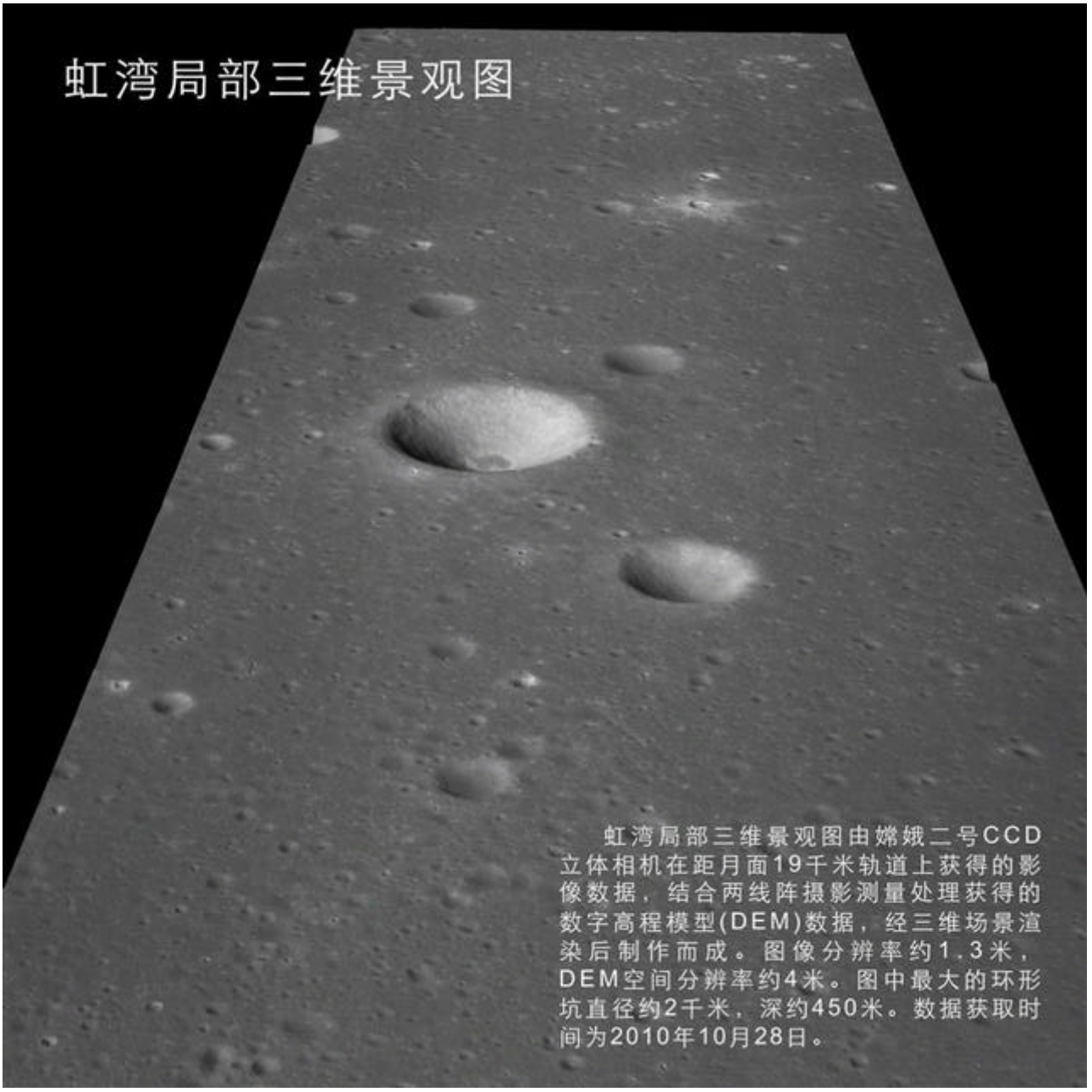
Lunar Rainbow Bay Image



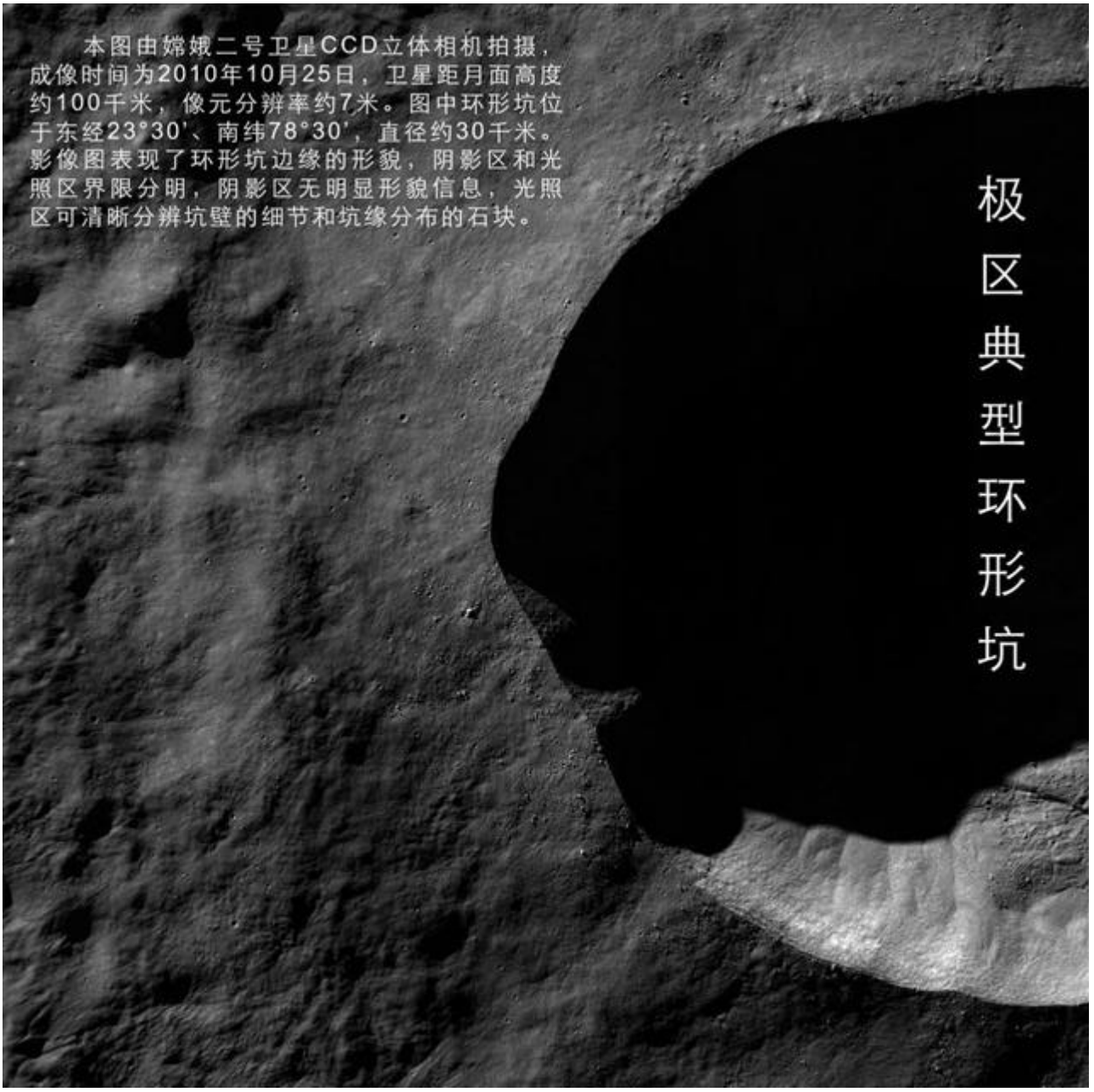
A ceremony was held on November 8, 2010 to unveil the local image of lunar Rainbow Bay shot by Chang'e-II in Beijing. Chinese Premier WEN Jiabao unveiled the lunar image at the ceremony.



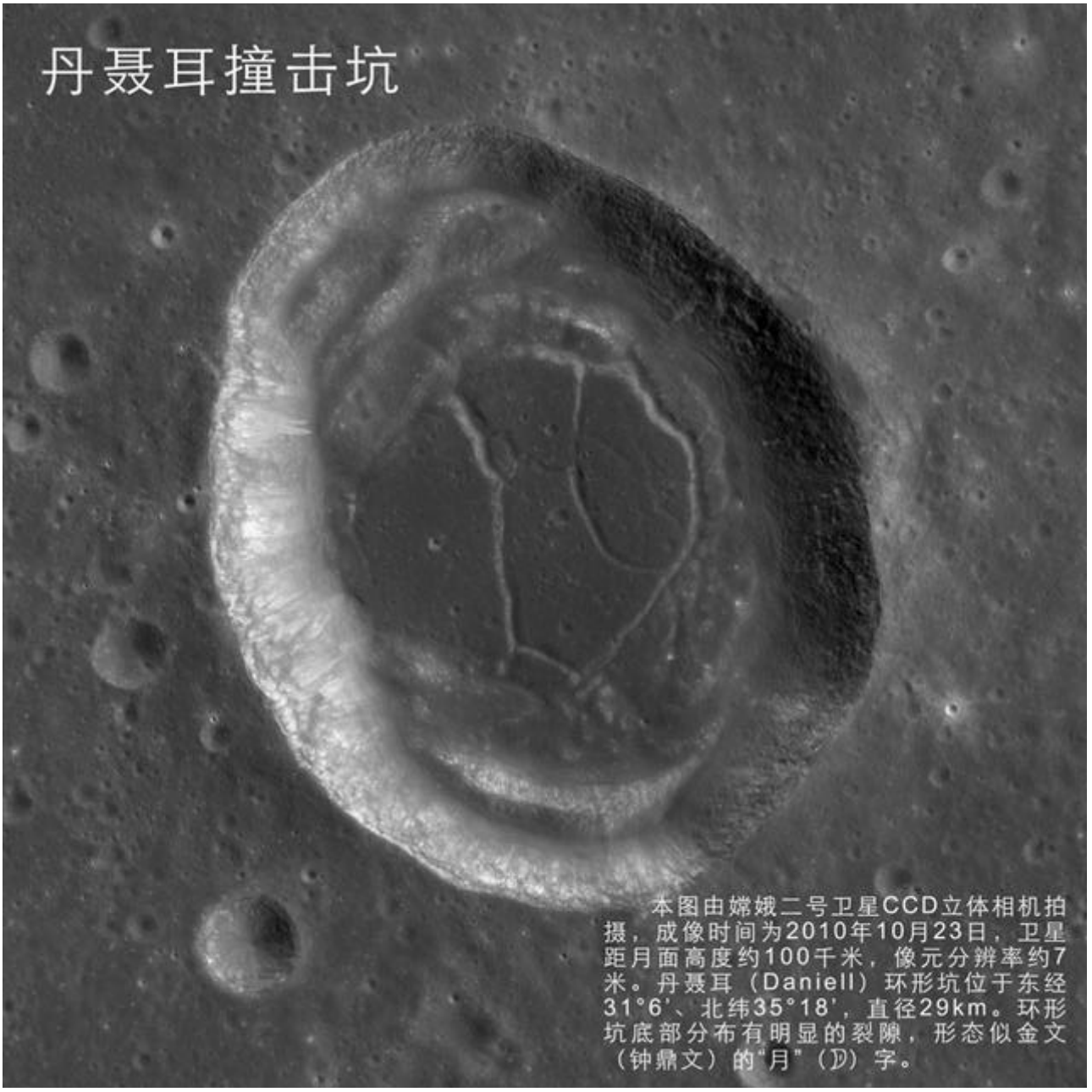
Local images of lunar Rainbow Bay shot by Chang è II satellite.



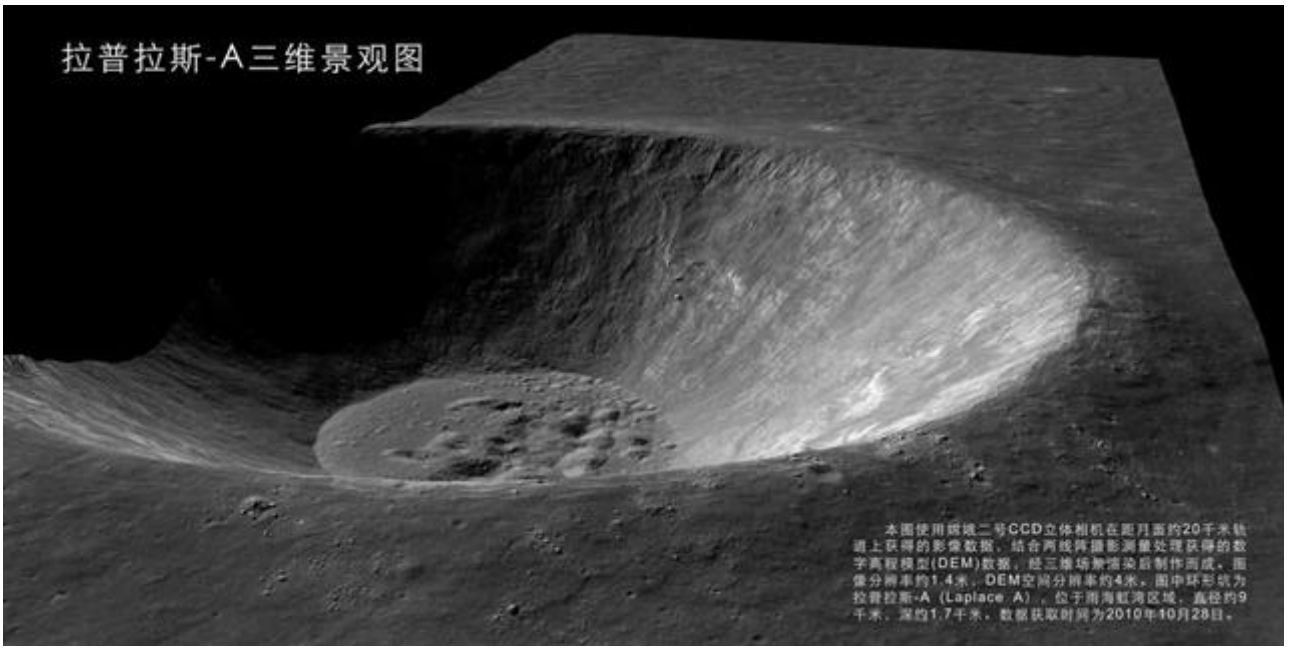
3-D image of lunar Rainbow Bay.



A typical polar crater in circular shape.



A Daniell lunar impact crater.



A Laplace-A three-dimensional landscape plan.

Chinese State Bureau of Science, Technology and Industry for National Defense unveiled on November 8, 2010 the local images of the lunar Rainbow Bay shot by Chang'e-II, a pre-selected landing area for Chang'e-III satellite. Chinese Premier WEN Jiabao unveiled the lunar images at the ceremony.

The local images of the lunar Rainbow Bay publicized for the first time is the black-and-white photos shot at 18:00 October 28, 2010, at a distance some 18.7 km from the lunar surface. The image shooting mission, putting an end to the six major missions designed for the lunar satellite, marks the successful completion of Chang'e-II ' s lunar probe.

The CCD camera aboard Chang'e II enjoys a greatly enhanced resolution, compared with Chang'e-I ś 120m resolution. Chang'e II is able to achieve a 10-meter resolution in the 100 km circular orbit, and 1-meter resolution in the 100 km × 15 km elliptical orbit, exceeding
the preset indicator for 1.5m. According to a briefing, Chang'e III Lander will be equipped with the same CCD camera, so as to select the best landing site based on the lunar surface images it captures.

Mouse Brain at Neurite Level

Prof. LUO Qingming and coworkers at Huazhong University of Science and Technology published a paper reporting the application of micro-optical sectioning tomography to obtaining a high-resolution mouse brain atlas in the November 5, 2010 issue of journal *Science*.

Thanks to 8-year painstaking efforts, LUO and his team developed the needed methodologies and techniques to build the neuroanatomical architecture of mouse brain at the submicrometer level, along with a micro-optical sectioning tomography system. The system is able to automatically collect data for 242 consecutive hours, which would produce 0.3×0.3 micron coronal section images with a pixel resolution of 15,380 layers. Researchers obtained a 3D structural dataset of a Golgi-stained whole mouse brain at the neurite level, using precise positioning and handling techniques. The whole mouse brain at the neurite level provides important experimental data for digitizing mouse brain structures, and for simulating brain functions.

Genes Regulating Grain Size Variation Found

Not long ago, ZHANG Qifa, a Chinese Academy of Sciences academician, and his team at Huazhong Agriculture University, reported in the recent issue of the PNAS that they have linked differential domain functions (OSR) of the GS3 protein to the natural variations of rice grain size.

ZHANG and his team have worked on the GS3 protein starting from 1997. They spotted the gene in 2006. In recent years, researchers have made an in-depth study of the gene, and confirmed that it is a major protein that regulates the grain size of rice, unveiled the ties between the protein structure and its functions.

Researchers found that the wild-type isoform is composed of a plant-specific organ size regulation (OSR) domain in the N terminus, and a von Willebrand factor type C in the C terminus, showing an inhibitory effect on the OSR function. The balance between the two determines the grain size. Researchers also found that the loss of OSR function results in long grain (10mm), the wild-type allele corresponds to medium grain (8mm), and the loss of function mutations of these domains produces very short grain (6mm).

Researchers reported that almost all the fine rice species possess a full GS3 protein that corresponds to medium grain. The long grain rice has lost OSR function. Apparently, the manipulation of GS3 protein will produce the rice varieties with different grain sizes, indicating that the GS3 protein plays a decisive role in determining the yield and quality of rice, and is a major factor regulating the variation and evolution of grain size.

It is worth mentioning that researchers have found the homologous genes of GS3 in corn, barley, and soybean, and the existence of OSR in those genes, indicating that they probably regulate the grain size of these crops as well.

NEWS BRIEFS

New Navigation Satellite Launched

At 0026, November 1, 2010, China blasted off another navigation satellite aboard a CZIIIC launch vehicle, from the Xi ̀chang Satellite Launch Center. The launch makes the 4th of its kind in 2010. The launch vehicle employed this time is painted with the logo of Compass navigation satellite: seven stars in a blue circular shape, along with grid earth elements, showing the integration of the satellites and the earth. The Compass navigation satellite network is designed to provide high precision and reliable positioning, navigation, and time service, under the motto of open and compatible, worldwide, and serving the globe.

New Weather Satellite Launched

At 02:37, November 5, 2010, China blasted off a new weather satellite, FY III, second of its kind, aboard a Long March-4C launch vehicle, from the Taiyuan Satellite Launch Center. 19 minutes after lifting off, the ground control in Xi àn confirmed the satellite ṡ entry into the solar synchronous orbit. The new satellite will be delivered to National Satellite Meteorological Center, part of China Meteorological Administration, after in-orbit tests. The new satellite will make a team with the first FY III satellite launched on May 27, 2008, enhancing China ṡ meteorological observation network and medium term weather forecast capability.

The satellite is equipped with a dozen of payloads, including visible and infrared scanning radiometer and infrared spectrometer, enjoying a greatly enhanced sounding performance, compared with FY-I series, able to make 3-D, all-weather, multiple-spectrum, and quantitative weather watch, collecting ground, marine, and space data for medium-term numerical weather prediction.

Lunar Satellite into Working Orbit

Chang'e II has smoothly entered its working orbit. The ground control in Beijing put the satellite on the long-term management mode on November 2, 2010, allowing her to embark on the missions of shooting high resolution images of the moon. In a period of six-month, the ground control will track down the satellite in a selected manner, monitoring the operation of satellite and its orbit status on a daily basis.

The long-term management will be made to achieve the following missions: 1) orbit maintenance to fence off the impact of lunar gravitational field. The orbit will see a large

change in both perilune and apolune in a month. Therefore, one has to maintain the orbit where the satellite works on a regular basis, keeping the orbital height at 100km; 2) physical examination ’to the satellite. The ground control will keep an eye on the working status of onboard payloads, ensuring them working smoothly and properly; and 3) scientific probe. The ground control will activate onboard shooting missions and scientific experiments in line with the preset schedules. The satellite will shoot more images of the lunar Rainbow Bay area in due time.

Comments or inquiries on editorial matters or

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