



Countdown craze

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CHINA, PAGE 6

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HKSAR, PAGE 4

Digital revival

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香港版
HONG KONG

CHINA DAILY

WEDNESDAY, April 29, 2026

中國日報

www.chinadailyhk.com HK \$12

Satellites aid China's ecological monitoring efforts

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China has developed a modern monitoring network that integrates space, air, ground and sea systems for ecological and environmental protection, supported by about 150 satellites, the Ministry of Ecology and Environment said on Monday.

Addressing a news conference, Zhang Dawei, director of the ministry's department of ecological and environmental monitoring, highlighted the April 17 launch of a new satellite capable of high-precision greenhouse gas detection.

Equipped with five advanced instruments, including a lidar system and a hyperspectral greenhouse gas monitor, the satellite enables, for the first time globally, integrated active and passive detection of greenhouse gases, Zhang said.

He said the satellite can conduct large-scale, high-precision monitoring of major greenhouse gases and gaseous pollutants worldwide.

"This represents a major milestone in the development of China's modern ecological and environmental monitoring system," Zhang said.

The ministry is the lead user for eight operational environmental and atmospheric satellites and can also coordinate data from more than 140 commercial and civilian satellites, he said.

Using multispectral sensors with broad wavebands and short revisit cycles, the satellites allow the ministry to conduct full-

coverage "health checks" every two months on 3.3 million square kilometers of nature reserves and key zones under ecological conservation red lines, Zhang said.

The system also scans 21,000 kilometers of mainland coastline and 100,000 sq km of coastal waters every quarter to detect human damage or illegal encroachment, he added.

Beyond wide-area scanning, the satellites are equipped with hyperspectral sensors for high-precision targeting, enabling identification of atmospheric components and quantitative measurement of trace gases such as ozone, nitrogen dioxide and formaldehyde, supporting air pollution control, Zhang said.

Globally, the system can pinpoint methane leaks from oil and gas fields, coal mines and landfills, tracing emissions to specific facilities, he said.

The satellites also enable all-weather monitoring, as their radars do not rely on light sources and are not limited by adverse weather conditions, Zhang said.

They are part of a national biodiversity monitoring network that also uses drones, maritime vessels and ground-based sample plots, he said.

Since the start of the 14th Five-Year Plan period (2021-25), the ministry established 214 comprehensive ecological monitoring stations and 16,400 sample plots covering eight major ecosystem types, achieving full coverage of 80 key protected areas and all five national parks, Zhang said.

China plans to launch five more environmental and atmospheric satellites during the 15th Five-Year Plan period (2026-30), he said.

The ministry will accelerate the development of fully automated production of diverse remote-sensing products and expand operational applications in areas including ecological damage, illegal solid waste dumping and global greenhouse gas emissions, Zhang said.

"We will deploy more 'space eyes' with even more piercing vision to safeguard the building of a beautiful China," he said.