

Global Disastrous Weather Report in February 2023

Abstract: In February 2023, the main disastrous weather events that occurred globally were cold wave, snowstorm, heavy rainfall and flooding, typhoon, abnormal high temperature, etc. In mid-February, the temperature in India and Pakistan was abnormally high, the earliest 40 degrees Celsius ever seen in Asia. Cold wave and rain and snow happened in Turkey, Iran, Kazakhstan, Canada, the United States and other places. Strong tropical storm "Freddy" twice landed in Mozambique, a long period of continuous heavy precipitation and damaging wind occurred in Madagascar, Mozambique.

1. Overview of global weather

In February 2023, there were large differences in global temperature (Fig. 1). In addition to the Far East, the high latitudes of the Eurasian continent, and the southern Tibetan Plateau, Pakistan, Afghanistan, the eastern United States and central Brazil, the average temperature is more than 2 degrees Celsius higher than the same period of the year, and the temperature in the western Scandinavian Peninsula, the northern Ural Mountains east of the region, the southern edge of the Tibetan Plateau 4 to 6 degrees Celsius higher, locally 8 degrees Celsius higher than the above. The average temperature in the Russian Far East, north-central Canada, the western United States and other places is 2 to 4 degrees Celsius lower, locally 5 to 8 degrees Celsius lower.

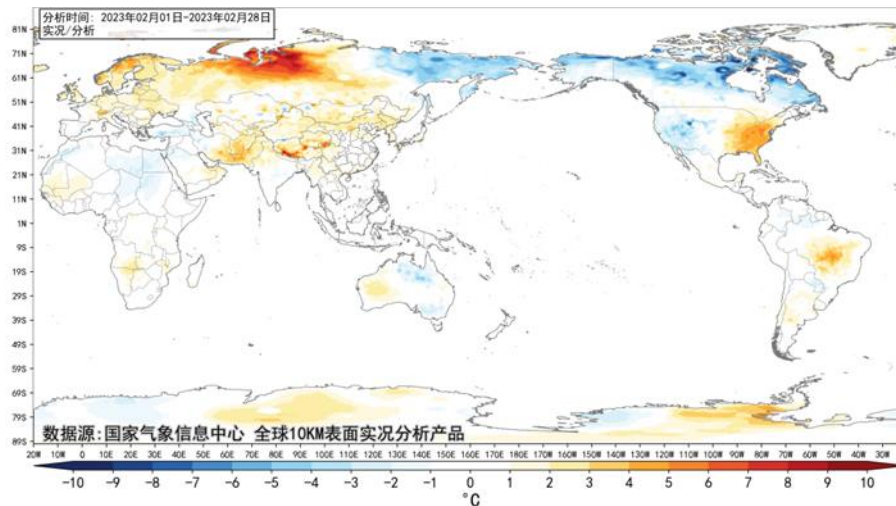


Fig.1 Monthly 2m temperature anomaly in February 2023 (unit: °C)

The global daily maximum temperature of more than 40 degrees Celsius in the region mainly in central Africa, western and southern Australia, southern South America, especially the number of high temperature days above 40 degrees Celsius in central parts of Africa and western Australia is more than 10 days (Fig. 2). In addition, some areas in western India and Pakistan have more than 40 degrees Celsius high temperature weather, some sites break the local record high temperature in February.

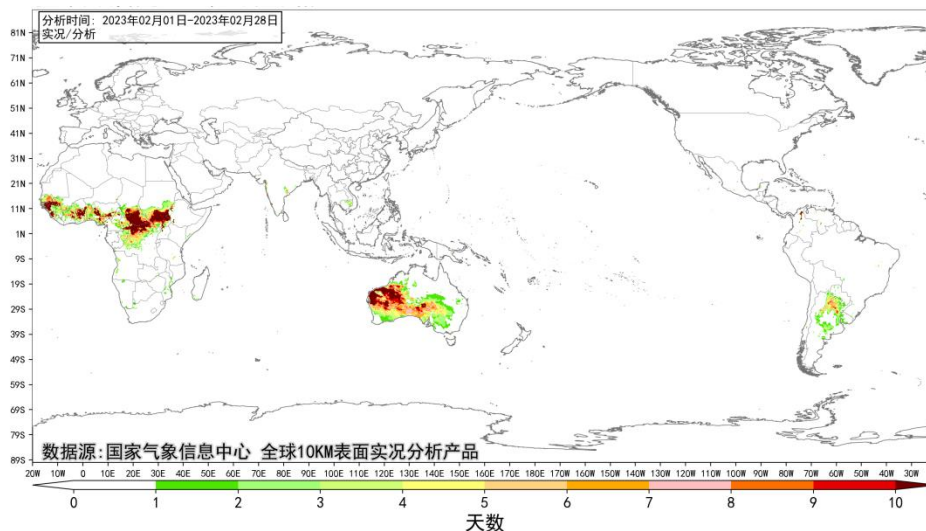


Fig.2 Number of global hot days above 40 °C in February 2023 (unit: day)

In February 2023, global precipitation was unevenly distributed, with 100 to 200 mm of precipitation accumulated in Southeast Asia, northern Australia, eastern United

States, north-central South America, and south-central Africa, with 300 to 600 mm of precipitation in some areas of the Amazon Plain, Madagascar, Mozambique, and northeastern Australia. Compared with the same period of the year, western Canada, the northeastern United States, southeastern Africa, Central Asia, Eastern Europe, the precipitation is more than the same period of the year, including the northeastern United States, Mozambique and the Greater Caucasus region of Russia and other places more than 2 to 4 times (Fig. 3).

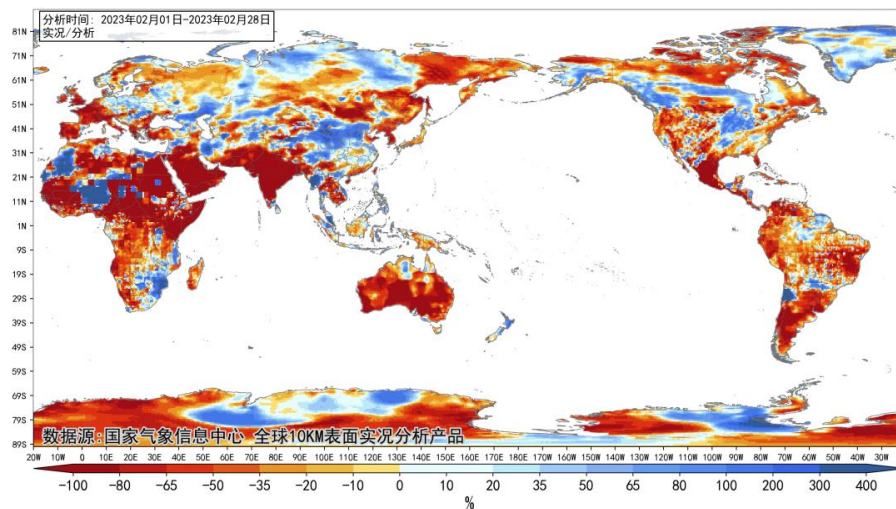


Fig.3 Monthly total accumulated precipitation percentage anomaly in February 2023 (unit: %)

In February 2023, the main disastrous weather events that occurred globally were cold wave, snowstorm, heavy rainfall and flooding, typhoon, abnormal high temperature, etc. In addition, there are five tropical cyclone activities in the world (Fig. 4), and the number of them is less than usual.

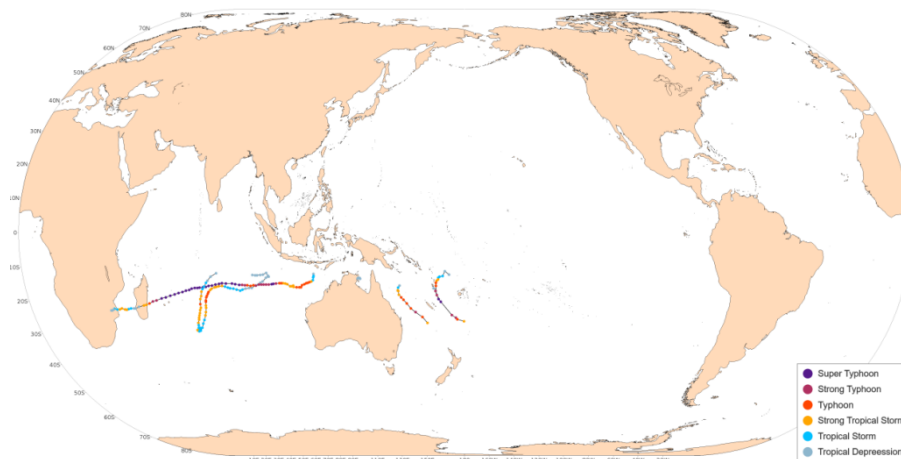


Fig.4 Global tropical cyclones in February 2023

2. Severe weather

2.1 Extreme cold wave and snowstorm in North America

From 17th to 18th February, a huge low vortex system splitting trough in northern Canada merges with a low vortex near the west coast of the U.S. The westerly trough moves from west to east affecting Canada and the U.S., bringing cold wave and rain or snow to the above areas. The windy weather and cooling down was happened in Alaska region, northwestern Canada and the most of the United States of America, the average temperature in most of the above areas fell 8 to 16 degrees Celsius, local cooling up to 20 degrees Celsius, and accompanied by 4 to 6 level wind, wind gusts in the plains up to 8 to 9 level. Under the influence of the trough system, the United States in the Midwest had heavy snow, the strongest snowfall period appeared in the 14th to 15th.

2.2 Tropical cyclone "Freddy" affects southeast Africa

In February 2023, tropical cyclone Freddy affected Mauritius, Madagascar, Mozambique and Zimbabwe, bringing heavy rains and flooding that affected more than 171,000 people, including 10 deaths in Mozambique and 17 in Madagascar. Freddy was generated near Indonesia on February 6th, and made its first landfall in Madagascar on the night of the 21st, and then crossed the Mozambique Channel to make a second landfall in Mozambique in southeastern Africa on the 24th. Freddy brought less than 100 mm of precipitation to Madagascar, while most of Mozambique exceeded 300 mm.

2.3 High Temperature Weather in Australia and India

Under the influence of the subtropical high pressure system, Australia experienced persistent and strong hot weather, and India and Pakistan saw the first hot weather that exceeded 40°C this year. In addition to the eastern coast of Australia, the rest of February daily maximum temperatures exceeded 35 degrees Celsius, especially in central and western Australia exceeded 40 degrees Celsius. Some measuring stations in India and Pakistan have daily maximum temperatures exceeding 40 °C and breaking historical records of high temperatures for the same period.

3. Outlook

It is predicted that in the next two weeks, significantly warmer temperatures and lower precipitation in Central and Southern Eastern Europe and Western and Southern Central Asia, but low temperatures and high precipitation will happen in the northern Arabian Peninsula. The low temperatures in southern North America, with light to moderate snow or sleet in western North America, the Great Lakes, the northeastern United States, and southern Canada, with heavy snow in some areas. Southwest coastal areas and southern areas of the United States, most of South America have light to moderate rain, the southern Amazon plain, the northern Brazilian plateau, the western and eastern La Plata plains, the western Patagonian plateau and other places have heavy to torrential rain. Mostly sunny weather will in Australia, with high temperatures in the Midwest. High precipitation will in central Africa.

Editor: Luo Qi, Liu Longsheng, Zhang Tao, Yuan Fang, Jia Xu, Zhang Bo