Global Disastrous Weather Report in March 2024

Abstract: In March 2024, a variety of catastrophic weather events occurred globally, with severe impacted in some regions. The United States and Canada experienced five large-scale snowstorm events, while the southeastern United States suffered severe convective weather and above-average precipitation. Parts of southeastern Brazil and western Asia experienced extreme heavy rainfall , Mongolia and northern China experienced two episodes of dust storms, Switzerland and southeastern France were also affected by dust. In early March, the minimum temperatures in countries such as Iran, Afghanistan, and Pakistan surpassed historical lows for the same period, while Thailand, Laos, and other countries experienced maximum temperatures breaking or approaching historical highs for the same period. In late March, many areas in the central and northern United States, as well as central Canada, experienced historically low temperatures. Four tropical cyclones formed in March, and rised gale and heavy rain to Mozambique, Madagascar, and northern Australia.

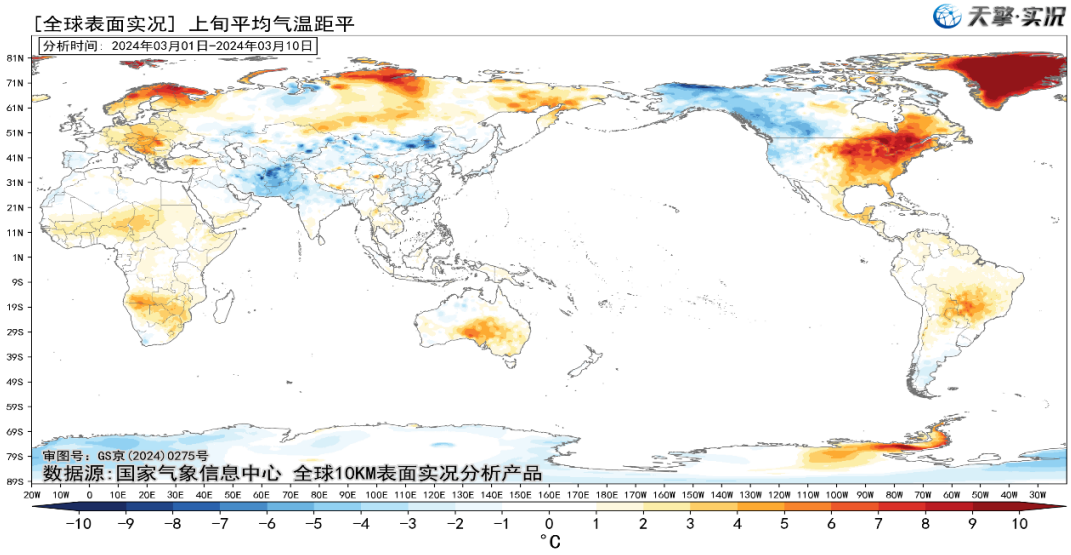
1 Overview of global weather

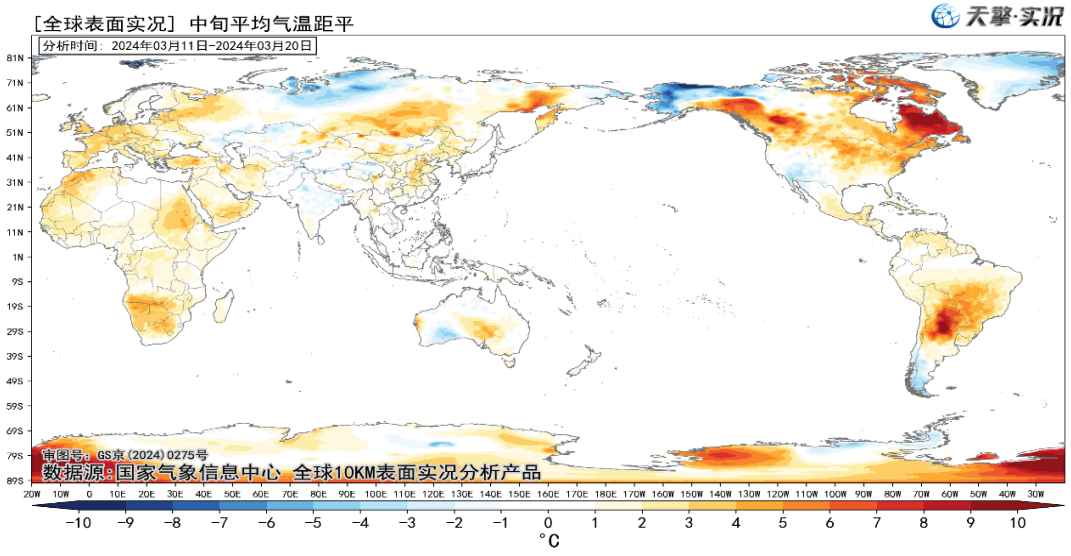
1.1 Temperature

In March, the polar vortex in the Northern Hemisphere exhibited dipole distribution, with two centers towards the eastern and western hemispheres respectively. As a result, temperatures were noticeably lower

in eastern Russia and central-western Canada, while much of Europe and the eastern parts of North America experienced above-average temperatures. In the southern hemisphere, temperatures were close to average in most areas, with temperatures in southern Africa and central South America 2-4℃ above average. In early March, cold air masses had a strong influence over Asia, resulting in temperatures across much of the continent being 1-3℃ below normal. In some areas of southern Central Asia and western Asia, temperatures were 4-6℃ below average. In countries such as Iran, Afghanistan, and Pakistan, minimum temperatures broke historical records, while maximum temperatures in countries like Thailand and Laos reached historical highs for the same period. Alaska, western Canada, and the northwestern United States were affected by cold waves and heavy snowstorms, resulting in significantly lower temperatures. In mid-March, the influence of cold air in Asia slightly weakened, with temperatures in East Asia close to or slightly above average by 1-2℃, while temperatures in Central Asia and the northern parts of South Asia remained mostly below average. Across most of North America and South America, temperatures were significantly above average. Several stations in the southwestern part of Canada, northwestern and eastern parts of the United States, the Caribbean region, and countries such as Brazil recorded their highest temperatures on record. In late March, the meridional pattern of the Eurasian circulation further

diminished. Temperatures in the high latitudes of Siberia were significantly below average, while temperatures in most other areas further rebounded. The influence of cold air masses in North America strengthened, leading to below-average temperatures. In many areas of the central and northern United States as well as central Canada, minimum temperatures broke historical lows for the same period.





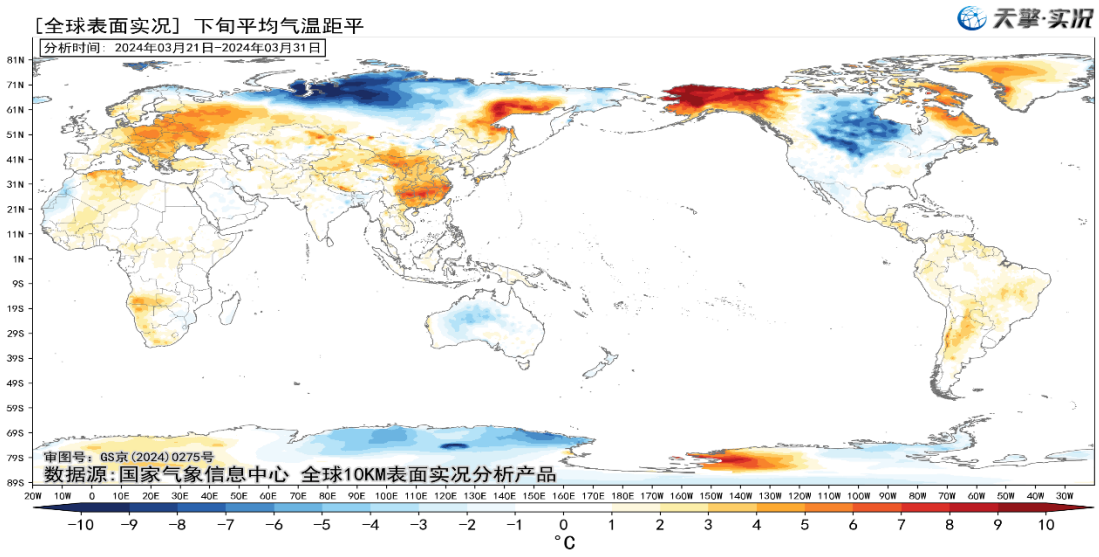
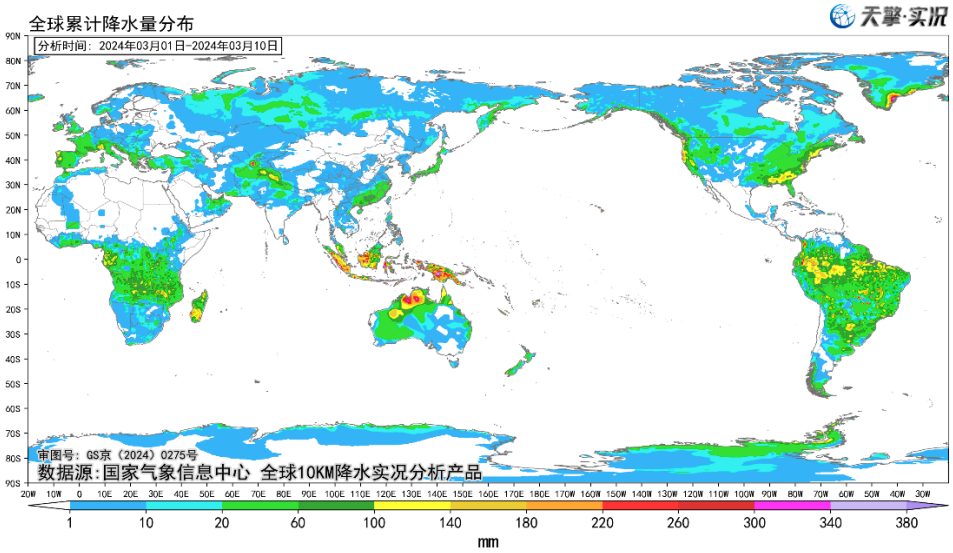


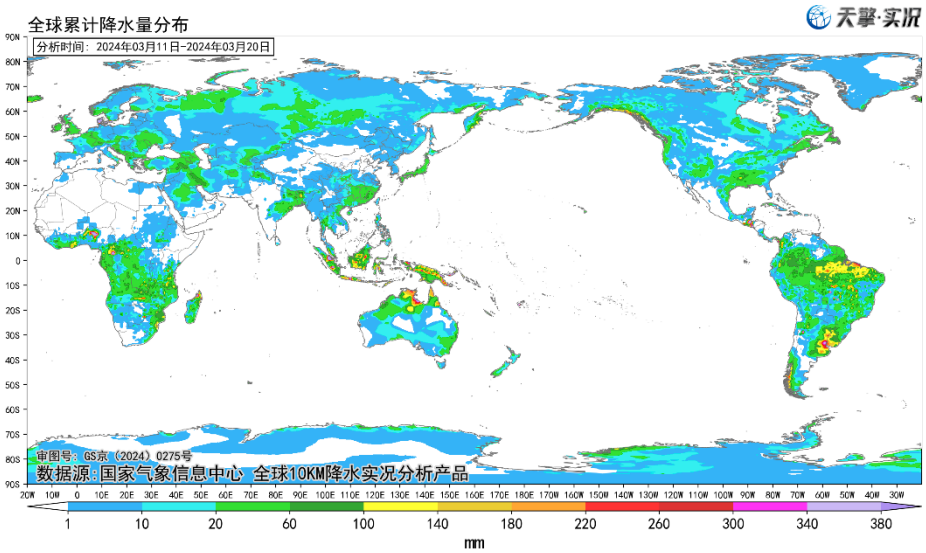
Figure 1. Global Mean Temperature Anomalies for Each 10-Day Period in March 2024 (Unit: ℃)

1.2 Precipitation

In March, the Northern Hemisphere experienced a seasonal increase in precipitation, with rainfall primarily concentrated in Western Europe, Southern Europe, South Asia, East Asia, Southeast Asian archipelagos, and the western and eastern regions of the United States. In the Southern Hemisphere, precipitation was mainly observed in southern West Africa, East Africa, Central Africa, northern Australia, and central-northern South America, with accumulated rainfall exceeding 100-300 millimeters in these regions and localized rainfall exceeding 500 millimeters. Compared to the climatological averages, precipitation in Western Europe, Northern Europe, Southern Europe, parts of Asia, western and eastern regions of the United States, eastern Canada, and central Australia was significantly above normal, with some areas experiencing precipitation levels exceeding 80% above average and in some areas more than the historical

maximum for the same period.





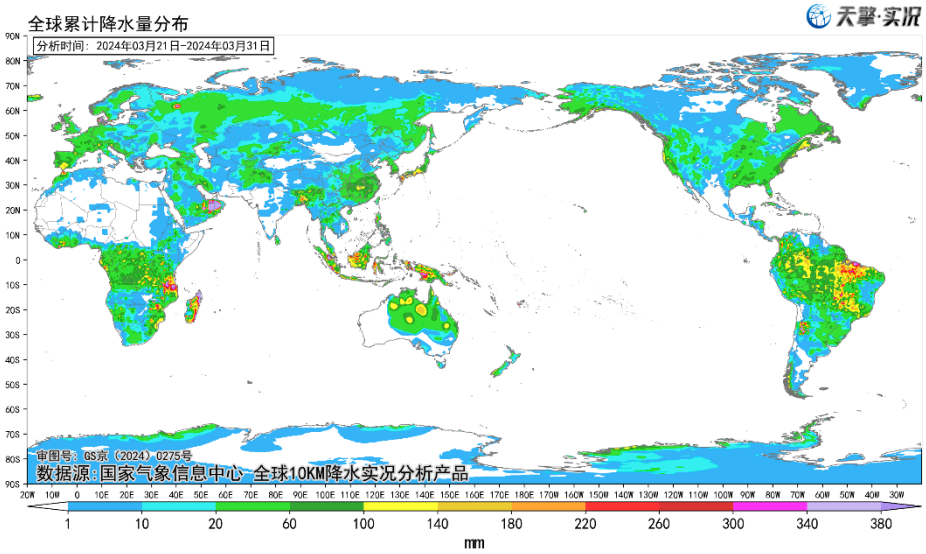


Figure 2. Distribution of global accumulated precipitation for Each 10-Day Period in March 2024 (unit: mm)