WORLD METEOROLOGICAL ORGANIZATION

GLOBAL SEASONAL CLIMATE UPDATE

TARGET SEASON: November-December-January 2023-24
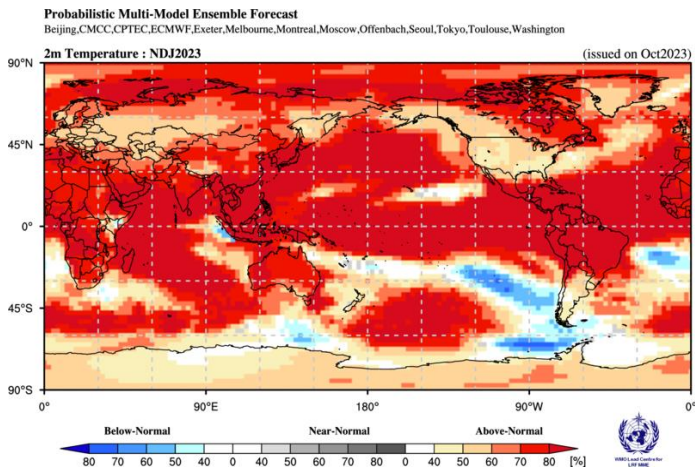
Prepared: 20 October 2023

Summary

During July-September 2023, Pacific Niño sea-surface temperature (SST) index in the eastern Pacific (Niño 1+2) were much above-normal and the other three indices in the central Pacific were also above-normal. The observed SST conditions in the equatorial Pacific were characterized by an El Niño state. The observed Indian Ocean Dipole (IOD) was also above-normal. The North Tropical Atlantic (NTA) SST index was above-normal and the South Tropical Atlantic (STA) SST index was near-normal (but was positive) and reflected widespread warmth in the tropical Atlantic north of the equator.

Above-normal sea-surface temperature anomalies in the Niño 3.4 and Niño 3 regions are predicted to strengthen during the November-January (NDJ) 2023-24 season, indicating possible amplification of El Niño conditions. Farther west in the Niño 4 region, above-normal sea-surface temperature anomalies are also predicted to strengthen. The Indian Ocean Dipole (IOD) index is predicted to stay in the above-normal category. In the equatorial Atlantic, SSTs are predicted to be above-normal in both the northern (NTA) and the southern (STA) regions during the season.

Consistent with the anticipated development of an El Niño in the equatorial central and eastern Pacific, together with the prediction of above-normal sea-surface temperatures over much of the global oceans, there is widespread prediction of above-normal temperatures over almost all land areas. Positive temperature anomalies are expected over almost the entire Northern Hemisphere. The largest increase in probabilities for above-normal temperatures in the Northern Hemisphere is predicted generally south of about 40º N (except over North America), and also over north-eastern parts of North America, and in the regions north of 65º N. Elsewhere in the Northern Hemisphere, including Greenland, Europe and Asia between 45° and 65º N, and in North America north of about 30º N, the probabilities for above-normal temperature are moderately increased. There are also enhanced probabilities for above-normal temperatures over most of the Southern Hemisphere, except for the areas bordering the eastern tropical Indian Ocean, and southeast Pacific between 120 and 70º W where probabilities for below-normal temperature is enhanced. Over most other Southern Hemisphere land areas north of about 30° S, the probabilities for above-normal temperature are strongly increased. However, over New Zealand the probability for above-normal temperatures are only weakly increased, while over the central and eastern Pacific Ocean islands south of about 20º S the probabilities for near to below-normal temperatures are indicated. There is no clear signal over South America south of about 35º S extending to the southern tip of the continent.

Predictions for rainfall are similar to some of the canonical rainfall impacts of El Niño, which is expected to strengthen in NDJ 2023-24. Probabilities for above-normal rainfall are enhanced over a narrow band along and just north of the equator from 150º E extending across the equator to the west coast of South America. Across most of the Pacific Ocean south of about 30° N, and immediately to the north of the wet band, rainfall is predicted to be below-normal. South of the equator and east of the Maritime continent, an area of strong enhancement in below-normal rainfall extends into the Indian Ocean to about 60º E and is consistent with the prediction for the positive phase of the IOD. This area of below-normal rainfall extends southeast towards the western coast of Australia, where it further extends eastward towards Tasmania. East of the Maritime continent, an area of below-normal rainfall extends towards the southeast to the Date Line. The probability for below-normal rainfall is also weakly enhanced over much of Australia and over the northern regions of New Zealand. The probability for above-normal rainfall is enhanced in the Indian Ocean north of the equator and extends towards the eastern coast of Africa and into the Greater Horn of Africa, where along the equator it extends further towards western Africa. There is a weak enhancement in the probability of above-normal rainfall over the Arabian Peninsula, central and northern Asia, parts of eastern Asia, and northern Caribbean. Over North America, a weak enhancement in the probability of above-normal rainfall is predicted in the southeast and north of 55º N merging with the expectations for above-normal rainfall in the Arctic latitudes. The probability for below-normal rainfall is enhanced across much of the northern part of South America north of about 25° S. The probability for above-normal rainfall is enhanced in South America below 30º S, however, over the extreme southern tip of the continent extending westward along 55º S to about 120º W in the Pacific Ocean, and along the western coastal regions of the continent the probability for below-normal rainfall is enhanced. An area of enhancement in the probability for near-normal rainfall is located between 10ºS and the equator in the central and eastern Pacific.
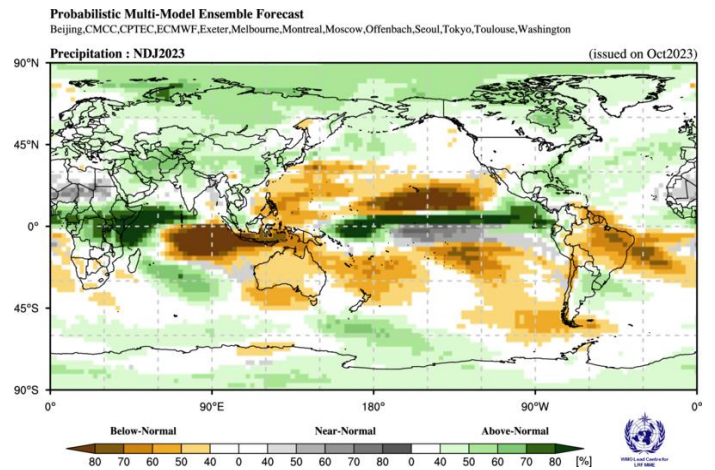
Surface Air Temperature, NDJ 2023-24

Probabilistic Multi-Model Ensemble Forecast
Beijing,CMCC,CPTEC,ECMWF,Exeter,Melbourne,Montreal,Moscow,Offenbach,Seoul,Tokyo,Toulouse,Washington

Precipitation, NDJ 2023-24

Probabilistic Multi-Model Ensemble Forecast
Beijing,CMCC,CPTEC,ECMWF,Exeter,Melbourne,Montreal,Moscow,Offenbach,Seoul,Tokyo,Toulouse,Washington

Figure 1. Probabilistic forecasts of surface air temperature and precipitation for the season November-January 2023-24. The tercile category with the highest forecast probability is indicated by shaded areas. The most likely category for below-normal, above-normal, and near-normal is depicted in blue, red, and grey shadings respectively for temperature, and orange, green and grey shadings respectively for precipitation. White areas indicate equal chances for all categories in both cases. The baseline period is 1993–2009.

Obs Surface Temperature Anomaly (C) JAS2023
(with respect to the 1991–2020 base period)

Obs Surface Temperature Percentile JAS2023
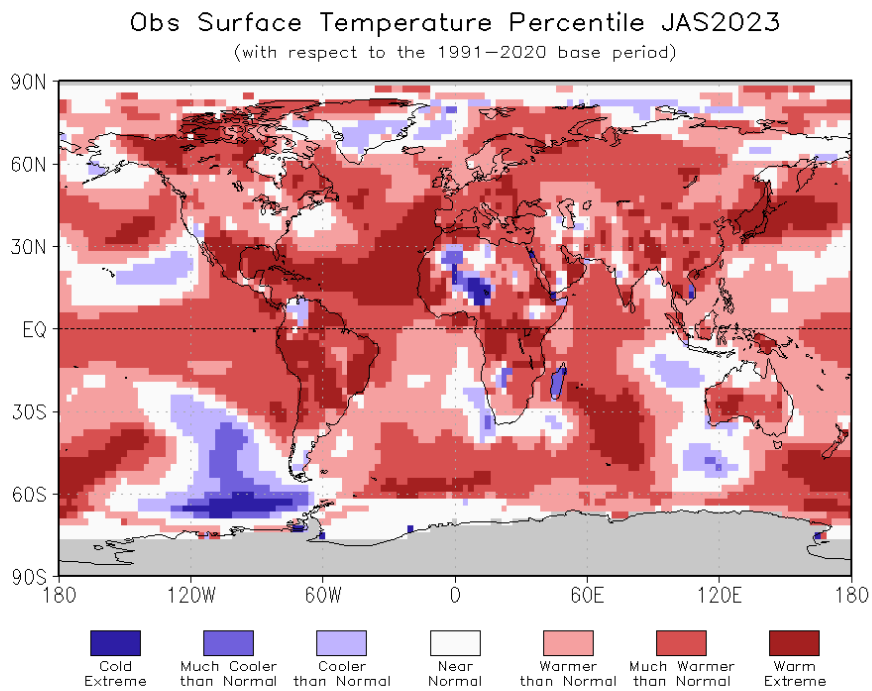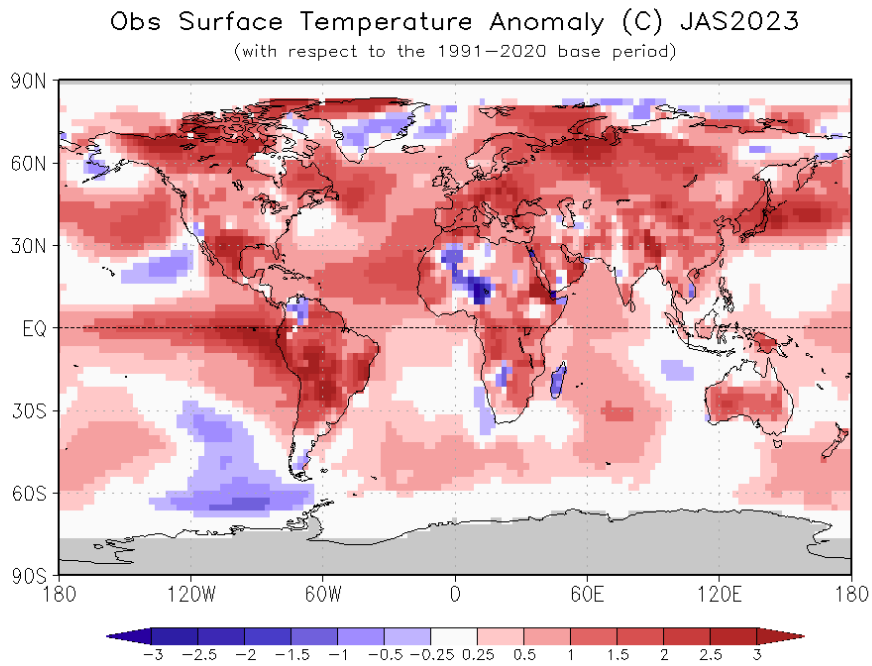(with respect to the 1991–2020 base period)

Figure 2. Observed July-September 2023 near-surface temperature anomalies relative to 1991–2020 (top). The Cooler than Normal, Near Normal, and Warmer than Normal shadings on the percentile map (bottom) indicate that seasonal mean anomalies were in the bottom, middle, and upper tercile of the 1991–2020 distribution, respectively. Regions with anomalies in the lowest and highest decile (or 10%) of the distribution are marked as Much Cooler than Normal and Much Warmer than Normal, respectively. The Cold Extreme and Warm Extreme shadings indicate that the anomalies exceeded the coldest and warmest temperature values of the 1991–2020 period for the season. Grey shading indicates areas where observational analysis was not available. (Source: U.S. Climate Prediction Center).

Obs Precipitation Anomaly (mm/day) JAS2023
(with respect to the 1991–2020 base period)

Obs Precipitation Anomaly (mm/day) JAS2023
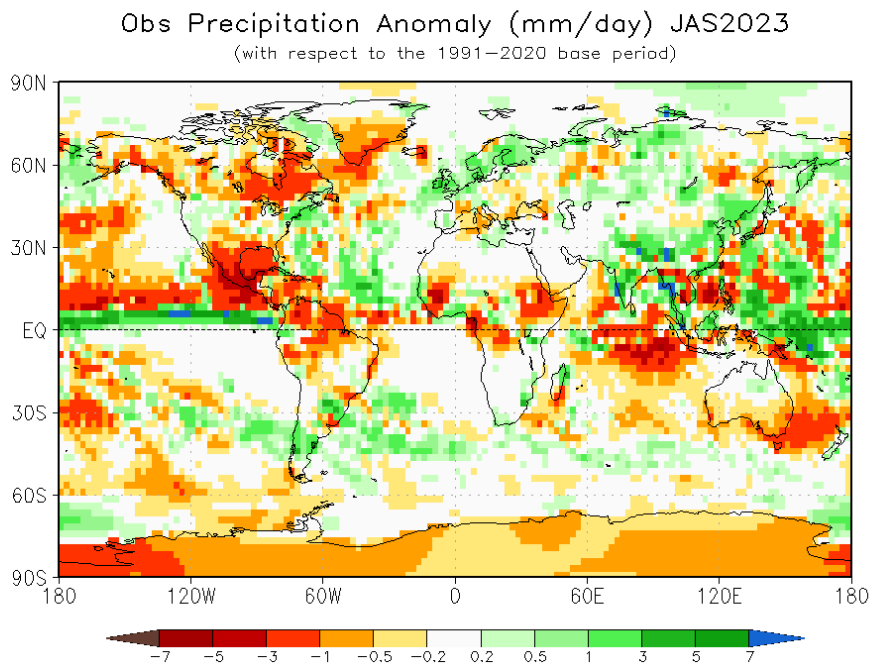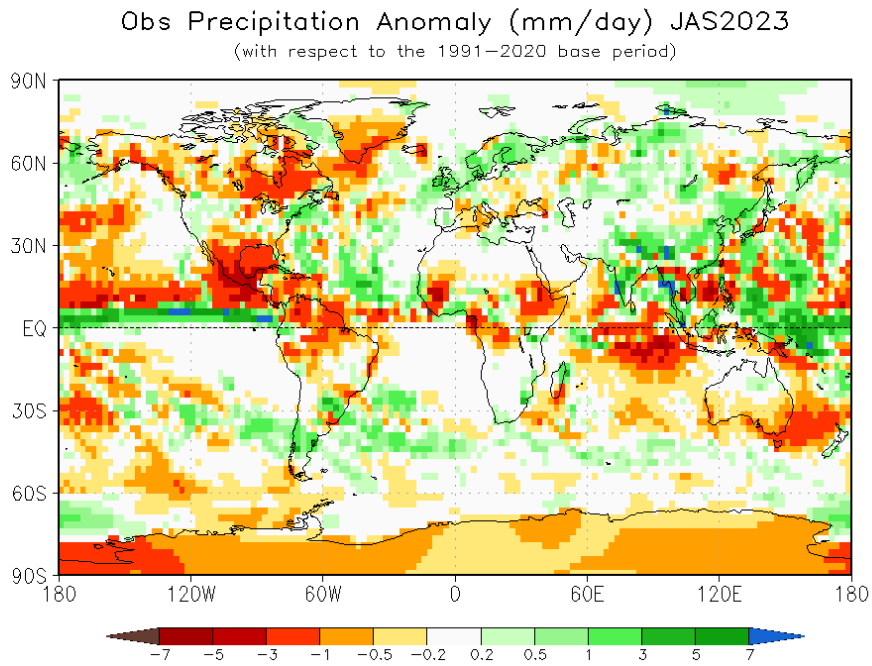### (with respect to the 1991–2020 base period)

Figure 3. Observed precipitation anomalies for July-September 2023, relative to 1991–2020 base period (top). The Drier than Normal, Near Normal and Wetter than Normal shadings on the percentile map (bottom) indicate that seasonal mean anomalies were in the bottom, middle, and upper tercile of the 1991–2020 distribution, respectively. Regions with anomalies in the lowest and highest decile (or 10%) of the distribution are marked as Much Drier than Normal and Much Wetter than Normal, respectively. The Dry Extreme and Wet Extreme shadings indicate that the anomalies exceeded the driest and wettest values of the 1991–2020 period for the season. (Source: U.S. Climate Prediction Center).