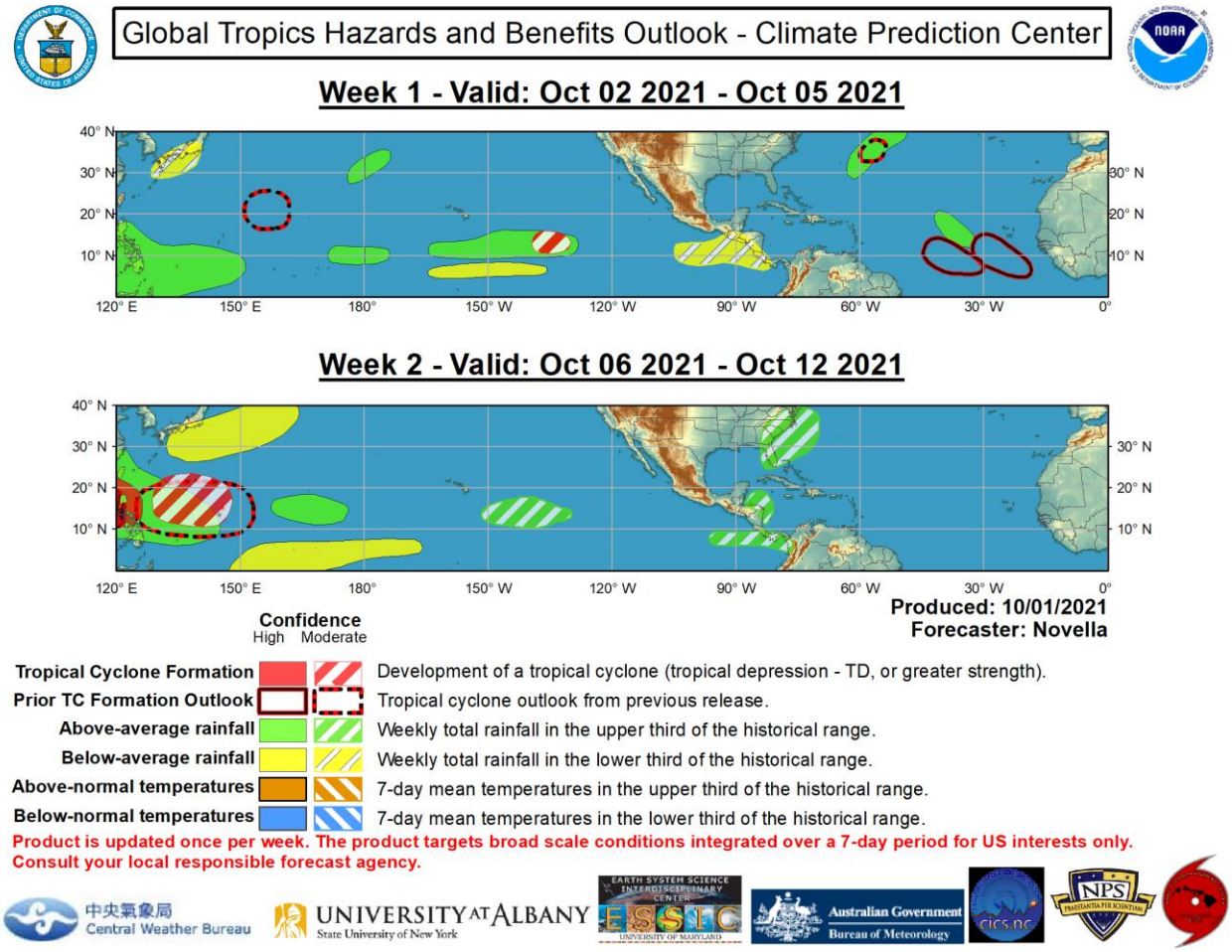

The MJO has gained amplitude in RMM space over the Maritime Continent during the past few days. Much of the increase in amplitude appears tied to the development of anomalous lower-level westerlies overspreading the tropical Indian Ocean, and increasing convection to the east of 120E. There is little change to the MJO perspective since earlier this week, as dynamical models continue to feature renewed eastward propagation of intraseasonal signal into the West Pacific during the next two weeks. The GEFS favors the development of a more pronounced MJO event, whereas the ECMWF and other models favor a weakening of the intraseasonal signal by week-2, which is likely associated with destructive interference with the emerging La Nina base state. With large ensemble spread remaining evident among the dynamical models, there continues to be uncertainty in the strength of the MJO later in October.

Two tropical cyclones (TCs), Hurricane Sam and Tropical Storm Victor, are currently active in the tropical Atlantic. The National Hurricane Center (NHC) forecasts Sam to continue tracking northward, maintain Major Hurricane strength, and bring tropical storm conditions to Bermuda during the next day or so. Sam remains forecast to gradually weaken over colder waters and begin extratropical transition in the higher latitudes by early next week. Over the Main Development Region (MDR), Victor formed to the

south of the Cabo Verde Islands, resulting in the removal of the TC area from the initial outlook earlier this week. Victor is forecast to maintain tropical storm intensity and track northwestward under the influence of a broad upper-level low developing in the central Atlantic this weekend. The system is then expected to rapidly weaken and become a remnant low under a hostile shear environment by next week. Elsewhere in the Atlantic, TC formation chances associated with two other disturbances outlined in the initial outlook have since considerably lowered and are removed in the updated outlook. For days 5-11, several deterministic solutions from the GFS continue to favor TC formation in the Caribbean and western Atlantic. However, this potential remains unsupported in the other models and probabilistic guidance, and no corresponding areas are added in the updated map. Farther east, chances for additional tropical cyclone formation remain low across the MDR, consistent with a less active climatology through mid-October.

The Central Pacific Hurricane Center (CPHC) and NHC are monitoring three areas for potential formation in the central and eastern Pacific. A moderate confidence area for TC formation is added to the updated outlook from approximately 140W to 130W for the days 1-4 period, where the NHC ascribes a 40% chance for development during the next 5 days. TC activity is anticipated to remain quiet in the eastern Pacific during the latter outlook period. In the West Pacific, TC Mindulle, located approximately 200 miles east of Honshu, Japan and is expected to accelerate northeastward and soon become absorbed in the westerlies. Farther east, there are decreased chances for TC formation tied to a cutoff low located to east of the Mariana Islands, and the corresponding TC area is removed in updated days 1-4 outlook. However, there continues to be good support in the ensemble guidance and probabilistic tools for TC formation in the South China Sea supporting the continuation of a high confidence area for days 5-11. A moderate confidence area also remains posted east of the Philippines where the latest ensembles continue to favor the formation of a closed low late next week.

Forecast for above and below normal precipitation have been modified to reflect the latest model guidance and active TC tracks for the remaining outlook periods.

-------- Previous discussion released on September 28, 2021 follows --------

The RMM index indicates the MJO has stalled over the Maritime Continent while weakening in amplitude since last week, though an increase in amplitude has been observed during the past few days. Upper-level velocity potential anomalies exhibit a disorganized pattern, with enhanced convection remaining anchored over the Indian Ocean and Maritime continent suggestive of a low frequency footprint. Zonal wind fields also reflect low frequency features as robust trades and anomalous westerlies aloft throughout much of the equatorial Pacific remain consistent with the developing La Nina

base state. Looking ahead, there is a general consensus in the dynamical models favoring the reemergence of the intraseasonal signal over the Maritime Continent that propagates eastward into the West Pacific during the outlook period. However, there is still a good amount of uncertainty that the MJO will maintain an organized structure given the potential for destructive interference with the aforementioned low frequency pattern in October, as well as continued large spread in the ensemble guidance. Kelvin wave activity may help to incite tropical cyclone (TC) formation across the East Pacific and the Atlantic during week-1, however conditions are expected to become more quiet over these basins during the later period. In the eastern Hemisphere, the large-scale environment is anticipated to remain favorable for additional tropical cyclogenesis across the Indian Ocean and West Pacific during the next two weeks.

Two TCs formed during the last seven days in the Atlantic. Tropical Storm Teresa formed on 9/24 to the north of Bermuda bringing elevated winds to the island before dissipating the following day. In the Main Development Region (MDR), Major Hurricane Sam formed on 9/23 and is presently located near 17N/53W at a category 4 strength system. The National Hurricane Center (NHC) forecasts Sam to maintain its intensity as a Major Hurricane through the end of the week, and begin to take on a more northerly track under the influence of an upper-level trough settling in over the western Atlantic. Track guidance has been trending eastward over the past several model runs, lessening the potential for adverse impacts over Bermuda as Sam is expected to eventually begin extratropical transition over open waters late this weekend.

For week-1, the NHC is currently monitoring three areas for potential development in the Atlantic. The remnants of TC Peter (originally formed on 9/19) currently located to the east of Bermuda have been showing some signs of organization, and a moderate confidence formation area is posted for week-1. In the MDR, two disturbances are being monitored with a high chance of development (>80%) during the next 5 days, prompting a pair of high confidence areas in the week-1 outlook. These two potential systems are generally favored to curve northward over open waters under a weakness in the subtropical ridge in the central Atlantic, however some deterministic solutions favor the eastern disturbance located in the MDR to take a more southerly track which bears closer monitoring should this disturbance reach the Caribbean or western Atlantic next week. In the eastern Pacific, the NHC is monitoring an area of low pressure to the south of Mexico with at least a 30% chance of development during the next 5 days. Formation chances associated with this potential system have been declining since yesterday, resulting in no corresponding TC area being posted on the map. This area will continue to be monitored and reflected in this week's Friday update should it show better signs for development this week. Beyond the week-1 period, there are decreasing chances for additional TC formation in the East Pacific and Atlantic tied to a more unfavorable large-scale environment forecast and no TC shapes are posted for week-2. It is worth noting that there is a less active climatology in the MDR by mid-October as TC activity typically shifts westward to the western Atlantic and Caribbean by this time of the Hurricane season.

In the eastern Hemisphere, TCs Mindulle and Dianmu developed in the West Pacific, while TC Gulab formed in the Bay of Bengal. Although Dianmu was a short-lived system, it brought locally heavy precipitation amounts and floods across parts of Vietnam and Thailand during the last week. Across the Philippine Sea, Mindulle brought heavy rainfall and floods to Guam as it tracked westward and peaked as a Super Typhoon (Category 5) intensity this past weekend. Despite weakening to a category 2 strength system, the Joint Typhoon Warning Center (JTWC) forecasts Mindulle to strengthen under a more favorable environment and accelerate northward towards Honshu, Japan. Although Mindulle is not currently forecast to make landfall, there is the potential for heavy precipitation over eastern Honshu during the next week. Additionally, strong gale force winds are likely over Honshu with a transient high pressure system expected to move in behind Mindulle as it eventually undergoes extratropical transition.

In the northern Indian Ocean, TC Gulab peaked at Tropical Storm strength as it made landfall near Kalingapatam, India and brought heavy rainfall amounts over many portions of India. While this system has dissipated over land, there is good model agreement that the remnant low will continue to track west and reform over the Arabian Sea, leading to a high confidence area in the week-1 outlook. Heavy precipitation amounts and high winds are possible over northwestern India and southern Pakistan during this upcoming weekend. The JTWC is also monitoring a disturbance in the northern Bay of Bengal and a high confidence area for TC formation is posted for week-1. Regardless of whether the low moves on land before forming, locally heavy rainfall amounts are likely for portions of the West Bengal and Jharkland States of India and western Bangladesh during the next few days. In the southern Indian Ocean, model guidance favors an area of low pressure developing to the west of the Keeling Islands during week-1, however, there is insufficient confidence that a TC will form given the basin climatology and an unfavorable shear environment forecast resulting in no shape being posted.

For week-1 in the West Pacific, a moderate confidence area is posted to the east of the Mariana Islands associated with a potential closed low that is expected to form into a subtropical system during the next few days. For week-2, model guidance and probabilistic tools support a high confidence area for TC development in the South China Sea tied to Rossby wave activity forecast late in week-1. Farther east, a broad moderate confidence area is posted for much of the Philippine Sea and east of the Mariana Islands. Here, there is continued support in the dynamical models for the development of a broad area of low pressure where a closed low may form during the later period.

The precipitation outlook during the next two weeks is based on a consensus of GEFS, CFS, and ECMWF guidance, anticipated TC tracks, with some input from historical MJO precipitation composites. For hazardous weather concerns during the next two weeks across the U.S., please refer to your local NWS

Forecast Office, the Weather Prediction Center's Medium Range Hazards Forecast, and CPC's Week-2 Hazards Outlook. Forecasts over Africa are made in consultation with the International Desk at CPC and can represent local-scale conditions in addition to global scale variability.