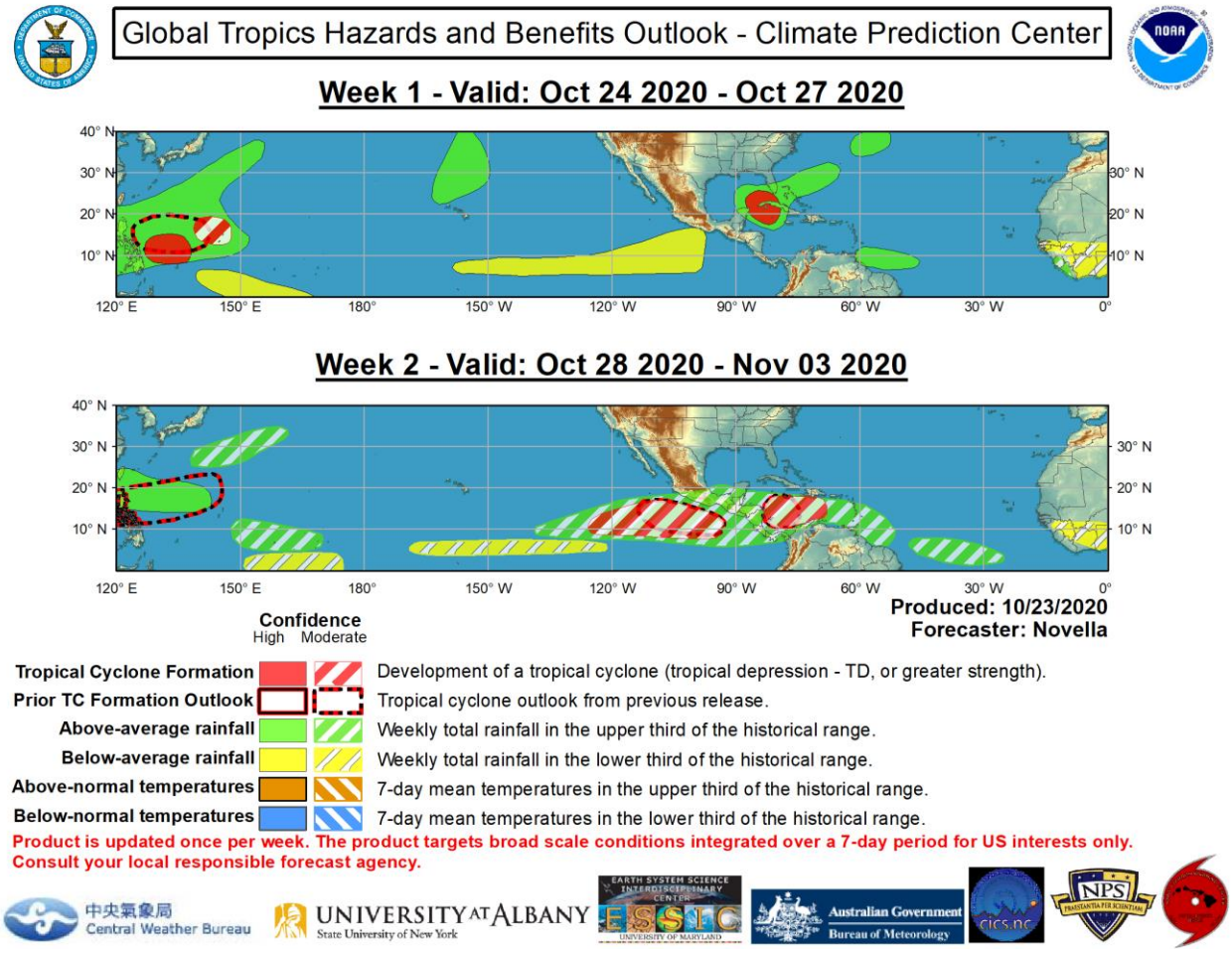

The enhanced phase of the MJO remains over the Maritime Continent, and has slightly shifted eastward over the past couple of days approaching phase 6 in RMM space. Consistent with model guidance earlier this week, dynamical models favor an eastward propagation of the intraseasonal signal, with disparities in their evolution into early November. The ECMWF and Canadian continue to feature westward shifts in the RMM index in the near term, likely associated with Rossby wave and Tropical Cyclone (TC) activity, before propagating eastward into phases 5 (week-1) and 6 (week-2). The GEFS and the CFSv2 still remain the most progressive, favoring the intraseasonal signal to reach well into the Western Hemisphere by week-2. Forecast confidence in the MJO continues to remain limited given the potential for destructive interference with the La Nina base state and these differences seen in the dynamical models.

Following the formation of Typhoon Saudel and Tropical Depression 20 in the West Pacific earlier this week, no new TCs have formed in the basin during the last several days. Saudel is continuing to track westward across the South China Sea and has strengthened to a Category 1 system. According to the Joint Typhoon Warning Center, Saudel is expected to gradually weaken to Tropical Storm strength as it passes south of Hainan and dissipate over Vietnam by early next week. Despite this weakening, any heavy precipitation from Saudel is expected to exacerbate ground conditions in Vietnam which has been

adversely affected by flooding, landslides, and damages to infrastructure in recent weeks. East of the Philippines, JTWC is currently monitoring two tropical disturbances, the first is located near (11N/134E) and the second is located near (8N/156E). Both of these disturbances have an elevated potential for development during the next several days with warm sea surface temperatures and favorable atmospheric conditions. As a result, the broad moderate confidence region in the original outlook is adjusted to now depict two formation regions for days 1-4. There is a high confidence for development with the former disturbance as both the GEFS and ECMWF ensemble means are in agreement with a rapidly deepening low that tracks towards the Philippines by early next week. A moderate confidence region is issued for the latter disturbance near the Mariana Islands, where there is less consensus between the GEFS and the ECMWF ensembles. For week-2, model guidance and TC tools have become less supportive of new formation areas in the West Pacific, and the moderate confidence region has been removed from the original outlook.

Across the Atlantic, Hurricane Epsilon is currently passing a few hundred miles to the east of Bermuda and is forecast to weaken and begin tracking northwestward into the open sea. Impacts to Bermuda have been relatively minimal, however, the National Hurricane Center (NHC) cautions that life-threatening surf and rip tides are anticipated over parts of the Caribbean, Maritime Canada and the east coast of the U.S. over the next several days. In the Caribbean, NHC is monitoring a tropical disturbance located near the Grand Cayman Islands with increased chances for development (60%) over the next five days. Compared to previous guidance, models have come much better aligned with potential development, and a high confidence region is added to today's update. This disturbance is expected to move to the northwest toward the Gulf of Mexico and bring enhanced precipitation across parts of Florida, Cuba and the Bahamas. For week-2 over the Atlantic and the East Pacific, the perspective from the original outlook has not changed much. With the potential for the MJO to propagate eastward, models continue to show elevated potential for TC activity across the Caribbean and East Pacific late in week-2. These moderate confidence regions have been expanded in accordance with the latest guidance and probabilistic TC tools.

Modifications to the favored areas of above- and below-average rainfall from the previous outlook are based on GFS, CFS, and ECMWF precipitation output as well as anticipated storm tracks.

----- Original Discussion from Tuesday, October 20, 2020 follows: -----

Following a stationary pattern since mid-September, the MJO has shown signs of some strengthening as it has begun to propagate eastward over the Maritime Continent during the past several days. Upper-level velocity potential anomalies continue to depict much of the enhanced convection centered over

the Maritime Continent, with suppressed convection extending from the Americas to Africa. Anomalous upper-level divergence has shifted east in recent days suggesting the MJO may soon be destructively interfering with the La Nina base state. There has been a steep decline in the equatorial Pacific sea surface temperature anomalies, particularly in the Nino 4 and 3.4 regions, with an atmospheric response showing stronger easterly (westerly) anomalies near the surface (aloft) over these areas in recent weeks. Dynamical model forecasts in RMM space indicate a continued eastward propagation of the intraseasonal signal with varying degrees of amplitude during the next two weeks. The GEFS and CFS appear to be the most progressive with the signal, with many ensemble members placing the MJO in phases 7 and 8 by early November. The ECMWF and Canadian models are relatively slower, and favor a westward shift of the signal in phase 5 likely tied to equatorial Rossby wave activity during week-1 before entering phase 6 by week-2. In light of this, forecast confidence remains limited given the increased potential for destructive interference with the low frequency footprint and varying phase speeds among the dynamical models. If the MJO does propagate eastward as fast as some ensemble members suggest, increased tropical cyclone (TC) activity over the East Pacific and Caribbean is more likely during late October. However, if the intraseasonal signal is slow to propagate, continued TC activity is anticipated over the West Pacific.

Three TCs have formed in the last seven days. In the West Pacific, Tropical Storm Saudel formed on 10/19 in the Philippine Sea and is forecast to track westward across Luzon today before moving into the South China Sea. The Joint Typhoon Warning Center (JTWC) anticipates the system to intensify under more favorable conditions, and is predicted to track westward towards Hainan later this week. Please refer to the JTWC for the latest update on this system. To the northeast of Saudel, Tropical Depression 20 (formerly 97W) formed today (10/20) and is located approximately near (140E/25N). Both the GEFS and ECMWF ensembles show this disturbance to be short-lived and is anticipated to become absorbed by a mid-latitude trough traversing Japan, which may help to reinforce a high amplitude mid-level pattern over the higher latitudes of North America later this week. In the Atlantic, Tropical Storm Epsilon formed on 10/19 over the central Atlantic (several hundred miles southeast of Bermuda). Initially a hybrid structured storm, Epsilon is expected to take on more tropical characteristics (i.e. symmetrically warm core) with warm sea surface temperatures and reduced wind shear to aid in its development. The National Hurricane Center (NHC) forecasts Epsilon to intensify into Hurricane in the next few days and track northwestward towards Bermuda. There is an elevated risk of direct impacts for wind, heavy precipitation and storm surge across the island, and interests there should refer to NHC for the latest updates.

Following Saudel, the GEFS continues to favor the development of another area of low pressure in the Philippine Sea late in week-1. The ECWMF ensemble mean, however, is relatively more delayed with this development, increasing TC formation potential by early week-2, while also depicting increasing signals for TC formation farther west in the South China Sea likely tied to Rossby wave activity in the region. To address the uncertainties with timing and location, a moderate confidence area is added over the

Philippine Sea during week-1, and a broader moderate confidence area is posted to cover these areas during week-2. In the Western Hemisphere, the potential for TC formation looks to increase towards the end of October and into early November associated with the predicted phase of the MJO by some of the models. Since last week, our previous outlooks have been highlighting a region in the western Caribbean with elevated odds for formation associated with a Kelvin wave traversing the region. However, guidance has become more tenuous with this development, and NHC has trimmed the chances of formation over the next 5 days from 30% to 10% resulting in the TC formation area being removed from the outlook for week-1. The associated trough of low pressure, however, is expected to promote enhanced rainfall for parts of the Caribbean and the Gulf of Mexico during week-1. For week-2, probabilistic tools are depicting increased signals for TC formation in the Caribbean and today's GEFS ensemble shows a stronger area of low pressure in the region compared to prior guidance during the latter portion of week-2. This is consistent with climatology, and a moderate confidence area is added to the outlook for week-2. In the East Pacific, probabilistic tools and model ensembles also support elevated chances for TC formation during week-2, and a moderate confidence area is also included from approximately 113W to 93W to the south of Mexico.

The precipitation outlook during the next two weeks is based on the consensus among the CFS and ECMWF ensemble means, the low frequency state, MJO composites, and anticipated TC tracks. For hazardous weather concerns over the U.S. during the next two weeks, please refer to your local NWS Forecast Office, the Weather Prediction Center's Medium Range Hazards Forecast, and CPC's Week-2 U.S. 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.