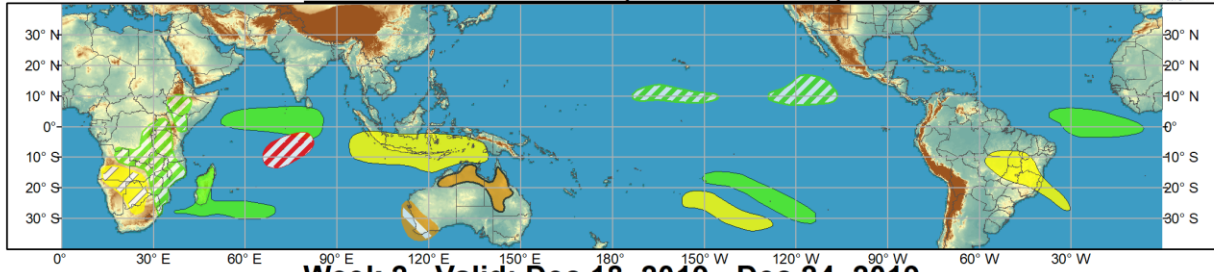




Global Tropics Hazards and Benefits Outlook - Climate Prediction Center



Week 1 - Valid: Dec 11, 2019 - Dec 17, 2019



Week 2 - Valid: Dec 18, 2019 - Dec 24, 2019



Produced: 12/10/2019

Forecaster: Artusa

- | Confidence | | |
|------------|----------|---|
| High | Moderate | |
| | | Tropical Cyclone Formation Development of a tropical cyclone (tropical depression - TD, or greater strength). |
| | | Above-average rainfall Weekly total rainfall in the upper third of the historical range. |
| | | Below-average rainfall Weekly total rainfall in the lower third of the historical range. |
| | | Above-normal temperatures 7-day mean temperatures in the upper third of the historical range. |
| | | Below-normal temperatures 7-day mean temperatures in the lower third of the historical range. |

Product is updated once per week, except from 6/1 - 11/30 for the region from 120E to 0, 0 to 40N. The product targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.



The MJO signal is currently weak and located over the western Indian Ocean. As was the case last week, competing modes of tropical variability have complicated both the analysis and the two-week prediction of the MJO. These modes include equatorial Rossby waves (ERWs), a Kelvin wave (KW), the MJO, the low frequency signal (in this case, the Indian Ocean Dipole or IOD), and westward-moving tropical cyclones (TC). The IOD is presently in its positive phase with anomalously warm water over the western Indian Ocean, which constructively interferes with the enhanced phase of the MJO to produce an enhancement of convection over that region. Record warm sea-surface temperatures (SSTs) accompanied this IOD event over the western Indian Ocean, which has also lasted longer into the late autumn than is typically the case. Increased subsidence and a corresponding lack of convection has dominated the Maritime Continent, western Pacific Ocean, and Australia.

Most MJO RMM index forecasts predict the continuation of a weak subseasonal signal throughout the next two weeks. The bias-corrected GEFS and the Canadian model predict a slight strengthening of the signal in Week-1, followed by a rapid weakening to well within the unit circle thereafter. The Canadian plot depicts a broad range of possibilities, underscoring high uncertainty. The signal is forecast to move from the western Indian Ocean (Phase 2) to the western Pacific (Phase 6), which suggests some

interference from a KW. The CFS predicts retrogression of the subseasonal signal from Phase 2 to Phase 1 (Atlantic/Africa) and back again. This kind of motion is often associated with ERW activity. The ECMWF phase diagram resembles the bias-corrected GEFS and Canadian plots, but does not depict the large dispersion of solutions that the Canadian model does.

There were several TC's that formed over the North Indian Ocean/Arabian Sea during the past week. Pawan developed east of Somalia, but struggled in a hostile wind shear environment. It later made landfall as a cyclonic storm in Somalia, bringing heavy rain and mudslides to the surrounding areas (top winds 45 mph). Cyclone Belna unexpectedly intensified in the final hours before landfall in Madagascar on 9 December, with peak sustained winds of 90 mph. Climatologically, this is a favorable time of year for TC's in this basin, as wind shear associated with the monsoon circulation weakens. During Week-1, tropical depression formation (moderate confidence) is possible over the Indian Ocean, with the 6z GEFS and 0z ECMWF ensemble forecasting persistent low pressure near the Maldives. The GEFS forecasts this low pressure center to track southwestward towards Madagascar, while the ECMWF ensemble predicts a track more to the south. Early in Week-2, the GEFS and ECMWF ensemble indicate a developing area of low pressure well east of the Philippines between about 140W-150W.

There is high confidence of above normal temperatures across portions of northern and east-central Australia during Week-1 (moderate confidence for southwestern Australia), with daytime maximum temperatures expected to range between the upper 30's to low 40's (Celsius). A moderate confidence of above normal temperatures is posted for Week-2, but the anomalous heat is forecast to shift southward, to include approximately the southern half of the Australian continent.

Anomalous rainfall forecasts for both Week-1 and Week-2 are based on areas of agreement among CFS, GEFS, and ECMWF precipitation guidance, and on the broad-scale climate factors noted in the first paragraph of this message. Above normal rainfall is forecast across the north-central Indian Ocean (related to expected constructive interference between the MJO and IDO, high confidence), and near/over Madagascar (related to Cyclone Belna, high confidence). Areas of above normal rainfall are also favored over portions of the central and eastern North Pacific (associated with the ITCZ, moderate confidence), the central South Pacific (associated with the eastward propagation of the South Pacific Convergence Zone, high confidence), and the low-latitude Atlantic (related to the ITCZ, high confidence). Below normal rainfall is forecast for the Maritime Continent (constructive interference between the MJO and IDO suppressed convective phases, high confidence), the central South Pacific (on the suppressed side of the South Pacific Convergence Zone, high confidence) and Brazil (associated with mid-latitude influences, high confidence).

During Week-2, there is a moderate risk of above normal rainfall over the north-central Indian Ocean, and a moderate risk of drier-than-normal conditions across the Maritime Continent region, similar to Week-1.

Forecasts over Africa are made in consultation with the CPC International Desk, and can represent local-scale conditions in addition to global-scale variability.