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Abstract

Prediction of Northern Australian Rainfall Onset Using the ACCESS-Seasonal Model †

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† Presented at the third International Tropical Agriculture Conference (TROPAG 2019), Brisbane, Australia, 11–13 November 2019.

Published: 8 April 2020

Abstract: The development of the Australian Community Climate Earth-System Simulator-Seasonal version 1 (ACCESS-S1) prediction system signifies a major step in addressing predictive limitations in multi-week to seasonal forecasting. It is anticipated that ACCESS-S1 will provide greater skill in its prediction of the wet season onset and intensity, which are crucial to the viability of cattle grazing across northern Australia. We evaluate the hindcast skill of the ACCESS-S1 for the northern rainfall onset, defined as the date when 50 mm of precipitation has accumulated at a given location from the 1st of September, heralding the start of the seasonal dry-to-wet transition over northern Australia. We show that the raw ACCESS-S1 hindcasts, regridded to a 5 km observed grid, capture the broad-scale features of the median onset, including an early October onset over the western Top End and southeast Queensland. However, the hindcasts fail to capture the later December onsets over central Australia. The greatest improvement in onset skill comes from first calibrating the hindcasts using observations, which outperform the raw model and bias corrected hindcasts over central Australia and the far west in the Pilbara-Gascoyne basin. Based on its simulation of realistic northern rainfall onset dates and variability alone, ACCESS-S1's prediction performance can be considered an improvement over the older predictive system. As the real-time onset forecasts have were issued using ACCESS-S1 in July 2019, it is expected that the calibrated predictions will help improve the resilience of cattle producers and graziers to drought across northern Australia.

Keywords: wet season; seasonal forecasts; hindcasts; rainfall onset; prediction; cattle grazing