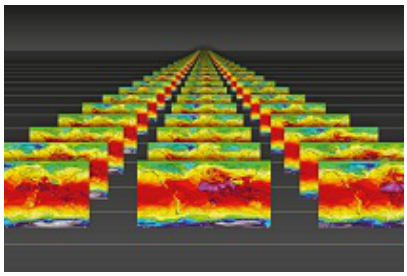

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AgScore - a skill test of climate models for agriculture

Traditionally crop and other agronomic models are forced using an analogue year approach based on historical climate data. With the increasing skill and resolution of seasonal climate models, a model ensemble is now becoming a feasible option to directly force agronomic models and predict yields. However we have found that even when a climate model scores well on standard metrics (such as Nino3.4 or monthly rainfall) it may not have high enough forecast skill when used with crop models (e.g. due to nonlinear relationships between variables or too much drizzle). It is not simple for a climate modeller or downscaling expert to know what daily climate features are important for growing grain or for a non-expert to test this in a farming systems model. Our solution is a web based tool that can be easily used by climate modellers to encourage cross-disciplinary explorations. AgScore will be called from any Matlab, R or Python script and an ensemble of forecasts uploaded for a location and crop (chosen from a broad, international predefined set). A grains model (APSIM) is executed with the uploaded model data, and AgScore analyses the results against identical APSIM simulations using baseline climatology for the same period. A standard suite of metrics are then sent back to the user giving them an indication of model performance. Note that this tool will not be able to give real time yield forecasts or replace existing CSIRO yield forecasts. The ultimate goal of this new metric is to allow climate modellers to understand the features of most relevance to agriculture and focus model development on these aspects. We are keen to hear feedback on how to develop this metric to best meet the needs of the climate community and to expand it beyond the grains industry to other agricultural applications.

Primary authors: BROWN, Jaclyn (CSIRO Agriculture and Food); Dr HOPWOOD, Garry (CSIRO); Dr HOLZWORTH, Dean (CSIRO); Dr SHARMAN, Chris (CSIRO); Dr SMETHURST, Philip

Presenter: BROWN, Jaclyn (CSIRO Agriculture and Food)

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