

## About the ACCESS-S model

### The model

The Bureau of Meteorology's climate forecast system for weekly to seasonal and longer-range climate outlooks is called the Australian Community Climate Earth-System Simulator –

Seasonal (ACCESS-S). It is a state-of-the-art dynamical (physics-based) forecast modelling system, which uses ocean, atmosphere, ice, and land observations to initiate outlooks for the season ahead. The ACCESS-S climate model is a collaboration between the Bureau of Meteorology and the UK Meteorological Office (UKMO).

The atmosphere and land model components of ACCESS-S operate at an approximate resolution of 60 km in the Pacific region. At this resolution, the model can represent for example the markedly different climates of the western and central division of Viti Levu, Fiji. The ocean model component of ACCESS-S operates at an approximate resolution of 25 km in the Pacific region. At this resolution, the model can resolve small-scale currents and eddies.

ACCESS-S outlooks are based on a 99-member ensemble. This is a common climate forecasting technique where the model is run 99 times with slightly different initial conditions to capture a range of likely future scenarios. Being a dynamical model, ACCESS-S is undergoing continuous research and development. Advances in the science of seasonal prediction, improvements in the observations and how they are fed into the model, as well as increases in supercomputing power are just some of the ways the model's accuracy will increase over time. For Australian stakeholders, ACCESS-S2 replaced ACCESS-S1 in October 2021, while ACCESS-S1 replaced POAMA in August 2018. POAMA, also a dynamical climate model, was used for official Bureau climate outlooks from May 2013 until ACCESS-S was brought into operation. Prior to 2013, the Bureau used a statistical method to generate climate outlooks.

For more technical details on ACCESS-S2, see: Wedd, R. et al, 2022: ACCESS-S2: the upgraded Bureau of Meteorology multi-week to seasonal prediction system. Available via <https://www.publish.csiro.au/es/pdf/ES22026>

### The outlooks

The Bureau uses output from ACCESS-S for several products including forecasts of the El Niño–Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD), multi-week tropical cyclone's, as well as weekly to seasonal rainfall and temperature outlooks, and sea surface temperature (SST) anomaly forecasts.

### Mean sea level pressure, rainfall, maximum and minimum temperature outlooks

ACCESS-S produces Mean Sea Level Pressure (mslp), rainfall, maximum and minimum temperature outlooks for the weeks to seasons ahead. They are based on an ensemble of 99 forecasts (or scenarios) for the future climate. The variability of the outlooks among the 99 ensemble members

gives an indication of the range of possible future scenarios. For instance, if 80 of the 99 ensemble members suggest drier conditions are likely, we can say there is about an 80% chance of drier conditions in the upcoming month/season. The outlooks are provided as the difference from average, probability of getting above median, below/normal/above normal mslp, rainfall or temperature (maximum and minimum) for the weeks to seasons ahead. El Niño–Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) outlooks Sea surface temperatures in specific regions of the Pacific and Indian oceans are monitored to establish whether significant climate drivers, such as El Niño or La Niña, may be developing. These events can influence, or drive, Pacific rainfall and temperature patterns. ACCESS–S produces temperature forecasts for these regions for the seasons ahead to monitor the possible development of ENSO or IOD events.

For long-range sea surface temperature outlooks (ENSO and IOD outlooks) go to <http://www.bom.gov.au/climate/ocean/outlooks/#region=NINO34>

For more information on these outlooks go to <http://www.bom.gov.au/climate/enso/indices/about.shtml>