

Seasonal Climate Outlook

Date: May 2024

Summary

The current model rainfall outlook for the South West Land Division (SWLD) from May to July, extending to August to October, indicates neutral chances of exceeding median rainfall, with an equal likelihood of below or above median rainfall. Warmer temperatures than usual are anticipated to persist.

Key points to consider:

- The Bureau of Meteorology's temperature outlook for next three months, May to June 2024, and further ahead to winter, June to August, suggests above-average maximum and minimum temperatures, with an 80% chance of exceeding median temperature.
- The El Niño Southern Oscillation (ENSO) remains neutral, with climate models indicating this neutrality is likely to continue until at least July 2024.
- All five models surveyed by the Bureau suggest a positive Indian Ocean Dipole (IOD) is expected to form in May and persist until September. A positive IOD typically results in drier and warmer conditions for the SWLD during winter and spring. However, confidence in IOD forecasts beyond autumn is currently low.
- Rainfall on 30 April from a western trough brought widespread but patchy rain to the SWLD, the majority falling in the Central West forecast district. A strong high pressure system is sitting south of WA, with its slow movement acting as a blocking high.
- The Bureau's Water and the Land is indicating 1-50 mm rain for the SWLD for the first week of May.

Rainfall Outlook for the South West Land Division

A summary of 20 national and international models reveals that 12 models suggest neutral chances of exceeding median rainfall for the SWLD from May to July 2024.

Looking further ahead, the majority of models also predict a neutral chance of exceeding median rainfall for winter, June to August and July to September. An equal number of models indicate below median and neutral chances for rainfall in August to October.

It's important to note that a neutral outlook does not imply average rainfall but rather normal climatic conditions, where anything is possible. However, it's crucial to exercise caution when interpreting forecasts beyond autumn, as climate models have their lowest skill due to the 'autumn predictability barrier".



Fig 1. Model summary of rainfall outlook for the South West Land Division up to August to October 2024, with majority of models indicating a neutral chance of exceeding median rainfall.

Climate Drivers

International climate models suggest that ENSO will likely remain neutral until at least July 2024. However, while three out of seven international models predict central Pacific Sea Surface Temperatures (SST) to reach La Niña thresholds in July, predictions for El Niño and La Niña made in mid-autumn tend to have lower accuracy compared to predictions made at other times of the year. Therefore, caution should be exercised when using current forecasts of the ENSO state beyond July.

All five international climate models surveyed by the Bureau indicate positive Indian Ocean Dipole (IOD) conditions in May, persisting until at least September.

For the SWLD, a positive IOD, generally signifies a drier and warmer winter and spring. Nonetheless, confidence in model IOD forecasts beyond autumn is low.

The Bureau of Meteorology's model, the Australian Community Climate Earth-System Simulator – Seasonal (ACCESS-S2), forecasts SST for July 2024, indicating the development of a positive IOD in the Indian Ocean (warmer than normal SST in the IOD west box compared to cooler than normal SST in the IOD east box) and cooler than normal sea surface temperatures in the Pacific Ocean, suggesting a potential development of La Niña.



Fig2. Global sea surface temperature forecast for July 2024 from the Bureau of Meteorology ACCESS model. Indicating a positive Indian Ocean Dipole in the Indian Ocean and cooler than normal sea surface temperatures in the Pacific Ocean, indicating a potential La Nina developing.

Soil Water Products

Various applications are available for users to access soil water information, including national projects such as the Bureau of Meteorology's Australian Landscape Water Balance model and the Australia Terrestrial Ecosystem Research Network (TERN), which integrates the Bureau's model with a national soil grid and satellite imagery. Additionally, DPIRD produces a plant-available soil water map based on a model. Read more about these products below.

Soil Moisture Integration and Prediction System (SIMPS)

TERN (Australia's Terrestrial Ecosystem Research Network) has developed a Soil Moisture Integration and Prediction System (SMIPS), which offers nationwide daily estimates of volumetric soil moisture at a 1 km resolution. It also provides an index ranging from 0 to 1, approximating how full or wet the top 90 cm of soil is at a specific location and time. See below for an example.

SMIPS integrates data from TERN's Soil and Landscape Grid of Australia, precipitation and potential evapotranspiration data from the Bureau of Meteorology's Australian Landscape Water Balance model, along with soil moisture data collected from on-ground soil moisture sites.

To enhance accuracy, it utilizes daily satellite soil moisture data from the European Space Agency's Soil Moisture Ocean Salinity Earth Explorer mission.



Fig3.Soil Moisture Integration and Prediction System map of proportion full for 14 March to 13 April for the South West Land Division. Indicating that there are low levels of water in the top 90 cm of soil.

The Bureau of Meteorology

<u>The Australian Water Outlook</u> offers historical daily gridded output of precipitation, soil moisture, runoff and deep drainage, along with seasonal forecasts and future climate projections.

The information is generated using a range of climate inputs, static grids and satellite observations, which are fed into the Australian Water Resources Assessment Landscape Model (AWRA-L).

This model simulates the flow of water through the landscape with precipitation entering a grid cell through vegetation and soil moisture stores and then out of the grid cell as evapotranspiration, runoff or deep drainage into the groundwater.



Fig4.Bureau of Meteorology's Australia Water Outlook relative root zone soil moisture percentile rank for WA grainbelt for 18 April 2024. Indicating below average to lowest 1% soil moisture for parts of the South West Land Division.

DPIRD's Fallow and Crop Soil Water Maps

DPIRD produces plant-available soil water maps for fallow from March to June, covering 10 different soil types, and displays the mean of these soils. The map is based on the Ritchie two-layer fallow evaporation model run, which runs from the first of November in the previous year.

For crop maps, DPIRD produces them from July to October, encompassing various soil types. Evapotranspiration of a generic wheat crop is estimated using the Food and Agriculture Organization crop factor methos. The timing of crop germination (break of season) is estimated using a two-part rule.

These maps are less technical than the other two methods described above as they do not utilize satellite imagery. However, the map is easier to interpret due to distinct breaks in the legend, unlike the SMIPS map, where the proportion of fullness over the landscape is represented by a change in gradient of a single colour, making differentiation challenging.



Fig5.Plant available soil water map for the South West Land Division for 22 April. Using two-layer fallow Ritchie model, indicating high amount of water available around Hyden.

Recent Climate

Rainfall for January to April (and for the past 7 months) has been well below average for the majority of the South West Land Division.

One exception are the shires surrounding Kulin, having received decile 8-10 rainfall from heavy rain in February and March. Rainfall for the growing season, from the 1 April, has been limited.

Patchy rainfall on April 30th originating from a western trough rather than the more common cold fronts typical of autumn and winter, brought widespread but patchy rainfall to the Central West forecast district, with New Norcia recording 45 mm and Ejanding 37 mm.



Fig6.Rainfall to date map for 1 January to 30 April 2024 for the South West Land Division. Indicating high falls for shires surrounding Hyden.



Fig7.Rainfall decile map for 1 January to 30 April 2024 for the South West Land Division. Indicating decile 1-3 rainfall for the majority.



Fig8. Rainfall to date map for 1 April to 1 May 2024 for the South West Land Division. Indicating some places have received no rainfall so far this growing season.

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