February – April 2020 Issued: 30 January 2020

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NIWA Outlook: February – April 2020

Outlook Summary

- ENSO neutral conditions continued during January 2020. The Southern Oscillation Index (SOI) was well within the neutral range while sea surface temperatures (SSTs) remained on the El Niño side of neutral.
- Oceanic ENSO neutral will most likely persist (68% chance) over the next three months.
- The primary climate driver during February-April is expected to be a warm pool of ocean water in the west-central Pacific Ocean since the Indian Ocean Dipole (IOD) dissipated.
- Increasing coastal sea surface temperatures (SSTs) are also expected to influence New Zealand's air temperatures in a warmer direction over the coming three months.
- For New Zealand, the change in climate drivers will most likely be associated with a change in circulation patterns and an increasing threat for periodic, heavy rainfall events, especially in the North Island. High humidity may also be a factor.
- February – April 2020 air pressure is forecast to be lower than normal to the north and higher than normal to the southeast of New Zealand. This is expected to be associated with mixed westerly and northeasterly quarter air flow anomalies.
- Temperatures are expected to be near or above average for all regions of New Zealand except the north of the North Island where above average temperatures are most likely.
- Rainfall is expected to be near normal in all regions of New Zealand except for the east of the South Island where normal or below normal rainfall is about equally likely.

- The tropics to the north of New Zealand may have an increase in activity during mid-February. For the current tropical cyclone season (to April 2020), the risk for New Zealand is near normal. On average, one ex-tropical cyclone passes near the country each year. Significant rainfall, damaging winds, and coastal damage can occur during these events.

February – April 2020 temperatures are about equally likely to be near average (40-45% chance) or above average (40-45% chance) in all regions of New Zealand except the north of the North Island where above average temperatures are most likely (50% chance).

February – April 2020 rainfall is most likely to be near normal (45% chance) in all regions of New Zealand except for the east of the South Island where normal (40% chance) or below normal (35% chance) rainfall is about equally likely. During periodic, northeasterly air flow patterns, the north and east of the North Island may be exposed to moist and humid conditions from the sub-tropics. This pattern may also be associated with significant rainfall events.

February – April 2020 soil moisture levels and river flows are most likely to be below normal (45-50% chance) in the north of the North Island and west and east of the South Island, about equally likely to be near normal (40% chance) or below normal (35% chance) in the west and east of the North Island, and near the climatological value in the north of the South Island.

Regional predictions for February – April 2020

Northland, Auckland, Waikato, Bay of Plenty

The table below shows the probabilities (or percent chances) for each of three categories: above average, near average, and below average. In the absence of any forecast guidance there would be an equal likelihood (33% chance) of the outcome being in any one of the three categories. Forecast information from local and global guidance models is used to indicate the deviation from equal chance expected for the coming three-month period, with the following outcomes the most likely (but not certain) for this region:

- Temperatures are most likely to be above average (50% chance).
- Rainfall totals are most likely to be near normal (45% chance).
- Soil moisture levels and river flows are most likely to be below normal (45% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	50	30	25	20
Near average	35	45	30	35
Below average	15	25	45	45

Central North Island, Taranaki, Whanganui, Manawatu, Wellington

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be near average (40% chance) or above average (45% chance).
- Rainfall totals are most likely to be near normal (45% chance).
- Soil moisture levels and river flows are about equally likely to be near normal (40% chance) or below normal (35% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	45	25	25	25
Near average	40	45	40	40
Below average	15	30	35	35

Gisborne, Hawke's Bay, Wairarapa

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be near average (40% chance) or above average (45% chance).
- Rainfall totals are most likely to be near normal (45% chance).
- Soil moisture levels and river flows are about equally likely to be near normal (40% chance) or below normal (35% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	45	30	25	25
Near average	40	45	40	40
Below average	15	25	35	35

Tasman, Nelson, Marlborough, Buller

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be near average (45% chance) or above average (40% chance).
- Rainfall totals are most likely to be near normal (45% chance).
- Soil moisture levels and river flows are most likely to be near the climatological value.

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	40	25	30	30
Near average	45	45	35	35
Below average	15	30	35	35

West Coast, Alps and foothills, inland Otago, Southland

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be near average (40% chance) or above average (40% chance).
- Rainfall totals are most likely to be near normal (45% chance).
- Soil moisture levels and river flows are most likely to be below normal (45-50% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	40	20	20	20
Near average	40	45	30	35
Below average	20	35	50	45

Coastal Canterbury, east Otago

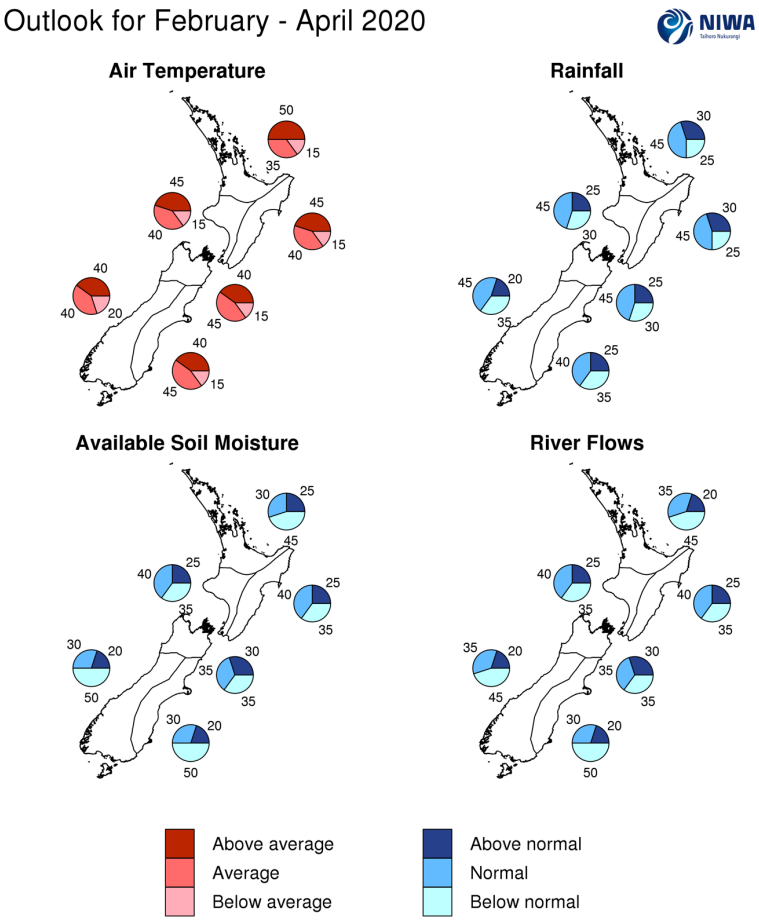
Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be near average (45% chance) or above average (40% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or below normal (35% chance).
- Soil moisture levels and river flows are most likely to be below normal (50% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	40	25	20	20
Near average	45	40	30	30
Below average	15	35	50	50

Graphical representation of the regional probabilities



Background

The NINO3.4 Index anomaly (in the central Pacific) for the month of January was +0.45˚C. The warmest ocean waters with respect to average continued to be located in the west-central Pacific, with the NINO4 region recording a monthly value of +0.82˚C.

During January 2020**,** upper-oceanic heat content remained above average near the International Dateline, as it has for much of the past year. The warmest SSTs (29-31˚C) on the globe are located in this region and therefore anomalous rainfall and convection is expected over the upcoming three month period. Overall, this was indicative of oceanic ENSO neutral conditions that leaned toward El Niño Modoki.

Trade winds were weaker than normal near and west of the International Dateline during January, allowing the west-central Pacific warm pool of ocean water to persist. During February, stronger than normal trade winds are forecast to develop in the eastern and central Pacific, which may lead to cooling of SSTs in that region.

According to the consensus from international models, ENSO-neutral conditions are most likely (68% chance) for the February – April period. For the May – July period, the probability for ENSO-neutral conditions is 64%. The probability of La Niña increases to 30% in August-October although ENSO-neutral remains the most likely outcome.

New Zealand's coastal water temperatures were largely cooler than average during January 2020. Overall, these were the coolest SSTs (with respect to average) since January 2017. The cool seas were the result of strong, southwesterly winds during the first half of January, which contributed to upwelling (churning of the cooler sub-surface sea water up to the surface). A late-month spell of heat led to a rapid warming of SSTs which is expected to continue into early February. With periodic northeasterly winds during the next three months, coastal SSTs may remain above average into autumn.

New Zealand Coastal Sea Surface Temperatures during January 2020

North NI	West NI	East NI	North SI	West SI	East SI
-0.48˚C	-0.89˚C	+0.18˚C	-0.46˚C	-0.65˚C	+0.37˚C

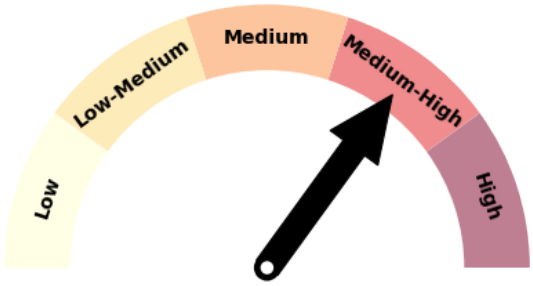
The Southern Annular Mode (SAM) was negative to start the month of January and was associated with cool, southwesterly winds in New Zealand. For the rest of the month, the index alternated between positive and negative values. This variability is expected to continue for the first half of February. The tropics to the north of New Zealand may have more of an influence on the local climate than the SAM during the upcoming three months.

The Madden Julian Oscillation (MJO) was active over the Maritime Continent and western Pacific during January (phases 4-7). The MJO is expected to progress through the same phases during mid-February. The typical rainfall anomalies for these phases during February include an increased chance for rainfall in the north and east of the North Island along with near or above average temperatures. The MJO may be convectively active in phases 4-7 several times from February-April in association with the warm pool of ocean water in the west-central Pacific.

The Indian Ocean Dipole (IOD) is now in the neutral range (latest weekly value: -0.01, Australian Bureau of Meteorology). Its role as a climate driver has dissipated.

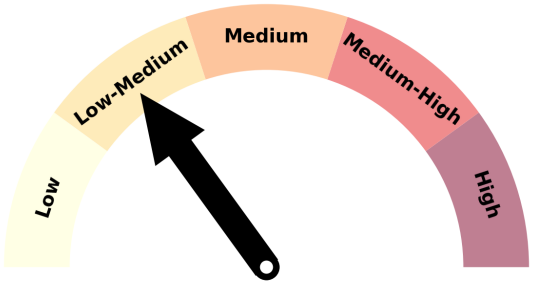
Forecast Confidence

Temperature



Forecast confidence for temperature is medium to high. Coastal sea surface temperatures have increased significantly during late January and are expected to continue to rise into February, which will have an influence on air temperatures over land. There is also strong model agreement that cooler than average temperatures are unlikely.

Rainfall



Forecast confidence for rainfall is low to medium. The lack of strong climate drivers (fading IOD, ENSO-neutral, variable SAM) makes this a particularly challenging forecast, although the emergence of rainfall and convection in the tropical western Pacific has historically coincided with an increase in moist, northerly air flows for New Zealand.

For comment, please contact

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Notes to reporters and editors

1. NIWA's outlooks indicate the likelihood of climate conditions being at, above, or below average for the season as a whole. They are not 'weather forecasts' as it is not possible to forecast precise weather conditions three months in advance.
2. The outlooks are the result of the expert judgment of NIWA's climate scientists. They take into account observations of atmospheric and ocean conditions and output from global and local climate models. The presence of El Niño or La Niña conditions and the sea surface temperatures around New Zealand can be a useful indicator of likely overall climate conditions for a season.
3. The outlooks state the probability for above average conditions, near average conditions, and below average conditions for rainfall, temperature, soil moisture, and river flows. When a particular probability reaches or exceeds 60%, we conclude it is "very likely".
4. This three-way probability means that a random choice would be correct only 33 per cent (or one-third) of the time. It would be like randomly throwing a dart at a board divided into three equal parts, or throwing a dice with three numbers on it.
5. Each month, NIWA publishes an analysis of how well its outlooks perform. This is available online. See www.niwa.co.nz/our-science/climate/publications/all/cu
6. All outlooks are for the three months as a whole. There will inevitably be wet and dry days, and hot and cold days, within a season. The exact range in temperature and rainfall within each of the three categories varies with location and season. However, as a guide, the "near average" or middle category for the temperature predictions includes deviations up to ±0.5°C for the long-term mean,

whereas for rainfall the “near normal” category lies between approximately 80 per cent and 119 per cent of the long-term mean.

7. The seasonal climate outlooks are an output of a scientific research programme.
8. Where probabilities are within 5% of one another, the term “about equally” is used.
9. The forecast confidence meter for temperature and rainfall represents the expert judgement of NIWA’s climate scientists. It aims to synthesize various forecast elements, such as global and local climate drivers, in order to clearly communicate forecaster confidence.

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