

# SUMMARY ASSESSMENT OF SEASONAL FORECASTS

DECEMBER 2019 TO FEBRUARY 2020

## Executive Summary

The general indication from forecast models and current climate signals is that a relatively mild and wet December-February is likely.

### Storms

Indications are that the frequency of storms moving into the UK from the North Atlantic will most likely be around or above average during the three-month period.

### Precipitation

UK precipitation totals will most likely be around or higher than the long-term seasonal average.

### Temperature

UK temperatures will most likely be warmer than the long-term seasonal average.

### Long-range Models

Numerical Weather Prediction models strongly favour above average temperatures and generally favour above average precipitation totals.

### Climate Signals

There are few dominant climate signals (e.g. ENSO is neutral) but the North Atlantic is relatively warm in the vicinity of the UK and the QBO is in a state consistent with an increased chance of mild, wet and stormy weather. However, some climate signals now suggest an increasing possibility of a cold and dry period from the New Year onwards.

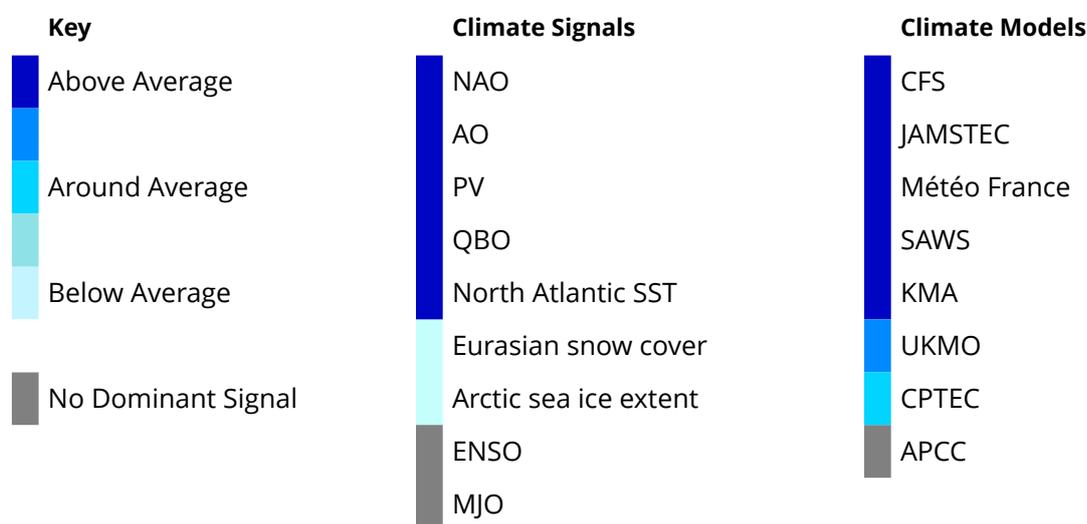
Further monthly updates will continue to be issued through the season.

# Seasonal Forecast Assessment Summary

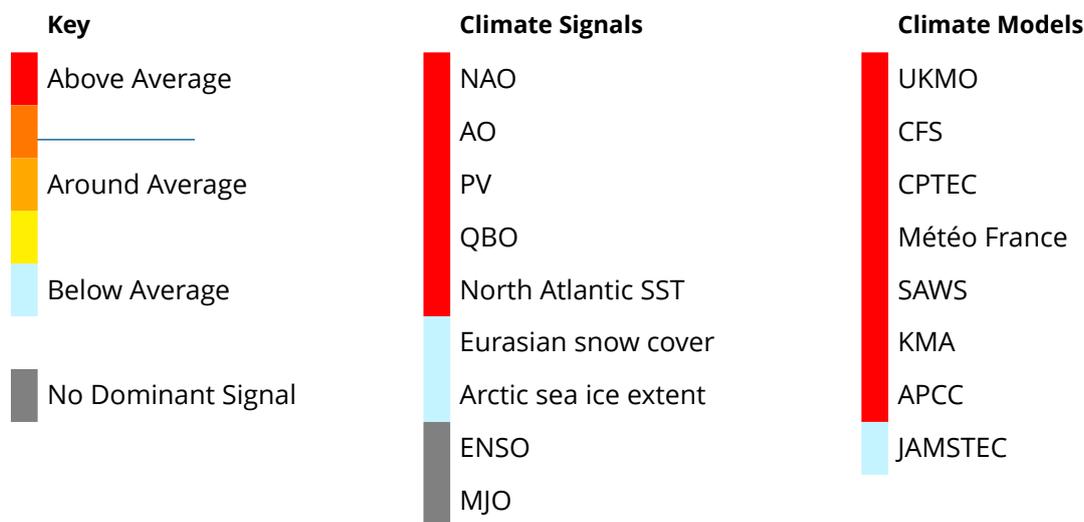
In order to produce this seasonal forecast assessment, the outputs of various seasonal forecast models have been analysed, along with some key climate indicators. In terms of the seasonal forecast models, EuroTempest has chosen to focus on precipitation and temperature as all agencies used in this report provide forecasts for both of these parameters, enabling a comparison across all agencies. Owing to the relationship between the occurrence of North Atlantic storms and mild and wet conditions, temperature and precipitation have been used as a proxy for storminess, as forecast models do not provide a direct measurement of storm occurrence. Similarly, despite the relationship between most climate signals and UK weather being relatively weak, the status of these signals can often be suggestive of which weather types may be more likely to prevail, and so can be used to indicate trends in temperature, precipitation and storminess.

The seasonal forecasts and climate signals are summarised in the Seasonal Forecast Assessment section of this report. For more information on the characteristics of the signals please see the EuroTempest climate signals [factsheet](#). The implications of these models and signals on UK weather during DJF 2019 are shown in the diagram below.

## Precipitation



## Temperature



## How stormy has the season so far been?

The table below shows the number of ‘windy days’ that occur on average each month through the UK winter windstorm season. It defines a ‘windy day’ in three different ways based on the percentage of UK weather observation stations that record maximum gusts of 45mph or higher.

% stations >45mph	Number of “Windy Days”										
	Average season								2019/2020 Season		
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	TOTAL	Sep	Oct	Nov
>10%	9	16	20	21	21	15	15	117	10	17	15
>20%	2	5	9	11	10	7	6	50	3	2	4
>50%	0	0	1	2	2	2	1	8	0	0	0

The number of windy days where more than 10% of stations reported gusts of over 45mph has been around average this season so far but there have been a lower than average number of windy days where more than 20% of stations reported such gusts. However, the season has been very wet, the wettest for nearly 20 years (since autumn 2000). Rainfall totals for England and Wales were over 50% higher than the long-term average in each of the autumn months (September, October and November). It is yet to be officially confirmed but early indications are that there have been just four wetter autumns than 2019 in England and Wales since 1766.

## Extended Outlook

The following forecast is based on both the output of numerical weather prediction models and climate signals with a shorter-term impact.

### Early-Mid December

Weather models and some climate signals suggest that the next few weeks will likely be characterised by increasingly unsettled conditions. Indications are that the [AO](#) and the [NAO](#) are most likely to move into and then remain in a positive phase. These signals are consistent with an increased likelihood of wet and windy UK weather compared to recent more settled conditions.

### Remainder of December into early January

The last few weeks of December are likely to start unsettled. Though there is a steadily increasing chance of an extended period of cold weather from around the beginning of January, a mild and wet period is still the most likely outcome.

# Seasonal Forecast Assessment

## Models

The general indication from the forecast models is that a relatively mild and wet three-month period is likely.

Most models favour above average precipitation and temperature and there is only one instance of a forecast model favouring a below average season for either parameter. The signal is arguably strongest for temperature, with many models suggesting that the chance of a warmer than average winter is >50% - i.e. it is not only the favoured outcome but also more likely than the two alternative outcomes (of an average or a colder than average winter) combined. The forecast models are generally slightly less definitive about precipitation, with many suggesting the probability of a wet winter is only marginally greater than the probability of an average winter. However, the majority of forecast models generally suggest that the probability of a relatively dry winter is low (<20%).

It should be noted that the forecast models generally define “average” conditions as the mean of the last 30 years or so. The generally increasing trend of warmer conditions, as a result of climate change, makes it more likely that temperatures will exceed these historical averages. Therefore, temperatures this DJF period that are colder than those that the UK has experienced within the last few years could still be above “average” by this definition.

Models used:

**UKMO:** UK Met Office

**CFS:** The US National Centers for Environmental Prediction Climate Forecast System

**JAMSTEC:** Japan Agency for Marine-Earth Science and Technology

**CPTEC:** Center for Weather Forecasts and Climate Studies (Brazil)

**Météo-France:** National Met Agency of France

**SAWS:** South African Weather Services

**KMA:** Korea Meteorological Administration

**APCC:** APEC Climate Center (South Korea)

[Climate Signals](#) (see [climate signals factsheet](#) for more information)

The climate signals are currently more ambiguous than the forecast models. Many are in a weak or neutral state. The climate signals suggest that milder, wetter and windier conditions are more likely than cooler, drier and calmer weather, at least in the near term. The combination of warm sea surface temperatures close to the UK, a strong polar vortex, and a favourable phase of the QBO contributes to a slightly increased likelihood of a positive NAO during the DJF period, which in turn indicates a slightly increased likelihood of mild, wet and windy weather. However, there are now some indications that the polar vortex may begin to weaken in the New Year. This, along with above average Eurasian snow cover and below average Arctic sea ice suggests an increasing possibility of an extended period of cold weather in the latter part of the three-month period. Nevertheless, this possibility is not expected to increase to the point that an extended period of cold weather is the most likely outcome. The most likely outcome is still a mild and wet period.

**NAO: North Atlantic Oscillation**

**Current State:** Slightly positive

**Projected State:** Expected to trend more positive over the next week and then remain positive for at least the following week.

**Implications for UK weather:** Slightly increased chance of wet and windy conditions while in a positive phase.

**AO: Arctic Oscillation**

**Current State:** Slightly positive

**Projected State:** Expected to first trend more positive over the next week before returning to near neutral later in the month.

**Implications for UK weather:** Slightly increased chance of wet and windy conditions while in a positive phase.

**PV: Polar Vortex**

**Current State:** Strong

**Projected State:** Potentially weakening from the end of December

**Implications for UK weather:** Slightly increased likelihood of colder and drier periods towards the end of the winter.

**QBO: Quasi-Biennial Oscillation**

**Current State:** Westerly phase

**Projected State:** Westerly

**Implications for UK weather:** Increased chance of mild, wet and stormy weather.

**ENSO: El Niño Southern Oscillation**

**Current State:** Neutral

**Projected State:** ENSO is expected to remain in a neutral or near-neutral state through the DJF period. A distinct El Niño or La Niña event is unlikely.

**Implications for UK weather:** ENSO is not currently expected to have much effect on the UK weather over the coming three months.

**MJO: Madden Julian Oscillation**

**Current State:** The MJO is currently weak and not well defined.

**Projected State:** No clear timescale for the progression through the phases.

**Implications for UK weather:** If the MJO does strengthen it will be into a phase that favours, mild, wet and stormy weather later in December.

**North Atlantic SST**

**Current State:** Warmer than average across mid-latitudes and below average across high-latitudes.

**Projected State:** This pattern is expected to persist

**Implications for UK weather:** Increased likelihood of positive NAO, suggesting an increased chance of milder, wetter and stormier periods.

**Eurasian Snow Cover and Arctic Sea Ice Extent**

**Current State:** Eurasian snow cover is above average, Arctic sea ice extent is not.

**Projected State:** Arctic sea ice is expected to remain below normal.

**Implications for UK weather:** Slightly increased likelihood of colder and drier periods.

## Appendices

### Seasonal Forecast Assessment - Notes

- This is not a EuroTempest forecast. This is a EuroTempest summary of a number of World Meteorological Organization (WMO) designated global producing centres for long-range forecasts. (<http://www.wmo.int/pages/prog/wcp/wcasp/gpc/gpc.php>)
- The brief summary of the possible climate signals gives some indications of possible weather patterns. However, these signals only give some suggestions and are not as detailed or refined as the WMO centres forecasts.
- There is little tendency for one type of weather to prevail over any three month period and this assessment does not dismiss the possible occurrence of other weather types over shorter time periods during the winter.
- Seasonal forecasts are for average conditions over a three month period, they are not forecasts for weather conditions persisting throughout the whole of the period.
- This report is produced for information only. Please contact us if you require further information or have any feedback.

### Seasonal Forecast Assessment - Method

In order to have any confidence in whether a season will likely turn out as forecast (by any agency) it is necessary to consider:

- a) whether there is a strong indication in any given forecast towards conditions for the coming season which are different from what might be expected from an average season based on the long term historical record
- b) consistency across a range of available forecasts

In assessing the outlook for the UK, EuroTempest has taken account of forecasts produced by WMO designated global producing centres for long-range forecasts, these are either National Meteorological Agencies or other meteorological centres. These centres are listed in the "Seasonal Forecast Assessment – Sources" section below.

EuroTempest has chosen to focus on precipitation and temperature as all agencies used in this report provide forecasts for both of these parameters, enabling a comparison across all agencies. Owing to the relationship between the occurrence of North Atlantic storms and mild and wet conditions, temperature and precipitation have been used as a proxy for storminess, as forecast models do not provide a direct measurement of storm occurrence.

No two agencies present their forecasts in exactly the same way. Some present forecasts in terms of probabilities – e.g. the probabilities of the upcoming period being in the top third (above average), middle third (average) or bottom third (below average) of historical periods in terms of observed mean precipitation or temperature.

Other agencies present forecasts in terms of anomalies - i.e. the expected difference in the mean precipitation or temperature over the coming season from what would be expected from an average period based on the historical record. Forecasts using this method are generally either stated as being above or below the average.

For example the probability of above average precipitation should be considered against the "climatological" chance of an above average period. This is 1 in 3, or around 33%, because any period will fall in either the top third (above average), middle third (average), or bottom third (below average).

It should be noted that these agencies generally define "average" conditions as the mean of the last 30 years or so. The generally increasing trend of warmer conditions as a result of climate change makes it more likely that temperatures will exceed these historical averages. Therefore, temperatures this season that are colder than those that the UK has experienced within the last few years could still be above "average" by this definition.

Also, the resolution of the forecasts (both spatial and in terms of the forecast parameter) differs between agencies. As such, absolute direct comparisons are not possible. EuroTempest has assessed each of the forecasts and summarised its conclusions in the summary tables.

The entries in the table represent EuroTempest's standardised interpretation (applied to the UK) of the forecasts provided by each agency and do not necessarily represent a specific forecast for the UK by each agency.

It is also important to note that all agencies advise treating seasonal forecasts with caution – e.g. the UKMO seasonal forecast website states “Raw data are displayed for use by international meteorological centres. This does not constitute a seasonal forecast for a given location.”

#### Seasonal Forecast Assessment - Sources

In assessing the outlook for the UK winter season EuroTempest has taken account of forecasts produced by eight agencies. These are either National Meteorological Agencies or other meteorological organisations. All eight of these agencies/organisations are World Meteorological Organization (WMO) designated global producing centres for long-range forecasts. (<http://www.wmo.int/pages/prog/wcp/wcasp/gpc/gpc.php>)

#### **UK Met Office (UKMO)**

<http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob>

#### **The US National Centers for Environmental Prediction Climate Forecast System (CFS)**

<http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/>

#### **Japan Agency for Marine-Earth Science and Technology (JAMSTEC)**

<http://www.jamstec.go.jp/frcgc/research/d1/iod/e/seasonal/outlook.html>

#### **Center for Weather Forecasts and Climate Studies (CPTEC) - Brazil**

<http://clima1.cptec.inpe.br/gpc/pt>

#### **Météo-France**

<http://www.meteofrance.com/accueil/previsions-saisonnieres>

#### **South African Weather Services (SAWS)**

<http://www.weathersa.co.za/component/content/article/2-uncategorised/179-long-range-forecast?Itemid=168>

#### **Korea Meteorological Administration (KMA)**

[http://www.wmolc.org/~GPC\\_Seoul/](http://www.wmolc.org/~GPC_Seoul/)

#### **APEC Climate Center (APCC) – South Korea**

<http://www.apcc21.net/ser/outlook.do?lang=en>