

Summary Assessment of Seasonal Forecasts for: January, February and March 2019

Executive Summary:

There remains some consistency across seasonal forecast models towards a milder and wetter than average JFM 2019 in terms of the 3-month average. However, many of the climate signals, which provide a stronger indication of weather patterns in the shorter term, indicate the potential for the development of blocked weather patterns, which could result in extended periods (a few days up to a week or so) of calmer but colder conditions across the UK during JFM 2019. Despite these differences, the available information suggests:

- **Storms:** While there is no clearly dominant signal overall, the frequency of storms moving in from the North Atlantic is most likely to be around average over the three month period. There is some indication of a lower than average frequency throughout January and into the beginning of February.
- **Precipitation:** There is most likely to be around or potentially greater than average precipitation. However, some climate signals and weather models indicate the potential for some extended dry periods, particularly across northern parts of the UK.
- **Temperature:** Temperatures are most likely to be around or potentially milder than the long-term climatological average. However, some climate signals and weather models currently indicate the potential for some extended cold periods, particularly towards the end of January.

This is the final issue of the Summary Assessment of Seasonal Forecasts.

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.

Climate Models Summary

Eight different seasonal forecasts derived from Numerical Weather Prediction (NWP) models are discussed in section 3.1. The implications of these models for UK weather during JFM 2019 have been interpreted as follows:

Agency	<i>PRECIPITATION</i>	<i>TEMPERATURE</i>
UKMO	Around average	No dominant signal
CFS	Around or above average	Above or around average
JAMSTEC	Below average	Above average
CPTEC	Around average	Above average
Météo France	No dominant signal	No dominant signal
SAWS	Above average	Above average
KMA	Above or around average	Above or around average
APCC	Above or around average	Above average

Climate Signals Summary

The current and projected states of available climate signals are summarised in section 3.2, for more information on the characteristics of these signals please see the EuroTempest climate signals [factsheet](#). The impacts of these signals on UK weather during JFM 2019 have been interpreted as follows:

Signal	<i>PRECIPITATION</i>	<i>TEMPERATURE</i>
NAO	Around or below average	Around or below average
AO	Around or below average	Around or below average
PV	Below average	Below average
QBO	Above average	Above average
ENSO	Below or around average	Below or around average
MJO	Around or below average	Around or below average
North Atlantic SST	Above average	Above average
Eurasian snow cover	Below or around average	Below or around average
Arctic sea ice extent	Below or around average	Below or around average

1. How Does This Season Compare to ‘Normal’?

This section compares the number of ‘windy days’ per season by comparing the number of days with more than 10%, 20% and 50% of weather stations recording maximum gusts of 45mph or higher. The table below compares the 11-year average October-March winter season to the number of days so far this season (October – December).

Monthly Breakdown:

%	Number of Days											
	Average Season							This Season				
	O	N	D	J	F	M	TOTAL	O	N	D	JFM	TOTAL
>10%	16	20	21	21	15	15	108	16	16	21	NA	53
>20%	5	9	11	10	7	6	53	7	7	14	NA	28
>50%	0	1	2	2	2	1	8	1	1	1	NA	3

So far this season, the October to December period has been characterised by an around average number of windy days in the context of the last 11 years.

2. Extended Outlook

2.1 Early-Mid January

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

Following a relatively calm end to December and beginning of January, both weather models and some climate signals suggest that the next couple of days will continue to be characterised by calm, cold and dry conditions. However, a brief period of unsettled weather is then expected, bringing milder and wetter conditions, especially across northern and western regions, before conditions return to a more settled state. While the [NAO](#) remains in a negative phase, this pattern of extended periods of cold, calm and dry weather, interrupted by brief periods of unsettled weather is expected to continue into the second week of January. However, if the NAO becomes positive in early-mid January as is currently forecast, it is possible that the calmer periods between spells of unsettled weather will reduce in length as a westerly airflow pattern becomes more dominant. In general, temperatures are currently expected to remain around or above average across northern parts of the UK, while colder than normal temperatures are more likely across southern regions.

2.2 Remainder of January

The penultimate full week of January is most likely to continue to be characterised by brief periods of unsettled weather, with strong winds and heavy precipitation possible in places at times. This potentially unsettled weather is in line with the current westerly phase of the [QBO](#) and warm [NA SSTs](#), both of which contribute to an increased likelihood of a dominant westerly airflow pattern during mid-to-late January. This type of airflow pattern typically results in wet, mild and windy weather spreading across the UK from the west. However, due to the sudden stratospheric warming event that is currently underway, and the further weakening of the [PV](#) expected, it is possible that

towards the end of the month the [NAO](#) and [AO](#) may become negative as forecast, which could increase the chance of a blocking event occurring. An increased chance of blocking in turn increases the likelihood of northerly or easterly winds becoming dominant for a time, which could result in a colder and drier than average period towards the end of January.

3. Seasonal Forecast Assessment

3.1 Models

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)

Precipitation:

There is an indication of some consistency in these seasonal forecast models towards around or above average precipitation for JFM with:

- Six of the eight NWP seasonal forecasts used in this report indicating average or above average precipitation
- One indicating below average precipitation
- One suggesting below, above or around average precipitation are equally likely over the three month period.

Temperature:

There is also some consistency in the seasonal forecast towards around or above average temperatures for the JFM period with:

- Six of the eight NWP seasonal forecasts indicating around or above average temperatures
- Two suggesting below, above or around average temperatures are equally likely over the three month period.

The general indication from the forecast models is that the chance of an average to above average 3 months in terms of precipitation outweighs the chance of a relatively dry three months, while a colder than average UK JFM period is much less likely than an average or warm JFM period. **However, 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 JFM period that are colder than those that the UK has experienced within the last few years could still be above “average” by this definition.

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

NAO: North Atlantic Oscillation

Current State: Negative

Projected State: Expected to become weakly positive for a time before returning to a negative phase towards the end of January.

Implications for UK weather: Increased chance of wet and windy weather at the beginning of January before becoming drier, cooler and less windy towards the end of the winter season

AO: Arctic Oscillation

Current State: Weakly positive

Projected State: Expected to become negative and remain so through much of the three month period

Implications for UK weather: Increased chance of wet and windy conditions while in a positive phase, before becoming drier and cooler if the change to a negative phase occurs

PV: Polar Vortex

Current State: Weak and disrupted

Projected State: Expected to continue to weaken

Implications for UK weather: Potential for cooler and drier weather, with an increased chance of a Sudden Stratospheric Warming event

QBO: Quasi-Biennial Oscillation

Current State: Entering a westerly phase

Projected State: Westerly

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

ENSO: El Nino Southern Oscillation

Current State: Neutral

Projected State: ~90% chance of a moderate El Nino developing and persisting through the JFM period

Implications for UK weather: In the later winter months an El Nino event may increase the likelihood of a negative NAO, therefore suggesting an increased chance of drier, cooler and less windy weather

MJO: Madden Julian Oscillation

Current State: Phase 5-6

Projected State: No consistent timescale for the progression through the phases

Implications for UK weather: During and preceding phases where the MJO is active over the Pacific (such as in 5 and 6) the likelihood of a negative NAO may increase, therefore suggesting an increased chance of colder, drier and calmer weather.

North Atlantic SST

Current State: Warmer than average between 30 and 50°N, while cooler than or around average elsewhere.

Projected State: This pattern is expected to persist

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

Eurasian Snow Cover and Arctic Sea Ice Extent

Current State: Eurasian snow cover is around average while Arctic sea ice extent has remained below normal

Projected State: There is the potential for Eurasian snow cover to continue to increase, while Arctic sea ice is expected to remain below normal

Implications for UK weather: Slight increased likelihood of colder and drier periods

The general consensus among the current climate signals suggests that cooler, drier and calmer conditions may be more likely during JFM than milder, wetter and windier weather. For example, the combination of a strongly favoured El Nino event, the current phase of the MJO and the weakening of the PV all contribute to an increased likelihood of a negative NAO event during the JFM period.

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. Contact details are provided in the "Contacts" section below.

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-saisonnières>

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/

APEC Climate Center (APCC) – South Korea

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