

## Summary Assessment of Seasonal Forecasts for December, January, February 2018-2019

### Executive Summary:

As was suggested in the previous seasonal forecast assessment, the winter season 2018-2019 has continued to be characterised by periods of unsettled weather, despite a calmer period in mid-November.

Looking ahead, there remains some consistency across seasonal forecast models towards the dominance of a westerly airflow pattern during DJF 2018-19. However there is slightly less consistency between current climate signals. Despite this, the available information suggests:

- **Storms:** The frequency of storms moving in from the North Atlantic is likely to be around or potentially greater than average. In general, a season with a lower frequency of storms is less likely than one with an around or greater than average frequency.
- **Precipitation:** There is likely to be around or greater than average precipitation. A season characterised by lower than average precipitation is much less likely than a season with around or above average precipitation.
- **Temperature:** Temperatures are likely to be milder than or around average. A season characterised by temperatures lower than the climatological average is much less likely than a season with above or around average temperatures.

This report is an early indication of conditions over winter 2018-19 and will be updated in January.

## 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 DJF 2018-19 have been interpreted as follows:

<b>Agency</b>	<i>PRECIPITATION</i>	<i>TEMPERATURE</i>
UKMO	Around or above average	No dominant signal
CFS	Around or above average	Above or around average
JAMSTEC	Around average	Below average
CPTEC	Around average	Around or above average
Météo France	Around average	Below average
SAWS	Above average	Above average
KMA	No dominant signal	No dominant signal
APCC	No dominant signal	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 DJF 2018-19 have been interpreted as follows:

<b>Signal</b>	<i>PRECIPITATION</i>	<i>TEMPERATURE</i>
NAO	Above average	Above average
AO	Around or above average	Around or above average
PV	Below or around average	Below or around average
QBO	Above average	Above average
ENSO	Above average	Above 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 – November).

Monthly Breakdown:

%	Number of Days										
	Average Season							This Season			
	O	N	D	J	F	M	TOTAL	O	N	DJFM	TOTAL
>10%	16	20	21	21	15	15	108	16	16	NA	32
>20%	5	9	11	10	7	6	53	7	7	NA	14
>50%	0	1	2	2	2	1	8	1	1	NA	2

So far this season, October and November have been characterised by an around average number of windy days in the context of the last 11 years, with October recording slightly more windy days than average and November slightly fewer.

## 2. Extended Outlook

### 2.1 The Next 15 days

The following 15 day forecast is based on both the output of numerical weather prediction models and climate signals with a shorter term impact.

**Dec 3<sup>rd</sup> – 9<sup>th</sup>:** Following a wet and windy end to November, both weather models and some climate signals suggest that the first week of December is expected to be slightly more settled. While the [MJO](#) remains in an active phase across the Pacific (phases 5 and 6) the development of both [El Nino](#) and a positive [NAO](#) are likely to be hindered, reducing the likelihood of a wet, mild and stormy start to December. As a result, any heavy precipitation and strong winds are most likely to be confined to northern and western parts of the UK. However, some periods of unsettled weather also remain possible elsewhere, particularly towards the middle and end of the week, which is in line with a forecast strengthening of a positive NAO by the end of the first week of December.

**Dec 10<sup>th</sup> – 16<sup>th</sup>:** Periods of unsettled weather are expected to continue through the second week of December, particularly across northern and western regions, while some more settled weather may be experienced elsewhere. Temperatures are generally expected to remain around average across much of the UK, however while the [AO](#) remains weakly negative, weakening of the [PV](#) is possible, increasing the chance of northerly winds becoming dominant for a time, which could result in a colder than average period across northern regions.

### 2.2 Remainder of December

The remainder of December is currently expected to continue to be characterised by periods of unsettled weather, with strong winds and heavy

precipitation expected in places at times. If the [QBO](#) enters its westerly phase, [El Nino](#) conditions develop and the [NAO](#) and [AO](#) become positive as forecast, a westerly airflow pattern is expected to dominate, resulting in wet, mild and windy weather spreading across the UK from the west. However, if [Eurasian snow](#) cover continues to build and the [PV](#) continues to weaken as forecast, there is also the chance for some drier periods towards the end of the month.

### 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 DJF with:

- Six of the eight NWP seasonal forecasts used in this report indicating average or above average precipitation
- Two suggesting below, above or around average precipitation are equally likely

#### **Temperature:**

There is slightly less consistency in the seasonal forecast models with regards to temperature, however a tendency towards around or above average temperatures for DJF still appears to be the more dominant signal with:

- Four of the eight NWP seasonal forecasts indicating around or above average temperatures
- Two suggesting below, above or around average temperatures are equally likely
- Two indicating below average temperatures for the coming three months in the UK

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 DJF period is much less likely than an average or warm DJF 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 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.

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

#### NAO: North Atlantic Oscillation

**Current State:** Very weakly positive

**Projected State:** Expected to become more strongly positive through the beginning of December

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

#### AO: Arctic Oscillation

**Current State:** Weakly negative

**Projected State:** Expected to turn very weakly positive through the beginning of December

**Implications for UK weather:** Slight increased chance of mild, wet and stormy weather

#### PV: Polar Vortex

**Current State:** Above average strength for the time of year

**Projected State:** Expected 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:** 80% chance of El Nino developing through the DJF period

**Implications for UK weather:** May increase the likelihood of a positive NAO, therefore suggesting an increased chance of milder, wetter and stormier 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 is currently well below normal

**Projected State:** Eurasian snow cover is expected to increase, while Arctic sea ice is expected to remain below normal

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

There is no clear consensus from the climate signals considered here on the most likely conditions expected for DJF, with conflicting messages from different signals. For example, while an El Niño event is strongly favoured and therefore suggestive of wet, mild and stormy conditions due to an increased chance of a positive NAO, the phase of the MJO suggests the opposite is more likely. The interaction of these signals could be responsible for the only weakly positive NAO at the start of December and therefore the likelihood of near to or slightly wetter, milder and stormier than average conditions. In contrast, if the forecast weakening of the PV comes to fruition, in combination with an around or above average Eurasian snow cover and below average Arctic sea ice extent, conditions could be more likely to be around or below average in terms of precipitation, temperature and storminess.

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/](http://www.wmolc.org/~GPC_Seoul/)

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

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