

Summary Assessment of Seasonal Forecasts for September, October and November 2019

Executive Summary

The general indication from forecast models and current climate signals is that a relatively cool, dry and settled September-November is unlikely.

- **Storms:** Indications are that the frequency of storms moving into the UK from the North Atlantic will most likely be around or potentially above average during the three-month period.
- **Precipitation:** Precipitation totals will most likely be around or potentially higher than the long-term seasonal average.
- **Temperature:** 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 average to above average precipitation totals.
- **Climate Signals:** There are few dominant climate signals at present (e.g. ENSO is neutral) but the North Atlantic is relatively warm in the vicinity of the UK and the QBO is in a positive phase. This is consistent with a slightly increased chance of mild, wet and stormy weather.

This assessment is an early indication of expected conditions during the first few months of the 2019-2020 UK storm season. Further monthly updates will 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.

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 SON 2019 have been interpreted as follows:

| Agency | PRECIPITATION | TEMPERATURE |
|--------------|-------------------------|-------------------------|
| UKMO | Above average | Above average |
| CFS | Around or above average | Above or around average |
| JAMSTEC | Above average | Above average |
| CPTEC | Around average | Above or around average |
| Météo France | No dominant signal | Above average |
| SAWS | Around or above average | Above average |
| KMA | No dominant signal | Above average |
| 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 SON 2019 have been interpreted as follows:

| Signal | PRECIPITATION | TEMPERATURE |
|-----------------------|--------------------|--------------------|
| NAO | Around average | Around average |
| AO | Around average | Around average |
| PV | No dominant signal | No dominant signal |
| QBO | Above average | Above average |
| ENSO | No dominant signal | No dominant signal |
| MJO | No dominant signal | No dominant signal |
| North Atlantic SST | Above average | Above average |
| Eurasian snow cover | No dominant signal | No dominant signal |
| Arctic sea ice extent | No dominant signal | No dominant signal |

1. What is defined as a ‘average’ windy season?

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 | | | | | | | |
| | S | O | N | D | J | F | M | TOTAL |
| >10% | 9 | 16 | 20 | 21 | 21 | 15 | 15 | 117 |
| >20% | 2 | 5 | 9 | 11 | 10 | 7 | 6 | 50 |
| >50% | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 8 |

An average September-November is represented by 45 days on which more than 10% of weather observation stations report maximum wind gusts of at least 45mph, 16 days where more than 20% of stations reported such gusts, and one day with more 50% of stations reporting 45mph max gusts, with increasingly more windy days later in the 3-month period than in September.

We will be monitoring storminess through the season and in future reports will include the number of windy days observed to date as the season progresses.

2. Extended Outlook

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

2.1 Early-Mid September

Weather models and some climate signals suggest that the next week or so will be characterised by changeable conditions across northern regions of the UK, with calm and dry conditions interspersed by wetter and windier periods. More settled conditions are likely across southern regions, with light winds and extended periods of dry weather. In general, temperatures are expected to be around or just below average across northern parts of the UK, while milder than normal temperatures are more likely across southern regions.

2.2 Remainder of September

Changeable conditions, with periods of unsettled weather interrupted by brief periods of drier and colder weather, are most likely to characterise the last few weeks of September and into October, especially across northern regions of the UK. These indications of periods of unsettled weather are consistent with the current westerly phase of the [QBO](#) and warm [North Atlantic SSTs](#).

3. Seasonal Forecast Assessment

3.1 Models

The general indication from the forecast models is that a relatively cool and dry three-month period is unlikely.

None of the forecast models favour below average temperatures and all models clearly favour average or above average temperatures. The forecast models are slightly more ambiguous about precipitation, with three suggesting that a dry, average, or wet 3-months are each equally likely, but the remaining five models all favour an average or wet 3-months. 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 SON 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)

3.2 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. It is also generally the case that most of the climate signals exert most influence on the UK in winter than during autumn and other times of the year. Nevertheless, there is a suggestion among the current climate signals that milder, wetter and windier conditions may be more likely than cooler, drier and calmer weather, which is at least consistent with the forecast models. The combination of warm sea surface temperatures close to the UK within a favourable phase of the QBO contributes to an increased likelihood of a slightly positive NAO event during the SON period, which in turn indicates a slightly increased likelihood of mild, wet and windy weather.

NAO: North Atlantic Oscillation

Current State: Weakly positive

Projected State: Expected to be changeable between weakly positive to weakly negative.

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

AO: Arctic Oscillation

Current State: Weakly positive

Projected State: Expected to remain near neutral, with a slight preference for a weakly positive phase through much of the three-month period

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: Expected to remain strong

Implications for UK weather: Potential for warmer and wetter conditions when the polar vortex is strong. However, this climate signal doesn't have as strong an influence on UK weather during the next few months (it is generally stronger into the winter season rather than autumn).

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 Nino Southern Oscillation

Current State: Neutral

Projected State: ~50% chance of ENSO remaining in a neutral state through the SON period.

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

MJO: Madden Julian Oscillation

Current State: Currently no phase is favoured

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

Implications for UK weather: The MJO is not currently any indication of trends in UK weather over the coming 3 months.

North Atlantic SST

Current State: Warmer than average close to the UK.

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 around average, Arctic sea ice extent is below normal.

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

Implications for UK weather: Slightly increased likelihood of colder and drier periods. However, these climate signals don't have as strong an influence on UK weather during the next few months (the influence is generally stronger into the winter season rather than autumn).

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-saisonieres>

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>