

SUMMARY ASSESSMENT OF SEASONAL FORECASTS FOR EUROPE

DECEMBER, JANUARY AND FEBRUARY 2020/21

Executive Summary

Seasonal forecast models and climate signals suggest December to February 2020/21 as a whole is most likely to be milder than average across the whole of Europe. A north south split for precipitation is indicated with Scandinavia most likely to be wetter than average and southern Europe drier than average.

Storms

The frequency of storms moving in from the North Atlantic is most likely to increase and be above average for northern Europe and Scandinavia and below average for southern Europe, especially towards the end of the period.

Precipitation

Precipitation is most likely to be above average across Scandinavia and below average across southern Europe. There is no clear consensus across the forecast models and climate signals for precipitation across northern Europe for this period.

Temperature

Temperatures are most likely to be warmer than the long-term climatological average across Europe.

Analogue Years

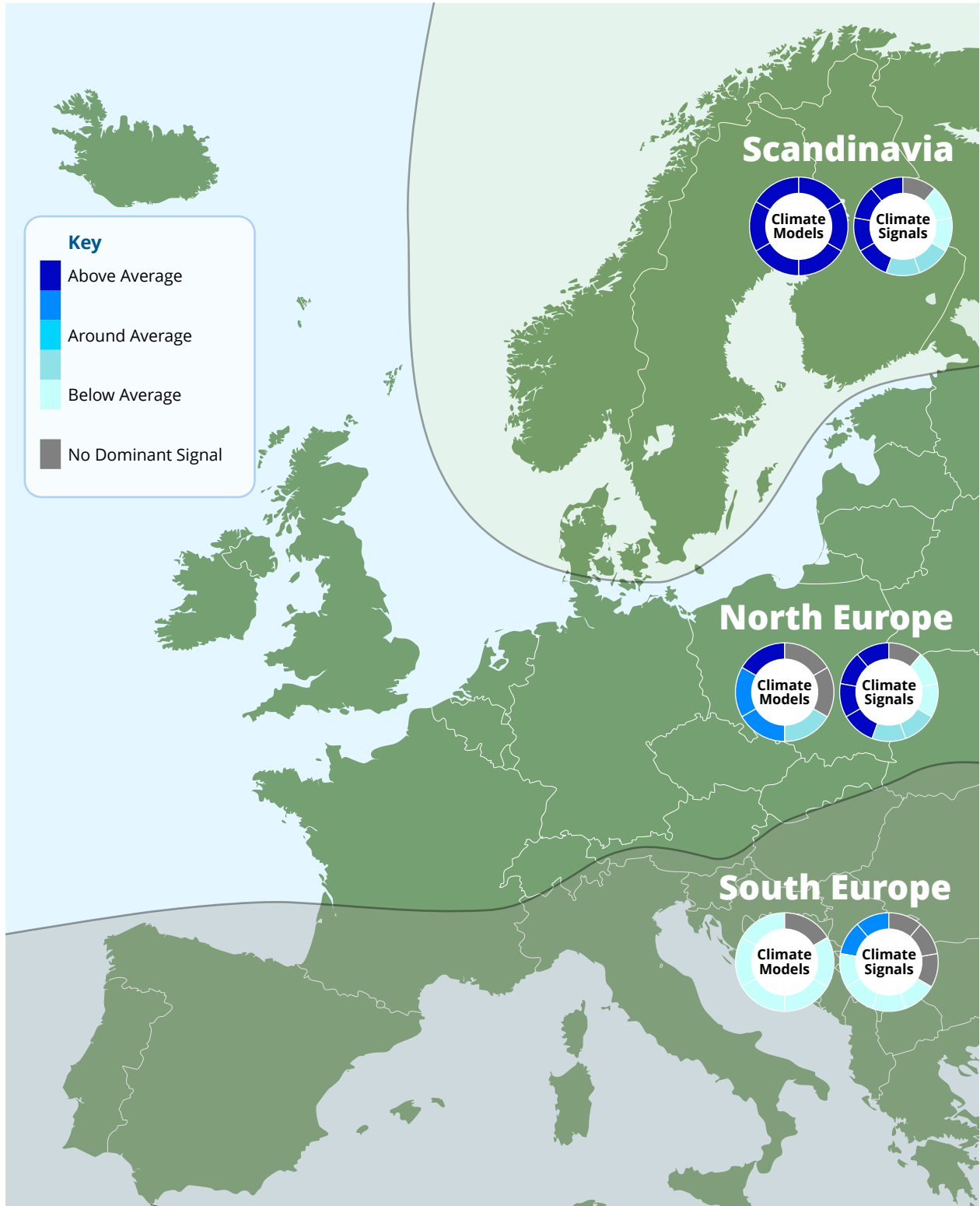
This assessment again includes results from an analysis of climate drivers from previous years. This analysis has looked at periods, termed analogue years, when climate signals have shown a similar pattern to those exhibited currently. Based on climate signals throughout November the most appropriate analogue for this coming winter is the winter of 1999/2000. This suggests that both the number of windstorms and the maximum storm severity index for this winter is unlikely to be below average.

This report is an early indication of conditions over winter 2020-2021 and will be updated in January.

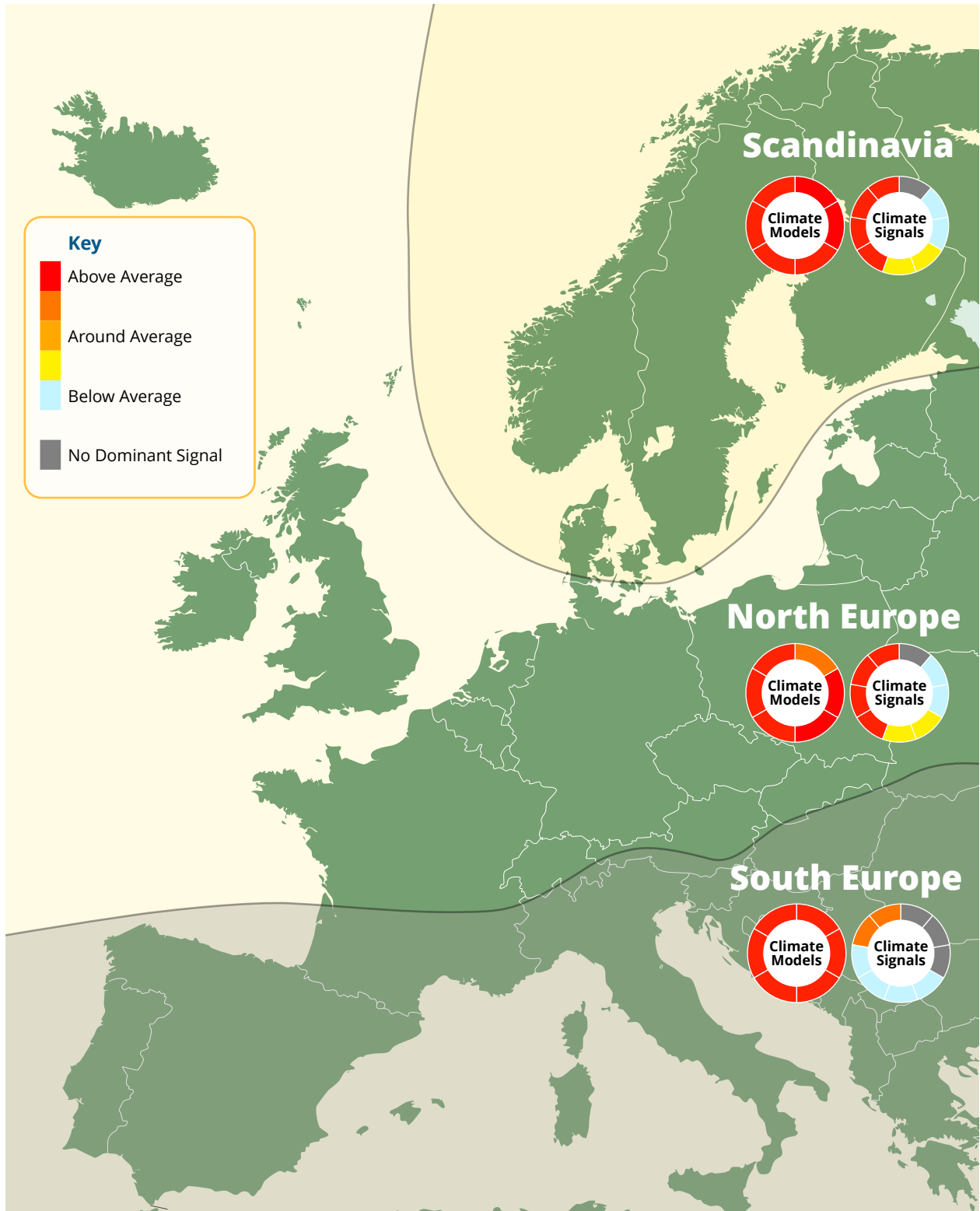
Europe Climate Regions for December 2020 – February 2021

Our analysis of six climate models and nine climate signals suggest that conditions across Europe can be broadly grouped into three regions for December 2020 – February 2021: Northern Europe, Southern Europe and Scandinavia. The maps below summarise the conclusions of assessment of the forecasts for each of these regions.

Assessment Summary – Precipitation December, January and February 2020/21



Assessment Summary – Temperature December, January and February 2020/21

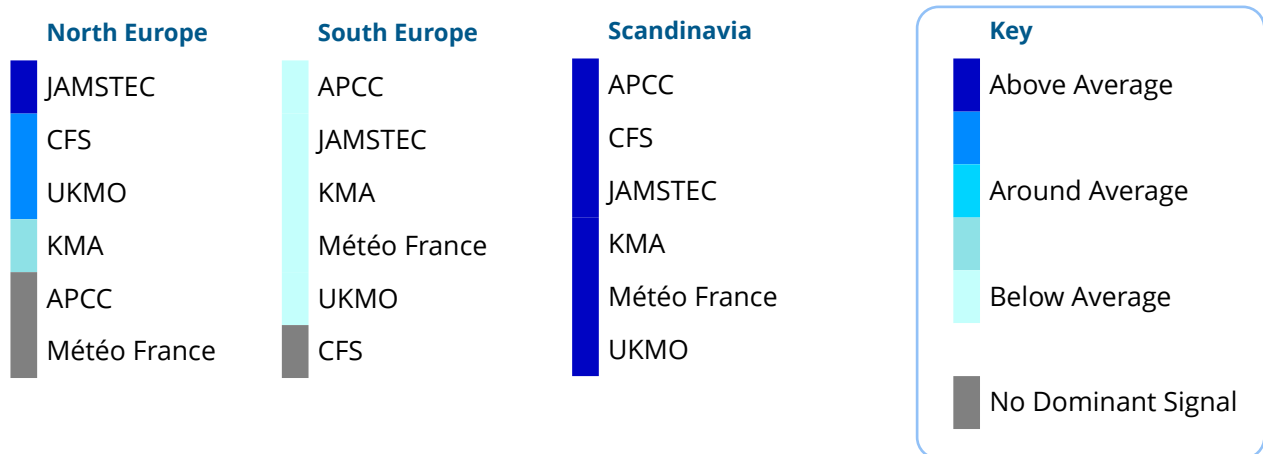


Seasonal Forecast Assessment Summary

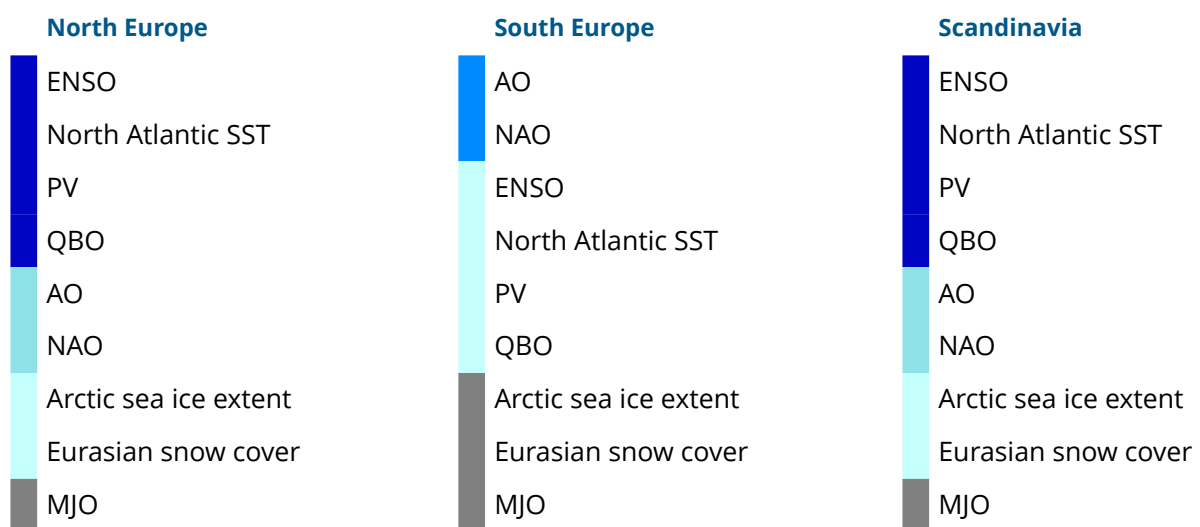
In order to produce this seasonal forecast assessment, the outputs of various seasonal forecast models have been analysed, along with some key climate indicators. In terms of the seasonal forecast models, EuroTempest has chosen to focus on precipitation and temperature as all agencies used in this report 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 European 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. As well as this, the use of analogue years identified by the phase of a number of climate signals has been used to forecast the possible characteristics of the upcoming winter storm season.

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 2020/21 are shown in the diagram below.

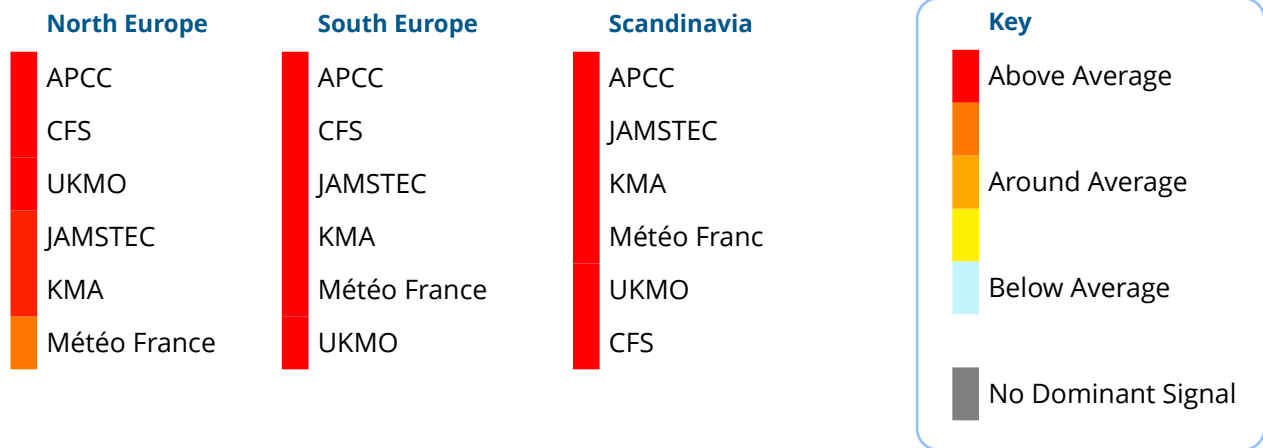
Precipitation - Climate Models



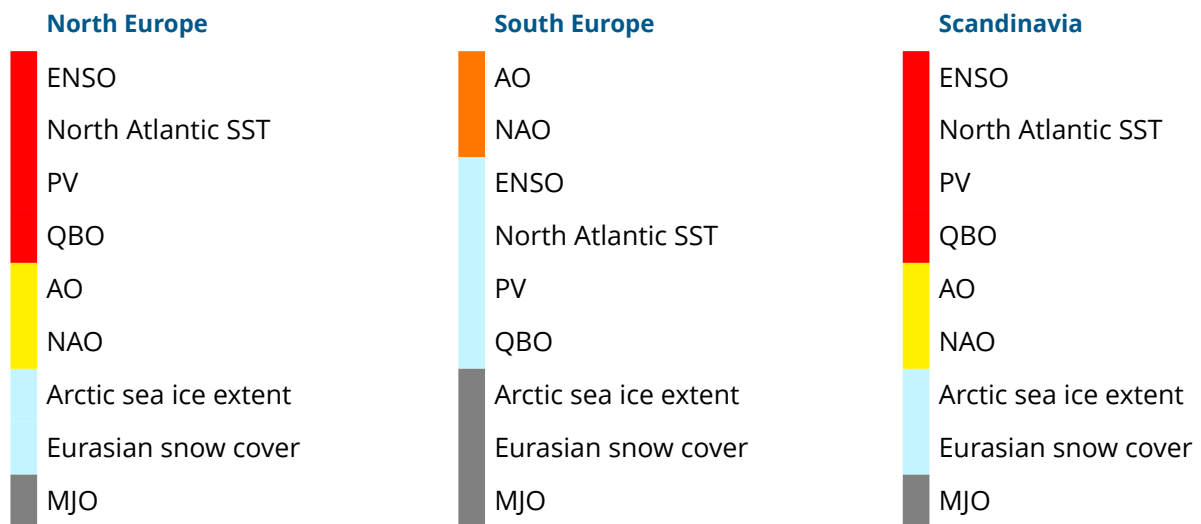
Precipitation - Climate Signals



Temperature - Climate Models



Temperature - Climate Signals



Extended Outlook

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

There is currently no strong signal in the weather models and climate signals for any dominant weather pattern to develop during the next few weeks, especially across northern and southern Europe. However, from January conditions are likely to become more unsettled with milder and wetter conditions more likely across much of northern Europe and drier and warmer conditions across southern Europe.

Seasonal Forecast Assessment

Climate Models Summary

Precipitation:

There is good consistency between the seasonal forecast models towards above average precipitation across Scandinavia and below average precipitation across southern Europe whilst there is no clear indication for northern Europe with:

- All six NWP seasonal forecasts used in this report indicating above average precipitation for Scandinavia
- Five of the six models indicating below average precipitation for southern Europe
- Two models suggesting each outcome (below, above or around average precipitation) is equally likely for northern Europe, with little consensus between the remaining four models

Temperature:

There is very good consistency in the seasonal forecast models towards above average temperatures across Europe for the DJF period with:

- All six NWP seasonal forecasts indicating above average temperatures across Scandinavia and southern Europe
- Five of the six models suggesting above average temperature for northern Europe, with one model suggesting around or above average temperatures

For precipitation, the indication from the forecast models is that the chance of a wet DJF is much more likely than an average or dry DJF for Scandinavia, while for southern Europe the chance of a dry DJF outweighs that of an average or wet DJF. A warmer than average DJF is much more likely than an average or cold DJF across the whole of Europe. It should be noted however that "average" conditions are generally defined as the mean of the last 30 years or so. The generally increasing trend of warmer conditions associated with climate change makes it more likely that temperatures now will exceed these historical averages. Temperatures this DJF period that are colder than those that Europe 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**Météo-France:** National Met Agency of France**KMA:** Korea Meteorological Administration**APCC:** APEC Climate Center (South Korea)**Climate Signals**

There is an indication from climate signals that the potential for milder, wetter and windier conditions across northern regions of Europe (including Scandinavia) may increase as the next three months progress. There is currently no clear signal from the climate signals for any dominant weather pattern to develop for Europe during the next few weeks. However, the combination of warm sea surface temperatures across the northern Atlantic and a westerly phase of the QBO are consistent with an increased likelihood of a positive NAO event towards the end of the DJF period. Likewise, ENSO is currently in a La Niña state and the influence of La Niña on European weather changes through the winter season, increasing the potential for mild, wet and stormy weather in Scandinavia and northern Europe (and drier weather in southern Europe) as the season progresses.

Analogue Year**Comparison year:** [The winter of 1999/2000.](#)

Analysis of the overall state of the climate during November of this year and comparison with previous years has identified 1999/2000 as an appropriate analogue year for the upcoming winter season. This is based on the similarity of the phases and magnitudes of several climate drivers, such as QBO, and ENSO, between this November and the November of previous years.

In the last seasonal forecast assessment 2013/14 was identified as an appropriate analogue year based on the state of the climate during October. That winter was a significant one, with 4 storms exceeding the PERILS €200m threshold. The winter of 1999/2000 was one of the worst in recent history, with 3 storms (Anatol, Lothar and Martin) causing over €10bn of insurance losses across Europe. It should be noted that the analysis of analogue years is not able to predict the number and scale of storms and we are not concluding that storms of equivalent scale are likely to occur during the next 3 months. However, it is possible to conclude, from our historical analysis of climate signals, that the number of storms and their severity this winter are unlikely be below average.

For more details on this method see the report entitled "Using Climate Signals to Forecast the UK Winter Storm Season" published [here](#).

NAO: North Atlantic Oscillation**Current State:** Slightly negative.**Projected State:** Expected to be slightly negative or near average over the next month.**Implications for European weather:** Increased potential for chillier, drier and calmer periods across northern Europe and Scandinavia.**AO: Arctic Oscillation****Current State:** Slightly negative.**Projected State:** Expected to be slightly positive or near average over the next month.**Implications for European weather:** Increased potential for mild, wet and stormy periods across northern Europe and Scandinavia.**PV: Polar Vortex****Current State:** Strong.**Projected State:** Expected to remain strong.**Implications for European weather:** Potential for warmer and wetter conditions across northern Europe and Scandinavia.

QBO: Quasi-Biennial Oscillation

Current State: Westerly phase.

Projected State: Westerly.

Implications for European weather: Increased potential for mild, wet and stormy weather across northern Europe and Scandinavia and an increased chance of drier weather across southern Europe.

ENSO: El Niño Southern Oscillation

Current State: La Niña conditions.

Projected State: ~95% chance of La Niña conditions continuing through the DJF period.

Implications for European weather: La Niña slightly increases the potential for mild, wet and stormy weather across northern Europe and Scandinavia later in the winter season.

MJO: Madden Julian Oscillation

Current State: Currently in phase 4 but weak.

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

Implications for European weather: This climate signal is not likely to have a strong influence on European weather during the next month.

North Atlantic SST

Current State: Warmer than average in the north Atlantic.

Projected State: This pattern is expected to persist.

Implications for European weather: Increased potential for a positive NAO during this phase and increased potential for mild, wet and stormy periods across northern Europe and Scandinavia.

Eurasian Snow Cover and Arctic Sea Ice Extent

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

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

Implications for European weather: Some potential for colder and drier periods, especially across northern regions.

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 preclude 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 Europe, 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 Europe 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 Europe) of

the forecasts provided by each agency and do not necessarily represent a specific forecast for Europe 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 European winter season EuroTempest has taken account of forecasts produced by six agencies. These are either National Meteorological Agencies or other meteorological organisations. All six 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)

<https://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>

Météo-France

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

Korea Meteorological Administration (KMA)

https://wmlc.org/GPC_Seoul/

APEC Climate Center (APCC) – South Korea

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