

SUMMARY ASSESSMENT OF SEASONAL FORECASTS FOR EUROPE

JANUARY, FEBRUARY AND MARCH 2023

Executive Summary

There are indications that stormy conditions can be expected for Europe at times during January, February and March despite a slightly enhanced likelihood of drier than average conditions in northern Europe (not including Scandinavia) overall across the three months. These indications are not conclusive as there are some conflicting indications, particularly in the climate signals, as well as few close historical analogues. Seasonal forecast models are however consistent in suggesting that the next three months are likely to be warmer than average across the whole of Europe.

Storms

Some climate signals and historical analogues suggest broadly average conditions for the time of year can be expected during January to March this year. This means that at least one notably impactful European weather event is more likely than none but is by no means guaranteed. However, the historical climate analogues to this month are not particularly close - there are no Decembers in the recent (40-year) historical record that match the phase that all three of the major climate indicators, (ENSO, QBO and Atlantic SSTs) were in at the end of this last December.

Precipitation

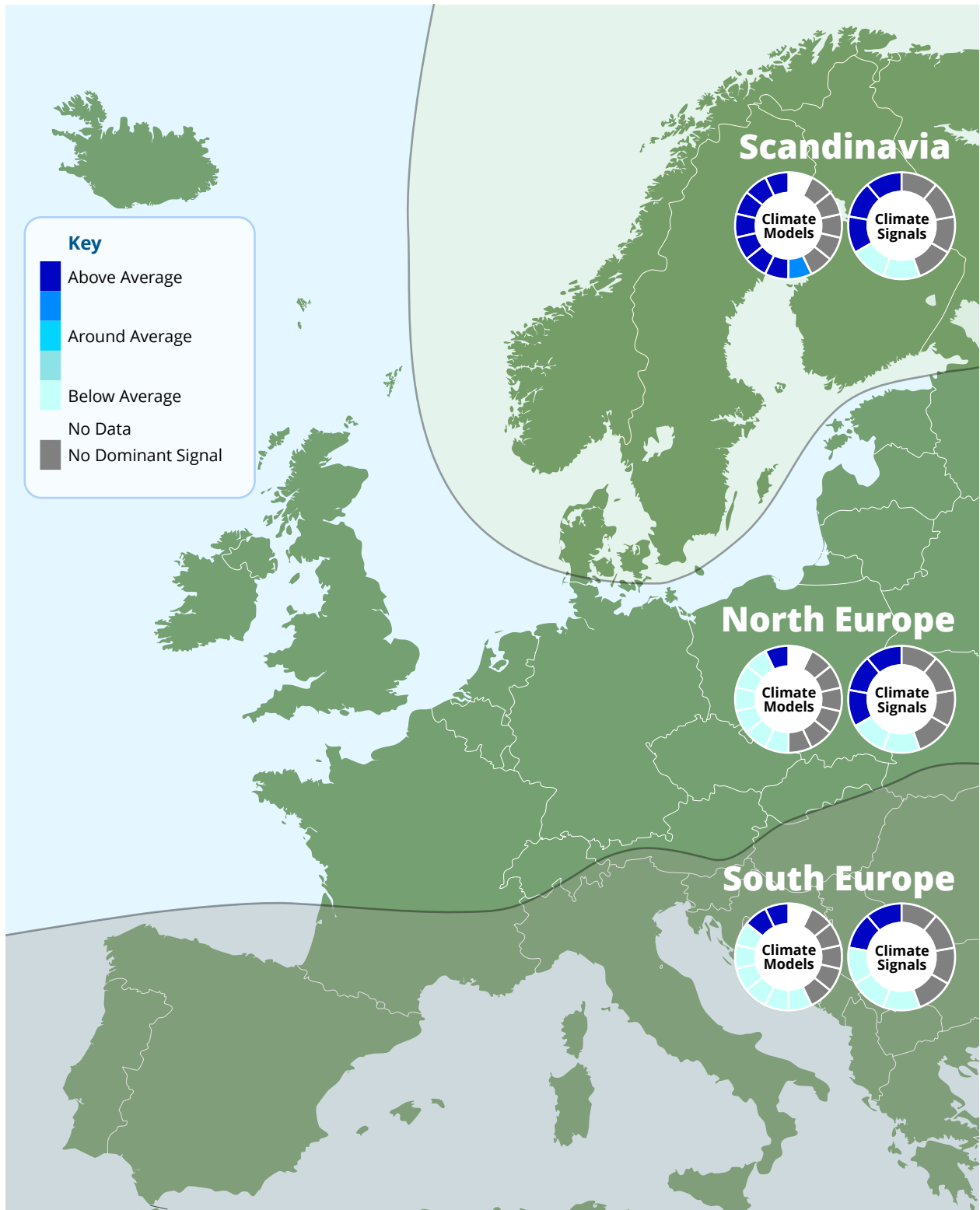
Long range forecast models suggest a slightly enhanced likelihood of above average precipitation totals across Scandinavia and of below average precipitation totals across the rest of Europe.

Temperature

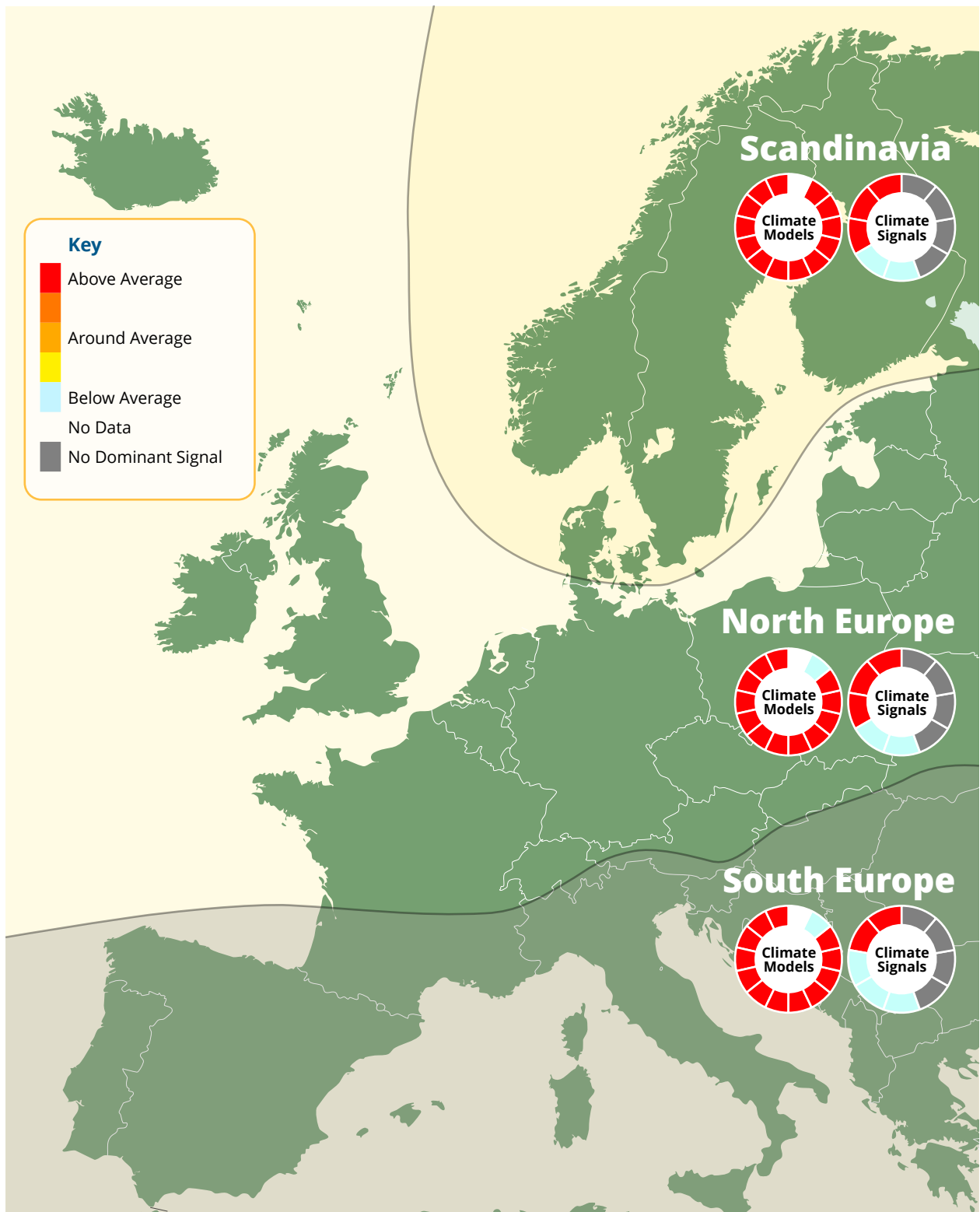
Temperatures are most likely to be warmer than the long-term climatological average across Europe.

This report is an early indication of weather conditions across Europe during Jan-Mar 2023 and will be the final EuroTempest Seasonal Forecast Assessment issued this winter season. The next EuroTempest Seasonal Forecast Assessment will be issued for the 2023-24 winter season in October 2023.

Assessment Summary – Precipitation January, February and March 2023



Assessment Summary – Temperature January, February and March 2023



Extended Outlook

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

Next few weeks

There are some suggestions from numerical weather prediction models for calmer and drier than average conditions across much of Europe during the last week of January. A continuation of changeable conditions, wet and windy at times, is expected at least up until that time.

Next Month

There are few dominant signals that suggest any particular outcome is more likely than another during the first few weeks of February, although there are some longer range weather models that suggest that calmer and drier than average conditions could continue for a time during the beginning of the month, particularly across continental northern Europe. However, the state of ENSO, the QBO and the Polar Vortex suggest that more changeable conditions, potentially stormy at times, will become increasingly likely through the month.

Seasonal Forecast Assessment

Climate Models Summary

While there is some variability between the climate models they are reasonably consistent in suggesting a slightly enhanced likelihood of wetter than average conditions across Scandinavia for January to March 2023 (JFM) as a whole and of drier than average conditions across the rest of northern Europe. Projections for southern Europe show a slightly more mixed picture but the general suggestion is of an enhanced likelihood of drier than average conditions.

The climate models also suggest that a warmer than average three months is much more likely than an average or cold period across 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.

Climate Signals

In terms of their influence on European weather at this time of the year the main global climate signals of ENSO and QBO are now aligned in a phase suggestive of an enhanced likelihood of wetter and stormier weather across northern Europe and Scandinavia. Conversely, below average sea surface temperatures (SSTs) in the influential region of the north Atlantic suggest an enhanced likelihood of calmer than average conditions. The Polar Vortex (PV) is still not fully developed but while it had been weaker than average prior to this month it has recently been strengthening rapidly. It is currently of average strength but if the strengthening trend continues will be stronger than average within the next few weeks, if not sooner. A strong PV tends to enhance storm development and suppress the likelihood of colder, drier conditions across northern Europe and Scandinavia.

Looking at indications for the shorter term in particular, there is a mixed picture and no clearly dominant signal. Projections for the Arctic Oscillation are suggestive of a slightly enhanced likelihood of more settled conditions in northern Europe and Scandinavia during the next couple of weeks at least but the current phase of the MJO suggests the opposite. Projections for the NAO are neutral and not suggestive of any particular prevailing weather type.

Longer range climate signals influential up to 3 months ahead

Signal	Current State	Projected State	Implications for European Weather
ENSO: El Nino Southern Oscillation	La Nina conditions	Equal chances of La Nina and ENSO-neutral during JFM 2023	Increased potential for warmer, wetter and stormier periods across northern Europe and Scandinavia.
QBO: Quasi-Biennial Oscillation	Westerly Phase	Westerly	Increased potential for warmer, wetter and stormier periods across northern Europe and Scandinavia.
North Atlantic SST	Below average	This pattern is expected to persist	Increased potential for colder, drier and calmer periods across northern Europe and Scandinavia.
Eurasian Snow Cover	Around Average	This pattern is expected to persist	No increased potential for any particular type of weather.
Arctic Sea Ice Extent	Around Average	This pattern is expected to persist	No increased potential for any particular type of weather.
PV: Polar Vortex	Around Average	Expected to continue to develop over the next month and peak later in January and into February	No increased potential for any particular type of weather.

Shorter range climate signals influential up to 1 month ahead

Signal	Current State	Projected State	Implications for European Weather
MJO: Madden Julian Oscillation	Neutral	Expected to move into Phase 2 towards the end of January	Increased potential for warmer, wetter and stormier periods across northern Europe and Scandinavia, from the beginning of February
NAO: North Atlantic Oscillation	Slightly positive	Expected to become neutral over the next few week	No increased potential for any particular type of weather.
AO: Arctic Oscillation	Negative	Expected to be negative over the next month	Increased potential for colder, drier and calmer periods across northern Europe and Scandinavia.

For more information on the characteristics of the signals please see the EuroTempest [climate signals factsheet](#).

Historical Analogues

Possible characteristics of upcoming months can be investigated by looking at previous years in which there was a similar climatic set up. Strictly speaking, there were no years in the last 40 in which the broader climate at the end of December exactly matched conditions at the end of this last December ie, had an ongoing La Niña, a westerly QBO and below average north Atlantic SSTs, but there are a number of years which come close. There are two years (2008 and 2020) in which QBO and ENSO conditions (La Niña) at the end of December were broadly the same as they are this year but in which Atlantic SST conditions differed, and a number of years (1984, 1988, 1996 and 2000) in which ENSO and Atlantic SST conditions in December closely matched those of this December but in which the QBO was in the opposite phase. The subsequent Jan-Mar periods to these latter four Decembers were generally characterised by below average storminess. However, the westerly phase of the QBO is particularly strong at the moment, so it is arguable that the two seasons in which the QBO (and ENSO) phase in December is most closely matched with this last December (2008-09 and 2020-21) are more relevant in the assessment of likely outcomes for the next three months.

If a “notable” European weather event is defined as one that appears in the XWS European Windstorm Catalogue (XWS Datasets: (c) Copyright Met Office, University of Reading and University of Exeter) and/or is identified by PERILS AG as a qualifying event then, on average, we can expect there to be one notable European weather event during January-March each year. Applying this definition to the two years identified above as analogues to this year (using ENSO and QBO) there were no notable European weather events during Jan-Mar 2021 (although there were three non-qualifying PERILS events, which is around the average) and there were two notable European weather events during Jan-Mar 2009 (windstorms Klaus and Quinten). In total, there were no more notable events in these two climatologically similar years than would be expected from the overall average across all years.

In summary, the historical Decembers most closely climatologically analogous to this last December suggest that broadly average conditions for the time of year can be expected during Jan-Mar. This means that at least one notably impactful European weather event is more likely than none, within unsettled conditions generally, but this is by no means guaranteed. Nevertheless, the caveat that the analogues this month are not particularly close does need to be applied - there are no Decembers in the recent (40-year) historical record that match the phase that all three of the major climate indicators (ENSO, QBO and Atlantic SSTs) were in at the end of this last December. If only ENSO and Atlantic SSTs are used to identify analogues (ie, ignoring QBO) then the potential for relatively calm, storm free conditions is suggested. Overall, the current climate conditions still do not preclude any particular outcome.

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

