

SUMMARY ASSESSMENT OF SEASONAL FORECASTS FOR EUROPE

DECEMBER, JANUARY AND FEBRUARY 2022/23

Executive Summary

There are some indications of an enhanced likelihood of stormy conditions at times but of drier than average conditions overall for December, January and February. These indications are not conclusive as climate signals in particular are currently providing conflicting indications or 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 that there is an enhanced likelihood of stormier than average conditions across northern Europe and Scandinavia, particularly from January onwards. However, the historical analogues to this month are not particularly close - there are no Novembers in the recent (40-year) historical record that match the phase of all three of ENSO, QBO and Atlantic SSTs at the end of this November.

Precipitation

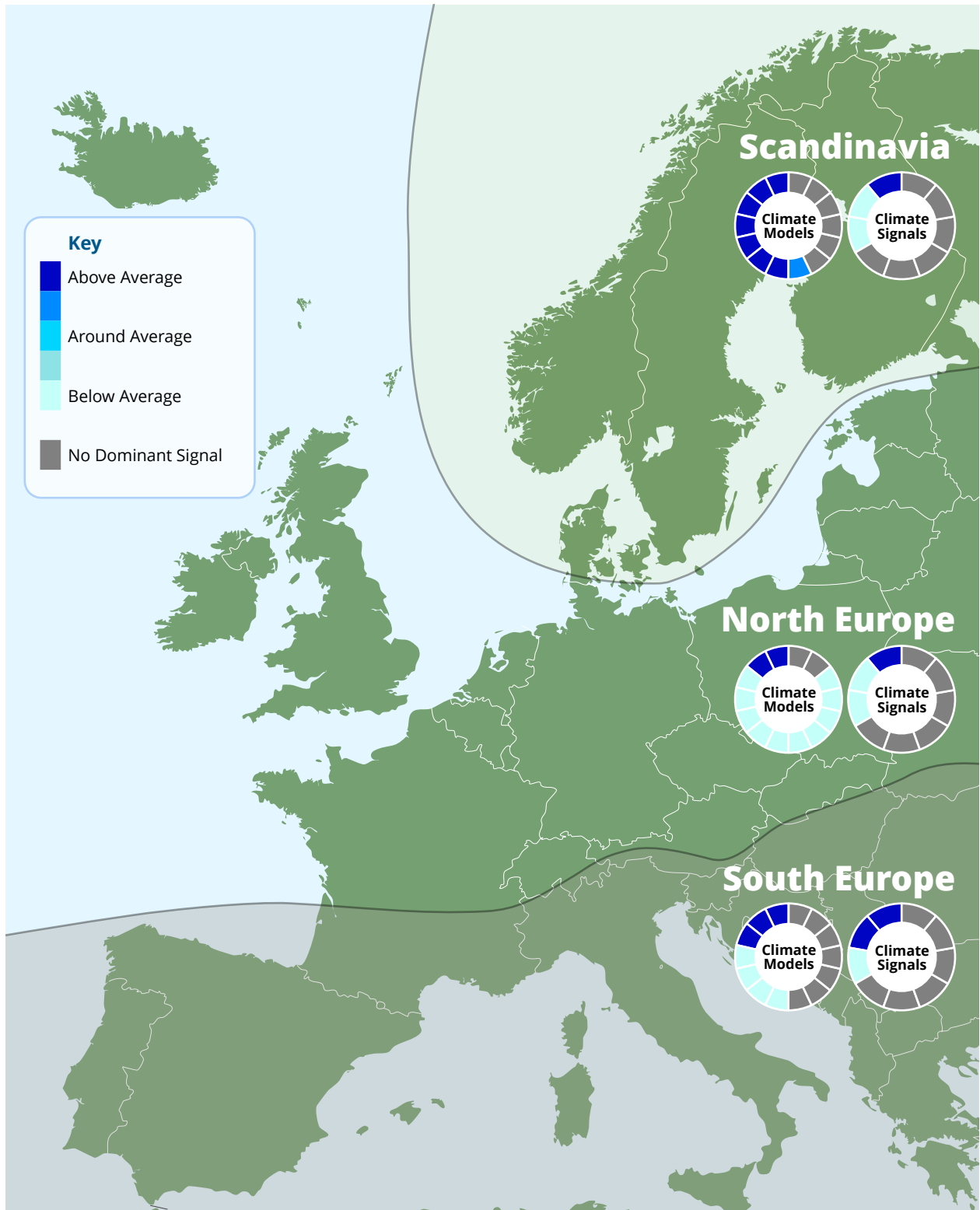
Long range forecast models and climate signals suggest a slightly enhanced likelihood of below average precipitation totals across northern Europe. Indications are more mixed for Scandinavia and southern Europe where there is less consensus between models and climate signals.

Temperature

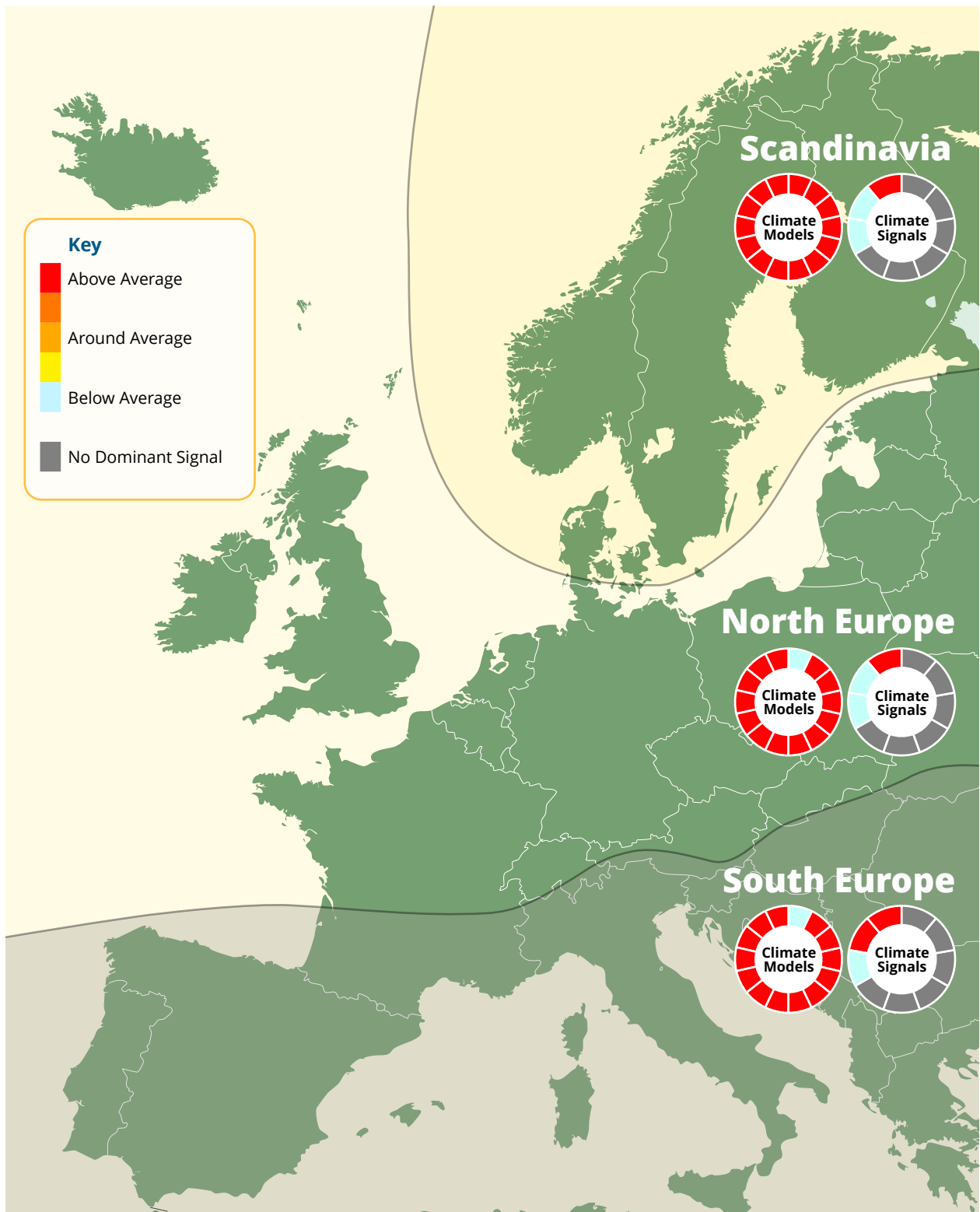
Temperatures are most likely to be warmer than the long-term climatological average across Europe.

This report is an early indication of conditions over winter 2022-2023 and will be updated in mid-January.

Assessment Summary – Precipitation December, January and February 2022/23



Assessment Summary – Temperature December, January and February 2022/23



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 currently no indications of any particularly unusual or extreme weather during the end of December and into January but more changeable conditions, wet and windy at times, are likely across western Europe and Scandinavia. More settled conditions are likely further east.

Next Month

There are no dominant signals suggesting that any particular outcome is more likely than any other during the first few weeks of the New Year. The state of ENSO and the QBO suggest that more changeable conditions, potentially stormy at times, will become more likely, but the Polar Vortex is developing relatively slowly this year. If this continues this could delay or suppress the potential for storm development.

Seasonal Forecast Assessment

Climate Models Summary

While there is evident variability between the climate models they are reasonably consistent in suggesting a slightly enhanced likelihood of wetter than average conditions across Scandinavia for December, January and February (DJF) as a whole and of drier than average conditions across the rest of northern Europe. Projections for southern Europe show a mixed picture with no particular dominant signal and suggest all outcomes are equally likely. 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 currently in “competing” phases. The ENSO La Niña phase currently prevailing (and which has prevailed since early 2020) tends to reduce the likelihood of wet, stormy weather in northern Europe and Scandinavia during the last three months of the year. Conversely, the current westerly phase of the QBO (the QBO has switched from the easterly to the westerly phase since last autumn/winter) tends to enhance the likelihood of wet and stormy weather here. The Polar Vortex (PV) is never fully developed at this time of year but is nevertheless currently weaker than average for the time of year. A weak PV tends to suppress storm development and enhances the likelihood of colder, drier across northern Europe and Scandinavia. Near average sea surface temperatures (SSTs) in the influential region of the north Atlantic suggest no enhanced likelihood either way of stormier or calmer than average conditions.

There is a little more consistency in signals and projections influential in the shorter term but no clearly dominant signal. The current phase of the MJO and projections for the NAO are not suggestive of any particular prevailing weather type. Only projections for the Arctic Oscillation show anything other than a neutral signal and are suggestive of a slightly enhanced likelihood of more settled conditions in northern Europe and Scandinavia during the next couple of weeks at least.

Looking ahead to the longer term (ie, towards the beginning of next year): although the existence of a La Niña ENSO phase tends to reduce the likelihood of wet, stormy weather in northern Europe and Scandinavia during the final three months of the year there is evidence that this influence flips around the turn of the year to an increase in the likelihood of such weather in the first three months of the year. In the absence of any large shift in ENSO or the QBO (which is not currently anticipated), any influence they have on European weather will no longer be competing but will become aligned (towards an enhanced chance of stormy conditions) at around this time.

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	76% chance of La Niña conditions persisting until February	Increased potential for colder, drier and calmer periods across northern Europe and Scandinavia at first then an increased potential for warmer, wetter and stormier periods developing from January onwards.
QBO: Quasi-Biennial Oscillation	Westerly Phase	Westerly	Increased potential for warmer, wetter and stormier periods across northern Europe and Scandinavia.
North Atlantic SST	Around average	This pattern is expected to persist	No increased potential for any particular type of weather.
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	Weak	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	Neutral	No increased potential for any particular type of weather.
NAO: North Atlantic Oscillation	Near Neutral	Neutral	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 November exactly matched conditions at the end of this November ie, had an ongoing La Niña, westerly QBO and average north Atlantic SSTs, but there are a number of years which come close. There are three years (1999, 2016 and 2020) in which QBO and ENSO conditions (La Niña) at the end of November were broadly the same as they are this year but in which Atlantic SST conditions differed, and one year (1985) in which QBO and Atlantic SST conditions in November closely matched those of this November but in which ENSO conditions differed, although only marginally. Though La Niña conditions in November 1985 were less strong than they are this year, 1985 overall had been a La Niña year up to that point and conditions were only just beginning to transition back into neutral through November.

Overall, the December to February (DJF) weather outcomes in Europe in these four analogue years were somewhat varied, though there are a few common and notable features. Two years (1985 and 1999) were generally dominated by drier than average conditions across many parts of Europe and 2016 was generally drier than average in the west of Europe. Only 2020 saw wetter than average conditions dominate across the continent. The overall bias towards drier than average conditions in these analogue years is reasonably consistent with the current model consensus towards drier than average conditions across northern Europe in DJF this year.

Despite the generally drier than average conditions in the analogue years, westerly winds in the north of Europe (including Scandinavia) were generally above average in three of the four years (1999, 2016 and 2020) and three of the four years (1985, 1999 and 2016) saw notable DJF windstorms: one in January 1986 which affected Denmark and Germany, Egon and Thomas (Doris) in Jan and Feb 2017, and of course the damaging storms of late 1999 (Anatol, Lothar and Martin). This is not to suggest that a period as stormy as late 1999 is a strong possibility (a period as quiet as 2020 is arguably equally likely), though of course it cannot be ruled out. More to the point, the relative prevalence of notable windstorms in the analogue years is not inconsistent with the suggestion that European windstorms become more likely from around the New Year when La Niña conditions prevail.

In summary, the historical Novembers most closely climatologically analogous to this November suggest that stormier than average conditions are more likely than not in northern Europe during DJF this year, and particularly from the New Year onwards. They also suggest that drier than average conditions overall are more likely than not. However, the caveat that the analogues this month are not particularly close does need to be applied - there are no Novembers in the recent (40-year) historical record that match the phase of all three of ENSO, QBO and Atlantic SSTs at the end of this November. 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](#).

