SUMMARY ASSESSMENT OF SEASONAL FORECASTS FOR EUROPE

DECEMBER, JANUARY AND FEBRUARY 2021/22

Executive Summary

There are some indications of a slightly increased likelihood of above average European windstorm activity for Dec 2021 to Feb 2022 as a whole (though relatively settled conditions are likely for at least the next few weeks). Indications for the season are relatively weak as many climate models and observable climate signals are generally not producing a strongly dominant signal in this regard. 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

There are some indications, primarily from current observable climate signals and historical analogue seasons, that an active and impactful northern European windstorm season is slightly more likely than normal. However, many models and signals are providing no dominant signal or have opposing influences and relatively settled conditions are likely for at least the next few weeks.

Precipitation

Climate models suggest a slightly increased likelihood of above average seasonal precipitation totals across Scandinavia and below average totals across southern Europe, with no consensus or dominant outcome for northern Europe. Several climate signals currently have opposing influences and as such are providing no dominant signal though there are some indications of a wetter than average season further to the north.

Temperature

Seasonal forecast models are consistent in suggesting that the next three months are likely to be warmer than average across the whole of Europe. There are some indications from climate signals of an increased chance (though not a likelihood) of a spell of cold weather across northern Europe within the first few months of next year

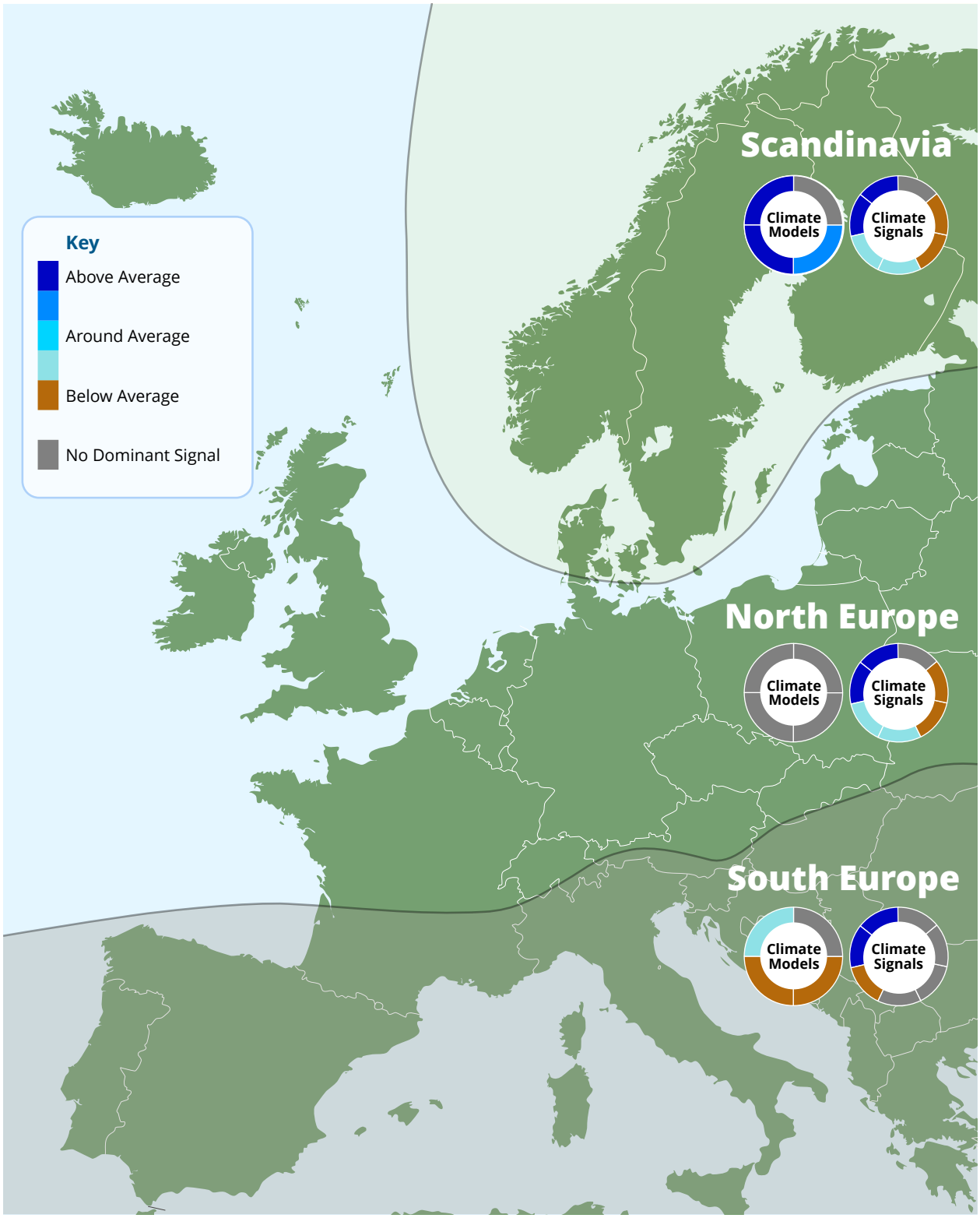
Analogue Years

Years in the historical record in which climate signals have been in a similar pattern to that currently prevailing were characterised by relatively stormy conditions and produced some notable windstorms.

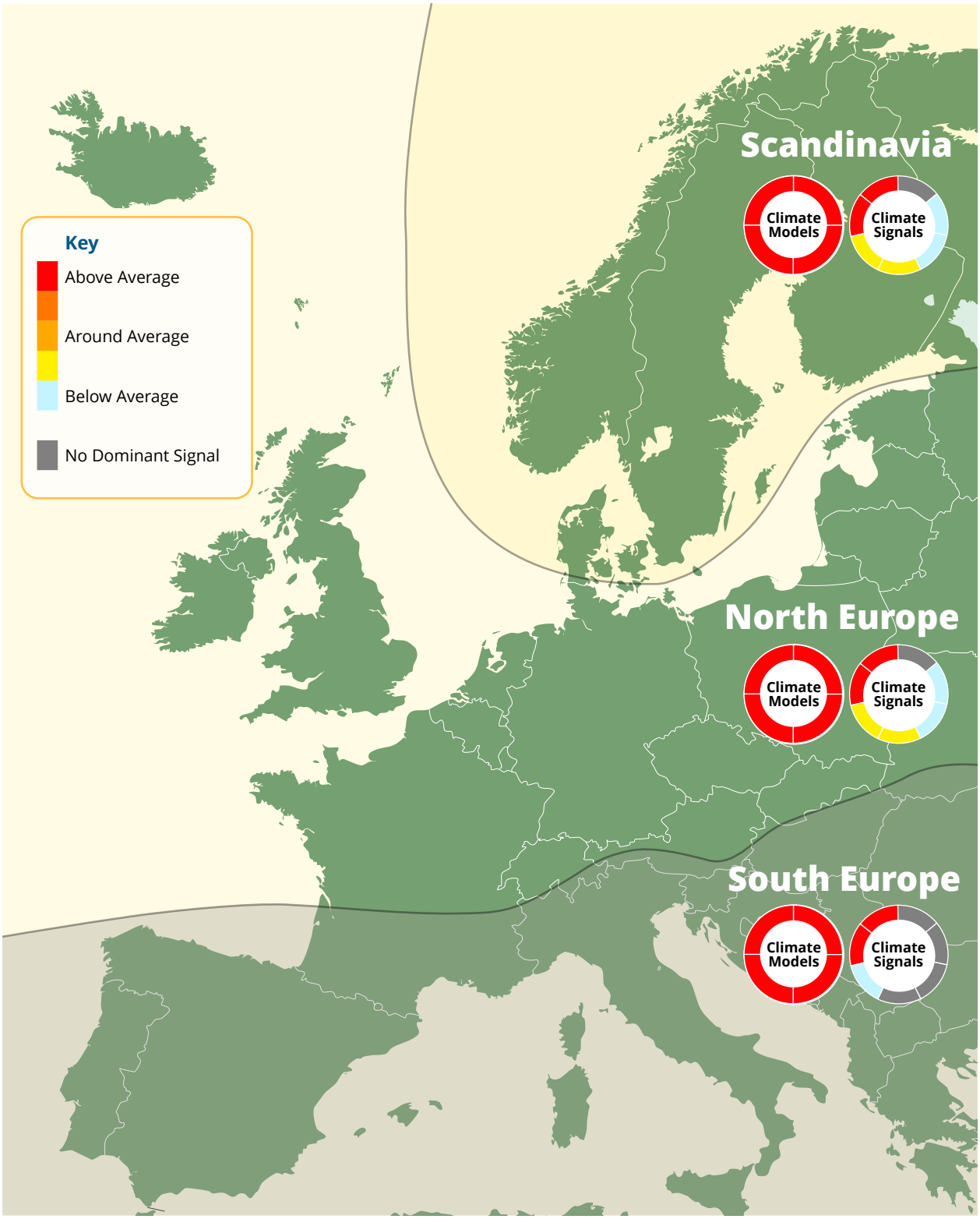
A further Seasonal Forecast Assessment (for Jan 2022 to Mar 2022) will be issued in mid-January 2022.

Euro Tempest

Assessment Summary – Precipitation
December, January and February 2021/22



Assessment Summary – Temperature
December, January and February 2021/22



Extended Outlook

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

Next few weeks

Largely settled conditions are most likely across northern Europe and Scandinavia over the next few weeks but occurrences of wetter and more unsettled conditions are likely to continue across southern Europe.

First few weeks of January

The split between calmer conditions in northern Europe and more unsettled conditions in the south is likely to persist into the first half of January. There are some indications that this pattern will gradually begin to break down through this period, leading to a steadily increasing chance of wet and windy conditions in the north.

Seasonal Forecast Assessment

Climate Models Summary

Though the available climate models are currently producing no dominant signal towards likely levels of precipitation across northern Europe for December-January-February (DJF) as a whole, there are some indications from them of an increased chance that Scandinavia will be wetter than average and southern Europe drier than average during that period. As this is a reversal of the pattern indicated by the short and medium range models for the next few weeks to a month (see above) the suggestion is of a possible switch (from drier to wetter conditions in the north / Scandinavia and vice versa in the south) from around the middle of January. The climate models, as is often the case, suggest that a warmer than average DJF is much more likely than an average or cold three months across the continent but, as ever, it should be noted that "average" conditions are generally defined as the mean of the last 30 years or so. The general trend of increasingly warm conditions associated with climate change makes it more likely that temperatures now will exceed these historical averages and 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

Some of the climate signals point to a decreased likelihood of frequent and active low pressure systems across northern Europe and Scandinavia. One such is the polar vortex (PV) - there are indications that the development of the polar vortex will not be particularly strong this winter. This is often the case in years, such as this, with the QBO in an easterly phase. By contrast, other climate signals present have been associated with more active, wet, windy and unsettled winter weather across northern Europe and Scandinavia - eg, sea surface temperatures (SSTs) in the north Atlantic have warmed notably over the last month and are now warmer than average. ENSO is now in a (albeit weak) La Niña phase which is expected (90% chance) to continue through the winter and is generally associated with an increased chance of wetter and windier weather in northern Europe in the early part of the year. However, La Niña conditions have also been associated with an enhanced chance of a very cold and dry spell in years (such as this) with an easterly QBO and weakened polar vortex. Even with no La Niña, an easterly increases the chance of a period of dry and very cold weather in the early months of the year. It is of course possible for cold spells to occur within seasons otherwise characterised by wet and windy weather. Overall, the climate signals reflect some of the ambiguity observed in the climate models and suggest a wide range of possible outcomes, particularly with respect to expectations for the windstorm season. The chances of an active season have increased slightly since last month with the confirmation of La Niña and the increase in Atlantic SSTs but are counterbalanced by the expectations of a weakened polar vortex influenced by an easterly QBO. There is also, however, a greater than average chance (though not a likelihood) of a very cold spell across northern Europe within the first few months of next year.

Signal	Current State	Projected State		Implications for European Weather
NAO: North Atlantic Oscillation	Slightly Positive	Expected to become negative over the next week or so		Settled for northern Europe and Scandinavia and unsettled for southern Europe for the next 2 weeks
AO: Arctic Oscillation	Slightly positive	Most likely to become near neutral however there are a wide range of potential outcomes indicated by the available models		Average conditions for the time of year
PV: Polar Vortex	Near Normal	Isn't expected to develop significantly over the next month to become slightly weaker than average for the time of year in January.		Reduced chance of prolonged periods of very unsettled weather and an increased chance of a very cold spell for northern Europe in the New Year.
QBO: Quasi-Biennial Oscillation	Easterly Phase	Remaining easterly		Increased chance of a very cold spell for northern Europe in the New Year
ENSO: El Nino Southern Oscillation	La Niña	La Niña is expected (~90% chance) to persist throughout the Northern Hemisphere winter		Increased chance of periods of unsettled weather throughout the season and an increased chance of a very cold spell for northern Europe in the New Year.
MJO: Madden Julian Oscillation	Phase 7	Expected to move into phase 8 during the last week in December		Settled conditions into early January across northern Europe.
North Atlantic SST	Above average	Remaining above average		A slightly increased potential for warmer, wetter conditions across northern Europe and Scandinavia

For more information on the characteristics of the signals please see the EuroTempest climate signals factsheet.

Historical Analogues to the Current Climatic Set Up

Possible characteristics of this upcoming winter can be proposed by finding years in which there was a similar climatic set up. The closest recent analogues for this year (with La Niña conditions, relatively warm Atlantic sea surface temperatures (SSTs) and an easterly phase of the QBO at this time of year) are 2017, 1998 and 2011. All these seasons produced some notable windstorms - eg, windstorm David led to EUR1.6bn losses (PERILS) across northern Europe in January 2018, Dagmar (Patrick) and Ulli affected Scandinavia and the UK respectively in late 2011 and early 2012, and storm Stephen affected the UK in late December 1998. Looking forward, if the climate signals develop through December as currently expected, 1983 also comes into play as a candidate reference year. Similar to those seasons already discussed above, the 1983 season saw some notable windstorms affecting northern Europe in mid-January 1984. Nevertheless, while all these historical analogue seasons produced at least one storm of note none of them produced a storm ranked in the top third of the UK Met Office Extreme Windstorm Catalogue by storm severity index (David 2017 notwithstanding, as the catalogue ends in 2013).

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