SUMMARY ASSESSMENT OF SEASONAL FORECASTS FOR EUROPE

OCTOBER, NOVEMBER AND DECEMBER 2021

Executive Summary

Seasonal forecast models and climate signals suggest October to December 2021 as a whole is most likely to be milder than average across the whole of Europe. There is no clear consensus for precipitation, however there are some indications that northern Europe and Scandinavia could be drier than average and southern Europe wetter than average.

Storms

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

Precipitation

There is no clear consensus across the forecast models and climate signals for precipitation across Europe although below average precipitation is slightly more favourable across northern Europe and Scandinavia and above average across southern Europe, especially later in the period.

Temperature

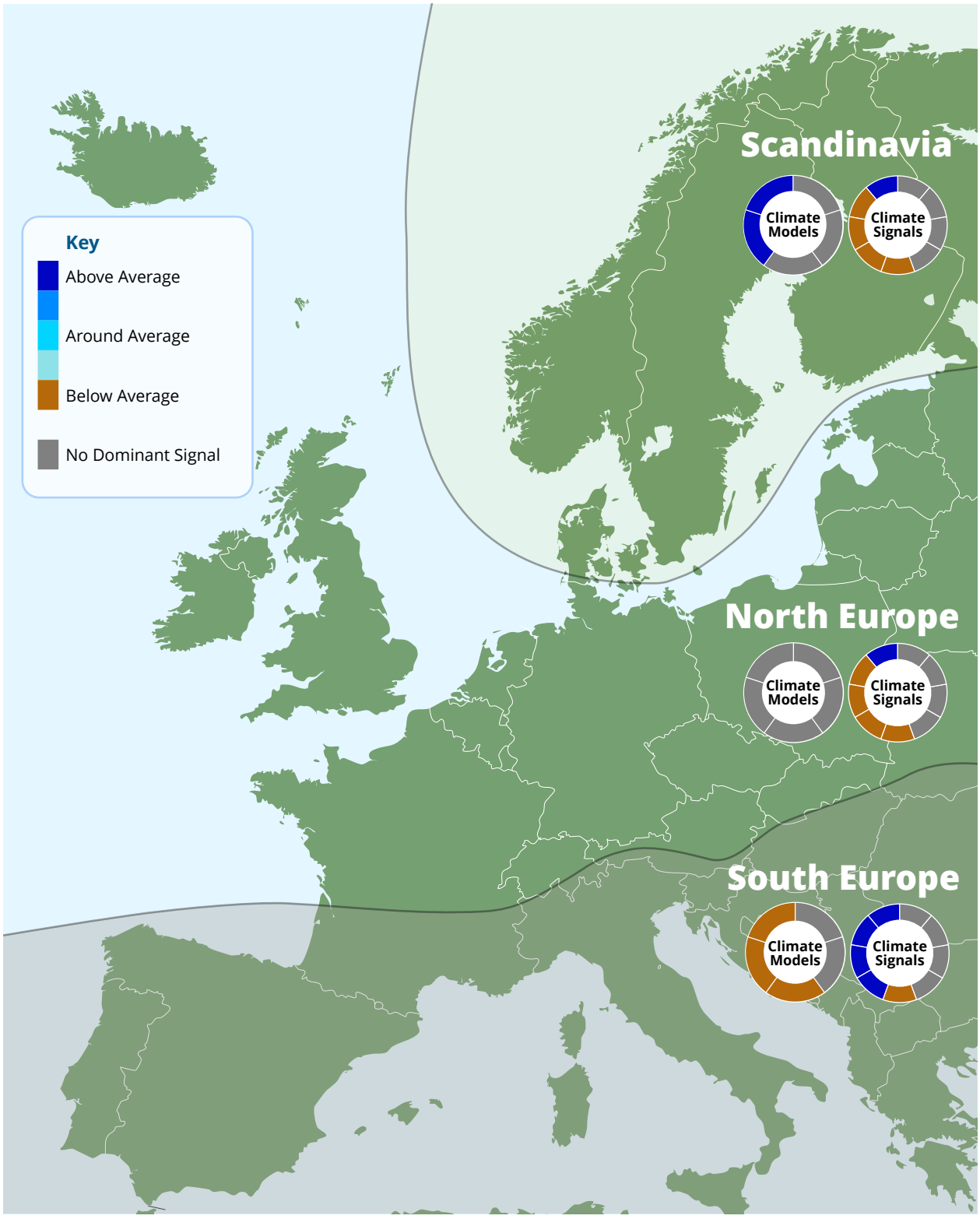
Temperatures are most likely to be warmer than the long-term climatological average across Europe.

Analogue Years

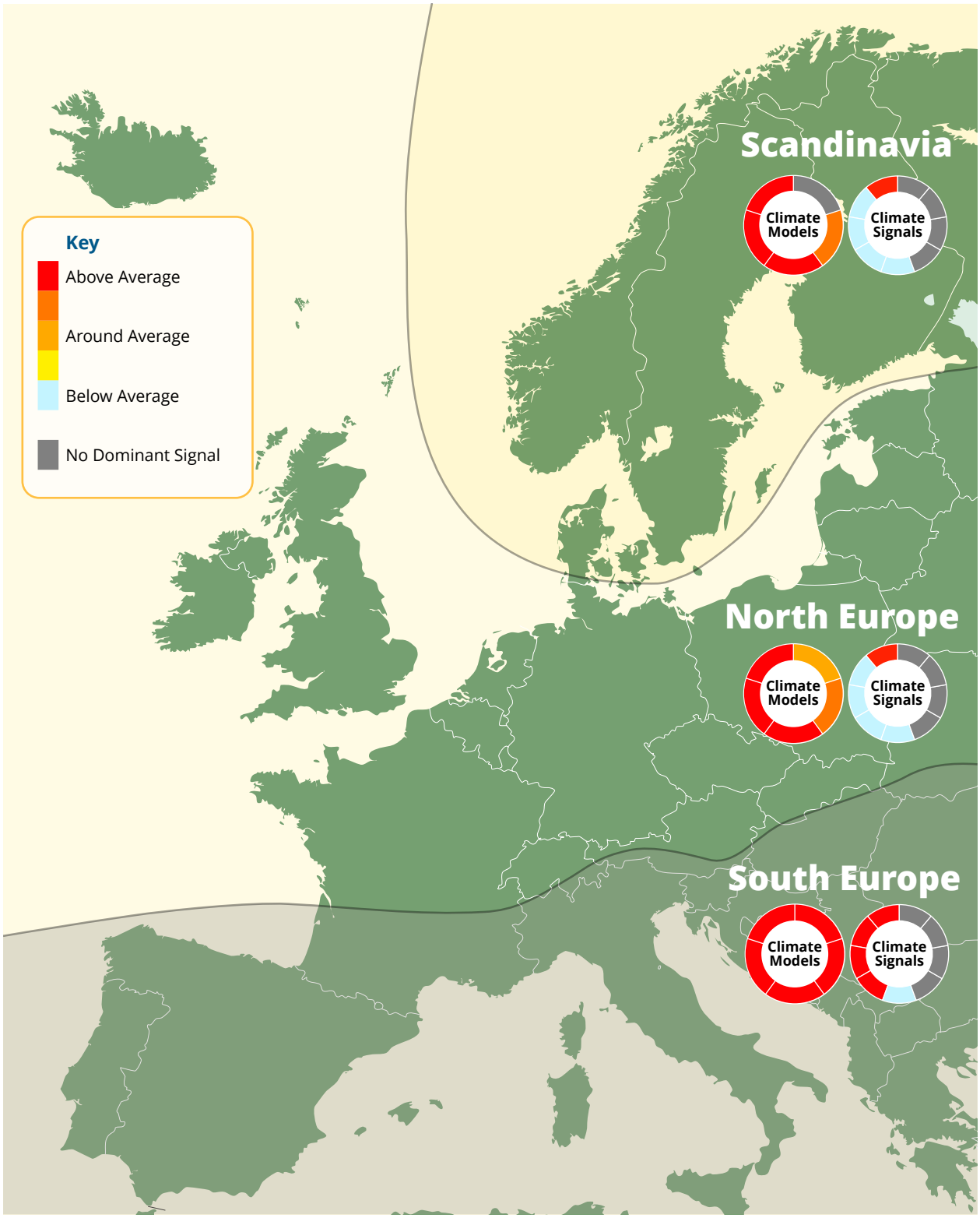
This analysis has looked at periods, termed analogue years, when climate signals have shown a similar pattern to those exhibited currently. The reference years found suggest that a below average storm season is less likely than normal, especially for northern Europe.

This report is an early indication of conditions over winter 2021-2022 and will be updated in November.

Assessment Summary – Precipitation
Precipitation October, November and December 2021



Assessment Summary – Temperature
Temperature October, November and December 2021



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
There is currently the potential for some spells of wet and windy weather across northern Europe and parts of southern Europe during the next few weeks.

Next Month
From early November settled conditions are currently expected to become more likely with drier and chillier conditions possible across Scandinavia and much of northern Europe and warmer conditions across southern Europe.

Seasonal Forecast Assessment

Climate Models Summary
For precipitation, the indication from the forecast models is that the chance of a wet OND is slightly more likely than an average or dry OND for Scandinavia, while for southern Europe the chance of a dry OND outweighs that of an average or wet OND. However, there is no dominant signal across northern Europe. A warmer than average OND is much more likely than an average or cold OND across southern Europe. The chance of a warmer than average OND is more favourable than an average or cold OND across northern Europe and Scandinavia. 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 OND 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
The current negative phase of the NAO, indicates an increased potential of chillier, drier and calmer periods across northern Europe and Scandinavia. However, the AO is expected to become more positive with there also being signs of the jet stream strengthening and reaching from the Gulf of Mexico across the north Atlantic. This increases the potential for deep low pressures to affect areas of northern Europe and Scandinavia during the next few weeks. The easterly phase of the QBO is likely to weaken the strength of the polar vortex as it begins to develop during the next few months. This is likely to be coupled with a weak La Niña event which is expected to develop during the next few months. As we move towards mid winter a La Niña state and an easterly QBO increase the potential for chillier, drier and calmer weather in Scandinavia and northern Europe (and wetter weather in southern Europe). Eurasian snow cover, arctic sea ice, PV and the MJO, are currently not expected to have a strong influence on European weather during the next few months compared to their influence later in the season.

Reference Years
By finding years in which there was a similar climatic set up and viewing their outcomes possible characteristics of this upcoming winter can be proposed. Within the last 40 years there have only been three years in which there has been a developing La Nina event, an easterly QBO and slightly below average North Atlantic SST at this point in the year. These years range from having an average storm season, with both an average number of storms and an average maximum storm severity index value to an above average storm season with both the number of storms and the maximum storm severity index being above average. The most common storm track during these reference years was mostly across northern Europe. Taking these years with a similar climatic set up to now therefore suggest that a below average storm season is less likely than normal, especially for northern Europe.

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

Signal	Current State	Projected State		Implications for European Weather
NAO: North Atlantic Oscillation	Negative	Expected to be negative or slightly negative over the next month		Increased potential for chillier, drier and calmer periods across northern Europe and Scandinavia
AO: Arctic Oscillation	Negative	Expected to be around average or slightly positive over the next month		Increased potential for warmer, wetter and stormier periods across northern Europe and Scandinavia
PV: Polar Vortex	Developing	Expected to continue to develop over the next month		This climate signal doesn't have as strong an influence on European weather during the next few months compared to later in the season.
QBO: Quasi-Biennial Oscillation	Easterly Phase	Easterly		Increased potential for chillier, drier and calmer periods across northern Europe and Scandinavia, especially later in the period.
ENSO: El Nino Southern Oscillation	La Nina conditions	70-80% chance of La Niña conditions developing during the next few months		Increased potential for chillier, drier and calmer periods across northern Europe and Scandinavia
MJO: Madden Julian Oscillation	Phase 5	No consistent timescale for the progression through the phases		This climate signal is not likely to have a strong influence on European weather during the next month.
North Atlantic SST	Slightly below average	This pattern is expected to persist		A slight increased potential for chillier, drier and calmer periods across northern Europe and Scandinavia
Eurasian Snow Cover	Developing	Expected to continue to develop over the next month		This climate signal doesn't have as strong an influence on European weather during the next few months compared to later in the season.
Arctic Sea Ice Extent	Developing	Expected to continue to develop over the next month		This climate signal doesn't have as strong an influence on European weather during the next few months compared to later in the season.

For more details on the methods used for this Summary Assessment please read the Appendices.