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Advanced prediction in
polar regions and beyond



 **climateeurope**
Linking science and society

APPLICATE energy case study

Understanding linkages between the Arctic and mid-latitudes

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Advanced prediction in
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IN A NUTSHELL

- Develop **enhanced predictive capacity** for weather and climate in the Arctic and beyond
- Determine the **influence of Arctic climate change on Northern Hemisphere mid-latitudes**, for the benefit of policy makers, businesses and society.



USER ENGAGEMENT

USER GROUP



BLOG Polar Prediction Matters



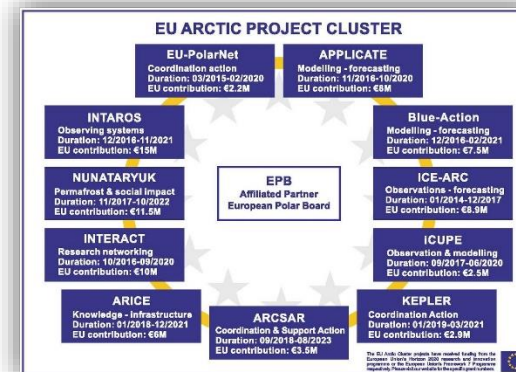
ONLINE COURSE 2019



WORKSHOPS



EU-ARCTIC CLUSTER



CASE STUDIES

IN THE MEDIA

[HOME](#) > [CLIMATE](#)

Loss of Arctic Sea Ice Affects Weather in Europe and North America



Aerial view of low water level in drought conditions at Lake Shasta in California, 2014. DWR (Department of Water Resources), California.

Published at: Jun 11 2019 - 16:04 / Updated at: Jun 14 2019 - 13:41

Arctic loss of sea ice is connected to changes in the weather in Europe and North America and lower latitudes in general. However, the political reaction still seems weak.

1 | **ORA Oxford Summer School 2019**

Last Few Places for 2019 Summer School - Please contact Admissions Team asap



Work from Ivana Cvijanovic, Research Scientist and Beatriu de Pinós fellow at BSC

<https://www.highnorthnews.com/en/loss-arctic-sea-ice-affects-weather-europe-and-north-america>

CASE STUDIES

- ▶ **Past events of relevance** for stakeholders (affecting their business, activities, etc.)
- ▶ **Showcase the utility of enhanced weather, climate and sea ice prediction** (i.e., how this information would have been useful if available in the moment of the event)
- ▶ Illustrate how to **move from model outcomes to decision-making**
- ▶ Useful to identify **research gaps**

CASE STUDY



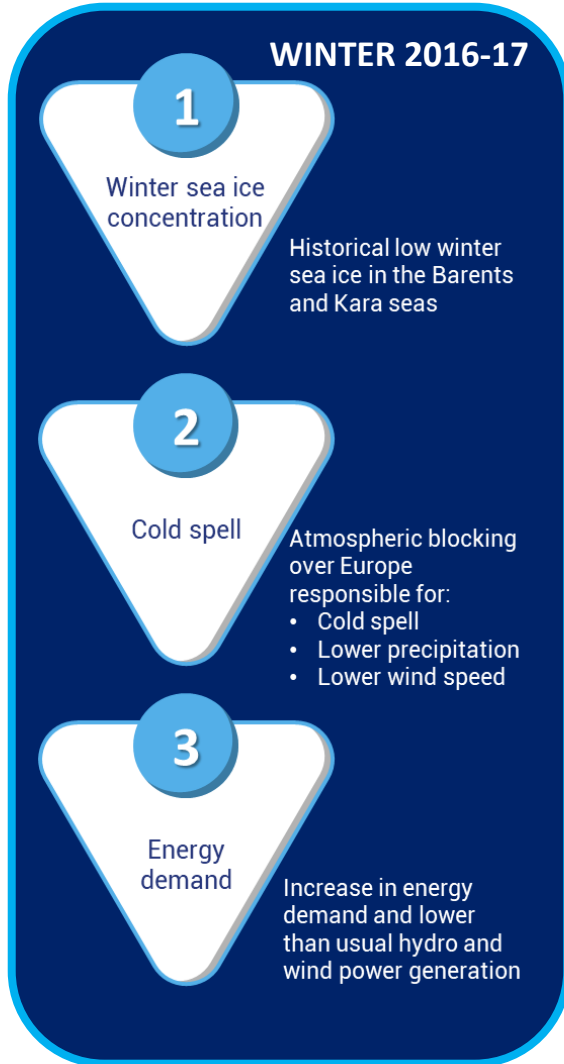
▶ Winter 2016: event **identified as relevant** by stakeholders in the energy sector

▶ Joint effort between **climate scientists, social scientists and science communication specialists** taking part in the consortium in collaboration with the **S2S4E project**

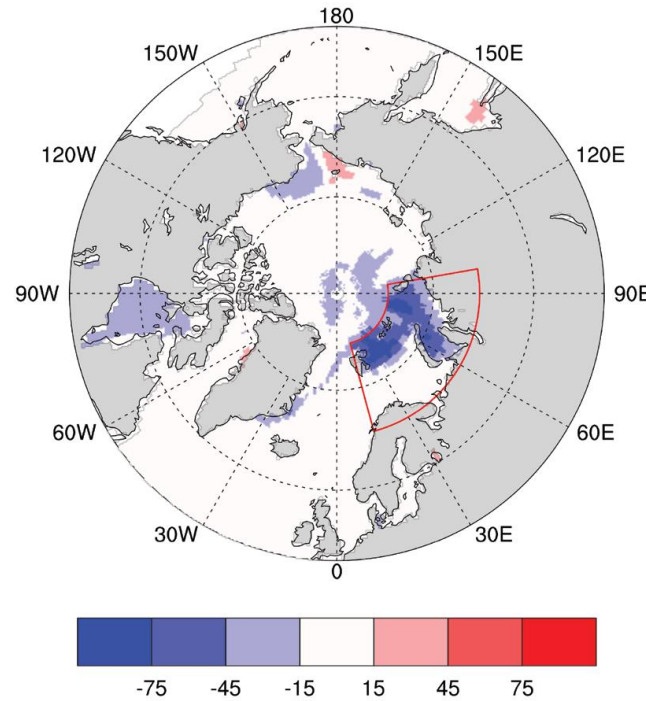


▶ **Policy makers**
Big energy associations (EWEA, IRENA, AREA...)
Global networks of TSOs (ENTSO-E...)
Others?

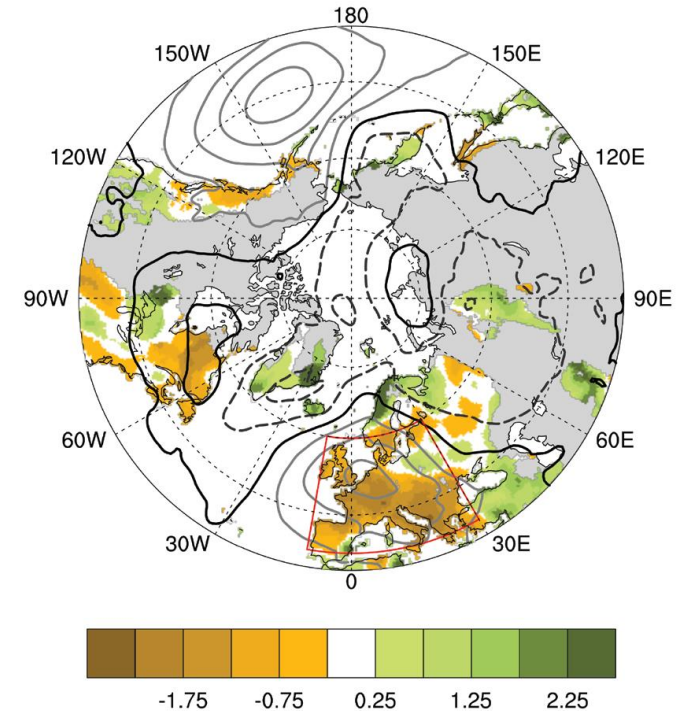
CASE STUDY



1. Historical low sea ice concentration in the Barents and Kara seas

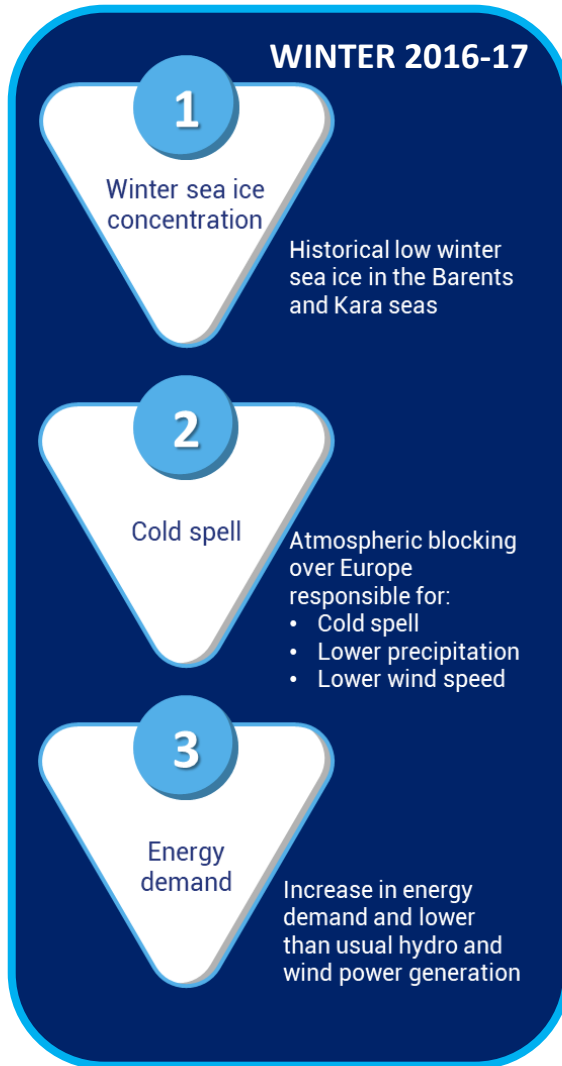


Sea ice concentration anomaly Nov-Dec 2016 relative to the average for 1980-2015



Dec 2016 standardized anomalies for **total precipitation** (colour) and sea level pressure (contours)

CASE STUDY

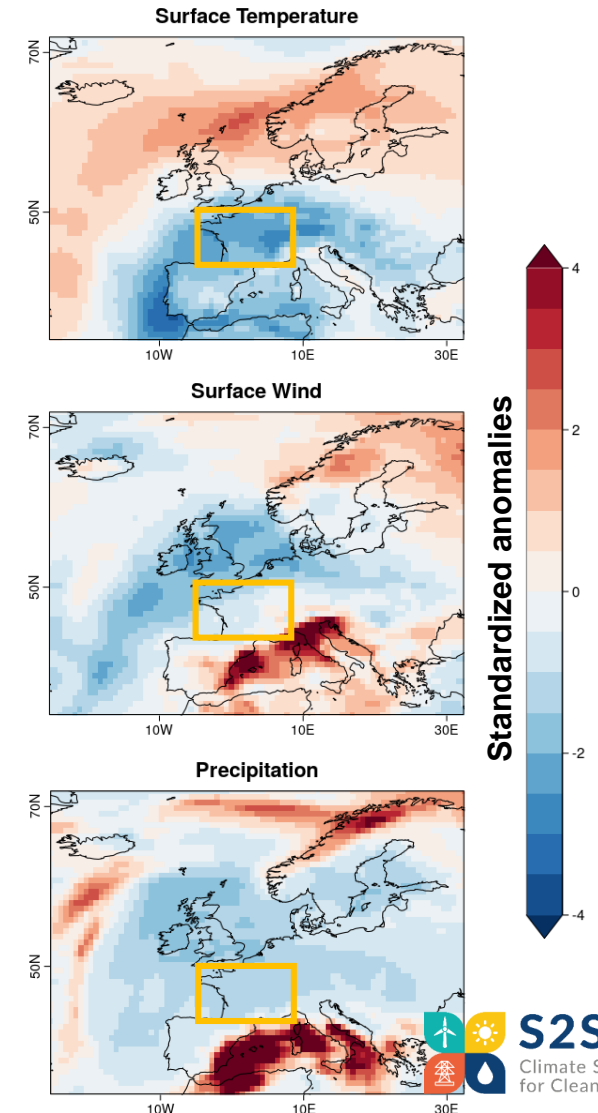


2. Cold spell over Europe

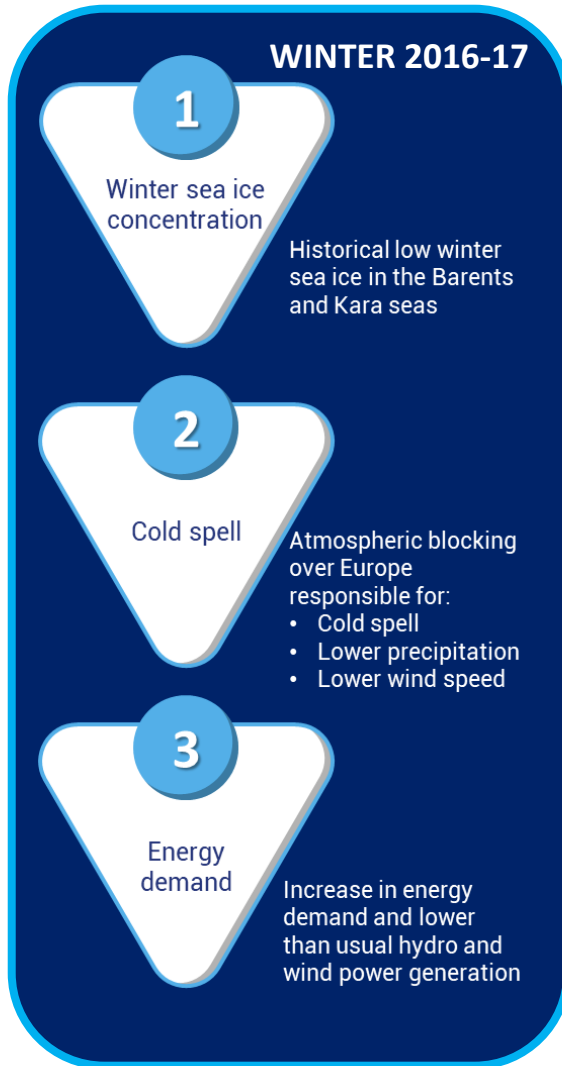
- ▶ **Lowest total precipitation since 1901** (Acosta Navarro 2018)
- ▶ **Least windy winter months of last three decades** (Vautard et al. 2017)

Temperature, precipitation and wind speed anomalies in the third week of January 2017 (17-23 Jan) relative to the average for 1980-2015

Source: *Pechlivanidis et al. 2018*

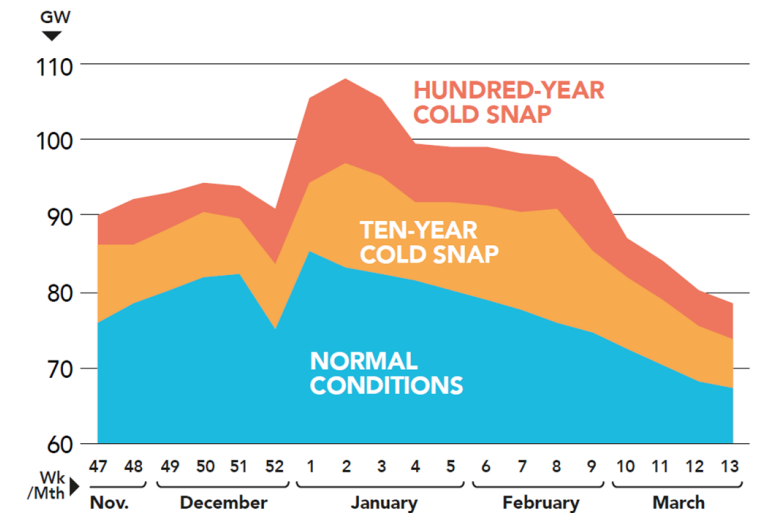


CASE STUDY



3. Increase in energy demand and lower than usual hydro and wind power generation in France

- ▶ **Increase of demand** in France, since most the domestic heating systems feed on electricity
- ▶ Electricity consumption **peaked at 94 GW at 7pm on 20 Jan** (third highest peak ever recorded in France)
- ▶ Cold spell + nuclear shutdown = **energy security risk** with restrictions and energy import from neighbouring countries



▶ **Peak electricity demand (GW) for winter 2016-17 in France.** The event recorded in the third week of Jan corresponded to a once in ten year cold spell occurrence (under normal conditions: 85 GW in Jan)

CASE STUDY

OUTCOMES

- ▶ Suggests that a **high reduction of Arctic sea ice has favoured a record-breaking low precipitation and wind speed** over parts of western Europe
- ▶ APPLICATE **contributes to understand the linkages** between the Arctic and mid-latitudes
- ▶ Once better understood, future forecasts of extremely low sea ice extent (that also relate with forecasts of electricity demand and supply) could be **potentially valuable for adaptation and for assessing risk for the European energy systems**

DOWNLOAD case study:

<https://applicat.eu/news/221-effects-of-arctic-sea-ice-on-energy-production-in-mid-latitudes>

NEXT CASE STUDIES

- Heatwaves/fires
- Rain on snow/landslides & reindeer husbandry
- Policy brief: optimal locations to describe variability in Arctic sea ice
- Insurance
- Biodiversity

Thank you!

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