



Impact on European weather and climate due to Arctic variability and trends

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The Arctic amplification of global warming and the pronounced Arctic sea-ice retreat constitute some of the most significant signs of global climate change. The amplification changes the meridional gradient of heat and moisture and the sea-ice retreat alters the surface energy balance causing local energy sources and sinks for the atmosphere, depending on season. All these changes may impact the large scale atmospheric circulation hereby affecting climate in the mid latitudes.

Here we present circulation patterns based on a Self-Organizing Map (SOM) analysis applied on the 500 hPa field for the European and Atlantic sector. We investigate how frequency and persistence of these patterns are linked to Arctic changes, and how these modes affect weather and climate in Europe. For instance the analysis reveals that a SOM mode recognized as a Scandinavian high pattern becomes more persistent for Arctic amplification and causes divergence of dry-static and latent energy over large part of Europe implying colder and more dry conditions there.