

## **EURACLIM: Predictability of the wintertime climate variability in Eurasia related to oceanic heat anomalies in the Nordic Seas and North Atlantic**

Effects of climate variability are felt by the societies all over the world. Their prediction on the global, regional and local scale is a great challenge for the climate research community. Prospects for reliable prediction of climate variability from a season to years ahead depend on the strength of atmospheric response to persistent anomalies in other components of the climate system, such as the ocean and sea ice. However, oceanic sources and the associated physical mechanisms of the seasonal to decadal climate predictability are not yet fully identified and sufficiently understood.

The main objective of EURACLIM is to estimate and understand the seasonal predictability of wintertime atmospheric conditions (seasonal mean winds, air temperatures, precipitation, activity of weather systems, etc.) in Eurasia related to oceanic heat anomalies in the Nordic (Greenland-Iceland-Norwegian and Barents) Seas and impact of these anomalies on the Arctic sea ice extent. EURACLIM will also compare this predictability to the predictability of wintertime atmospheric conditions in Eurasia associated with oceanic heat anomalies in the North Atlantic. These goals will be achieved by thorough statistical analyses and physical interpretation of a comprehensive set of oceanic observations and atmospheric re-analyses (observations combined with numerical models of atmospheric circulation) from recent decades (1979-present).

The focus of EURACLIM on wintertime climate predictability in Eurasia is motivated by abnormally cold winters which frequently occurred in this region in the early 21st century, despite increasing annual-mean surface air temperature over land. Recent studies indicate that wintertime atmospheric conditions in the extratropical Northern Hemisphere are influenced by Arctic sea ice extent anomalies, and that wintertime sea ice cover anomalies in the Nordic Seas are strongly affected by oceanic heat anomalies. A study by the EURACLIM proposer based on observations in the period 1982-2005 reported statistically significant links of several wintertime climate variables in Eurasia to half a year earlier anomalies in the temperature of Atlantic Water in the Nordic Seas. If the relations of the large-scale wintertime atmospheric conditions to summertime anomalies of Atlantic Water temperature in the Nordic Seas as a predictor are found robust by EURACLIM or if better oceanic predictors of these conditions are found by EURACLIM, one can expect that inclusion of this predictor (or these predictors) into simple statistical seasonal prediction systems should improve their ability to forecast wintertime climate variability in Eurasia.