



Climate feedbacks and predictability in the Nordic Seas area: a view based on oceanic observations and atmospheric reanalysis data in recent decades

Pawel Schlichtholz

Institute of Oceanology, Polish Academy of Sciences, Sopot, Poland (schlicht@iopan.gda.pl)

Prospects for short-term (seasonal-to-interannual) prediction of extratropical climate variability depend on the strength of feedbacks between different components of the climate system, the atmosphere and ocean in particular. Our recent studies indicate that such feedbacks are particularly strong in the Nordic (Greenland-Iceland-Norwegian and Barents) Seas area where anomalous air-sea interactions are enhanced by a large amplitude of the seasonal cycle of the sea ice cover, especially in the Barents Sea. We have shown that wintertime sea ice extent anomalies in this area are strongly linked to half a year earlier anomalies of Atlantic water temperature at the entrance to the Barents Sea and to local air-sea interactions and sea surface temperature anomalies in the preceding winter-to-spring season. We have also shown a substantial predictability of wintertime anomalies of surface air temperature and winds over the Nordic Seas from oceanic heat anomalies and proposed mechanisms responsible for a long persistence of the atmospheric anomalies. We will review these concepts and provide further evidence of a strong atmospheric response in the Nordic Seas and adjacent areas to oceanic heat anomalies based on ocean temperature observations and atmospheric reanalysis data from recent decades. We will show that significant oceanically-driven air temperature and wind anomalies extend to the tropopause and explain mechanisms responsible for such a deep response.