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Title: *Transport and variability of the West Spitsbergen Current in the past 50 years based on numerical model results and observations.*

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The accelerating retreat of sea ice cover in the Arctic Ocean requires understanding of all of its forcings, both by the atmosphere and the ocean. One of the important sources of heat in the eastern Arctic is associated with warm Atlantic Water (AW) advected to the north across the Barents Sea and through Fram Strait. Researchers at the Institute of Oceanology Polish Academy of Sciences (IOPAS) have been investigating the flow and variability of AW into the Arctic since the late 1980s. Hydrographic data collected by the IOPAS during summer cruises of the R.V. "Oceania", among a number of analyses, allow computing baroclinic volume fluxes by the West Spitsbergen Current (WSC). Observational estimates based on these data suggest an increasing strength of the WSC during the last decade, especially during AW warming in summers 2005 and 2006. Similarly, a version of the Regional Arctic System Model (RASM) forced with realistic atmospheric data from the Common Ocean Reference Experiment version 2 (CORE2) 1948-2009 reanalysis shows an increased northward volume transport across Fram Strait in the 2000s, in particular in 2006. One of the questions we attempt to address with the RASM model is if this is a unique occurrence or a repeating event in the past 50 years. RASM results suggest that events with even stronger WSC have happened in the past, for instance in the early 1990s. The unique situation in the first decade of 21st century was that the substantial amount of water mass and heat carried by the WSC entered the Arctic Ocean, whereas in the past most of Atlantic Water recirculated within the Greenland Sea and Fram Strait.