EGU2020-11409
https://doi.org/10.5194/egusphere-egu2020-11409
EGU General Assembly 2020
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Atlantic- and Arctic Water transport across the Yermak Plateau

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The pathway by which Atlantic Water ultimately inflows to the Arctic Ocean via the Yermak Plateau are of great interest for improving the current understanding of the evolving state of the European Arctic. The Arctic branches of the West Spitsbergen Current (WSC), i.e. the Svalbard Branch (SB), the Yermak Pass Branch (YPB) and the Yermak Branch (YB), are the primary routes through which warm AW enters the Arctic Ocean (AO). These branches either flow around (YB) or passes (SB, YPB) over the Yermak Plateau, the Arctic Sill, which is a topographic obstacle for warm water intrusion to the Arctic and possible melting of sea ice. In addition, The Spitsbergen Polar Current (SPC), carrying fresh costal and Arctic type water from the Barents Sea has to cross the Yermak Platea along the northwestern corner of the Spitsbergen coastline. In order to reveal the dynamics across the YP and the roles of the different AW branches in heat flux variability across this arctic sill, a set of in situ ocean data, ocean climatology (UNIS HD), reanalyzed atmospheric data (NORA10) and altimetry data products from Ssalto/Duacs (CMEMS), where synthesized in order to study the seasonal and year-to-year variability in ocean currents across the YP. In situ data from the *Remote Sensing of Ocean Circulation and Environmental Mass Changes (REOCIRC)* project consist of water time series of temperature, salinity, ocean current and Ocean Bottom Pressure (OBP), which covered the SB and the SPC. Air-ocean interaction mechanisms for controlling volume transport and heat fluxes in the SB and SPC are presented, and further linked to the variability of the other primary AW routes towards the AO. Moreover, surface geostrophic currents from Absolute Dynamic Topography (ADT) are calibrated against the geostrophic bottom current calculated from in situ OBP recorders. Estimates of winter volume- and heat transports across the YP for the time period 1993-2019 are presented, and interannual variability in the SB linked to the WSC and other AW branches are discussed together with consequences for sea ice melting north of Svalbard.