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Variability of the Polar Front in the western Barents Sea in summers 1998-2010

Ilona Goszczko and Waldemar Walczowski
Institute of Oceanology, Polish Academy of Sciences, Sopot, Poland (ilona_g@iopan.gda.pl)

Summer observations of the Polar Front occurring south of Spitsbergen during the last thirteen years show changes in its location and structure. Conductivity-temperature-depth profiles as well as ocean currents' measurements with Acoustic Doppler Current Profiler and Lower Acoustic Doppler Current Profiler at sections between the South Cape and the Bear Island are analyzed according to local circulation composed of two main current systems: West Spitsbergen Current and East Spitsbergen Current, which transport saline and warm water from the North Atlantic and fresh and cold water originating from the Arctic Ocean, respectively. Water masses modification, horizontal gradients of water properties and mixing processes occurring over the frontal zone decide about both heat and salt exchange. Furthermore, the near bottom outflow of dense water from the Storfjord Trench over the shelf break and increasing surface impact of melting sea ice are visible as factors which influence local hydrographic conditions and force the circulation. In addition to that, satellite measurements of Sea Surface Temperature show high variability during the summer season and allow to observe mesoscale features occurring in the study area.