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Climatology and Genesis Environment of North Atlantic Polar Lows

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Polar lows are intense maritime cyclones occurring during cold air outbreaks in high latitudes. We use the Melbourne University cyclone algorithm to detect and track polar lows. The algorithm employs the Laplacian of mean sea level pressure and is applied to the ERA-Interim reanalyses from 1979 to 2014. Track density maps indicate that polar lows mainly occur close to Svalbard, as well as in the northern Norwegian Sea and the Barents Sea. This is in accordance to previous studies about polar low tracks densities which are using less objective method and shorter time periods. Also the cyclogenesis density correlates well with the winter-time climatology of cold air outbreaks. Furthermore, we present inter- and intra-annual variability of polar lows and its relation to the NAO as well as sea ice extent. We also differentiated the polar low genesis environment into forward and reverse shear conditions, where forward shear implies that the thermal and mean wind are in the same direction, whereas they are opposite for reverse shear conditions. The forward and reverse shear results based on the objective tracking are similar to a previous study based on polar low tracks from the STARS data set provided by MET Norway.