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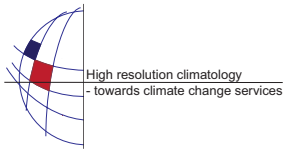

The structure of cyclonic moisture transport into the European Arctic: results from a water vapour tagging method

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In order to enhance the process understanding of atmospheric energy transport into the European Arctic, the magnitude and variability of the moisture transport from individual cyclones entering the European Arctic were studied. We applied a moisture source tracking algorithm embedded in the limited-area numerical weather prediction model (NWP) Climate High-Resolution Model (CHRM) to trace the evaporation sources and transport of water vapour from different latitude bands of the North Atlantic Ocean. Septermber 2002 and December 2006 were chosen as initial analysis periods, since a particularly large number of cyclones (including former hurricanes) traveled within the North Atlantic storm track during these months. The main findings are that moisture from more southerly source regions is transported at higher altitudes. Stronger storms draw moisture from a larger area (further south), and the ensuing precipitation will hence on average originate from further south as well. Most long-range transport of moisture occurs in the cold frontal bands. Most moisture that is semi-permanently transferred to north of 60ºN in the Atlantic storm track originates from directly south of that latitude, implying on average short atmospheric moisture lifetimes, and hence a fast energy turnover.