MMARIA: A multi-static, multi-frequency meteor radar approach to improve the MLT wind field measurements

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Traditionally mean values of the mesosphere and lower thermosphere winds over the radar volume are obtained using monostatic specular meteor radars. Such observing volume consist of a few hundreds of kilometers in radius. Moreover the differences between measured radial velocities and the expected radial velocities from the measured mean winds are used to derive properties of gravity wave momentum fluxes. Recently, Stober and Chau [2015] have proposed to use a multi-static approach, MMARIA (Multi-static, Multi-frequency Agile Radar to Investigate the Atmosphere) to retrieve horizontally resolved wind fields, where most of the radar volume is observed from different viewing angles. Similar results could be obtained if measurements from close-by monostatic systems are combined. We will present the preliminary results of MMARIA network being implemented in northern Germany taking advantage of two existing transmitting stations working at different frequencies. Special focus will be devoted to selected events during the January-March 2016 period. In addition, we present the climatology of the derived horizontal divergence and relative vorticity from combining existing specular meteor radar data between 2004 and 2015 from the Trømso (19.22^{o}W, 69.58^{o}N) and Andenes (16.04^{o}W, 69.27^{o}N) radar systems. We found that both parameters present a persistent behavior during the northern hemisphere polar summer, i.e., the horizontal divergence is negative below 88 km and positive above, while the relative vorticity is positive below 86 km and negative above.

Key words: MLT Wind Fields, Polar Summer Mesosphere, Vertical Coupling

References

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