



## **Statistical climatology of mid-latitude mesospheric summer echoes characterised by radar observations**

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Mid-latitude mesospheric summer echoes (MSEs) appear in radar observations during summer months. Geophysical factors controlling the formation of MSEs include solar and energetic particle ionisation, neutral atmosphere temperature, turbulence, and meridional wind transport. 12 years of summer month observations by OSWIN VHF radar in Northern Germany have been analysed to detect MSE events and to analyse statistical connections to these controlling factors. A more sensitive and consistent method for deriving signal-to-noise ratio has been utilised. Daily and monthly composite analysis demonstrates strong daytime preference and early summer seasonal preference for MSEs. It is shown that the meridional wind transport from colder high-latitude summer mesosphere is the important controlling factor, while no clear connection to geomagnetic and solar activity is found.