

Spatial and temporal variations of upper mesospheric winds inferred by using successive images of noctilucent clouds observed in Iceland.

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Injection of momentum through dissipations of gravity waves propagated from lower atmosphere and active productions of minor constituents caused by precipitation of energetic particles are known as dominant sources of disturbances in upper mesosphere. Since some of these disturbances occur locally and intermittently, it is important to know time constant (i.e. diffusivity) against such impulsive fluctuations on momentum and concentration of minor constituents to understand the energy and mass budgets in the upper mesosphere. One of the straight methods to know the amplitude of the eddy diffusion is to measure the spatial distribution of wind field with high temporal resolution. In this study, derivation of spatial and temporal variation of upper mesospheric winds by tracking a motion of noctilucent cloud (NLC) observed by a ground-based color digital camera in Iceland is conducted. The procedure for wind field estimation consists with 3 steps; (1) projects raw images to a geographical map (2) enhances NLC structures by using FFT method (3) determines horizontal velocity vectors by applying template matching method to two sequential images. In this talk, a result of the wind derivation by using successive images of NLC with 3 minutes interval and ~1.5h duration observed on the night of Aug 1st, 2013 will be reported as a case study.

Keywords: Noctilucent cloud, wind field, mesopause, upper mesosphere