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Indications of small-scale wind systems in Earth's auroral thermosphere

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Atmospheric kinematic viscosity increases with height and, above ~90 km altitude, so does temperature. These two conditions oppose respectively the establishment of spatial velocity gradients and of vertical motion. Thus, it has long been assumed that small-scale circulation systems (<100 km) are absent in the middle and upper thermosphere. However, we will present observational evidence that such motions do indeed occur. In particular, we will show that height profiles of vertical wind observed during the HEX rocket experiment require surprisingly large yet spatially localised horizontal divergence. Such observations imply thermospheric circulation at hitherto unexplored spatial scales, the implications of which remain unknown.