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Deriving horizontally resolved winds applying inverse theory to multi-static meteor radar observations

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Mesospheric dynamics is characterized by the presence of atmospheric waves at different spatial and temporal scales such as planetary waves (PW), tides and gravity waves (GW). In particular, gravity waves provide a significant contribution to the mesospheric variability on short time scales from minutes to several hours. As GW carry a considerable amount of energy and momentum from their source region up to the region where they dissipate they contribute to the energy budget in the stratosphere and mesosphere. Here we present a new mathematical approach applying inverse theory to derive horizontally resolved wind fields using meteor radar networks. The horizontally resolved wind field contains valuable information about the horizontal scale of this short term variability and permit to access the horizontal wavelength spectra of GW. Our preliminary results indicate that our retrieval algorithm keeps the mesoscale information, viz. median of the retrieved winds is in agreement to all-sky meteor wind fit.