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RANGE IMAGING RESULTS FROM POLAR MESOSPHERE SUMMER ECHOES

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The range resolution of pulsed radars is usually limited by the transmitting pulse length and the sampling time. The so-called range imaging (RIM) has been developed to reduce these limitations. To apply this method the radar operates alternately over a set of distinct frequencies. Then the phase differences of the receiving signals can be used for optimization methods to generate high-resolution maps of reflections as function of range insight the pulse length.

The technique has been implemented on the ALWIN VHF radar in Andenes (69) and the OSWIN VHF radar in Kühlungsborn (54N). Here we present results of the RIM method from measurements in polar mesosphere summer echoes – PMSE. These strong radar echoes are linked to ice particle clouds in the mesopause region.

The dynamic of the PMSE can be reflected very well by RIM. The movement of PMSE and the edges of the extension can be tracked with a high altitude resolution. Comparisons between simultaneous measurements by RIM and by standard radar techniques demonstrate the advantages of RIM. Wave structures can be identified with RIM whereas they are not detectable with the lesser resolution of the standard measurements. Gravity wave parameter associated with these variations are estimated using the simultaneous measured velocity field.