

## **1.25 AUTOMATIC DETECTION OF THE MELTING LAYER USING POLARIMETRIC RADAR PROFILER**

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On the one hand the melting layer (ML) is an unwanted effect in radar rainfall estimation. To counter this effect, several ML detection algorithms have been developed. On the other hand, for scientific purposes, it is interesting to better understand the characteristics of the melting layer. The current ML detection algorithms are primarily based on specific radar observable thresholds and are not always well suited for application with all radar types under all climatologic conditions. Some observables have a distinct signature with a horizontally oriented radar, while others are more pronounced with a vertically oriented radar. Some radars do not have the ability to measure the linear depolarisation ratio (LDR), while others do. These differences make it difficult to develop an algorithm which can be used more universally.

In this research work, such an algorithm is being investigated. The data of the Doppler polarimetric radar, TARA (Transportable Atmospheric RADar), are used. Two elevations are considered, 90° and 45°. At first a thorough analysis of the radar observables under different circumstances using the ACCEPT (Analysis of the Composition of Clouds with Extended Polarization Techniques) campaign is being made. Then, a choice is made on the radar observables which are best suited for ML detection. Next, an algorithm is developed using the characteristics of the radar to optimally select the best suited observables. Finally, an entirely different approach on ML detection is made. Some first steps will be set in using image processing techniques to identify the ML or to improve the detection probability of the previously mentioned methods.

After the algorithms are developed, a measure of detection quality will be investigated to be able to analyse the detection performance of the algorithms.

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