Using the correlation RHO_LDR between the co and cross channel for target classification of cloud radar data

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Most cloud radars are operating in LDR mode and use only the power spectra from the co and cross polarized signals. The linear depolarization ratio (LDR) calculated from the averaged power spectra is very useful for removing non-meteorological targets (plankton and ground clutter) from the cloud radar data. In some cases it is not possible to distinguish melting ice and plankton as both have similar LDR values. For weather radars operated in STSR mode (simultaneous transmit and simultaneous receive) the product of the complex spectrum of the H-channel and the complex conjugate spectrum of the V-channel is commonly calculated for deducing the H-V-correlation RHO_HV and differential phase DPS_HV. These parameters have been calculated for a cloud radar operated in LDR mode during several months. It has turned out that RHO_LDR gained from this procedure is very useful additional parameter for making an unambiguous distinction between melting ice and plankton.

The distinction between melting ice and plankton is especially difficult if the cloud radar is used for fog detection, as in the layer close to the ground the signal may be contaminated by plankton even if it is too cold for insects to fly. Algorithms using the new parameter RHO_LDR for automatic cleaning of the fog data are developed within the TeFiS project, which is funded by the German government. This work is also done in cooperation with ITARS funded by the EU.