



## **Assessment of crop damage and hail risk based on radar hail signature information**

Satyanarayana Tani, Helmut Paulitsch, Reinhard Teschl, and Barbara Süsser-Rechberger

Institute of Microwave and Photonic Engineering, Graz University of Technology, Graz, Austria  
(satyanarayana.tani@tugraz.at)

Hail storm damage is a major concern to the farmers in the province of Styria, Austria. Each year severe hail storms are causing damages to crops, resulting in losses of millions of euros. High spatiotemporal resolution data are essential to properly assess crop damage information for the insurance sector and also for the better risk assessment. Radar data offer high spatial and temporal resolutions, resulting in very promising option for crop damage assessment and hail risk analysis. This study focuses on the combined analysis of hail signature information from radar and ground measurements for crop hail damage assessment. The days with the high crop hail damage claims were selected for the investigation. Total 16 hail days were assigned to examine the relation between radar-derived products and damages produced by hail in Styria during 2015. 3D single polarization C-band weather radar data and radiosonde freezing level data were used to derive hail kinetic energy flux as well as flux integrated over the whole event. Hail events from ESWD (European Severe Weather Database) and crop damage reports from the Austrian Hail Insurance System were allotted for validation. The spatial distribution maps of total hail kinetic energy were developed to capture the swath and intensity of the hail storms to identify potential hail damage areas. The results show that in most cases radar-based hail signature information well corresponds to the areas where hail events and damage footprints were reported. The radar-based hail signature information is a useful detection option for the assessment of crop damage and hail risk.