

Image processing for weather radar data correction for aeronautical meteorology.

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Digital image processing methods can be well applied to weather radar data. The spectrum of application reaches from visualization, modification, feature tracking and extrapolation, detection and correction of spurious signals within weather radar images and data fusion to other meteorological remote sensing sensors. As temporal and spatial high resolution weather radar data are used extensively for nowcasting and warnings like aeronautical meteorology, the quality and reliability highly depends on processing and correction of these data.

Digital image algorithms are able to cope with the high variety of artefact appearance and allow for reliable detection of artefacts and uncovered zones within radar images. In Austria, there is a strong increase of spurious signals on low land weather radars mainly due to RLAN signals. The detection of artefacts by means of texture analysis and pattern recognition based on geometric features and trend analysis show reliable results for removal of radial and spherical artefacts. To increase the detection performance the algorithms can be applied to two and three dimensional data.

The benefit of these methods without the ability of dual polarization is shown as well as statistics of RLAN signals, which can be presented to national radio agencies. For correction of blocking areas, additional satellite data are combined by applying pattern recognition and classification approaches to fill the gap areas of radar data. Additional automatic signature identification of different dangerous storm structures is investigated.