



remote sensing



Special Issue Reprint

Processing and Application of Weather Radar Data

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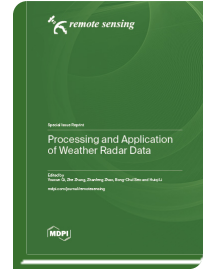
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Today, weather radar technology plays a pivotal role in severe weather detection. This reprint explores advancements in radar signal processing, including attenuation correction, deep learning models for missing data completion, and optimization techniques for sidelobe suppression in strong convection. Studies on raindrop size distribution (DSD) examine spatial variability and its impact on quantitative precipitation estimation (QPE), featuring evaluations of dual-polarization radar performance under different wavelengths and rainfall conditions. A microphysics analysis compares convective and stratiform precipitation, while aircraft observations provide insights into cloud microphysics. In weather forecasting, blending techniques combining radar extrapolation, numerical models, and machine learning improve heavy precipitation predictions. Deep learning approaches like the Spatial Variability Representation Enhancement loss function and Attentional Generative Adversarial Network address spatial inaccuracies in nowcasting. Multiscale representation integrates atmospheric data from models and satellites to enhance small-scale weather pattern detection. Precipitation forecasting benefits from bias correction methods like MPTT-QM and nonlinear grid transformation for convective echo extrapolation.



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