**Title**

Precipitation Nowcasting using a Generative Adversarial Network

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**Abstract**

Nowcasting high-intensity precipitation is crucial for emergency services and municipalities when making weather-dependent decisions. This research implements and trains a deep generative model for nowcasting using a cleaned precipitation radar composite dataset spanning 15 years, with a 5-minute temporal and 1 km spatial resolution.

We propose and apply a method for speckle-like clutter removal to enhance data quality, particularly for high-intensity precipitation rates. The deep generative model is trained with two data sampling strategies to balance the data and improve the accuracy of high-intensity precipitation forecasts. Model performance is evaluated using several standard metrics, and we propose an adaptation to one metric to quantify a score to peak anticipation time in precipitation nowcasting. We also compare our model's performance with a state-of-the-art deterministic Lagrangian extrapolation-based nowcasting system.

Our results show that the proposed data quality improvement method effectively removes certain errors from historical radar data. Although the deep generative model currently scores low on the standard metrics, the model trained with a focus on high-intensity precipitation shows an improved score to peak anticipation time. Both deep generative models exhibit less blurring compared to the state-of-the-art model and, in some cases, perform similarly or outperform it.