

# Radar-Based Rainfall Nowcasting based on Deep Learning over Southern China

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Precipitation is a critical component of hydrological circle and water resource. It has complex formation process and is difficult to be predicted. Accurate forecasting precipitation is very important for the government and the public in decision making. Usually, weather nowcasting is conducted based on linear extrapolation of radar observations. Up to date, many methods have been developed for precipitation nowcasting. These methods include data assimilation and deep learning based on artificial neural network (ANN). Recently, deep learning algorithm gets more and more attentions and were applied successfully in a lot of sectors like pilotless driving and face recognition. Many meteorologists are working on how to make use of deep learning to do precipitation nowcasting. This study utilizes the latest deep learning algorithm, i.e. Convolutional Long Short Term Memory (ConvLSTM) neural network structural to conduct short-term (1-2 hour) precipitation forecast based on radar observations over Nanning in southern China. The radar observation data collected from August of 2018 to July of 2019 were used as training dataset, and the data in August of 2019 were input into the model to do nowcasting. Nowcasting results were compared to the radar observations with commonly-used statistics metrics. These metrics includes Probability Of Detection (POD), False Alarm Ratio (FAR), Critical Success Index (CSI). This study is expected to show the potentials of deep learning algorithm in precipitation nowcasting in southern China.

Keywords: precipitation nowcasting, deep learning