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Deep Learning for Precipitation Estimation from Satellite and Rain Gauges Measurements

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In the coming years, Artificial Intelligence (AI), for which Deep Learning (DL) is an essential component, is expected to transform society in a way that is compared to the introduction of electricity or the introduction of the internet. The high expectations are founded on the many impressive results of recent DL studies for AI tasks (e.g. computer vision, text translation, image or text generation...). Also for weather and climate observations, a large potential for AI application exists.

We present the results of the recent paper [Moraux et al, 2019], which is one of the first demonstrations of the application of cutting edge deep learning techniques to a practical weather observation problem. We developed a multiscale encoder-decoder convolutional neural network using the three most relevant SEVIRI/MSG spectral images at 8.7, 10.8 and 12.0 micron and in situ rain gauge measurements as input. The network is trained to reproduce precipitation measured by rain gauges in Belgium, the Netherlands and Germany. Precipitating pixels are detected with a POD of 0.75 and a FAR of 0.3. Instantaneous precipitation rate is estimated with a RMSE of 1.6 mm/h.

Reference:

[Moraux et al, 2019] Moraux, A.; Dewitte, S.; Cornelis, B.; Munteanu, A. Deep Learning for Precipitation Estimation from Satellite and Rain Gauges Measurements. *Remote Sens.* **2019**, *11*, 2463.