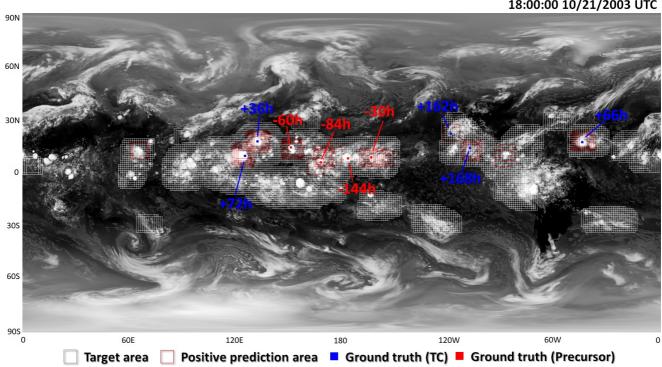# Deep Learning Approach for Detecting Precursors of Tropical Cyclone Simulated by a Global Nonhydrostatic Atmospheric Model

*松岡 大祐[1,2]、中野 満寿男[1]、杉山 大祐[1]、内田 誠一[3]

*Daisuke Matsuoka[1,2], Masuo Nakano[1], Daisuke Sugiyama[1], Seiichi Uchida[3]

1. 国立研究開発法人海洋研究開発機構、2. 国立研究開発法人科学技術振興機構、3. 九州大学
1. Japan Agency for Marine-Earth Science and Technology, 2. Japan Science and Technoloy Agency, 3. Kyushu University

In recent years, deep learning, one of the machine learning methods based on neural networks, has been applying to image pattern recognition. In the present study, we investigate the probability of predicting Tropical Cyclones (TCs) 14 days prior from long-term global atmospheric simulation data (only Outgoing Longwave Radiation) using deep convolutional neural networks (CNNs). Our deep CNNs train 50,000 TC data including its precursor and 500,000 not TC data (center of low pressure) generated by TC tracking algorithm. As a result, we succeeded in predicting the precursors of TCs seven and 14 days before their formation with a Recall of 92.0%. Although seasonal and spatial predictability of precursor of TCs are strongly correlated with the number of training data, in some seas and/or seasons, high accuracy is obtained despite the small amount of training data.

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