Kudo, A., 2022: Statistical post-processing for gridded temperature prediction using encoder–decoder-based deep convolutional neural networks. *J. Meteor. Soc. Japan*, **100**, 219-232.
https://doi.org/10.2151/jmsj.2022-011

**Plain Language Summary:** In this study, an encoder–decoder-based convolutional neural network (CNN) has been proposed to predict gridded temperatures at the surface around the Kanto region in Japan. Verification results showed that the proposed model greatly improves the Japan Meteorological Agency's (JMA's) operational gridded temperature guidance and can correct NWP model biases, such as a positional error of coastal fronts (Fig. 1) and extreme temperatures.

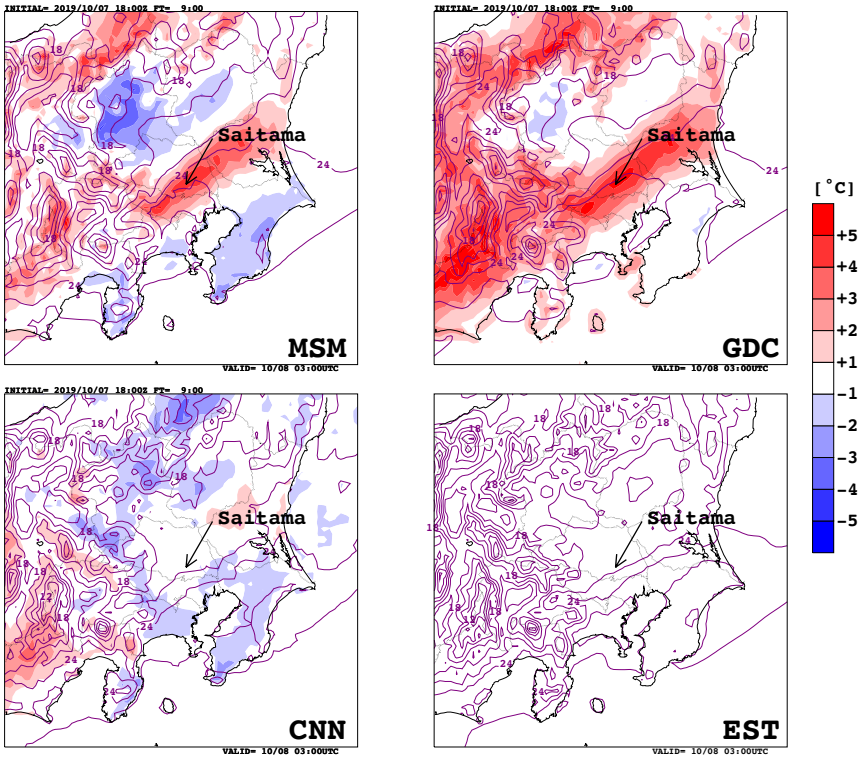


Figure 1. A case of temperature prediction associated with a coastal front. Temperature forecast (contours) at 03 UTC on 8 October 2019, by the operational meso-scale model (MSM, upper left), the operational gridded temperature guidance (GDC, upper right), and the CNN model (lower left) initialized at 18 UTC on 7 October 2019. The lower right is the estimated weather distribution (EST) surface temperature at 03 UTC on 8 October 2019. The color shades indicate the difference between the predicted and estimated temperatures.

- Seven-layer deep CNN model, which inputs seven MSM output variables, was used to predict 2-dimensional temperature field around the Kanto region.
- Verification results using an independent dataset from training and validation datasets showed that the proposed CNN model greatly improved the JMA's operational gridded temperature guidance.
- The CNN model can predict temperatures associated with radiative cooling, coastal fronts, and heatwaves, which have been difficult to correct using the operational temperature guidance.