

## Influences of the Kuroshio path variation south of Honshu on summer surface air temperature in Kanto district, Japan

\*Shusaku Sugimoto<sup>1</sup>

1. Graduate School of Science, Tohoku University

In the Kuroshio and its extension (KE), the warm surface waters compared to the surrounding waters enhance upward heat release in winter, indicating that the ocean affects the atmosphere. On the other hand, in summer, atmospheric response to the Kuroshio/KE remains unclear because of a small difference between sea surface temperature (SST) and surface air temperature (SAT) over the Kuroshio/KE and of its-associated weak SST gradient. Here we investigated summertime (June-August) SST variations south of Japan, using high spatial resolution satellite-derived measurements of 2003–2018. The result showed that the variation is dominant in the region off Kanto-Tokai district, which was related to the Kuroshio path state; the SST increases off Kanto-Tokai district when the Kuroshio takes the meander path, which would reflect the following two points. In the meander period, (1) the Kuroshio shifted southward around Cape Shionomisaki, moves to the north around the Izu Islands, and then reaches very close to south coast of Kanto district, and (2) westward warm flow, which is a flow on the north edge of the anticlockwise eddy north of the Kuroshio, runs very close to the south coast of Tokai district. To reveal the extent to which the warm surface waters off Kanto-Tokai district influence the atmospheric fields, we conducted regional atmospheric model experiments using the high-resolution Japan Meteorological Agency nonhydrostatic model (JMA-NHM) with 5 km horizontal grid spacing. The experiment showed that, over the warm surface waters, evaporation increased considerably, and the northward water vapor transport by low-level wind caused an increase of moisture in Kanto district. The warm-water-induced moisture increase enhances downward longwave radiation at the surface in Kanto district, leading to the SAT increase. Actually, the SST off Kanto-Tokai district is significantly correlated with the SAT in Kanto district, from the Automated Meteorological Data Acquisition System (AMeDAS) of the Japan Meteorological Agency. Our results indicate that, in summer, the Kuroshio path state (meander or straight path) affect the overlying atmosphere and climate on Japan.

Keywords: Kuroshio meander path, SST off Kanto-Tokai district, SAT in Kanto district, Regional atmospheric model experiment