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## Influence of Drag Coefficient for Tropical Cyclone Intensification by Numerical Simulations.

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A project "Moonshot Goal 8" was established to study the possible weakening of typhoon intensity due to artificial interventions supported by Japan Science and Technology Agency. One of our measures is to increase the sea surface drag near typhoons by using obstacles such as large ships.

The maximum potential intensity theory suggests that the equilibrium intensity decreases as the surface drag coefficient increases.

Still, few numerical studies tested it for real tropical cyclones (TCs). Some studies used fine-resolution simulations (e.g., with a sub-kilometer grid) to agree with the theoretical indication, but the number of cases is limited by calculation resources. Also, no studies have been conducted to elucidate the effect of surface drag coefficient change in a limited oceanic region.

Therefore, we aim to conduct a comprehensive study on how TC would react to surface drag change over limited regions that can be set in various ways. Now, we focused on the intensification of Typhoon Faxai in 2019 and conducted sensitivity experiments by changing the drag coefficient ( $C_D$ ) over the circle area around it. In this study, we ran the Scalable Computing for Advanced Library and Environment (SCALE) at a coarse horizontal resolution of 5 km. The resultant central pressure and maximum 10m wind speed were sensitive to  $C_D$ , especially for the value. These were reduced almost linearly and weakened by about 60% of the control run (CTL) when  $C_D$  was set to 3.0 times that in CTL. Additionally, the results of the sensitivity to a radius of changing  $C_D$  area showed that maximum wind speed during the mature stage has remained unchanged when over 100 km radius area changed.

We will conduct further studies until the meeting.