Tamura, K., and T. Sato, 2020: Responses of polar mesocyclone genesis to topographic forcing along the eastern coast of Eurasian continent. J. Meteor. Soc. Japan, 98, 1261-1277. https://doi.org/10.2151/jmsj.2020-065.

Plain Language Summary: Polar mesocyclones (PMCs) genesis over the offshore west of Hokkaido is affected by the mountains at the eastern end of the Eurasian continent. In the experiment without the mountains, strong westerly from the continent blow over the southern part of offshore west of Hokkaido. Consequently, PMCs tend to make landfall earlier and before reaching maturity. In contrast, the low-level wind over the Strait of Tartary prior to PMC genesis is unaffected by the removal of the mountains. Thus, topographic effects are not important for PMC genesis in this region.

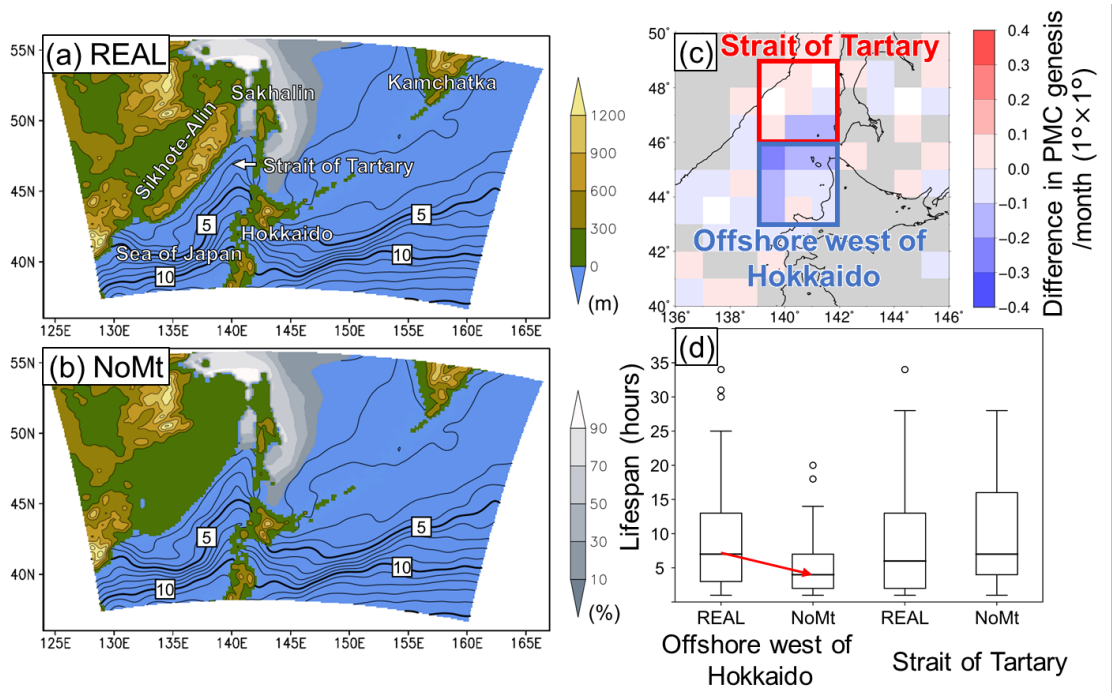

Figure 1. Topography, sea surface temperature, and distribution of sea ice concentration around Hokkaido in the numerical simulations for realistic (a) and without mountains (b) settings. Difference in the distribution of PMC genesis between the NoMt and REAL experiments (NoMt – REAL) in January (c). The lifespans of the PMC, defined as the duration between PMC genesis and landfall (d) for each experiment and region.

- Long-term numerical simulations extending over 36 winter seasons are performed to examine the topographic effects on various types of PMCs.
- The mountainous topography over the eastern end of the Eurasian continent has a role to weaken the low-level westerly over the offshore west of Hokkaido, which promotes the genesis of matured PMCs by extending the duration that they develop over the sea.
- This paper revealed that the responses of PMCs to topographic forcing has a regional variability.