Inatsu, M., H. Suzuki, and M. Kajino, 2019: Relative risk assessment for hypothetical radioactivity emission at a snow climate site. *J. Meteor. Soc. Japan*, **97**, http://doi.org/10.2151/jmsj.2019-010.

Plain Language Summary: We assessed relative risk for hypothetical radioactivity emission from the Tomari Nuclear Power Plant in Hokkaido, Japan. With a brand-new risk evaluation method, we found that the risk was higher in the eastern part of the target area owing to the westerly flow.

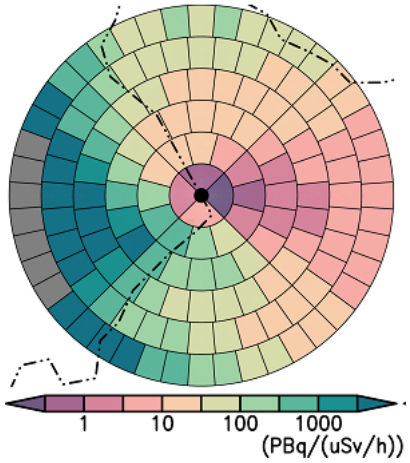

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Figure 1. Median of the ratio of total ^{137}Cs emission amount to the maximum effective dose rate criterion (E/C ratio). The units are PBq $(\mu Sv\ h^{-1})^{-1}$. The shading is as per the reference in the bottom and grey shading means that no total deposition days exceed half of the total.

- A set of atmospheric dispersion-deposition model integrations was conducted with a hypothetical emission of radioactive materials consisting of ^{137}Cs, ^{131}I, and ^{134}Cs from the Tomari Nuclear Power Plant in Hokkaido, Japan, which is a snow climate site. Each integration was driven by Japan Meteorological Agency's meso-scale model analysis data with 5-km horizontal resolution. The initial conditions were those on each day from January 2010 to December 2016 and the integration period was at most 4 days. The target was the area within 30 km of the plant.
- Extending a unit-mass emission concept, the measure of relative risk is the probability of exceeding the threshold of the maximum effective dose rate based only on exposure from groundshine. Considering that the measure increased monotonically with the ratio of the total emission amount to the threshold, we evaluated the probabilistic risk with its median.
- Figure 1 suggested that the risk was higher in the eastern part of the target area owing to the prevailing westerly flow.
- The frequent snowfall in winter drags radioactive materials down in the target region, even under an active turbulent condition with strong vertical shear.
- The composite analysis of wind direction averaged over the target area revealed that the risk was high in the leeside, but that mountains effectively blocked the inflow of the radioactive materials.