**Introduction**
Blowing snow is a phenomenon that strong wind resuspends surface snow particles or blows snowfall particles. Blowing snow in road often causes poor visibility and these situations have risks for traffic accidents. Some blowing-snow prediction systems operated in Japan use weather forecast data with 5-km grid mesh. However, blowing snow is caused by background wind, mostly turbulent surface flow under the boundary layer. We found a large scale gap between the resolution of weather forecast data in conventional blowing snow prediction system and the scale of blowing snow development. This study aims to diagnose blowing-snow potential with 1-km resolution dynamically downscaled (DDS) data and find an add value of DDS data.

**Data & Methods**

**DDS**
- **Original data**
  - Mesoscale Model (MSM) analysis provided by the Japan Meteorological Agency
- **Time interval** 3 hourly
- **Resolution** 5 km
- **Model configuration**
  - Horizontal grid mesh: 90 × 90
  - Vertical layers: 32 layers (model top: 19,981 m)
  - Integration time: 72 hours
  - Resolution: 1 km
  - Domain: 141.0° E - 141.8° E by 42.7° N - 43.4° N

**Snow concentration**

\[
n(z) = \frac{P}{w_f} + \left( \frac{n_1 - P}{w_f} \right) \left( \frac{z}{z_0} \right)^{-\frac{w_f}{\nu_w}}
\]

\[
U_* = \frac{kU(10)}{\ln(10/z_0)}
\]

**Visibility**

\[
\log(vis) = -0.773 \cdot \log(n(z) \cdot U(z)) + 2.845
\]

**Results**

1. **Comparison with observation**
   - The DDS reproduced an increase of the wind speed after 0000 UTC on 1 Feb, whereas the MSM analysis provided a rather constant wind.
   - Based on DDS data, the snow concentration increased on almost all grids in the three hours just before expressway closing.
   - Visibility based on DDS data and based on observation data became low rapidly, about 100-500 m visibility, at 0000 UTC. This time was just after closing expressways around Ebetsu.

2. **Snow concentration**

3. **Visibility**

**Summary**
- We have estimated snow concentration and visibility based on the dynamically downscaled data with 1-km resolution.
- The temporal variation of blowing snow could be diagnosed based on the DDS data.
- In contrast, the blowing snow potential with the meso-scale model analysis did not reproduce the blowing snow development.

**Case**
31 Jan 2019 - 1 Feb 2019
- Strong wind caused blowing snow around Sapporo in the morning on 1 Feb.
- Expressway between Sapporo and Ebetsu had been closed from 2330 UTC on 31 Jan to 0410 UTC on 1 Feb.
- Traffic accidents had happened for low visibility in Ishikari city.


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