Sekiyama, T. T., M. Kunii, M. Kajino, and T. Shimbori, 2015: Horizontal resolution dependence of atmospheric simulations of the Fukushima nuclear accident using 15-km, 3-km, and 500-m grid models. *J. Meteor. Soc. Japan*, **93**, 49-64.
https://doi.org/10.2151/jmsj.2015-002

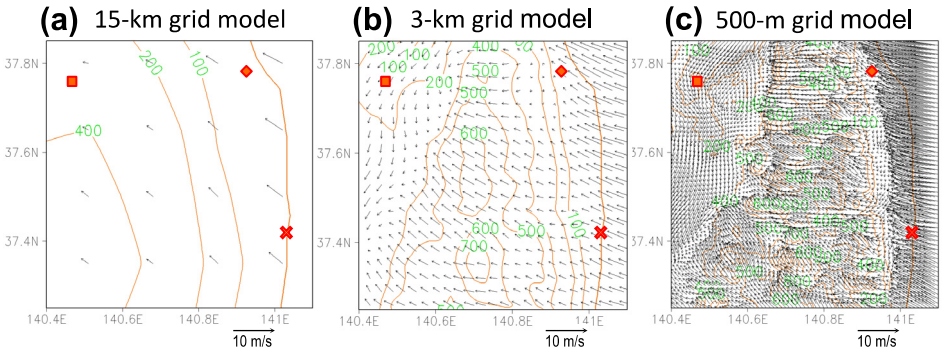

Figure 1. Surface wind in the northern area of the Abukuma Mountains, Fukushima, at 15:00 UTC 15 March 2011 simulated by the (a) 15-km grid model, (b) 3-km grid model, and (c) 500-m grid model. The orange lines depict the contours of altitude. The cross mark indicates the Fukushima Daiichi Nuclear Power Plant. The diamond (square) mark indicates Souma City (Fukushima City).

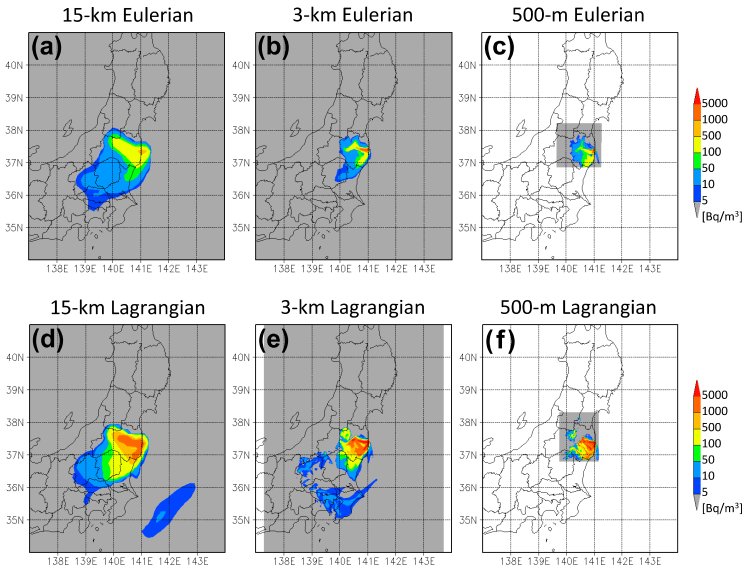

Figure 2. Daily averaged surface ^{137}Cs concentration on 15 March 2011 simulated by the Eulerian model with the (a) 15-km, (b) 3-km, and (c) 500-m grid meteorological analyses. The same as simulated by the Eulerian model but the Lagrangian model with the (d) 15-km, (e) 3-km, and (f) 500-m grid meteorological analyses.

- There was a large difference in the surface wind field between the 15-km grid resolution and the other (3-km and 500-m) grid resolutions. The 15-km grid model could not reproduce Fukushima's mountainous topography in detail (Fig. 1).
- The 15-km grid models could not represent the blockage of the ^{137}Cs plume, which unnaturally spread out through the Naka-dori valley. In contrast, the 3-km and 500-m grid models successfully replicated the blockage along the valley (Fig. 2).
- It is illogical to use low-resolution atmospheric models to assess the Fukushima nuclear accident when a regional analysis is needed. Meanwhile, it is reasonable to use a 3-km grid model instead of high-resolution models due to the similarities between the 3-km and 500-m grid simulations.