Supplement figures to “Detailed source term estimation of the atmospheric release for the Fukushima Daiichi Nuclear Power Station accident by coupling simulations of atmospheric dispersion model using improved deposition scheme and oceanic dispersion model”

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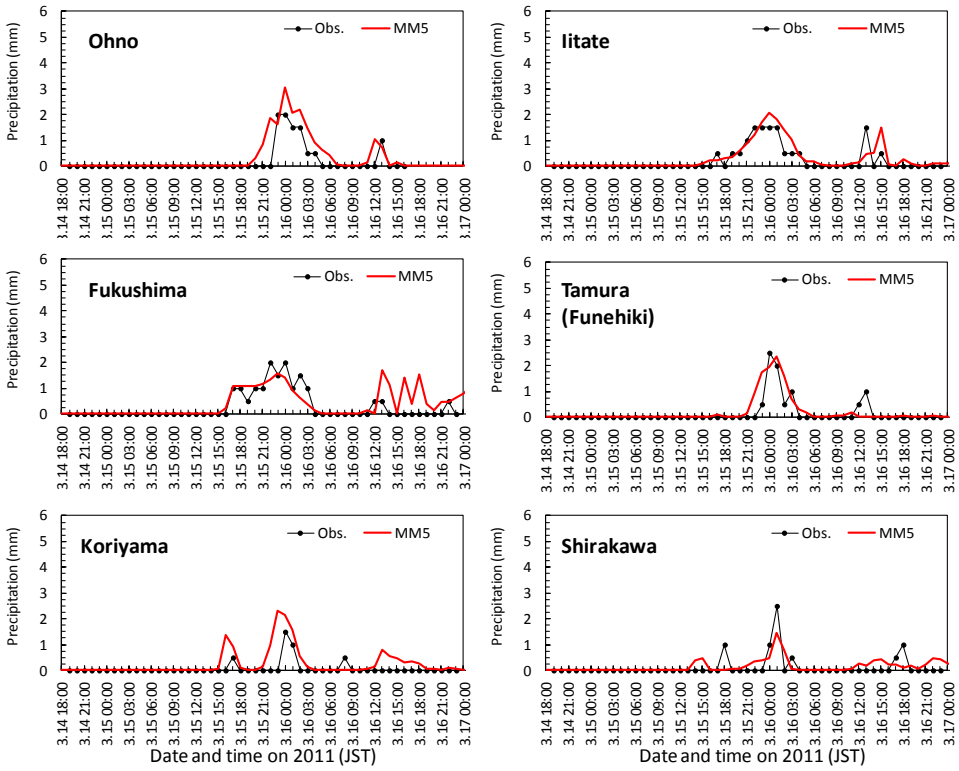


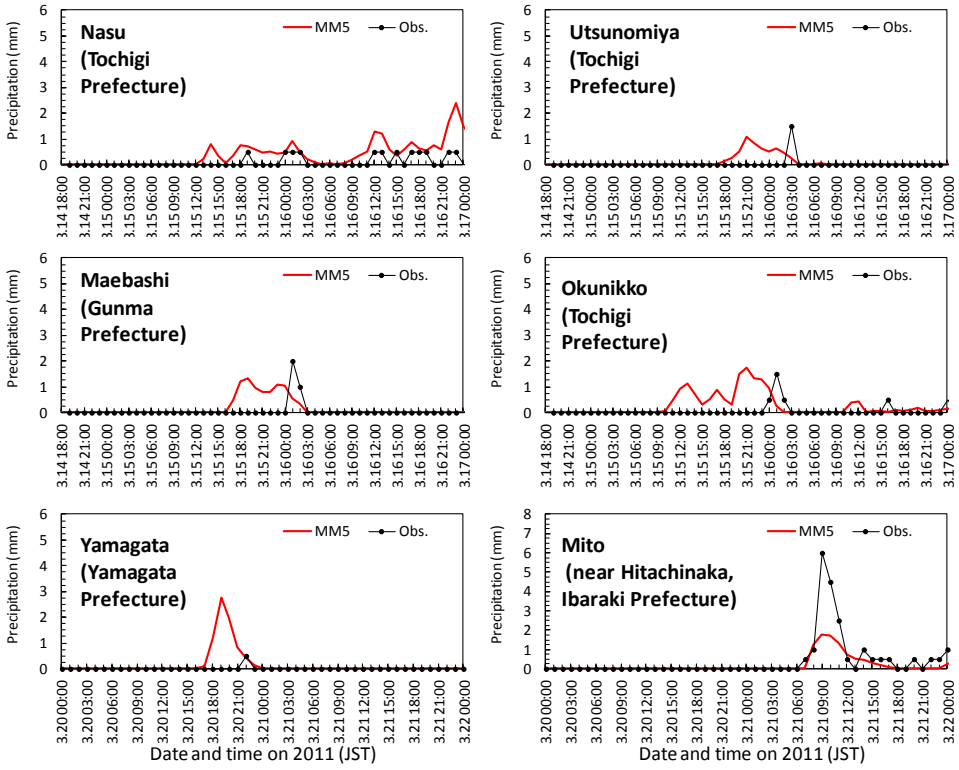


Figure S1. Temporal changes in calculated and observed meteorological variables in East Japan on March 2011 in the WSPEEDI simulation. Locations of the comparisons were selected in several prefectures for those sites with high dose rates (Figs. 3 and 4c).

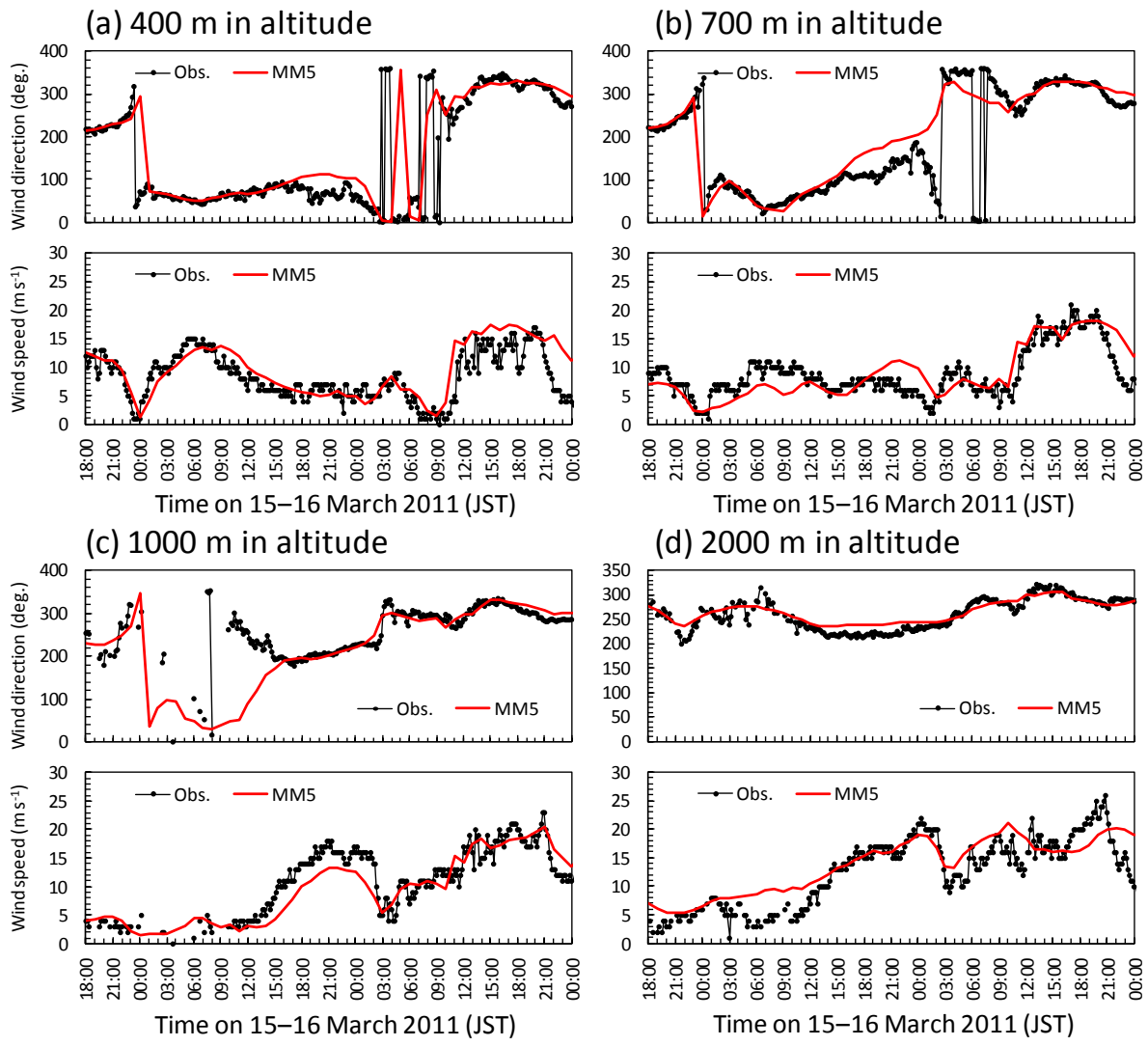
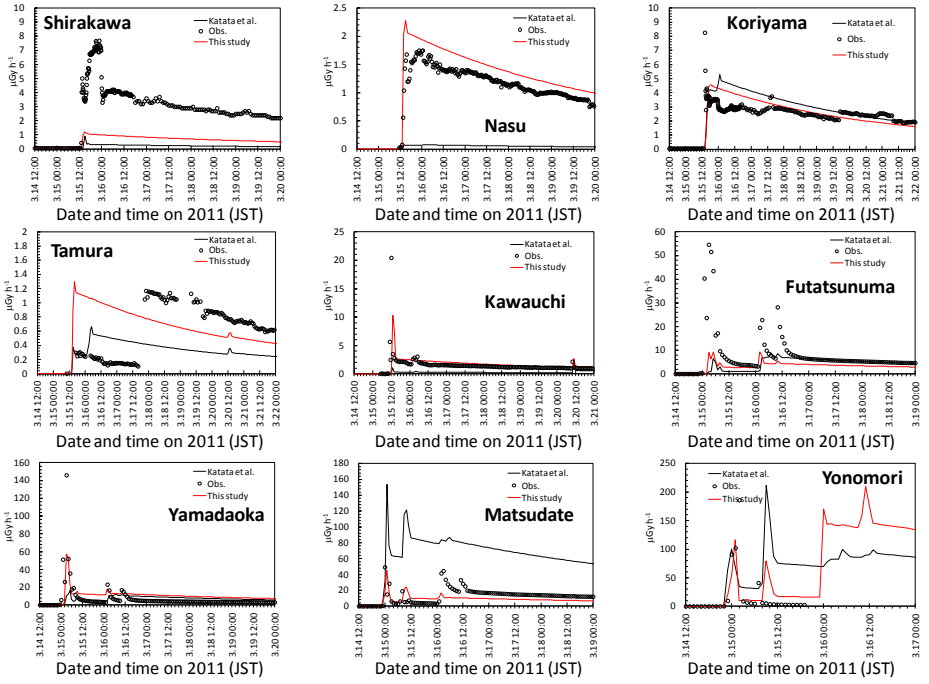


Figure S2. Temporal changes in the calculated and observed upper-air observations of wind and air temperature at (a) 400 m, (b)700 m, (c) 1000 m, and (d) 2000 m in altitude at Mito in Ibaraki Prefecture from 15–16 March 2011. The observational location is near the Hitachinaka fallout measurement site (No. 7) in Fig. 4c.



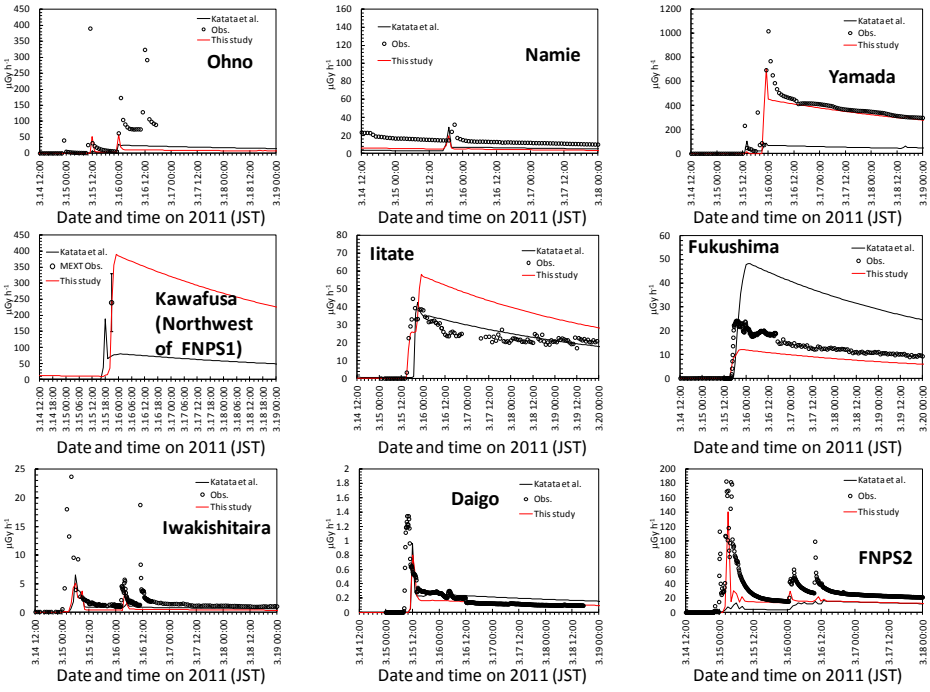
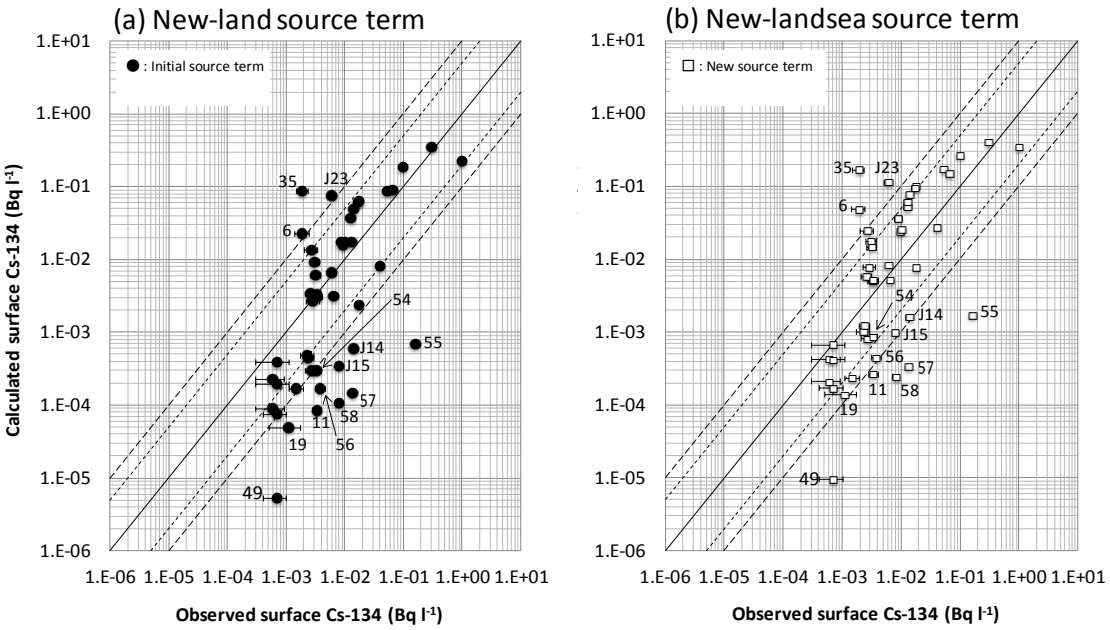


Figure S3. Temporal changes in the calculated and observed air dose rates in Fukushima on 15–16 March 2011in the WSPEEDI simulation (red thick lines) and Katata et al. (2012) (black thin lines). Locations of the monitoring points are shown in Fig. 3. The error bar with observational data at Kawafusa represents the range of values measured by Geiger-Mueller survey meters and ionization chambers at three locations from 20:40–20:50 on 15 March (MEXT, 2011).



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2 Figure S4. Scatter diagrams of ^{134}Cs sea surface concentration over the Pacific Ocean for
3 measured and calculated values using (a) the source term land data only (referred as "New-
4 land") and (b) both land and sea data (referred as "New-landsea").

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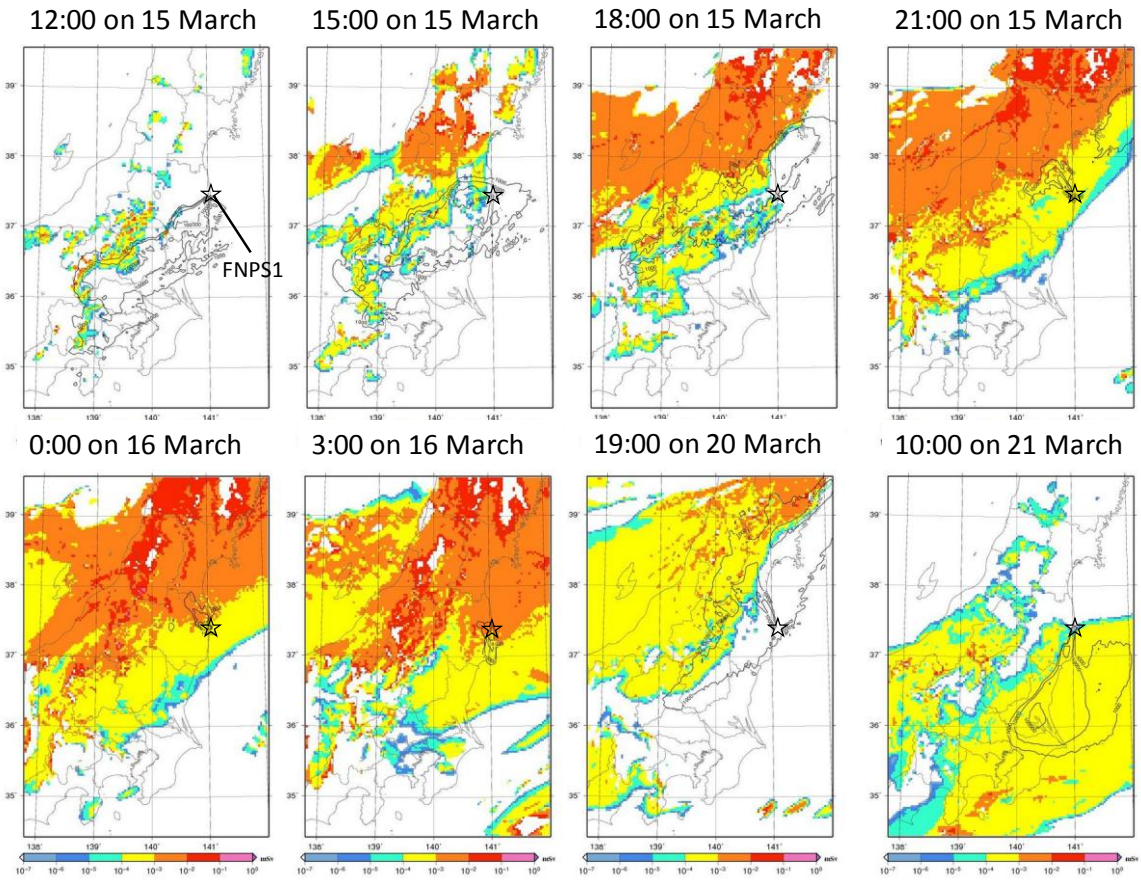

Figure S5. Spatial distributions of the scavenging coefficient, Λ (s^{-1}) calculated and observed meteorological variables in East Japan for 15–16, 20, and 21 March 2011 in the WSPEEDI simulation. Λ represents the vertical mean values for the atmospheric layers where the calculated ^{137}Cs concentration was greater than zero. The contour lines represent vertical accumulated concentration of ^{137}Cs.

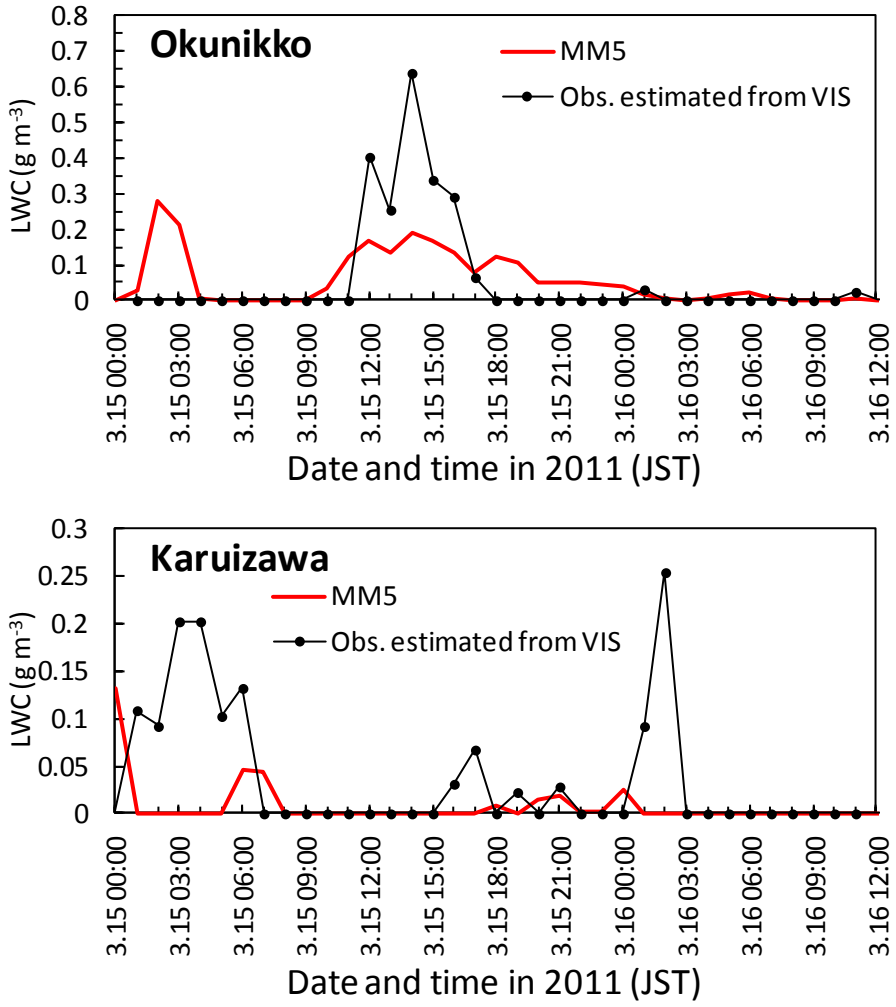

Figure S6. Temporal changes in the calculated and observed cloud liquid water content (CLW) near the surface at the meteorological surface station of Okunikko and Karuizawa in 15–16 March 2011. Locations of both stations are depicted in Fig. 27a. The observed CLW was derived from visibility (VIS) data using the empirical relationship between CLW and VIS proposed by Stoelinga and Warner (1999).

References

MEXT (Ministry of Education, Culture, Sports, Science and Technology): Results of Air Dose Rate Monitoring around the Fukushima Dai-ichi and Dai-ni Nuclear Power Stations by Using Monitoring Cars of the Ministry of Education, Culture, Sports, Science and Technology, http://radioactivity.nsr.go.jp/en/contents/3000/2417/24/1306873_031601.pdf, 2011 (last access: 25 April 2014)

Stoelinga, M.T., and Warner, T.T.: Nonhydrostatic, mesobeta-scale model simulations of cloud ceiling and visibility for an east coast winter precipitation event. J. Appl. Meteorol., 38, 385-404, 1999.