

This revised manuscript has been greatly improved. The target of this paper (EC and sulfate) is clearly defined. An additional simulation, NICAM-g6, helps to show advantages of the stretched grid system. Comparisons with WRF-CMAQ are useful to see effects of different model types. Statistical parameters shows the model performance quantitatively. All the figures have been much improved. A controversial part including health impacts has been eliminated. Now all the reviewer's comments have been addressed.

I felt that the former manuscript exaggerated the model performance without any confidence. Now the description of this revised manuscript is based on concrete reasons. It also clearly and honestly indicates limitations of this model.

I still have comments on this revised manuscript. I recommend that this paper is published after all the following comments have been addressed.

Specific comments:

Line 39

What kind of the underestimation is caused by what kind of the underestimation in China?

Line 46 and others

What kind of a variation is intended to be shown by the word "weekly variation"? It may imply a typical variation from Sunday to Saturday due to human activities. Please reconsider the word.

Line 120 and Line 306

I think it is not necessary to mention the model inter-comparison here in the context of this paper.

Line 189

What does "current study" mean here?

Line 253

Takemura et al., 2002a -> Takemura et al., 2002

Line 274

Is "one-hour" accurate?

Line 299

Are these cloud and precipitation schemes used in NICAM-g6str too? If so, these description should be included in the section 2.1.

Line 376

Arakane et al., 2013 -> Arakane et al., 2014

Line 380

Is MSL Mean Sea Level? What is “for the model bottom of MSL”?

Line 388

This sentence is confusing. Why is NICAM-g6str higher than NICAM-g6 because the spatial resolution in NICAM-g6str is finer than that in NCEP-FNL?

Line 389

larger -> higher?

Line 394

Does it mean that the stretched grid system does not affect the general circulations and only affects fields around complex topography?

Line 397

Aerosol concentrations should not be six-hourly “instant” values.

Line 406

NICAM-g6-simulated -> NICAM-g6str-simulated?

Line 469

NICAM-g6-str -> NICAM-g6str

Line 480

NICAM-g6str reproduces with a large uncertainty?? What does it mean?

Line 561

NICAM-g6str at Tsukuba -> NICAM-g6 at Tsukuba

Line 567

I do not understand why reasons for August 12 and 14 can be assumed like this. How about a plume from volcanoes? A plume from volcanoes sometimes causes a high peak, and models sometimes fail to simulate its exact path. I think it can be checked in simulated results.

Line 581

Japanese areas are not shown in Figures 14 and 15 for EC.

Line 598

An evaluation of the prescribed oxidants should be able to be done by sensitivity analyses described in the next section 3.2.

Line 608

Only dry deposition? What about wet deposition?

Line 617

The doubled amount of SO₂ emissions can overcome the slight underestimation of the

simulated sulfate compared with the observations. Therefore, the emission inventories of SO₂ should be improved for the better simulation of the sulfate. On the other hand, the results obtained by the sensitivity experiments of twice strength remain underestimated compared with the measurements. Then, what is a possible solution? Do following sentences are also indicating the emission inventories should be improved?

Line 644

How about effects of prescribed oxidants on hourly variations in this sensitivity analyses? The sentence in Line 537 has implied that prescribed oxidants cause the discrepancy of the hourly variations.

Line 654

An explanation of different Y-axes for observed and simulated values in Figure 17 should be added here, too.

Line 661

What is expected to show here by using the ratios of daytime and nighttime?

References

Following references do not appear in the main text.

Carmichael et al., 2009

Chung et al., 2009

Koch et al., 2007

Lamarque et al., 2010

Moss et al., 2010

Ueda et al., 2009

Watanabe et al., 2010

Figure 1

Where are 2 Sites (LIDAR measurements)? I could not find them in this figure.

Figure 14

It is better to insert R and Br within this figure.

Figure 15

A range of the color bar for SO₂ should be changed to see gradients more clearly.