Second review of

"Contributions of Nordic anthropogenic emissions on 1 air pollution and premature mortality over the Nordic region and the Arctic" by Im et al.

The authors have adequately addressed most issues raised in the first review, however there are still a number of inaccuracies and errors to be corrected.

Major issue:

Fig. 4 shows clearly the contribution of seasalt as a major PM2.5 component. Obviously, this contribution is not part of the considered anthropogenic sectors and cannot be regulated. It is not clear from the manuscript if the large 'Rest' contribution in Fig. 5 includes seasalt, or if only anthropogenic sectors are considered. This should be made clear in the text, and if seasalt is indeed included in Fig. 5, it sheds a different light on the 'external' contribution to PM2.5 and on the potential of Nordic versus external air quality control measures.

Minor comments:

L63: originating from south-western Europe

L. 96 – 97: The EU limit level for annual mean PM2.5 is 25µg/m³ (not 40). The WHO limit value is 10µg/m³ (not 20).

Section 2.1: Please mention whether residual water is included in the modelled PM2.5 mass or if it is dry PM2.5 (monitoring stations determine the mass at a standard RH of 50% which in theory would dry pure ammonium salts, however in reality the more complex chemical mixture retains some water).

Is there a difference between SO2 (table 1) and SOx (Figure 1)?

Section 2.2 (health impacts):

L217: c should be δc

L236: (Andersen, 2008) is missing in References

R in the equation (L216) should be specified as mortality rate or life years lost (per population); I don't see how it could represent 'days' or 'episodes'. The alpha values in Table 2 unit is cases/µgm-3/population (maybe it's more clear if the values are multiplied with a scaling factor 1E6 and expressed as cases/µgm-3/million population

I think SOMO35 should not be in the alpha formula in Table 2 (in the case of O3, SOMO35 = δc in the R equation).

Infant mortality: should be < 9 months instead of > 9 months in Table 2.

In this section, long-term health impact from PM is expressed in YOLL, however in Table 5 they are presented as number of premature deaths. Please make this consistent.

Section 3.1 (Evaluation): the authors did not address the request to include as well mean concentrations for O3 and PM2.5 in Table 4. Some values are given in the text in L357 – 359. This should be moved to the validation section and preferably introduced in the table. Same for model results for O3 (and NO2 and SO2 in the SI).

L311: where the overestimations are higher => where values are overestimated

L312: die to => due to

L 316-317 “Differences … can be attributed to … “ : basically repeats what was written in L315.

Section 3.2:

L371: downwind => upwind (also in L602)

L485: leads => lead

Figure 11: please include country borders

L537: is almost responsible for => is responsible for almost

Table 5 and 6: What are the values in brackets? Describe in the caption. Presumably confidence intervals? Based on what? It’s hard to believe that the model can predict mortalities with a 2% accuracy!