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Comment

## ***Interactive comment on “Introduction to the European Monitoring and Evaluation Programme (EMEP) and observed atmospheric composition change during 1972–2009” by K. Tørseth et al.***

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This is a valuable paper as it summarizes the trends and levels in the observed concentrations of all the chemical compounds included in the EMEP-programme since its inception around 1972 and to the present time (2009). It thus covers 4 decades of atmospheric measurements on a European scale at observational sites selected to represent regional rather than urban or suburban pollution levels, and the observations were made through times with very significant changes in emissions.

I think the paper should be published with minor revisions, and I suggest the authors consider some of the following general comments in revising the paper, as it may im-

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prove its message and information value.

1. The paper reviews observations taken over four decades, but the references are largely from the last decade. As the paper covers all the observational evidence from the whole programme period, the paper would gain from following the basic rules of referencing. The paper describing an original or basic result for the first time, should be referenced. Many of the older and original papers even have co-authors from NILU. For instance on p 10 line 13, sulphur and nitrogen deposition causing acidification and eutrophication is supported by references from 2006-2011. And the large reductions in emissions in Europe in the 1990s (p 14, line 7) is supported by references from 2004 and 2007. The paper would become more of a "legacy"-paper if the original papers were better referenced. 2. The reasoning behind the spatial and temporal representativity and averaging of EMEP observations is presented only superficially (eg page 4). It could be argued more stringently why 24h averaging was used in the acidification and eutrophication work. I also miss a somewhat more thorough discussion of the question of representativity of sites; the spatial covariance around a measurement point, etc. It is true that "Still the number of monitoring sites in Eastern Europe is inadequate" (p 11 line 6-7), but this is a statement that could be better qualified. The EMEP monitoring strategy contains sentences with more information content than is provided here.

3. There is a hierarchy of good regional observational networks in atmospheric chemistry worldwide, and I think the EMEP network ranks in the top because of its duration, maturity in terms of substances covered and reasoning behind it (the EMEP monitoring strategy and its link to the EMEP strategy), its governance (through CLRTAP with eg TFMM, TFIAM, TFRN, TFIAM, WGSR; SB and EB), and not least, due to its manual (SOP) for observations, and top-down quality control of the observational data including laboratory intercomparisons and field intercomparisons, all documented through EMEP reports that are reviewed and taken note of by the relevant parts of the EMEP-structure. EMEP is a primary observational programme. It is set up, funded and operated on its own. The regional networks of GAW would be nonexistent without networks

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like EMEP, as GAW is not a primary network. Therefore EMEP is on the top of the hierarchy. In my view the text on pp 4, 7-8 could be strengthened to show that EMEP actually stands out from the other networks, and in many cases is seen as a model for the others.

4. Should "critical load" be defined? (p 13, line 1).
5. Harwell in the UK measured TSP at least from early 1970s (p 18 line 3).
6. Ozone site representativity could be discussed better than is the case on p 25, line 20.
7. The nature of the observations used in the EEA ozone assessment (p 25 line 10) needs to be discussed. Are rural and urban/suburban observations from Airbase combined, or are the data "stratified" to detect trends in the larger spatial scale?
8. The figure material includes some very useful new figures like Nos 1-3, 13, 16-18. The maps with the colored dots have been in use for a long time in EMEP publications, and one wonders if it is possible to enhance their information value by varying the size of the dot dependent on the representativity of the sites, for instance, or by some other innovation.

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