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Agenda Item	8 – Pollution Load Compilation
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Submitted by	Finland
Reference	8-4 Atmospheric supply of nitrogen to the Baltic Sea in the period 1990-2014

Background

HELCOM PRESSURE 5-2016 was invited to check the draft EMEP Draft Technical Report 1/2016, provide feedback, if any corrections are needed, and approve the document.

The technical report includes an unacceptable number of errors; comments are attached to this document. Finland has also provided comments directly to the Secretariat for the 8-4 draft fact sheets, which also included several errors.

The problem has persisted for a longer time and with previous reporting and feedback has been given also earlier. Finland wishes that EMEP reports would be proofread before submitting to HELCOM meetings.

Action requested

The Meeting is invited to

- take note of the comments and
- discuss the quality of EMEP reports and actions to improve the EMEP services.

Comments to EMEP draft technical report 1/2016

Chapter 0 (Title, Summary, Preface, Acknowledgements, Contents)

The title page has timing: OSLO September 2014

The odd page header reads: EMEP/MSC-W Technical Report 1/2014

p. iv, second paragraph: 'It should be mentioned that estimations of the ship emissions from the Baltic Sea developed by the Finnish Meteorological Institute based on AIS are 19% higher in 2014.' It is not clear if the 2014 emissions are higher than the emissions provided by CEIP (or TNO-MACC?), or if they are 19% higher than emissions in 2013 in general. See below (Chapter 3 Nitrogen, 3.7 Conclusions for Chapter 3, p.47 first paragraph) for another comment about ship traffic emissions in 2013 and 2014.

Chapter 1 Introduction

p.1 first paragraph: The references Bartnicki et al. 2012, Bartnicki et al. 2013, and Valiyaveetil et al. 2014 are not given here nor included in the References section.

p.1 fourth paragraph: The references Fagerli 2004, Fagerli 2005, Fagerli et al. 2006, Simpson et al. 2006, and Simpson et al. 2006b are not given here nor included in the References section.

Chapter 2 Measurements

2.1 HELCOM measurement stations, p.9 second paragraph: The references Hjellbrekke 2016 and Aas and Nizzetto 2016 are not given here nor included in the References section.

Chapter 3 Nitrogen

p.21 5th paragraph: FMI is identified as a data supplier without defining the identity. I am assuming that FMI denotes the Finnish Meteorological Institute, where the Ship Traffic Emission Assessment Model (STEAM) which can provide fully dynamic ship emission inventories based on the Automatic Identification System (AIS) has been developed. The FMI modeling is introduced without any reference to published articles or other contact information. It would be good if the FMI and STEAM information could be complemented.

The FMI/STEAM emission modeling team recommends the following 3 references for the STEAM model:

J.-P. Jalkanen, A. Brink, J. Kalli, H. Pettersson, J. Kukkonen and T. Stipa, "A modelling system for the exhaust emissions of marine traffic and its application in the Baltic Sea area", *Atmos. Chem. Phys.* 9 (2009) 9209-9223.

J.-P. Jalkanen, L. Johansson, A. Brink, J. Kalli, J. Kukkonen and T. Stipa, "Extension of an assessment model of ship traffic exhaust emissions for particulate matter and carbon monoxide", *Atmos. Chem. Phys.*, 12 (2012) 2641-2659.

L. Johansson, J.-P. Jalkanen, J. Kalli and J. Kukkonen, "The evolution of shipping emissions and the costs of recent and forthcoming emission regulations in the northern European emission control area", *Atmos. Chem. Phys.*, 13 (2013) 11375-11389.

3.6 Source allocation of nitrogen deposition, p.41: besides the CEIP (TNO-MACC) provided data, emission data provided by FMI has been used in the EMEP/MSC-W model calculations for 2014, with results presented in figures 3.17, 3.18, 3.21 and 3.22. This use of emission data is not stated in anywhere in Chapter 3 text.

3.7 Conclusions for Chapter 3, p.47 first paragraph: 'According to FMI inventory, ship emissions were 1% lower in 2014 than in 2013.' I am assuming that this is not a contradiction with the Chapter 0 Summary text where the ship emission estimates from the Baltic Sea developed by the Finnish Meteorological Institute are noted to be 19% higher in 2014.

3.7 Conclusions for Chapter 3, p.47 6th paragraph: 'Calculated annual deposition of total nitrogen to the Baltic Sea basin in 2014 was 240 kt, approximately 15% higher than in 2013. Deposition of oxidised nitrogen was 19% higher and deposition of reduced nitrogen was 11% higher in 2014 compared to 2013.' What depositions are compared here? Based on the deposition Tables 1-3 in Appendix C (Indicators), the deposition of total nitrogen to the BAS is 240 kt N in 2014 and 220.2 kt N in 2013. This is a 9% increase, not 15%. The deposition of oxidized nitrogen is 131.3 kt N in 2014, and 123.8 kt N in 2013, an increase of 6%, not 19%. The deposition of reduced nitrogen, on the other hand, is 108 tk N in 2014 and 96.4 kt N in 2013, and increase of 12%, which is quite close to 11%.

3.7 Conclusions for Chapter 3, p.47 6th paragraph: 'Deposition of oxidised nitrogen accounted for 55% of total nitrogen deposition in 2011.' What is the point of discussing year 2011 here? According to Tables 1 and 3 in Appendix C, the proportion of oxidized nitrogen deposition of total is 56.6%. However, 55% fits the results for 2014.

3.7 Conclusions for Chapter 3, p.47 8th paragraph: Is some word missing from the last sentence (e.g. wet deposition?).

3.7 Conclusions for Chapter 3, p.48 4th paragraph: 'The main sources contributing to total nitrogen deposition to the Baltic Sea basin are: Germany, Poland, Denmark, United Kingdom and Sweden.' In Figure 3.21 (highest contributions of nitrogen emissions to annual deposition of total nitrogen) and in Figure 3.22 the country order is Germany, Poland, Denmark, Sweden, RUE, and United Kingdom.

3.7 Conclusions for Chapter 3, p.48 4th paragraph: 'Contribution of some distant sources like ship traffic on the North Sea, France and the Netherlands is also significant.' Netherlands is not included in Figures 3.21 and 3.22, but based on Figures 3.19 and 3.20, the share for Netherlands would be 7.3% in Figure 3.21, still lower than Finland which is the rightmost country in the figure.

3.7 Conclusions for Chapter 3, p.48 5th paragraph: 'When FMI inventory is used instead of CEIP inventory for ship emissions from the Baltic Sea, contribution of these emissions to oxidised nitrogen deposition to the Baltic Sea basin is 8% and contribution to total nitrogen deposition 7%.' In this sentence, obviously the relative contributions (Figures 3.18 and 3.22) are compared?

3.7 Conclusions for Chapter 3, p.48 5th paragraph: What is the point of the last sentence 'This is 2% and 1% than respective depositions based on CEIP inventory.' , are the relative contributions of the CEIP (TNO-MACC) and FMI/STEAM ship emission estimates compared?

Chapter 4 Cadmium

4.6 Concluding remarks, 2nd paragraph: EMEP Technical Report 2/2015 (Atmospheric Supply of Nitrogen, Lead, Cadmium, Mercury and PCBs to the Baltic Sea in 2013) was used to check the comparison with year 2013 deposition.

Chapter 5 Mercury

5.6 Concluding remarks, 2nd paragraph: EMEP Technical Report 2/2015 (Atmospheric Supply of Nitrogen, Lead, Cadmium, Mercury and PCBs to the Baltic Sea in 2013) was used to check the comparison with year 2013 deposition.

Chapter 6 BaP

6.6 Concluding remarks 2nd paragraph: 'B(a)P deposition in 2014 was higher comparing to 2013 by 23%.' The 2013 deposition of benzo(a)pyrene or reference to the result is not available, so this conclusion cannot be checked.

Chapter 7 PBDE

7.1 Emission data for model assessment, p. 152: 'According to these estimates penta-BDE emissions declined from 2000 to 2014 about 7 times. Long-term measurements of BDE-99 air concentrations at the EMEP monitoring sites in the UK, Norway, Sweden, and Finland indicate decrease of concentrations from about 5 to almost 15 times (Figure 7.3a). In particular, long-term measurements at monitoring site SE14, approximated by the logarithmic curve, show the decrease of concentrations from 2000 to 2014 by 5.2 times (Figure 7.3b). To construct scenario of emission for 2014 it was assumed that levels of emissions in the European region decreased from 2000 to 2014 by 7 times on the average.' It is unclear how these "by X times" units are defined. It would be nice if amounts or percentage units could be used for emission and concentration comparisons.

Chapter 8 References

References Aas and Nizzetto 2016, Bartnicki et al. 2012, Bartnicki et al. 2013, Fagerli 2004, Fagerli 2005, Fagerli et al. 2006, Hjellbrekke 2016, Simpson et al. 2006, Simpson et al. 2006b, Tista et al., 2016, Valiyaveetil et al. 2014, and Vestreng 2003 are cited in chapters and appendixes of this document but are not included in the References section.

Chapter 11 Appendix C Indicators

p. 186 Key message: 'nitrogen oxides emissions are 12-61% lower in 2014 than in 1995 with the most significant drop of nitrogen oxides emissions in Sweden (53%) and Denmark (61%).' According to Table 1 on p. 189, the nitrogen oxides emissions in Sweden were 74.7 kt N/a in 1995, and 41.1 kt N/a in 2014. This drop is 45%, not 53%.

p. 186 Key message: 'Also, for all HELCOM Contracting Parties the reductions of total nitrogen emissions can be observed in the period 1995 – 2014, ranging from 3% in Estonia to 47% in Denmark.' According to Table 3 on p. 191, the total nitrogen emissions in Estonia have decreased 50.5% from 1995 to 2014, and the emissions in Denmark 66%. There may be something wrong with the Tables 2 (p. 190) and 3, as the last 3 rows are identical in both. Therefore, it is impossible to infer what these numbers should be, and which Table and which conclusions are relevant.

p. 186 Key message: 'Only ammonia, annual emissions increase in four out of nine HELCOM Contracting Parties in the period 1995-2014. These are: Estonia (10%), Germany (9%), Finland (2%) and Latvia (2%). In the remaining countries a decline (6-33%) of the ammonia emissions can be noticed.' According to Table 2 on p. 190 the ammonia emissions in Latvia are 1.37% lower in 2014 than in 1995, while the ammonia emissions have increased in Estonia by 9.18%. If the decline in Latvia is taken into account, the decline percentages in the remaining countries are 1-33%

p. 188 1st paragraph: 'A small increase can only be noticed for ammonia emissions from Finland, Germany and Latvia.' See the above comment on ammonia emissions in Latvia and Estonia.

p. 188, 2nd paragraph: 'In all HELCOM Contracting Parties, nitrogen oxides emissions are 12-61% lower in 2014 than in 1995 with the most significant drop of nitrogen oxides emissions in Sweden (53%) and Denmark (61%) followed by Finland (46%) and Sweden (45%).' According to Table 1 on p. 189, the nitrogen oxides emission drop in Sweden is 45%, not 53%.

p. 188, 2nd paragraph: Last sentence 'Large reduction, in the considered period, can be also noticed in Germany (43%), Poland and Latvia (33%) and Poland (32' is unfinished and strange with Poland twice.

p. 188, 3rd paragraph: 'Ammonia, emissions in five out of nine HELCOM Contracting Parties are lower in 2014 than in 1995, with the largest reduction in Denmark (33%),' According to Table 2 on p. 190, emissions drop in six countries between 1995 and 2014.

p. 188 3rd paragraph: 'followed by Poland, Sweden and Lithuania – all 14%, and finally Russia (6%).' According to Table 2 on p. 190, the drop in Poland and Sweden is 16%, and 14% in Lithuania.

p. 188 3rd paragraph: 'Compared to 1995, ammonia emissions in 2014 are higher in Estonia (10%), Germany (9%), Finland (2%) and Latvia (2%).' According to Table 2 on p. 190, the emissions in Estonia were 9.18% higher in 2014 than in 1995, and decreased 1.37% in Latvia.

p. 188 4th paragraph: 'For all HELCOM Contracting Parties the reductions of total nitrogen emissions can be observed in the period 1995 – 2014, ranging from 3% in Estonia to 47% in Denmark. Besides Denmark, large reductions of total nitrogen emissions in the considered period can also be observed in Sweden and Finland – both 33%.' According to Table 3 on p. 191, the emission reduction is 50% in Estonia, 66% in Denmark, 72% in Finland, and 65% in Sweden. I assume, Table 3 is not correct.

Figures 1 (p. 187) and 2 (p. 188): The figure captions have an instruction 'Click image to enlarge' at the end, which does not work.

Table 2 (National total emissions of ammonia) on p. 190 and Table 3 (National total emissions of total nitrogen) on p. 191: The bottom three data lines in the tables are identical.

p. 193 Key message: 'Compared to 1995, normalised depositions of oxidised and reduced nitrogen in 2014 are lower: 36% and 12%, respectively.' Table 4 (Normalized depositions of oxidised, reduced and total nitrogen to the Baltic Sea basin) on page 200 does not contain data for year 2014, thus it is difficult to inspect the % values for normalized deposition reductions.

p. 196 last paragraph: What is the point of the discussion on the 2012 and 2013? Based on the numbers in Tables 1 (p. 197) and 2 (p. 198), the deposition of oxidized N in WEB is 4.5% lower and reduced N 4.1% lower in 2013 than in 2012. Not higher by 8.6% and 12.9% as stated in the first sentence. And based on Table 3, the total N deposition in WEB is 3.8% lower in 2013 than 2012, not higher by 11.2% stated in the second sentence.

Figure 2: The figure caption has a capital red 'OK' at the end, which I do not understand.

Figure 3: The figure caption has instruction 'Click to enlarge' at the end, which does not work.

Table 4: The table caption states that total nitrogen deposition is given for the period 1995-2014. However, year 2014 is missing.

The update note, last line on p. 201 reads: 'Last updated: 30 September 2015'

p. 202 last paragraph: 'The most significant drop of cadmium emissions can be noted for Estonia (80%) and Sweden (75%).' According to Table 4.2 on p. 88 in Chapter 4 Cadmium, cadmium emissions dropped by 87% in Finland.

p. 206 Data section: A reference is made to Microsoft Excel file HM_emissions_data.xls which is not included with the draft report.

p. 206 Meta data section, Description of data: 'Annual total emissions of all three metals were officially reported to the UN ECE Secretariat by HELCOM countries.' Only cadmium and mercury are discussed in this appendix, not three metals.

p. 206 Meta data section, Temporal coverage: Reference is made to Tista et al., 2016, which is not opened in this Appendix or included in Chapter 8 References.

p. 208 Assessment section first paragraph: Reference is made to an appendix of the EMEP report for year 2011 (http://emep.int/publ/helcom/2013/Chapter12_AppD_description.pdf). Year 2014 and a figure of 2014 results is included in Appendix D of this report. Should be updated.

p. 212 Data section: A reference is made to Microsoft Excel file HM_deposition_data.xls which is not included with the draft report.

p. 212 Metadata section, Description of data: 'Emissions of all three metals for each year of this period were officially reported by most of HELCOM countries.' Only cadmium and mercury are discussed in this appendix, not three metals.

p. 213 Meta data section, Methodology and frequency of data collection: 'Meteorological data used in the calculations for 1990-2013 were obtained using MM5 meteorological data pre-processor on the basis of meteorological analysis of European Centre for Medium-Range Weather Forecasts (ECMWF).' The report includes also 2014 deposition. Should be updated.

p. 216 Figure 1: Figure text says that the emissions are given as % of 1990. The figure x-axis title says t/year, and the axis maximum is 250. Also, the figure depicts bars, and all are above 100, which corresponds to the text, with the Assessment section text with 2014 emissions total of 108 t. Should be revised.

p. 218 Data section: A reference is made to Microsoft Excel file BaP_emissions_data.xls which is not included with the draft report.

p. 218 Meta data section, Temporal coverage: Reference is made to Tista et al., 2016, which is not opened in this Appendix or included in Chapter 8 References.

p. 220 Assessment section first paragraph: Reference is made to an appendix of the EMEP report for year 2011 (http://emep.int/publ/helcom/2013/Chapter12_AppD_description.pdf). Year 2014 and a figure of 2014 results is included in Appendix D of this report. Should be updated.

p. 220 Assessment section, second paragraph: Reference is made to Table 1 which is not included in the appendix.

p. 222 Data section: A reference is made to Microsoft Excel file BaP_deposition_data.xls which is not included with the draft report.

Chapter 12 Appendix D Description (Calculation of normalised depositions)

p. 225, D.2 Annual deposition, second paragraph: Reference is made to Vestreng 2003, which is not opened in this Appendix or included in Chapter 8 References.

p. 231, first paragraph: 'The results of these calculations for the years 1995-2011 are shown in Figs. 3.12-3.14, for oxidised, reduced and total nitrogen deposition.' The years shown in the figures on the page are 1995-2014. The figure numbering is not 3.12-3.14, those numbers correspond to Chapter 3 (Nitrogen) of this report, where temporal development of oxidized, reduced and total nitrogen deposition is shown in three separate figures. The figure in this Appendix on page 231 is Fig. D2.

p. 231 first paragraph: 'The normalised depositions for HMs and PCDD/Fs are calculated in a very similar way to this described for nitrogen. They are included in the corresponding Indicator Fact sheets for HMs and PCDD/Fs, with the links given in Appendix C.' HM is discussed in Appendix C of this Report, PCDD/Fs is not.