

### 3. Annual 1998 Emissions in the Baltic Sea Region

**Annual country totals.** The 1997 and 1998 annual emissions of oxidized nitrogen, reduced nitrogen, lead, cadmium, total mercury and lindane, from the HELCOM countries and remaining EMEP sources are shown in Tables 3.1 - 3.6. Detailed information about 1998 annual country total emissions from all EMEP sources can be found in the EMEP home page, under the subject of emission. For both nitrogen compounds, the 1998 emissions from the HELCOM countries are only slightly (2% and 3%) lower than corresponding 1997 emissions. The same applies to lead and mercury emissions, which are 4% and 5%, respectively, lower in 1998 than in 1997. Cadmium emissions from the HELCOM countries are 20% lower in 1998 compared to 1997 and lindane emissions remain on the same level.

**Maps of 1998 emissions.** Maps of the annual 1998 emissions in the Baltic Sea region are presented for: oxidized nitrogen, reduced nitrogen, lead, cadmium, total mercury and lindane in Figures 3.1-3.6, respectively. Emission maps for the entire EMEP domain are also available on the EMEP web pages under emission subject. Concerning the spatial distribution of emissions in the Baltic Sea region, for all compounds, there is not much difference between 1997 and 1998.

**Table 3.1.** Annual emissions of oxidized nitrogen in the HELCOM countries, in the Baltic Sea (from international ship traffic) and in the entire EMEP area, used in the 1997 and in the 1998 computations. Units: 1000 tonnes of NO<sub>2</sub> year<sup>-1</sup>. The change of emissions between 1997 and 1998 (in % of 1997 emissions) is also shown in the Table as “Diff”. The country with the maximum increase in emissions is marked red and the country with the maximum decrease in emissions is marked with green colour.

Country	1997	1998	Diff.
Denmark	248	231	-7
Estonia	45	46	+2
Finland	260	252	-3
Germany	1803	1780	-1
<b>Latvia</b>	35	42	<b>+16</b>
Lithuania	57	60	+5
<b>Poland</b>	1158	991	<b>-14</b>
Russian Federation	2379	2488	+5
Sweden	280	257	-8
<b>TOTAL - HELCOM Countries</b>	<b>6265</b>	<b>6147</b>	<b>-2</b>
The Baltic Sea	352	352	
<b>TOTAL - EMEP</b>	<b>20888</b>	<b>22186</b>	<b>+6</b>

**Table 3.2.** Annual emissions of reduced nitrogen in the HELCOM countries and in the entire EMEP area, used in the 1997 and in the 1998 computations. Units: 1000 tonnes of NH<sub>3</sub> year<sup>-1</sup>. The change of emissions between 1997 and 1998 (in % of 1997 emissions) is also shown in the Table as “Diff”. The country with the maximum increase in emissions is marked red and the country with the maximum decrease in emissions is marked with green colour.

Country	1997	1998	Diff.
Denmark	102	104	+2
Estonia	29	29	
<b>Finland</b>	34	38	<b>+11</b>
Germany	648	625	-4
<b>Latvia</b>	17	13	<b>-24</b>
Lithuania	35	35	
Poland	350	371	+6
Russian Federation	730	675	-8
Sweden	64	59	-8
<b>TOTAL - HELCOM Countries</b>	<b>2009</b>	<b>1949</b>	<b>-3</b>
<b>TOTAL - EMEP</b>	<b>7258</b>	<b>8198</b>	<b>+13</b>

**Table 3.3.** Annual emissions of lead in the HELCOM countries, in the entire EMEP area and natural emissions, used in the 1997 and in the 1998 computations. Units: tonnes year<sup>-1</sup>. The change of emissions between 1997 and 1998 (in % of 1997 emissions) is also shown in the Table as “Diff”. The country with the maximum increase in emissions is marked red and the country with the maximum decrease in emissions is marked with green colour. Data officially submitted to EMEP are used for the HELCOM countries emissions.

Country	1997	1998	Diff.
Denmark	8	8	
<b>Estonia</b>	33	21	<b>-34</b>
<b>Finland</b>	12	20	<b>+67</b>
Germany	624 <sup>b</sup>	632 <sup>b</sup>	-1
Latvia	5 <sup>a</sup>	4 <sup>a</sup>	-20
Lithuania	19	22	+16
Poland	896	736	-18
Russian Federation	2247	2262	-1
Sweden	38 <sup>b</sup>	38 <sup>b</sup>	
<b>TOTAL - HELCOM countries</b>	<b>3882</b>	<b>3743</b>	<b>-4</b>
<b>TOTAL - EMEP</b>	<b>26266</b>	<b>17307</b>	<b>-34</b>
<b>Natural</b>	<b>912</b>	<b>912</b>	

a) Emissions from gasoline are not included.

b) This figure was reported for 1995.

**Table 3.4.** Annual emissions of cadmium in the HELCOM countries, in the entire EMEP area and natural emissions, used in the 1997 and in the 1998 computations. Units: tonnes year<sup>-1</sup>. The change of emissions between 1997 and 1998 (in % of 1997 emissions) is also shown in the Table as “Diff”. The country with the maximum increase in emissions is marked red and the country with the maximum decrease in emissions is marked with green colour. Data officially submitted to EMEP are used for the HELCOM countries emissions.

Country	1997	1998	Diff.
Denmark	0.85	0.78	-8
Estonia	0.1	0.1	
<b>Finland</b>	0.6	1.3	<b>+117</b>
Germany	11.0 <sup>a</sup>	11.0 <sup>a</sup>	
<b>Latvia</b>	1.44 <sup>a</sup>	0.77	<b>-50</b>
Lithuania	2.0	2.59	+29
Poland	85.8	55.4	-35
Russian Federation	50.4	49.0	-3
Sweden	0.8 <sup>a</sup>	0.8 <sup>a</sup>	
<b>TOTAL - HELCOM countries</b>	<b>153</b>	<b>122</b>	<b>-20</b>
<b>TOTAL - EMEP</b>	<b>508</b>	<b>362</b>	<b>-29</b>
<b>Natural</b>	<b>49</b>	<b>49</b>	

a) This figure was reported for 1995.

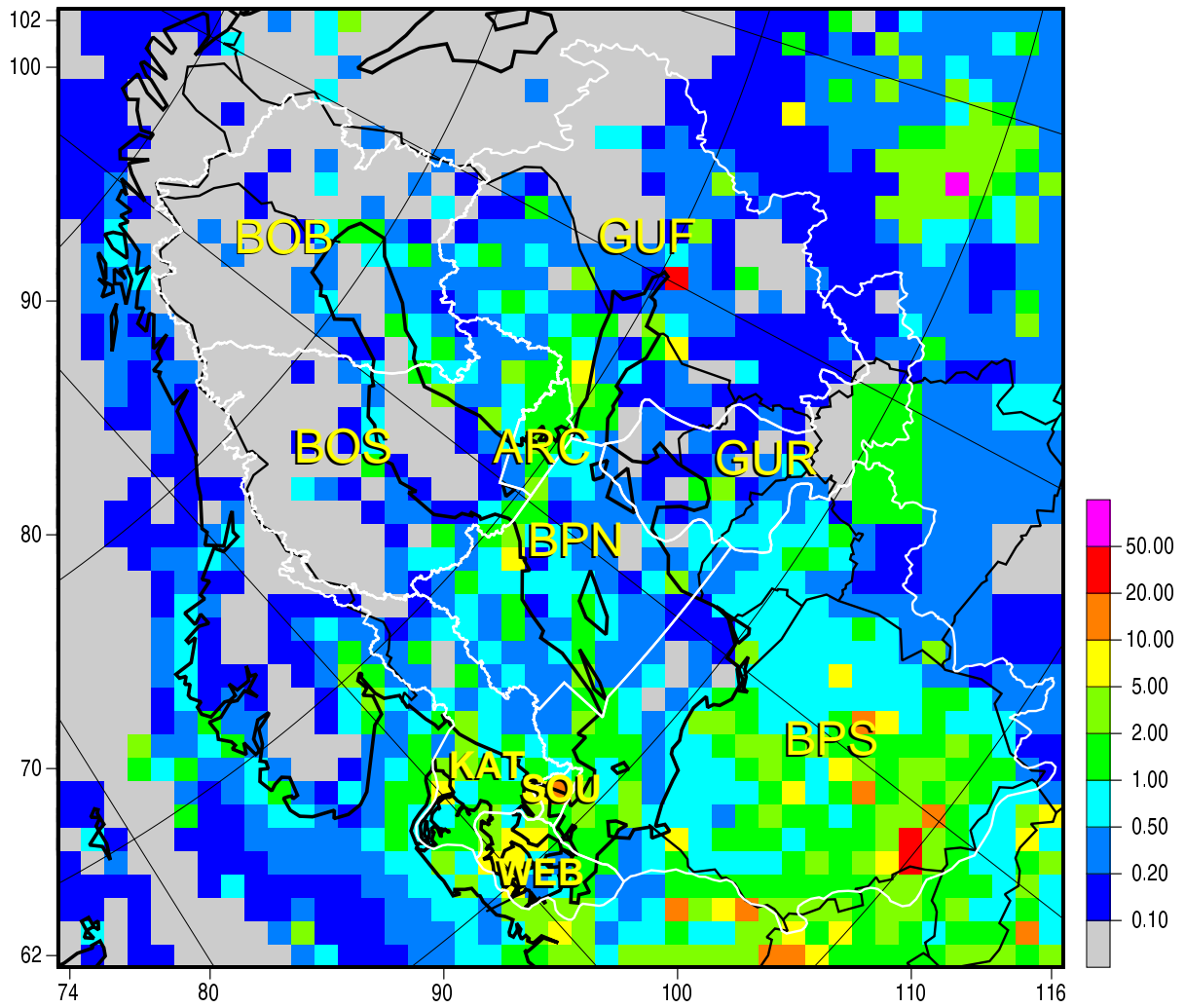
**Table 3.5.** Annual emissions of total mercury in the HELCOM countries, in the entire EMEP area and natural emissions, used in the 1997 and in the 1998 computations. Units: tonnes year<sup>-1</sup>. The change of emissions between 1997 and 1998 (in % of 1997 emissions) is also shown in the Table as “Diff”. The country with the maximum increase in emissions is marked red and the country with the maximum decrease in emissions is marked with green colour. Data officially submitted to EMEP are used for the HELCOM countries emissions.

Country	1997	1998	Diff.
Denmark	2.13	1.95	-8
Estonia	0.01	0.01	
Finland	0.60	0.50	-17
Germany	31.00 <sup>a</sup>	31.00 <sup>a</sup>	
Latvia	0.14	0.23	+64
Lithuania	0.23	0.25	+9
Poland	33.00	29.50	-11
Russian Federation	9.60	9.40	-2
Sweden	0.90 <sup>a</sup>	0.90 <sup>a</sup>	
<b>TOTAL - HELCOM countries</b>	<b>77.6</b>	<b>73.7</b>	<b>-5</b>
<b>TOTAL - EMEP</b>	<b>273</b>	<b>270</b>	<b>-1</b>
<b>Re-emission</b>	<b>52</b>	<b>52</b>	
<b>Natural</b>	<b>220</b>	<b>220</b>	

a) This figure was reported for 1995.

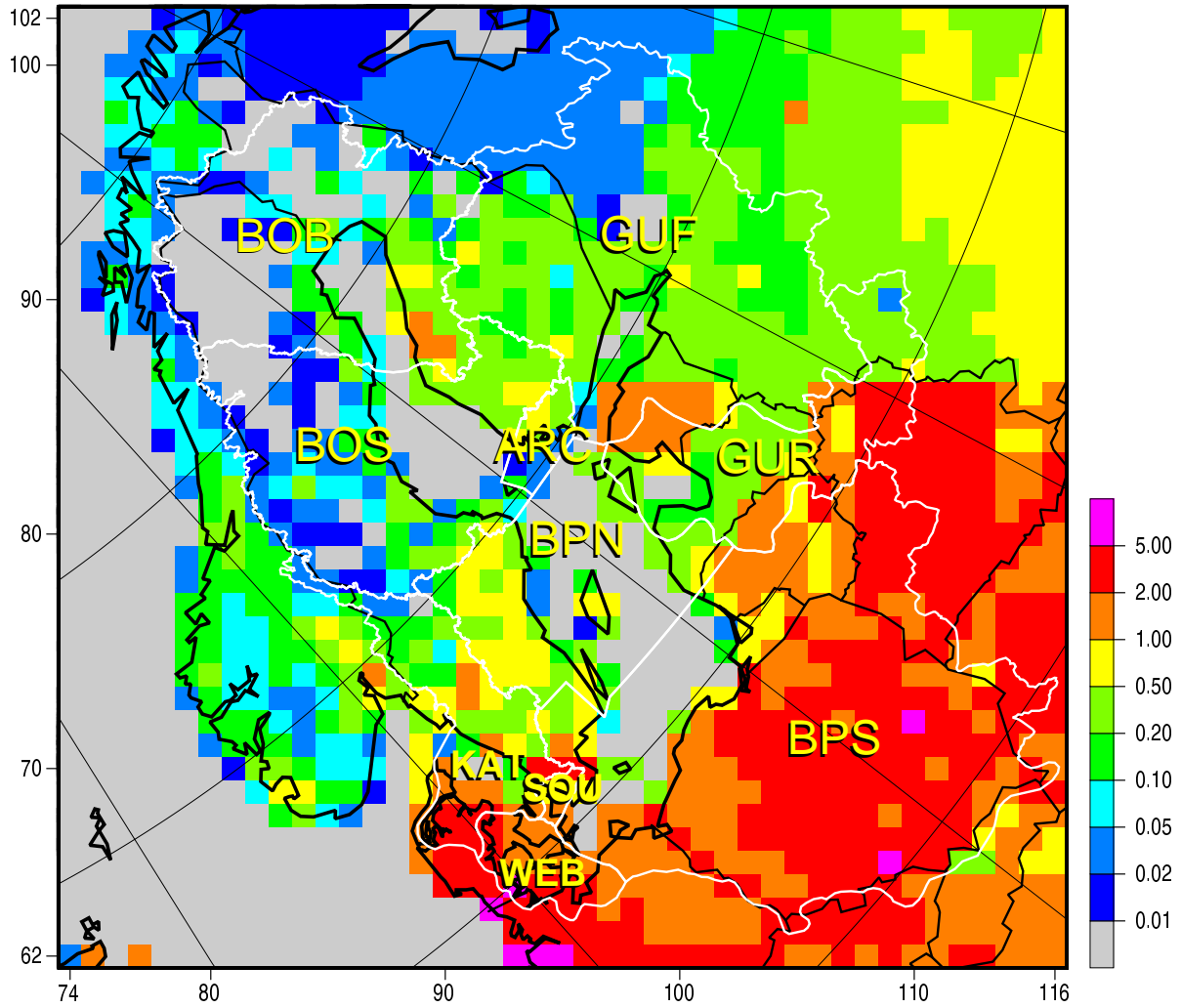
**Table 3.6.** Annual emissions of lindane in the HELCOM countries and in the entire EMEP area used in the 1997 and in the 1998 computations. Units: tonnes year<sup>-1</sup>. The change of emissions between 1997 and 1998 (in % of 1997 emissions) is also shown in the Table as “Diff”. The country with the maximum decrease in emissions is marked with green colour. Data officially submitted to EMEP are used for Denmark and Sweden for 1998.

Country	1997	1998	Diff.
Denmark	0	0	
Estonia	0.003	0.003	
Finland	0	0	
Germany	0	0	
Latvia	0.003	0.003	
Lithuania	0.002	0.002	
Poland	0.28	0.28	
Russian Federation	5.941	5.941	
Sweden	1.101	0.000	-100
<b>TOTAL - HELCOM countries</b>	<b>7</b>	<b>6</b>	<b>-14</b>
<b>TOTAL - EMEP</b>	<b>790</b>	<b>777</b>	<b>-2</b>

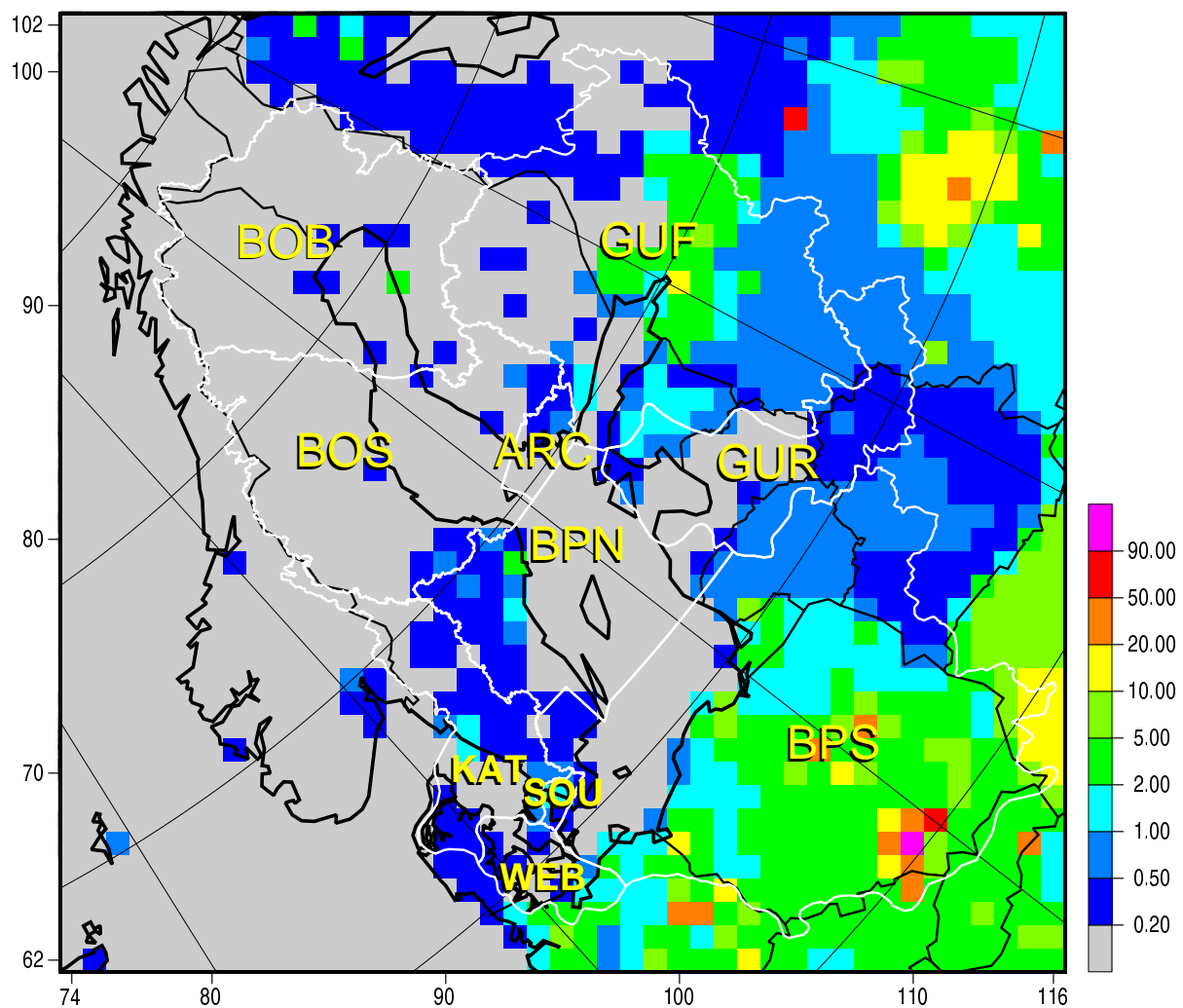


**Figure 3.1.** Annual 1998 emissions of oxidized nitrogen in the Baltic Sea region. Units: ktonnes N year<sup>-1</sup> grid<sup>-1</sup>.

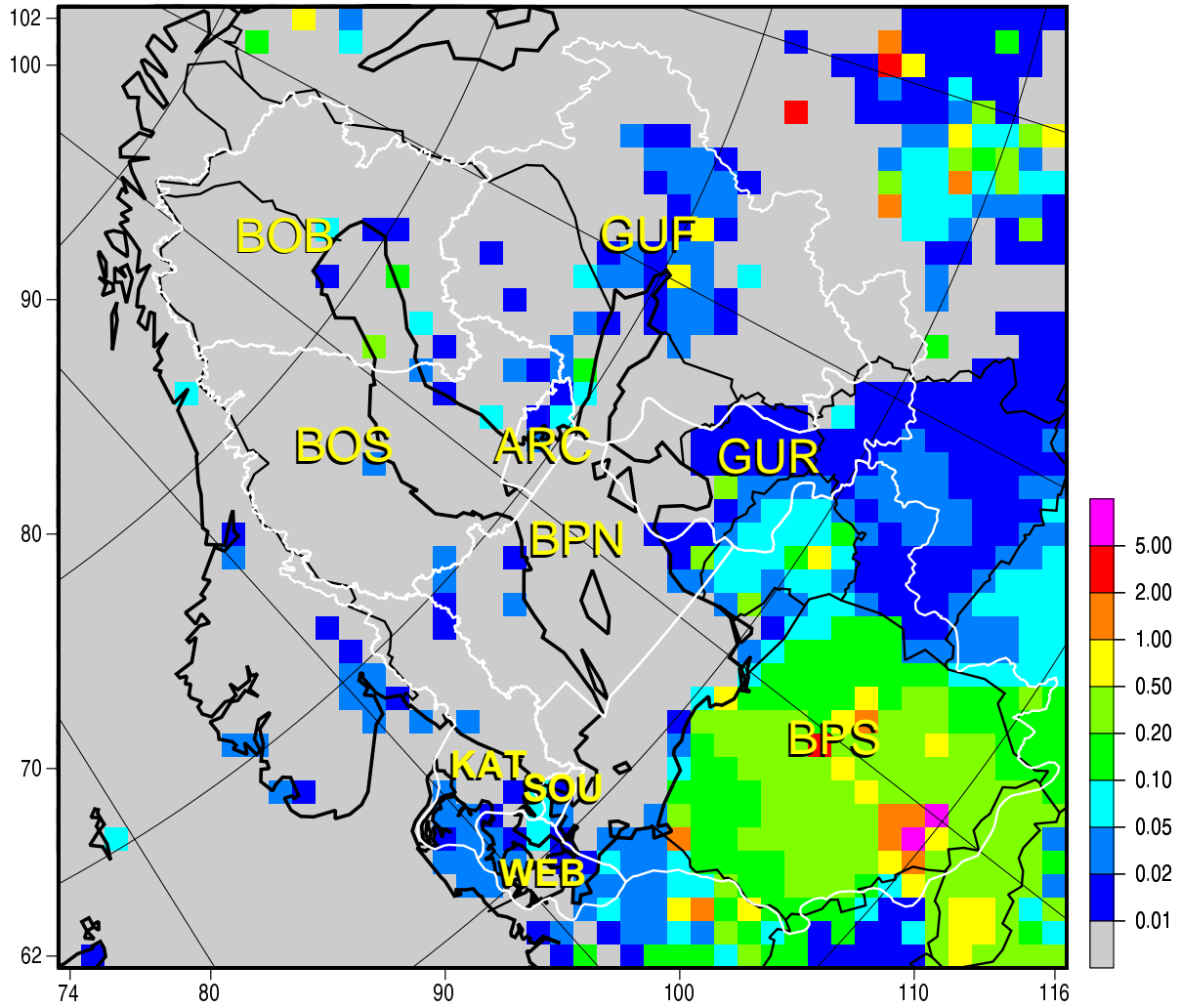




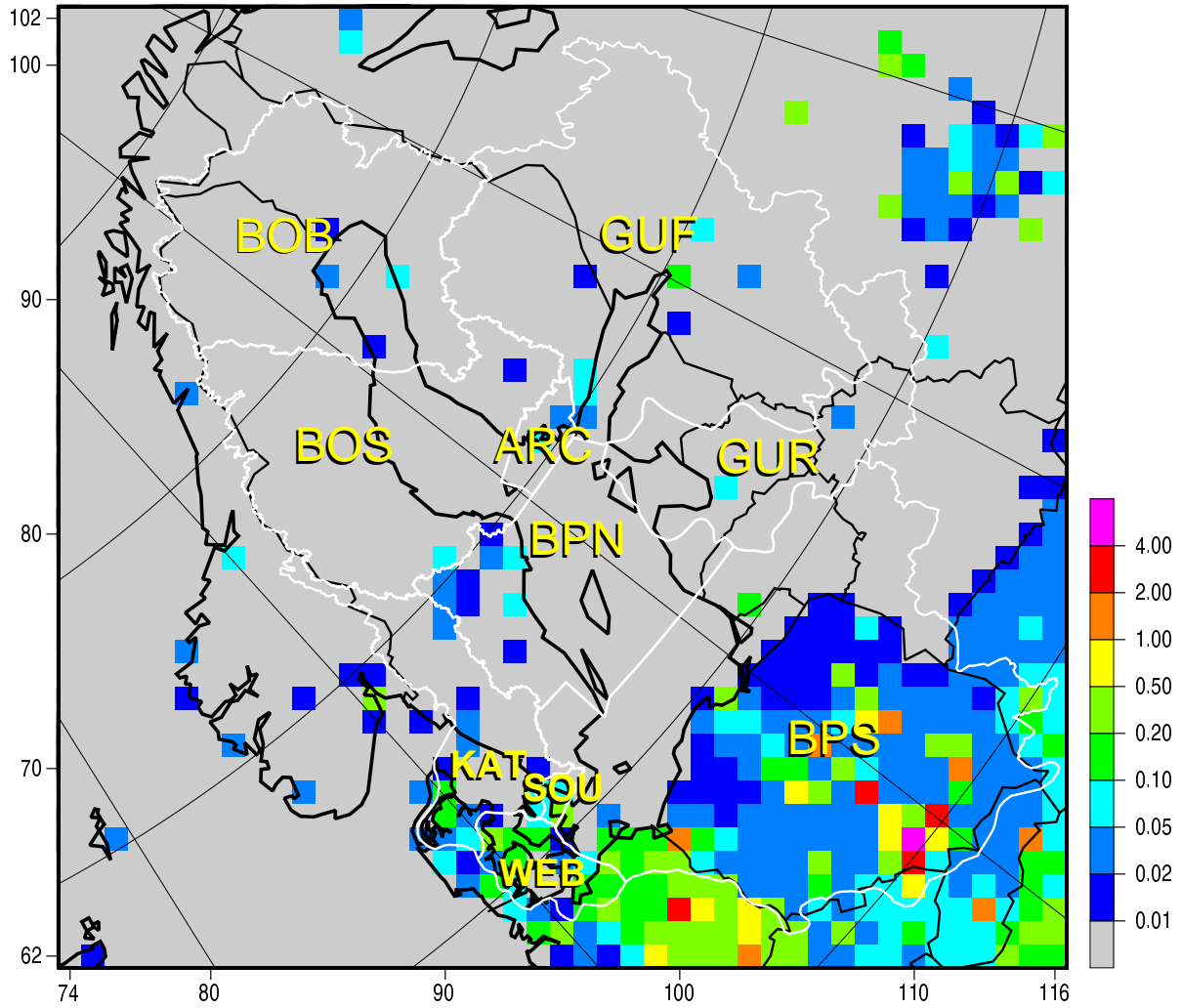
*Figure 3.2.* Annual 1998 emissions of ammonia in the Baltic Sea region.  
Units: ktonnes N year<sup>-1</sup> grid<sup>-1</sup>.



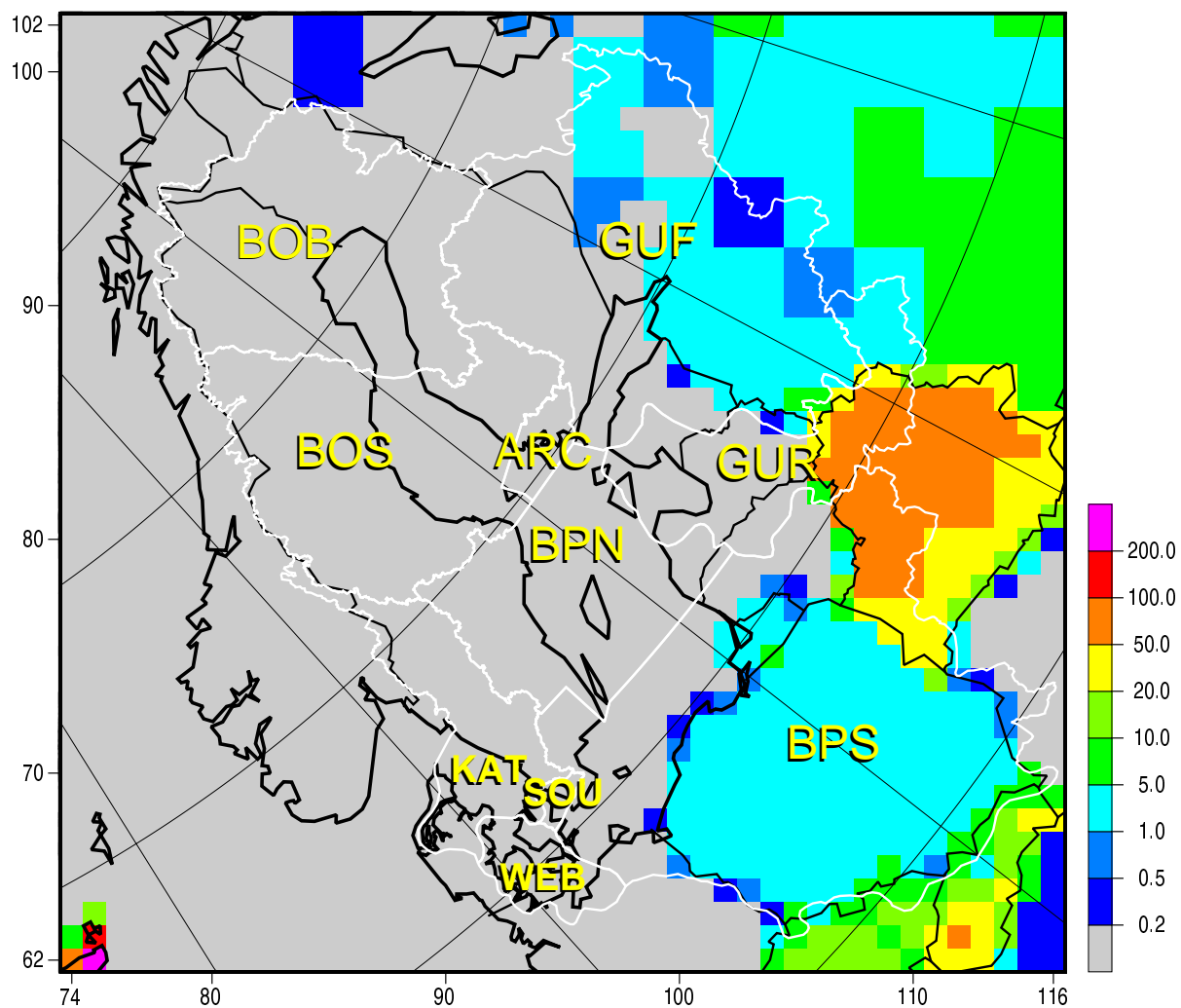
**Figure 3.3.** Annual 1998 emissions of lead in the Baltic Sea region.  
Units: tonnes year<sup>-1</sup> grid<sup>-1</sup>.



*Figure 3.4.* Annual 1998 emissions of cadmium in the Baltic Sea region.  
Units: tonnes year<sup>-1</sup> grid<sup>-1</sup>.



**Figure 3.5.** Annual 1998 emissions of total (sum of all forms) mercury in the Baltic Sea region. Units: tonnes year<sup>-1</sup> grid<sup>-1</sup>.



**Figure 3.6.** Annual 1998 emissions of lindane in the Baltic Sea region.  
Units:  $\text{kg year}^{-1} \text{ grid}^{-1}$ .