# Mercury

Mercury is an extremely rare element in the earth's crust but occurs in concentrated ores in young geologically active areas *e.g.* often in hot springs or volcanic regions. It is obtained commercial from the ore cinnabar. Industrial and commercial use of mercury has led to the dispersion of mercury and the elevation of environmental mercury concentrations in certain locations. Due to its heavy liquid state, mercury has specific technical applications in a number of products including dental amalgam, batteries, industrial control instruments, laboratory and medical instruments and lighting appliances.

### *What is the problem?*

Mercury is extremely toxic to both man and biota and can be transformed within the aquatic environment into more toxic organic compounds (*e.g.* methyl mercury). A main pathway of mercury to the sea is atmospheric and it can be carried long distances from its source. The main sources of mercury to the environment are natural atmospheric emissions from volcanoes and anthropogenic emissions from coal-fired power stations and metal production and cement production. Mercury also enters into the environment through the disposal products containing mercury including: car parts, batteries, fluorescent bulbs, medical products, thermometers, and thermostats. Emissions from crematoria are a small but widespread source. Many of the releases of industrial mercury during the 1900s came from the mercury cell chlor-alkali process used to produce chlorine. Due to the introduction of new technology, this source has largely been phased out over the last twenty years.

### *What has been done?*

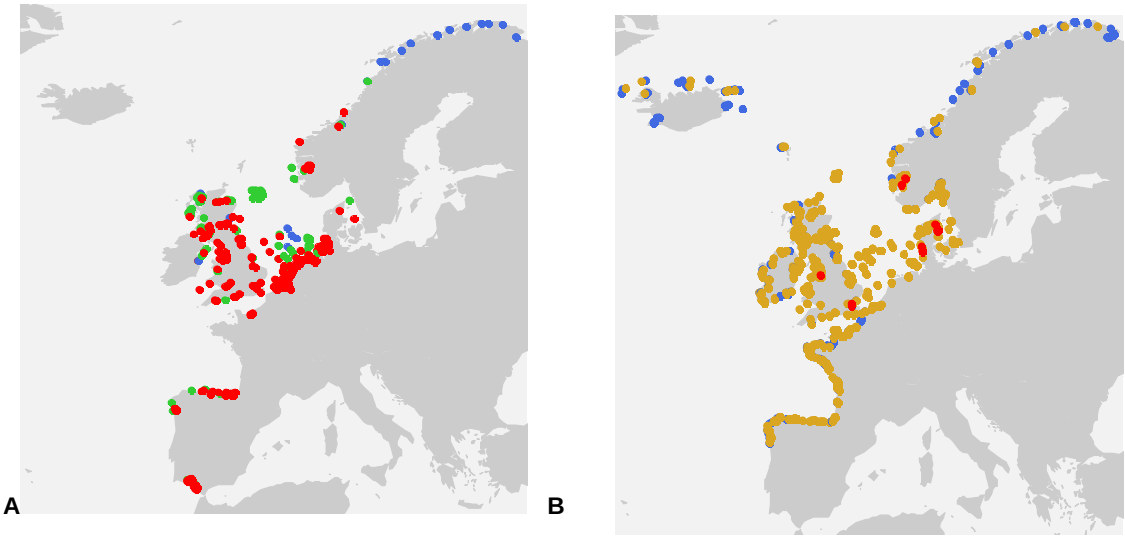
OSPAR measures and subsequent EU measures regulate the main industrial sources for mercury releases to the environment. A suite of OSPAR measures control mercury emissions and discharges from the chloralkali industry, including the complete phase-out of mercury cell chlor-alkali plants by 2010. Other OSPAR measures address a variety of important sources for mercury including dentistry, thermometers, batteries and dental filters, crematoria and other diffuse sources. OSPAR has promoted actions in other international forums, especially the EU, *e.g.* call for actions to prevent pollution from the disposal of large amounts of pure and waste mercury arising from the closure or conversion of mercury cell chlor-alkali plants and for control measures on the use and marketing of mercury in various products. Other measures in the EU address a series of other uses including in biocides, plant protection products and batteries, toys and ceramics. The initiative in the UNEP framework to develop a legally binding global instrument to reduce mercury releases worldwide will support the OSPAR's cessation target for mercury.

### *Did it work?*

According to data reported to EMEP there has been an overall reduction in total air emissions of around 20% in the period 1998 – 2006. The picture of reductions achieved across OSPAR countries is very varied. Total emissions from industrial processes, including manufacturing industries, remained fairly stable over this period with there being an increase in emissions from the metal production sector. The most consistent development since 1998 has been for mercury emissions from the chlor-alkali industry which halved, as have the total losses of mercury from this industry through product, waste water and air. Recent estimates suggest that despite significant emission reduction in Europe and North America, global mercury emissions have not changed significantly over the past 15 years due to emissions growth in other parts of the world (*e.g.* Asia). Data on discharges of mercury to water reported to EPER give indication that discharges from heavily regulated point sources continue, but do not allow conclusions on trends. Direct and riverine inputs of mercury are the major input in Regions II (Greater North Sea), III (Celtic Seas) and IV (Bay of Biscay/Iberian Coast). Riverine inputs of mercury decreased significantly by 75% in Region II. Direct discharges were much smaller and showed a similar scale of decrease. Major reductions in riverine inputs (~85%) and direct discharges of mercury were also observed for the Celtic Seas. Data are not sufficient to allow conclusions on changes in either riverine or total waterborne mercury inputs in Region I (Arctic Waters) or IV. In Region I atmospheric deposition accounts for 99% of inputs.

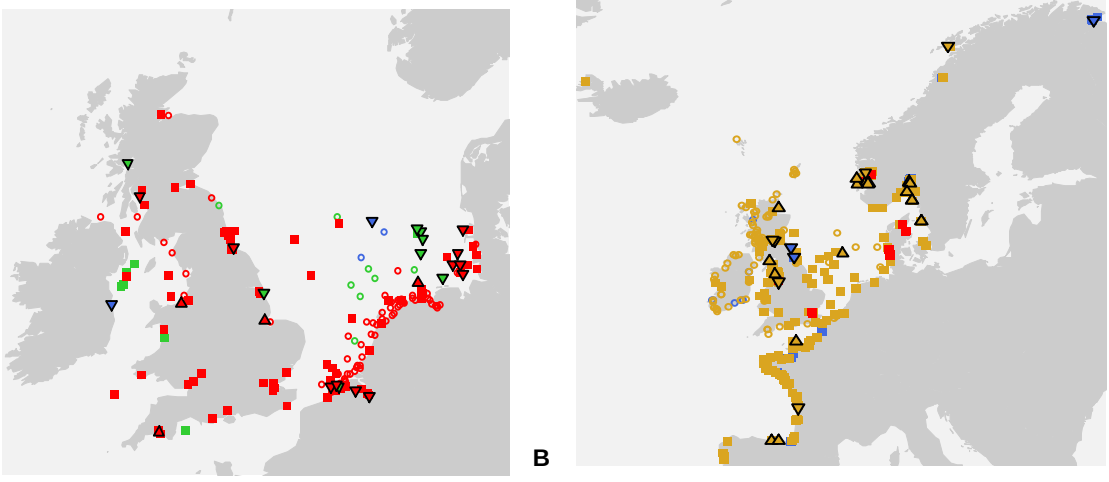
### *How does this affect the quality status?*

Almost all temporal trends in mercury concentrations in sediments are downwards. Both upward and downward temporal trends occur in biota. A number of upward trends of mercury in biota were detected in southern Norway. Concentrations of mercury in sediments indicate a risk of pollution effects in the southern North Sea, at many of the other locations monitored on coast of the UK, west coast of Norway and some locations in near urban industrialized areas in northern and southern Spain. Concentrations around the Dogger Bank are also high, but elsewhere in offshore areas of the North Sea are lower, and at background in some locations. Background concentrations also occur in parts of northern Scotland and in northern Norway. Mercury concentrations in fish and shellfish are at background at a large proportion of stations on the Channel coast of France, and the French and Spanish coasts of the Bay of Biscay. Background concentrations are also found at some stations in Ireland, Scotland, and western Norway. Concentrations above EU dietary limits occur mainly around Denmark and in certain industrialized estuaries in Norway and the UK. Elevated concentrations close to Iceland may be a consequence of geological conditions.



A B

*Status of mercury concentrations in (A) sediments and (B) biota: background (blue), acceptable (green) or below EU dietary limits (amber), and unacceptable (red)*



A B

*Temporal trends of mercury concentrations in (A) sediment and (B) biota: downward ▽, upward △, insufficient data for trend assessment ○*

*Electronic navigator to OSPAR publication sources (publication number):*

- ➥ Status and trend of marine chemical pollution (395/2009)
- ➥ Towards the cessation target (354/2008)
- ➥ Trends and concentrations in marine sediments and biota (390/2009)
- ➥ Trends in waterborne inputs (448/2009)
- ➥ Trends in atmospheric concentrations and deposition (447/2009)
- ➥ Background Document for mercury (100/2000) (as updated)