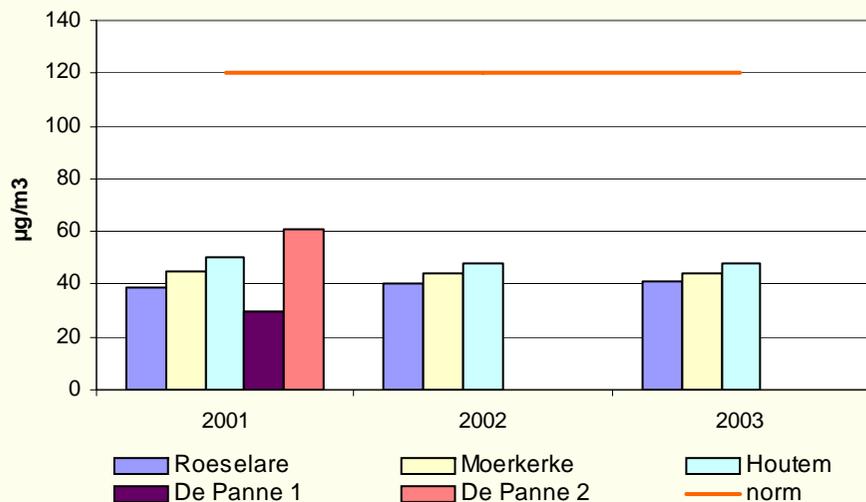
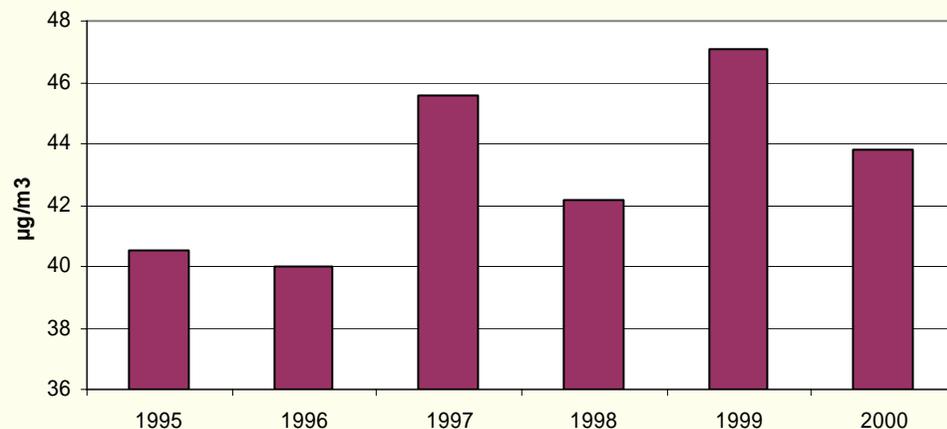


Indicator 22 Air quality

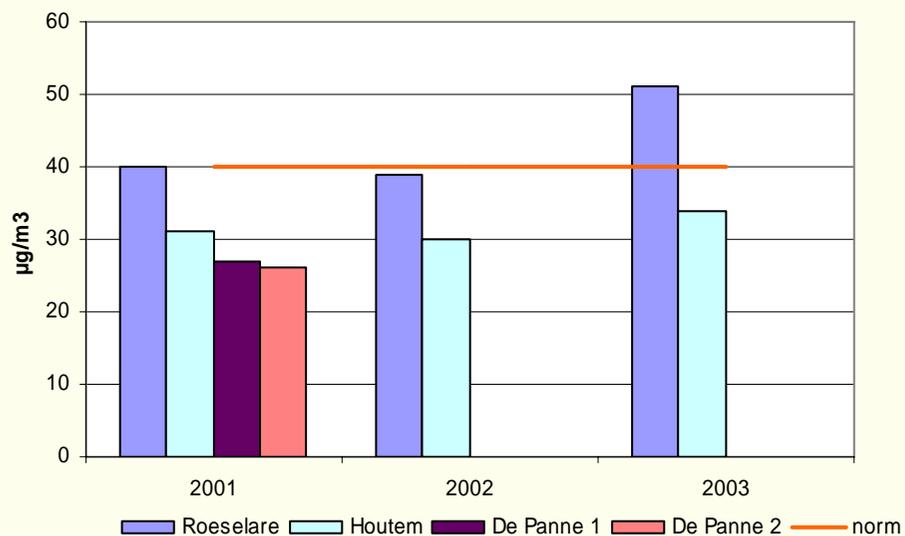
Ozone concentrations (daily average in $\mu\text{g}/\text{m}^3$) in West-Vlaanderen (VMM, 2001-2003)



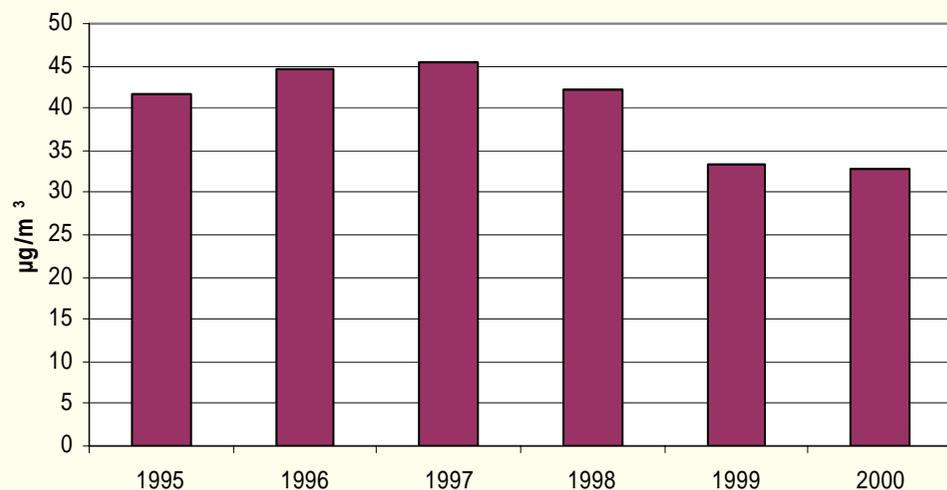
Ozone concentrations (daily average in $\mu\text{g}/\text{m}^3$) in Zeeland (LNL, 1995-2004)



PM-10 concentrations (daily average in $\mu\text{g}/\text{m}^3$) in West-Vlaanderen (VMM, 2001-2003)



Concentration of PM-10 (daily average in $\mu\text{g}/\text{m}^3$) Zeeland (LNL, 1995-2004)



Key Message

- International (CAMP-OSPAR) mandatory monitoring of substances in ambient air in the coastal stations of the Southern North Sea is not fully complied with in all SAIL countries.
- At most monitoring stations, measured concentrations of sulphur dioxide and nitrogen dioxide are below target levels; the levels of ozone and particulate matters, however, still exceed target and critical values in coastal stations.
- Transboundary and coordinated research is needed to enhance comparability and reliability of the monitoring results.

Why monitor air quality?

In the past, an important number of sanatoria and health centres were located along the Southern North Sea coast. Not only seawater but also the healing effect of the pure air attracted people to the seaside to revalidate or heal from lung diseases. After decades of increasing intensity in shipping, port and industrial expansion, and widespread urban development, the impact of contaminants in and along the North Sea has left its mark on air quality. Chronic and acute contamination of ambient air affects human health and deteriorates the natural environment, buildings and cultural heritage sites. It is caused by emissions from both mobile and point sources; these are directly linked to energy consumption, concentrations of industries, density of urban and transport networks and intensity of traffic on land and at sea.

Fine particulates (PM-10) have a diameter less than 10 micrometres and therefore can be carried deep into the lungs, where they may cause inflammation. PM-10 and Ozone are a concern for human health in general, specifically to people with heart and lung diseases. SO₂ and CO are related to acidification processes. Nitrogen may be absorbed by sea water and add to eutrophication and algal blooms.

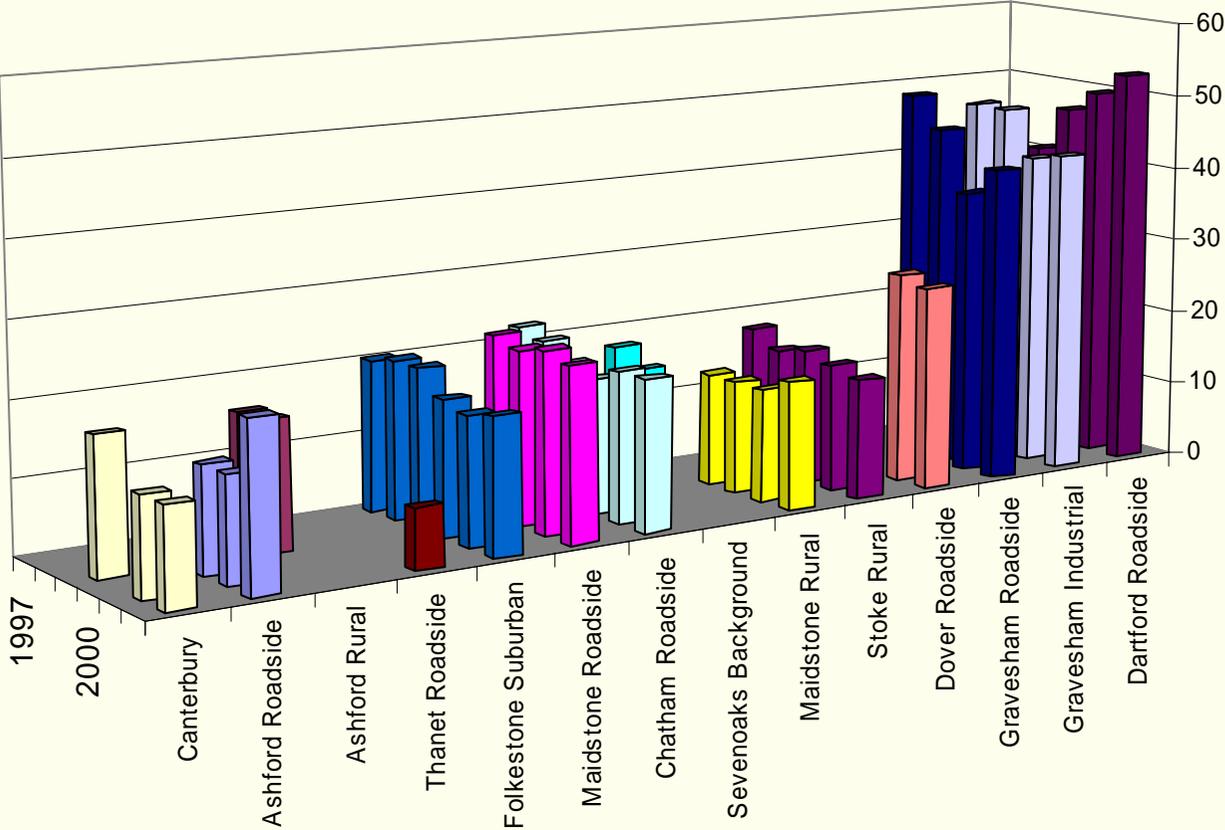
Where do the data come from?

Compliance with the EU Ozone Daughter Directive 2002/3/EC, obliges Member States to report data for the annual reference period. PM-10 data is annually submitted under the Exchange of Information Decision. Responsible authorities in the SAIL countries are the Vlaamse Milieu Maatschappij (VMM) in Flanders, Landelijk Meetnet Luchtkwaliteit (LNL)- Rijksinstituut voor Volksgezondheid en Milieu in The Netherlands; the networks of AREMA, Opal'Air and Hygeos in Nord-Pas de Calais (France). In Nord-Pas de Calais, a number of authorities are responsible for an extensive coverage of local monitoring networks. In the UK, a number of local authority networks have been set up to monitor air quality in Essex (Essex Air Quality Consortium), Kent (Kent Air Quality Monitoring Network) and the London Air Quality Network.

Transboundary cooperation between the monitoring networks of Flanders and Nord-Pas de Calais has enabled valuable comparison and interpretation of air quality and related processes.

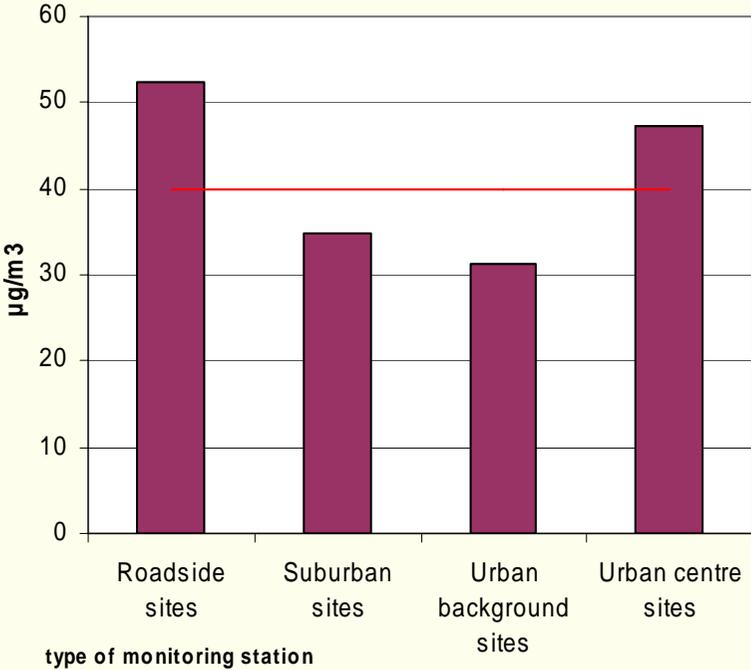


Concentration of Particulate Matter PM-10 ($\mu\text{g}/\text{m}^3$) in the UK (Kent Air Quality Monitoring Network, 1997-2002)



- Canterbury
- Thanet Roadside
- Chatham Roadside
- Stoke Rural
- Gravesham Industrial
- Ashford Roadside
- Folkestone Suburban
- Sevenoaks Background
- Dover Roadside
- Maidstone Rural
- Gravesham Roadside
- Ashford Rural
- Maidstone Roadside
- Gravesham Industrial
- Dartford Roadside

Concentration of SO₂ ($\mu\text{g}/\text{m}^3$) in Kent and the Thames region (Netcen, 2002)



What does the indicator show?

In a modelling study in the Thames corridor (EA, 1993), it was found that 70% of nitrogen dioxide was the result of emissions from motor vehicles. Levels of ozone and PM-10 exceed targets in a number of stations in the Thames area, and also at Stoke in Medway (roadside) station.

The limit value for PM-10 is $50\mu\text{g}/\text{m}^3$ (24 hour average) not to be exceeded for more than 35 days per calendar year, from 2005. The target value for Ozone is $120\mu\text{g}/\text{m}^3$ (maximum daily 8 hour mean), not to be exceeded on 25 or more days per year, from 2010.

PM-10 levels were also found to be particularly high at Dartford and Gravesham roadside stations, and Gravesham industrial site (1997-2002).

In Flanders, measuring stations at the coast record that NO_2 , SO_2 and ozone average daily concentrations ($\mu\text{g}/\text{m}^3$) remain below the norm. Sulphur dioxide concentrations are higher at Zeebrugge, although they remain below the norm ($120\mu\text{g}/\text{m}^3$). The average daily concentration of particulate matter PM-10 is higher in Roeselare (hinterland) than in coastal stations; it exceeded the norm in 2003. Although the results suggest an increasing trend, longer time-series are needed for interpretation.

In Zeeland, concentrations of PM-10 are close to limit value but seem to be decreasing over the period 1995-2000. Ozone concentrations fluctuate but remain far below target levels.

What are the implications for planning and managing the coast?

Air quality is a transboundary issue; it is therefore addressed by common legislation and norms or target values in the European context. The EU Ozone Daughter Directive 2002/3/EC established target values, long-term objectives, information and thresholds for Ozone. According to this Directive, which amends the former 92/72/EEC, Member States must inform the Commission on a monthly basis of observed exceedences of the information and alert ozone threshold values. Data for the annual reference period must also be reported. The PM-10 data is annually submitted under the Exchange of Information Decision.

Where air quality objectives are unlikely to be achieved, or targets values are frequently exceeded, local authorities may declare specific air quality management areas and/or intensify monitoring.

Under the Comprehensive Atmospheric Monitoring Program CAMP for the OSPAR Commission mandatory monitoring is required in coastal stations. In spite of its mandatory status, substances are not monitored in all OSPAR countries. In 2003, only 4 stations in the SAIL region (all located in Belgium) reported required monitoring results. France and the United Kingdom did not submit data for 2003. Transnational cooperation is crucial to assess reliability and to produce comparable results. Although there is a long way still to go, authorities in Flanders and Nord-Pas de Calais coordinate joint air quality research through specific projects (AEROSOL, EXPER/PF) and monitoring networks across the Channel have produced the first transnational databases on air quality, which can be consulted at:

<http://hygeos.net1.nerim.net:8080>.

How reliable is the indicator?

Meteorological variability is large and high ozone peaks are strongly dependent on weather conditions. Therefore, measuring stations need to monitor ozone concentrations on a regular basis, and geographical coverage of the monitoring network needs to be sufficiently large. Specific instruments applied for the monitoring of particulate matter (Belgium, The Netherlands), is known to underestimate actual concentrations and a correction factor is applied. It is not always clear whether this is consistently done in other monitoring networks. The CAMP-OSPAR monitoring reports on significant difference in quality control between countries.

