

THE AIR QUALITY OVER THE NORTH SEA: HAS IT CHANGED OVER THE LAST THIRTY YEARS?

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The presumed air quality is an important factor in the well-being of people visiting the North Sea coast. For more than three decades, we have been (partially) involved in objectively studying the atmospheric chemical composition above the North Sea and in other marine environments.

As far as atmospheric particles are concerned, the concentrations of e.g. toxic heavy metals are definitely lower at the coast, but mostly when the air masses come from the North. With easterly winds, the wind carries pollutants from all of West Europe; when the wind comes from the south, the industries of Northern France (e.g. steel industry) affect the air quality. Under the predominant Westerlies, the influence of Great Britain can be measured (e.g. from power plants, until recently), but still the levels are lower at the coast than far inland. Most of our measurements have been done by X-ray spectrometric methods, for both bulk and single particle analysis, on samples taken from airplanes and ships and at the coast. In general, the heavy metal levels have decreased significantly over the last two decades, not only for the North Sea but in general over Western Europe. Nowadays, the role of atmospheric particles (= 'fijn stof') in human health, the Global Climate Change and cultural heritage deterioration has become more important than the effect of its heavy metals on ecosystems.

Atmospheric deposition of nutrients could be an important factor in the eutrophication of the North Sea. We found that mostly gaseous ammonia, which derives from agriculture, is important here, and its levels at the Belgian coast are among the highest in the world. Also the deposition with the rain of particulate nitrate (derived from nitrogen oxides which are due to traffic) is relevant. Some decrease in these compounds has been noted, but the improvements have not been spectacular.

Iodine is 'well known' to be highly elevated at the coast. Some tourist brochures claim that the air over the German Wadden islands is 'saturated' with iodine! We have measured many different organic and inorganic, gaseous and particulate iodine species at the VLIZ station in De Haan, and indeed found the total iodine levels to be enhanced about tenfold at the coast than inland. But the daily needed intake of iodine for humans is about 100-times higher than what can be obtained by breathing a full day at the coast. Hence the physiological effect of iodine is definitely a myth, which has been around for a century or more, while no measurements had ever been done.