

Algal blooms

What is the issue?

Changes in ocean climate (sea temperature, salinity and stratification) could lead to changes in the incidence of harmful algal blooms (blooms with harmful consequences due to the release of toxins or by depletion of oxygen). For example, higher temperatures in the future could lead to better growth conditions.

What has happened and how confident?

Over the last few decades, changes in phytoplankton species in the European seas have created a situation of anomalous phytoplankton blooms, often associated with harmful consequences (i.e., HABs) on humans and the surrounding ecosystem (Hoepffner, 2006). This has been especially the case since the major hydroclimatic change (regime shift) that occurred in the mid-1980s, although increases are primarily restricted to specific habitats affected by lower salinities, such as the Norwegian Trench, and much higher temperatures, such as the German Bight (Raine *et al.*, 2008).

The increasing frequency of blooms and the potential harmful consequences have seen the development of regional and national programmes, such as EUROHAB (Granéli *et al.*, 1999). The EU-US scientific initiative on harmful algal blooms (EC-NSF, 2003) is an example of a thematic programme promoting new research in this area. The development of a common approach may lead to better understanding and management of local HAB events (Hoepffner, 2006).

What might happen?

In the future, higher temperatures may lead to better growth conditions, and increased stability (leading to increased water clarity), with the potential to favour the growth of some toxic and other HAB species (Raine *et al.*, 2008).

The major environmental variables associated with climate change that will affect HABs are:

- Increase in temperature.
- Increase in the frequency of storms.
- An increase in amount of flooding, particularly during the summer months.
- Alterations in the coastline due to sea-level rise.

It is, at present, difficult to assess the time-scale over which such changes will occur through lack of knowledge of the exact dependence of each species on any climatic variable (Raine *et al.*, 2008).

Are there any OSPAR regional differences?

See what has happened and what might happen sections above.

↪ [*Go to the full QSR assessment report on impacts of climate change \(publication number 463/2009\)*](#)

References

- EC-NSF, 2003. The EU-US Scientific initiative on Harmful Algal Blooms. Report from a Workshop jointly funded by the European Commission – Environment and Sustainable Development programme – and the US National Science Foundation (Trieste, Italy, Sept. 5-8, 2002).
- Granéli, E., Codd, G.A., Dale, B., Lipiatou, E., Maestrini, S.Y. and Rosenthal, H., 1999. EUROHAB. Science initiative. Harmful algal blooms in European marine and brackish waters. Energy, Environment and sustainable development. EUR 18592.

- Hoepffner, N. (Ed.), 2006. Marine and coastal dimensions of climate change in Europe. European Commission-Joint Research Centre, report EUR 22554 EN, Ispra, pp 107 (http://ies.jrc.ec.europa.eu/fileadmin/Documentation/Reports/Varie/cc_marine_report_optimized2.pdf)
- Raine, R., Edwards, M., Reid, P.C., Bresnan, E. and Fernand, L., 2008. Harmful Algal Blooms in Marine Climate Change Impacts Annual Report Card 2007–2008. (Eds. Baxter, J.M., Buckley, P.J. and Wallace, C.J.), Scientific review, 8 pp. www.mccip.org.uk/arc/2007/PDF/HABs.pdf