

Monitoring and prediction of harmful algae blooms in Norwegian coastal waters - the concept and experience from *Chattonella* events

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Algae blooms are an important and necessary part of the annual biological cycle of coastal and marine waters of the global oceans. However, some blooms may have harmful or even toxic effects on the natural life and impact human activities in the marine waters. The need for HAB monitoring and prediction is therefore evident. A regular network of 29 coastal stations does sampling during the main algae growth season and more frequently during identified HAB events and published through the web (<http://algeinfo.imr.no>) primarily for use by the aquaculture industry. Since 1998 the North Sea has been regularly monitored using various satellite earth observation technologies, including the Orbview-2 SeaWiFS, NOAA AVHRR and experimentally ERS and Envisat SAR. This information has been integrated, analysed and published for research purposes at the web-site <http://www.nersc.no/HAB>. Massive coastal and off-shore blooms of the specie *Chattonella* have been detected early in SeaWiFS images in 1998, 2000 and 2001 in the coastal Danish and Norwegian waters. During all years the development peak and decay of the blooms were monitored by integrated use of satellite and in situ data. A qualitative consistency was observed between the in situ observations and the satellite data of the bloom extent and development cycles. Regional algorithms for retrieval of phytoplankton chlorophyll, suspended sediments and dissolved organic matter are applied in order to improve the use of ocean colour Earth observation data products, as well as the evaluation of new sensors such as MERIS. In order to improve the HAB prediction capabilities the species specific description of *Chattonella* has been developed and implemented in the NORWECOM ecosystem model. An integrated approach of use of in situ and satellite data in combination with numerical prediction models are the essential and key components that will be demonstrated as parts of an operational (H)AB monitoring system.