



## Development of a deep chlorophyll maximum of *Heterocapsa triquetra* Ehrenb. at the entrance to the Gulf of Finland

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**ABSTRACT:** The development of a deep chlorophyll maximum (DCM) at a depth of 30-35 m was followed during a 15-d case study in July 1998 at the entrance to the Gulf of Finland. The study consisted of three 18-24-h periods of biological (chlorophyll a, phytoplankton, primary production), chemical (nitrate, phosphate) and physical (CTD, turbulence, vertical particle size distribution) measurements at an anchor station and six mesoscale towed CTD/ fluorometer mappings over the surrounding area. Exceptionally cold and windy weather led to a red tide of the dinoflagellate *Heterocapsa triquetra* instead of the cyanobacterial bloom that frequently occurs in late summer. Comparison of the estimated amount of nitrogen required for an *H. triquetra* bloom biomass with external loading affirmed that the bloom had been formed on the basis of the nitrate pool below the thermocline. The development of the bloom, therefore, led to the extremely deep nitracline. The DCM formed by *H. triquetra* developed at the top of the nitracline at an illumination of <0.1% of the sea surface illumination. A temperature-salinity analysis showed that the DCM was not caused by intrusions from inshore regions. It was concluded that the DCM was formed as a result of changing migratory behavior of *H. triquetra* after an upwelling event that fertilized the upper layer with phosphorus.

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