



Coccolithophore bloom size variation in response to the regional environment of the subarctic North Atlantic

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ABSTRACT: Several environmental/physical variables derived from satellite and in situ data sets were used to understand the variability of coccolithophore abundance in the subarctic North Atlantic. The 7-yr (1997-2004) time-series analysis showed that the combined effects of high solar radiation, shallow mixed layer depth (<20 m), and increased temperatures explained >89% of the coccolithophore variation. The June 1998 bloom, which was associated with high light intensity, unusually high sea-surface temperature, and a very shallow mixed layer, was found to be one of the most extensive (>995,000 km²) blooms ever recorded. There was a pronounced sea-surface temperature shift in the mid-1990s with a peak in 1998, suggesting that exceptionally large blooms are caused by pronounced environmental conditions and the variability of the physical environment strongly affects the spatial extent of these blooms. Consequently, if the physical environment varies, the effects of these blooms on the atmospheric and oceanic environment will vary as well.

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