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TITLE: From silk to satellite: half a century of ocean colour anomalies in the Northeast Atlantic

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ABSTRACT:

Abstract Changes in phytoplankton dynamics influence marine biogeochemical cycles, climate processes, and food webs, with substantial social and economic consequences. Large-scale estimation of phytoplankton biomass was possible via ocean colour measurements from two remote sensing satellites ? the Coastal Zone Colour Scanner (CZCS , 1979?1986) and the Sea-viewing Wide Field-of-view Sensor (SeaWi FS , 1998?2010). Due to the large gap between the two satellite eras and differences in sensor characteristics, comparison of the absolute values retrieved from the two instruments remains challenging. Using a unique in situ ocean colour dataset that spans more than half a century, the two satellite-derived chlorophyll-a (Chl?a) eras are linked to assess concurrent changes in phytoplankton variability and bloom timing over the Northeast Atlantic Ocean and North Sea. Results from this unique re-analysis reflect a clear increasing pattern of Chl?a, a merging of the two seasonal phytoplankton blooms producing a longer growing season and higher seasonal biomass, since the mid-1980s. The broader climate plays a key role in Chl?a variability as the ocean colour anomalies parallel the oscillations of the Northern Hemisphere Temperature (NHT) since 1948.

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