

OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Friday, October 12

Oral Session 12

14:00–15:20

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ZOOPLANKTON SUPER-SWARMS DETECTED FROM SPACE

The occurrence of super-swarms of the zooplankton *Calanus finmarchicus* in northern coastal waters off Norway has been known since early years of the 20th century, probably longer. For the first time we can report direct observation of these super-swarms from space using RGB imagery from the VIIRS ocean colour sensor. Extensive red patches in VIIRS imagery are shown to coincide with high concentrations of *C. finmarchicus*. Using serial addition measurements in a PSICAM absorption meter, we show that the red pigmentation of *C. finmarchicus* is sufficient to influence remote sensing reflectance. This is the first time a metazoan zooplankton species has been observed from space. There are important implications for monitoring this species which supports many commercially important fish stocks in the North Atlantic and which is itself commercially harvested for astaxanthin pigment. This study also raises fundamental questions about the potential influence of large, relatively sparse, coloured particles on ocean colour remote sensing signals and our ability to adequately measure associated optical properties in situ. In this case, by absorbing blue photons and reducing blue reflectance values, the presence of high concentrations of zooplankton negatively impact on the performance of blue-green reflectance ratio algorithms for chlorophyll concentration and diffuse attenuation. However, none of the currently available in situ IOP sensors have a sufficiently large sample volume to adequately sample these particles leading to a systematic underestimation of their presence and optical significance.

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