

# OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Wednesday, October 10

Oral Session 8

14:00–16:00

15:00–15:20

## **GLOBAL DECADAL SHIFTS IN COCCOLITHOPHORE BLOOM DISTRIBUTION**

Analyses of coccolithophorid bloom distribution during the CZCS (1978-1986) and SeaWiFS (1997-2010) era show large distributional changes in bloom occurrence; particularly in the mid- to high-latitude oceans. To bridge the observational gap between these two sensors, alternative bloom detection algorithms have been developed to exploit the available data from the visible channel of AVHRR. Despite being notably less sensitive than its ocean colour counterparts (3% vs SeaWiFS Channel 5), AVHRR-based approaches have been successfully used to identify and monitor coccolithophorid blooms in many high-latitude ocean cases. However, the lack of a consistent calibration across AVHRR platforms, and challenges in comparing multiple orbits, has prevented this approach from being applied to the global ocean until now. Here, we describe the production of a new, 40-year, global, remote sensing reflectance ( $R_{rs}$ ) data set, derived from the consistently calibrated and geolocated AVHRR top-of-atmosphere reflectances, provided by the NOAA v5.3 PATMOS-X 0.1 degree resolution climate data record. Coccolithophorid blooms, identified in this product, are validated where possible against contemporaneous ocean colour imagery. Time series analysis of coccolithophore occurrence, suggests marked shifts in bloom distribution, including a pronounced reduction in the mid-latitude North Atlantic, over a time period where climatic shifts have been shown to be demonstrable. Conversely, while bloom patterns in the high-latitude Southern Ocean (known as the Great Calcite Belt) are more episodic, they appear to be more robust, remaining undiminished into the 21st Century.

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