

# OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Wednesday, October 10

Poster Session 3

16:00–18:00

## **Poster 143**

### **TRUE COLOUR OF 1,400 NEW ZEALAND LAKES: CLEAN, GREEN AND PRISTINE?**

True colour is the colour of an object perceived by a human observer and can be derived using satellite-borne multispectral sensors. It does not suffer from the algorithmic difficulties hampering the retrieval of bio-geophysical variables in case 2 waters and therefore lends itself to the monitoring of inland waters across a range of optical water types. Our dataset of 44,947 observations of true colour in over 1,400 lakes in New Zealand was derived from Landsat 8 OLI. We found that 60% of lakes can be reliably categorised into blue, green and yellow colour bins. Thirty five percent of New Zealand's lakes are persistently yellow, indicating ubiquitous presence of optically active substances such as phytoplankton, suspended sediments or coloured dissolved organic matter. Blue water, indicating low levels of optically active substances, was found in 16% of lakes in our dataset and only 8% of lakes were predominantly green. About 40% of lakes show significant temporal variability in colour and flip between blue, green and yellow states. The time scales of transitions between colours vary between lakes and provide valuable insight into the mechanisms that drive lake ecology. For example, there are no blue or blue-green lakes in catchments where dairy pasture makes up more than 20% of land use. Due to the iconic status of lakes in New Zealand, water colour is regularly monitored by some regional authorities and remote sensing can help to manage these waterbodies more efficiently and provide ecological insights.

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