Monday, October 8
Oral Session 2
14:00–16:00

15:00–15:20

THE FUNDAMENTAL ROLE OF PHYTOPLANKTON SPECTRAL SCATTERING IN PFT DETECTION

There is increasing interdisciplinary interest in phytoplankton community dynamics as the growing environmental problems of water quality and climate change demand attention. This had led to a pressing need for improved biophysical, causal understanding of Phytoplankton Functional Type (PFT) optical signals, in order that satellite radiometry may be used to detect ecologically significant phytoplankton assemblage changes. Towards this goal, a series of investigations are undertaken here using a phytoplankton Inherent Optical Property (IOP) model which has biophysically and biogeochemically consistent absorption and scattering characteristics. Coupled with Hydrolight, it allows the systematic examination of algal assemblage characteristics in relation to the bulk optical water-leaving signal. The sensitivity of the optical signal to changes in accessory pigments and assemblage effective diameter is evaluated for a selection of PFT detection case studies. These optical signals can be isolated and assessed in terms of both their magnitude and their spectral location, with direct relevance to community discussions around the value of hyperspectral sensors and satellite measurement sensitivity requirements. The potential for identifying a PFT signal with confidence from the bulk water-leaving signal, against variability in other optical components (CDOM and BBS) is also discussed, and the fundamental role of phytoplankton scattering in the accessible PFT signal is demonstrated. The full code for the IOP model have been made freely available in Matlab and Python, and it is hoped that this will stimulate new discussion around the role of phytoplankton scattering in the PFT question, and in ocean optics generally.

Lisl Robertson Lain, University of Cape Town, lislrobertson@gmail.com
Stewart Bernard, CSIR, UCT, sbernard@csir.co.za