

OCEAN OPTICS XXIV

Valamar Lacroma Dubrovnik Hotel | Dubrovnik, Croatia | October 7–12, 2018

<https://oceanopticsconference.org>

Thursday, October 11

Poster Session 4

10:30–12:00

Poster 84

WATER COLOR AND BRIGHTNESS – NEW LIGHT SHED ON OLD QUESTIONS

Aided by a coupled atmosphere–ocean radiative transfer model, we revisit old questions about the perceived color and brightness of water: (1) To what degree is the ocean color determined by surface reflection of skylight, in contrast to being governed by water constituents? (2) Why do storms make oceans look green? (3) Why are some Norwegian mountain lakes green while others are blue? (4) Would an ocean of the ultrapure water presented at the previous Ocean Optics conference give violet oceans instead of blue? (5) Why would a hypothetical ocean without absorption be white? (6) Are oceans really so bright that they reflect enough ultraviolet radiation to explain why we easily get sunburned at sea, or to what degree do other factors contribute to the extra UV dose? When answering these questions, we calculate the angular dependent spectral radiance for different atmospheric and water conditions, color coordinates are obtained by applying the CIE color matching functions, which give fisheye plots showing the angular distribution of colors for varying conditions. Also, we do a brief detour to look at the blue light seen in the water surrounding nuclear power reactors, which is generated by electrons traveling faster than the speed of light in the water. Finally, we simulate the sunset and show that the ozone layer surprisingly becomes important for the perceived water color.

Børge Hamre, University of Bergen, Norway, borge.hamre@uib.no

Håkon Sandven, University of Bergen, Norway, hakon.sandven@uib.no

Arne Kristoffersen, University of Bergen, Norway, arne.kristoffersen@uib.no