18-O Does light pollution affect benthic primary producers in shallow streams?

Maja Grubisic [1] - Gabriel Singer [2] - Alessandro Manfrin [1] - Michael T. Monaghan [3] - Maria Cristina Bruno [4] - Franz Hölker [2]

Freie Universität Berlin & Leibniz-institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany [1] - Leibniz-institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany [2] - Berlin Center For Genomics In Biodiversity Research, Berlin, Germany [3] - Fondazione Edmund Mach, San Michele all'Adige, Italy [4]

The spread of the electrical artificial lighting worldwide continues to introduce artificial light at night into the environments that have not experienced nighttime illumination before, such as freshwater ecosystems adjacent to urban settlements. Light properties greatly influence photosynthesis and community structure and phenology of primary producers in aquatic systems, therefore changes in light quality, duration, intensity and natural light/dark patterns can potentially have numerous effects on these communities. We simulated night-time irradiance levels comparable with near shore street lighting in outdoor flume simulations to explore how artificial light at night may affect benthic primary producers. We measured biomass and community composition of autotrophs in biofilms at two different colonization stages in two seasons (spring and fall) and evaluated their susceptibility to altered light conditions. Biofilms at early colonization stages responded to nighttime illumination treatment with reduced biomass and increase in diatom content, compared to the biofilms grown under natural dark-light cycles. The responses were highly season-dependent. Contrastingly, pre-established communities were found to be resilient to the illumination treatment. Having in mind the important role of autotrophs in primary production and food webs, we conclude that aquatic systems dominated by biofilms in early colonization stages, such as shallow streams recovering after physical disturbances, may be particularly sensitive to light pollution.

18-O Relationship between satellite water surface reflectance and in situ estimations of water attenuation coefficient in a large reservoir.

M. Potes [1], M. J. Costa [1,2], R. Salgado [1,2], M. Morais [1], D. Bortoli [1], I. Kostadinov [3]

[1] Institute of Earth Sciences (ICT), Évora, Portugal; [2] Physics Department, University of Evora, Évora, Portugal; [3] Proambiente S.c.r.l., Emilia Romagna High Technology Network, c/o CNR Research Area, Bologna, Italy

It is intention of the team to present the relationship between the satellite remote sensing (Moderate Resolution Imaging Spectroradiometer) of spectral surface reflectance and in situ estimation of water column spectral attenuation coefficient. Periodic profiles of spectral downwelling irradiance are performed at Alqueva reservoir, southeast of Portugal, at four sites along the reservoir allowing a reasonable coverage of the surface of the reservoir. A new apparatus, developed by the team, is coupled to a portable spectroradiometer (ASD, Inc.) through a fiber bundle driven by a customized frame for underwater environment and to keep the tip pointing to the zenith direction. The apparatus presents a hemispherical tip (180º of field-of-view) allowing measurements to be independent of solar zenith angle. The profiles obtained throughout the water column can be used to estimate the spectral and broadband light attenuation coefficients. The attenuation coefficients are relevant for the water surface layer energy budget, in particular, this coefficient is important in the computation of the water surface temperature, which is a key parameter for heat and moisture transfers between the reservoirs and the atmosphere, namely by the lake models.

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18-P Does colour matter? Planktivorous fish and zooplankton prey perspectives in different ranges of the visible light spectrum.

Ewa Babkiewicz, Marta Czarnocka-Cieciura, Przemysław Dynak, Maciej Z. Gliwicz, Piotr Maszczyk

University of Warsaw, Department of Hydrobiology, Warsaw, Poland

Light is an important factor influencing capabilities of a planktivorous fish as a predator, and is also important to a planktonic animal as an information about the level of predation risk, therefore foraging activity of fish and depth selection behaviour of planktonic animals could be affected by different light spectrum. When estimating capture rates in a typical planktivorous fish (rudd) fed zooplankton prey at three different ranges of the visible-light spectrum, each at two different light intensities, we have found that it was 30% lower in the red than in the green band, and nearly 20%