



Comunicação oral - Quarta Sessão: Ecologia e conservação

Influence of oceanographic variables on methods of primary production rates in the São Sebastião channel

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It is a consensus that primary production (PP) studies in the ocean are important due to its role in the global carbon cycle. In the last few decades, efforts were applied to develop fast and non-invasive techniques to measure rates of PP to improve temporal and spatial data acquisition, and thus overcome the disadvantages and gaps associated with classical methods using incubation of samples. The aims of this work are: (1) to compare two techniques, Bio-optical (PPabs) and Active Variable Fluorescence (PPFire), to the classical method involving oxygen evolution by the planktonic community metabolism (represented here by the Gross Primary Production - GPP), and, (2) to determine the influence of oceanographic variables, such as temperature, salinity, chlorophyll-a concentration and Secchi Disk depth in PP prediction in the São Sebastião channel. Our results showed that GPP varied between 47.55 and 341.94 mg C m⁻³ d⁻¹, PPabs between 73.7 ± 6.9 and 454.9 ± 25.8 mg C m⁻³ d⁻¹ and PPFire between 9.0 and 57.8 mg C m⁻³ d⁻¹ in the summer of 2018. The relationships between methods were significant (GPP vs. PPabs, $p = 0.007$, GPP vs. PPFire, $p = 0.01$ and PPabs vs. PPFire, $p = 0.01$). A multiple linear regression test show that GPP ($p = 0.003$) and PPFire ($p < 0.001$) were predicted by surface temperature and chlorophyll-a concentration, and additionally, PPabs ($p = 0.007$) was also predicted by salinity. As expected, the compared methods yielded different PP magnitudes. Nonetheless, it is important to highlight that each method provides distinct ancillary information: GPP gives the gross primary production of the overall planktonic community, while PPabs supplies insights on pigments composition and species size, and PPFire adds phytoplankton cell photophysiology parameters. The correlations found between the PPs estimated from the different methods and both temperature and salinity indicate that all are sensitive to changes in local water masses, resulting from intrusions of upwelled South Atlantic Central Water as well as the input of diffuse freshwater discharges at the surface, which modulate light and nutrients availability. In conclusion, the significant proportionality found among each of the methods encourage further uses of non-invasive methods (PPabs and PPFire) to improve the temporal and spatial resolution of PP regionally. In addition, the supplemental information provided by each method incites the development of hybrid models in the future.

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