

Poziv na predavanje/Seminar invitation

“Fragility of primary production”

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14:00/2pm CET
16. Studenog 2021./16. November 2021

PAG, IIIkat/ PAG III floor

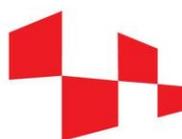
Rooseveltov trg 6, 10000 Zagreb

Link: <https://zoom.us/j/97695055269>

Ecosystem fragility is an often-used term in oceanography yet to this day it lacks a precise and widely accepted definition. Defining and subsequently quantifying fragility would be of great value, for such measures could be used to objectively ascertain the level of risk marine ecosystems face. Risk assessments could further be used to define the level of protection a given ocean region requires from economic activity, such as fisheries. With this aim the concepts of marginal production and fragility are defined for marine photosynthesis, the base of the oceanic food web. It is demonstrated that marine photosynthesis is always fragile with respect to light, implying variability in surface irradiance acts unfavourably on biomass, whereas it can be both fragile and antifragile with respect to mixed-layer depth, implying variability in mixed-layer depth can act both favourably and unfavourably on biomass. Quantification of marginal production and fragility is presented on data from two open ocean stations: Hawaii Ocean Time Series and Bermuda Atlantic Time Series. The calculations are then placed in a dynamical context using a model with stochastic forcing. Seasonal cycle of biomass is modelled and the effect of asymmetries in the response of primary production to mixed-layer depth variability is analysed. A new tipping point for marine phytoplankton is discussed. Using the new definitions presented here a rich archive of data, thus far untapped in this context, can be used to quantify primary production fragility. The presented definitions can also be used to predict when primary production enters the fragile state during the seasonal cycle.



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