

XXV Congresso AIOL – Plenary lectures

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Plenary lecture

Long-term changes in the phytoplankton community under climate change and other anthropogenic drivers (northern Adriatic Sea)

Important information about the functioning of marine pelagic ecosystems can be derived from the study of planktonic time series. Such studies, with a historical perspective in time and space, are primarily used to distinguish unsystematic natural variability from trends or shifts in coastal ecosystems that are often associated with anthropogenic disturbances, e.g. eutrophication superimposed on climate change impacts in the last decade.

The northern Adriatic Sea (NA) is a semi-enclosed coastal ecosystem characterized by sharp gradients in nutrients, chlorophyll-a, and productivity with distance from major riverine inputs of freshwater and nutrients. Due to its extensive river basin, it has long been considered one of the most productive areas of the Mediterranean, experiencing frequent episodes of various aspects of anthropogenic eutrophication in the decades from the 1970s to about 1990s, and finally undergoing cultural oligotrophication in the mid-2000s. Besides the general lowering of trophic status, evidenced by a decrease in chlorophyll-a, the most striking feature from the time series

spanning more than three decades (1985-2018) is the increase in seawater temperature, particularly in the last decade in the northernmost part of the NA, the Gulf of Trieste (0.14 °C year⁻¹ and 0.12 °C year⁻¹ at the surface and above the bottom, respectively). The effect of increased temperature is most evident in precipitation, leading to alternating droughts and floods on pluriannual to multidecadal scales. These features coupled with human activities lead to unbalanced nutritional conditions in the seawater. The complexity of anthropogenic drivers and their impacts on the phytoplankton that dominate primary production in this coastal ecosystem is assessed at the community level, as changes in the phenology of phytoplankton taxa and specifically of species responsible for Harmful Algal Blooms.

Biosketch

Assoc. Prof. Dr. Patricija Mozetič was awarded a Ph.D. in biology in 1997 at the University of Ljubljana (Slovenia). Her research activities cover the study of the role of phytoplankton in coastal pelagic food web (diversity, biomass, and abundance of phytoplankton, photosynthetic properties and primary production), study of harmful algal blooms, long-term changes in phytoplankton community in relation to climate change and eutrophication and implementation of the EU directives (WFD and MSFD) in the national water policy. In 2018, she was appointed head of Marine Biology Station Piran. For more than a decade, she was being assigned the leader of two national monitoring programs. She attended several phytoplankton courses, joined the Spanish scientific expedition Malaspina 2010 and obtained grants as a visiting scientist in Italy and the USA. From 2002 onwards, she is the national representative of the Intergovernmental Panel on Harmful Algal Blooms of the UNESCO IOC-HAB program. Since 2013, she is also employed at the University of Primorska and holds lectures at undergraduate and master's study programs. She was the mentor of three Ph.D. students. Until now, she published 58 scientific and professional articles, 3 chapters in monographs, 70 presentations at scientific meetings.

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Selected publications

Brush, M.J., Mozetič, P., Francé, J., Bernardi Aubry, F., Djakovac, T., Faganeli, J., Harris, L.A., Niesen, M. 2021. Phytoplankton dynamics in a changing environment. In: Malone, T.C., Malej, A., Faganeli, J. (eds.). Coastal ecosystems in transition: a comparative analysis of the northern Adriatic and Chesapeake Bay, (Geophysical monograph series). AGU: Wiley. DOI: 10.1002/9781119543626.ch4.

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