

## XXV Congresso AIOL – Plenary lectures

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*Plenary lecture*

### **Disentangling the ecological role of natural and anthropogenic disturbance in marine ecosystems: from detection to solutions**

Disturbance can be defined as a phenomenon composed of discrete, often unpredictable, events over time which undermine ecosystems' stability through direct and indirect effects influencing the performance of individual organisms, whose consequences pervade all hierarchical levels of ecological organization. Anthropogenic disturbance has pervaded the entire biosphere and, to date, >40% of the global ocean is exposed to multiple stressors (e.g., pollution, destructive fishing practices, overfishing, aquaculture, spread of invasive species, eutrophication, oil and gas operations, offshore renewable energy search and development, coastal engineering and development). In spite of the huge conservation efforts and the continuous implementation of environmental management measures aimed at preserving marine ecosystems' abilities to produce goods and services needed for human wellbeing, the global oceans are experiencing unprecedented rates of change. In addition to these disrupting factors, climate change (CC) is severely impairing marine habitats' integrity and ecosystems' functioning. Using examples from recent research outcomes, I will delineate the potential risks of synergistic effects of natural and anthropogenic

disturbance on a selection of marine ecosystems and habitats and will provide a vision on possible solutions to counteract, wherever possible, or adapt to global change effects on marine ecosystems.

### *Biosketch*

I'm Full Professor of Ecology and Coordinator of the Biology School at the University of Cagliari and Vice-President of the Italian Society of Ecology. I've been President (2016-2019) and Vice-President (2012-2015) of the Italian Association of Limnology and Oceanography. Formerly Associate Professor (2008-2015) and Senior Researcher (1998-2008) at the Polytechnic University of Marche (2008-2015), PhD in Marine Environmental Sciences (University of Genoa, 1997) and Degree in Biology (University of Cagliari, 1991). I coordinate the project "Marine habitats restoration in a climate change-impaired Mediterranean Sea" (2020-2022) and participated in many local, national and international projects. I carried out my research in several marine ecosystems, from transitional ecosystems to the oceans' hadal depths. My research interests deal with the trophodynamics of marine benthic ecosystems and ascertaining how they vary in response to different typologies of natural or anthropogenic disturbance, including climate change. I authored >140 articles in international ranked journals, currently score a Hirsch factor of 43 and >5000 citations (SCOPUS, April 2021). Since July 2017 I'm included in the Top Italian Scientists list (Natural & Environmental Scientists) of VIA. I'm currently the Co-Editor in Chief of *Advances in Oceanography and Limnology* (AIOL Journal).

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### *Selected publications*

- Pusceddu A., Mea M., Canals M., Heussner S., Durrieu de Madron X., Sanchez-Vidal A., Bianchelli S., Corinaldesi C., Dell'Anno A., Thomsen L., Danovaro R. (2013) Major consequences of an intense dense shelf water cascading event on deep-sea benthic trophic conditions and meiofaunal biodiversity. *Biogeosciences*, 10: 2659-2670
- Pusceddu A., Bianchelli S., Martín J., Puig P., Palanques A., Masqué P., Danovaro R. (2014) Chronic and intensive bottom trawling impairs deep-sea biodiversity and ecosystem functioning. *Proceedings of the National Academy of Science of the United States of America* 111(24): 8861-8866
- Pusceddu A., Frascchetti S., Scopa M., Rizzo L., Danovaro R. (2016) Meiofauna communities, nematode diversity and C degradation rates in seagrass (*Posidonia oceanica* L.) and unvegetated sediments invaded by the algae *Caulerpa cylindracea* (Sonder). *Marine Environmental Research*, 119: 88-99
- Bianchelli S., Buschi E., Danovaro R., Pusceddu A. (2016) Biodiversity loss and turnover in alternative states in the Mediterranean Sea: a case study on meiofauna. *Scientific Reports*, 6: 34544. doi: 10.1038/srep34544; ISSN: 2045-2322

- Paradis, S., Pusceddu, A., Masqué, P., Puig, P., Moccia, D., Russo, T., Iacono, C. Organic matter contents and degradation in a highly trawled area during fresh particle inputs (Gulf of Castellammare, southwestern Mediterranean). *Biogeosciences* 16(21) 4307-4320.
- Cau A., Avio G.C., Dessì C., Follesa M.C., Regoli F., Pusceddu A. 2019. Microplastics in the crustaceans *Nephrops norvegicus* and *Aristeus antennatus*: Flagship species for deep-sea environments? *Environmental Pollution*, 255(1), article 113107