



FISH AND CLIMATE CHANGE: 2 SEMINARS

Aula C1 'MONROY' ore 15.00

Dipartimento di Scienze della Terra e del Mare

11 Luglio 2023



OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY GRADUATE UNIVERSITY

MSc. MICHAEL IZUMIYAMA

Marine Climate Change Unit, Okinawa Institute of Science and Technology (OIST), Japan

Utilizing volcanic CO₂ seeps to study the adaptive potential of fish communities to climate change. Understanding if and how fishes will adapt to climate change is essential in understanding the future of fish populations. Unique CO₂ seep sites provide a natural analog to predicted future ocean conditions under climate change and offer the opportunity to understand how fishes may be able to adapt to these extreme environments. We collected fishes from CO₂ seep and nearby control reefs and examined the differentially expressed genes in the brain and gill. Our study provides insight into the genetic mechanism for adaptation to climate change and highlights the importance of natural analogs of future oceans to study how fishes will respond to climate change.

Michael Izumiyama is a PhD student of the Ravasi Lab, Marine Climate Change Unit at the Institute of Science and Technology (OIST) in Okinawa (Japan) and collaborates with the International CO₂ Natural Analogues (ICONA) Network. Michael's research aim is the understanding of the impacts of climate change on marine fish using evolutionary biology and ecology approaches, with a focus on fish adaptation to future ocean conditions.





Dr DAVIDE SPATAFORA

Shimoda Marine Research Centre (SMRC), Tsukuba University, Shimoda City, Shizuoka, Japan

Natural analogues provide valuable insights on the potential mechanisms for fish adaptation and acclimation in the face of changing ocean conditions. Natural analogues are characterized by temporal and spatial environmental fluctuations and are home to pre-adapted 'biodiversity' (e.g., organisms chronically exposed to high CO₂ conditions). Therefore, these spots provide a unique opportunity to investigate the ability of the fish to acclimate or adapt to future ocean conditions thus informing us about how they may adjust in a future world. Here, we reported evidence for local behavioural adaptation and/or acclimatization to projected ocean acidification conditions of fish living around the Vulcano Island natural CO₂ vent (Southern Italy). The responses of two temperate fish species, characterized by a limited home range, have been investigated and compared between fish from low-pH/high pCO₂ sites and fish from control sites. Furthermore, we presented a transplanting experiment conducted in Palau's Nikko Bay (last month) to assess ecological and genetics responses of tropical fish to several environmental disturbances (e.g., high CO₂, sedimentation, hypoxia). Overall, these studies will contribute towards understanding the potential resilience of fish under future ocean conditions.

Davide Spatafora is a postdoctoral researcher in a joint project between the University of Tsukuba & ICONA (International CO₂ Natural Analogues Network). Davide's research interests focus on understanding the impacts of environmental changes on marine communities. Currently, he is particularly interested in predicting the potential for fish behavioural, physiological and molecular local adaptation to projected future ocean conditions at CO₂ seeps.

