



ΤΜΗΜΑ ΒΙΟΛΟΓΙΑΣ

Πανεπιστημιούπολη Βουτών, Κτήριο “Φώτης Καφάτος”,
Τ.Κ. 700 13, Ηράκλειο Κρήτης
E-mail: secbio@uoc.gr, Τηλ.: 2810 394400-3

DEPARTMENT OF BIOLOGY

Voutes University Campus, “*Fotis Kafatos*” Building,
GR 70013 Heraklion, Crete, Greece
E-mail: secbio@uoc.gr, Tel.: +30 2810 394400-3

Lecture of the Department of Biology, UNIVERSITY OF CRETE

We invite you to attend the event

On MONDAY / OCTOBER 20, 2025 /12.00 -13.30

“An introduction to ECCO and Darwin, two key ingredients for building a world-class global ocean biogeochemistry and plankton ecology model”

Dimitris Menemenlis, Moss Landing Marine Labs, San José State University, CA, USA.

Ioannis Tsakalakis, Hellenic Center for Marine Research, Crete, Greece.

The lecture will be hosted on Amfitheater B, Department of Biology

Abstract

For understanding the present-day climate, the extent to which it is changing, the places in which heat and nutrients are being moved, the uptake of carbon from the atmosphere, and a host of other scientific questions, we need systematic syntheses of the diverse and sparse available observations with our best understanding of the principles determining ocean circulation, chemistry, and plankton ecology.

The first required ingredient is good ocean physics. For the past three decades, the Estimating the Circulation and Climate of the Ocean (ECCO) project has been producing a quantitative depiction of the time-evolving global ocean state by combining most available ocean observations with a General Circulation Model. A distinguishing characteristic of ECCO ocean state estimates is that they conserve mass, heat, and tracers, making them ideal for biogeochemical applications.

The second ingredient is a realistic ocean plankton model. The Massachusetts Institute of Technology Darwin model simulates plankton communities and their interactions with the environment, linking cellular processes to large-scale ecological patterns. The Darwin model has contributed to our knowledge of phytoplankton biogeography and biodiversity patterns, carbon and nutrient cycles, and climate change impacts in the global ocean ecosystem.

Together, ECCO and Darwin provide a powerful tool for studying questions central to society, for example, the ocean carbon cycle and the health and diversity of plankton ecosystems, which bring energy to the entire ocean food web and regulate climate through photosynthesis and carbon export.

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<https://www.researchgate.net/profile/Dimitris-Menemenlis/3>

