Jan 16th, 4:00 PM - 5:00 PM

Unlocking Past Ocean Circulation And Climate Changes Using Benthic Foraminifera

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MONTCLAIR STATE UNIVERSITY

The MSU Sustainability Seminar Series Presents:

Unlocking past ocean circulation and climate changes using benthic foraminifera

WHEN: January 16, 4:00 pm
WHERE: CELS 120 lecture hall

Dr. Chiara Borrelli
University of Rochester

Dr. Borrelli is an interdisciplinary scientist working with a group of unicellular organisms called foraminifera. She has a B.S. and M.S. in Marine Biology from the Polytechnic University of Marche (Ancona, Italy) and a Ph.D. in Geology from Rensselaer Polytechnic Institute (Troy, NY). Currently, Dr. Borrelli is a Research Associate and Lecturer at the University of Rochester (Rochester, NY). In her research, Dr. Borrelli aims to better understand the connections between the environment and the foraminiferal chemical and isotopic composition to address questions related to past changes in ocean circulation, climate, and sedimentary biogeochemical cycles. In addition, she is very interested in better comprehending biomineralization processes in foraminifera.

The analysis of the chemical and isotopic composition of calcareous benthic foraminifera is a widely used approach to reconstruct changes in ocean circulation and climate through time. In the first part of the seminar, I will present the application of the “traditional” benthic foraminiferal oxygen and carbon isotope ratios to reconstruct ocean circulation changes in the North Atlantic during the greenhouse-icehouse transition, one of the most important climatic and oceanographic transitions of the last 50 million years. In addition, I will present microscopy and spectroscopy data revealing a novel biomineralization strategy in a particular foraminiferal species called *Melonis barleeanus*. In the second part of the talk, I will show some preliminary data regarding the development of novel approaches to study methane dynamics and biogeochemical cycles in marine sediments today and in the geological past. In particular, the “non-traditional” benthic foraminiferal hydrogen and sulphur isotope ratios look very promising for studying methane fluxes in marine sediments, whereas the investigation of the benthic foraminiferal S/Ca, Mn/Ca, and Fe/Ca can provide some insight on modern and past changes of the carbon, sulfur, manganese, and iron cycles as consequence of methane release, methane oxidation, and availability of dissolved oxygen in sediments.