PhD course in Sustainable Development and Climate Change University School for Advanced Studies IUSS Pavia - 39° cycle



# PLANKTONIC FORAMINIFERA AS PROXY FOR CLIMATE CHANGE Laura Bellentani



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### INTRODUCTION

Foraminifera are single-celled microorganisms which create a calcium carbonate shell capable of fossilizing and recording surrounding environmental variables. They are very abundant in marine environments and their abundance, widespread distribution, and rapid evolutionary capacities have made them important indicators for studying past environments, climate change, and evolutionary processes.

## Tutor: Prof. Anna Sabbatini

#### OBJECTIVE

Investigate if planktonic foraminifera *Neogloboquadrina pachyderma* trapped in the sea-ice: (1) develop a different adaptive morphological design of their tests compared to those living in the seawater column, and if (2) these different morphological designs evolve in a unique sea-ice species confirmed also by elemental and morphological analyses.

## MATERIALS AND METHODS Study Area



### **Sample Collection**



Isolation of Foraminifera in cell slides	Count and identification of Foraminifera under stereomicroscope	Petri dish with sample	Washed sample (volumetric standardization at 250 ml)	Wash and siev samples with filter 10 – 63 µm, 63 – >150 µm	ve the in sizes: 150 µm,	Samples in for	malin
FUTURE ANALYSIS				Last Chamber (f)	<sup>23</sup> Na/ <sup>44</sup> Ca	<sup>24</sup> Mg/ <sup>44</sup> Ca	
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Morphometric faunal analysis with Scanning Electron Microscope (SEM)				Ultrastructural and geochemical analysis			

#### **EXPECTED RESULTS AND IMPACT**

The shell of foraminifera act as natural archives that record information about the environmental conditions at the time its formation. If the morphological characteristics of the *N. Pachyderma* of the ice show differences compared to the one in the water column and sediment, Can we use this specific foraminifera elemental signature as proxy for paleoclimatic



#### this will be an important proxy for geological and sedimentary climatic



reconstructions?