



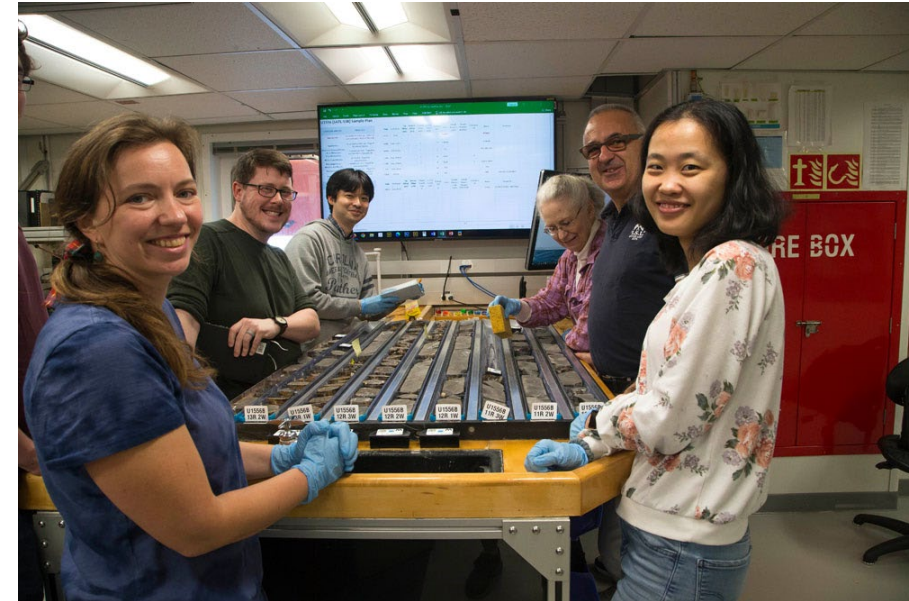
Forams in Sediments: Witnesses and Recorders of Ocean Oxygen

Yi Wang, Tulane University
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100 μm

Who am I?

- Yi Wang (she/her), Assistant Professor, Tulane University
- Originally from China
- Which is the furthest place you have travelled away from home? [South Atlantic??](#)
- One fun fact about you? [Love going to museums!](#)





RT



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Anything you'd like to share about yourself (e.g., subjects you teach, a fun fact, etc?)

All responses to your question will be shown here

Each response can be up to 200 characters long

Turn on voting to let participants vote for their favorites



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Planet Earth 2025 spring



What did you learn from last class?

0 responses

mass extinctions
eras eons
relative age
calculate relative age



What type of faulting would be most likely to occur along divergent boundary?



What did you learn from last class?

0 responses

earthquake
half lives
rock age
faults
parent isotopes



Anything you'd like to share about yourself (e.g., subjects you teach, a fun fact, etc?)

0 responses



How do we get historical records?

Marine sediments from ocean coring/drilling

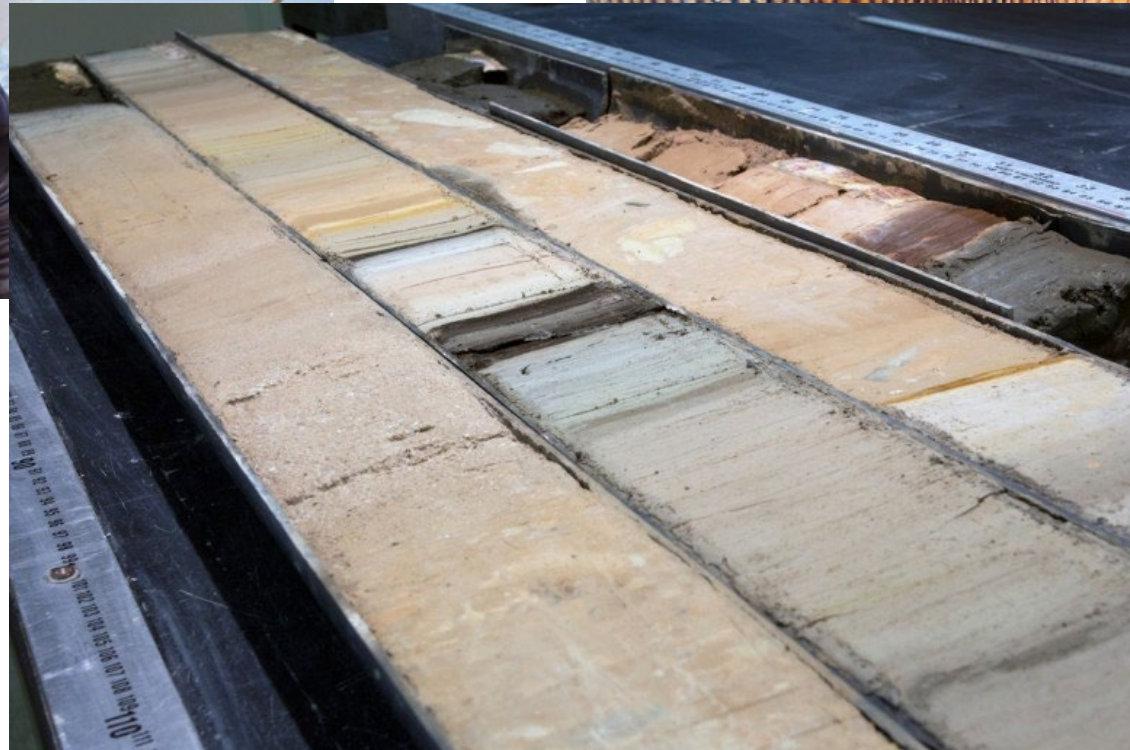


Photo credit: NASA and Eos

How do we get historical records?

Cupcake coring activity

- Look at the cupcake and make a prediction on what it looks like inside.
- Push a straw into the cupcake, and then pull out to retrieve a core. Does the core match your expectation?
- Compare your core with your neighbor. What are the differences and similarities?
- Enjoy your cupcake after the activity!



How do we get historical records?

In reality the idea is the same – use **gravity/mechanical force to penetrate seafloor**

Go on a research vessel first!



How do we get historical records?

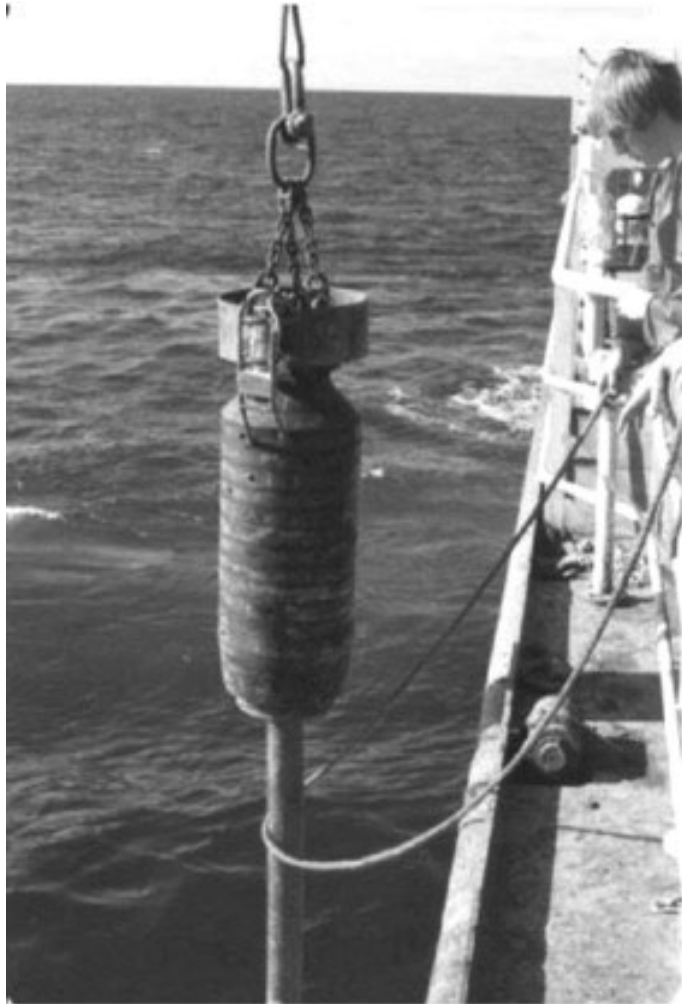
Multicorer

https://www.youtube.com/watch?v=xv55_ITJsAM



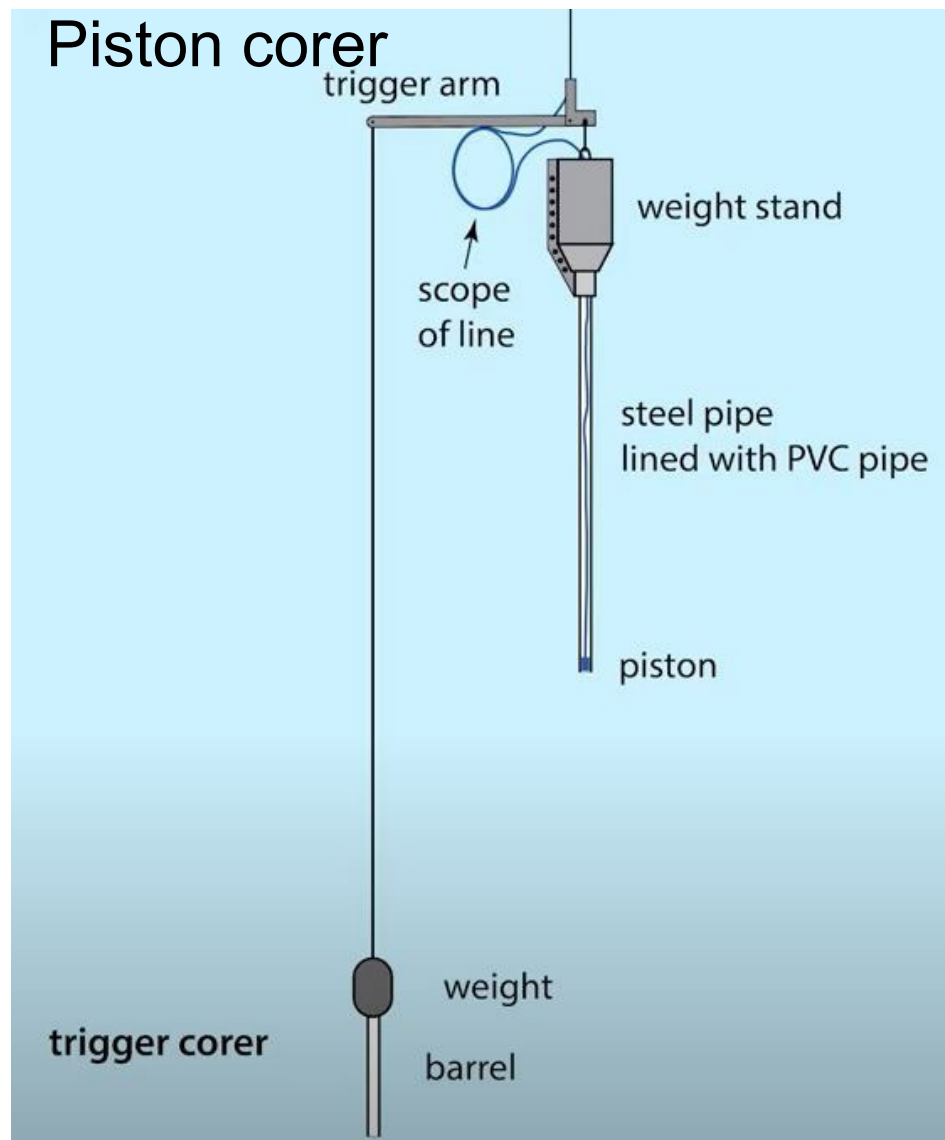
How do we get historical records?

Gravity corer



How do we get historical records?

Piston corer



How do we get historical records?

Pick a spot!



Assemble the core



Labels first



How do we get historical records?

<https://www.youtube.com/watch?v=NvOencTxiRA>



Lowering down the core



Core recovered!

How do we get historical records?



You will tour a real core facility at WHOI in the afternoon!

How do we get historical records?

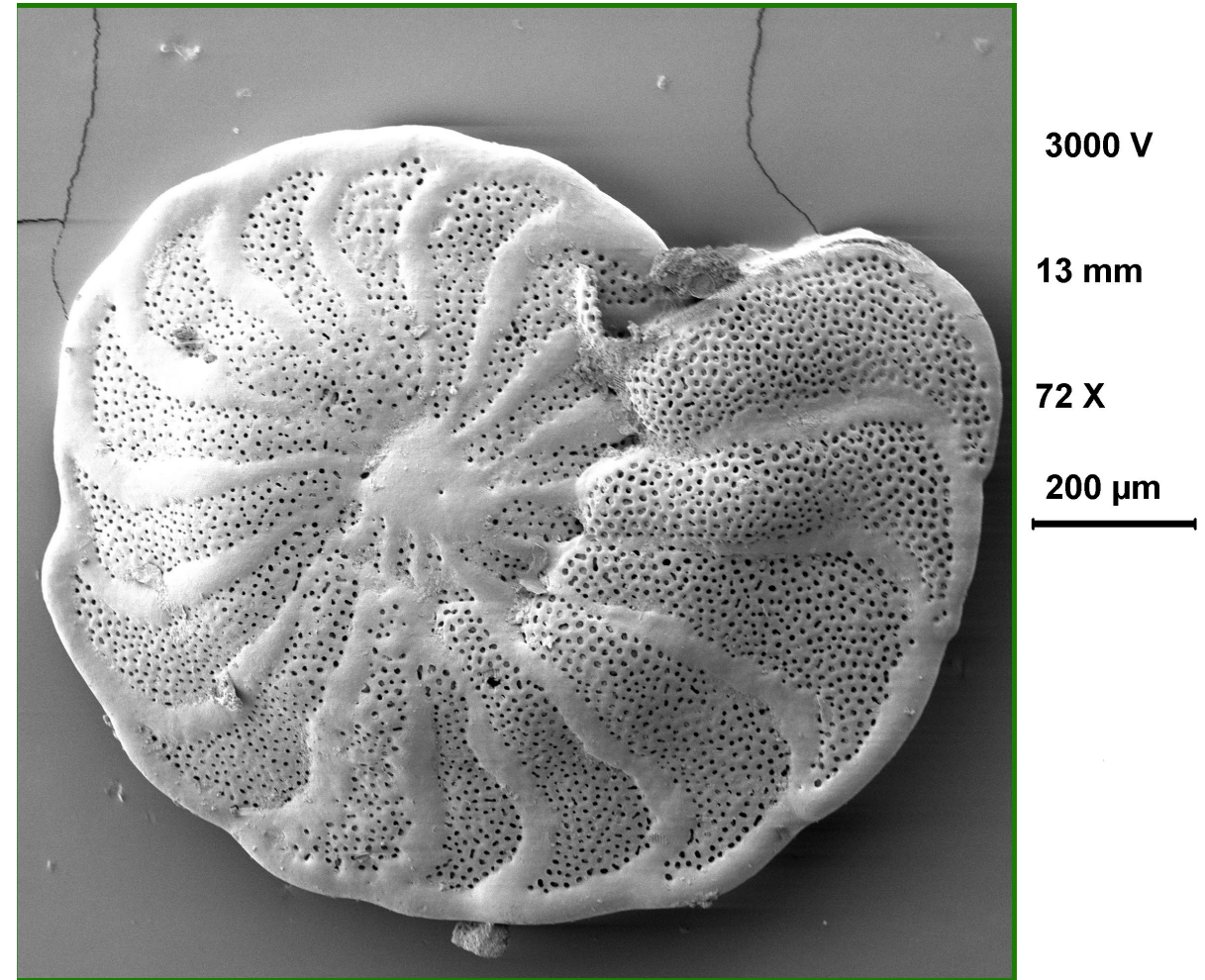


And you will try separating some forams from sediments this afternoon!

How can forams help us determine past oxygen?



Leaf stomata for gas exchange and water loss control

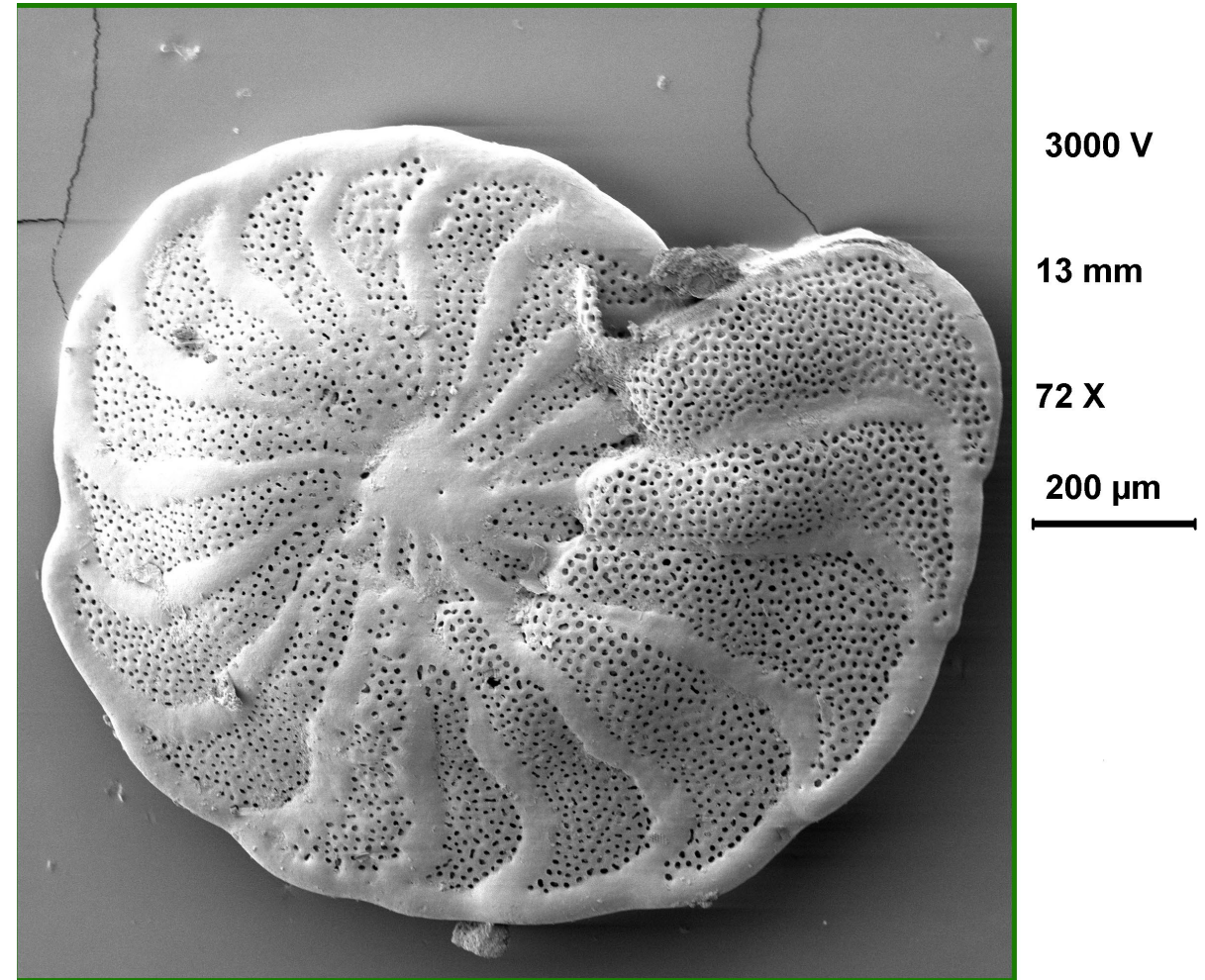


Foram pores for gas exchange, nutrients, and/or organic carbon (food)

How can forams help us determine past oxygen?



Lower CO₂, more stomata needed to get enough CO₂ for photosynthesis

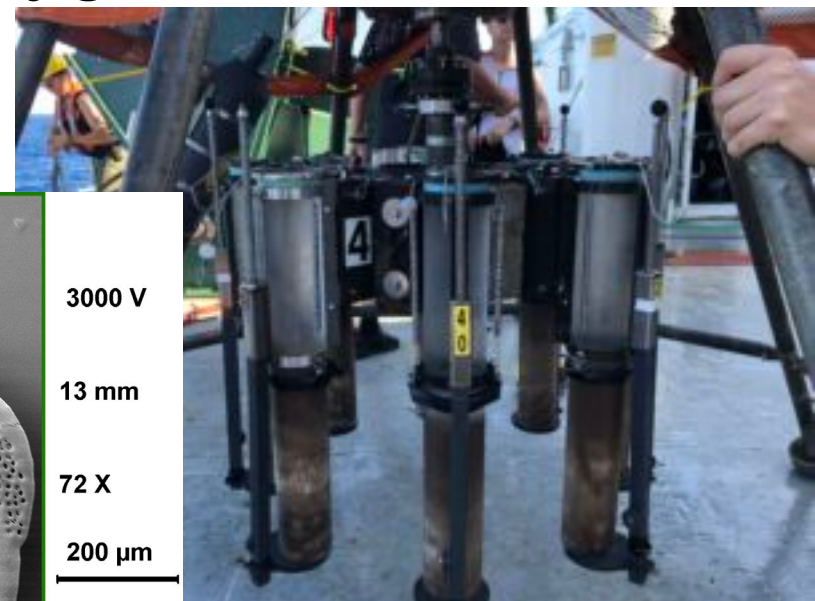
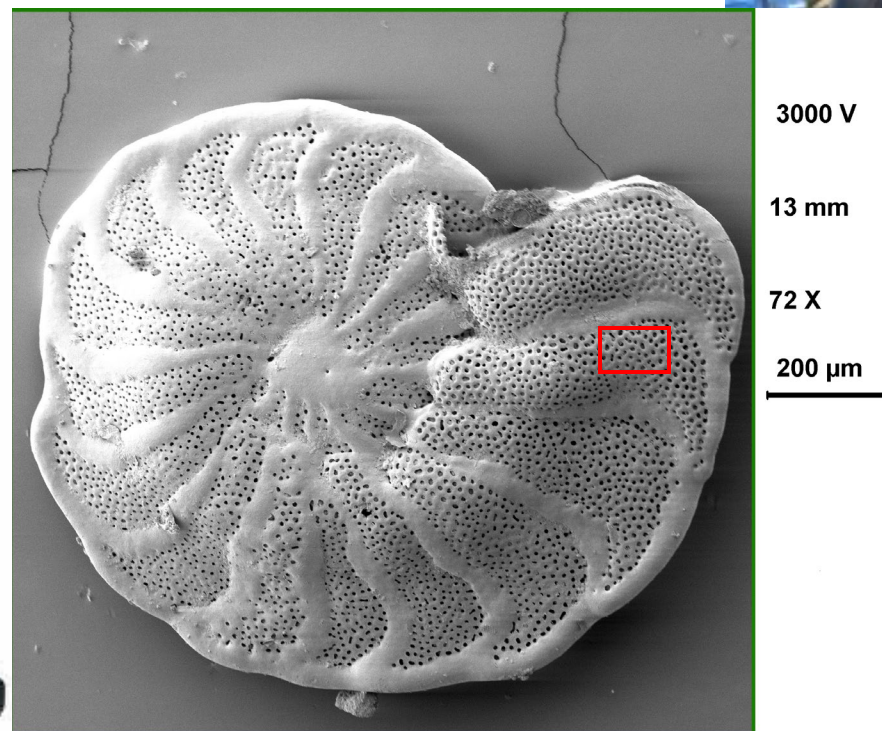


Lower O₂, higher porosity needed to get enough O₂ for respiration

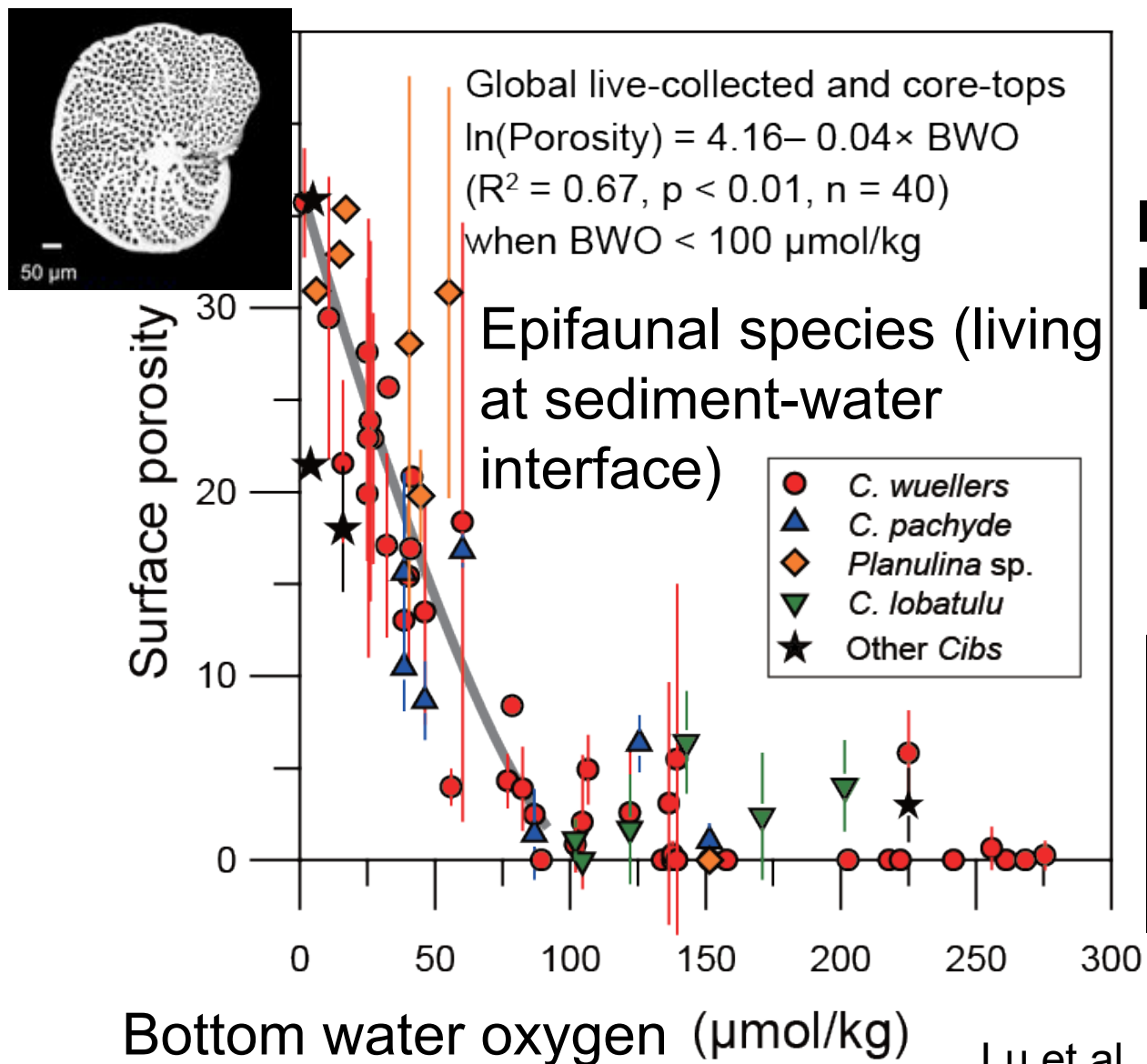
How can forams help us determine past oxygen?



Scanning Electron Microscope
(SEM)



How can forams help us determine past oxygen?



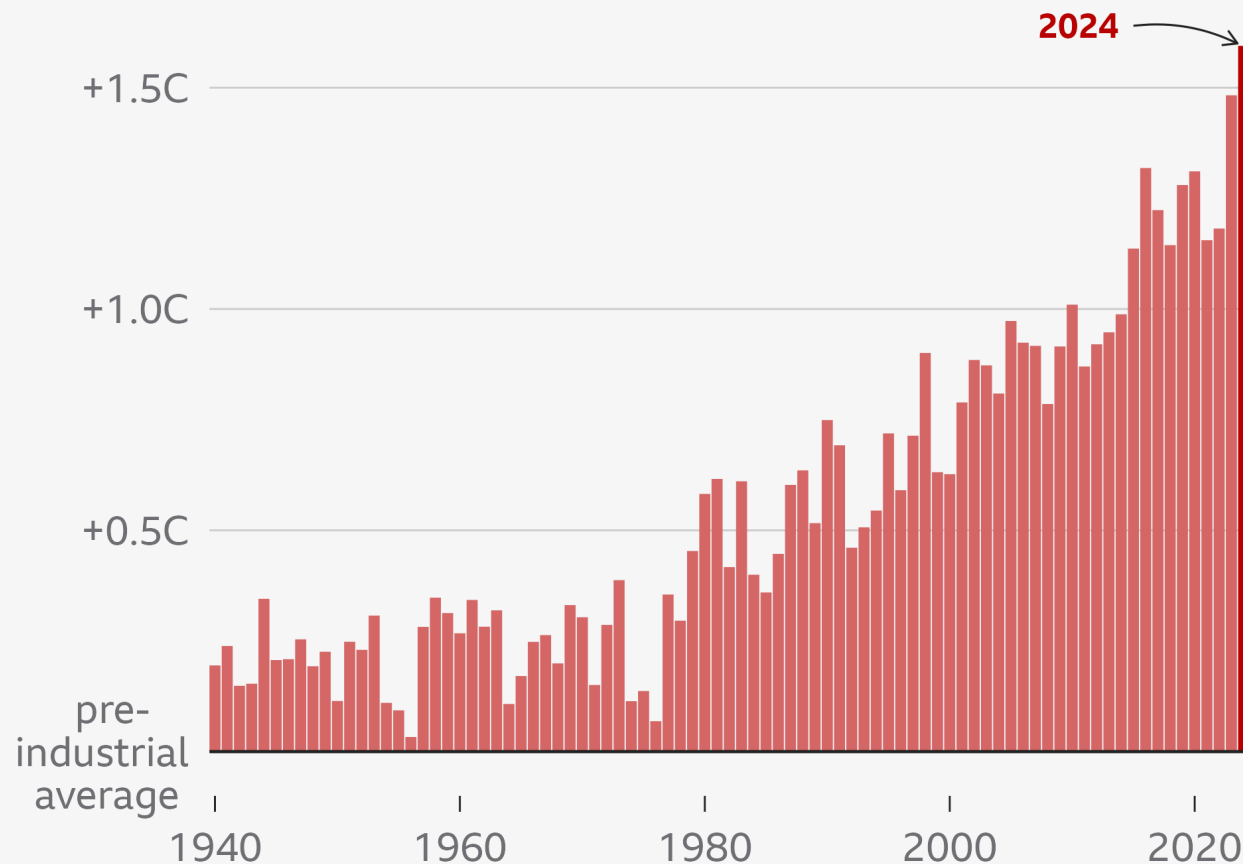
**Low O_2 ,
higher porosity**



Past warm periods and implications for future

2024 set to be hottest year on record

Global average temperature by year, compared with the pre-industrial average, 1850-1900



Provisional estimate for 2024, based on January to October temperatures

Source: ERA5, C3S/ECMWF

BBC

2024 first year to pass 1.5C global warming limit

9 January 2025

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Mark Poynting, Erwan Rivault and Becky Dale

BBC Climate & Verify data journalism teams

AP

WORLD U.S. POLITICS SPORTS ENTERTAINMENT BUSINESS SCIENCE FACT CHECK ODDITIES BE WELL NE

Mark Carney Pennsylvania plane crash Josh Allen contract Davante Adams Sudiksha Konanki missing

AP SETS
SUPPORT

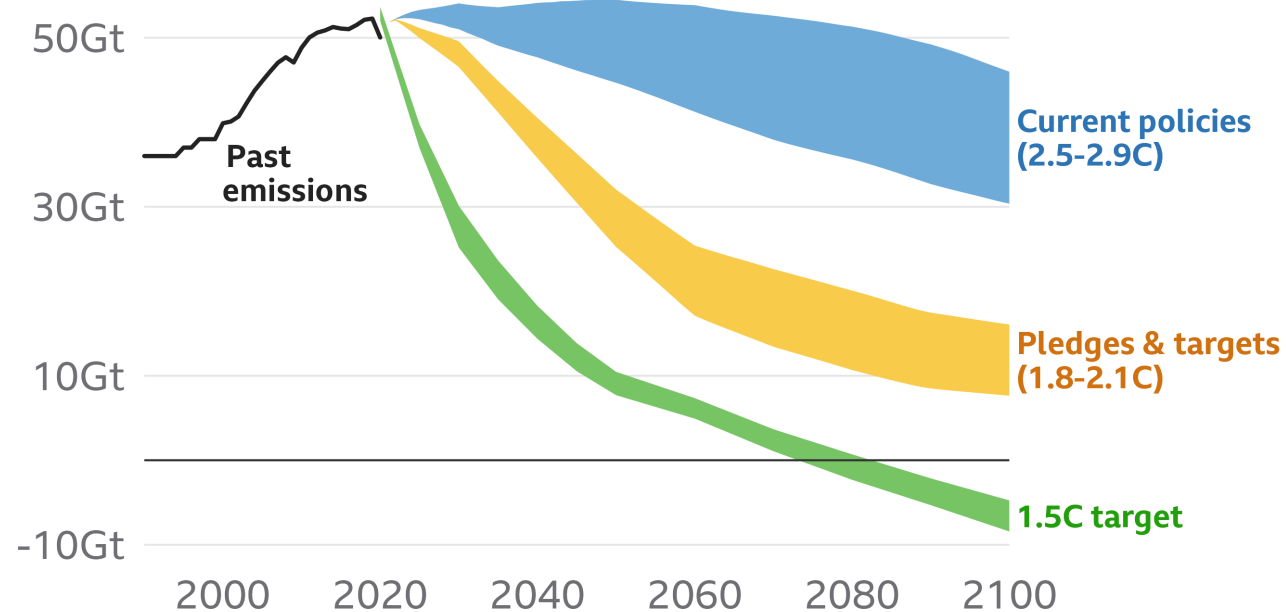
CLIMATE

Earth breaks yearly heat record and lurches past dangerous warming threshold

Past warm periods and implications for future

How close is the world to its 1.5C target?

Projected greenhouse gas emissions and future warming levels vary by actions taken



Emissions measured in gigatonnes of carbon dioxide equivalent

Source: Climate Action Tracker, Dec 2023. Broad lines show possible range **B B C**

2024 first year to pass 1.5C global warming limit

9 January 2025

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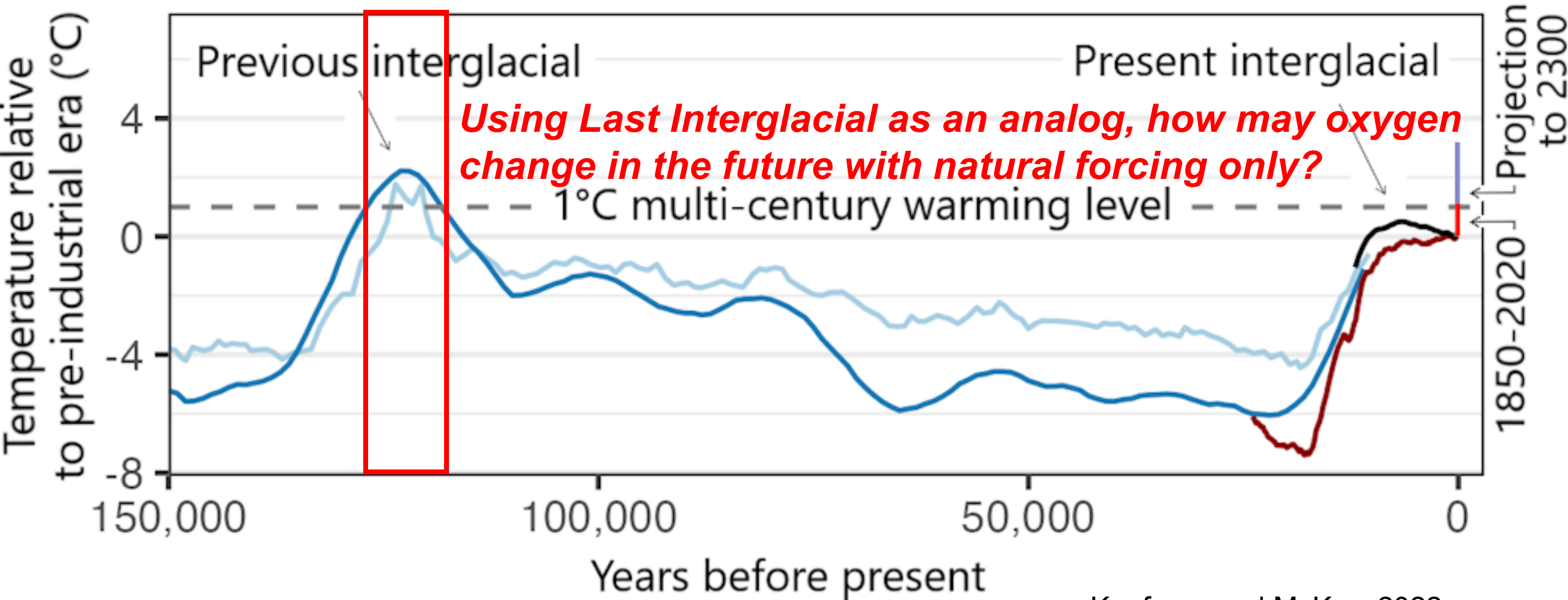
Mark Poynting, Erwan Rivault and Becky Dale

BBC Climate & Verify data journalism teams

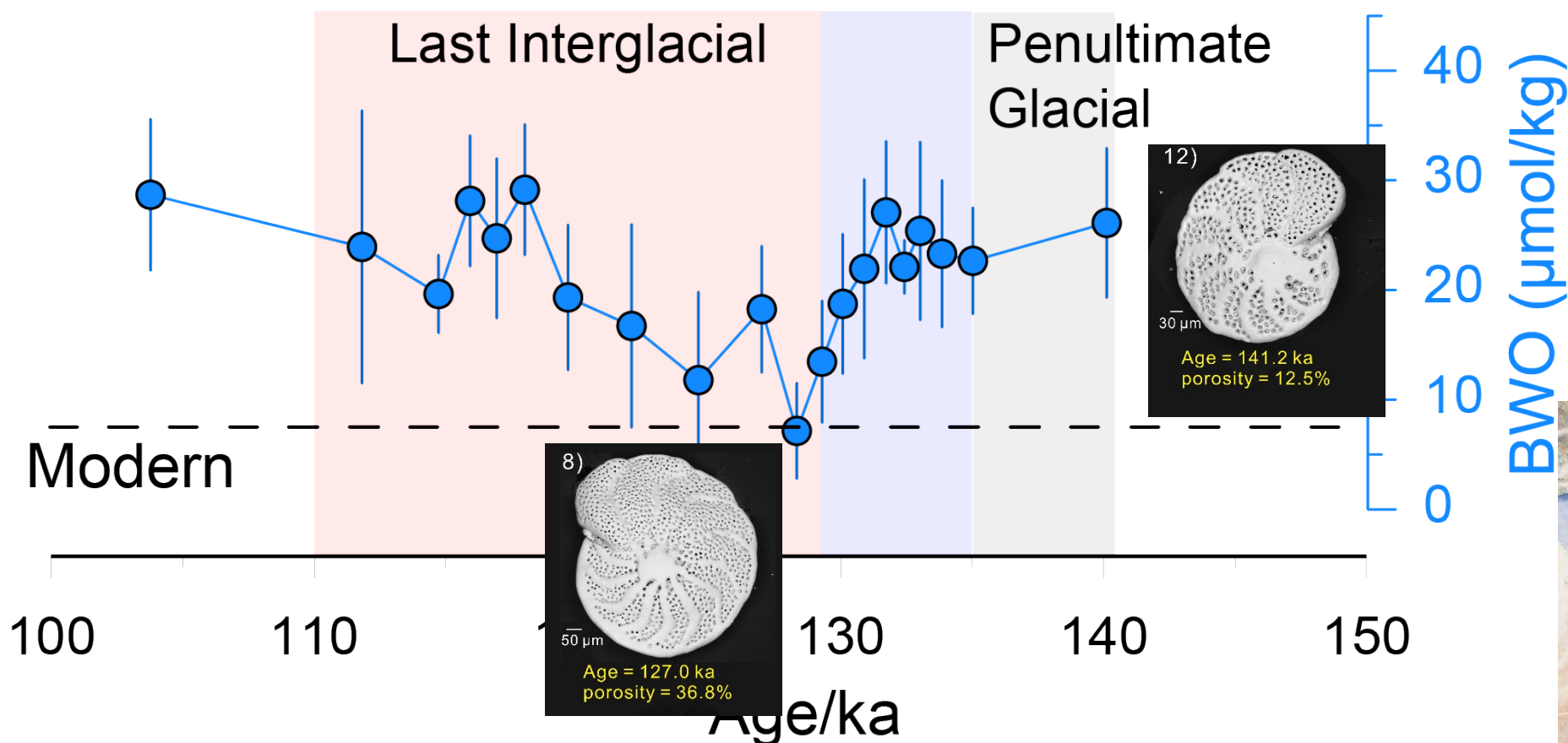


Past warm periods and implications for future

Last Interglacial (~125,000 years ago)



Last Interglacial Arabian Sea oxygen



Last Interglacial had even higher average bottom water oxygen than today



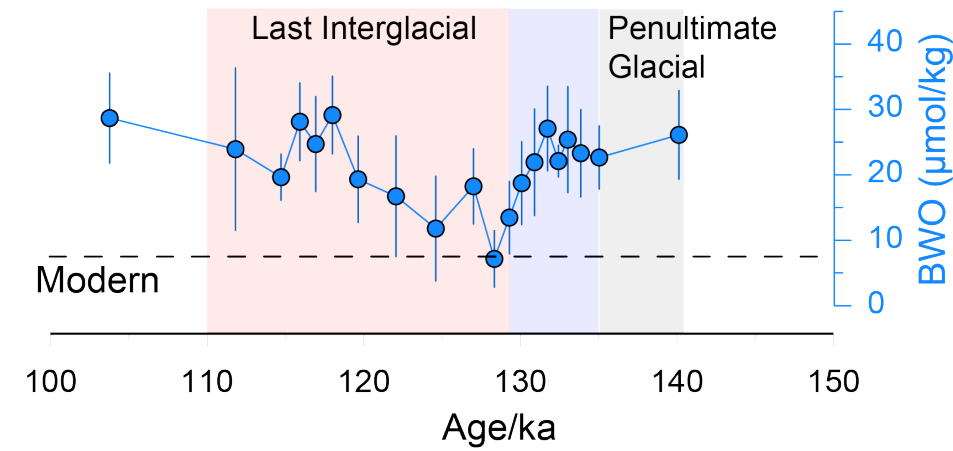
Dr. Fang Qian



Last Interglacial Arabian Sea oxygen

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What does it mean for the future? Hopes? Challenges?



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Choose a slide to present

Why did you choose this class (no wrong answer!)

RT response

In this photo A is __, B is ____ and C is _____

0 0 0
Option 1 Option 2 Option 3

