

## **Matthew W. Schmidt, Ph.D.**

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### **ACADEMIC APPOINTMENTS**

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| 2014-present | <b>Associate Professor</b><br>Department of Ocean and Earth Sciences<br>Old Dominion University, Norfolk, VA  |
| 2013-2014    | <b>Associate Professor</b><br>Department of Oceanography<br>Texas A&M University, College Station, TX   |
| 2007-2013    | <b>Assistant Professor</b><br>Department of Oceanography<br>Texas A&M University, College Station, TX   |
| 2005-2007    | <b>NOAA Climate and Global Change Postdoctoral Fellow</b><br>School of Earth and Atmospheric Sciences<br>Georgia Institute of Technology, Atlanta, GA |

### **EDUCATION**

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| <b>Ph.D., 2005</b> | <b>Geology, University of California, Davis</b><br>Major Professor: Dr. Howard J. Spero                                    |
| <b>M.S., 1997</b>  | <b>Geology, University of South Florida</b><br><b>Outstanding Master's Thesis Award, 1998, University of South Florida</b> |
| <b>B.S., 1993</b>  | <b>Geology and Fine Arts (with Honors), Vanderbilt University</b>  |

### **RESEARCH EXPERIENCE**

I am currently working on three funded research projects spanning the tropical Atlantic, Pacific and Indian Oceans. The first project involves developing a new paleo-salinity proxy based on Na/Ca ratios in planktonic foraminifera using a suite of sediment core tops spanning the subtropical/tropical Oceans. Based on initial results from nine Atlantic core tops, salinity is the dominant factor controlling shell Na/Ca ratios in *Trilobatus sacculifer*. However, the initial calibration needs to be expanded across a wider range of salinities and in other ocean basins. The major goal of this project, therefore, is to develop species-specific global calibrations that can be used at any location.

The second project involves reconstructing how the Eastern Equatorial Pacific (EEP) mean state and ENSO varied across the millennial-scale climate events of the last deglaciation. The magnitude of these abrupt climate events make them the ideal natural experiment to test how the system will evolve in the near future. By utilizing a unique combination of multi-proxy methods together in a single study, this project will generate records of surface and subsurface

temperature, thermocline temperature variance, upper-water column hydrography and upwelling variability from targeted time slices in the EEP across the last glacial cycle.

Finally, I am working on a project focused on: 1) where and how atmospheric carbon dioxide was sequestered from the atmosphere, or ventilated from the ocean, on millennial timescales, and 2) how these carbon dynamics are related to both changes in atmospheric and oceanic circulation over the last glacial period. To address these objectives, an integrated suite of multiple proxies are being measured on several high accumulation rate sediment cores previously collected from the EEP. I am measuring Boron/Calcium (B/Ca) ratios in planktic and benthic foraminifera as a proxy for carbonate ion concentration in surface and bottom waters of the EEP. By investigating the storage of a respired carbon pool in the deep ocean and how it altered the pH of surface and bottom waters during cold periods of the last glacial period, this collaborative research will shed light on the mechanistic links between ocean (stratification/ventilation) and atmospheric (wind belt shifts) circulation and the modification of atmospheric CO<sub>2</sub> levels.

### **KEY PUBLICATIONS** (\*denotes student author, †denotes postdoc author)

- 1) Watkins, C.\*, **Schmidt, M.W.** and Hertzberg, J.E.† (2021). Calibrating *Trilobatus sacculifer* Na/Ca ratios from Atlantic core-tops as a proxy for sea surface salinity. *Paleoceanography and Paleoclimatology*, 36, e2021PA004277.
- 2) Glaubke, R.\*, Thirumalai, K., **Schmidt, M.W.**, and Hertzberg, J.E.† (2021). Discerning changes in high-frequency climate variability using geochemical populations of individual foraminifera. *Paleoceanography and Paleoclimatology*, 36, e2020PA004065.
- 3) Loveley, M., Marcantonio, F., Wisler, M., Hertzberg, J.E., **Schmidt, M.W.**, and Lyle, M. (2017). Millennial-scale iron fertilization of the Eastern Equatorial Pacific over the past 100,000 years. *Nature Geoscience*, 10, 760-764. \*Chosen for News and Views highlight.
- 4) Hertzberg, J.E.\*, **Schmidt, M.W.**, Smith, R., Shields, M., Bianchi, T. and Marcantonio, F. (2016). Comparison of eastern tropical Pacific TEX<sub>86</sub> and *Globigerinoides ruber* Mg/Ca derived sea surface temperatures: Insights from the Holocene and Last Glacial Maximum. *Earth and Planetary Science Letters*, 434, 320-332.
- 5) Xie, R.\*, Marcantonio, F., and **Schmidt, M.W.** (2014). Reconstruction of intermediate water circulation in the tropical North Atlantic during the past 22,000 years. *Geochimica et Cosmochimica Acta*, 140, 455-467.
- 6) Hertzberg, J.E.\* and **Schmidt, M.W.** (2013). Refining *Globigerinoides ruber* Mg/Ca paleothermometry in the Atlantic Ocean. *Earth and Planetary Science Letters*, 383, 123-133.
- 7) **Schmidt, M.W.**, Chang, P., Hertzberg, J.E.\*, Them, T.R.\*, Ji, L., and Otto-Bliesner, B.L. (2012). Impact of Abrupt Deglacial Climate Change on Tropical Atlantic subsurface temperatures. *Proceedings of the National Academy of Sciences*, 109, 36, 14348-14352.

### **HONORS**

**Allen G. Marr Prize, 2006**, University of California, Davis, for most distinguished dissertation in the fields of Mathematics, Physical Sciences, Engineering and Social Sciences