

## CURRICULUM VITAE

### Casey Saenger

Graduate Student

Paleoceanography

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### Education

2004-2009: Ph.D. in Marine Geology & Geophysics. Focus on Paleoceanography  
Massachusetts Inst. of Technology, Woods Hole Oceanographic Inst.

2002: B.S. Geology, Bates College. *Summa cum laude*. minor in Music

### Primary Research Interests

Tropical and subtropical Atlantic paleoclimate reconstructions over the past 2000 years

Marine carbonate biomineralization

Detection/attribution of human and natural forcings in the climate system

### Dissertation

*Low latitude Atlantic sea-surface temperature variability over the past millennium.*

Human influences on climate must be detected above the background of natural variability. Despite the climatic impact of north Atlantic ocean temperatures, little is known about the region's natural variability at decadal to centennial timescales. Using coralline and foraminiferal trace metal ratios in conjunction with general circulation models, I have investigated low latitude north Atlantic climate variability over the past 1,000 years. My major conclusions are 1) ocean temperatures have likely oscillated within a range of  $\sim 1.5^{\circ}\text{C}$  since 1,000 A.D. 2) present low-latitude Atlantic temperatures may not be unprecedented 3) multidecadal temperature oscillation may not be a persistent, predictable mode of Atlantic variability. 4) periods of increased tropical Atlantic aridity were probably accompanied by cooler tropical ocean temperatures

### Awards

2007: WHOI Ocean Ventures Fund research grant

2007: The Climate Project selection for training by Al Gore in communicating climate change

2006: American Geophysical Union citation for excellence in reviewing, Paleoceanography

2006: WHOI Ocean and Climate Change Institute research grant

2004: National Science Foundation Graduate Student Fellowship

### Teaching Experience

2007: Boston University guest lecturer in Depts. of Geology, and Environmental Geoscience

2004: Georgetown University guest lecturer in Dept. of Science Tech. and International Affairs

### Professional Experience

2004 – present: Graduate Student, MIT/WHOI, Cambridge/Woods Hole, Massachusetts

2002-2004: Research Scientist, U. S. Geological Survey, Reston, Virginia

2000-2002: Teaching Assistant, Bates College, Lewiston, Maine

### Shipboard Experience

2004: Shipboard Scientist on SSV Corwith Cramer

2003: Shipboard Scientist on R/V *Marion-Dufresne*

## Publications:

- Saenger, C.**, Chang, P. Ji, L. Atlantic Intertropical Convergence Zone sensitivity to tropical and extratropical sea surface temperature in an atmospheric general circulation model. In preparation
- Saenger, C.**, Cohen, A. C., Oppo, D. W. Atlantic sea surface temperature trends and variability since 1552. *Nature Geoscience*. In review
- Saenger, C.**, Cohen, A. C., Oppo, D. W., Hubbard, D. H. Interpreting sea surface temperature from strontium/calcium ratios in *Montastrea* corals: Link with growth rate and implications for proxy reconstructions. *Paleoceanography* 23 doi:10.1029/2007PA001572
- Saenger, C.**, Cronin, T.M., Willard, D., Halka, J., Kerhin, R. 2008, Increased terrestrial to ocean sediment fluxes in the northern Chesapeake Bay with twentieth century land alteration. *Estuaries and Coasts* doi:10.1007/s12237-008-9048-5
- Saenger, C.**, Miller, M., Smittenberg, R. H., Sachs, J., 2006, A physico-chemical survey of inland lakes and saline ponds: Christmas (Kiritimati) and Washington (Teraina) Islands, Republic of Kiribati. *Saline Systems* 2 (8) doi:10.1186/1746-1448-2-8
- Saenger, C.**, Cronin, T., Thunell, R., Vann, C., 2006, Modeling River Discharge and Precipitation from Estuarine Salinity in the Northern Chesapeake Bay: Application to Holocene Paleoclimate. *The Holocene*, v. 16 (4) p. 467-477
- Cronin, T. M., Thunell, R., Dwyer, G. S., **Saenger, C.**, Mann, M., Vann, C., Seal, R. R., 2005. Multiproxy evidence of Holocene climate variability from estuarine sediments, Eastern North America. *Paleoceanography*, v. 20, PA 4006, doi: 10.1029/2005PA001145
- Cronin, T., Sanford, L., Langland, M., Willard, D., and **Saenger, C.**, 2003. Estuarine sediment transport, deposition, and sedimentation. In Langland, M. and Cronin, T. (eds) A summary report of sediment processes in Chesapeake Bay and watershed. USGS Publication Water Resources Investigation 03-4123, p. 61-79.

## Presentations:

- Saenger, C.**, Cohen, A. L., Oppo, D. 2008 Annually resolved Atlantic sea surface temperature since 1552: External forcing versus internal variability. WHOI Department of Geology and Geophysics Department seminar
- Saenger, C.**, Cohen, A. L., Oppo, D., Gaetani, G. 2008. Reconstructing sea surface temperature from coral geochemistry and growth rate. Bates College Department of Geology Department seminar
- Saenger, C.** Paleoclimate proxies and their application with respect to corals. 2007 Texas A&M University Department of Oceanography and Meteorology weekly seminar.
- Sachs, J.P., Z. Zhang, R. Smittenberg, **C. Saenger**, D. Sachse (2006). "Holocene Hydrologic Changes in the Tropical Pacific." 2006 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 11-15, 2006.
- Saenger, C.**, Smittenberg, R. H., Sachs, J. P., 2006. The Boy and his rain: reconstructing ENSO variability from lacustrine algal hydrogen isotopes. University of Washington Graduate Climate Conference.
- Sachs, J.P., Zhang, Z., Smittenberg, R., **Saenger, C.**, Pahnke, K., Koutavas, A., 2005. Holocene ENSO Reconstructions from Molecular Rain Gauges. 2005 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 5-9, 2005.
- Cronin, T. M., **Saenger, C.**, Willard, D. A., 2004. Sediment and carbon budgets for Chesapeake Bay and its watershed: Impacts of land clearance and climate variability. American Geophysical Union Meeting.
- Saenger, C.**, Cronin, T. M., Thunell, R., Vann, C., Dwyer, G., Seal, R., 2004. Eastern U. S. Holocene climate variability from Chesapeake Bay sediments. NE/SE Geological Society of America Meeting.
- Cronin, T. M., Willard, D. A., Thunell, R., Dwyer, G. S., Mann, M., **Saenger, C.**, 2004. Climate Variability derived from Estuarine Sediments: A Case Study in Chesapeake Bay. Climate Variability Conference.
- Cronin, T. M., Thunell, R., Swart, P. K., Dwyer, G. S., **Saenger, C.**, 2004. Abrupt Climate Change: Implications for Coastal Ecosystem Restoration. National Conference on Ecosystem Restoration.
- Cronin, T.M., Willard, D.A., **Saenger, C.**, and Halka, J., 2004. Application of the sediment core record of environmental change to Chesapeake Bay management issues. NE/SE Geological Society of America Meeting.
- Cronin, T., **Saenger, C.**, Thunell, R., Vann, C., Dwyer, G., Seal, R., 2003. Holocene Climate variability from Chesapeake Bay sediments. Geological Society of America National Meeting.
- Saenger, C.**, 2002. Holocene basin evolution and paleoclimate reconstruction from laminated sediments, Cape Hurd Lake, Devon Island, Nunavut, Canada. Maine State Geological Society Meeting.

## Posters:

- Saenger C**, Cohen A, Oppo D. 2008. Atlantic sea surface temperature trends and variability since 1552. AGU Fall Meeting
- Saenger, C.**, Oppo, D. W., Malmgren, B. A., Cohen, A. L. 2007. Northeastern Caribbean sea surface temperatures since 350 A.D. derived from foraminiferal Mg/Ca. 9<sup>th</sup> International Conference on Paleoceanography.
- Saenger C**, Cohen A, Oppo D, Hubbard D. .2006. Tropical North Atlantic Coral-Based Sea Surface Temperature and Salinity Reconstructions From the Little Ice Age and Early Holocene. Eos Trans. AGU, 87(52), Fall Meet. Suppl., Abstract PP31A-1735
- Cohen A, **Saenger C**. 2006. Tropical Atlantic SSTs at the Last Glacial Maximum derived from Sr/Ca ratios of fossil coral. Eos Trans. AGU, 87(52), Fall Meet. Suppl., Abstract U13A-0808
- Saenger, C.**, Cohen, A. L., Oppo, D., 2006. Wishing upon a mountainous star: Sr/Ca and d<sup>18</sup>O-based Caribbean temperature and salinity reconstructions from the coral *Montastrea annularis*. University of Washing Graduate Climate Conference.
- Smittenberg, R. H., **Saenger, C.**, Dawson, M. N., Sachs, J. P., 2005. Reconstruction of the West Pacific El Nino history using (isotopic) biomarker record of marine anoxic lakes, Palau. International Marine Organic Chemistry Meeting.
- Saenger, C.**, Cronin, T., Vann, C., Thunell, R., 2003. River Discharge, Precipitation, and Chesapeake Bay Salinity: Application to Holocene Paleoclimate History. Estuarine Research Federation Meeting
- Retelle, M., Carter, P., **Saenger, C.**, 2002. Variations in late Holocene deposition conditions from two arctic isolation basins, Nunavut, Canada. NE Geological Society of America Meeting.
- Retelle, M., Carter, P., Fasy, M. K., Janukajtis, F., **Saenger, C.**, 2001. Laminated sediment and depositional processes in high Arctic coastal isolation basins, Nunavut, Canada. Geological Society of America National Meeting.

## Non-MIT/WHOI collaborators and recent coauthors:

Ping Chang (Texas A&M University), Thomas Cronin (U.S. Geological Survey), Julian Sachs (University of Washington), Rienk Smittenberg (E.T.H. Zurich), Robert Thunell (University of South Carolina), Michael Mann (Pennsylvania State University), Gary Dwyer (Duke University), Robert Seal (U.S. Geological Survey), Debra Willard (U.S. Geological Survey) Michael Miller (University of Cincinnati)