

Dr. Richard A. Mortlock

PERSONAL

Citizenship USA

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A) Professional Preparation.

B.A. – Natural Science, 1981, University of Pennsylvania

M.S. – Chemical Oceanography, 1985, Florida State University

PhD – Geological Sciences, 2017, Rutgers University

B) Professional Appointments

2019 – present: Assistant Research Professor, Dept. Earth and Planetary Sciences

2008 – 2018: Research Associate, Rutgers University, Dept. Earth and Planetary Sciences

2008 – present: Manager, Stable Isotope MS Facility, Dept. Earth and Planetary Sciences

2018-present: Affiliate Scientist, College of Science, Florida Atlantic University

1992- 2008: Manager, ICP-MS Facility (Lamont-Doherty)

1995 –2008: Manager, Stable Isotope and Plasma 54 Facilities (Lamont-Doherty)

1988 -2008: Senior Staff Associate, Lamont-Doherty Earth Observatory

1985 -1988: Research Staff Associate, Lamont-Doherty Earth Observatory

C) Publications: peer reviewed journals

- Clementi, V.J Rosenthal, Y., Bova, S.C., Thomas, E.K., Wright, J.D., Mortlock, R.A., Cowling, O.C., Godfrey, L.V., Childress, L.B., and Expedition 379T Scientists (2022). Deep submarine infiltration of altered geothermal groundwater on the south Chilean Margin. *Nature Communications, Earth and Environment*. Published, on-line.
- Modys, A., Oleinik, A.E., Mortlock, R.A., Toth, L.T. Precht, W.F. (2022). Climate-modulated reef development off southeast Florida during the late Holocene. *Frontiers in Marine Science*. Submitted.
- de Wet, C., Driscoll, E., de Wet, A., Godfrey, L., Jordan, T., Luethje, M., Caterham, C., Mortlock, R. (2022). Exceptional Preservation in Quaternary Atacama Desert Tufas: Evidence for Increased Groundwater and Surface Water in the Calama Basin, Atacama, Chile. *The Depositional Record*. Accepted in press.
- Beck, C.C., Feibel, C.S., Mortlock, R.A., Quinn, R., Wright, J.D., (2021). Little Ice Age to modern lake-level fluctuations from Ferguson’s Gulf, Lake Turkana, Kenya, based on sedimentology and ostracod assemblages. *Quaternary Research*, 1-14. doi:10.1017/qua.2020.105
- Beck, C.C., Feibel C.S., Wright, J.D., Mortlock, R.A. (2019). Onset of the African Humid Period by 13.9 Kyr BP at Kabua Gorge, Turkana Basin, Kenya. *The Holocene*, 1-9.
- Quinn, R., Warnasch, S., Watson, M., Godfrey, L., Setera, J., VanTongeren J., Mortlock, R., Wright, J. (2019) Biogeochemical evidence for residence, diet and health of the Woman in the Iron Coffin (Queens, New York City). *International Journal of Osteoarchaeology*, V. 30, 2, 225-235.
- Mondal, D.R., McHugh, C.M., Steckler, M.S., Seeber, L., Goodbred, S.L., Akhter, S.H., Mortlock, R.A. (2018) Microatolls document the 1762 and prior earthquakes along the southeast coast of Bangladesh. *Tectonophysics*, 745, 196-213.
- Mortlock, R.A., Abdul, N.A., Wright, J.D., and Fairbanks, R.G. (2016). Reply to comment by E. Bard et al. on “Younger Dryas sea level and meltwater pulse 1B recorded in Barbados reef crest coral *Acropora palmata*” by N. A. Abdul et al. *Paleoceanography*

- 31, 1609-1616.
- Abdul, N.A., Mortlock, R.A., Wright, J.D., and Fairbanks, R.G. (2016). Younger Dryas Sea-Level and Meltwater Pulse 1B Recorded in Barbados Reef-Crest Coral *Acropora palmata*. *Paleoceanography*, v. 31 no 2, p.337-344.
- Harmand, S., Lewis, J.E., Feibel, C.S., Lepre, C. J., Prat, S., Lenoble, A., Boes, X., Quinn, R.L., Brenet, A., Arroyo, A., Taylor, N. Cle´ment, S., Daver, G., Brugal, J.P., Leakey, L., Mortlock, R.A., Wright, J.D., Lokorodi, S., Kirwa, C., Kent, D.V., Roche (2015) 3.3-million-year-old stone tools from Lomekwi 3, West Turkana, Kenya. *Nature* 313 (521), 310-315.
- E. Randall-Goodwin, E., Meredith, M.P., Jenkins, A., Yager, P.L., Sherrell, R.M., Abrahamsen, E.P., Guerrero, R., Yuan, X., Mortlock, R.A., Gavahan, K., Alderkamp, A-C., Ducklow, H., Robertson, R., Stammerjohn, S.E. (2015). Freshwater distributions and water mass structure in the Amundsen Sea Polynya region, Antarctica. *Elementa: Science of the Anthropocene* (3), 1-19.
- Newton, R., Schlosser, P., Mortlock, R., Swift, J., MacDonald, R., 2013. Canadian Basin freshwater sources and changes: Results from the 2005 Arctic Ocean Section. *Journal of Geophysical Research: Oceans* 118, 2133-2154.
- Quinn, R.L. Lepre, C.J. Feibel, C.S., Wright, J.D., Mortlock, R.A., Harmand, S. e Brugal, J-P., Roche, H. (2013) Pedogenic carbonate stable isotopic evidence for wooded habitat preference of early Pleistocene tool makers in the Turkana Basin. *Journal of Human Evolution* (65), 65-78.
- Mana, S., Furman, T., Carr, M.J., Mollel, G.F., Mortlock, R.A., Feigenson, M.D., Turrin, B.D., Swisher, C.C.III (2012). Geochronology and geochemistry of the Essimingor volcano: Melting of metasomatized lithospheric mantle beneath the North Tanzanian Divergence zone (East African Rift). *Lithos*, 155, 310-325.
- Reynaud, S., Ferrier-Pages, C., Meibom, A., Mostefaoui, S., Mortlock, R., Fairbanks, R. and Allemand, D. (2007). Light and temperature effects on Sr/Ca and Mg/Ca ratios in the scleractinian coral *Acropora* sp. *Geochemical et Cosmochimica Acta* 71, 354-362.
- Cao, L., Fairbanks, R.G., Mortlock, R.A., and Risk, R.J. 2007. Radiocarbon reservoir age of high latitude North Atlantic surface water during the Last Deglacial. *Quaternary Science Reviews*, 26, 732-742.
- Chiu, T-C, Fairbanks, R.G., Cao, L., Mortlock, R.A. (2007). Analysis of the atmospheric ^{14}C record spanning the past 50,000 years derived from high precision $^{230}\text{Th}/^{234}\text{U}/^{238}\text{U}$, $^{231}\text{Pa}/^{235}\text{U}$ and ^{14}C dates on fossil corals. *Quaternary Science Reviews*, 26, 18-36.
- Chiu, T.-C., Fairbanks, R.G., Mortlock, R.A., Cao, L., Fairbanks, T.W., Bloom, A.L., (2006). Redundant $^{230}\text{Th}/^{234}\text{U}/^{238}\text{U}$ and $^{231}\text{Pa}/^{235}\text{U}$ dating of fossil corals: verification of U-series ages for radiocarbon age calibration. *Quaternary Science Reviews*, 25, 2421-2440.
- Fairbanks, R.G., Mortlock, R.A., Chiu, T.-C., Cao, L., Kaplan, A., Guilderson, T.P., Fairbanks, T.W., Bloom, A.L., Grootes, P.M., Nadeau, M.-J., (2005). Radiocarbon calibration curve spanning 0 to 50,000 years BP based on paired $^{230}\text{Th}/^{234}\text{U}/^{238}\text{U}$ and ^{14}C dates on pristine corals. *Quaternary Science Reviews* 24 (16-17), 1781-1796.
- Mortlock, R.A., Fairbanks, R.G., Chiu, T.-C., and Rubenstone, J. (2005). $^{230}\text{Th}/^{234}\text{U}/^{238}\text{U}$ and $^{231}\text{Pa}/^{235}\text{U}$ ages from a single fossil coral fragment by multi-collector magnetic-sector inductively coupled plasma mass spectrometry. *Geochim. et Cosmochim. Acta*, 69, 3, 649-657.
- Chiu, T.-C., Fairbanks, R.G., Mortlock, R.A., Bloom, A.L., (2005). Extending the radiocarbon calibration beyond 26,000 years before present using fossil corals. *Quaternary Science Reviews* 24 (16-17), 1797-1808.
- Ekwurzel, B., Schlosser, P., Mortlock, R. A., Fairbanks, R. G., Swift, J. H. (2001). River Runoff, sea ice meltwater, and Pacific water distribution and mean residence times in the Arctic Ocean. *Journal of Geophysical Research*, 106, no. C5, 9075-9092.

- Bareille, G., Labracherie, M., Mortlock, R.A., Maier-Reimer, E., Froelich, P.N. (1998). A test of $(\text{Ge}/\text{Si})_{\text{opal}}$ as a recorder of $(\text{Ge}/\text{Si})_{\text{seawater}}$. *Geology*, V. 26, No. 2, 179-183.
- Fairbanks, R. G., Evans, M. N., Rubenstone, J. L., Mortlock, R. A., Broad, K., Moore, M. D., Charles, C. D. 1997. Evaluating climate indices and their geochemical proxies measured in corals. *Coral Reefs*, 16, 93-100.
- Falkner, K. Kenison, Church, M., Measures, C., I. Lebaron, G., Thouron, D., Jeandel, C., Stordal, M.C., Gill, G. A., Mortlock, R., Froelich, P., Chan, L.-H. (1997). Minor and trace element chemistry of Lake Baikal, its tributaries, and surrounding hot springs. *Limnology and Oceanography*, 42, 329-345.
- Mortlock, R. A., and Froelich, P. N. (1996). Determination of germanium by isotope dilution-hydride generation inductively coupled plasma mass spectrometry. *Analytica Chimica Acta*, 332, 277-284.
- Mortlock, R. A., Froelich, P.N., Feely, R.A., Massoth, G.J., Butterfield, D.A., and Lupton, J.E. (1993). Silica and germanium in Pacific Ocean hydrothermal vents and plume. *Earth and Planetary Science Letters*, 119, 365-378.
- Mortlock, R.A., Charles, C.D., Froelich, P.N., Zibello, M.A., Saltzman, J., Hays, J.D., Burckle, L.H. (1993). Evidence for lower productivity in the Antarctic Ocean during the last glaciation. *Nature*, V. 351, 220-223.
- Mortlock, R. A., and Froelich, P.N. (1989). A simple method for the rapid determination of biogenic opal in pelagic marine sediments. *Deep-Sea Research*, 36, no. 9, 1415-1426.

D) Awards and Funding

Drought or Deluge? How did Rainfall in the Tropical South Pacific Respond to Sudden Climate Change during the Glacial Period? (2019). VUW-112. Marsden Fund, New Zealand (Assisting Investigator with lead investigator Dr. Daniel Sinclair). \$NZ960,000.

Reconstruction of Tropical Storm Activity in the Western Atlantic During the Late Holocene and Late Pleistocene Sea-Level supported with U-series Dated Fossil Corals (to Mortlock). 2021. USGS. \$32,500.

Acquisition of a New Stable Isotope Mass Spectrometer with Carbonate and Water Systems to Support Earth Science Research at Rutgers University. NSF Facilities and Instrumentation (Wright and Mortlock co-PI's). \$487,692.

Investigating the Response of the Indian Monsoon during the Little Ice Age with proxy data recorded in a fossil coral. EOAS Planetary Exploration and Stewardship Seed Grant Program (2019). To R. Mortlock and L. Godfrey. \$4918.

E) Presentations and Invited Talks

Invited Speaker to Mid-Winter Institute 2020: Investigating Climate Change with the International Ocean Discovery Program. American Museum of Natural History, February 19, 2020.

Yu, S.M., Wright, J.D., Mortlock, R.A. (2020). Synchronous thermocline dynamics across the equatorial Indian and Pacific inferred from multispecies foraminiferal analyses [poster]. GSA Joint Southeast and Northeast Meeting, Reston VA.

Keeting, R, Makarova, M., McLellen, O., Miller, K., Mortlock, R., Wright, J. (2019). Thermal Evolution of the northern North Atlantic during the Early-Middle Miocene from ODP Site 982 Record. Abstract PP21B 1613 presented at Fall AGU Meeting, San Francisco, Dec.

Rosenthal, Y., Adkins, J., Yu, M., Wright, J., and Mortlock, R. (2019). Reconstructing the density structure of the western equatorial Pacific during the LGM: Results from

- IODP Expedition 363. Abstract PP51C-1391 presented at Fall AGU Meeting, San Francisco, Dec.
- Hu, E., Adamo, L., Wright, J.D., Mortlock, R.A. (2018) A chronology of the climatic changes in the North Atlantic Ocean established from sedimentologic and isotopic records from southern Gardar Drift. Abstract ED13E-0798 presented at 2018 Fall Meeting, AGU, Washington DC, 10-14 Dec.
- Varkey, H., Mortlock, R.A. McHugh, C., Mondal, D., Schaller, M. (2018). Investigating the response of the Indian Monsoon during climate extremes with stable isotope records in corals. Abstract ED13E-0799 presented at 2018 Fall Meeting, AGU, Washington DC, 10-14 Dec.
- Modys, A., Oleinik, A.E., Mortlock, R.A. (2018). Expanded Late Holocene coral reef development in Southeast Florida linked to regional climate change. Abstract presented at GSA Annual Meeting, Indianapolis, IN. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, ISSN 0016-7592 doi: 10.1130/abs/2018AM-319505
- Yu. S.M., L. Godfrey, R. Mortlock, and J.D. Wright (2018) Maldives Hydrography Reconstruction over the Pleistocene [*Poster*]. Graduate Climate Conference 2018, Seattle, WA.
- Modys, A., Toth, L.T., Mortlock, R.A., Oleinik, A.E. (2017) Restricted fringing reef development on the southwest Florida continental reef tract during the late Holocene. Paper No. presented at GSA Annual Meeting, Seattle, WA.
- Modys, A., Oleinik, A.E., Mortlock, R.A., Toth, L.T. Precht, W.F. (2016). Timing of late Holocene coral reef development on the southeast Florida continental reef tract. Paper No. 76-28 presented at GSA Annual Meeting, Denver CO.
- Mondal, D.R., McHugh, C.M., Steckler, M.S., Seeber, L., Goodbred, S.L., Akhter, S.H., Mortlock, R.A. (2015) Submergence and Uplift Associated to Paleoearthquakes in the Northern Sunda Subduction System: Implications for Future Earthquakes. Abstract 61394 presented at 2015 Fall Meeting, AGU, San Francisco, CA., 14-18 Dec.
- Fairbanks, R. G., Mortlock, R. A.; Abdul, N. A.; Wright, J. D.; Cao, L.; Mey, J. L. (2015), The Barbados Sea-Level Record. Presented at the PALSEA2 2015 Workshop: Data-Model Integration and Comparison. 22-24 July. Tokyo, Japan.
- Sinclair D.J., Sherrell, R.M., Rowe, H., Wright, J.D., Mortlock, R., Hellstrom J., Cheng, H., Min, A., Edwards, R.L. (2014). A Speleothem Record of South Pacific Convergence Zone Dynamics During MIS 3 - Evidence for Non-Stationary Coupling Between the South Tropical Pacific and Greenland?. Abstract presented at 2014 Fall Meeting, AGU, San Francisco, CA., 15-19 Dec
- Fairbanks, R. G., Mortlock, R. A.; Abdul, N. A.; Wright, J. D.; Cao, L.; Mey, J. L. (2013), The Barbados Sea-Level Record. PP51D-05 presented at 2013 Fall Meeting AGU. San Francisco, California, 9-13 Dec.
- Beck, C. C., Feibel, C. S., Wright, J.D., Mortlock, R.A. (2014). A multi-proxy approach to tracing a regressive event at Ferguson's Gulf, Lake Turkana, Kenya: Implications for modern analogues to assist in interpretations of the Plio-Pleistocene record. Abstract EGU2014-4629, presented at 2014 Spring Meeting, EGU, Vienna.
- Mondal, D.R., McHugh, C.M., Steckler, M.S., Seeber, L., Goodbred, S.L., Akhter, S.H., Mortlock, R.A. (2013) Coseismic Deformation of the Great 1762 Arakan Subduction Earthquake Along South-Eastern Coast of Bangladesh, Abstract T23C-2609 presented at 2013 Fall Meeting, AGU, San Francisco, CA., 9-13 Dec.
- Turrin, B., Duane E. Champion; Richard A. Mortlock; Richard G. Fairbanks; Carl C. Swisher (2013). GP31A-06. $^{40}\text{Ar}/^{39}\text{Ar}$ and U-series ages of a Late Pleistocene geomagnetic excursion in Western North America: The Halina Pali event in Western North America?
- Fairbanks, R. G, Mortlock, R., Abdul, N. A., Wright, J. D., Cao, L., Mey, J. L. (2013), The Barbados Sea Level Record, Abstract PP51D-05 presented at 2013 Fall Meeting, AGU,

San Francisco, Calif., 9-13 Dec.

Abdul, N. A., Mortlock, R. A., Wright, J. D., Fairbanks, R. G., (2013), Detailed Sea Level Record from Barbados Spanning 13,000 to 11,000 Years Before Present, Abstract PP53B-2001 presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec

Mortlock, R.A., Abdul, N., Wright, J.D., Fairbanks, R.G., Cao, L. (2012). Is the atmospheric radiocarbon anomaly during the Mystery Interval (17.5 to 14.5 kyr BP) an artifact of calibration? Evidence from Barbados Corals. Abstract presented at 21st Radiocarbon conference. July 9-13, Paris, France.

Fairbanks, R. G., Abdul, N., Wright, J.D., Cao, L., Mortlock, R.A. (2012). Radiocarbon calibration using paired ²³⁰Th/²³⁴U dates on pristine corals. Abstract presented at 21st Radiocarbon conference. July 9-13, Paris, France.

Sinclair, D. J., Rowe, H., Sherrell, R.M., Wright, J.D., Mortlock, R.A., Edwards, R. L., and Cheng, H. (2012). Large Changes in Glacial Rainfall Captured in a Stalagmite from the Southern Tropical Pacific Ocean: A high-resolution Sr record from the Island of Niue. Abstract presented at 2012 Fall Meeting, AGU, San Francisco, CA.

Mortlock, R.A. "Is the decrease in atmospheric radiocarbon during the Mystery Interval an artifact of calibration? Evidence from Barbados Corals". Dept. Earth and Planet. Sci. Spring 2012 Colloquium.

Mortlock, R.A., Abdul, N., Wright, J.D., Fairbanks, R.G., Cao, L. (2011). A coral based reconstruction of Atmospheric $\Delta^{14}\text{C}$ through the Mystery Interval (17.5 to 14.5 kyr BP), Abstract presented at 2011 Fall Meeting, AGU, San Francisco, CA. 5-9 December.

Abdul, N.A., Mortlock, R.A., Wright, J.D., Fairbanks, R.G., Teneva, L. (2011). Atlantic Warm Pool Trigger for the Younger Dryas Climate Event. Abstract presented at 2011 Fall Meeting, AGU, San Francisco, CA. 5-9 December.

F). Synergistic Activities

Involved in STEM program for undergraduate research (ARESTY, SPARK, PROJECT SUPER LSAMP) at Rutgers since 2011.

Invited Speaker to Mid-Winter Institute 2020: Investigating Climate Change with the International Ocean Discovery Program. American Museum of Natural History, February 19, 2020.

G) Collaborators, last 60 months

R. Fairbanks (Columbia), J. Wright (Rutgers), K. Asetzu Scott (Bedford Institute of Oceanography), S. Reynaud (Centre Scientifique de Monaco), L. Godfrey, Y. Rosenthal, R. Sherrell, G. Ashley, M. Aubrey, S. Severmann (all at Rutgers), S. Jacobs (LDEO), C. McHugh, S. Pekar (CUNY, Queens), C. Charles (UCSD), R. Quinn (Seton Hall), S. Pekar (CUNY, Queens), M. Katz (RPI), D. Sinclair (Victoria, University of Wellington), S. Stammerjohn (UC Santa Cruz), S. Ackley (U. UTSA), M. Griffiths (William Paterson), L. Toth (FL USGS)

I) Graduate advisor: M.S. Philip N. Froelich (Florida State Univ.). PhD James D. Wright (Rutgers University)

II) Graduate Students supervised and trained, last 5 years

M. Yu, L. Podrecca, S. Ku, N. Abdul, C. Beck, W. Wei, M. Makarova, V. Clementi, J. Kalansky (all Rutgers University), Dhiman Mondal (CUNY Queens), Alexander Modys (FAU), Scarlett Hsia (U. Texas, Austin).