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Education

LIVERPOOL UNIVERSITY

Liverpool, England

October 1980–May 1983

1983 B. Sc. Honours First Class, Geography

COLUMBIA UNIVERSITY

New York, NY

September 1983– February 1990

1985 M. A. in Geological Sciences

1990 M. Phil. in Geological Sciences

1990 Ph. D. in Geological Sciences

Ph.D. Thesis: Modeling sea surface temperature and low level winds in the tropics.

Advisor: Professor Mark Cane.

Employment

March 1990–December 1990. Post-Doctoral Research Scientist at Lamont Doherty Geological Observatory of Columbia University, New York.

January 1991–December 1992. Post-Doctoral Research Scientist at The Joint Institute for Study of the Atmosphere and Ocean, University of Washington, Seattle.

January 1993 to December 1993. National Oceanic and Atmospheric Administration Program in Climate and Global Change Postdoctoral Fellow at Lamont Doherty Earth Observatory of Columbia University, New York.

January 1994 to July 1997. Associate Research Scientist at Lamont Doherty Earth Observatory of Columbia University, Palisades, New York.

July 1997 to July 2000. Research Scientist at Lamont Doherty Earth Observatory of Columbia University, Palisades, New York.

July 2000 to September 2008. Doherty Senior Research Scientist at Lamont Doherty Earth Observatory of Columbia University, Palisades, New York.

September 2008 to present. Palisades Geophysical Institute Senior Research Scientist at Lamont Doherty Earth Observatory of Columbia University, Palisades, New York.

Research interests

Climate change and variability on seasonal to glacial timescales, tropical forcing of global climate variations, North American drought, tropical atmosphere-ocean interactions, tropical climate change, explaining the causes of regional climates, climate modeling, seasonal to decadal climate prediction.

Professional service

US CLIVAR drought working group member (2006 to present).

Contributing author for Climate Change Science Program Synthesis and Assessment Report, abrupt change chapter (2006 to present).

Associate Editor, *Quarterly Journal of the Royal Meteorological Society* (2005 to present)

Member of the American Meteorological Society Committee on Tropical Meteorology and Hurricanes (1995 to 1999).

Member of the CLIVAR Pacific panel (1999 to 2001)

Awards

California Department of Water Resources Climate Science Paper awards for two separate papers, November 2008. Lamont Director's Award for Outstanding Research, September 2007.

National Oceanic and Atmospheric Administration Program in Climate and Global Change Postdoctoral Fellowship, July 1992.

Professional Associations

Member of the Royal Meteorological Society

Member of the New York Academy of Sciences

Member of The American Meteorological Society.

Member of the AMS Committee on Tropical Meteorology and Hurricanes (1995 to 1999).

Graduate students advised (wholly or partially)

Amy Clement, Alessandra Giannini, Arthur Greene, Alicia Karspeck, Julien Emile-Geay, Celine Herweijer, Wenchang Yang, Yutian Wu, Colin Kelley, Joelle Birnberg, Mary Moore, David Wang.

Postdoctoral fellows mentored

Nili Harnik (Lamont fellowship), Kris Karnauskas (Lamont fellowship), Jason Smerdon (Lamont fellowship), Ben Cook (NOAA fellowship).

Popular articles and un-refereed articles

- R. Seager, 2008: Setting the record straight on the Gulf Stream and European climate. *The Plantsman*, the quarterly magazine of the Royal Horticultural Society, **7**, 22-27.
- R. Seager, 2007: Making a bad situation worse: Climate change and human-induced aridification of southwestern North America. California Department of Water Resources *California Drought Update*, June 2008.

- Schubert, S., R. Koster, M. Hoerling, R. Seager, D. Lettenmaier, A. Kumar and D. Gutzler, 2007: Predicting drought on seasonal-to-decadal timescales. *Bull. Amer. Meteor. Soc.*, **88**, 1625-1630.
- R. Seager, 2006: The source of Europe's mild climate, *Am. Sci.*, **94**, 334-341.
- Clement, A.C., J. Emile-Geay, R. Seager, M. Cane and M. N. Evans, 2006: Solar forcing of the tropical Pacific climate and impacts over North America for the last millennium. *PAGES News*, **14**, 12-14.
- R. Seager, 2003: Gulf Stream, la fin d'un mythe. *La Recherche*, **361**, 40-45 (In French).

Refereed professional reports

- Cook, E.R., P.J. Bartlein, N. Diffenbaugh, R. Seager, B.N. Shuman, R. S. Webb and C. Woodhouse, 2008, Hydrological variability and change. In *Abrupt Climate Change*, A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. U.S. geological Survey, Reston, VA, pp. 143-257.
- Delworth, T.L., P.U. Clark, M. Holland, W.E. Johns, T. Kuhlbrodt, J. Lynch-Stieglitz, C. Morrill, R. Seager, A.J. Weaver, and R. Zhang, 2008: The potential for abrupt change in the Atlantic Meridional Overturning Circulation. In: *Abrupt Climate Change*. A report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. U.S. Geological Survey, Reston, VA, pp. 258-359.

Refereed publications

- Seager, R., N. Naik and G. Vecchi, 2010: Thermodynamic and dynamic causes of large-scale changes in the hydrological cycle in response to global warming. *J. Climate*, submitted.
- Seager, R., N. Naik, W. Baethgen, A. Robertson, Y. Kushnir, J. Nakamura and S. Jurburg, 2010: Tropical oceanic causes of interannual to multidecadal precipitation variability in southeast South America over the past century. *J. Climate*, submitted.
- Wu, Y., M. Ting, R. Seager, H.-P. Huang and M. Cane, 2009: Changes in storm tracks and energy transports in a warmer climate simulated by the GFDL CM2.1 model. *Clim. Dyn.*, submitted.
- Cook, B., R. Seager and R. Miller, 2009: Atmospheric circulation anomalies during two persistent North American droughts: 1932-1939 and 1948-1957. *Clim. Dyn.*, submitted.
- Harnik, N., R. Seager, N. Naik, M. Cane and M. Ting, 2009: Determining cause and effect in the transient eddy-mean flow response to tropical Pacific SST anomalies. *Quart. J. Roy. Meteor. Soc.*, submitted.
- Seager, R. and G. Vecchi, 2009: Global warming and the 21st century climate of southwestern North America. *Proc. Nat. Acad. Sci.*, submitted.
- Kushnir, Y., R. Seager, M. Ting, N. Naik and J. Nakamura, 2009: Mechanisms of tropical Atlantic SST influence on North American hydroclimate variability. *J. Climate*, in press.

- Seager, R., N. Naik, M. Ting, N. Harnik, M. Cane, Y. Kushnir and J. Nakamura, 2009: Adjustment of the atmospheric circulation to tropical Pacific SST anomalies: Variability of transient eddy propagation in the Pacific North-America sector. *Quart. J. Royal. Meteor. Soc.*, submitted.
- Cook, E. R., R. Seager, R. R. Heim, R. S. Vose, C. Herweijer, C. Woodhouse, 2009: Megadroughts in North America: Placing IPCC projections of hydroclimatic change in a long term paleoclimatic context. *J. Quat. Sci.*, doi:10.1002/jqs .
- Cook, B., R. Miller and R. Seager, 2009, Amplification of the North American Dust Bowl drought through human-induced land surface degradation. *Proc. Nat. Acad. Sci.*, **106**, 4997-5001.
- Seager, R., A. Tzanova and J. Nakamura 2009: Drought in the southeastern United States: Causes, variability over the last millennium and the potential for near future hydroclimate change. *J. Climate*, **22**, 5021-5045.
- Stahle, D.W., E. R. Cook, J. Villanueva Diaz, F. K. Fye, D. J. Burnette, R. D. Griffin, R. Acuña-Soto, R. Seager and R. R. Heim, 2009: Early 21st Century drought in Mexico. EOS Transactions of the American Geophysical Union, **90**, 89-90.
- Ting, M., Y. Kushnir, R. Seager, C. Li, 2009: Forced and internal 20th Century SST changes in the North Atlantic. *J. Climate*, **22**, 1469-1481.
- Karneuskas, K., R. Seager, A. Kaplan, Y. Kushnir and M. A. Cane, 2009: Observed strengthening of the zonal sea surface temperature gradient across the equatorial Pacific Ocean, *J. Climate*, **22**, 4316-4321.
- Seager, R., M. Ting, M. Davis, M. Cane, N. Naik, J. Miller, C. Li, E.R. Cook and D.W. Stahle, 2009: Mexican drought: An observational, modeling and tree ring reconstruction study of variability and climate change. *Atmosfera*, bf 22, 1-31.
- Cook, B., R. Miller and R. Seager, 2008: Dust and sea surface temperature forcing of the 1930s 'Dust Bowl' drought. *Geophys. Res. Lett.*, **35**, doi:10.1029/2008GL033486.
- Seager, R., R. Burgman, Y. Kushnir, A. C. Clement, E. R. Cook, N. Naik and J. Miller, 2008: Tropical Pacific forcing of North American Medieval megadroughts; Testing the concept with an atmosphere model forced by coral-reconstructed SSTs *J. Climate*, bf 21, 6175-6190.
- Seager, R., Y. Kushnir, M. Ting, M. Cane, N. Naik and J. Miller, 2008: Would advance knowledge of 1930s SSTs have allowed prediction of the Dust Bowl drought? *J. Climate*, **21**, 3261-3281
- Emile-Geay, J., R. Seager, M. A. Cane. G. H. Haug and E. R. Cook 2008: Volcanoes and ENSO over the last millennium, *J. Climate.*, **21**, 3134-3138.
- Herweijer, C. and R. Seager, 2008: The global footprint of persistent extra-tropical drought in the instrumental era. *Int. J. Climatol.*, , doi:10.1002/joc.1590.
- Murtugudde, R., R. Seager and P. Thoppil, 2008: Arabian Sea response to monsoon variations. *Paleoceanogr.*, bf 22, doi:10.1029/2007PA001467.
- Seager, R., M. Ting, I. M. Held, Y. Kushnir, J. Lu, G. Vecchi, H.-P. Huang, N. Harnik, A. Leetmaa, N.-C. Lau, C. Li, J. Velez and N. Naik, 2007: Model projections of an imminent transition to a more arid climate in southwestern North America, *Science*, **316**, 1181-1184.
- Seager, R., N. E. Graham, C. Herweijer, A. Gordon, Y. Kushnir and E. Cook, 2007: Blueprints for Medieval hydroclimate. *Quat. Sci. Rev.*, **26**, 2322-2336.
- Emile-Geay, J., M.A. Cane, R. Seager, A. Kaplan and P. Almasi, 2007: El Niño as a mediator of the solar influence on climate, *Paleoceanogr.*, **22**, doi:10.1029/2006PA001304.

- Seager, R., 2007: The turn of the century North American drought: Global context, dynamics and past analogues. *J. Climate*, **20**, 5527-5552.
- Herweijer, C., R. Seager and E. R. Cook, 2007: North American droughts of the last millennium from a gridded network of tree ring data. *J. Climate*, **20**, 1353-1376.
- Cook, E.R., R. Seager, M.A. Cane and D. W. Stahle, 2007: North American droughts: reconstructions, causes and consequences. *Earth Sci. Rev.*, **81**, 93-134.
- Seager, R. and D. S. Battisti, 2007: Challenges to our understanding of the general circulation: Abrupt climate change. *The General Circulation of the Atmosphere*, T. P. Schneider and A.S. Sobel, Eds., Princeton University Press, pp 331-371.
- Herweijer, C., R. Seager and E. R. Cook, 2006: North American Droughts of the mid to late Nineteenth Century: A history, model simulation and implications for Medieval megadrought. *The Holocene*, **16**, 159-171.
- Huang, H.-P., R. Seager and Y. Kushnir, 2005: The 1976/77 transition in precipitation over the Americas and the influence of tropical SST. *Clim. Dyn.*, **24**, 721-740.
- Seager, R., Y. Kushnir, C. Herweijer, N. Naik and J. Velez, 2005: Modeling of tropical forcing of persistent droughts and pluvials over western North America: 1856-2000. *J. Climate*, **18**, 4068-4091.
- Clement, A. C., R. Seager and R. Murtugudde, 2005: Why are there tropical warm pools? *J. Climate*, **18**, 5294-5311.
- Hazeleger, W., C. Severijns, R. Seager and F. Molteni, 2005: Tropical Pacific-driven decadal energy transport variability. *J. Climate*, **18**, 2037-2051.
- Herweijer, C., R. Seager and M. Winton, 2005: Why ocean heat transport warms the global mean climate. *Tellus*, **57A**, 662-675.
- Seager, R., W. A. Robinson, N. Harnik, Y. Kushnir, M. Ting, H. Huang and J. Velez, 2005: Mechanisms of ENSO-forcing of hemispherically symmetric precipitation variability. *Q. J. Royal. Meteorol. Soc.*, **131**, 1501-1527.
- Karspeck, A., R. Seager and M. Cane, 2004: Predictability of tropical Pacific decadal variability in an intermediate model. *J. Climate*, **17**, 2842-2850.
- Seager, R., A. Karspeck, M. Cane, Y. Kushnir, A. Giannini, A. Kaplan, B. Kerman and J. Miller, 2004: Predicting Pacific decadal variability, In *Earth Climate: The ocean-atmosphere interaction*, C. Wang, S.-P. Xie and J. A. Carton, Eds., 105-120.
- Hazeleger, W., R. Seager, M. A. Cane and N. Naik, 2004: How can tropical Pacific ocean heat transport vary? *J. Phys. Oceanogr.*, **24**, 320-333.
- Seager, R., R. Murtugudde, A. C. Clement and C. Herweijer, 2003: Why is there an evaporation minimum at the Equator? *J. Climate*, **16**, 3792-3801.
- Seager, R., N. Harnik, Y. Kushnir, W. A. Robinson and J. Miller, 2003: Mechanisms of hemispherically symmetric climate variability. *J. Climate*, **16**, 2960-2978.
- Seager, R., R. Murtugudde, N. Naik, A. Clement, N. Gordon and J. Miller, 2003: Air-sea interaction and the seasonal cycle of the subtropical anticyclones. *J. Climate*, **16**, 1948-1966.
- Kushnir, Y., R. Seager, J. Miller and J. Chiang, 2002: A simple model of tropical Atlantic decadal climate variability. *Geophys. Res. Letters*, **29**, 10.1029/2002GLO15874.
- Greene, A. M., Seager, R. and W. S. Broecker, 2002: Tropical snowline depression at the Last Glacial Maximum: comparison of coral and groundwater records. *J. Geophys. Res.-Atmospheres*, 10.1029/2001JD000670.

- Seager, R., D. Battisti, J. Yin, N. Naik, N. Gordon, A. C. Clement and M. A. Cane, 2002: Is the Gulf Stream responsible for Europe's mild winters?. *Quart J. Royal Meteor. Soc.*, **128**, 2563-2586.
- Seager, R., Y. Kushnir, N. Naik, M. A. Cane and J. Miller 2001: Wind-driven shifts in the latitude of the Kuroshio-Oyashio extension and generation of SST anomalies on decadal timescales. *J. Climate*, **14**, 4249-4265.
- Clement, A. C., M. A. Cane and R. Seager, 2001: An orbitally forced tropical trigger for abrupt climate change. *J. Climate*, **14**, 2369-2375.
- Giannini, A., J. C. H. Chiang, M. A. Cane, Y. Kushnir and R. Seager, 2001: The ENSO teleconnection to the tropical Atlantic Ocean: contributions of the remote and local SSTs to rainfall variability in the tropical Americas. *J. Climate*, **14**, 4530-4544.
- Seager, R., Y. Kushnir, P. Chang, N. Naik, J. Miller and W. Hazeleger, 2001: Looking for the role of the ocean in tropical Atlantic decadal climate variability. *J. Climate*, **14**, 638-655.
- Hazeleger, W., R. Seager, M. Visbeck, N. Naik and K. Rodgers, 2001: On the impact of the mid-latitude stormtrack on the upper Pacific. *J. Phys. Oceanogr.*, **31**, 616-636.
- Clement, A. C., R. Seager and M. A. Cane, 2000: Suppression of El Niño during the mid-Holocene by changes in the Earth's orbit. *Paleoceanogr.*, **15**, 731-737.
- Seager, R., Y. Kushnir, M. Visbeck, N. Naik, J. Miller, G. Krahmann and H. Cullen, 2000: Causes of Atlantic Ocean climate variability between 1958 and 1998. *J. Climate*, **13**, 2845-2862.
- Seager R., Clement, A. C. and M. A. Cane, 2000: Glacial cooling in the tropics: exploring the roles of tropospheric water vapor, surface wind speed and boundary layer processes. *J. Atmos. Sci.*, **57**, 2144-2157.
- Clement, A. C., R. Seager and M. A. Cane, 1999: Orbital controls on ENSO and the tropical climate. *Paleoceanogr.*, **14**, 441-456.
- Clement, A. C. and R. Seager, 1999: Climate and the tropical oceans. *J. Climate*, **12**, 3383-3401.
- Clement, A. C., M. A. Cane and R. Seager, 1998: Patterns and mechanisms of Twentieth Century climate change. *World Resource Review*, **10**, 161-185.
- Cane, M. A., A. C. Clement, A. Kaplan, Y. Kushnir, R. Murtugudde, D. Pozdnyakov, R. Seager and S. E. Zebiak, 1997: Twentieth century sea surface temperature trends. *Science*, **275**, 957-960.
- T. Stockdale, A. J. Busalacchi, D. E. Harrison and R. Seager, 1998: Ocean modeling of ENSO. *J. Geophys. Res.*, **103**, 14325-14355.
- R. Seager and R. Murtugudde, 1997: Ocean dynamics, thermocline adjustment and regulation of tropical SST. *J. Climate*, **10**, 521-534.
- A. C. Clement, R. Seager, M. A. Cane and S. E. Zebiak, 1996: An ocean dynamical thermostat. *J. Climate*, **9**, 2190-2196.
- R. Murtugudde, R. Seager and A. J. Busalacchi, 1996: Simulation of the tropical oceans with an ocean GCM coupled to an atmospheric mixed layer model. *J. Climate*, **9**, 1795-1815.
- R. Seager, Y. Kushnir and M. A. Cane, 1995: On heat flux boundary conditions for ocean models. *J. Phys. Oceanogr.*, **12**, 3219-3230.

- R. Seager, M. B. Blumenthal and Y. Kushnir, 1995: An advective atmospheric mixed layer model for ocean modeling purposes: Global simulation of surface heat fluxes. *J. Climate*, **8**, 1943-1957.
- Seager, R. and Zebiak, S. E., 1995: Simulation of tropical climate with a linear primitive equation model. *J. Climate*, **8**, 2497-2520.
- Seager, R. and M. B. Blumenthal, 1994: Modeling tropical Pacific sea surface temperature with satellite derived solar radiative forcing. *J. Climate*, **7**, 1943-1957.
- Seager, R. and Zebiak, S. E., 1994: Convective interaction with dynamics in a linear primitive equation model. *J. Atmos. Sci.*, **51**, 1307-1331.
- Seager, R., 1991: A simple model of the climatology and variability of the low level wind field in the tropics. *J. Climate*, **4**, 164-179.
- Seager, R., 1989: Modeling tropical Pacific sea surface temperature: 1970-1987. *J. Phys. Oceanogr.*, **19**, 419-434.
- Seager, R., Zebiak, S. E. and Cane, M. A., 1988: A model of the tropical Pacific sea surface temperature climatology. *J. Geophys. Res.*, **93**, 1265-1280.