Approved by the Regents
May 16, 2013

PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

Maria C. Cruz Da Silva Castro, associate professor of Earth and environmental sciences, with tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of Earth and environmental sciences, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	1995	University of Paris VI and Paris School of Mines
M.Sc.	1991	University of Paris VI
B.Sc.	1988	University of Porto

Professional Record:

2008 – present	Faculty Associate, Applied Physics Program, University of Michigan
2007	Visiting Professor, University Pierre et Marie Curie, Paris, France
2006 – present	Associate Professor, Department of Earth and Environmental Sciences, University of Michigan
1999 – 2006	Assistant Professor, Geological Sciences, University of Michigan
1998 – 1999	Post-doctoral Research Associate, University of Connecticut
1996 – 1998	Post-doctoral Research Associate, Lamont-Doherty Earth Observatory, Columbia University

Summary of Evaluation:

Teaching – Professor Castro contributes significantly to the teaching mission of the department by offering essential courses on water resources. These include both introductory and advanced courses that attract students from a wide variety of disciplines, including engineering, as well as departmental majors. Student ratings are very positive and invariably include enthusiastic feedback. She recently developed a new course for sophomores entitled, *Water in the 21st Century*, which examines the intersection of science and policy on one of our most vital resources. As part of her NSF CAREER grant, she offered an intensive undergraduate research course, which also received strong student evaluations.

Research – Professor Castro is a hydrogeologist who studies the water cycle through numerical modeling and the application of noble-gas geochemistry. She and her students have been very productive with about 30 publications in competitive journals. Her unique combination of skills allows her to decipher the history of water from its beginnings as rainfall or snowmelt to its travels through various natural reservoirs beneath the Earth's surface. She and her students have improved the temperature information that can be extracted from groundwater and applied this to glacial systems, which is providing a fresh perspective on recent climate history in high-latitude regions. She is also pioneering the application of noble-gas geochemistry to groundwater systems in highly fractured areas, which accounts for nearly 1/3 of the land area in the United States that is groundwater dependent. Globally, the application of this research to understanding the recharge history of critical water resources is of major societal relevance.

Recent and Significant Publications:

"Recharge and source-water insights from the Galapagos Islands using noble gases and stable isotopes," with R. B. Warrier and C. M. Hall, *Water Resources Research*, 48, 2012, W03508, doi:10.1029/2012GL053098.

"New insights into the origin and evolution of Lake Vida, McMurdo Dry Valleys, Antarctica – a noble gas study in ice and brines," with J. L. Malone, et al., *Earth and Planetary Science Letters,* v. 289, 2010, pp.112-122.

"Statistical properties of groundwater noble gas paleoclimate models: are they robust and unbiased estimators?," with T. Sun and C. M. Hall, *Geochemistry Geophysics Geosystems,* 11(2), 2010, Q02002, doi:10.1029/2009GC0027.

"A primordial, solar He-Ne signature in crustal fluids of a stable continental region," with L. Ma and C. M. Hall, *Earth and Planetary Science Letters,* v. 279, 2009, pp. 174-184.

Service – Within the department, Professor Castro has provided valuable service on important committees. Within the university, she served on the Rackham Merit Fellowship Evaluation Committee. She has been an associate editor for two main journals in her field and is currently on the editorial board of another.

External Reviewers:

Reviewer (A)

"She is clearly an original and independent thinker and a researcher who has an unusual diversity of talents, and a high depth of knowledge in the fields of hydrogeology and groundwater modeling and in the area of noble gas geochemistry and isotope geochemistry."

Reviewer (B)

"She is fluent in English, French, Portuguese, and Spanish. Her research experience also has exceptional geographic scope…Africa, the Paris Basin, Antarctica, the US Gulf Coast, and the Michigan basin, as well as the Galapagos. Professor Castro's career trajectory demonstrates a strong interest in international/global issues and world water issues in particular. As our scientific enterprise becomes increasingly international, I see Professor Castro's truly international perspective as a real asset."

Reviewer (C)

"Her hypotheses are intriguing and show a level of understanding of noble gas partitioning that I've not previously seen in the literature. This has led to a new research program to look at noble gases in precipitation which would be a great contribution to the field. … I have no hesitation in ranking Castro's contributions and visibility at a high level both nationally and internationally."

Reviewer (D)

"Dr. Castro's published work relates to her main area of specialty (isotope geochemistry)… All of the work is published in highly rated journals. … Much of her groundwater work is published in *Water Resources Research*, which is widely regarded as the top journal in our field."

Reviewer (E)

"I consider her one of the foremost experts on the application of noble gases in earth sciences at present. … This belief is supported by the ongoing financial support provided by NSF…"

Reviewer (F)
"I have found her work a breath of fresh air in a field that needed new data and new ways of looking at things. Her experience and perspective allowed her to question the assumptions and conclusions in a field far removed from her own. I find her work scholarly and innovative and it shows the mark of a good scientist. She clearly knows what she is doing and where she is going with it."

Reviewer (G)
"…she has a strong record of publishing in good journals, producing significant papers at a steady rate, and her resume is well-rounded in all the aspects expected of an academic."

Reviewer (H)
"Dr. Castro is at the cutting edge of her science. She is challenging the basic assumptions of noble gas geochemistry - particularly paleothermometry. I admire this. …her approach is based on sound science. … She is a very high energy and intelligent person with a lot of passion for what she does."

Summary of Recommendation:
Professor Castro's research is viewed as innovative and groundbreaking. She makes an important contribution to the teaching mission of her department and has provided valuable service. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Maria C. Cruz Da Silva Castro be promoted to the rank of professor of Earth and environmental sciences, with tenure, College of Literature, Science, and the Arts.

Terrence J. McDonald
Arthur F. Thurnau Professor,
Professor of History and Dean
College of Literature, Science, and the Arts

May 2013