

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

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

Academic Degrees:

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

Professional Record:

2004 – present	Faculty Associate, Program in the Environment, University of Michigan
1999 – present	Assistant Professor, Department of Geological Sciences, University of Michigan
1998 – 1999	Postdoctoral Research Associate, University of Connecticut
1996 – 1998	Postdoctoral Research Associate, Lamont-Doherty Earth Observatory, Columbia University

Summary of Evaluation:

Teaching – Professor Castro has an impressive record of diverse teaching experiences at the University, with course offerings that range from introductory to advanced undergraduate and graduate levels. Her performance in introductory level courses has been very impressive. The first year seminar entitled *Environmental Geology* is consistently fully enrolled, and her mini-course entitled *Water and Society* drew 388 students the last time it was taught. Although she sets high standards for performance, students typically rate her above the college median for introductory science classes.

Research – Professor Castro’s research is in hydrogeology, which examines the interaction of Earth’s water within a geological context. Water plays an essential role in the evolution and diversification of life processes as well as in the transport of natural or anthropogenic compounds as dissolved components. Her efforts to resolve the age of groundwater, the dynamics of its transport, and the chemical interactions water has experienced during its history within subsurface reservoirs constitute a timely and significant area of research. She recently received the Alfred Verdaguer Prize from the French National Academy of Sciences for her work on the balance between helium isotopic ratios and heat flow from the deeper mantle. Her publication list is long and rich, and recent work addresses very significant problems. Professor Castro’s analyses and insights are highly valued by colleagues.

Recent and Significant Publications:

“Noble Gases and Stable Isotopes in a Shallow Aquifer in Southern Michigan: Implications for Noble Gas Paleotemperature Reconstructions for Cool Climates,” with C. M. Hall and K. C. Lohmann, *Geophysical Research Letters*, 32, 2005, p. L18404.

- “2-D Numerical Simulations of Groundwater Flow, Heat Transfer and ^4He Transport - Implications for the He Terrestrial Budget and the Mantle Helium-Heat Imbalance,” with D. Patriarche and P. Goblet, *Earth Planetary Science Letters*, 237, 2005, pp. 893-910.
- “Calculation of Groundwater Ages – a Comparative Analysis,” with P. Goblet, *Ground Water*, 43(3), 2005, pp. 368-380.
- “Large-Scale Hydraulic Conductivities Inferred from Three-Dimensional Groundwater Flow and ^4He Transport Modeling in the Carrizo Aquifer, Texas,” with D. Patriarche and P. Goblet, *Journal of Geophysical Research*, 109, 2004, p. B11202.

Service – Professor Castro coordinated the weekly Smith/Turner Lecture Series, aggressively pursuing high-quality outside speakers, and served on the Graduate Admissions and Computer Committees. She played a key role in preparing a successful Graduate Assistance in Areas of National Need (GAANN) proposal and her participation in the Campus Day Program has been notable. Her service as associate editor for two major research journals, *Ground Water* and the *Hydrogeology Journal*, is especially noteworthy, and she co-convened special theme-sessions at meetings of two major scientific professional organizations.

External Reviews:

Reviewer (A)

“...I truly believe that Professor Maria Clara Castro has developed...an excellent research and teaching program...that she has proven her scientific excellence by her publications and research results... I therefore don’t hesitate to support her promotion to Associate Professor with tenure at the University of Michigan.”

Reviewer (B)

“...she is a naturally gifted scientist who came out of her graduate studies with an unusually impressive set of skills in not only field and laboratory methods for noble-gas studies, but also theoretical/numerical skills in the analysis and interpretation of her data. Most impressively, she has recognized the key application of her science to the characterization and understanding of subsurface dynamics and has whole-heartedly pursued that agenda.”

Reviewer (C)

“I view this expansion of her research program as a very wise move, one which will open up new avenues for research funding and assure continued sustainability and impact of her research program in the years to come.”

Reviewer (D)

“Such an [sic] broad interdisciplinary expertise is very rare since it combines a command of quantitative techniques, and the understanding of both low-temperature and high-temperature processes. ... Her recent paper flow is just mind-boggling. She seems very dedicated to teaching and also to advising students and younger colleagues.”

Reviewer (E)

“...Clara has a rather unique combination of expertise in both isotope geochemistry and groundwater flow and transport modeling.”

Reviewer (F)

“Professor Castro’s special strength is interpreting He data using a variety of techniques and methods. She is one of the world leaders in this area.”

Reviewer (G)


“Her past and future work modeling the observed accumulation of radiogenic ^4He in groundwater aquifers will go a long way towards advancing our ability to place time constraints on hydrologic processes and records. ...Castro has definitely established herself as a major player and potential leader in the field of noble-gas hydrogeology.”

Reviewer (H)

“Within the group of people occupying this niche over the last 15-20 years Dr Castro is prominent. She is distinguished by being one of the few to combine sound modeling skills and good geochemist [sic] techniques. She collaborates very effectively.”

Summary of Recommendation:

Professor Castro has established a successful, internationally visible research program that is having an exceptional impact in a broad range of fields. She is a dedicated teacher and has become a good citizen both at the University and in the community. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Maria C. Cruz Da Silva Castro be promoted to the rank of associate professor of geological sciences, with tenure.



Terrence J. McDonald, Dean
College of Literature, Science, and the Arts

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