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The Mother of Plate Tectonics

If you were lucky enough, maybe you caught one of her many talks around town, or participated in one of her field trips exploring California's spectacular geology. Perhaps you were one of her students.

However you found yourself in contact with UC Santa Barbara professor emerita Tanya Atwater, chances are you came away with a new or more profound appreciation for the earth under your feet, one that is reinforced every time the ground shakes, rattles and rolls.

For her work in the field of tectonics — the processes that govern the activities of the plates that comprise the Earth's crust and upper mantle — Atwater has been awarded the Penrose Medal by the Geological Society of America (GSA). The medal is among the most prestigious honors bestowed upon individuals in the field of earth sciences.

"I feel incredibly lucky to have had such a fun and interesting life and to be able to call it 'work,'" Atwater said. "I hope this award will encourage young women, indeed, all young people who would follow their passions into unconventional careers."

A geophysicist and marine geologist, Atwater is dubbed "The Mother of Plate Tectonics" for her extensive research in the field. She is best known for her work on the plate tectonic history of western North America, in particular the San Andreas fault system, a roughly 1,200-mile zone that serves as the boundary between the Pacific and North American plates. The fault, which extends almost the entire length

of California and Baja California, has been involved in major quakes including the 1906 San Francisco earthquake (magnitude 7.8) and the 1989 Loma Prieta quake near Santa Cruz (magnitude 6.9), and is thought to be the eventual site of the next “Big One” in southern California.

Not limited to dry land, Atwater’s work also reaches into the ocean, where she investigated processes such as sea floor spreading and underwater fault formation. According to the GSA, Atwater “brought understanding to processes at mid-ocean ridges, and more importantly, showed how the quantitative elegance and simplicity of plate tectonics could be brought to continents to understand their history with numbers, not with just qualitative analogies.” So significant was her work in this field, she earned a reputation as one of the foremost experts in ocean tectonics.

“A pioneer working at the forefront of her field, Professor Atwater is world-renowned for her research and award-winning teaching achievements in earth processes and plate tectonics,” said UC Santa Barbara Chancellor Henry T. Yang. “We are proud and honored as a campus to congratulate Tanya on her prestigious Penrose Medal, which is one of the highest distinctions an earth scientist can attain internationally.”

Atwater joined the UC Santa Barbara faculty in 1980 after stints at Massachusetts Institute of Technology, Woods Hole Oceanographic Institution and Scripps Institution of Oceanography. She received her bachelor’s degree from UC Berkeley in 1965 and her doctorate from Scripps in 1972. During the course of her career she participated in or led numerous field expeditions both on land and at sea, including 12 dives to the deep ocean floor — depths as great as two miles — in the tiny submersible “Alvin. ” Atwater is also known as a trailblazer for women’s rights to conduct oceanographic field research, a practice that was generally not allowed when she began her studies.

Atwater is the recipient of numerous honors and awards, including the Newcomb Cleveland Prize from the American Association for the Advancement of Science; the Encourage Award from the Association of Women Geoscientists; election to the National Academy of Sciences; the National Science Foundation’s Director’s Award for Distinguished Teaching Scholars; the Leopold von Buch Medal from the German Geosciences Society; a Lifetime Achievement Award from the Structure and Tectonics Section of the GSA; and a Los Angeles Area Emmy for Instructional Programming. She retired from teaching in 2007 but continues to deliver lectures and teacher workshops, and to lead field trips for the community.

Atwater will receive her medal at the GSA’s annual award presentation Sunday, September 22, at the Phoenix Convention Center in Phoenix, Arizona.

The Penrose Medal was established in 1927 by R.A.F. Penrose, Jr., to be awarded in recognition of eminent research in pure geology, for outstanding original contributions or achievements that mark a major advance in the science of geology.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.