

SPECIAL SEMINAR

MSI Auditorium • TUESDAY FEB 21st. • 12:00 PM

Organic Matter Sulfurization and the Carbon Cycle

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Organic matter burial in marine sediments is essentially the transfer of carbon from CO² in the atmosphere to kerogen in rocks. This flux is a fundamental control on the global carbon cycle, and it is dynamic, with extreme organic matter burial events marking major biogeochemical disruptions throughout Earth history. Despite its importance for global climate and elemental cycles, we still lack a mechanistic understanding of the processes that drive enhanced organic matter burial, beyond a general association with O²-depleted conditions and abundant sulfur. In this talk, I will first explore the role of abiotic organic matter sulfurization, which is thought to stabilize organic matter on early diagenetic timescales, in controlling organic matter burial in a modern O²-depleted environment, Cariaco Basin. Using new analytical approaches, we find evidence for rapid and extensive organic matter sulfurization in sinking particles, accounting for most of the organic sulfur burial in underlying sediments. These results imply that organic matter sulfurization may have played a key role in burying enormous amounts of organic matter in the geologic record, inspiring my current work on ocean anoxic event 2 (OAE2). I will present some preliminary results of this ongoing work and then discuss the implications of rapid organic matter sulfurization for the carbon balance and microbial activity of diverse O²-limited environments.