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Life in the sand: from the microscopic to the planetary scale

Marine sediments are a heterogeneous fabric of grains, covered and connected with each other by slime and fibers, with organisms living in them, on them and around them. They constitute one of the most extensive and the least explored habitats on Earth. One of their major ecosystem functions is the regeneration of nutrients that are trapped in organic matter. When organic particles reach marine sediments through a variety of mechanisms, mediated by physical and biological processes, they are attacked by a suite of organisms that rely partly or fully on them for energy, and are broken down to their original elemental constituents, typically in the form of carbon dioxide and nutrients. These nutrients are used to fuel primary production anew.

The size of the grains is a key factor in how marine sediments function as ecosystem mediators. Grain size ranges from a few micrometers (clay) to several centimeters (pebbles). The finer sediments, what we would call “muddy” in everyday language, have been – by far – the best-studied type of sediment, for historical and methodological reasons. The volume of work dedicated to them over-represents their distribution in the most productive regions of the world’s oceans and seas. And this has been done at the expense of coarser-grained sediments, primarily those we refer to as “sand.”

During this talk, I will discuss the role of sandy sediments on the function of marine ecosystems. I will give an historical account of sandy sediment research over the last fifty years, following which I will focus on nutrient regeneration and will elaborate on recent advances which elucidate the importance of grain size on nutrient regeneration and what it beholds for future research.

Suggested reading:

Information on the topic of sandy sediments, including on-line resources and relevant reading, is available at the following web-page: <http://www.cybaes.org/hannides/>.