

What is Geomicrobiology?

It's an amazing time right now! In the last ten years we have seen the advent of "Astrobiology" and "Geobiology." Somehow, I have been heavily involved in both. Surprisingly, both evolved from the microbiology side of science. Astrobiology crawled out of NASA's Exobiology program, among other places. Geobiology crawled out of geomicrobiology of which Dr. Dave Updegraff here at CSM played a great role.

Your book would say that it is the linkage between the bio-geo-chemistry of element cycling from the perspective of the organisms (prokaryotes) involved. An interface between microbial ecology and biogeochemistry...but really, microbes are the drivers of element cycling!

Another Book, *Introduction to Geomicrobiology* by Kurt Konhauser, says: How microbial *communities* have influenced biogeochemical and mineralogical processes *through* time. Can consider the geological consequences of microbial activity.

What I hope you gain is an awareness of the role microbes play in controlling Earth-surface processes. The field of "geobiology" has emerged. Geomicrobiology.....a subset:

If you believe Wikipedia:

Broadly defined, **geobiology** is an interdisciplinary field of scientific research that explores interactions between the biosphere and the lithosphere and/or the atmosphere. Investigators from numerous fields are involved in **geobiologic** research, including, but not limited to, such disciplines as: paleontology, paleobiology, microbiology, mineralogy, biochemistry, sedimentology, genetics, physiology, geochemistry (organic and inorganic), and atmospheric science. One major subdiscipline of geobiology is **geomicrobiology**, an area of study that focuses on investigating the interactions between microbes and minerals. Another related area of research is astrobiology, an interdisciplinary field that uses a combination of **geobiological** and planetary science data to establish a context for the search for life on other planets.

If you find other definitions:

Biogeosciences - the study of the fundamental interactions between life and the Earth's atmosphere, hydrosphere, and geosphere, and potentially includes such life on other planets. (Biogeosciences Working Group)

Geobiology - the study of the interactions that occur between the biosphere (living organisms and their products) and the geosphere. Therefore, it must include elements of the atmosphere, the hydrosphere (marine and freshwater), and the lithosphere. (Summons, 2003)

Geobiology - the study of how organisms have influenced and been influenced by the Earth's environmental history... the goal of geobiology is to provide a biological perspective on Earth history (Knoll and Hayes, 2000)

Geobiology - a field of scientific inquiry that is arising from the recognition that biological, physical, and chemical processes at the surface and shallow subsurface of Earth are inextricably

linked at all scales of space and time. (Kump, 2002)

Geobiology - The direct link between life and Earth's environmental history. the role of organisms as geologic agents. (Amend et al., 2001).

Another: Blanche Merz (Author, *Points of Cosmic Energy*) says, "Geobiology is the study of the Earth's influence, at a precise point, on everything that lives, be it human, animal, or plant."

But basically, I think of it as the Venn Diagram of Biosphere, Atmosphere, Hydrosphere and Geosphere.

A useful website:

<http://www.biogeosciences.org/about/define.htm>

Power Point Slides.....