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“Abysmal benthic communities shaped by seamounts and hills – implications for spatial management of deep-sea mining”

The abyssal plains cover ~70% of the global seabed, and are of increasing interest to the deep-sea mining industry for the polymetallic nodules found there. However, abyssal plains are not solely flat, but are punctuated by hills and seamounts. The seafloor environment on seamounts is altered by the winnowing of sediment and increased detrital inputs, altering the benthic community. I applied seafloor imagery to the study of benthic ecology on abyssal hills, and revealed that megafaunal community structure, in terms of biodiversity and biomass, are significantly different and correlated to environmental conditions, even on small hills. Using photographs, I showed that community function, in terms of feeding groups, also differed. I also examined ecosystem function by modeling carbon transfer mechanisms in the benthic food web, and found that carbon processing differed on abyssal hills from the plain. The Clarion Clipperton Zone in the central Pacific, where nodule mining is slated to occur, is an area of abyssal plain with many seamounts and hills. Although deep-sea mining will likely directly target only the plain, while not exploiting minerals on the hills or seamounts, consideration of these areas will be important in the spatial management of deep-sea mining for their unique environments and communities, and their potential value as refugia and larval sources for fauna from the plain. Based on scientific understanding, I have developed recommendations for spatial management of deep-sea mining at the project level. The designation of areas protected from mining, and the spatial planning of mine sites and coordination of mining activities at the local and regional scales should consider the implications of this habitat heterogeneity.

~Monday~  April 23rd, 2018  
3:00 p.m.  MSB 315