

DEEP OCEAN FIXING OF CARBON DURING THE PROCESS OF

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Both diffuse flow and high temperature hydrothermal vents emit large quantities of reduced sulfur, largely in the form of hydrogen sulfide. In diffuse flow areas, sulfide is taken up by host macrofauna, which have microbial endosymbionts. The endosymbionts oxidize hydrogen sulfide with oxygen and use the chemical energy from this reaction to fix carbon dioxide into biomass and into outer hard part material to cover the soft biomass. Some macrofauna are tubeworms with polysaccharide based tubes, and other macrofauna are snails and clams which have calcium carbonate shells that form at circumneutral pH. Although the shells are thin, the organisms still grow and thrive under deep ocean conditions. Further study of these deep sea organisms should give insight into how surface dwelling organisms, which form calcium carbonate shells, can adapt to lower pH waters. A brief discussion on the physical chemical reasons why it is difficult to reduce carbon dioxide will be given. Comparison of the chemistry, determined by *in situ* electrochemical methods, with the ecology of different hydrothermal diffuse flow areas in the eastern and western Pacific Ocean will follow.