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Joseph M. Mahaffy* (mahaffy@math.sdsu.edu), Department of Mathematical Sciences, San Diego State University, San Diego, CA 92182. *A two compartment model of the marine phage-host system.*

Bacteria can exist in concentrations of a 10^6 /ml in the oceans with their predators, the bacteriophage or phage having a concentration 10 times higher. The phage cause almost 25% turnover of the bacteria each day. This predator-prey system results in massive daily cycling of carbon in the oceans, yet little is known about this ecosystem. New research is rapidly expanding our knowledge in this field, but detailed dynamics of the interactions are still unknown. The ocean is actually a very heterogeneous environment at the scale of microbes. We develop a two compartment model for the interaction between phage and their host bacteria in a marine environment. Our studies of the two compartment model identify some key parameters and show how the 10:1 phage to bacteria ratio, which is seen in many environments, can be maintained. Analysis of the model fits some experimental data, giving some information about the dynamics of this very important predator-prey system. (Received September 20, 2007)