

THE DEEP BIOSPHERE AND GAS HYDRATES, IMPORTANT FACETS OF THE GLOBAL CARBON CYCLE

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For over 40 years, the earth science community has constructed increasingly sophisticated models of the global carbon cycle to address the evolution of our atmosphere, ocean, terrestrial biosphere, and climate – yet the geologic record clearly shows that we have omitted a fundamental component. Across certain critical time intervals, such as the Paleocene/Eocene boundary, enormous quantities of carbon suddenly entered the ocean and atmosphere at rates impossible to explain with conventional models. Release of bacterial methane from oceanic gas hydrates provides the best explanation for these past carbon cycle perturbations. But as we begin to incorporate these ice-like crystalline compounds of methane and water into global carbon cycle models, we are confronted with a series of questions concerning the mass, distribution, inputs and outputs of methane in marine sediment over space and time. ODP is currently addressing key issues about the deepsea methane cycle. Dr. Dickens sailed as a geochemist on ODP Legs 164, 174A, and 201. He has also served on an ODP Program Planning Group, the Integrated Ocean Drilling Program (IODP) Scientific Planning Working Group, and the Australian ODP Science Committee.