

EXPLORATION OF BIOGEOCHEMICAL TEMPORAL VARIABILITY

TOMMY D. DICKEY

Ocean Physics Laboratory, University of California, Santa Barbara,

tommy.dickey@opl.ucsb.edu

INTRODUCTION

There is growing interest in better understanding the biogeochemistry of the world oceans, largely because of the rapid increase of atmospheric carbon dioxide, CO₂, and the anticipated consequences for the oceans as well as the atmosphere. Interestingly, measurements are presently showing increasing levels of CO₂ in the surface layers of the ocean in relatively pristine areas, namely at the Joint Global Ocean Flux Study (JGOFS) time series sites off Hawaii and Bermuda (e.g., Karl et al., 2001). Suggested effects of rising levels of CO₂ include increases in global atmospheric and oceanic temperature, shifts in weather patterns causing regional droughts and flooding, melting of ice caps, sea level rise, and changes in ocean ecology and population dynamics that may affect fisheries. A fundamental scientific, societal, and political issue concerns the partitioning of the causes of these phenomena between natural variability versus anthropogenic influences.

Several important biogeochemical- and carbon-related questions stimulated the development and execution of the ambitious international JGOFS program and several related research efforts on a global scale (e.g., Brewer et al., 1986; Buesseler, 2001; Murray and other authors, this volume). Simply put, JGOFS and other recent studies were designed to study oceanic biogeochemical cycles and their roles in affecting global change and *vice versa* (see other chapters in this volume).