MONITORING OCEAN ACIDIFICATION: EVOLVING MEASUREMENT STRATEGIES AND CAPABILITIES Dr. Robert H. Byrne USF Distinguished Research Professor, College of Marine Science, University of South Florida, 140 Seventh Ave. South, St. Petersburg, FL 33701

The oceans are responsible for removing a large fraction of the anthropogenic carbon dioxide that is introduced to the atmosphere each year. While this atmosphere-to-ocean transfer has an ameliorative effect on the rate of increase of atmospheric CO_2, rising concentrations of CO_2 in seawater are creating marked changes in the biogeochemistry of the oceans. Observation of oceanic responses to incorporation of anthropogenic CO_2 will increasingly involve the use of new measurement technologies on moorings, floats, gliders, and ship-based hydrographic expeditions. It is widely accepted that shipboard measurements cannot provide spatial and temporal coverage adequate to resolve ocean evolution and variability at even relatively coarse scales. As such, autonomous in situ observations are expected to become an increasingly essential component of international networks for monitoring ocean acidification. The current state of the art for in situ observation of CO_2 system chemistry is primitive relative to shipboard measurement capabilities and needs to be rapidly improved. This presentation examines current capabilities of in situ and shipboard systems for measurements of the primary CO_2 system variables, and the future developments that are required to make in situ measurement systems a robust component of oceanic chemical monitoring.