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**Atmospheric Sciences Research Center (ASRC)**

**Sponsor:** National Science Foundation (NSF)

**Amount:** \$229,315

**Dates:** September 1, 2009 – August 31, 2012

### **Collaborative Research: Air/Sea Gas Exchange Studies of Carbon Dioxide, Dimethyl Sulfide and Acetone by Eddy Correlation**

**Intellectual merit:** This project involves shipboard measurement of air-sea fluxes of O<sub>2</sub>, DMS, and acetone over a broad range of oceanographic conditions. These gases are important in terms of their impact on atmospheric chemistry and climate: carbon dioxide as a greenhouse gas, DMS as a precursor of atmospheric sulfate aerosols, and acetone as a precursor for tropospheric HO<sub>x</sub> and ozone. The results will provide insight into the process of air/sea gas exchange and improve gas transfer and global biogeochemical models. Two shipboard studies will be carried out: 1) a tropical cruise focused on warm waters with low to moderate wind speeds and strong diurnal heating, and 2) a high latitude cruise focusing on areas of high biological productivity that will examine the role of bubbles and the influence of near surface gradients on gas transfer. Air/sea fluxes will be measured using the eddy correlation technique, employing infrared gas analyzers for CO<sub>2</sub>, and atmospheric pressure chemical ionization mass spectrometry for DMS and acetone. The partial pressure of these gases in surface waters will be measured using continuous flow equilibrators.

**Broader impacts:** This project will support the dissertation research of PhD students at SUNY Albany and UCI, summer research experiences for undergraduates and high school students at Chapman Univ. and UCI, and the participation of a K-12 educator in a research cruise. This project will contribute to the development and verification of global biogeochemical models that play a role in predicting future climate change and informing national climate policy.