Patterns and Controls on Trace Gas Fluxes of CO_2 and/or CH_4 in Marine and Terrestrial Habitats from Barrow, Alaska to Pago Pago, American Samoa

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San Diego State University (SDSU) has been conducting research on the patterns and controls of trace gas flux from terrestrial and marine ecosystems for over five decades. Recently, SDSU joined with the NOAA Educational Partnership Program to involve students, particularly from under-represented minorities, by joining the NOAA Cooperative Science Center for Earth System Sciences and Remote Sensing Technologies (NOAA-CESSRST) also known as "CREST". CREST conducts research, educates, and trains a diverse group of students, early career scientists, and engineers, in NOAA-related science missions. The goal is to help create a diverse STEM workforce for NOAA and its contractors, Academia, Industry, and the Private Sector. CREST supports NOAA's mission *"to understand and predict changes in Earth's environment and to conserve and manage coastal and marine resources to meet the nation's economic, social, and environmental needs"* by training a diverse group of successful students in disciplines that will augment NOAA's future workforce and by leading successful research and development collaborations that will contribute to the improvement of NOAA's products and services. NOAA-CREST students are involved in terrestrial and marine research from Barrow, Alaska to Pago Pago, American Samoa, working to better understand the patterns and controls on CO_2 and/or CH_4 flux from Alaska to American Samoa.

Recent research results have helped elucidate the temporal and spatial patterns and controls on CO_2 and CH_4 fluxes and energy balance. Of particular relevance is the importance of fall and winter periods and upland sites to net CH_4 emissions. Current research includes variations in and control on energy balance. Research in chaparral is exploring the effect of fire, drought, and temperature on net CO_2 balance and carbon sequestration in the chaparral of Southern California. Special emphasis is on developing management strategies to maximize carbon sequestration in the chaparral while maximizing wildlife habitat value and minimizing fire risk. Long-term eddy covariance research is documenting the pattern and controls of sea surface-atmosphere CO_2 exchange and partial pressure of CO_2 (pCO_2) and boat-based eddy covariance are being used to document the seasonal, anthropogenic, and biotic controls and sea surface-atmosphere exchange of CO_2 flux. These data will be used to improve models of surface-atmosphere CO_2 exchange and to inform management policies to help reduce atmospheric CO_2 levels.

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Figure 1. Chaparral "Old Stand" at San Diego State University Sky Oaks Field Station in San Diego, CA.