S8 POC Topic Session
The impacts of climate change on the carbon cycle in the North Pacific

Co-sponsored by International Ocean Carbon Coordination Project (IOCCP)

Session Convenors: Kitack Lee (Korea) and Christopher L. Sabine (U.S.A.)

An important area of contemporary carbon cycle research is the linkage and response to climate change. Many recent studies have investigated carbon cycle variability in the Central and North Pacific. A significant number of these studies were related to the effects of El Niño-Southern Oscillation (ENSO) on upwelling regions of the Equatorial Pacific. Recently, there have been several studies indicating significant variability over other regions of the North Pacific and potential linkages to the Pacific Decadal Oscillation (PDO). Most of these studies covered a relatively short time frame, examined only a relatively small portion of the North Pacific, or considered only a limited number of parameters. What is often lacking is an overall picture of North Pacific carbon cycle that draws together all of these individual lines of investigation and looks for coherent patterns that may help us understand the regional significance of variability and the possible mechanisms controlling the observed spatial and temporal patterns. This session will provide a forum to present new insights into links between climate change and the carbon cycle in the North Pacific. It will showcase, in part, results from a synthesis and modeling workshop (co-sponsored jointly by NOAA, Global Carbon Project and PICES) planned for June 2004, and will bring together many scientists focusing on such phenomena in the North Pacific region. We encourage contributed papers and posters that present recent research into the carbon cycle of the North Pacific with particular emphasis on the following: climate induced inter-annual and decadal variability in air-sea CO_2 exchange; the role of the North Pacific in taking up anthropogenic carbon; changes in phytoplankton community structure and its consequences for the carbon cycle; and recent modeling and synthesis activities that aim to understand such linkages.

Day 1 Wednesday, October 20, 2004 13:30-17:10

13:30-14:00 **David M. Karl** (Invited)
Microbial biogeochemical processes in the North Pacific Subtropical Gyre (S8-2047)

14:00-14:20 **C.S. Wong, Shau-King Emmy Wong and Yukihiro Nojiri**
Carbon change during SERIES (Sub-arctic Ecosystem Response Iron Enhancement Study) (S8-1882)

14:20-14:40 **Debby Ianson, Christoph Voelker and Ken Denman**
Modelled carbon fluxes in the NE Pacific SERIES iron fertilization experiment (S8-2147)

14:40-15:00 **James Christian**
Modelling the impact of climate change on the carbon cycle: Redfield and non-Redfield models (S8-2005)

15:00-15:20 **Coffee break**

15:20-15:50 **Nicolas Gruber, Christopher L. Sabine, Richard A. Feely, Scott C. Doney, Robert M. Key, Jorge L. Sarmiento, Alexander Kozyr and the workshop participants** (Invited)
Interannual to decadal variability in the carbon cycle and biogeochemistry of the North Pacific - Highlights from the NOAA/GCP/PICES synthesis and modeling workshop (S8-2031)

15:50-16:10 **Sabine Mecking, Mark J. Warner and John L. Bullister**
Age and AOU increases at the North Pacific subtropical-subpolar gyre boundary (S8-2102)

16:10-16:30 **Hernan E. Garcia, Tim Boyer, Syd Levitus, Ricardo Locarnini and John Antonov**
Oxygen and Apparent Oxygen Utilization content variability in the upper North Pacific Ocean (1955 to 1998) (S8-1817)

16:30-16:50 **Curtis Deutsch, Steven Emerson and Luanne Thompson**
Attributing the causes of North Pacific oxygen changes (S8-1834)

16:50-17:10 **Terry E. Whitledge, Kathleen Crane, Vladimir Smolin, Kevin R. Wood and Mikhail Zhdanov**
Initial results of Russian-American Long-term Census of the Arctic (RUSALCA) Expedition: 2004 (S8-2174)

Day 2 Thursday, October 21, 2004 8:30-12:00

08:30-09:00 **Keith B. Rodgers, Richard A. Feely, Olivier Aumont, James Orr, Gurvan Madec, Nicolas Metzl, Raghu Murtugudde, Patrick Wetzel, Ernst Maier-Reimer, Corinne Le Quere, Eric Buitenhuis, Fei Chai, Galen McKinley, Yasuhiro Yamanaka, Holger Brix, Nicolas Gruber, Taro Takahashi, Rik Wanninkhof, Hisayuki Y. Inoue and Masao Ishii**
Interannual to decadal variability in Equatorial Pacific pCO_2 and surface CO_2 fluxes: An intermodel comparison (S8-2140)

09:00-09:20 **Richard A. Feely, C. L. Sabine, R. Wanninkhof, A. Murata, R. Key, C. Winn, M. F. Lamb and D. Greeley**
Decadal changes of CO_2 in the North Pacific Ocean (S8-1985)

09:20-09:40 **Hisayuki Y. Inoue, Masao Ishii, Takashi Midorikawa, Akihiko Murata and Kazuhiro Nemoto**
Variations and distributions of pCO_2^{sw} in the western North Pacific during 1990 to 2003 (S8-1876)

09:40-10:00 **Fei Chai, Lei Shi, Mingshun Jiang, Tsung-Hung Peng and Yi Chao**
Modeling decadal variability of carbon cycle in the Pacific Ocean (S8-2146)

10:00-10:20 **Coffee break**

10:20-10:40 **Chen-Tung Arthur Chen, Shu-Lun Wang, Wen-Chen Chou and David D. Sheu**
Carbonate chemistry of the South China Sea (S8-2055)

10:40-11:00 **Geun-Ha Park, Kitack Lee, Kyung-Ryul Kim and Dong-Jin Kang**
What controls the uptake of atmospheric CO_2 by the well-ventilated East/Japan Sea? (S8-2080)

11:00-11:20 **Jeong Hee Shim, Young Chul Kang, Dong Seon Kim, Jae Hak Lee and Chul Ho Kim**
Seasonal change in surface pCO_2 distribution in the East China Sea (S8-1893)

11:20-11:40 **Kathryn E. Fagan, Fred T. Mackenzie, Daniel W. Sadler and Justin Dilg**
Processes controlling air-sea exchange of carbon dioxide, Kaneohe Bay, Oahu, Hawaii (S8-2151)

11:40-12:00 **Andrey G. Andreev, C.-T. A. Chen and Nataliya Sereda**
Increases in calcium and total alkalinity in the Bering and Chukchi Seas (S8-2015)

Posters

Andrey G. Andreev and Viktoria Baturina
Interannual variability of dissolved oxygen and inorganic carbon in the Kuril Basin of the Okhotsk Sea (S8-2124)

Liqi Chen, Zhongyong Gao, Liyang Zhang and Suqing Xu
Spatial-temporal variations of pCO_2 and their driving forces in the western Arctic Ocean (S8-2180)

Masao Ishii, Shu Saito, Takeshi Kawano, Kazuhiko Matsumoto, Kazuhiro Nemoto, Hitomi Kamiya, Takashi Midorikawa and Hisayuki Y. Inoue
Decadal trend of the oceanic CO_2 in the western equatorial Pacific warm pool (S8-1915)

Shu Saito, Masao Ishii, Hidekazu Matsueda, Keizo Shutta, Masahiko Fujimura, Ikuo Kaneko and Takashi Midorikawa
Change in total inorganic carbon and dissolved oxygen along the 137°E meridian between 1994 and 2003 (S8-1918)

Kazuhiro Nemoto, Takashi Midorikawa, Hitomi Kamiya, Masao Ishii, Hidekazu Matsueda and Hisayuki Y. Inoue
Long-term trend and interannual variations of winter oceanic pCO_2 and air-sea CO_2 flux in the western North Pacific (S8-1895)

Christopher L. Sabine, Richard A. Feely, Nicolas Gruber, Robert M. Key, Kitack Lee, John L. Bullister, Rik Wanninkhof, C.S. Wong, Douglas W.R. Wallace, Bronte Tilbrook, Frank J. Millero, Tsung-Hung Peng, Alexander Kozyr, Tsueno Ono and Aida F. Rios
The oceanic sink for anthropogenic CO_2 (S8-1988)

Daniel W. Sadler
CO_2 is HOT: Fifteen years quantifying carbon dioxide in the subtropical Pacific Ocean (S8-2069)

Takayuki Tokieda and Masao Ishii
Variability in the degree of saturation for CFCs in the North Pacific Central Mode Water (S8-1917)

Nobuo Tsurushima, Yutaka W. Watanabe, Yukihiro Nojiri and Koh Harada
Temporal and spatial variation of dissolved inorganic carbon in the western North Pacific in recent years (S8-2134)