

# S8 POC/BIO Topic Session

## Anthropogenic perturbations of the carbon cycle and their impacts in the North Pacific

Co-Convenors: *James Christian (Canada) and Toshiro Saino (Japan)*

Accumulation of anthropogenic carbon and associated changes in ocean chemistry (“ocean acidification”) affect all of the world’s oceans. Anthropogenic CO<sub>2</sub> has multiple feedbacks to ocean chemistry and biology, such as reduction of calcification, shifts in phytoplankton species composition, and dissolution of particulate or sedimentary carbonates. The carbon system can also be affected by other anthropogenic factors such as changes in river flow and aeolian dust deposition. Carbon and nutrient biogeochemistry will be affected both directly and indirectly by ocean acidification. This session invites papers that address the biogeochemistry of anthropogenic carbon (processes controlling its distribution, processes by which it alters ocean chemistry), other anthropogenic impacts on carbon and nutrient cycles, acidification impacts on marine biota, and feedbacks among these.

### Tuesday, October 27 (9:00-17:10)

- 9:00 **Introduction by Convenors**
- 9:05 **Richard E. Zeebe (Invited)**  
The future ocean: More acid, less calcifying, and more transparent to sound? (S8-5658)
- 9:50 **Shu Saito and Akihiko Murata**  
Decadal changes in CaCO<sub>3</sub> saturation state along 179°E in the Pacific Ocean (S8-5842)
- 10:10 **Christopher L. Sabine, Richard A. Feely, François M.M. Morel, Eric S. Egleston and Dana Greeley**  
Past and present trends in ocean carbon uptake and storage in the North Pacific (S8-5888)
- 10:30 **Coffee / tea break**
- 10:50 **Andrey G. Andreev**  
Inorganic carbon parameters change in the surface waters of the subarctic North Pacific (S8-5826)
- 11:10 **Tsuneo Ono and A-line monitoring team**  
Interannual variation of DIC in the Oyashio region along the A-line transect (S8-5625)
- 11:30 **Lauren W. Juranek, Richard A. Feely, William T. Peterson, Simone R. Alin, Jay Peterson, Kitack Lee, Christopher L. Sabine and Burke Hales**  
A novel method for determining seasonal variations in aragonite saturation state in the eastern North Pacific continental shelf using multi-parameter analysis (S8-5883)
- 11:50 **James R. Christian**  
The future ocean carbon cycle: Projections with the Canadian Earth System Model CanESM1 (S8-5775)
- 12:10 **Keith B. Rodgers, Laurent Bopp, Olivier Aumont, Daniele Iudicone, Jorge L. Sarmiento, Anand Gnanadesikan and John Dunne**  
Changes in North Pacific  $\Delta p\text{CO}_2$  and air-sea CO<sub>2</sub> fluxes over the 21<sup>st</sup> century in coupled models (S8-5904)
- 12:30 **Lunch**
- 14:20 **Steven S. Rumrill, Alicia R. Helms and Adam S. DeMarzo**  
Long-term pH shift in a Pacific Northwest estuary: Potential relationship between ocean acidification and alkalinity within the South Slough (Coos Bay, Oregon, USA) (S8-5950)

- 14:40 **Tae-Wook Kim, Kitack Lee, Richard A. Feely, Christopher L. Sabine, Hae Jin Jeong and Kwang Young Kim**  
Prediction of East/Japan Sea acidification over the past 40 years using a multiple-parameter regression model (S8-5780)
- 15:00 **Contributed poster presentations**
- 15:20 **Coffee / tea break**
- 15:40 **Ryo Kimura, Hideki Takami, Tsuneo Ono, Toshihiro Onitsuka and Yukihiro Nojiri**  
Effects of elevated  $p\text{CO}_2$  on early development of the Ezo abalone *Haliotis discus hannai* (S8-5784)
- 16:00 **Shinya Fukuda, Iwane Suzuki, Takeo Hama and Yoshihiro Shiraiwa**  
Control of seawater pH by the coccolithophorid, *Emiliana huxleyi* (Haptophyceae) (S8-5841)
- 16:20 **Takeo Hama, Shoko Kawashima, Yuhi Satoh, Koich Shimotori, Yuko Omori, Taiki Adachi, Shun Hasegawa, Hiroko Endoh, Takeshi Nakayama, Isao Inoue, Takashi Midorikawa, Masao Ishii, Shu Saitoh and Daisuke Sasano**  
Experimental study on the effect of ocean acidification on microbial structure and bioelemental cycles (S8-5693)
- 16:40 **Discussion**
- 17:10 **Session ends**

## S8 Posters

- S8-5620 **Jae Hoon Noh, Dong Han Choi, Charity Lee and E.J. Carpenter**  
Spatio-temporal variations of  $\text{N}_2$  fixation rates and abundance of  $\text{N}_2$ -fixers in the northwestern Pacific
- S8-5670 **Guimei Liu, Fei Chai, Huijie Xue and Lei Shi**  
Primary productivity and  $p\text{CO}_2$  variations in the China seas during 1990-2004: A three-dimensional physical-biogeochemical modeling study
- S8-5714 **Zhongyong Gao, Liqi Chen and Heng Sun**  
Transport of the Bering Slope Current and its effects on the carbon cycle in the Bering Sea and the western Arctic Ocean
- S8-5770 **Toshiya Nakano, Kazuhiko Hayashi, Yuichi Sasaki, Masao Ishii and Takashi Midorikawa**  
Estimation of the dissolved inorganic carbon inventory in the western North Pacific
- S8-5871 **Jeong-Hee Shim, Dong-Jin Kang, Chun Ok Jo, Young-Keun Jin, Pavel Ya. Tishchenko, Anatoly Obzhirov and Kyung-Ryul Kim**  
Distribution of surface  $p\text{CO}_2$  and its controlling factors at the eastern shelf of the Sakhalin Island in the Sea of Okhotsk
- S8-5911 **Hyung Chul Kim, Yiming Wang, Seong Heo and Pyoung Joong Kim**  
Long-term variations and autumn distribution of inorganic nutrients in the Yellow Sea
- S8-5912 **Yukihiro Nojiri, Shin-ichiro Nakaoka, Chihiro Miyazaki, Andrew G. Dickson and Inter-comparison Participants**  
Indoor seawater pool inter-comparison of ocean surface  $p\text{CO}_2$  systems developed for underway and buoy operation