

SEEDS II Workshop

Second Iron Enrichment Experiment in the Western Subarctic Pacific

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| Date: | October 17-18, 2005 |
| Venue: | Ocean Research Institute, The University of Tokyo, Tokyo, Japan (http://www.ori.u-tokyo.ac.jp/en/index.html) |
| Convenors: | A. Tsuda, S. Takeda, M. Uematsu (Univ. of Tokyo) and M. Wells (Univ. of Maine) |
| Organized by: | Ocean Research Institute, The University of Tokyo |
| Sponsored by: | Ocean Research Institute The University of Tokyo North Pacific Marine Science Organization (PICES) SOLAS Japan |

BACKGROUND AND OBJECTIVES (back to the [top](#))

The subarctic North Pacific is one of the major High-Nitrate, Low-Chlorophyll open ocean regions. Three mesoscale iron-enrichment experiments have been performed in the western and the Alaska gyres (SEEDS, SEEDS II and SERIES) to test the iron-limitation hypothesis at ecosystem scales as part of the PICES-IFEP and SOLAS activities. SEEDS II was conducted in the same western subarctic Pacific region as the initial SEEDS experiment, and was an international collaborative study utilizing two research vessels (R.V. Hakuho Maru and R.V. Kilo Moana). This experiment was designed to characterize the evolution of the fertilized patch over a longer time scale (1 month) and with a greater range of parameters than measured during SEEDS.

The preliminary results from SEEDS II showed both the iron-induced increase and subsequent decline in phytoplankton biomass. However, the iron-initiated bloom was much less intense than observed in SEEDS. Chlorophyll-*a* concentrations increased only 2 to 3 times over initial values, and the drawdown of nutrients and *p*CO₂ were small. The aim of the SEEDS-II Workshop is to provide a forum for exchanging scientific information and expertise to better understand the underlying cause for the dramatically different chemical and biological responses observed in these two mesoscale experiments.

MAIN THEMES (back to the [top](#))

1. To synthesize the key biological findings of the SEEDS II
 2. To elucidate the changes in iron biogeochemistry
 3. To determine the effect of iron addition on the production of trace gases
 4. To compare the biogeochemical changes associated with SEEDS I and SEEDS II
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PROVISIONAL AGENDA (back to the [top](#))

Monday, October 17th

- Invited oral presentations summarizing key observations from SEEDS II and SEEDS I (30 min. each) followed by an afternoon poster session.
- Establish the charges for breakout groups, select a Chair and rapporteur for each group, and begin discussions of the key aspects of the findings.

Tuesday, October 18th

- Continue breakout group discussions in the morning followed with oral presentations by group Chairs and synthesis discussion by all participants.

PROGRAM (back to the [top](#))

| October 17 th | |
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| 9:30-9:50 | A. Tsuda Background and introduction of SEEDS II |
| | Session 1: <u>Chair - K. Johnson</u> |
| 9:50-10:20 | D. Tsumune, Y. Watanabe, A. Shimamoto Physical behavior of the iron-fertilized patch by SF6 tracer release |
| 10:20-10:50 | J. Nishioka, H. Obata, S. Takeda, K. Johnson, M. Wells, S. Nakatsuka, Y. Kondo, S. Takada, Y. Sorin Iron and trace metal chemistry |
| 10:50-11:10 | Coffee Break |
| | Session 2: <u>Chair - S. Takeda</u> |
| 11:10-11:40 | H. Saito, K. Suzuki, H. Kiyosawa, A. Tsuda Biological responses |
| 11:40-12:10 | I. Kudo, T. Aramaki, W. Cochlan, Y. Noiri, T. Ono, and Y. Nojiri Primary production, bacterial production and nitrogen assimilation dynamics during SEEDS II |
| 12:10-12:40 | W. Cochlan, M. Wells, C. Trick Complexity of grow-out experiments: further iron stimulation of communities from an iron fertilized patch |
| 12:40-14:00 | Lunch |
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| | Session 3: <u>Chair - C. Trick</u> |

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| 14:00-14:30 | I. Nagao, S. Hashimoto, M. Uematsu DMS in the seawater and atmosphere measured during the iron fertilization experiment (SEEDS-II) in the sub-arctic North Pacific |
| | M. Levasseur, M. Lizotte and G. Caron The role of bacteria in modulating the impact of Fe on DMS production in HNLC waters |
| 14:30-15:00 | M. Uematsu, Y. Narita, Y. Iwamoto, M. Kondo, K. Yoshida, I. Nagao, S. Hashimoto, S. Toda, S. Kato, K. Kajii Distribution of marine biogases and their fates between surface seawater and marine atmospheric boundary layer during the SEEDS II cruise in the northern North Pacific |
| 15:00-15:30 | J. Hall The SAGE Experiment: Why was there no bloom? |
| 15:30-16:30 | Poster session |
| | Session 4: Chair - <u>A. Tsuda</u> |
| 16:30-16:50 | Establish the charges for breakout groups, select a Chair and rapporteur for each group, and begin discussions of the key aspects of the findings. Groups and Chairs 1. Trace metal chemistry (S. Takeda) 2. Biological responses (H. Saito) 3. Gasses (M. Uematsu) |
| October 18th | |
| 9:30-11:30 | Continue the group discussion |
| 11:30-12:15 | M. Fujii (M. Wells), N. Yoshie Suggestions from modelers |
| 12:15-13:45 | Lunch |
| 13:45-15:00 | Report from each breakout group |
| 15:00-15:20 | Coffee break |
| 15:20-17:00 | Synthesis and future plans Contribution to IFEP/PICES Listing of planned manuscripts Publications International meetings Etc. |

POSTERS (back to the [top](#))

- 1 Meso- and microzooplankton dynamics in SEEDS II.
A. Tsuda, H. Saito and R. Machida
 - 2 Dynamics of mass flux and particulate matter flux during SEEDS II
T. Aramaki, Y. Nojiri, and K. Imai
 - 3 Release of organic iron-binding ligands during grazing on phytoplankton and its effect on phytoplankton community structure.
M. Sato, S. Takeda and K. Furuya
 - 4 Complexation of iron (III) by natural organic ligands during SEEDS II.
Y. Kondo, S. Takeda, J. Nishioka and K. Furuya
 - 5 Iron oxidation status during the SEEDS II mesoscale experiment and its potential biological implications.
E. Roy, M. Wells, C. Trick and W. Cochlan
 - 6 Trace gasses in the water.
U. Tsunogai
 - 7 Geochemistry of bioactive trace metals during an in-situ iron enrichment in the subarctic western North Pacific Gyre (SEEDS II).
S. Nakatsuka, J. Nishioka, M. Kinugasa, Y. Sorin
 - 8 Phytoplankton dynamics.
K. Suzuki, H. Kiyosawa (cancelled)
 - 9 Ammonium inhibition of nitrate uptake during mesoscale iron-enrichment experiments: A comparison of the planktonic response during SOFEX and SEEDS II.
W. Cochlan, J. Herndon, J. Betts, D. Costello, C. Trick and M. Wells
 - 10 Behavior of rare earth elements and ^{210}Po - ^{210}Pb during the iron fertilization experiment
Y. Hara, H. Obata, T. Doi, Y. Hongo, T. Gamo
 - 11 Behavior of thorium and particles obtained by the multiple-unit large-volume in situ filtration system in SEEDS II.
T. Aono, T. Nakanishi, J. Zheng, M. Yamada and M. Kusakabe
 - 12 Temporal variability of cosmogenic radionuclides ^{32}P , ^{33}P and ^7Be in SEEDS II
T. Nakanishi, T. Aono, M. Yamada and M. Kusakabe
 - 13 Phosphorus dynamics during the SEEDS II
T. Yoshimura
 - 14 Effects of iron fertilization on the distribution of volatile organic compounds in seawater.
S. Toda, Y. Narita, H. Oda, Y. Akatsuka, T. Nagai, M. Kurihara, M. Uematsu,
S. Hashimoto
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| University of Tokyo | Tsuda, A., Uematsu, M., Obata, H., Hara, Y., Doi, T., Hongo, Y., Gamo, T., Takeda, S., Sato, M., Kondo, Y., Furuya, K., Machida, R. |
| Institute of Ocean Sciences, Canada | Johnson, K., Ianson, D. |
| CRIEPI | Tsumune, D., Yoshimura, T. |
| Hokkaido Univ. | Watanabe, Y., Suzuki, K., Kudo, I., Yoshie, N., Tsunogai, U., Nishioka, J. |
| KANSO | Shimamoto, A. |
| University of Maine | Wells, M., Fujii, M. |
| Kyoto University | Nakatsuka, S., Sorin, Y., Kinugasa, M. |
| Tohoku National Fisheries Research Inst. | Saito, H. |
| Marine Biological Research Institute of Japan | Kiyosawa, H. |
| National Institute of Environmental Research | Aramaki, T., Nojiri, Y. |
| Hokkaido National Fisheries Research Inst. | Ono, T. |
| San Francisco State Univ. | Cochlan, W., Henderson, J., Betts, J., Costello, D. |
| Univ. of West Ontario | Trick, C. |
| Université Laval | Lavasseur, M., Lizotte, M., Caron, G. |
| Nagoya Univ. | Nagao, I. |
| Univ. of Shizuoka | Hashimoto, S., Toda, S. |
| Tokyo Metropolitan Univ. | Kato, S., Kajii, K. |
| NIWA New Zealand | Hall, J. |
| National Institute of Radiological Sciences | Aono, T., Nakanishi, T., Zheng, J., Yamada, M., Kusakabe, M. |

CONTACT PERSON (back to the [top](#))

For questions regarding the scientific program, abstract submission, registration and accommodation, please contact:

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