SOLAS Japan

compiled by Mitsuo Uematsu

Notes:
Reporting Period is January 2011 – December 2011
Information will be used for: reporting, fundraising, networking, strategic development & outreach

1. Key scientific SOLAS-relevant highlights/findings (you may include figures and references)

i) Responses of marine ecosystem to typhoon passages in the western subtropical North Pacific by Shibano, R., Yamanaka, Y., Okada, N., Chuda, T., Suzuki, S., Niino, H., Toratani, M.

Strong phytoplankton blooms are occasionally observed around a recurvature point of typhoon tracks in the western subtropical Pacific. These are noteworthy events in subtropical regions where both nutrient concentrations and biological production are persistently low. We investigated the response of phytoplankton to typhoon passage using a numerical model with/without biogeochemical processes. The model reproduced the observed patch-like phytoplankton bloom around a recurvature point of Typhoon Keith in 1997. The strong bloom is caused by the typhoon-centered upwelling of nutrient-rich water from below the euphotic layer, which supplies the nutrients required for phytoplankton growth, resulting in higher chlorophyll-a concentrations. Biogeochemical processes then play essential roles in determining the response after the passage of typhoons in subtropical regions.

ii) Population dynamics of phytoplankton, heterotrophic bacteria, and viruses during the spring bloom in the western subarctic Pacific by Suzuki, K., Kuwata, A., Yoshie, N., Shibata, A., Kawanobe, K. and Saito, H.

An index for diatom bloom development has been established. Bloom-forming diatoms were mainly Thalassiosira and Chaetoceros species. Fucoxanthin can serve as a strong indicator of the diatom carbon biomass. Abundance of heterotrophic bacteria changed little during the spring diatom bloom. Viral abundance increased toward the end of the spring diatom bloom.

iii) Single-Particle Chemical Characterization and Source Apportionment of Iron-Containing Atmospheric Aerosols in Asian Outflow by Furutani, H., J. Jung, K. Miura, A. Takami, S. Kato, Y. Kajii, and M. Uematsu

Using a single‐particle mass spectrometer, the size and chemical composition of individual Fe‐containing atmospheric aerosols (Fe aerosols) with diameter from 100 to 1800 nm were characterized during Asian outflow season (spring of 2008) in Okinawa Island, Japan. The results show that anthropogenic sources contributes significant portion of Fe aerosols in Asian outflow. Excluding the vanadium type, relative contribution of the remaining four particle types was constant over the course of study, which remained even when the total concentration of Fe aerosols changed and fraction of the Fe aerosols among atmospheric aerosols decreased significantly by the switch of air mass type into marine type. The observed constant relative abundance reflected the relative source strength of Fe aerosols in Asian outflow, particularly emphasizing the importance of coal combustion source in East Asia.

2. Activities/main accomplishments (research projects, cruises, special events, workshops, remote sensing used, model and data intercomparisons etc)

The science projects, which have been planned to investigate responses of Antarctic marine ecosystems to such global environmental changes as global warming and oceanic acidification, and to study on plankton community structure and environmental parameters, under the six year plan Phase VIII of the Japanese Antarctic Research Expeditions (JARE-52 to -57, 2010/11-2015/16). The marine science cruises were conducted in January by RT/V Umitaka-Maru (Tokyo University of Marine Science and Technology) and in March by Icebreaker Shirase. The intensive study areas were around marginal sea ice zone along 110°E and 140°E in the Antarctic Ocean. On the other hand, shore based observations were conducted around Syowa Station (69°00'S, 39°35'E). Temporal changes in plankton communities and pCO2 under fast ice were investigated.

We postponed the Final Symposium for the W-PASS project in Tsukuba on March to Sapporo on 13 September 2011. We finalized the publication of final report both in Japanese and English version.

Many SOLAS-Japan members have been working on the radioactive material investigation released from the Fukushima Nuclear Power Plants in marine atmosphere and ocean by research vessels and on land. It is important to identify the inputs both from atmosphere and direct discharge of contaminated water to the ocean. SOLAS members are expert for this field.

3. Human dimensions (outreach, capacity building, public engagement etc)

After 5 year W-PASS project, we traced for young scientists involved the project. Seven students continued their PhD study from 37 students for master degree. Eleven scientists obtained PhD have been working as post doc or assistant professor. A new PhD got a job in a private industry. Among 34 post docs working for the W-PASS project, 7 obtained now faculty positions and 22 are keeping their post doc positions. Substantial numbers of young scientist are working in the SOLAS field in Japan, but we see some decrease of PhD candidates for the last 5 years.

4. Top 10 publications in 2011 (Reports, articles, models, datasets, products, website etc)

See attached file “Top 10 paper”

5. International interactions and collaborations (including contributions to international assessments such as the IPCC, links with observation communities etc)

A SOLAS-Japan research cruise will be carried out coincidentally with the TORERO (Tropical Ocean tRoposphere Exchange of Reactive halogen species and Oxygenated VOC) expedition over the Eastern Equatorial Pacific Ocean in February 2012. We will discuss a joint workshop or session at the AGU SFO meeting in future.

6. Goals, priorities and plans for future activities/events

For W-PASS scientific outcome, the final report in Japanese version will be published by the end of February. The English version planned to be a hard cover book is under editing process. Our expecting publishing date is by the end of March 2012. Unfortunately, the East Japan great earthquake made all publication schedule postponed.

7. Other comments

The person in charge of the National report preparation will take the place from Uematsu to Nojiri from 2012.