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POC Production and Export in the Indian Ocean Sector of the Southern Ocean: A US-China Collaborative Research Program

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Annual Report for Period:06/1998 - 06/1999**Submitted on:** 04/10/1999**Principal Investigator:** Pilskaln, Cynthia H.**Award ID:** 9726186**Organization:** University of Maine**Title:**

POC Production and Export in the Indian Ocean Sector of the Southern Ocean: A US-China Collaborative Research Program

Project Participants

Senior Personnel

Name: Pilskaln, Cynthia**Worked for more than 160 Hours:** Yes**Contribution to Project:**

PI organized and participated in all 1998-99 collaborative cruise field activities with the Chinese as planned, and maintained communications with the appropriate Chinese administrative partners before, during and after the cruise.

Name: Chai, Fei**Worked for more than 160 Hours:** No**Contribution to Project:**

F. Chai has substantially reduced his direct involvement in the project as originally stated in the funded budget justification and investigator responsibilities. He was not involved in any activities surrounding the project's 1998-99 cruise planning and decided not to participate on the cruise. He thus was not involved in the joint US-Chinese hydrographic data collection on the cruise which in the funded program was designated his responsibility. Pilskaln worked with the Chinese to collect these data sets, with the assistance of collaborator Dr. Vernon Asper of Univ. of So. Miss., who participated on the 1988-99 cruise. F. Chai has indicated that he would like to direct the remaining funds in the grant that were allocated to him for his participation in the joint US-Chinese cruises (which includes salary support, some of which he has used), associated travel, etc., to bring a colleague from China over to the US. He has not indicated to date to the PI what the objective of this visit would be and/or how it would benefit or address the stated objectives of the funded POC production and export in the Indian Sector of the Southern Ocean. The Chinese colleague is a physical oceanographer, having worked in the Antarctic some years ago and would require salary support to make such a visit.

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Name: Lehmann, Charlotte**Worked for more than 160 Hours:** Yes**Contribution to Project:**

C. Lehmann is a senior research associate in Pilskaln's lab and was instrumental in equipment and cruise preparations, ordering of new supplies and instruments, managing the shipping of all gear for the cruise, and providing logistical and communication assistance from Maine while the PI was at sea. Salary support for Lehmann was provided by the funded grant.

Other Participant

Name: Asper, Vernon**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Dr. Asper (USM) participated on the cruise formally as the mooring technician to assist the PI. A very modest amount of funds allocated in the project budget for this service was paid to him; the amount--\$10,000--would not cover his salary and associated benefits, etc. so Asper basically participated with his salary (for almost 2 months) being paid for by his institution. Asper used the

10K to provide partial support for a graduate student and to purchase a lap-top IBM PC which we used extensively on the cruise to for hydrographic data, e-mail, electronic equipment testing, etc. Asper contributed substantially to the data collection and success of the cruise, not only through his participation in the mooring preparations and deployment, but also through his provision of a CTD and transmissometer for use on the cruise. With this equipment, we completed suspended particle sampling (using the 10 liter Niskins provided by ASA for this purpose as well as for Chinese primary productivity, nutrient and chlorophyll measurements) and beam attenuation profiles at a large number of Chinese hydrographic stations. The beam attenuation data was provided to the Chinese along with all the USM CTD profile data sets. The Chinese requested and we agreed to leave the USM CTD and transmissometer with them following our departure from the ship so they could continue to collect data at a number of additional stations. It should also be noted that without the USM CTD, the Chinese would not of had accurate depth information for their nutrient casts or productivity and chlorophyll measurements as they had no CTD to attach to the hydrowire on which the Niskins were placed. The lack of a bow thruster on the Chinese ship and very large wire angles would have rendered the wire-out depth as useless for accurate depth determination for the bottle casts.

Research Experience for Undergraduates

Organizational Partners

Chinese Polar Research Institute

The Chinese Polar Research Institute (Shanghai) through a joint collaboration agreement with the US, provided shiptime, shipboard laboratory space, and cruise personel assitance to the PI on the 1998-99 cruise to the Southern Indian Ocean. The ship, the R/V Xue Long, is operated by and based at the Polar Research Inst. in Shanghai. Near-future delivery to the PI is anticipated of the Chinese-collected hydrographic and primary productivity data, as agreed upon in the collaboration memorandum signed by the director of the Polar Research Inst. and the PI. in June 1997.

Chinese Arctic and Antarctic Administr.

The Chinese Arctic and Antarctic Administration (CAAA in Beijing) provided the financial support for the 1998-99 cruise to the So. Indian Ocean, designated the various scientific personel from a number of Chinese institutions who would participate in the cruise and work with the PI, and provided the Chinese expedition leader and political officers to oversee the cruise activities, maintain contact with Beijing and Shanghai, and ensure expedition success.

Other Collaborators or Contacts

Contact and logistical support from the Australian Antarctic Division (or ANARE) was important to the success of the project's first field season/expedition. ANARE provided for the helicopter transport of the PI and collaborator Asper from the R/V Xue Long to the Australian Davis Station, provided for the room and board at Davis for Pilskaln and Asper for 3 days, and assisted in facilitating the transport of Asper and Pilskaln (and their gear) back to Hobart, Tasmania from the Antarctic via the tourist ship the Kapitan Khlebnikov on which many ANARE station people were transported back as well. Additionally, the PI has established a number of contacts within the Australian Antarctic Division, at the Univ. of Tasmania Antarctic CRC, and in Japan which will lead to additional collaborations in the Prydz Bay region of the So. Indian Ocean between the US, China, Australia and Japan.

Activities and Findings

Research and Education Activities:

Participation in 1998-99 Chinese Antarctic expedition to the Prydz Bay region, So. Indian Ocean. Accomplishments include deployment of a 3000 m subsurface time-series sediment trap/current meter mooring in 4000 m of water, offshore of Prydz Bay, So. Indian Ocean, and collaborative collection with the Chinese of hydrographic (CTD), primary productivity, SPM, beam attenuation, dissolved nutrient, chlorophyll and plankton tow data sets at 17 stations within Prydz Bay.

Findings:

Mooring will not provide data and samples for another year after which we will return and retrieve the mooring from the R/V Xue Long. Chinese data sets from the cruise on primary productivity, dissolved nutrients, chlorophyll-a, and plankton tows have not been received to date but are anticipated in the near future. SPM and beam attenuation data sets collected on the cruise show what is believed to be a strong subsurface phytoplankton maximum at 50 m at a number of the Chinese Prydz Bay hydrographic stations.

Training and Development:

During the first cruise collaboration with the Chinese in the So. Indian Ocean, we initiated training of the ship's crew and some of the scientific personnel in the methods/logistics of deploying an oceanographic instrument mooring, methods of large volume sampling and filtering for SPM analyses, techniques for completing transmissometer casts and data collection, and provided suggestions for enhancing the accuracy and precision of the primary productivity measurements completed by the Chinese.

Outreach Activities:

The PI provided information on the joint US-China collaboration project and the scientific objectives to local and national news service bulletins and articles (all done before, during, and after the cruise), to companies wishing to advertise the use of their equipment on the project (i.e., Inmarsat, Benthos, etc.), and provided expedition and cruise information to schools while at sea via e-mail. All of the above public education and outreach activities are continuing.

Journal Publications

Cynthia H. Pilskaln and Vernon S. Asper, "US-China collaborative research program on particulate organic matter production and export in the Southern Indian Ocean", Antarctic Journal of the United States (submitted), p. , vol. , (1999). Submitted

Books or Other One-time Publications**Web/Internet Site**

URL(s):

Description:

Other Specific Products

Product Type: Data or databases

Product Description:

All data hydrographic and mooring data collected will be incorporated into a web-accessed Prydz Bay database to be set up jointly by the PI, the Chinese and Australian colleagues and Japanese scientists working in the region.

Sharing Information:

Through web-based links to agencies and universities in US, China and Australia.

Contributions**Contributions within Discipline:**

Photographs, videos, and data sets collected from the 1998-99 joint US-China collaborative project are being actively presented to undergraduate students in advanced Oceanography courses taught at the Univ. of Maine and the Univ. of So. Mississippi.

Contributions to Other Disciplines:**Contributions to Human Resource Development:**

PI will give several seminars in the next few months with slides and video from US-China collaborative research expedition to K-12 groups and senior groups.

Contributions to Resources for Research and Education:

Inmarsat Systems is advertising our successful usage of their Inmarsat-M unit to provide e-mail and satellite phone connection to the US and Europe from 69 degrees south latitude during our expedition to Prydz Bay as proof that these small, suitcase-style systems can provide more than adequate communication from extremely high latitudes. Such systems had never been tested for operation at latitudes south of approximately 63 degrees nor on an open-ocean polar vessel prior to our field program.

Contributions Beyond Science and Engineering:

See previous section on contributions to resources for science and technology.

Special Requirements

Special reporting requirements: None

Change in Objectives or Scope: None

Unobligated funds: less than 20 percent of current funds

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Any Book

Contributions: To Any Other Disciplines