

## 低温科学研究所 国際シンポジウム

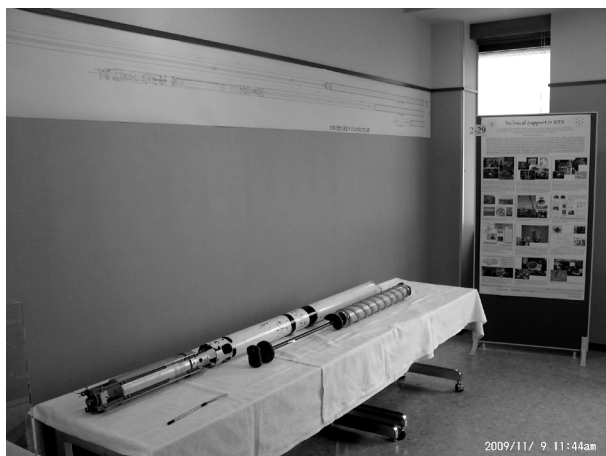
### 「低温科学のフロンティア」でのポスター発表

新堀 邦夫、高塚 徹、中坪 俊一、千貝 健、小野 数也、加藤 由佳子、  
中鉢 健太、藤田 和之、石川 正雄、福士 博樹、池田 正幸、江淵 直人

低温科学研究所 技術部

北海道大学サステナビリティ・ウィーク 2009 の一環で行なわれた低温科学研究所主催の国際シンポジウム「低温科学のフロンティア」（2009年11月9-10日）において、技術部でもポスター発表の機会を頂きました。

ポスターは、それぞれの技術職員それぞれの仕事の一部を紹介する内容としました（次ページに掲載）。私たちの仕事が本当に多岐に渡り、また、多くの研究者の方々の御指導・御協力の下で行なわれていることを実感する良い機会となりました。





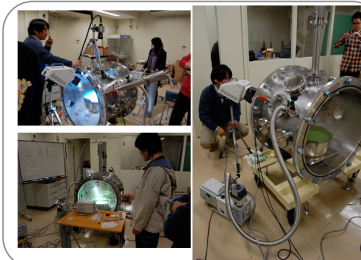
# Technical Support in ILTS



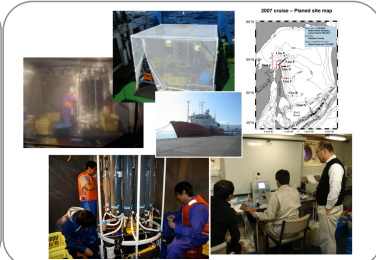
Kunio Shinbori, Toru Takatsuka, Shunichi Nakatsubo, Takeshi Chigai, Kazuya Ono, Yukako Kato, Kenta Chubachi, Kazuyuki Fujita, Masao Ishikawa, Hiroki Fukushi, Masayuki Ikeda, and Naoto Ebuchi  
 Technical Services Section, ILTS, Hokkaido University

*Naka-tech@lowtem.hokudai.ac.jp*

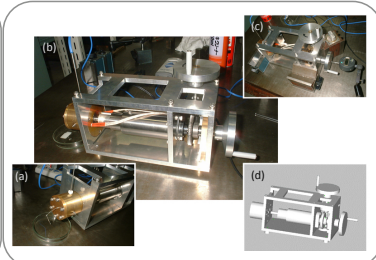
Technical supports in various research fields by the Technical Services Section of the Institute of Low Temperature Science, Hokkaido University, are introduced. Technical staffs in the Section support equipment developments, field observations, laboratory experiments, data analyses, and biological and chemical analyses in various fields covering physics, biology, chemistry, electronic engineering and information sciences. Some members participate in expeditions to Arctic, Antarctic, and Pan-Okhotsk regions, successfully carrying out the technical supports. This section technically contributes to several ILTS research projects. Outstanding technical developments and contributions in recent years include developments of ice-core drills and ice-core drilling at the Dome Fuji Station in Antarctica, developments of equipments for ice crystal growth experiments under microgravity in the space station, operation of high-frequency ocean radar system and monitoring of the Soya Warm Current in the Sea of Okhotsk, development of an automated platform for meteorological, oceanographic and sea-ice observations, and building a precise clock-synchronize system using GPS on research vessels. The Technical Services Section is composed of three shops; Equipment Development, Advanced Technical Support, and Facility Maintenance. The Equipment Development Shop is responsible for design and production of experimental and observational equipments. The Advanced Technical Shop is responsible for design and production of electric instruments, supports of biochemical analyses and ocean modeling. The Facility Maintenance Shop maintains the low temperature rooms and air-conditioning.



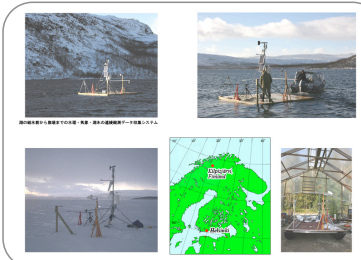
This experimental apparatus is now used for the education program of experimental planetology for graduate students, which is one of the curriculums provided by Kobe University-Hokkaido University Global Center of Excellence program approved in 2008 named as "Foundation of International Center for Planetary Science". This education program for graduate students is aimed to raise the level of the technique to make experiments from elementary to advanced one, and this program provides opportunities for the training the abilities of development, maintenance, and management of the various experimental apparatus.



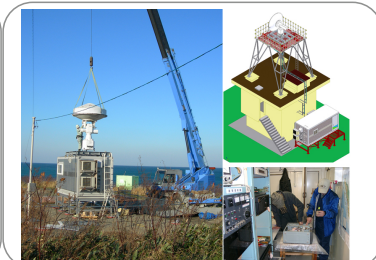
The Research Expedition was carried out on board the R/V "Professor Khromov" in 2007 summer. The purpose was to quantitatively clarify the physical, chemical and biological processes which occur in the Sea of Okhotsk. During these cruises, seawater samples for measuring iron concentration and hydrographic data were collected using a clean CTD-CMS system that was modified with trace metal clean technique. We construct some instruments such as an onboard clean-tent and a CTD-CMS rack for treat the samples under clean condition. We also participate in this cruise to sample seawater, titrate dissolved oxygen, and so on.



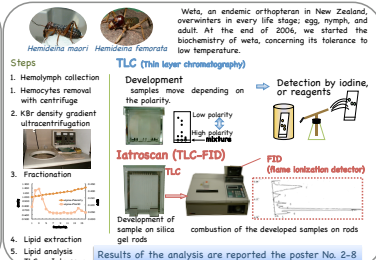
This instrument is to form indium by softening the scraps in cylinders by heat, and push it out by pistons. Indium is a silver white, soft metal with a low melting point of 156.4°C. It is soft enough to have the high thermal conductance and adhesions. It is often used for heat fusion of parts in low temperature conditions (-263°C) in our institute. Heat fusion of indium produces small scraps. Forming of these scraps enables recycle of indium. (a) during operations, (b)(c) completed product, (d) design



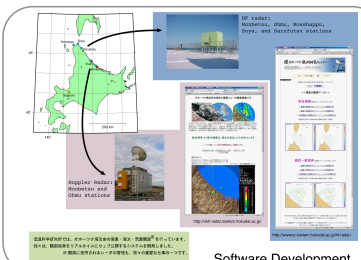
Snow Ice and Hydrometeorological Data Acquisition System through Year-Round at Kilpisjärvi, Northern Lapland, Finland.



The technical division designed the radar basements, supports radar operation and network service.



Chemical analysis (lipid analysis of weta hemolymph). Details and results are reported in poster No.2-8.



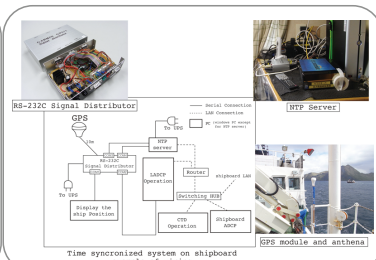
**Software Development**

Doppler radars and HF ocean radars (\*) are deployed at the Okhotsk region to observe the fields of the ocean currents, sea ice, and clouds. We developed the "In real time updating system" that the observed results display on our web sites in real time.

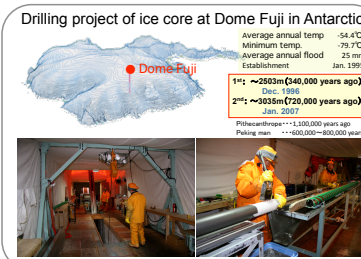
\*The maintenances of the radars are also important job.



This is an instrument to trap microorganisms in water (requested by Microbial Ecology Group: 400mm in length). This instrument is made in aluminum which is light and easy to carry out for field observations. It compresses a bag of water samples by pumps, and traps the samples in filters through small pipes (a). The aluminum weld was found out the best way for non-leakage of the air (b) by leaking checks.



Time synchronized server (NTP server) system. For the time synchronization of analysis equipments such as CTD, LADCP, ship board ADCP, and so on, we developed a low-cost NTP server using GPS with GPS signal distributor. This system achieved a long-time cruise without big trouble.



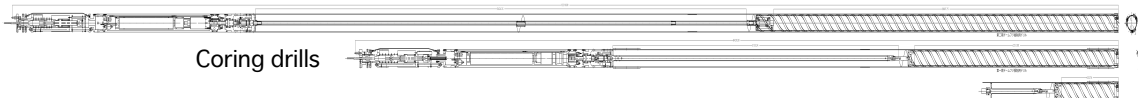
Technical division of ILTS has been developing drilling systems to obtain ice-cores from ice sheets and glaciers. These drilling systems were used at Antarctic ice sheet, and alpine glaciers in Alaska and Patagonia, and contributed greatly to glaciological studies.



This apparatus is to observe CO<sub>2</sub> efflux from soil or snowpack etc. by measuring the change rate of CO<sub>2</sub> concentration inside the chamber. Technical division have been manufactured nearly 300 chambers with different sizes.



We introduce our works in technical reports and conference every year.



Coring drills