A02-O03

INTRODUCTION OF "LONG-TERM PLAN FOR ARCTIC ENVIRONMENTAL RESEARCH, THEME 6: FUTURE ARCTIC ENVIRONMENT EXPLORED FROM PALEOENVIRONMENTAL RECORDS" OF JAPAN

Kenji Kawamura *(National Institute of Polar Research, Japan)*

kawamura@nipr.ac.jp

Arctic paleo-environmental community in Japan has contributed to the long-term planning of Japan Consortium for Arctic Environmental Research. Twelve scientific themes are summarized and Theme 6 “Future Arctic environment explored from paleoenvironmental records” is dedicated to paleoclimate studies.

The effects and feedbacks from Arctic warming on ice sheet, sea-ice, permafrost, land vegetation and aerosols receive much attention. However, by only studying the modern and recent past records, it is not possible to understand the whole Arctic climate system with time scales of up to tens of thousand years. In the past, there have been periods without any ice sheets, or glacial-interglacial cycles in which Arctic temperature and ice sheets underwent large variations. By examining the past environment, it is possible to understand the Arctic climate system and test numerical models. We list five questions for studying Arctic paleonvironment, for which Japanese community should play significant roles by integrating data and numerical modeling. **Q1**: How different were the past Arctic amplifications from that of today, and what were their causes? **Q2**: How did the Greenland and continental ice sheets change, and what caused them? **Q3**: What were the environments of the Arctic Ocean, especially in terms of sea-ice and biological productivity? **Q4**: How different were the terrestrial Arctic environments from that of today, and how were they related with atmospheric composition and climate? **Q5**: Were the natural variabilities on timescales from years to centuries in the Arctic different from today?

Research methods include collection and analyses of ice cores and marine sediment cores as well as geomorphological and geological surveys of land and sea-floor. Regarding the modeling, the approach is to develop a coupled Earth system model including climate, ice sheets, vegetation and solid Earth, and to conduct numerous, long numerical simulations. While it is particularly important to reconstruct and understand environmental conditions during previous warm periods, it is also important to investigate instability and variability of the climate system by studying abrupt climate changes which occurred repeatedly during glacial periods and deglaciations, and natural climate variations on timescales from years to centuries.

*Theme 6 authors: Kenji Kawamura, Masanobu Yamamoto, Kei Yoshimura, Kumiko Goto-Azuma, Ayako Abe-Ouchi, Yoshinori Iizuka, Go Iwahana, Ryu Uemura, Ryuta O’ishi, Junichi Okuno, Takuro Kobashi, Fuyuki Saito, Tetsuo Sueyoshi, Yusuke Suganuma, Osamu Seki, Naomi Harada, Yoshiyuki Fujii, Sumito Matoba, Hideki Miura, Masakazu Yoshimori