

:: Advancing Sub-Surface Biosphere and Paleoclimate Research MagellanPlus Workshop - 21- 23 August 2014, Seoul (South Korea)

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The workshop took place in Seoul, South Korea, on 21-23 August 2014, directly before the International Society for Microbial Ecology (ISME) meeting. 28 junior and senior scientists with experience in the geomicrobiological components of the IODP, ICDP, Deep Carbon Observatory (DCO) and IMPRESS (the successor of IMAGES) programmes participated in this workshop (right). The idea for this workshop was developed during the Chikyu+10 Workshop in April 2013 but has roots in many meetings and discussions over the last several years. The idea to have a community discussion on standard protocols for microbiological drilling, sample handling and long-term sample storage developed and broadened rapidly with the interest and support of ICDP and DCO.



Participants from ECORD member countries: S. Crowe, UBC, Canada; B. Engelen, Carl von Ossietzky Univ., Germany; K.U. Hinrichs, U. Roehl, Univ. of Bremen, Germany; J. Kallmeyer, GFZ-Potsdam, Germany; J. de Leeuw, NIOZ, The Netherlands; K. Lloyd, B.B. Jørgensen, A. Torti, Aarhus Univ. Denmark; D. Smith, ESO-BGS, UK; **USA:** J. Fang, Hawaii Pacific Univ.; T. Kieft, New Mexico Tech; H. Mills, Univ. Houston Clear Lake; M. Wilkins, Ohio State Univ.; **Japan:** T.Y. Hori, AIST; F. Inagaki, J. Kurado, Y. Morono, X. Nan, JAMSTEC; Y. Kubo, CDEX-JAMSTEC; Y. Suzuki, Univ. Tokyo; **China:** J. Chen, Univ. Hongkong; F. P. Wang, Shanghai Jiao Tong Univ.; **South Korea:** J.W Kim, Yonsei Univ.; J.H. Lee, Hanyang University; J. W Lee, KIOST; **Taiwan:** M.T. Chan, National Ocean Univ. Taiwan.

The overall aim of our workshop was to develop shared sampling and long-term storage strategies partly based on already existing white and scientific papers and to implement these strategies through standardised protocols for all drilling platforms, *i.e.* "traditional drilling" with the JOIDES Resolution, Chikyu and MSP/ICDP platforms. A decision was made during the workshop planning to expand the goal for standardisation to much less expensive seabed drilling and long piston core operations from additional research vessels.

Initial workshop discussions were mainly dedicated to providing background information on the current state of deep life components and organic proxy-based paleoclimatology within long-term scientific plans for IODP, ICDP, DCO and IMPRESS. In addition, presentations on sub-surface microbiology and organic proxy-based paleoclimatology highlighted the benefits of conducting geomicrobiological and paleoclimate research by acquiring high quality microbiological samples, even when the expedition may focus on other scientific disciplines. At the end of the first day and the start of day two, virtually all participants gave short 10-15 minute talks to present their research activities with an

emphasis on the key aspects of pre-drilling, drilling, onboard sample handling, in-repository sample handling and long-term storage. Therefore, to help develop and implement a feasible set of standardised protocols, the workshop participants first suggested a three level approach to improve the expectation of biological research for upcoming expeditions. Where possible, we took into account the diversity of drilling operations, *i.e.* "traditional drilling", seabed drilling and long-piston coring. The levels suggested are as follows:

Level 1 - expeditions with little to no geomicrobiological component

Expectation: microbiologist onboard, low frequency core sampling, no onboard contamination checks. Proposals listed at this level will not receive support from the biosphere community to improve their rank when evaluated.

Level 2 - expeditions with a modest geomicrobiological component

Expectation: microbiologist onboard, more frequent core sampling onboard, onboard contamination checks, limited geochemistry. Proposals listed at this level will receive some support from the biosphere community to improve their rank when evaluated.

Level 3 - expeditions with a significant geomicrobiological component

Expectation: microbiologist(s) onboard, frequent core sampling, full onboard contamination checks, onboard cell counting, extended geochemistry, onboard CAS freezing facilities. Proposals listed at this level will receive full support from the biosphere community to improve their rank when evaluated.

We concluded that the recommendations and protocols defined by the three sub-groups provide the opportunity to write a full handbook for microbiological and organic proxy-based paleoclimate drilling, sample processing and long-term storage. Once completed, the handbook should be tested onboard to determine feasibility. Additional protocols and procedures specific for different ocean and terrestrial drilling platforms, as well as within the repositories, will be included.

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