[EJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS06]Global climate change driven by the Southern Ocean and the Antarctic Ice Sheet

convener:Osamu Seki(Institute of Low Temperature Science, Hokkaido University), Akira Oka(Atmosphere and Ocean Research Institute, The University of Tokyo), Ryosuke Makabe(国立極地研究所, 共同), Ryu Uemura(University of the Ryukyus)
Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The Southern Ocean and Antarctic ice sheet, which are the giant reservoirs of heat, water, and materials, have a potential to play central roles in long-term global climate change. This system is composed of the following sub-systems; ice shelf which is a place of the interaction of ice sheet and ocean, flowing iceberg, seasonal sea ice zone, Antarctic bottom water which drives the thermohaline circulation, active biological production and Antarctic Circumpolar Current. These sub-systems are interacted with each other and have significant impact on changes in the global environmental system. This session aim to summarize recent observational and simulation studies from various fields relating to the past and present changes in the Antarctic Ice sheet and Southern Ocean, which are essential elements for unraveling the changes in the global climate system. Further, future science plans for understanding of the environmental changes of the Antarctic Cryosphere is also discussed.

[MIS06-P11]Climate model experiments using state-of-the art boundary conditions for the Late Pliocene and for the pre-PETM to Early Eocene

*Wing-Le Chan[1], Ayako Abe-Ouchi[1,2] (1.Atmosphere and Ocean Research Institute, The University of Tokyo, 2.Dept. of Integrated Climate Change Projection Research, JAMSTEC)
Keywords:climate modeling, Pliocene, Eocene

Warm periods of the past offer the chance to test climate models, not just through comparisons with proxy data, but also through model intercomparisons. The idea of an analogue to future global climate change, albeit with caveats, has additionally created much interest in these past periods. Two examples of these warm periods are the focus of intercomparison projects which have been established to utilize up-to-date paleodata to reconstruct formal boundary conditions for climate simulations. The Pliocene Model Intercomparison Project (PlioMIP), now in its second phase, focuses on the late Pliocene, approximately 3 Ma, while the Deep-Time Model Intercomparison Project (DeepMIP) looks back further to the period between the latest Paleocene and the early Eocene, approximately 55-50 Ma. Ice sheets in the polar regions are either smaller than those of today or are completely absent. Here, some results using the mid-resolution MIROC4m coupled atmosphere-ocean general circulation model will be presented. These results will focus on the most basic experiments specified in the projects, adhering to the protocols and using the boundary conditions provided. It is found that zonal mean sea surface and surface air temperatures exhibit stronger agreement with proxy data at low to mid-latitudes. Surface albedo and greenhouse gases are shown to contribute greatly to warming, especially at high latitudes. In the experiments using DeepMIP boundary conditions, different initial conditions can yield similar climate states but with differences in the Atlantic meridional overturning and downwelling in the Southern Ocean.