[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

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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-P01]Structure of the subpolar gyre in the Australian-Antarctic Basin derived from Argo

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Revealing a physics of the Antarctic subpolar gyre is substantial to understand the exchange processes of heat and materials in the Antarctic continental margin. Here we show autonomous profiling float (Argo) data over the past decade revealed the structure of the circulation in the seasonal ice zone off East Antarctica. A new method is introduced to utilize Argo under ice whose position is not well-determined. We devised automated position interpolation algorithm so as to follow isobaths, which is consistent with the contour of ambient potential vorticity. Estimation error by this interpolation was evaluated using the data whose coordinate are well-determined. The new scheme recovered as much as 40% of profiles in the seasonal ice zone. Their trajectories at 1000dbar clarified the horizontal velocity field of the continental margin(see Figure 1). The subpolar gyres off Wilkes Land and possibly off Mac Robertson Land (Prydz Bay Gyre) seem to be bounded by the westward ASF to the south and the eastward velocity maximum along 62-64S to the north in the Australian-Antarctic Basin. The eastward velocity maximum along 60-62S very likely corresponds to the southern ACC front (Kim and Orsi, 2014). The velocity maximum along 62-64S probably corresponds to the climatological position of Southern Boundary of ACC (or SB, based on Orsi et al. 1995; red curve in Figure 1), although the latitude is found systematically to the north of SB. Additionally, CTD data provided by Argo inferred a characteristic structure of isopycnals. The result provides a detailed structure of subpolar gyres broadly consistent with Wakatsuchi et al., 1994, indicating a strong control of coastal bathymetry.