

Wed-046**Ocean and cryosphere interactions: ocean circulation and topographic effects on Antarctic sea ice and its decadal trends****Lynne Talley**

University of California San Diego, Scripps Institution of Oceanography, La Jolla, U.S.A.

E-Mail: ltalley@ucsd.edu

The Antarctic winter sea ice edge is closely associated with the southernmost fronts of the Antarctic Circumpolar Current (ACC). The southwest-northeast orientation of mid-ocean ridges in the western Pacific and eastern Atlantic sectors guides the cold waters of the Ross and Weddell Sea circulations and the winter sea ice edge far to the north, with little interannual variability in the sea ice edge. Kerguelen Plateau has a similar role. In the intervening large zonal sectors of the ACC in the Amundsen/Bellingshausen Seas and along Adelie Land, the southern ACC fronts are free from topographic control, and swing southwards towards Antarctica along with their winter ice edges and warmer waters arising from lower latitudes. This is dynamically consistent with the direction of wind-driven Sverdrup transport due to upwelling. The standing meanders controlled by the topography are associated with net poleward heat flux. Over the past several decades, WOCE and GO-SHIP hydrographic observations indicate much stronger penetration of full-depth, warm ACC water into the Amundsen and Bellingshausen Seas, consistent with diminishing sea ice and increased ice shelf melt. Winter sea ice has increased in the sectors where the southern ACC boundary is locked into a northward pathway, fluxing cold water northwards. Taken together, the standing eddy pattern of ACC heat flux and observed pattern of decadal winter sea ice changes suggest a strengthening of the circulation along the southern side of the ACC over several decades.