Changes in the ASAID Basal Stress Boundary along the Antarctic Peninsula Coastline Observed over 30 years of LANDSAT observations

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Landsat image sequences of the Pine Island Bay area collected from online sources during the period 1972 through 2003 were analyzed and teams of researchers discovered a dissipating ice shelf that once occupied what is now known as *Elizabeth City State University Bay* [1]. The research was made possible by the definition of a Basal Stress Boundary (BSB) developed from the Antarctic Surface Accumulation and Ice Discharge (ASAID) project [2]. Similar changes are known to have occurred along the coastline of the western Antarctic ice sheet [3]. In particular, the Larsen Ice Shelf (LIS), occupying the northernmost extent of the Antarctic Peninsula, has shown similar significant glaciological changes [4, 5, 6]. Here we report the results of research and analysis to determine the existence of detectable variations in the Basal Stress Boundary (BSB) along the coastline of the Antarctic Peninsula, over the approximately 30-year record of Landsat observations. Changes in the BSB may have a direct correlation to historic ice-sheet mass loss. Images were gathered from online sources of the peninsula. ENVI 5.0 and ENVI 4.7 were used for image processing and overlaying the basal stress boundary vector file to visually represent any changes that occurred. LIS-C is the largest remaining component of the Larsen Ice Shelf complex. LIS-A and LIS-B having both disappeared starting in 1995. Evidence indicates that ice shelves retard the advance of great ice streams into the ocean where subsequently melt contributing to sea level rise. The cumulative collapse of ice shelves over time may play a role in accelerating sea level rise. All changes in LIS-C area based on the USGS Landsat archived 30+ year record of observations seen to have occurred at a scale greater than one square kilometer are reported.

References:

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Submitted for poster presentation during the general session.