

# ENSO Modulation of West Antarctic Climate

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According to research conducted in the so-called modern satellite era (post 1978), the El Niño-Southern Oscillation phenomenon has variable impacts on the climate of West Antarctica. The super El Niño of 1997-1998 (1982-1983) was strongly (weakly) manifested in West Antarctica. This followed from a decadal variability in the coupling between ENSO (monitored by the Southern Oscillation Index) and the Southern Hemisphere Annular Mode (SAM), most pronounced in austral spring. Further examination of this nonlinear coupling is well motivated by the finding that variable ENSO modulation is manifested in the new deep ice core from central West Antarctica (Eric Steig, personal communication, 2008).

To provide context for the above evaluation, the SAM has been seasonally reconstructed using principal component regression of surface pressure observations from Antarctica, the Southern Ocean, and the mid-latitude land masses. Prior to 1957 when surface pressure readings were not available in most parts of Antarctica, the reconstructions primarily depend on the mid-latitude pressure observations and the mid-latitude signature of the SAM. Reconstructions from 1865 were derived for summer and autumn, and from 1905 in winter and spring. Using these reconstructions, the relationship between ENSO and SAM is found to be quite variable in the historical record, and that periods similar to the 1990s when the two were strongly coupled have occurred in the past.