



Recent Plant Growth Conditions in the Antarctic Peninsula in Context of the Last 2000 Years

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The western Antarctic Peninsula has experienced some of the fastest warming globally during recent decades, with associated rapid changes in cryosphere and biosphere processes. The greenest ice-free coastal regions are dominated by bryophytes that can form aerobic peatbanks, which provide a long-term record of environmental change in frozen moss accumulations. Terrestrial macrofossil abundances and carbon stable isotope values in living and subfossil bryophytes at several sites along the Peninsula were determined to construct a 2000-yr record of changes in plant communities, plant growth, and organic matter accumulation. Carbon isotope values across multiple species were measured on a species-, tissue-, and compound-specific basis. Isotopic discrimination by dominant plants, tied to atmospheric circulation patterns, has been greater over recent decades than any time during the last two millennia. Changes in discrimination over time show a strong influence of the Southern Annual Mode at this latitude, providing a valuable regional record to the developing picture of changes and influence of climate modes at southern high latitudes. The recent boost in the terrestrial carbon sink in the Peninsula has a high potential for future enhancement.