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WATCHING MOSS GROW: RADIOCARBON REVEALS GROWTH RATE OF ANTARCTIC MOSSES

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Antarctica is both the coldest and most arid continent on Earth, and experiences continuous light in midsummer and continuous darkness in midwinter. These factors reduce the growth rate of the continental Antarctic flora (mosses, lichens and algae) to a minimum. Previous attempts to determine the growth rate of Antarctic moss shoots by conventional methods have encountered experimental complications and have been limited to a few years in duration at most. Mosses grow in an incremental fashion from the shoot tip, such that each shoot section contains a record of atmospheric carbon corresponding to the season in which it was photosynthetically active, in a similar fashion to tree rings. Shoots of the mosses *Ceratodon purpureus* and *Grimmia antarctici* collected from East Antarctica in January 2005 were analysed for radiocarbon content at the ANTARES AMS facility. Results show that the oldest shoot sections predate the 1960s ^{14}C bomb-pulse in both species, indicating that the shoots have grown less than 1.0 mm yr^{-1} on average over the last 50 years. This study is the first to determine the growth rates of Antarctic mosses over a time period spanning decades rather than individual or multiple field seasons. It is also the first study to examine how the 1960s ^{14}C bomb-pulse translates to plant material from extreme southern latitudes. The radiocarbon results indicate detectable changes in the growth rate of each species over the last 50 years. If the observed changes in growth rate can be correlated to changes in climatic variables this would provide a method for determining the impact of current or future climate change on an important component of terrestrial Antarctic ecosystems.