

# Unusual tree growth patterns in the Southern Hemisphere linked to climate change

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(Phys.org)—New findings from an international research team led by Western University geography professor Brian Luckman, based on tree-ring patterns, show unusual patterns of tree growth in the Southern Hemisphere relating to recent changes in the atmospheric circulation.

This study, published by *Nature Geoscience*, is part of an international collaborative project funded by the Inter-American Institute for Global Change Research, which includes scientists from Argentina, Chile and the United States with colleagues from Australia, New Zealand England and Switzerland.

Based on data from over 3,000 trees in Chile, Argentina, Tasmania and New Zealand, the study shows unusual decreases in [tree growth](#) over the last 50 years in Patagonia but increased growth in Tasmania and New Zealand.

According to Luckman, the primary cause of this global-scale transformation is related to changes in temperature and precipitation patterns driven by the circum-polar [atmospheric circulation](#). This [atmospheric phenomenon](#) is known as the Southern Annular Mode (SAM) or the Antarctic Oscillation (AAO) and changes at decadal (decade-long) and longer timescales.

"Essentially, recent changes in the pressure difference between the tropics and poles have led to a southward shift of the dry subtropical zone and the Westerly wind belts (winter storm belts that bring

precipitation) in South America. These changes, which are related to the development of the [ozone hole](#) over the Antarctic, are producing drier conditions in Northern Patagonia and warmer temperatures in Tasmania and New Zealand," says Luckman.

A 600 year-long reconstruction of the SAM from the tree-ring data shows that these recent anomalous circulation patterns are unprecedented in this long record.

"The big question for the future," asks Luckman, "is whether or not these patterns will continue to change with a reduction of the ozone hole?"

Provided by University of Western Ontario

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