

MEDIA RELEASE

NEWS FROM THE UNIVERSITY OF TASMANIA

DATE: THURSDAY 8 NOVEMBER 2012

ATTENTION: Chiefs of Staff, News Directors



Tree growth research has surprising ring of truth

New research has found that ozone depletion in Antarctica is affecting climate conditions across the southern hemisphere, that in turn control tree growth in Tasmania, New Zealand and Patagonia.

Dr Andrés Holz, Research Associate in the UTAS School of Plant Sciences, was part of the research team (lead by Dr. Ricardo Villalba from Argentina), which used tree-ring records from more than 3,000 trees in South America, Tasmania and New Zealand to identify dominant patterns of tree growth in recent centuries.

Recent changes in the summer climate Southern Hemisphere extra-tropics are primarily related to the dominance of the positive phase of the Southern Annular Mode (SAM).

The SAM describes see-saw-like differences in atmospheric pressure between high and mid latitudes, which affect the latitude and strength of the westerly winds. SAM's "positive phase" describes a decrease in atmospheric pressure at high latitudes and an increase in pressure at mid latitudes, which results in dry and warm conditions in western Tasmania, New Zealand and Patagonia.

Dr Holz said since the late 1970s, the depletion of (stratospheric) ozone has resulted in a colder Antarctic stratosphere and has lead to more frequent positive phases in the SAM.

"The research discovered that the foremost patterns of growth between 1950 and 2000 differed significantly (and asymmetrically among regions) from those in the previous 250 years.

"We showed how changes in the SAM have significantly altered tree growth patterns at mid-latitudes in the Southern Hemisphere.

"Specifically, we found that tree growth was higher than the long-term average in the subalpine forests of Tasmania and New Zealand, but lower in the dry-mesic forests of Patagonia."

Dr Holz said the research demonstrates that variations in SAM can explain 12–48 per cent of the tree growth anomalies in the latter half of the 20th century.

“Our tree-ring-based reconstructions of summer SAM indices suggest that the high frequency of the positive phase since the 1950s is unprecedented in the past 600 years.

“This findings are regionally-asymmetric because the trees that were collected in Tassie and NZ 'like' warmer conditions, whereas the opposite is true for those in Patagonia,” Dr Holz said.

“The worrisome part of the story is that even under a future ozone recovery, modelling efforts show that the SAM is expected to remain in its positive phase for the next 100 years or so due to increased global temperature. This might result in many long-term ecological consequences, including drought-induced tree mortality in Patagonia and increased bushfires in Tasmania and New Zealand.”

For a copy of the paper or an image of Dr Holz with a tree core (centre of tree used for counting rings), please email chcooper@utas.edu.au

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