

Global warming dominates regional effects of land-use change

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(PhysOrg.com) -- Changes in snow and rain caused by global warming dominate the effects of land-use change on regional climates, according to a new study in the journal *Nature Climate Change*.

The study by a team led by Professor Andy Pitman, of the ARC Centre of Excellence for [Climate](#) System Science, found that land-use and land-cover changes tend to act as regional cooling mechanisms at mid to [high latitudes](#) but amplify warming in [tropical regions](#). The Centre is hosted by the UNSW Faculty of Science.

However, it also found that larger climate change influences – particularly changes in regional precipitation caused by global warming – could override or significantly alter the size of those effects.

The findings are mostly significant for improving climate models, says Professor Pitman, a senior member of the UNSW Climate Change Research Centre. The research team also includes researchers from the CSIRO Centre for Australian Weather and Climate Research and the Laboratoire des Sciences du Climat et de l'Environnement, in France.

“This paper not only showed the influence of land use on regional climate, it emphasised exactly why we need to improve the way precipitation is represented in climate models,” Professor Pitman says.

“Currently we can show precipitation changes at global and continental level but projecting changes in precipitation down to regional scales as

the planet warms remains one of the great challenges for climate researchers.

“Until we can accurately project this it will be difficult to determine exactly how much land-use and land-cover change amplifies or potentially reduces the regional effects of [global warming](#).”

Regional precipitation is particularly difficult to project because of the lengthy chain of inter-related processes that occur within and outside these smaller areas to bring about rainfall, he says. Substantial, sustained research across a broad range of scientific disciplines is needed to meet this challenge.

“The Centre of Excellence for [Climate System](#) Science has been created to tackle exactly this kind of complex, long-term research,” he says.

“The extensive effort required to deliver foundation climate science of this nature is often limited due to the scale of expertise required – this is beyond the capacity of most single institutions.

“By bringing together a consortium of five universities along with major national and international partner organisations, the Centre has the capacity to take on this difficult and important research to strengthen and improve the building blocks of climate modelling.

“It is difficult research but it will have a direct impact on how Australian communities can prepare and adapt to the future challenges of [climate change](#).”

More information: paper online: www.nature.com/nclimate/journal/nclimate1294.html

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