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Media Release

Chiefs of Staff, News Directors

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New research identifies link between tectonic changes and new species evolving

New research into how tectonic changes in landscapes, such as the rise of new mountains, can initiate speciation has been published.

Dr Chris Burridge from the University of Tasmania's School of Biological Sciences was part of a team of researchers who found the evolution of 18 species of freshwater fish resulted directly from parallel tectonic landscape evolution.

Prior to this study, there has been very few well-documented examples of how new mountain ranges can separate biological populations and lead to new species.

The research began in 2006 in New Zealand's South Island, and evolved out of previous research on rates of molecular evolution.

"We found a really interesting system in New Zealand where fish had evolved in direct response to tectonic processes," Dr Burridge said.

"It represents the smoking gun of mountain uplift and speciation resulting from isolation.

"People often cite mountain uplift, and the isolation of two different populations either side, as an initiator of speciation.

"However, there aren't many good real-world examples of that, despite it being used so often.

"The reason why we don't have good examples is because when a mountain uplifts, typically we have all of these other environmental differences across the mountain range that could also trigger speciation, rather than isolation *per se*.

"When you look at the different species across the mountain range you don't know whether it is due to isolation resulting from the mountain, or it is due to adaptation to life in different environments.

"In order to find out, we needed a system where the species on either side of the mountain range were in the same environment."

The multi-disciplinary team of researchers used numerical models to reconstruct changes in the New Zealand's South Island over the past 25 million years.

The research showed that the island and mountain topography evolved in six principal tectonic zones, each having distinct drainage catchments which separated fish populations.

The freshwater environments inhabited by these fish are essentially identical, so isolation alone was responsible.

Through analysing freshwater fish populations the research found that landscape evolution has controlled on-going biological diversification over the past 25 million years.

The research, 'Rapid biological speciation driven by tectonic evolution in New Zealand', was published in *Nature Geoscience*.

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