

# LFRic vs. New Zealand – finding the limits of LFRic

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New Zealand has typically been a tough place for regional NWP models to do well. With its ocean dominated domains, broken up by a long and thin land mass with extremely steep mountains just kilometres inland from the coast, and subject to everything from sub-tropical storms to sub-Antarctic polar weather systems, it's a big ask for any model! NIWA has been running weekly very coarse-resolution LFRic rose-stem tests for over a year now but is now starting to test LFRic's ability to cope with the challenges that forecasting over NZ entails. In this presentation we present early results from testing of the RAL3-LFRic model over different regions of NZ, exploring the model's stability over complex terrain and its ability to deal with extreme events such as 2023's ex-TC Gabrielle.

A systematic bias of our current UM-based modelling systems is too much precipitation falling on the leeward side of the Southern Alps. Christened the "spillover effect", we explore if RAL3-LFRic exhibits similar tendencies and whether there are possible remedies to this bias via changes to the RAL3 physics and/or dynamical set up of the model.

Finally, we will outline our testing plan for the coming year, covering both scientific and technical performance, especially as we prepare to implement the model on NIWA's new HPC, due in early 2025.