# Spatial patterns in HIRDS rainfall predictions

NIWA's High Intensity Rainfall Design System (HIRDS) tool is extremely useful for stormwater and flood modelling, representing the best national-scale rainfall estimates available for New Zealand. HIRDS predictions are based on historical rainfall records, but also take elevation into account. However, as the rainfall data isn't presented graphically, it is easy for practitioners to miss the effect of spatial variability, especially with respect to elevation, on the catchment(s) of interest.

Often there are significant vertical differences between the top of a catchment and its outlet. Sometimes practitioners will choose a point in the centre of the catchment and use HIRDS data for that point to represent rainfall across the whole catchment, taking a "good enough" approach. Others might choose a few locations within the catchment and download HIRDS tables at each, manually comparing predictions at the duration of interest to determine how much variability there is, or taking the average.

This paper will examine a selection of locations to demonstrate both intended and unintended spatial variability in HIRDSv4 data, and the importance of understanding this when modelling runoff. Reasons for unintended variability will be discussed, with the goal of opening up a discussion on ho

w any subsequent iterations of HIRDS might improve the quality of predictions.
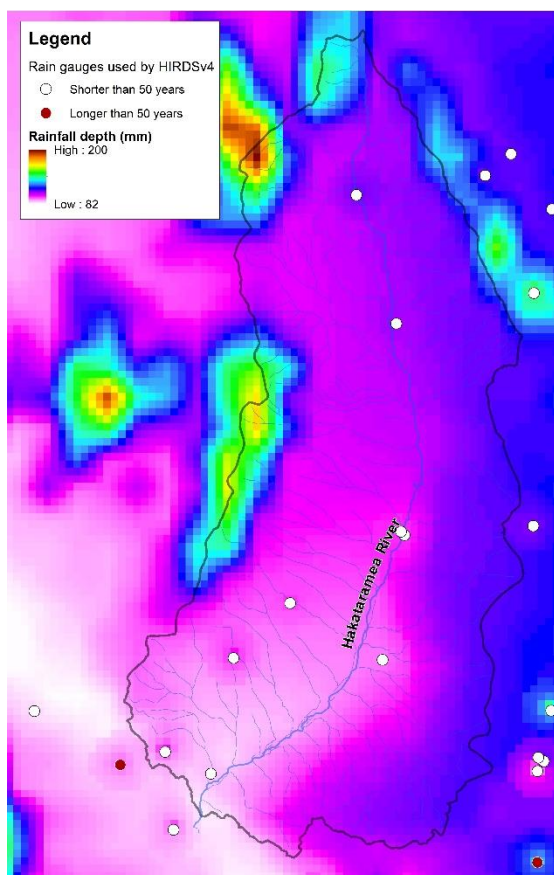
Terrain sensitivity of rainfall predictions for large catchment (Hakataramea; elevations from 200
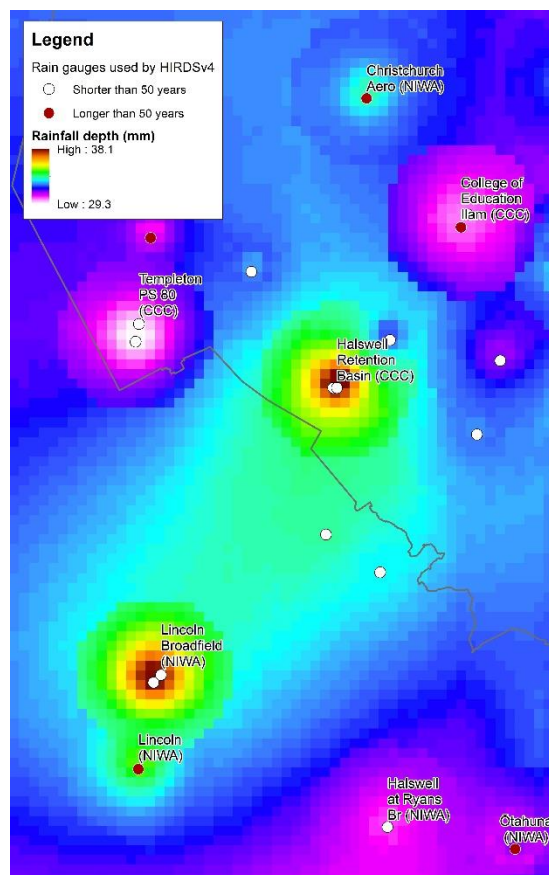
Unexpected variability over flat terrain (Lincoln and Halswell). 1 hour 100 year ARI historical rainfall depth plotted

mRL to 1900 mRL). 6-hour 100 year ARI historical
rainfall depth plotted