# GPS Measurements of Vertical Movement Across the Southern Alps of New Zealand

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Geologic observations from the Southern Alps of New Zealand record some of the highest rates of vertical motion in the world, approaching 10 mm/yr. This rapid movement obviously results partly from the component of convergence between the Pacific and Australian plates, but almost surely would not be so large if erosion rates on the west slope of the Southern Alps were not comparably high.

A network of continuous and semi-continuous GPS instruments across a segment of the Southern Alps is quantifying vertical movement (Figures 1 & 2). We also made measurements of absolute g at some stations with the goal of remeasuring g in the future to place bounds on the change in mass beneath the mountain belt. In this way, we can determine whether the vertical movement reflects a growing isostatically compensated range or is the isostatic response to erosion.

References

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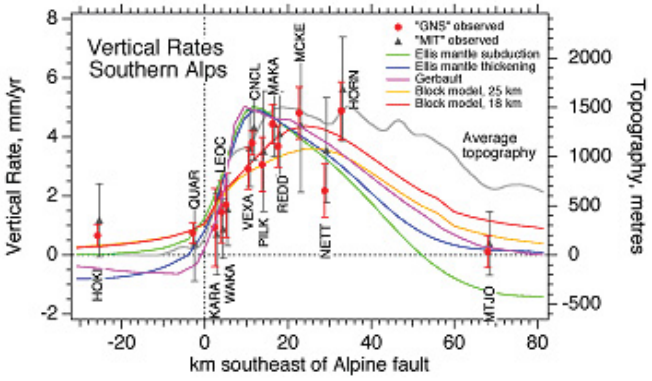


**Figure 1.** Profile of vertical components of velocity across the Southern Alps and calculated movement for a variety of assumed elastic and inelastic structures undergoing NW-SE shortening and thrust slip on the Alpine fault.

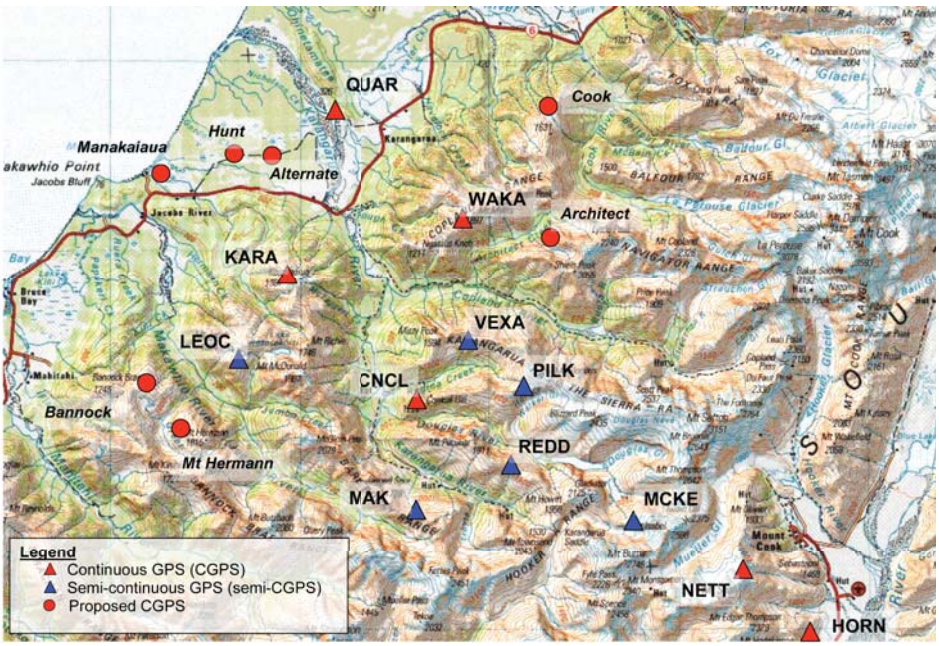


**Figure 2.** Map of Southern Alps GPS Network (SAGE)