



Kevin Smith

By Email: fyi-request-27723-07978fbf@requests.fyi.org.nz

28 August 2024

Dear Kevin

RE: Official Information Request - Sea Level Measuring Equipment in Buller

The Institute of Geological and Nuclear Sciences Limited (GNS Science) has been transferred a partial Official Information Act request from the National Institute of Water and Atmospheric Research Limited (NIWA), the information requested specifically relates to:

- *Could you please advise what vertical changes have been detected in the Buller coastal region over the past decades?*
- *I have heard from a local surveyor that a rise in ground level has been recorded. This would be by a number of measuring techniques so I am interested in the rate of rise and the method used.*

Request granted

The information you have requested is set out below.

GeoNet programme

The GeoNet programme has one continuous station in the region, WEST, Westport. The GPS station was installed in 2004 so has approximately 20 years of data. Interseismically (between earthquakes) the station is going down (about 1.8 +/- 0.2 mm/yr), but there have been a few significant earthquakes in the region that have caused instant uplift at the station, counteracting the subsidence.

There was also a short term post-seismic uplift in the region following the Kaikoura earthquake (14 Nov 2016) but the station WEST is now going back down.

As a result of earthquake activity on top of the background observed subsidence the net subsidence is approximately a couple of millimetres for the 20 year time period (an average of about -0.1 mm/yr for the 20 years).

This plot updates daily: https://sftp.gns.cri.nz/pub/sigrun/timeseries/WEST_long.png

It has a correction for the Kaikoura earthquake for the N and E component (for plotting purposes) but no earthquake correction has been applied to the vertical data. There were two antenna changes, in 2011 and 2019 that are corrected with the marked with blue lines. All estimates are relative to the ITRF14 reference frame.

GeoNet also has time series for WEST - select the site from the map confirming ongoing subsidence: <https://www.geonet.org.nz/data/gnss/map>

The NZ SeaRise: Te Tai Pari O Aotearoa programme

The NZ SeaRise: Te Tai Pari O Aotearoa programme has released location specific sea-level rise projections out to the year 2300 for every 2 km of the coast of Aotearoa New Zealand. These projections can be accessed through a online tool developed by Takiwā, a data management and analytics platform: <https://searise.takiwa.co/map/6245144372b819001837b900/embed>

Envisat InSAR data

Based on Envisat InSAR data analysed from 2003-2011, there was 1 mm/yr +/- 1.3 of subsidence across the wider Westport region consistent with the GNSS observations (see figure).

<https://www.gns.cri.nz/data-and-resources/new-zealands-dynamic-deformation-field/>

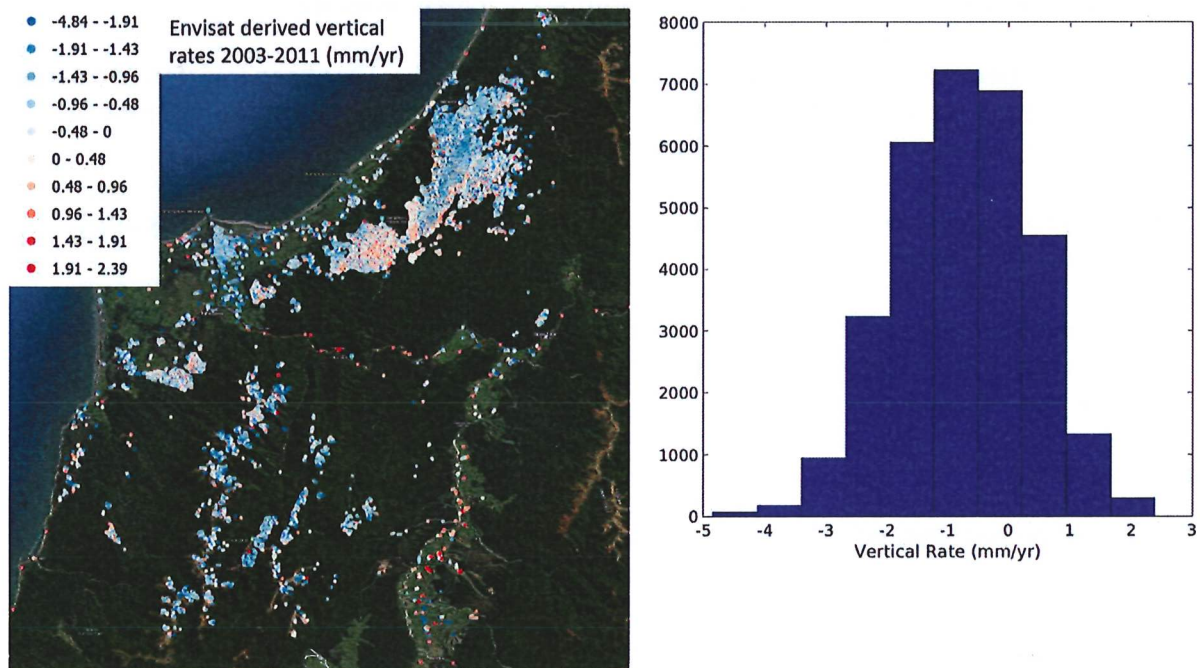


Figure Left) Map view of InSAR derived vertical rates across the region.

Figure Right) Histogram showing the distribution of vertical rate estimates for all of the InSAR points shown.

Your rights

You have the right to seek an investigation and review by the Ombudsman. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Yours sincerely

Anna Jellie
General Counsel