Aligning the New Zealand National Datum with the International Terrestrial Reference Frame in the face of tectonic deformation

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NZGD2000 – “plates-fixed” datum
The secular deformation model
NZGD2000 – “plates-fixed” datum

14-parameter transformation (ITRF2008 to ITRF96 at observation epoch)

Secular deformation

NZGD2000 Deformation Model

Non-secular deformation

NZGD2000
PositioNZ CORS network
Daily ITRF2008 solution
Example time series (Darwin)
Mean annual residual errors
Antenna change at AUCK
Representing time series

- Monthly stacking
- Station coordinate model
  - Velocity
  - step functions
  - post seismic deformation
  - Slow slip events
- NZGD2000 coordinate + deformation model
Station coordinate model
Representing time series

- Monthly stacking
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Auckland (AUCK) time series
Gisborne (GISB) time series
Puységur (PYGR) time series
Deformation model errors
Summary of errors

For generating ITRF2008 coordinates

- Aligning CORS stations daily solutions with ITRF (3mm horizontally, 8mm vertically at 95% CL)

For generating NZGD2000 coordinates

- Error in coordinate of reference marks. Depends on tectonic setting – eg where affected by slow slip the coordinate may reflect mean value through slow slip cycle.
- Error in deformation model errors affecting coordinates of older stations (30mm horizontally, 50mm vertically in 10 years)
Questions?