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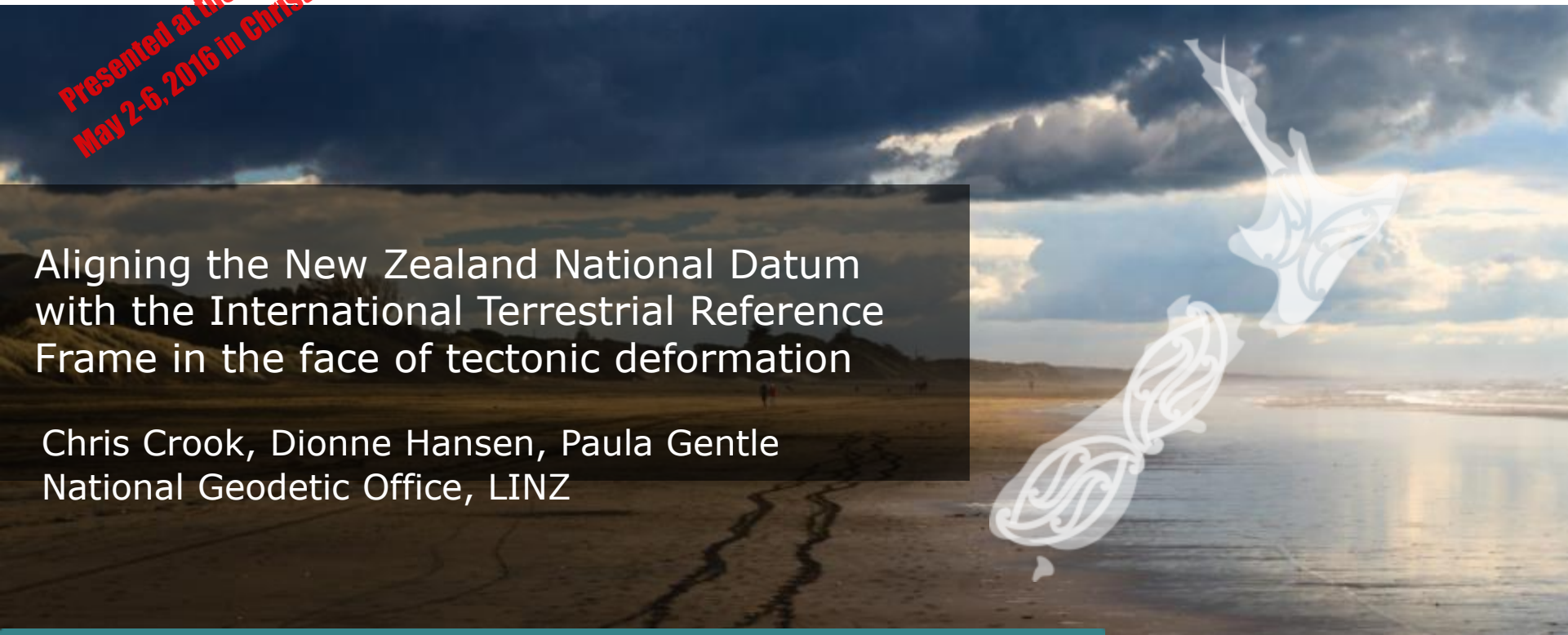
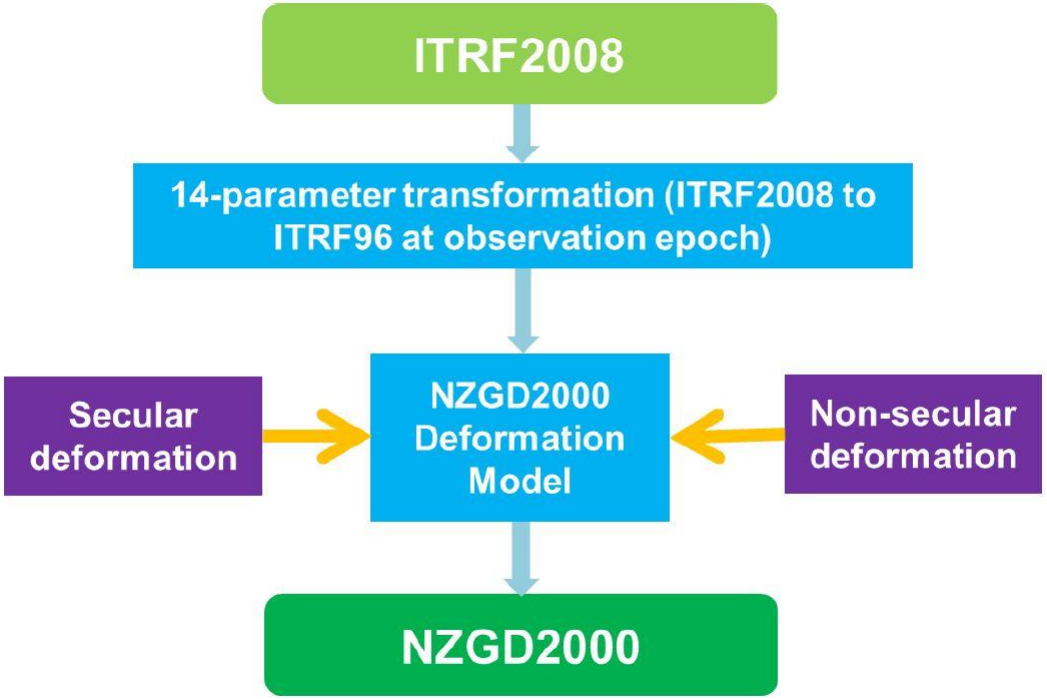
Presented at the FIG Working Week 2016,
May 2-6, 2016 in Christchurch, New Zealand



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

Chris Crook, Dionne Hansen, Paula Gentle
National Geodetic Office, LINZ

NZGD2000 – "plates-fixed" datum



The secular deformation model

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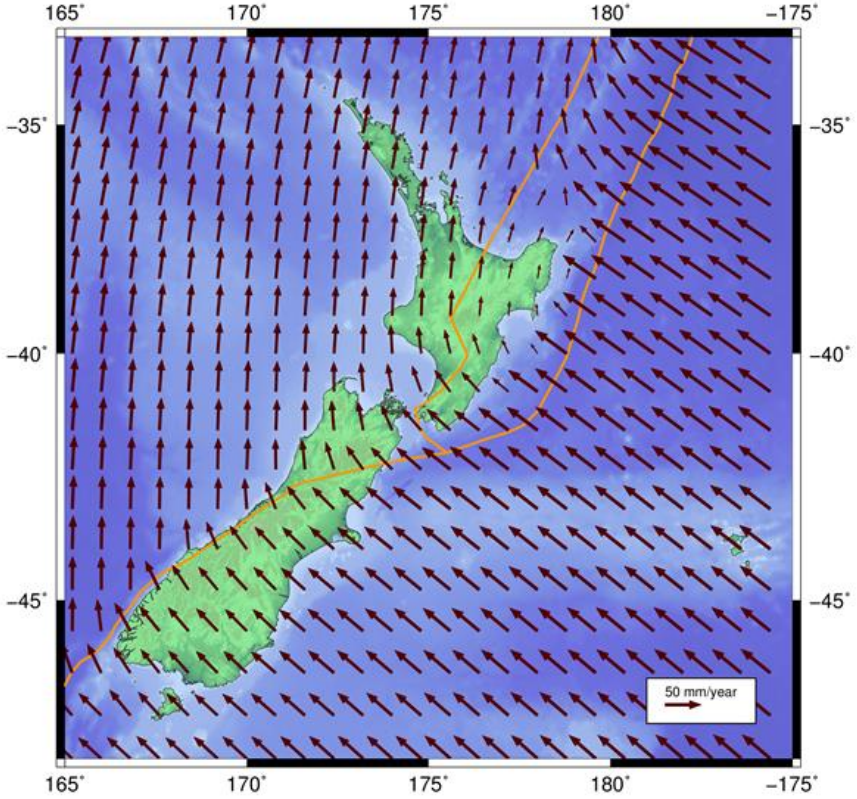

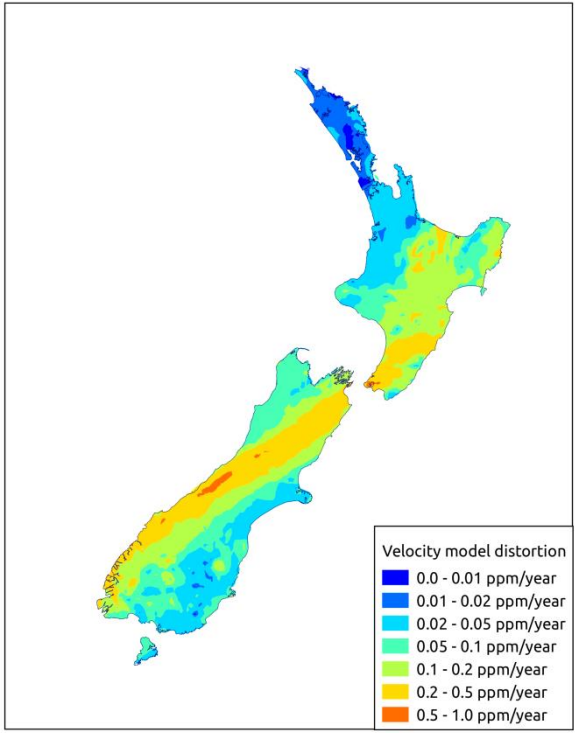

NZGD2000 – "plates-fixed" datum

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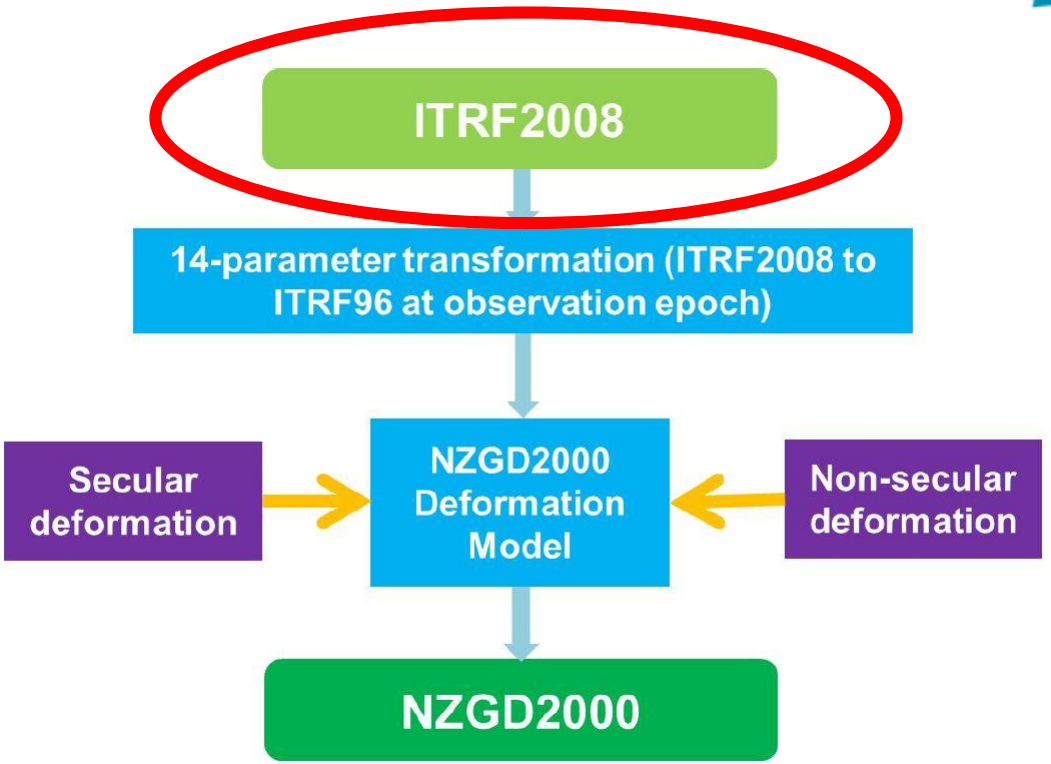
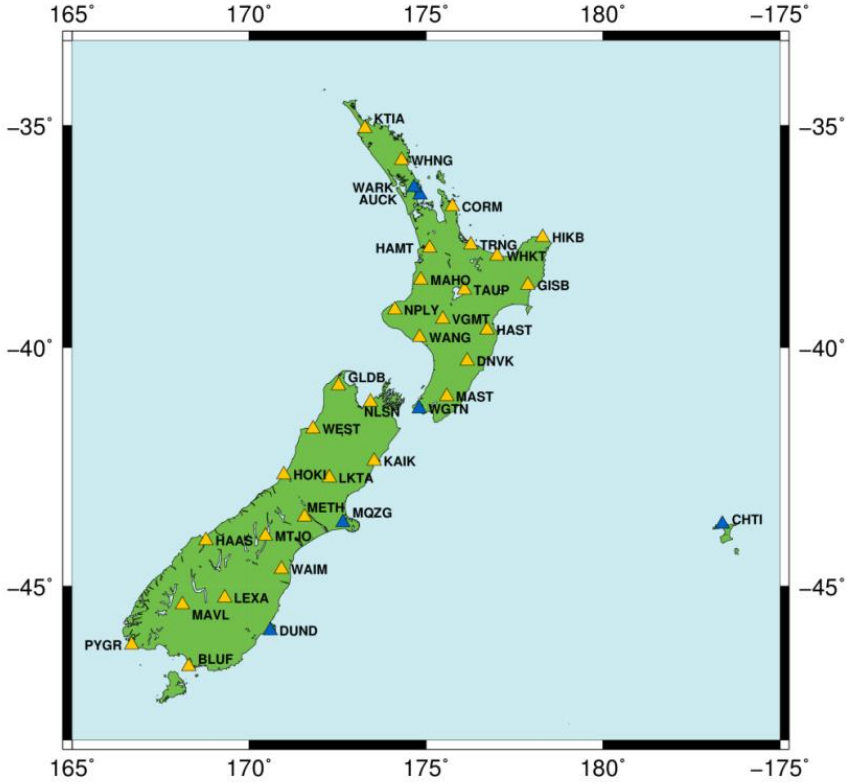


PositioNZ CORS network



Daily ITRF2008 solution

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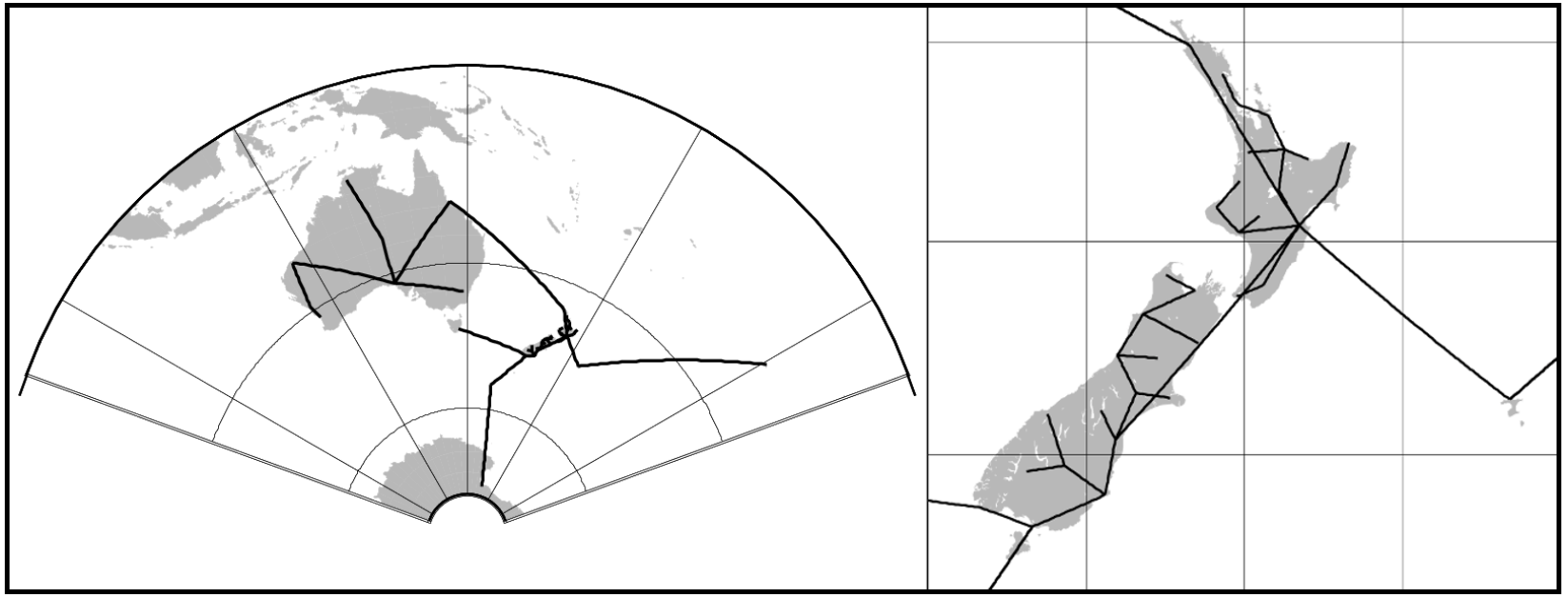
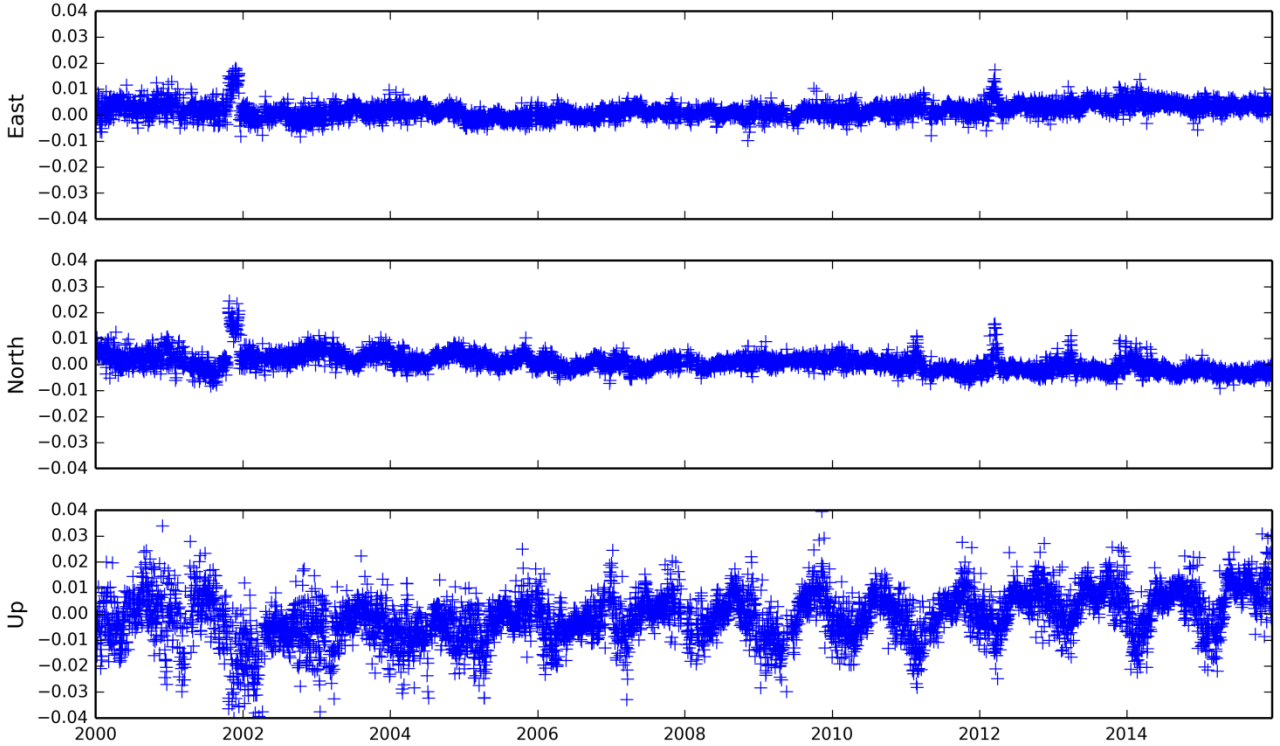
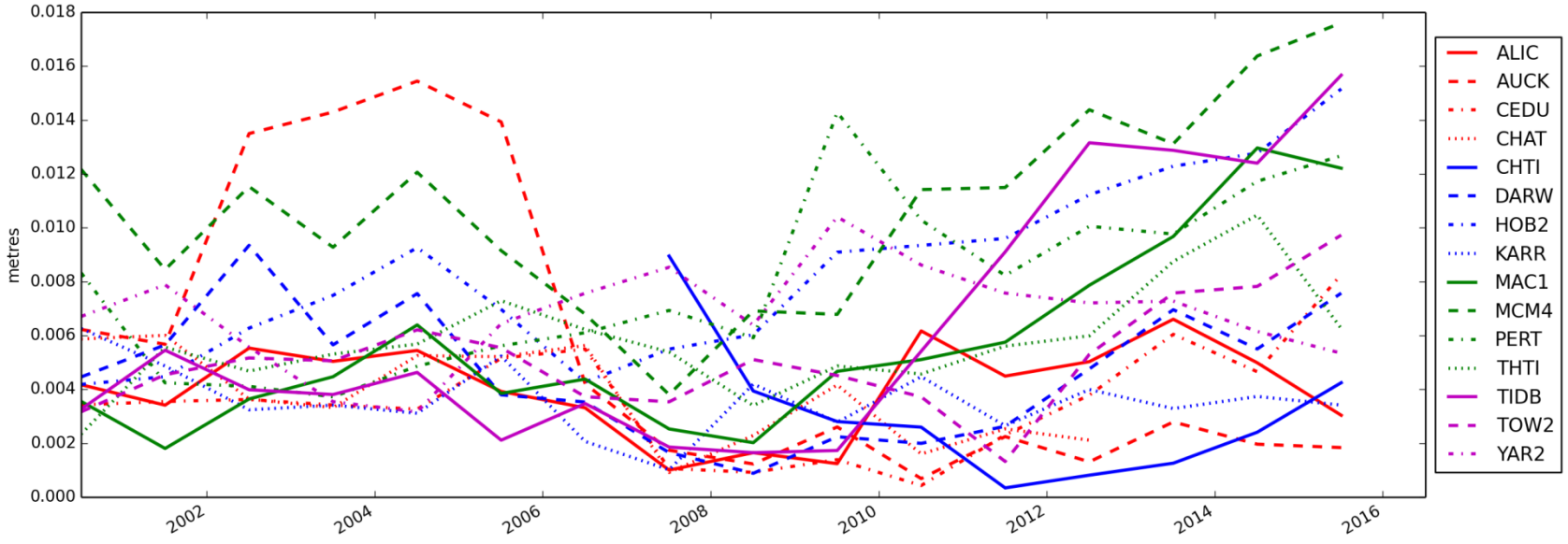


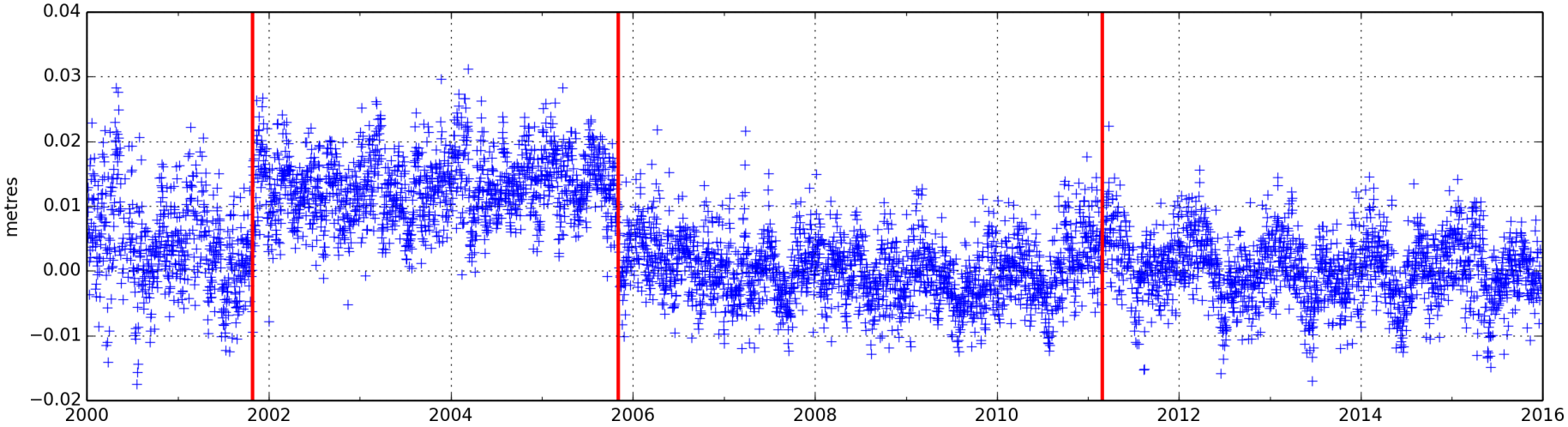
Example time series (Darwin)



Mean annual residual errors



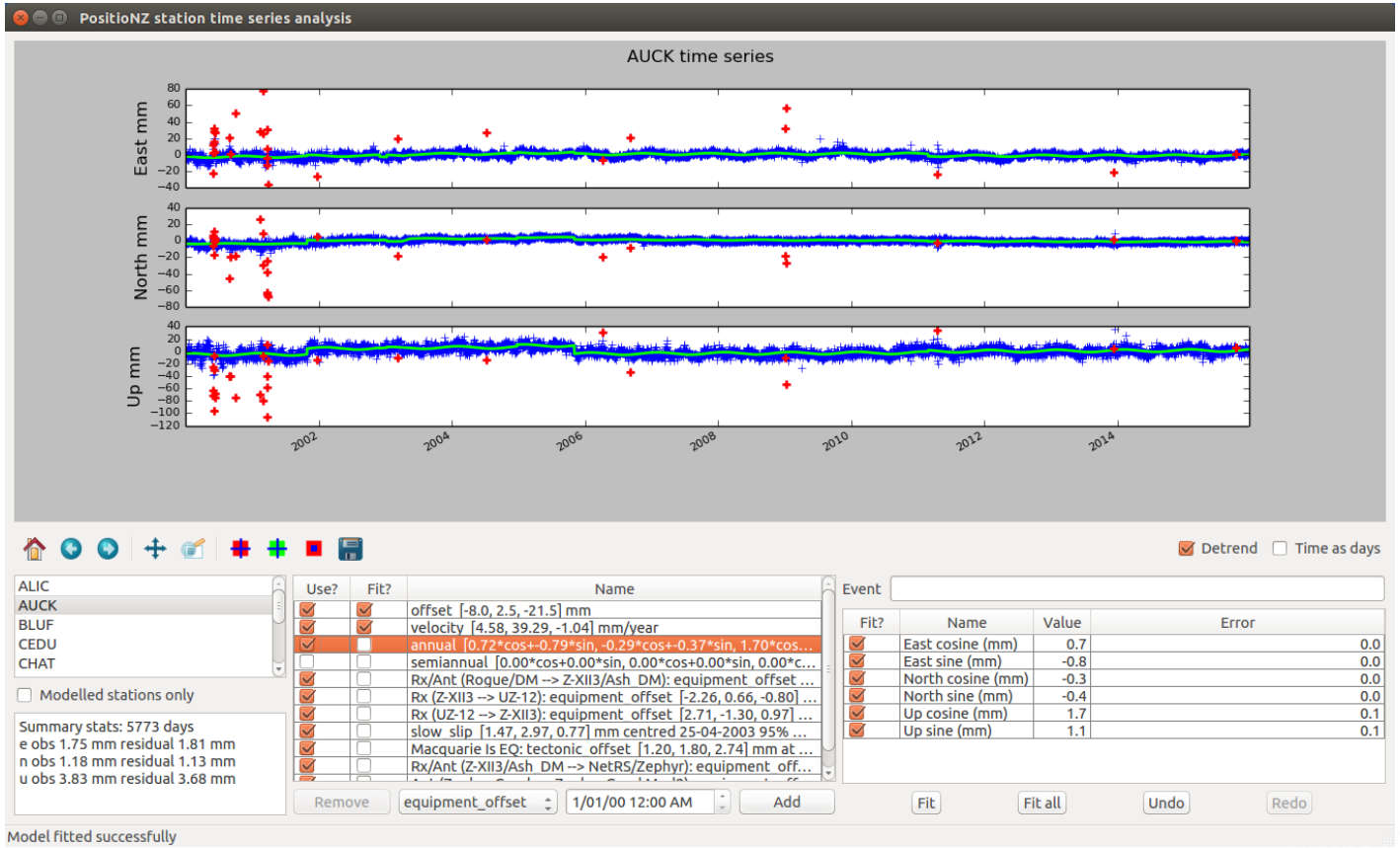
Antenna change at AUCK



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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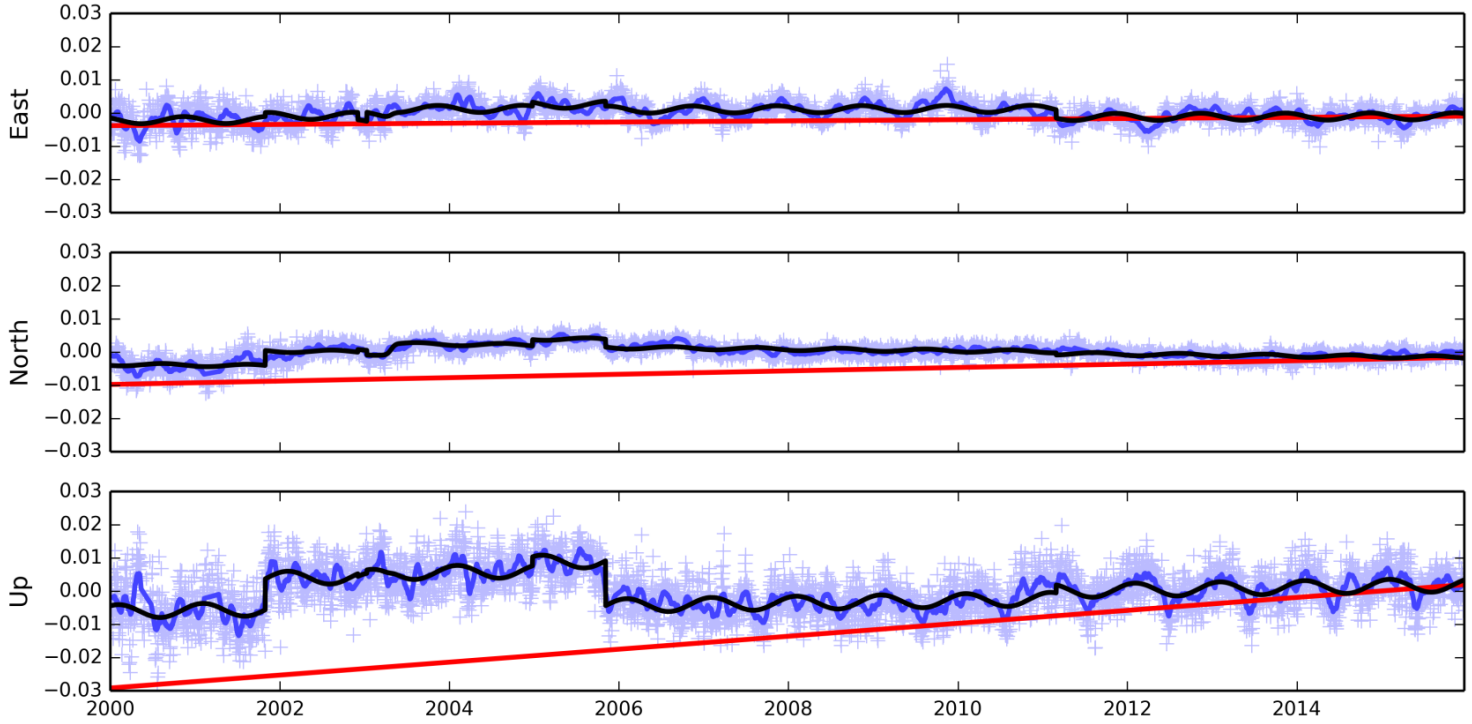
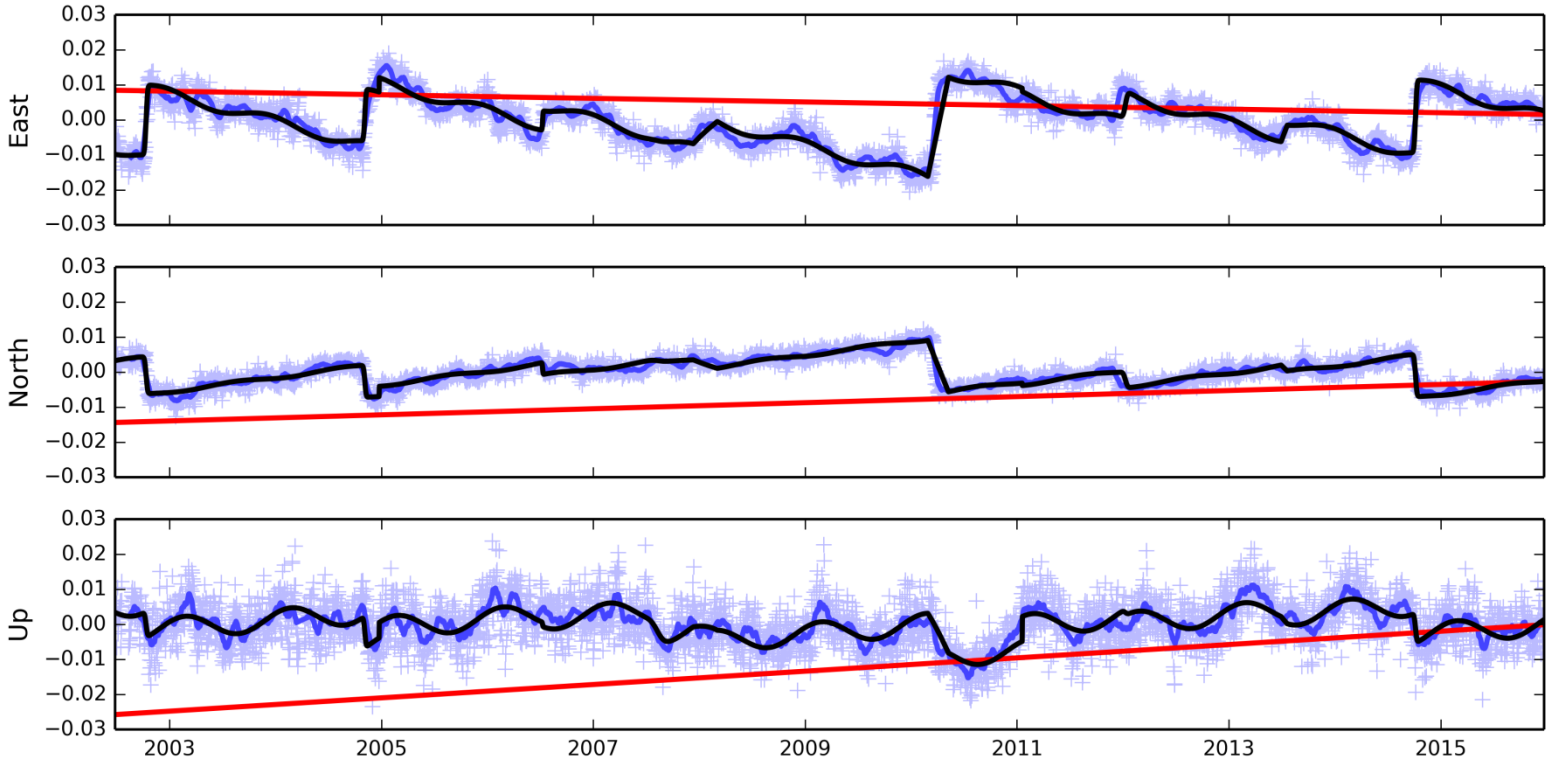
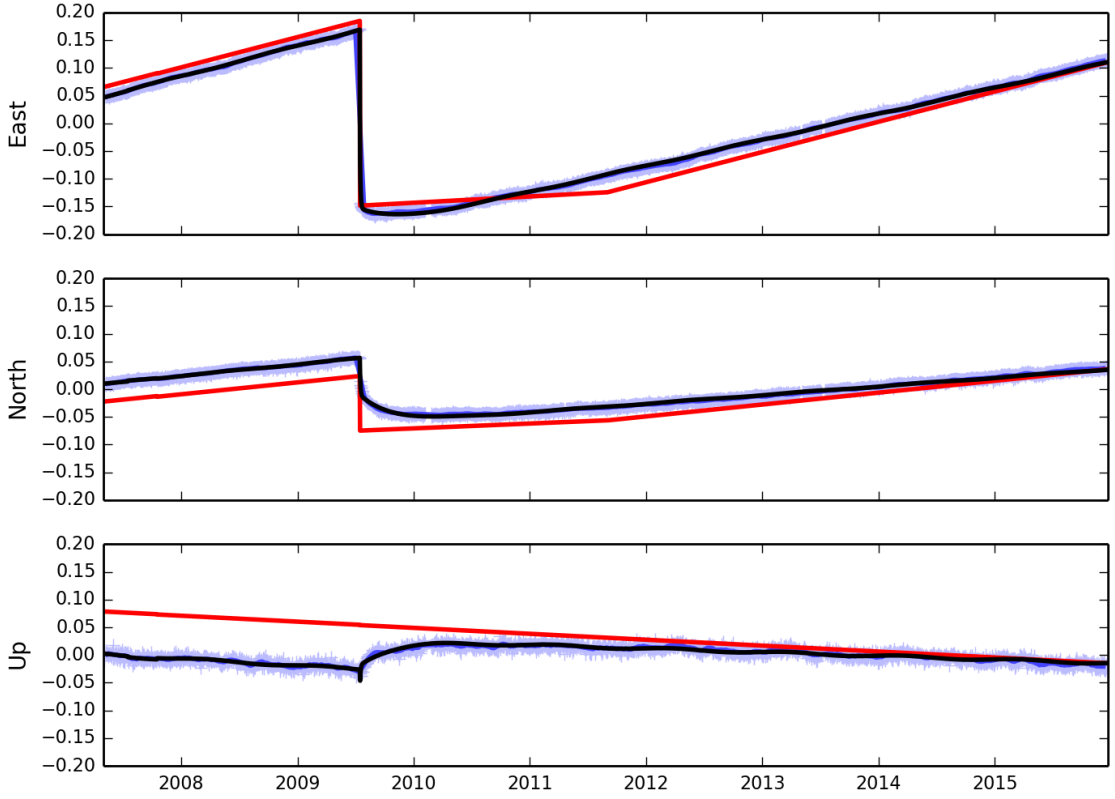
Auckland (AUCK) time series



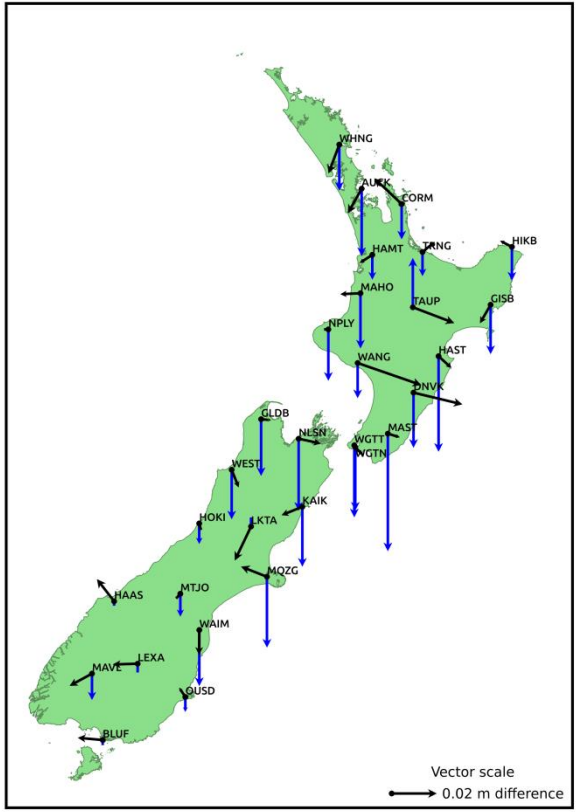
Gisborne (GISB) time series



Puysegur (PYGR) time series



Deformation model errors



Summary of errors

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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)

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Questions?