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A Single Adjustment of New Zealand's Geodetic Observations

Nic Donnelly

Miriam Broadbent

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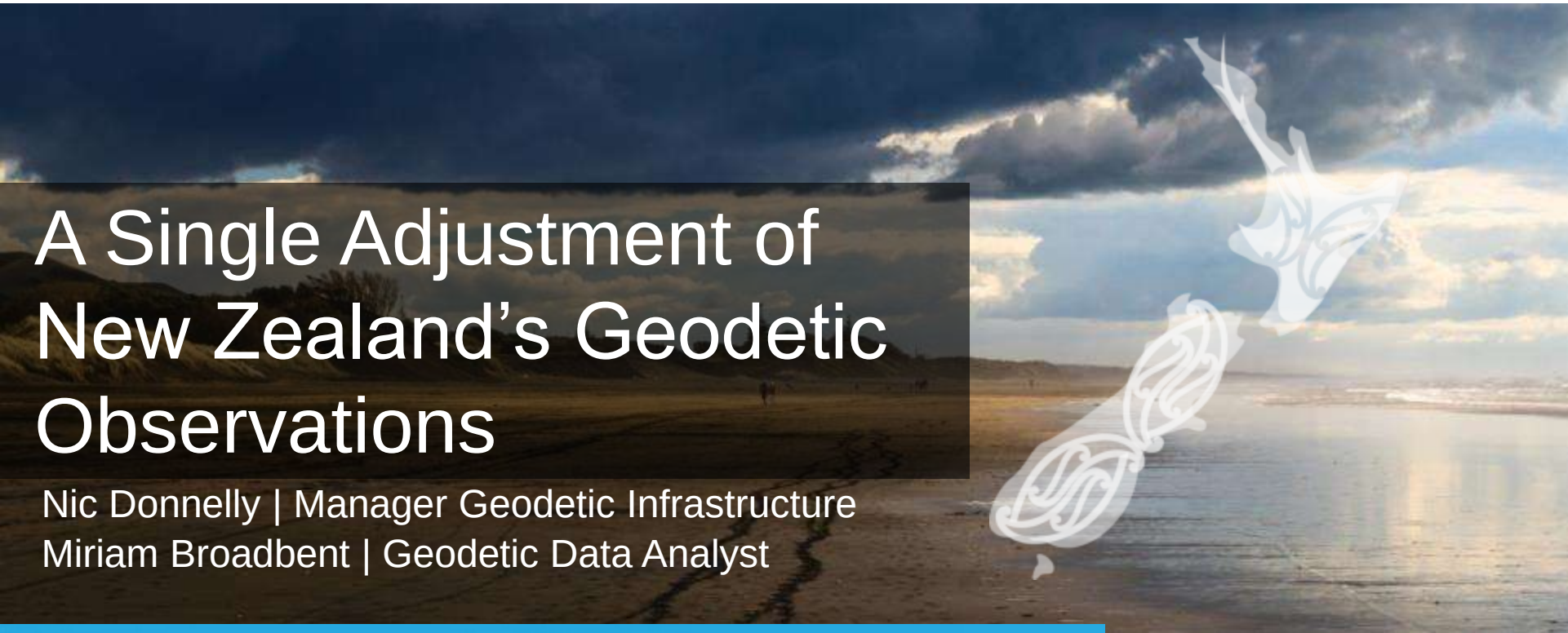

A Single Adjustment of New Zealand's Geodetic Observations

Nic Donnelly | Manager Geodetic Infrastructure
Miriam Broadbent | Geodetic Data Analyst

Key points

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- Almost all New Zealand's geodetic coordinates, including heights, are now computed in a single least squares adjustment
- Observations at different epochs, and in different reference frames, are brought into a consistent frame using appropriate models

Drivers

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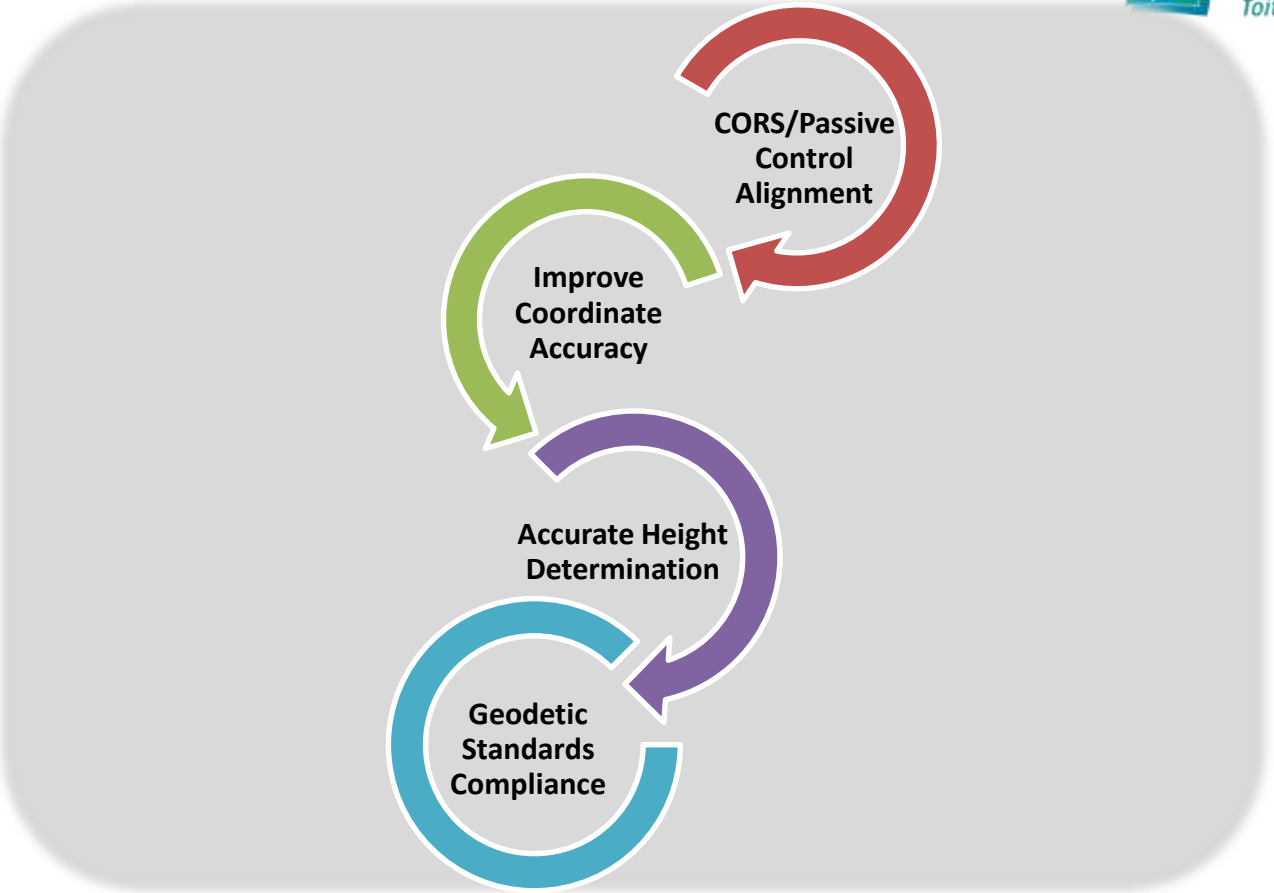
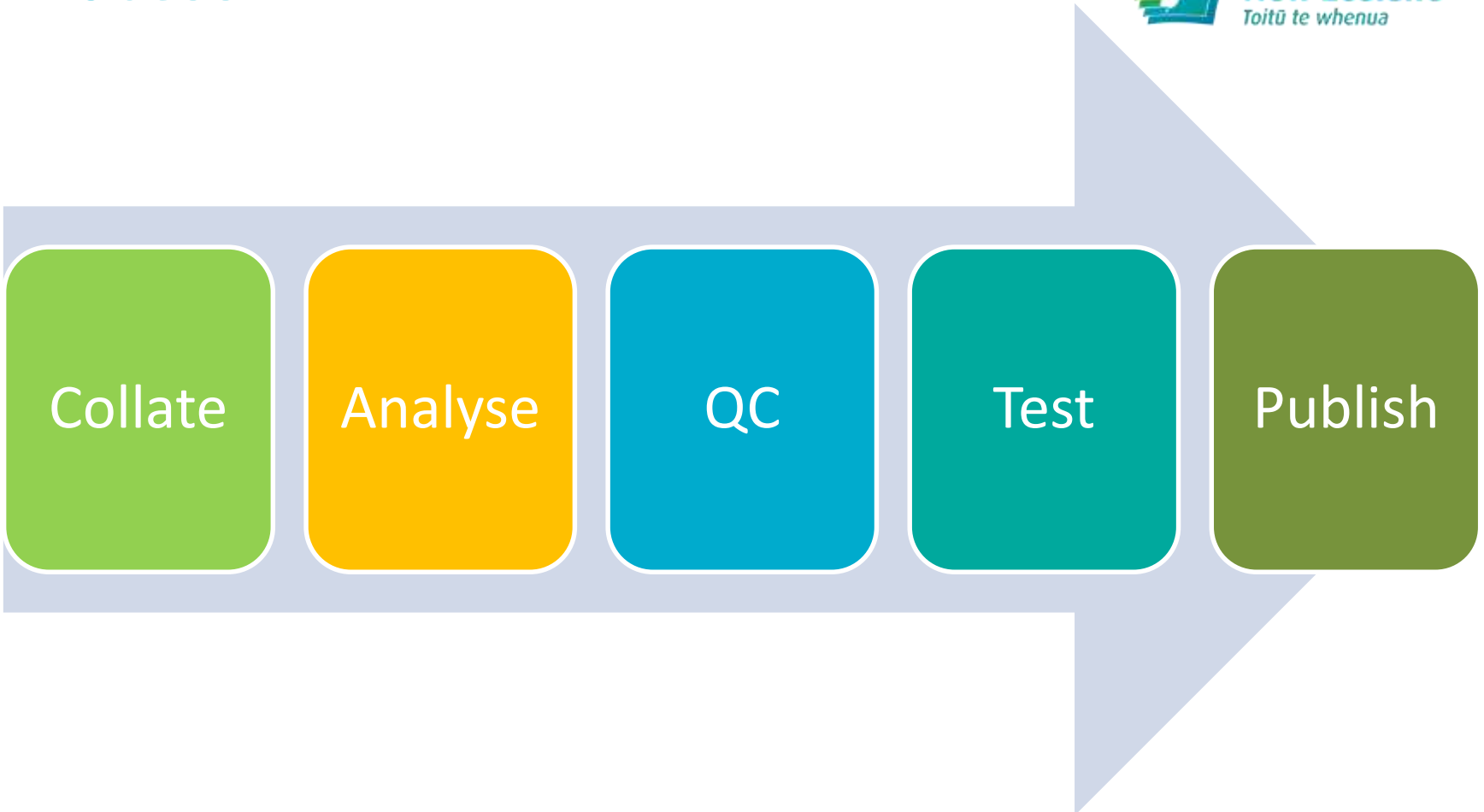


Software - SNAP

- Free, open-source
- Commands are criteria-driven
- Full support for deformation model

Process



Visualisation

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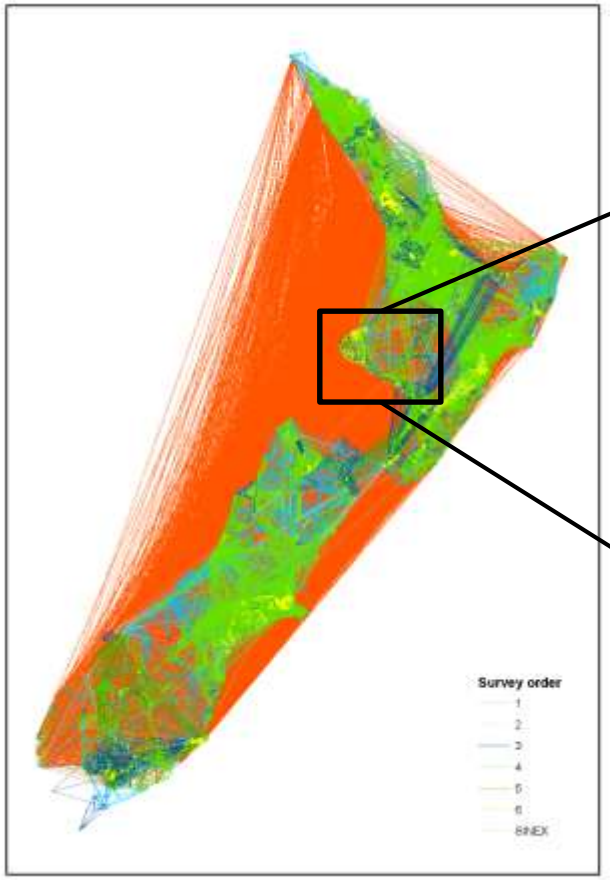
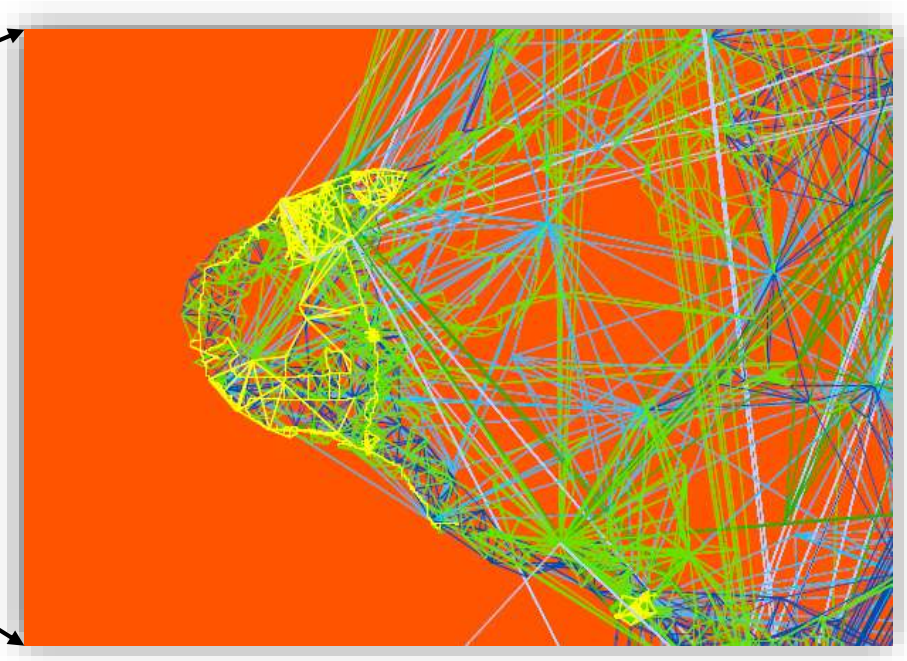
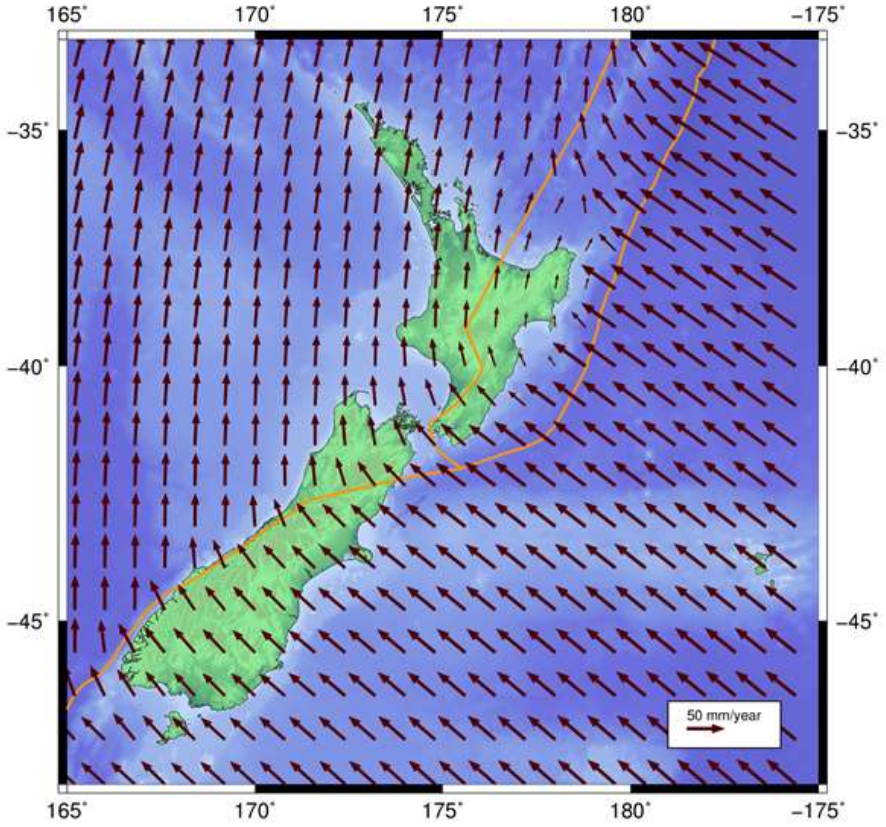


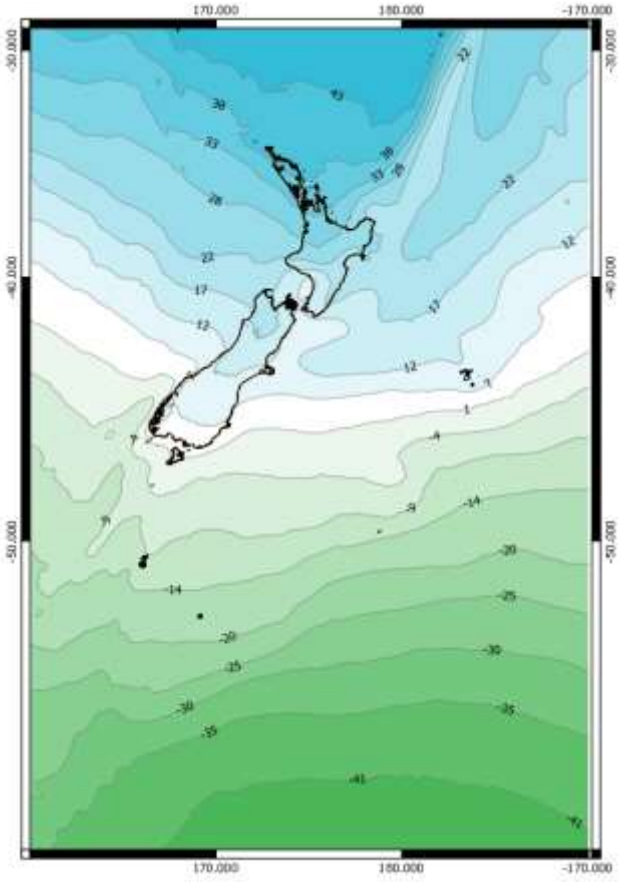


Deformation Model



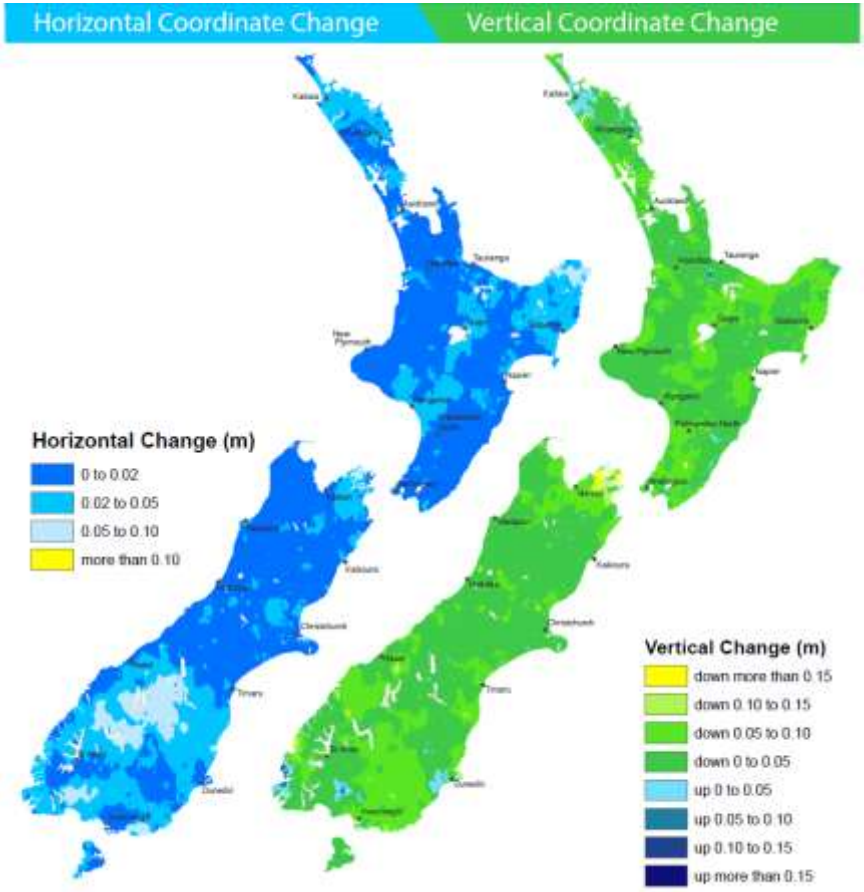
- Used to bring observations at various epochs into a consistent reference frame

Quasigeoid Model



- Used to bring orthometric (precise-levelled) and ellipsoidal (GNSS) height differences into a consistent reference frame

Results



- 95% of horizontal uncertainties (95% confidence interval) better than 0.02m, relative to CORS
- 95% of vertical uncertainties (95% confidence interval) better than 0.03m, relative to CORS

Propagating to the Cadastre

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- National Wide Area Cadastral Adjustment Programme in progress
- Objective to ensure the spatial cadastre is aligned with the updated geodetic control

Summary

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- About 1 million observations used to update 100,000 geodetic stations in a single adjustment
- Deformation and quasigeoid models enable disparate observations to be seamlessly combined
- Updates will be made periodically, but will usually be minor

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Questions?