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Volunteering for the future – Geospatial excellence for a better living

Support for dynamic datums in Trimble software

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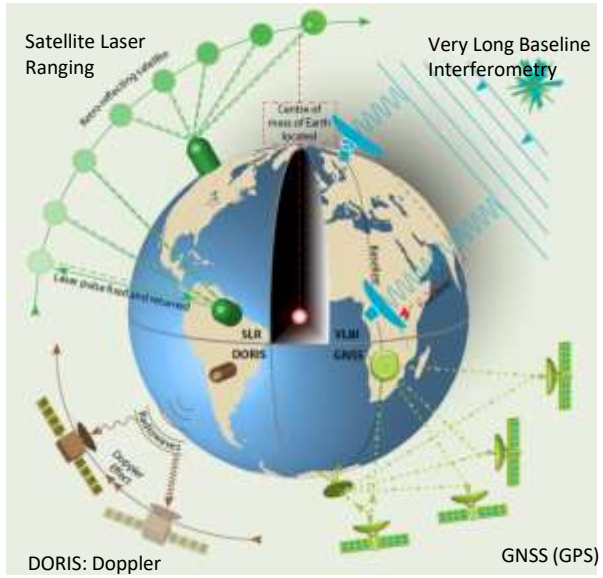
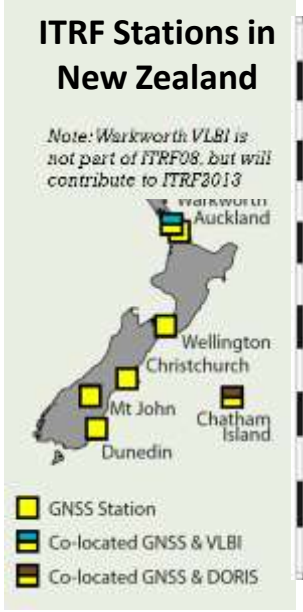
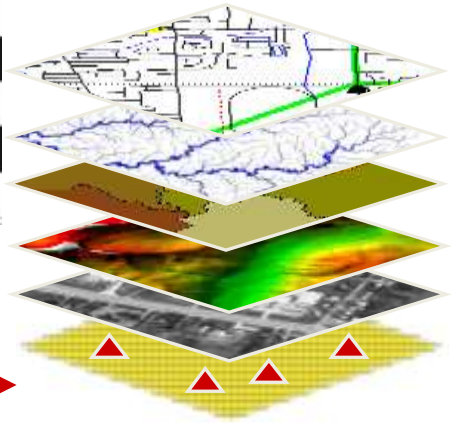
Semi-dynamic datum







Datum transformation 14 param

Deformation model

ITRF

Required by GPS

No deformation model

coordinates change significantly with time

NZGD2000

Stable coords

deformation model

Coordinates transformed to common reference epoch

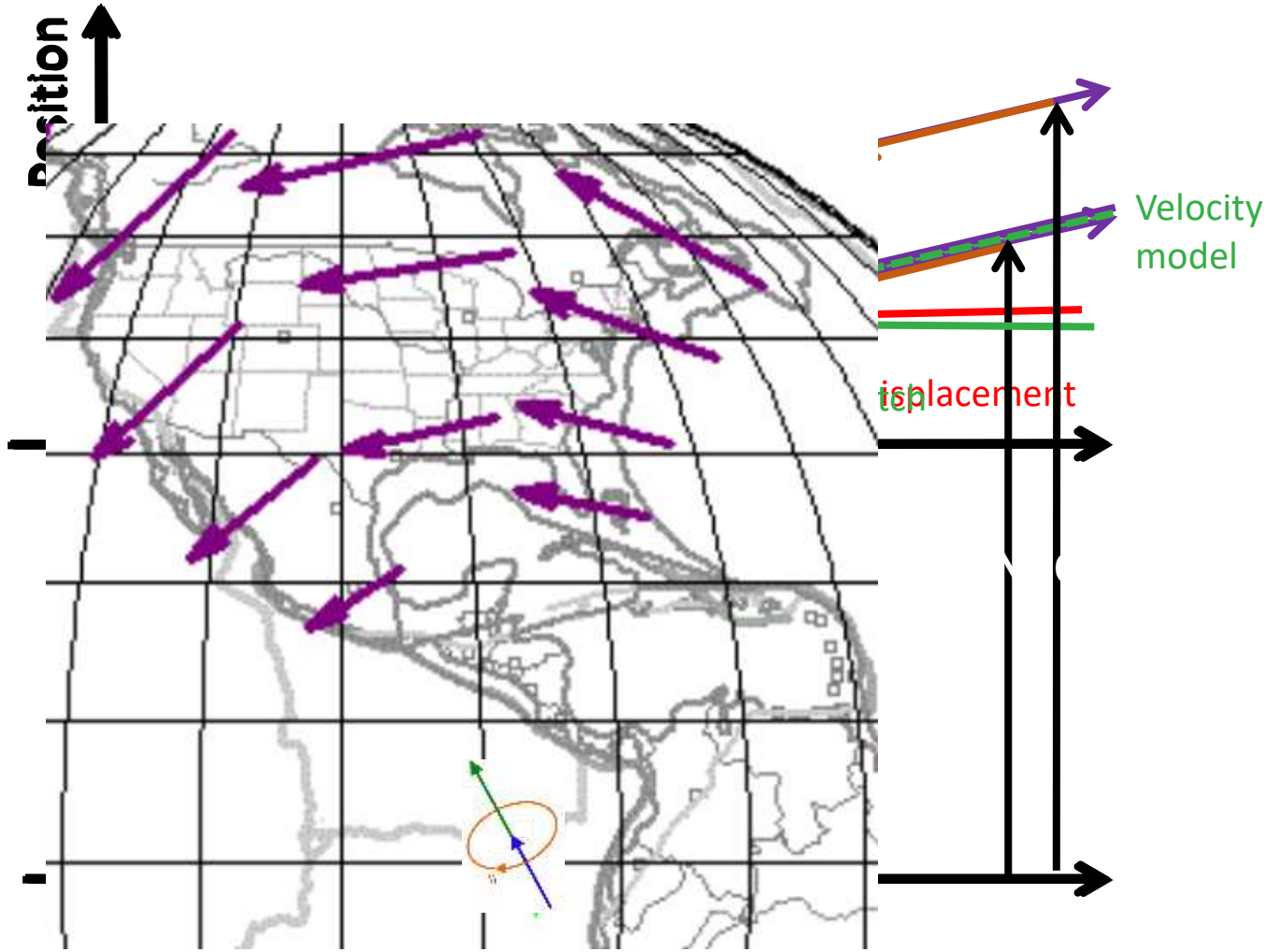
2000 for New Zealand

using deformation model

cGNSS for active control

Deformation models

correct for tectonic motion between the epoch of measurement and the National datum Reference epoch



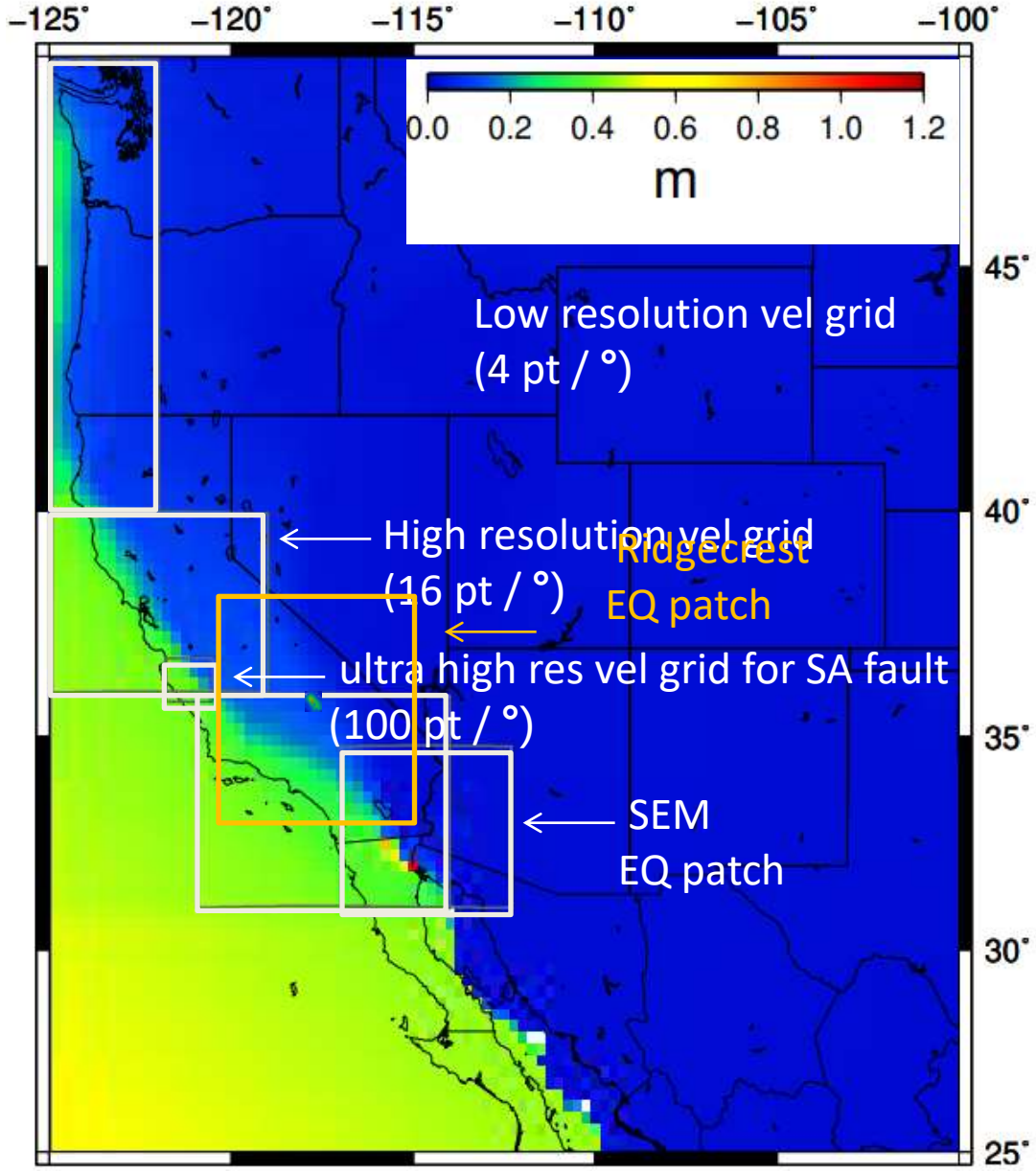
Euler Poles

Average Velocity only

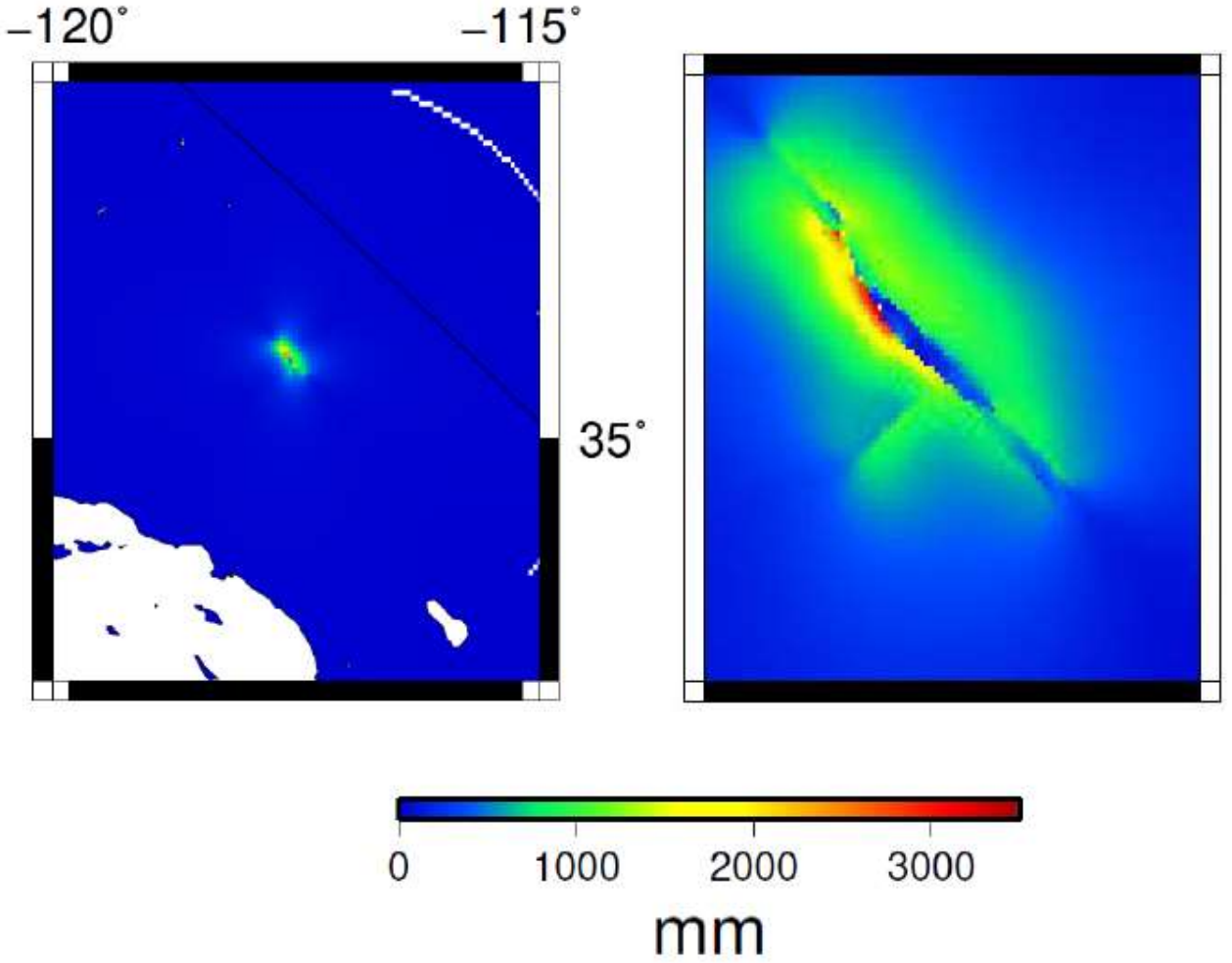
Velocity + EQ +PS

Distortion grid: Displacement between t and reference epoch

NAD83 (2011) CONUS



- HTDP3.4 has 3 new earthquake models
  - Ridgecrest earthquake in California and 2 in Alaska
  - Ridgecrest earthquake caused surface rupture so we used 2 nested grids with a high resolution patch near the epicenter



Implementation in Trimble Software

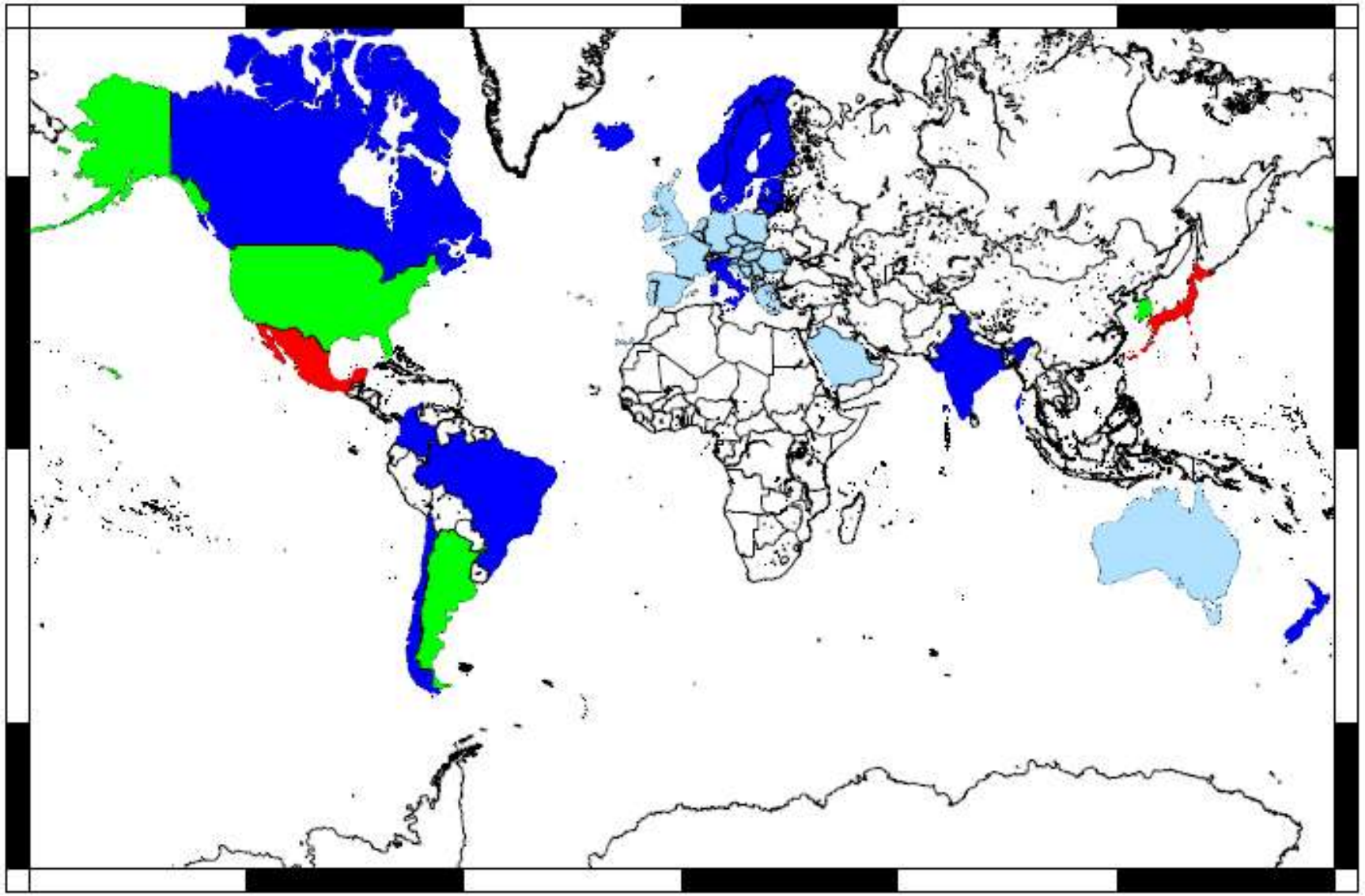
Our **generic time dependent transformer** can convert:
$(X, Y, Z)_{ITRF}$ at eom from or to $(X, Y, Z)_{LOCAL}$ at eor

It uses **data files** modeling:
- Datum transformation (14 p transformation or grid)
- Displacement models (with secular velocity & earthquake patches)

Field, office & web applications are providing **consistent coordinates**, as soon as they use same data. (They exchange used data).

Models **addition & updates are easy** deploying new data files.

Map of displacement models



Euler Poles

Velocity grid

Velocity + EQ +PS

Distortion grid: Displacement between t and reference epoch

Conclusions

- TGL has been upgraded to support time dependent datum transformations
- Includes a grid based algorithm to support deformation models
  - Based on the approach used by Land Information New Zealand
  - It can be used to support any national deformation model
- It is consistent with the OSG's proposed standard for deformation models
- Future deformation models should follow OGC standard for easy and consistent deployment across software vendors