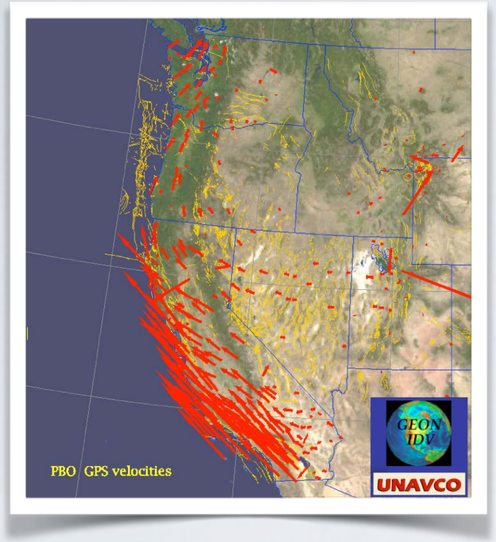
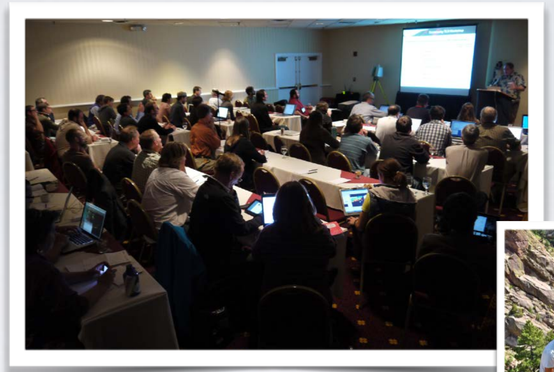
EARLY CAREER GEO-RESOURCES FOR YOU & YOUR TEACHING

Shelley Olds, UNAVCO
December 10, 2017
Early-Career Scientists/Faculty: Introduction to GeoPRISMS/ MARGINS Data Resources, Mini-Lessons, and Effective Broader Impacts
New Orleans, LA

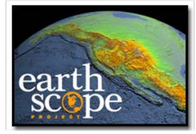


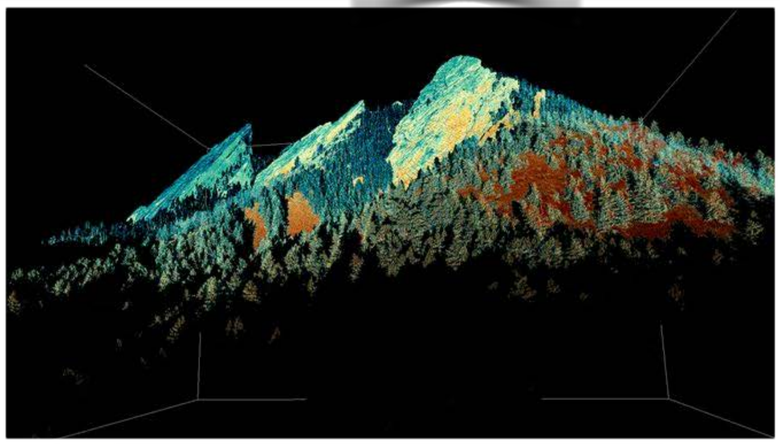


UNAVCO

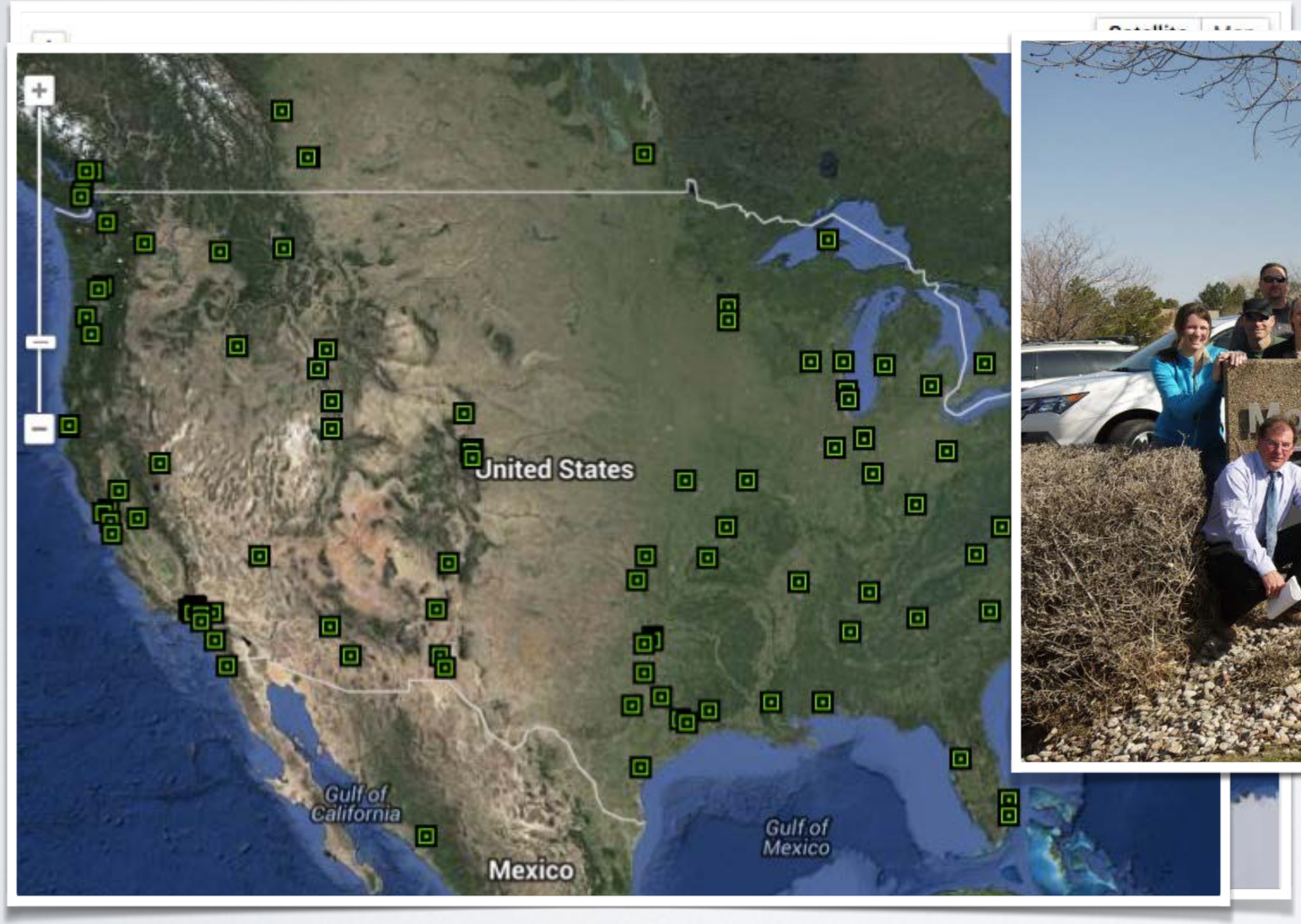
a non-profit university-governed consortium, facilitating geoscience research and education using geodesy

Video »





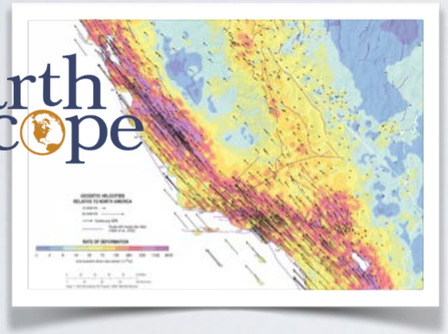
UNAVCO = COMMUNITY + FACILITY



UNAVCO

ADVANCE YOUR RESEARCH: REQUEST SUPPORT

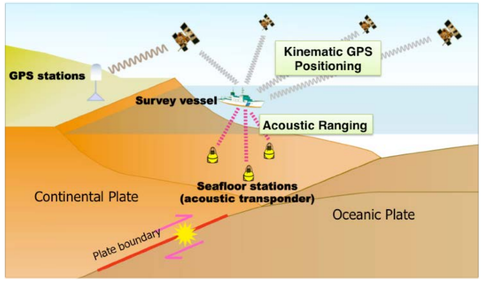
Crustal Kinematics and Mantle Dynamics



Understanding mantle and plate motions to enhance resilience to earthquakes, tsunamis and volcanic eruptions

Hydrogeodesy

Helps with planning emergency response and for engineering structures in tsunami-prone areas

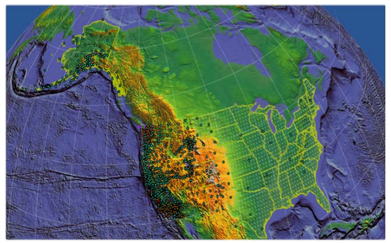


Volcanic Deformation

Decipher surface rise or fall related to magma movement with volcano early warning benefits

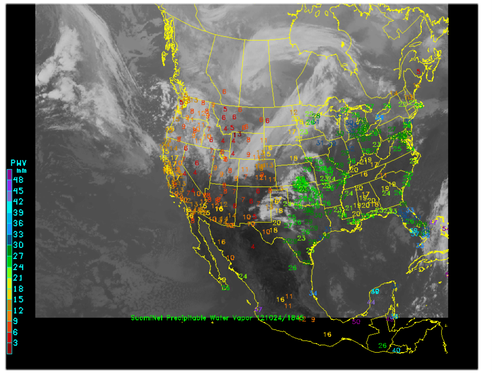
Coseismic Deformation and GPS Seismology

Earthquake and tsunami early warning to save lives and property



GPS Meteorology

Improve hurricane forecasting and severe storm tracking

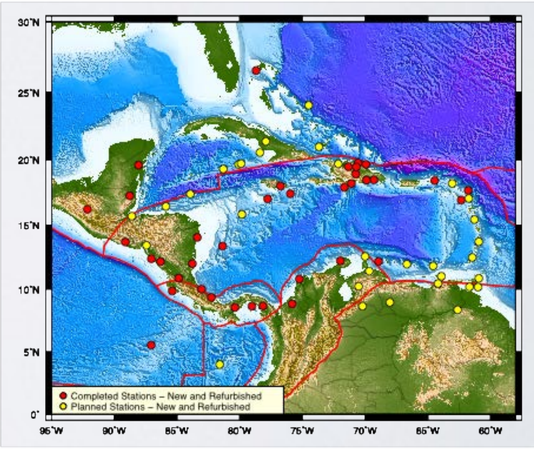


Glaciology

Assess ice mass, forecast melting and estimate climate change effects

Earthquake Hazards

Assess earthquake hazard to mitigate future losses



NETWORKING OPPORTUNITIES & EARLY CAREER SUPPORT

Faculty - Student Mentoring

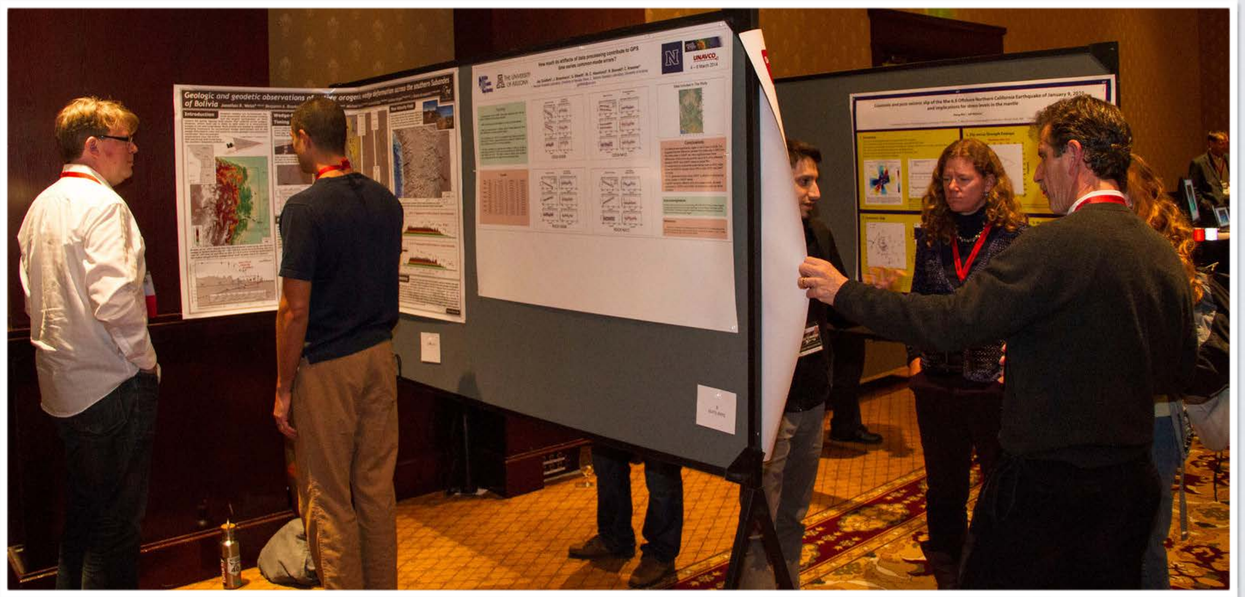
- Building & improving mentoring skills

PI Broader Impact Proposal Support

- Guidance to develop Broader Impacts for NSF proposals) (CAREER award, research

AGU Early Career Investigators Networking Event

- Networking luncheon held at Fall AGU - facilitate networking for early career investigators in UNAVCO and IRIS communities



Poster session at the 2014 UNAVCO Science Workshop at the Omni Interlocken Hotel in Broomfield, Colorado. (Photo/ Travis Bildahl)

ADVANCE YOUR TECHNICAL EXPERTISE:
SHORT COURSES

GPS Data Processing and Analysis with GAMIT/ GLOBK/TRACK

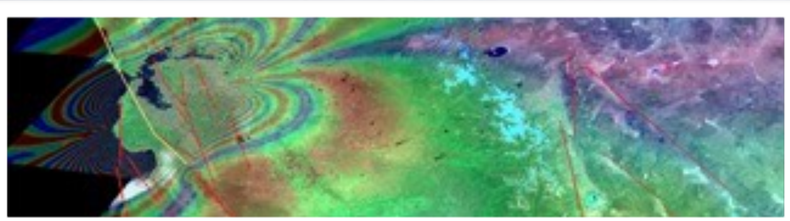
InSAR Processing and Theory with GMSTSAR & Advanced InSAR Processing

Terrestrial & Airborne Laser Scanning

TLS and Structure from Motion (SfM) Photogrammetry
in Undergraduate Field Education

Working with Strainmeter Data

ENHANCE YOUR TEACHING:
LEARNING MODULES USING GEODESY: GETSI



Surface Process Hazards (Introductory-level)

Geodesy data : LiDAR

Ice Mass and Sea Level Changes (Introductory-level)

- Geodesy data: **Sea level altimetry, InSAR, ICESat, GRACE, vertical GPS**

Measuring Water Resources (Majors-level)

Geodesy data: **Gravity, vertical GPS, reflection GPS**

Imaging Active Tectonics (Majors-level)

- Geodesy data: **LiDAR, InSAR**

Analyzing High Resolution Topography with TLS & SfM (Majors-level)

- Geodesy data: **TLS, Structure from Motion**

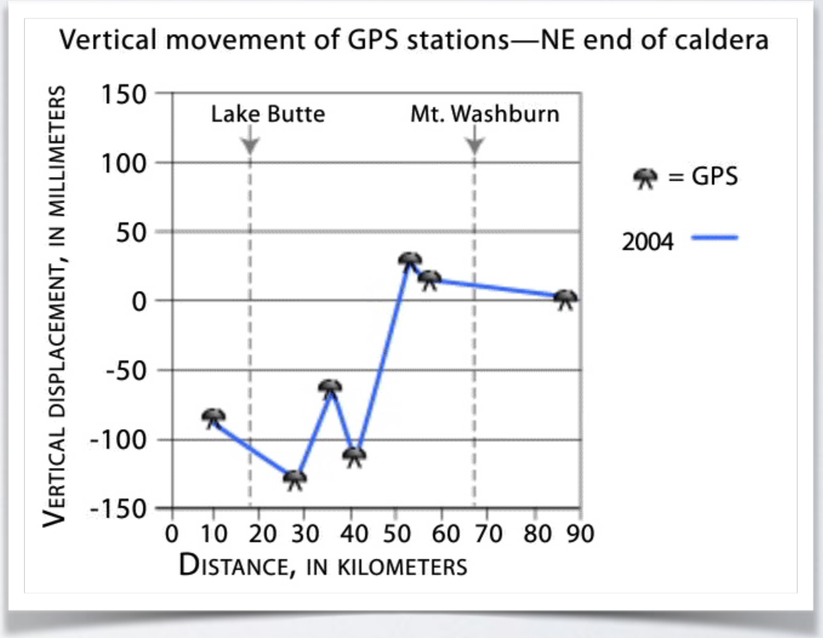
GPS, Strain, and Earthquakes (Majors-level)

- Geodesy data: **GPS**

ENHANCE YOUR TEACHING:
LEARNING ACTIVITIES & MATERIALS

Education Materials:

- Teaching plate tectonics with GPS: A modern approach using science, data, technology, and maps.
  - 6 lesson sequence
- Animations
- Data-focused tutorials
- Regional map handouts



STAY CONNECTED

Social Media

facebook

UNAVCO on Facebook
Keep up on current events, share experiences, and learn about geodesy.

RESESS on Facebook
Find out about our summer internship program dedicated to increasing the diversity of students entering the geosciences and learn about student opportunities.

twitter

UNAVCO on Twitter
Follow us to receive news related to UNAVCO, science policy, and geodesy.

YouTube

UNAVCO on YouTube
Check out our feed for videos about UNAVCO, animations, Science Seminars presented at our Boulder facility, Ignite talks given at the UNAVCO Science Workshops, and more.

SmugMug

UNAVCO on SmugMug
See photos of staff, interns, and fellow researchers getting down with geodesy all over the world.

Instagram

UNAVCO on Instagram
See photos of the amazing places geodesy can take you. From Antarctica to southern California and beyond.

Google+

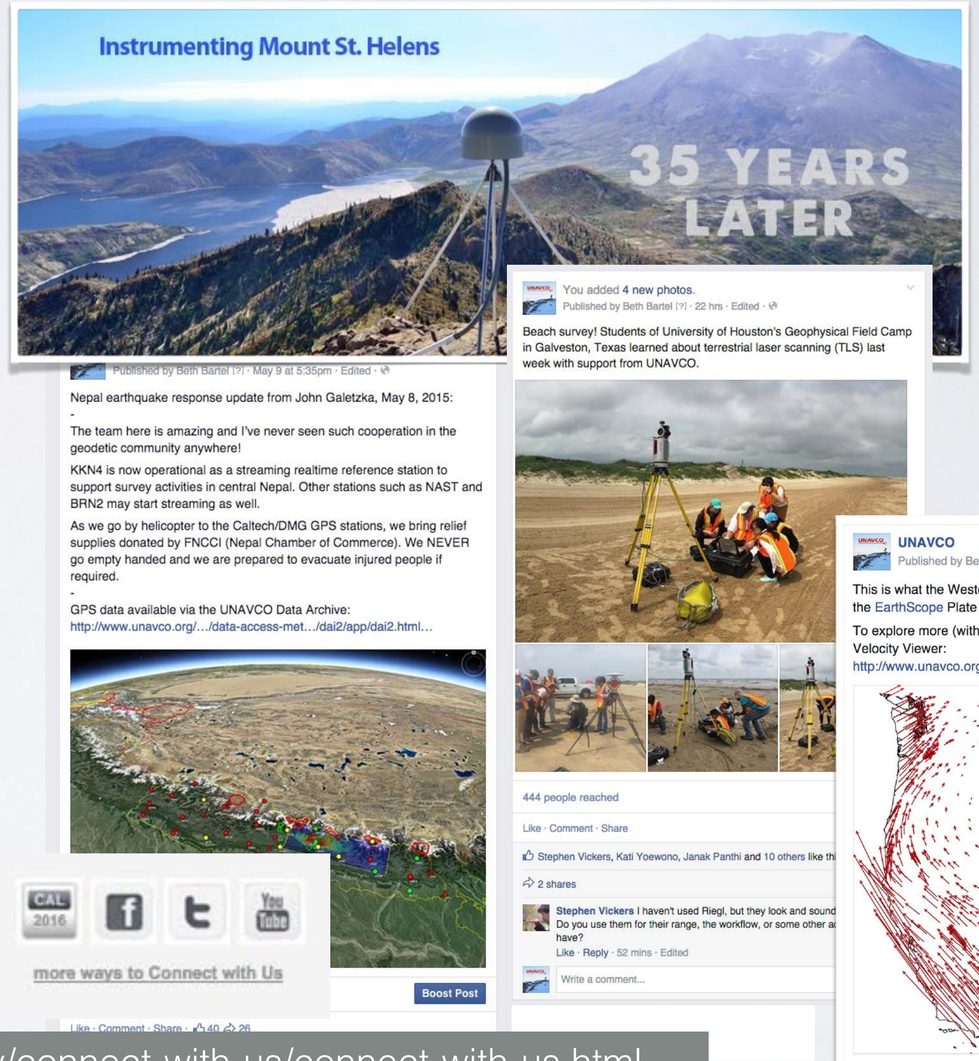
UNAVCO GDS Technical News on Google+
Keep up with the latest news about geodetic stations, technology, and data processing.

LinkedIn

UNAVCO on LinkedIn
Network with other scientists and find out when job opportunities are posted.

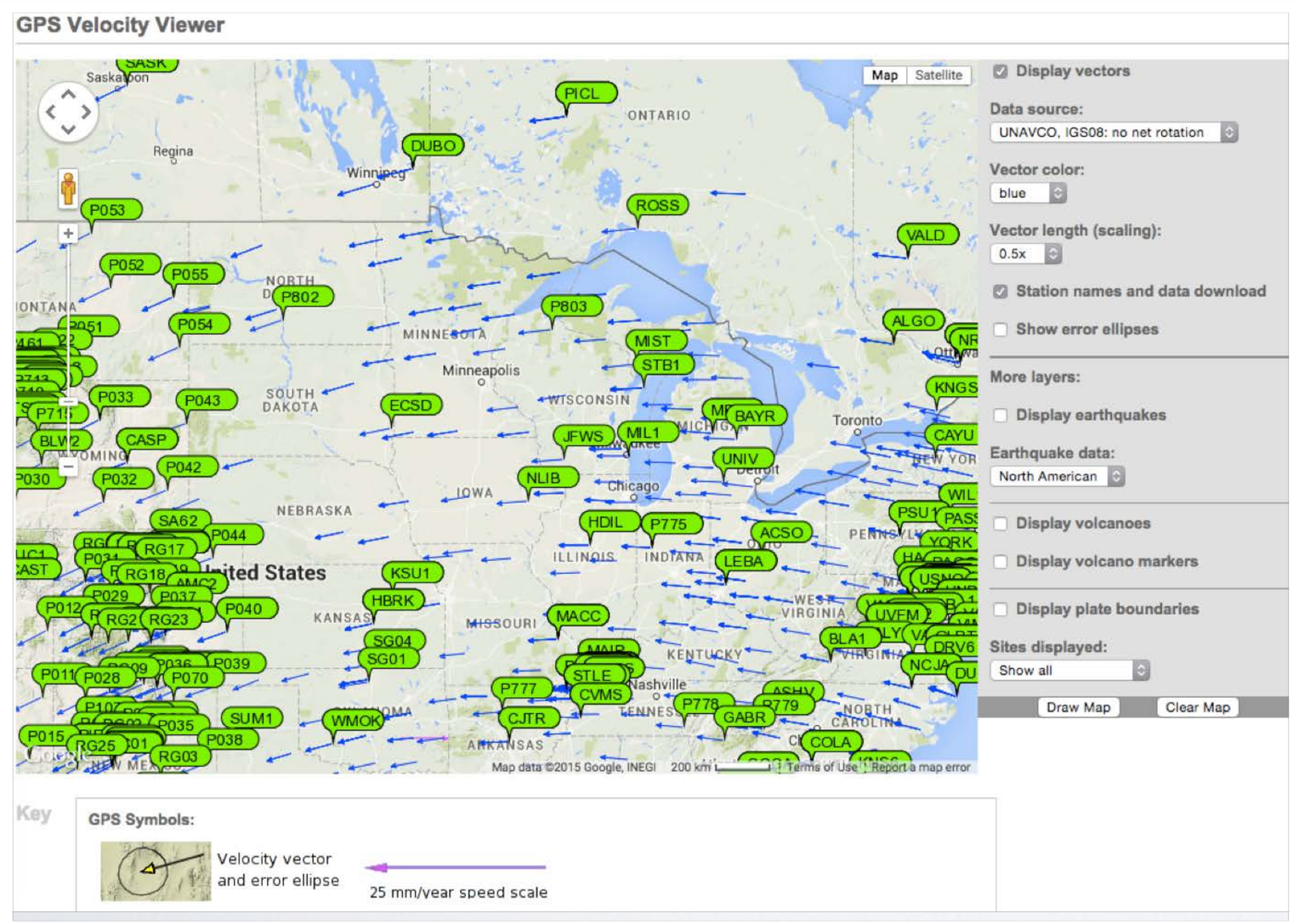
Pinterest

UNAVCO on Pinterest
Access information, interesting web
data.



http://www.unavco.org/community/connect-with-us/connect-with-us.html

TOOLS YOU CAN USE IN YOUR CLASSROOM



Tools & Data Products

- GPS Velocity Viewer
- Processed GPS data, reformatted for ease of use
- PBO H2O & GPS Spotlight
- EarthScope Voyager Jr & Jules Vern Voyager suite

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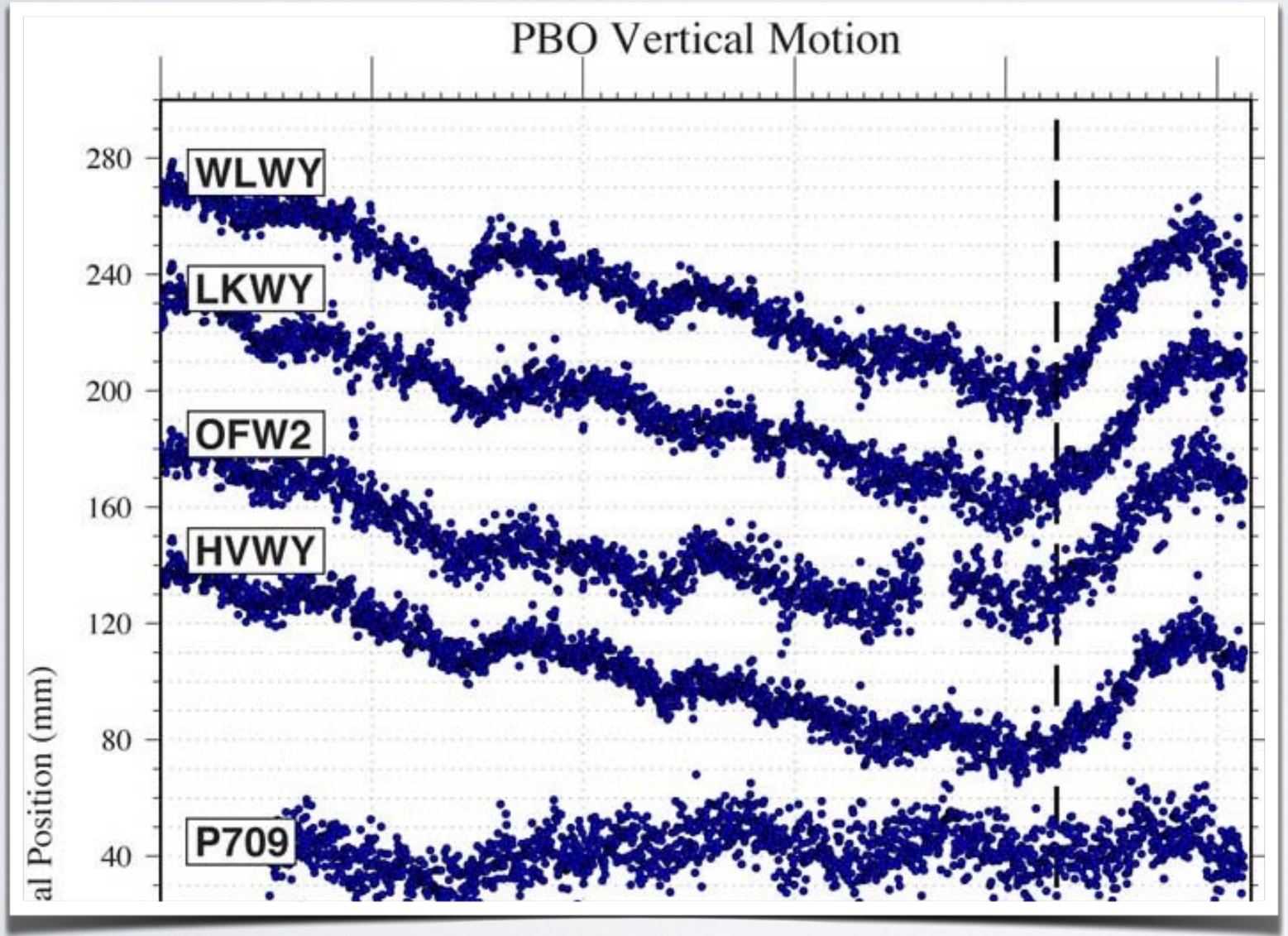

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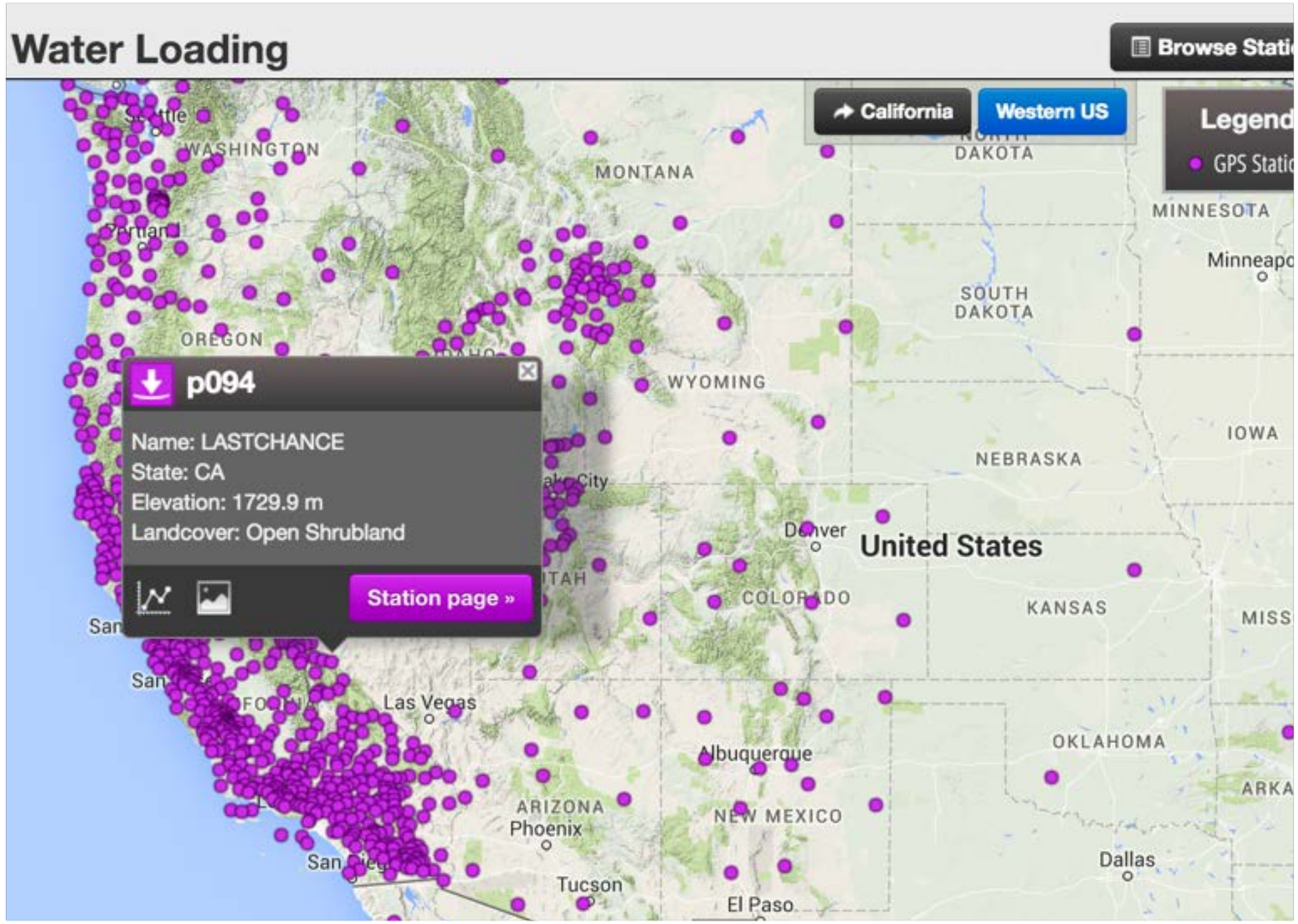

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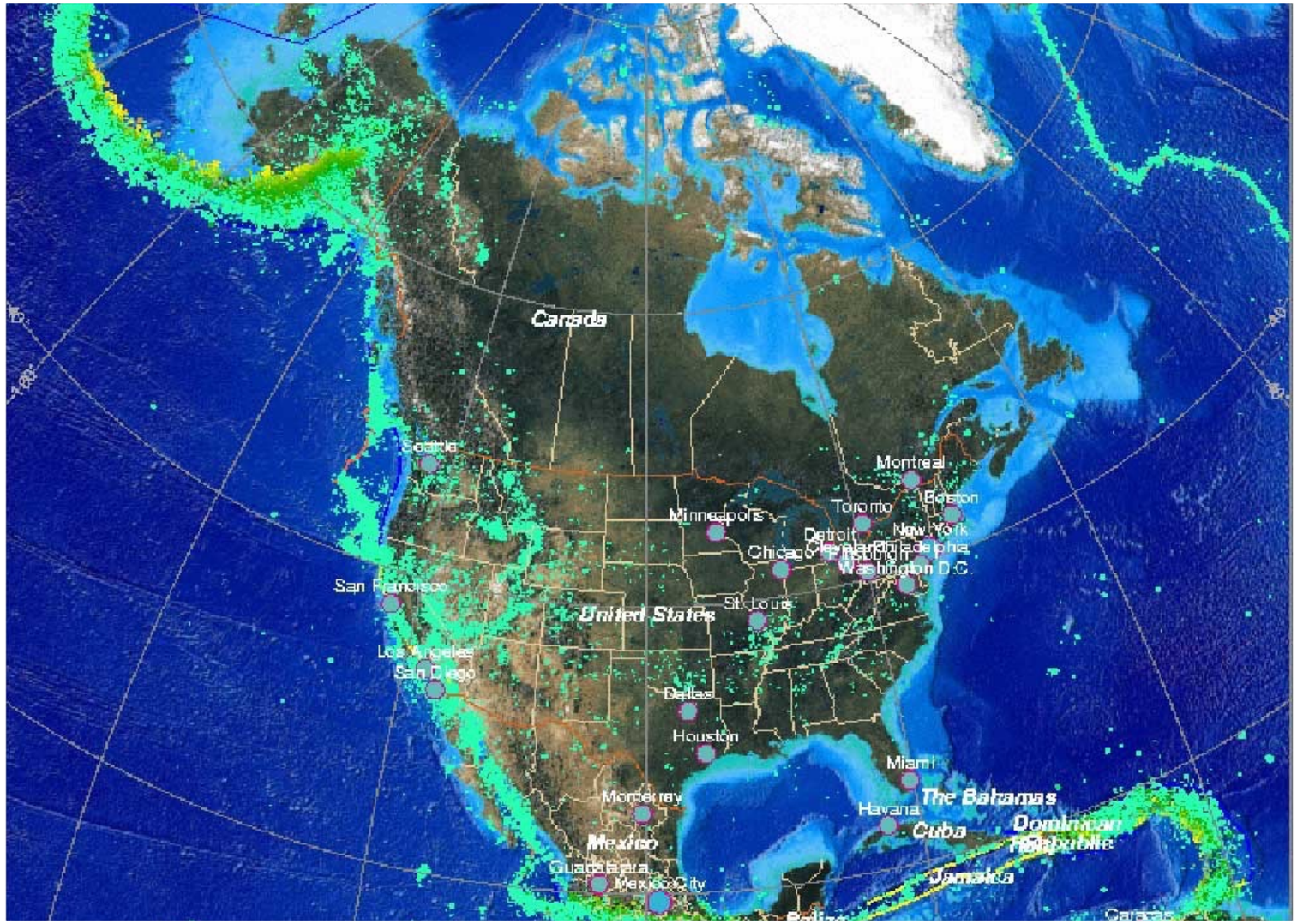

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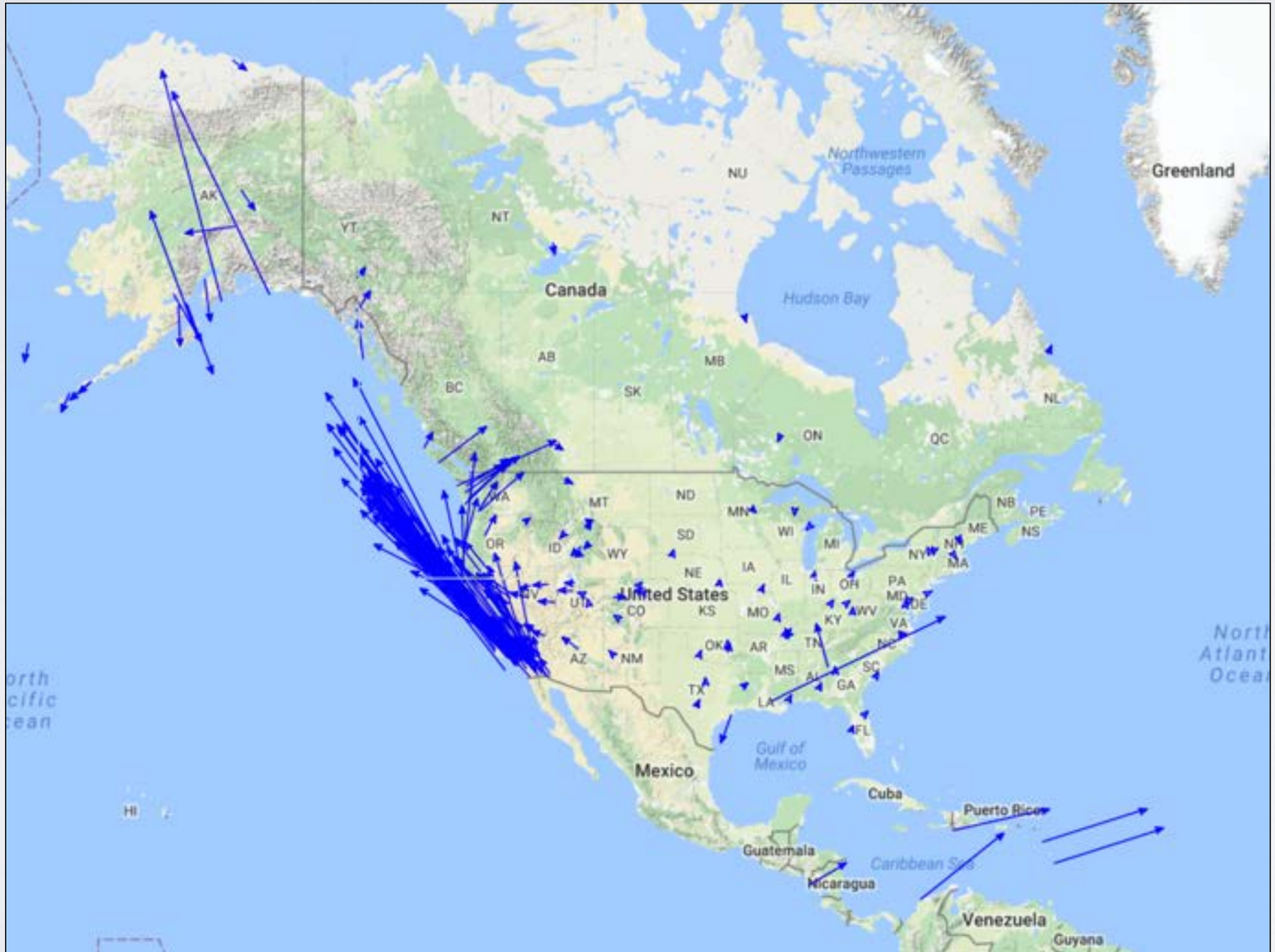
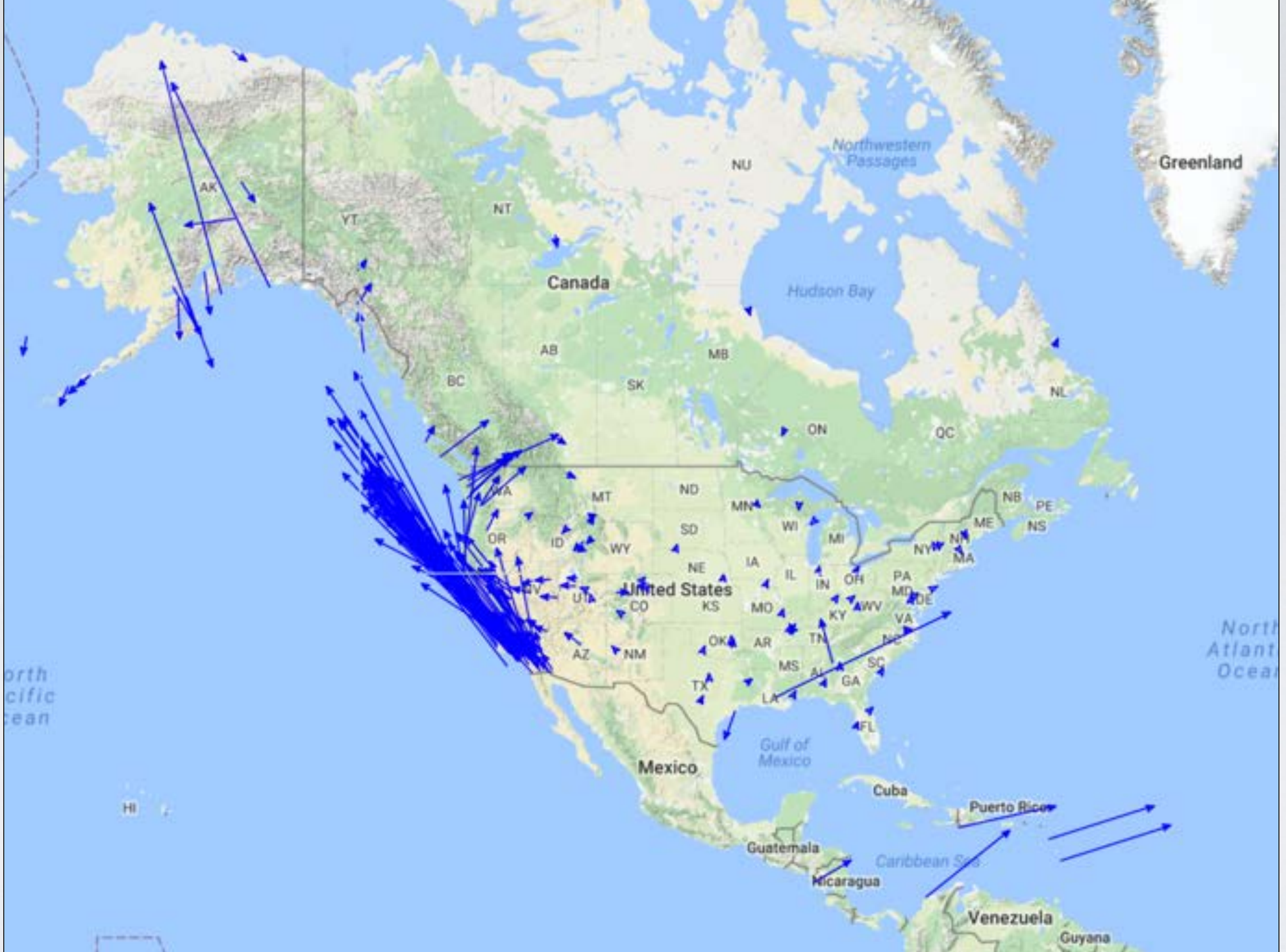
CLOSER LOOK: GPS VELOCITY VIEWER




Greenland
Northwestern Passages
NU
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SC
GA
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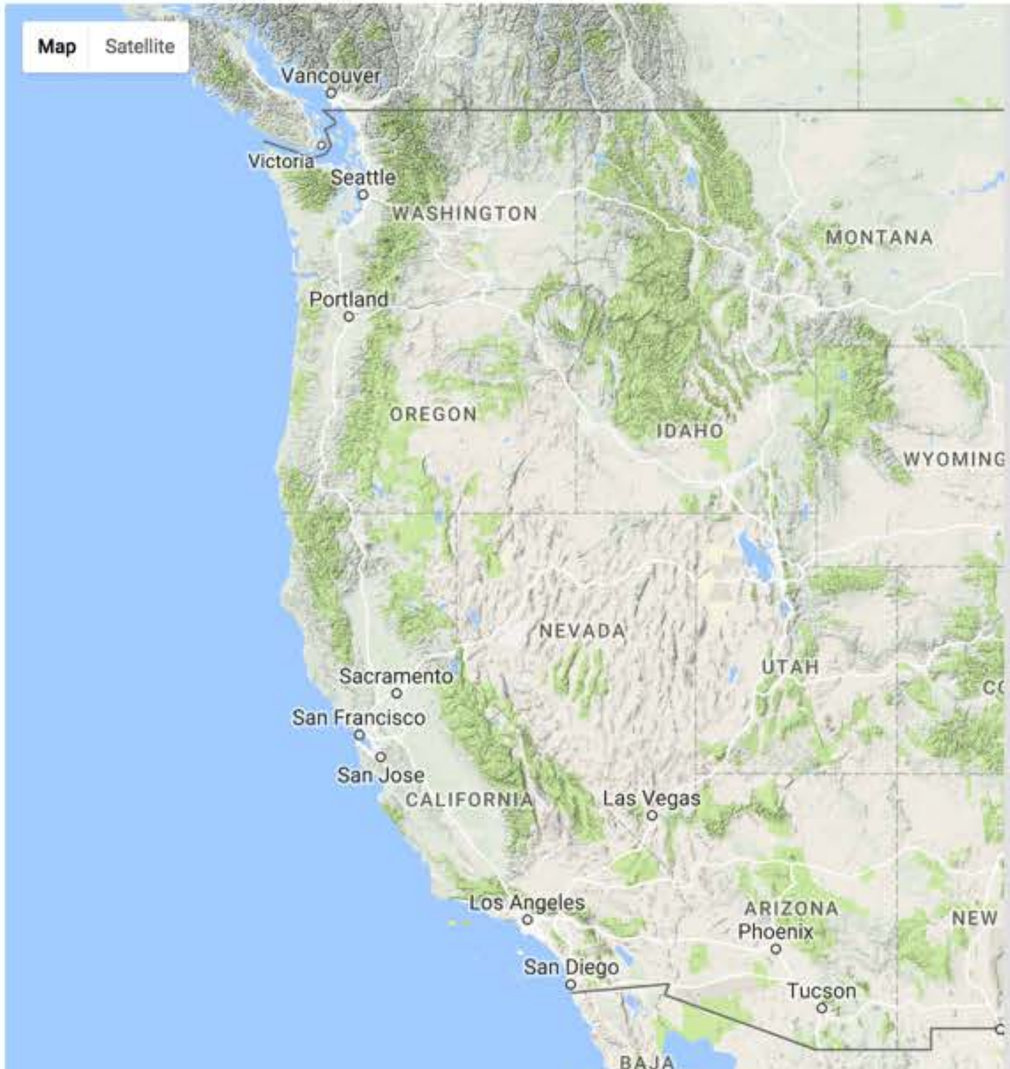
MS
LA
AR
OK
KS
MO
CO
UT
NV
AZ
NM
TX
United States
Mexico
Gulf of Mexico
Cuba
Puerto Rico
Caribbean Sea
Guatemala
Nicaragua
Venezuela
Guyana
HI

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source: UNAVCO, NAM08: North America

☑ **Display vectors**

Vector color: blue

Vector length (scaling): 1x

☐ **Station labels and data download**

☐ **Display error ellipses**

☐ **Display vertical rates**

How many markers displayed: Show one in ten

More types of data

☐ **Display volcanic centers**

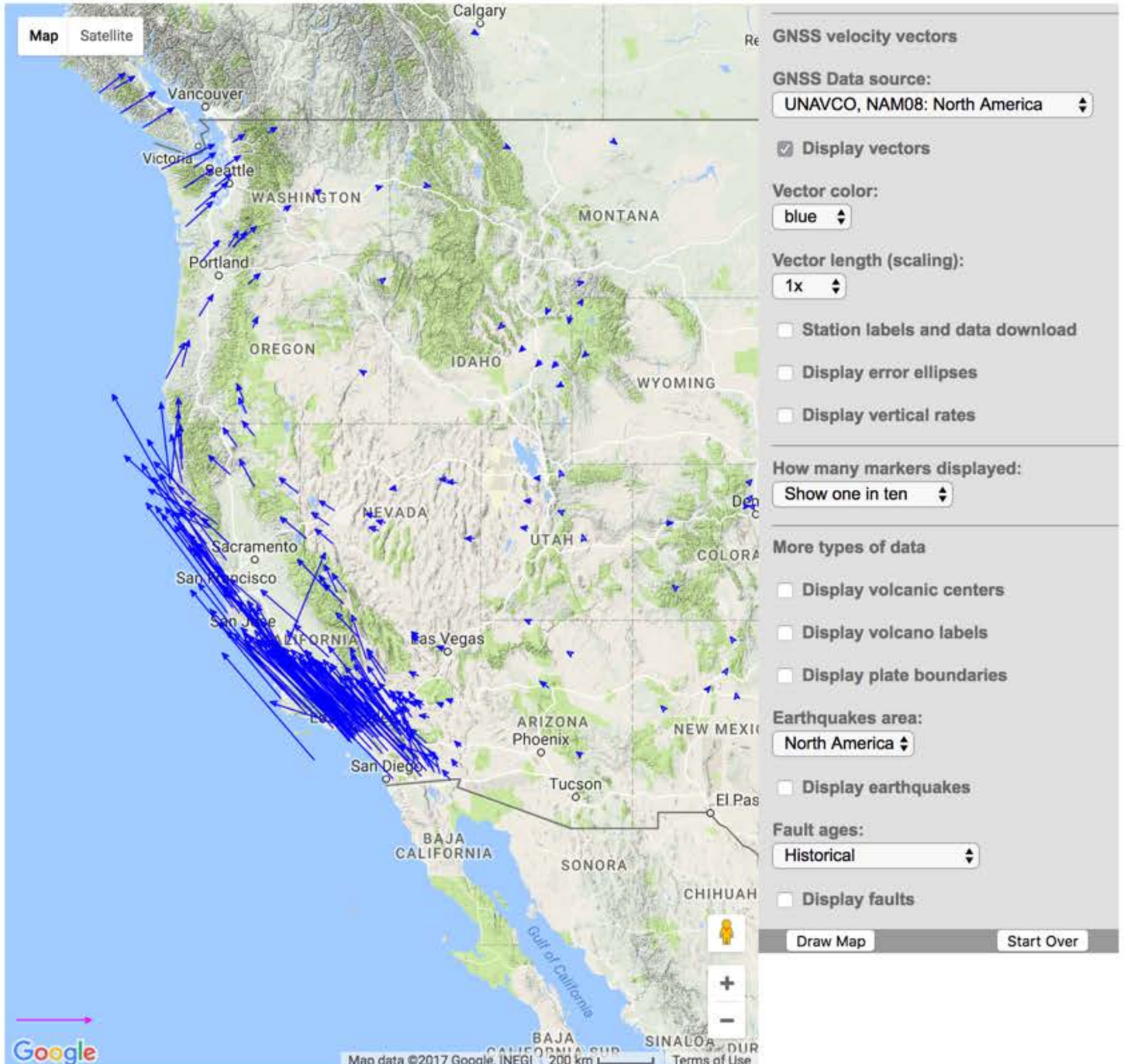
☐ **Display volcano labels**

☐ **Display plate boundaries**

Earthquakes area: North America

☐ **Display earthquakes**

GPS Velocity Viewer



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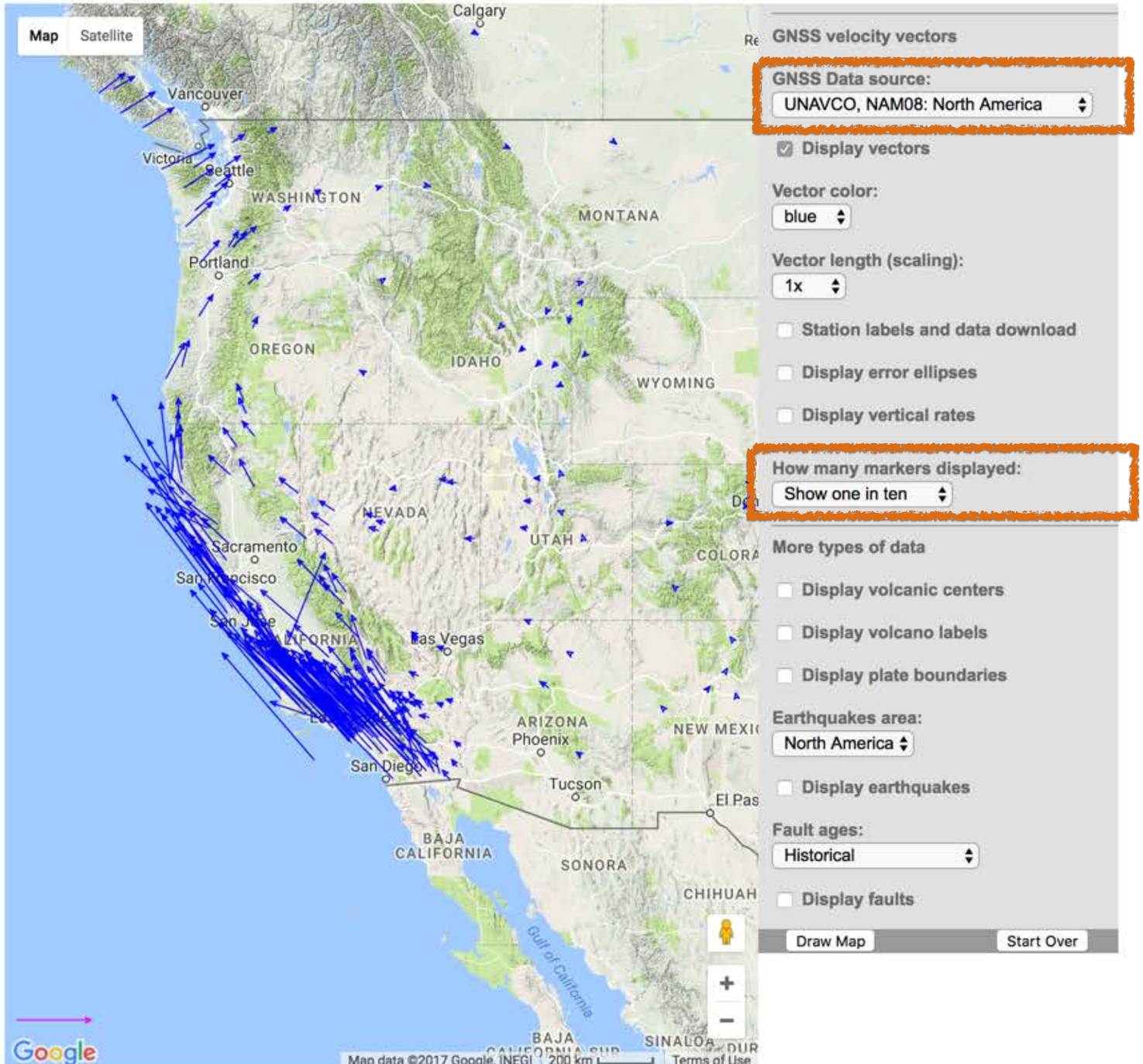

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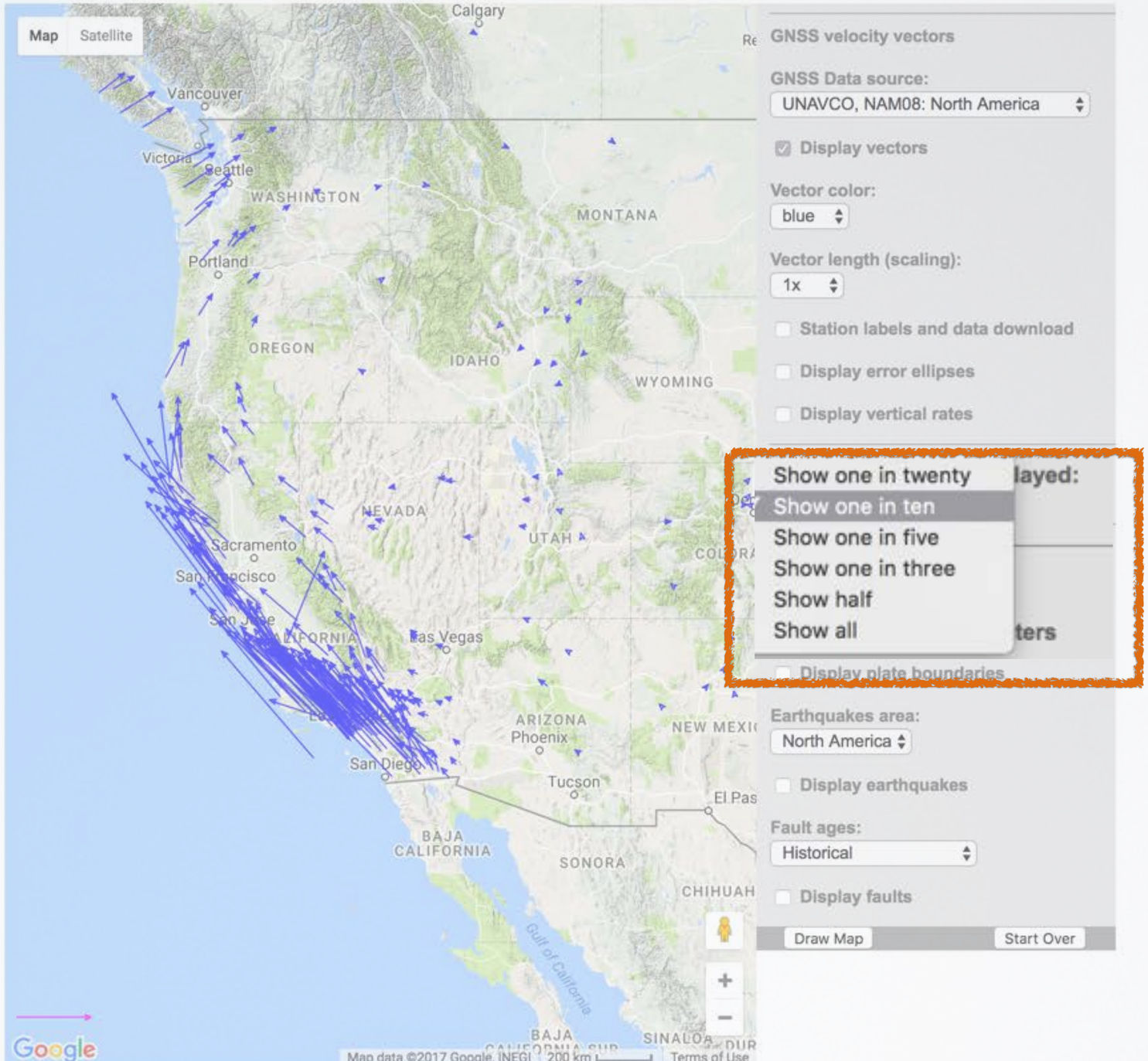

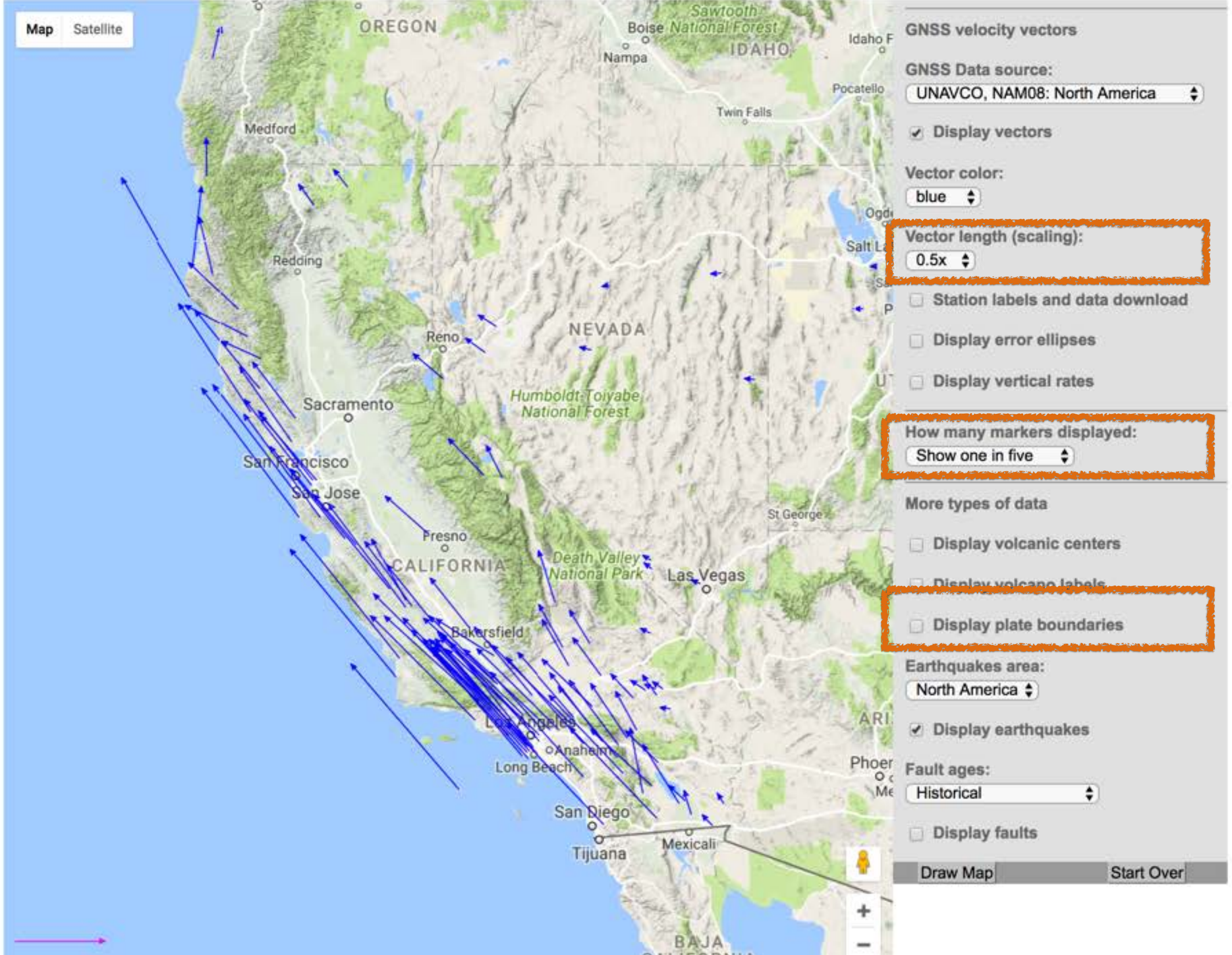
Map
Satellite
OREGON
IDAHO
NEVADA
CALIFORNIA
Boise
Nampa
Sawtooth National Forest
Idaho F
Pocatello
Twin Falls
Medford
Redding
Reno
Sacramento
San Francisco
San Jose
Humboldt-Toiyabe National Forest
Presno
Death Valley National Park
Las Vegas
St George
Bakersfield
Los Angeles
Anaheim
Long Beach
San Diego
Tijuana
Mexicali
BAJA
GNSS velocity vectors
GNSS Data source:
UNAVCO, NAM08: North America
Display vectors
Vector color:
blue
Vector length (scaling):
0.5x
Station labels and data download
Display error ellipses
Display vertical rates
How many markers displayed:
Show one in five
More types of data
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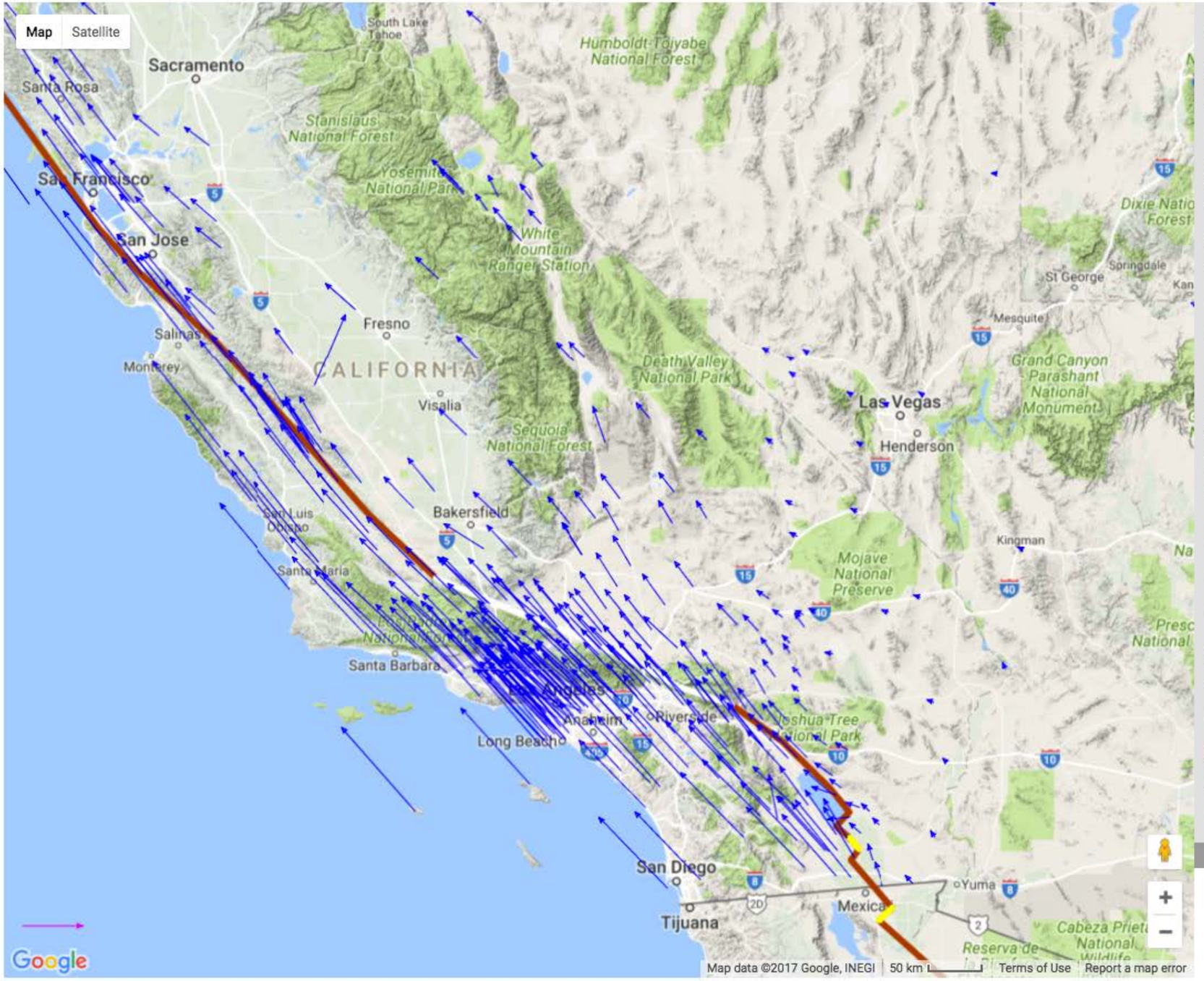
Display plate boundaries
Earthquakes area:
North America
Display earthquakes
Fault ages:
Historical
Display faults
Draw Map
Start Over

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source:
UNAVCO, NAM08: North America

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Draw Map | Start Over

Key

GNSS data symbols:

Velocity vectors:

Velocity vector and error ellipse

25 mm/vear speed scale

Vertical speeds:

Other symbols:

Earthquakes:

Eq mags 3 to 7:

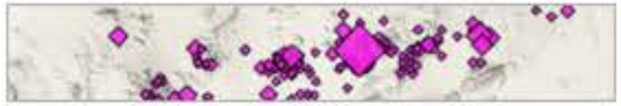
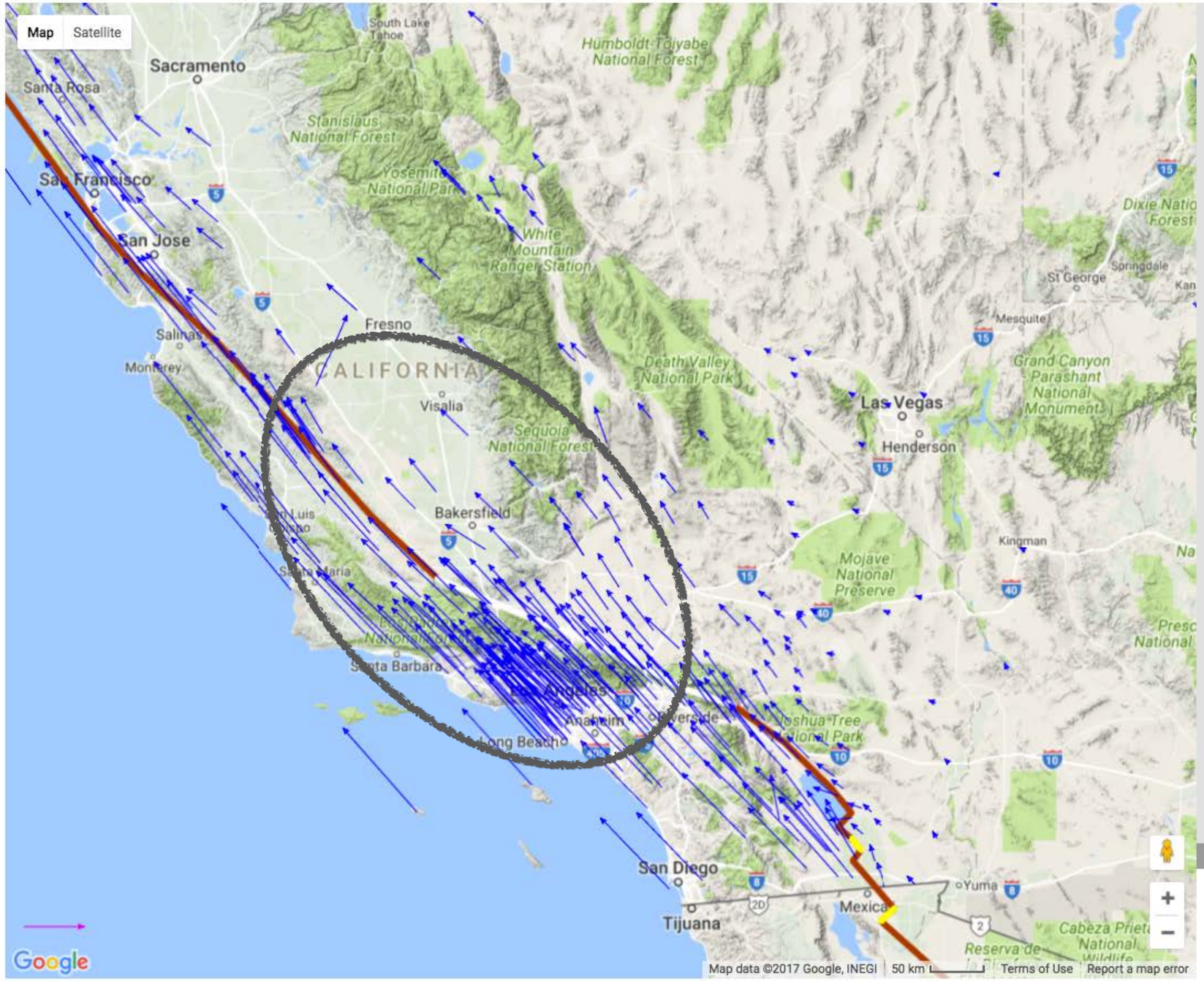


Plate Boundaries:

Fault ages:

Volcanoes:

GPS Velocity Viewer



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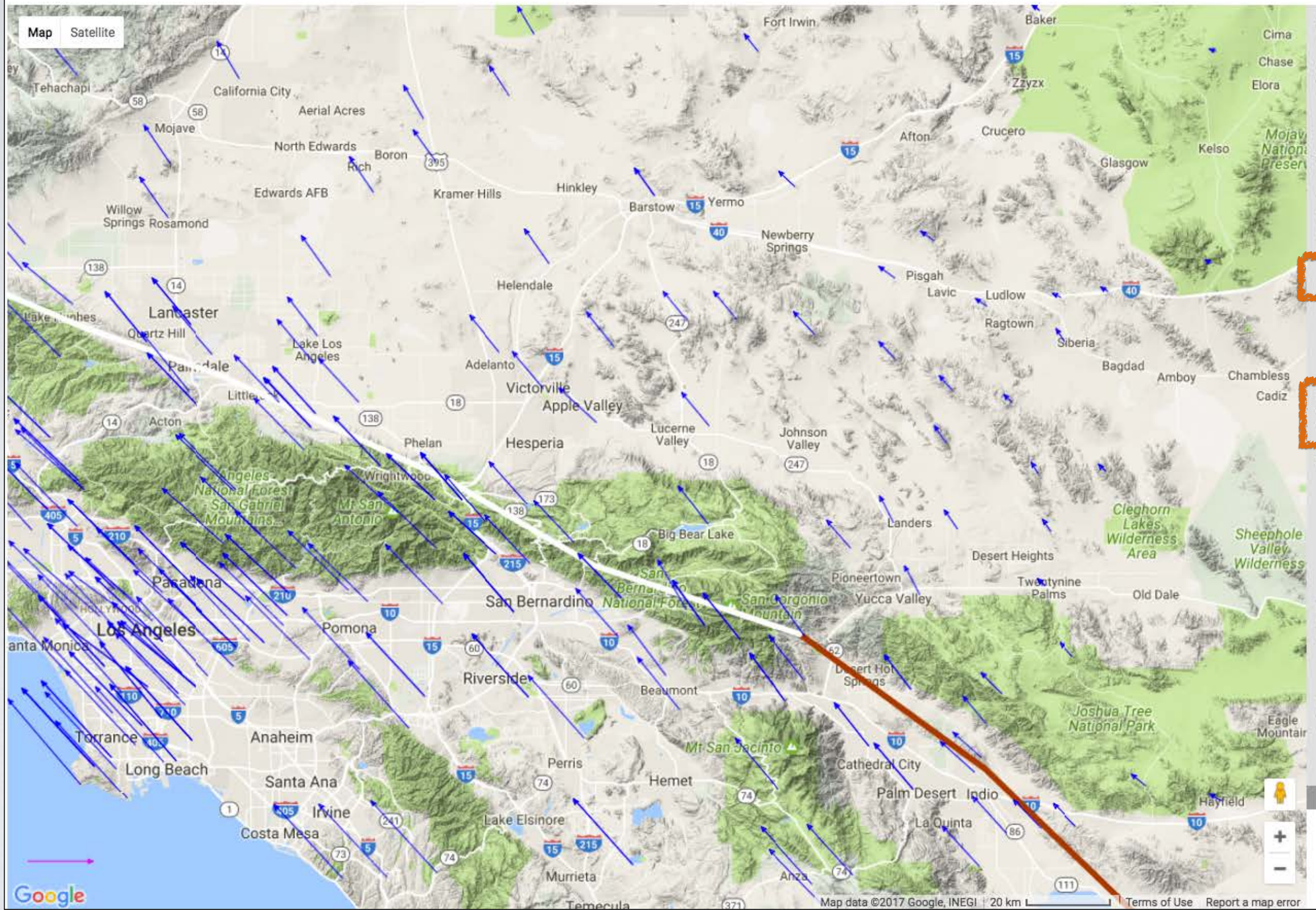

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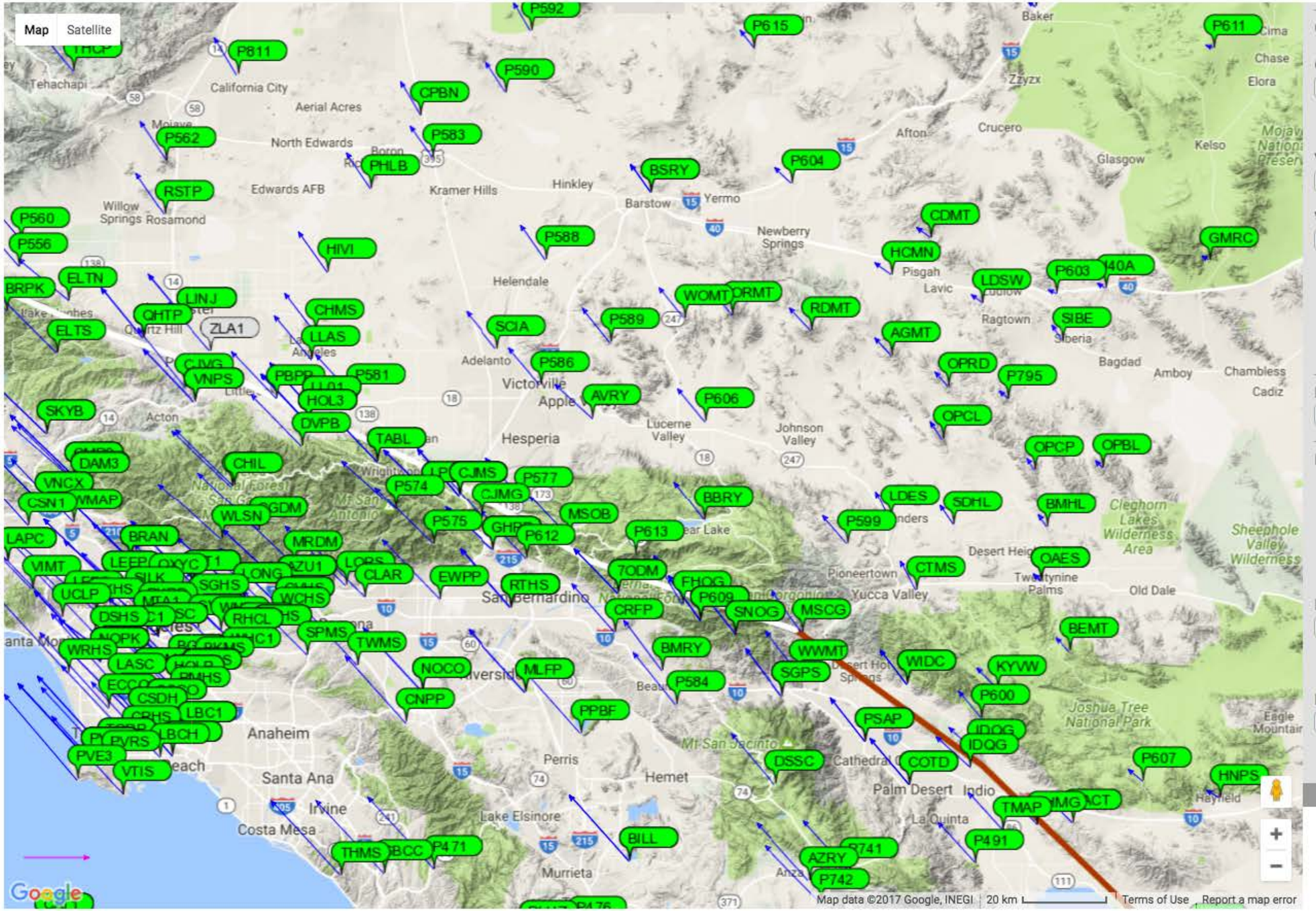

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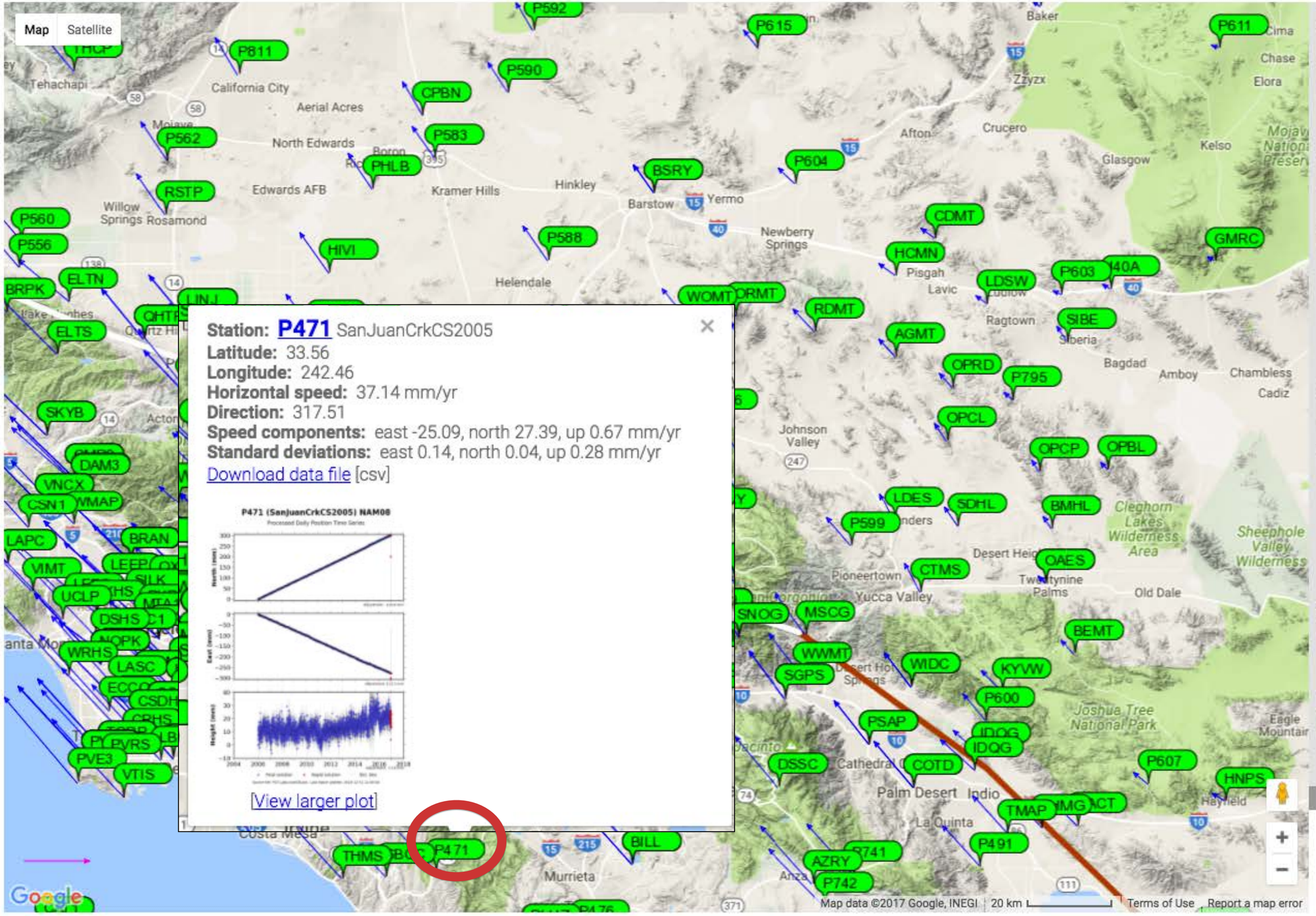

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More types of data

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- [x] Display plate boundaries

Earthquakes area: North America

- [ ] Display earthquakes

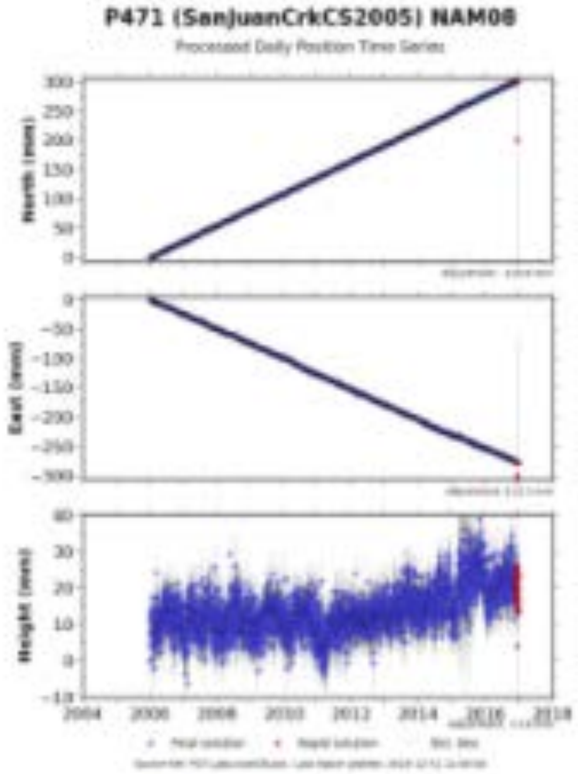
Fault ages: Historical

- [ ] Display faults

Draw Map | Start Over

Station: P471 SanJuanCrkCS2005
Latitude: 33.56
Longitude: 242.46
Horizontal speed: 37.14 mm/yr
Direction: 317.51
Speed components: east -25.09, north 27.39, up 0.67 mm/yr
Standard deviations: east 0.14, north 0.04, up 0.28 mm/yr

Download data file [csv]



[View larger plot]

GNSS velocity vectors
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Start Over

Station: P471 SanJuanCrkCS2005

Latitude: 33.56

Longitude: 242.46

Horizontal sp

Direction: 31

Speed comp

Standard dev

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P471 (SanJuan

View la

GNSS velocity vectors

GNSS Data source:

UNAVCO, NAM08: North America

HOME | ABOUT | CONTACT | HELP

UNAVCO

Community | Projects | Instrumentation | Data | Software | Science | Education

home » instrumentation » networks » pbo » overview » P471

P471 - Overview | PBO Station Page

Overview | Data Products | Station Health | Maintenance | Photos

Instrumentation

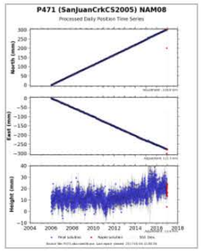
- Help with Instrumentation
- **Network Monitoring**
  - PBO Networks
    - PBO GPS Network
    - PBO Strainmeter Network
    - PBO Seismic Network
    - PBO Network State of Health
    - PBO Network Maintenance
  - Polar Networks
    - ANET
    - GNET
    - Polar Networks State of Health
  - NASA-GGN
  - COCONet
  - TLALOCNet
  - Real-Time GPS Subnets
    - PBO GPS
    - COCONet
    - TLALOCNet
  - Principal Investigator Stations

Related Links

- *PBO Project Overview*

P471 Station Overview

Station Position



Station Type: GPS

Station Information

Station Status:	**Installed/Operable**
Station ID:	P471
Station Name:	SanJuanCrkCS2005
Location (City, State):	San Juan Capistrano, CA
Monument Type:	DDBM
Station Install Date:	2005-07-27

Station Data

IGS Site Log:	Text File
Installation Report:	BIRT Report
Time Series Data:	NAM08 CSV | IGS08 CSV
Time Series Plot Viewer:	Nearby GPS Plots
Realtime Dataflow:	Available
Meteorologic Plots:	**Not Available**

Colocated Instruments

None

Nearby Stations Map

Local Weather Data

METAR: KL10	**DATE:** unavailable
COND: unavailable	**TEMP:** unavailable
HUMIDITY: unavailable	**WIND:** unavailable

GPS Monument Coordinates

Approximate Geographic Coordinates

lat/lon/elev (d/d/m)*:	33.56213	-117.54087	175

IGS08 Reference Frame

X/Y/Z (m/m/m):	-2460056.9654	-4717506.8045	3506174.8721
Ref Epoch:**	2016.434		

*Approximate latitude and longitude are in decimal degrees and elevation is in meters, where "elevation" is the vertical topocentric distance from the reference ellipsoid to the antenna reference point (ARP). See CORS for legal positions.

** Station position based on the most recent full 7 days of final orbit solutions available, with the reported epoch being the middle day of this 7 day period.

Station: P471 SanJuanCrkCS2005

Latitude: 33.56

Longitude: 242.46

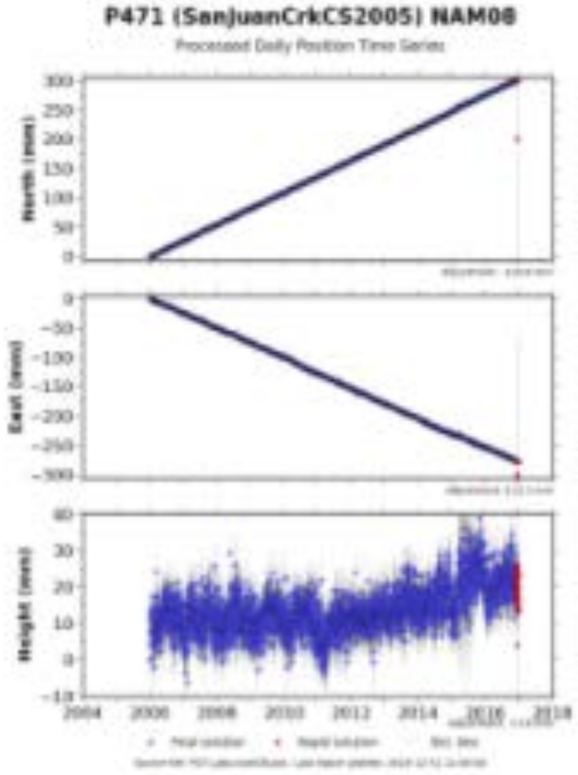
Horizontal speed: 37.14 mm/yr

Direction: 317.51

Speed components: east -25.09, north 27.39, up 0.67 mm/yr

Standard deviations: east 0.14, north 0.04, up 0.28 mm/yr

Download data file [csv]



[View larger plot]

GNSS velocity vectors

GNSS Data source: UNAVCO, NAM08: North America

Display vectors

Vector color: blue

Vector length (scaling): 0.5x

Station labels and data download

Display error ellipses

Display vertical rates

How many markers displayed: Show one in three

More types of data

Display volcanic centers

Display volcano labels

Display plate boundaries

Earthquakes area: North America

Display earthquakes

Fault ages: Historical

Display faults

Draw Map | Start Over

Station: P471 SanJuanCrkCS2005
Latitude: 33.56
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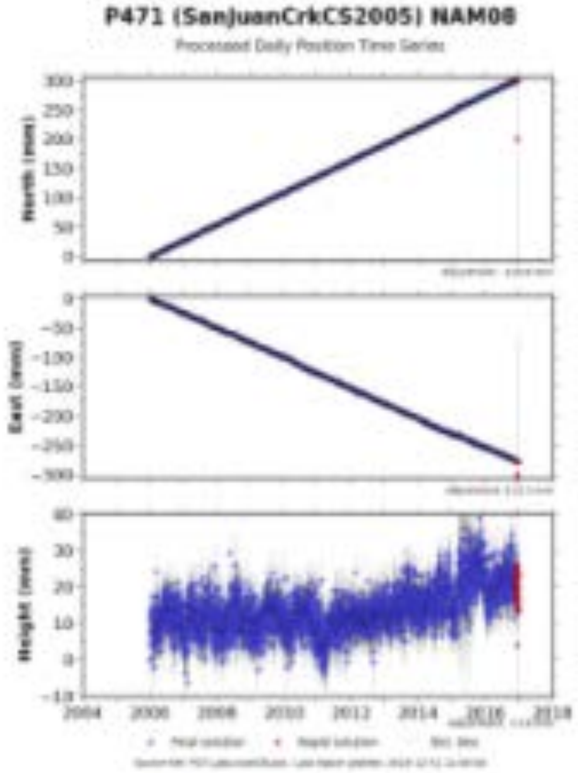
Download data file [csv]



[View larger plot]

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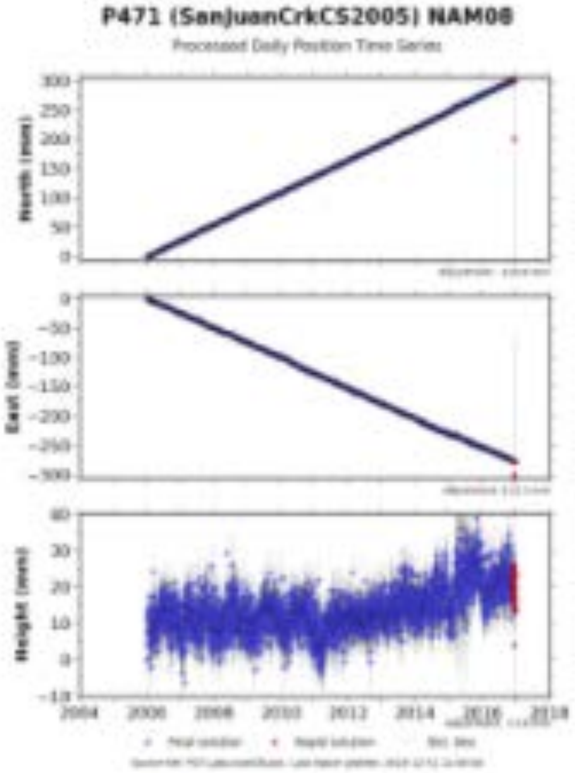

[View larger plot]

GNSS velocity vectors
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Vector length (scaling): 0.5x
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Display faults
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GPS Velocity Viewer

Station: P471 SanJuanCrkCS2005

Latitude: 33.56

Longitude: 242.46

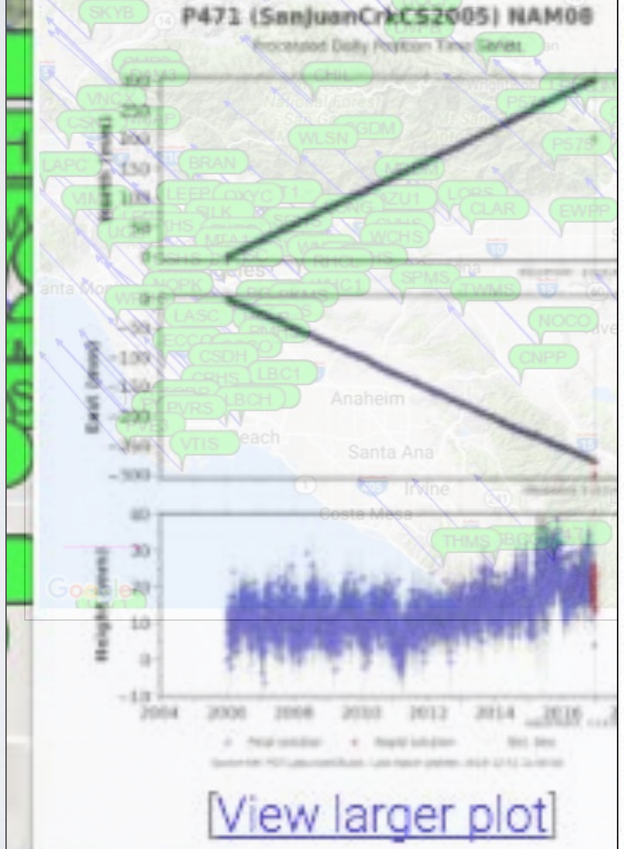
Horizontal speed: 37.14

Direction: 317.51

Speed components: eas

Standard deviations: ea

Download data file [csv]



[View larger plot]

```
PBO Station Position Time Series.
Format Version, 1.2.0
Reference Frame, NAM08
4-character ID, P471
Station name, SanJuanCrkCS2005
Begin Date, 2006-01-10
End Date, 2017-01-06
Release Date, 2017-01-08
Source file, P471.pbo.nam08.pos
Offset from source file, 120.78 mm North, -112.26 mm East, 11.58 mm Vertical
Reference position, 33.5621253085 North Latitude, -117.5408655946 East Longitude,
174.76550 meters elevation
Date, North (mm), East (mm), Vertical (mm), North Std. Deviation (mm), East Std.
Deviation (mm), Vertical Std. Deviation (mm), Quality,
2006-01-10,0.00, 0.00, 0.00, 3.5, 3.39, 15.71, repro,
2006-01-11,1.48, 0.05, 11.04, 1.4, 1.26, 5.33, repro,
2006-01-12,0.40, -0.52, 13.82, 1.23, 1.12, 4.69, repro,
2006-01-13,0.46, -0.69, 11.89, 1.22, 1.11, 4.7, repro,
2006-01-14,-0.66, -0.60, 4.19, 1.59, 1.44, 6.07, repro,
2006-01-15,0.21, -1.51, 13.31, 1.44, 1.31, 5.46, repro,
2006-01-16,-0.20, -1.26, 12.53, 1.47, 1.33, 5.59, repro,
2006-01-17,1.05, -0.48, 8.09, 1.31, 1.22, 4.95, repro,
2006-01-18,0.72, -0.88, 11.12, 1.38, 1.24, 5.31, repro,
2006-01-19,1.86, -0.96, 10.42, 1.54, 1.39, 5.89, repro,
2006-01-20,1.23, -1.30, 6.49, 1.25, 1.13, 4.76, repro,
2006-01-21,0.94, -1.16, 9.97, 1.15, 1.04, 4.37, repro,
2006-01-22,1.07, -1.71, 7.30, 1.21, 1.08, 4.57, repro,
2006-01-23,1.26, -0.08, 4.57, 1.3, 1.15, 4.87, repro,
2006-01-24,1.79, 1.75, 7.66, 1.39, 1.26, 5.29, repro,
2006-01-25,1.47, -2.54, 11.97, 1.85, 1.77, 7.91, repro,
2006-01-26,1.69, -1.07, 0.84, 1.33, 1.23, 5.11, repro,
2006-01-27,1.64, -1.80, 7.76, 1.29, 1.19, 4.98, repro,
2006-01-28,2.27, -1.70, 9.01, 1.25, 1.15, 4.83, repro,
2006-01-29,1.17, -1.69, 3.71, 1.31, 1.19, 5.02, repro,
2006-01-30,1.74, -1.59, 6.89, 1.27, 1.16, 4.9, repro,
2006-01-31,1.65, -1.07, 13.41, 1.45, 1.31, 5.53, repro,
2006-02-01,1.61, -2.78, 17.08, 1.32, 1.21, 5.12, repro,
2006-02-02,2.36, -2.83, 8.62, 1.24, 1.13, 4.76, repro,
2006-02-03,1.87, -2.36, 10.30, 1.25, 1.14, 4.82, repro,
2006-02-04,2.35, -2.84, 8.71, 1.24, 1.12, 4.77, repro,
2006-02-05,2.35, -3.60, 8.89, 1.36, 1.23, 5.28, repro,
2006-02-06,2.65, -3.03, 10.68, 1.23, 1.12, 4.79, repro,
2006-02-07,1.99, -2.84, 8.37, 1.15, 1.04, 4.49, repro,
```

GNSS velocity vectors

GNSS Data source:

UNAVCO, NAM08: North America

Station: P471 SanJuanCrkCS2005
Latitude: 33.56
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Horizontal speed: 37.14 mm/yr
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Speed components: east -25.09, north 27.39, up 0.67 mm/yr
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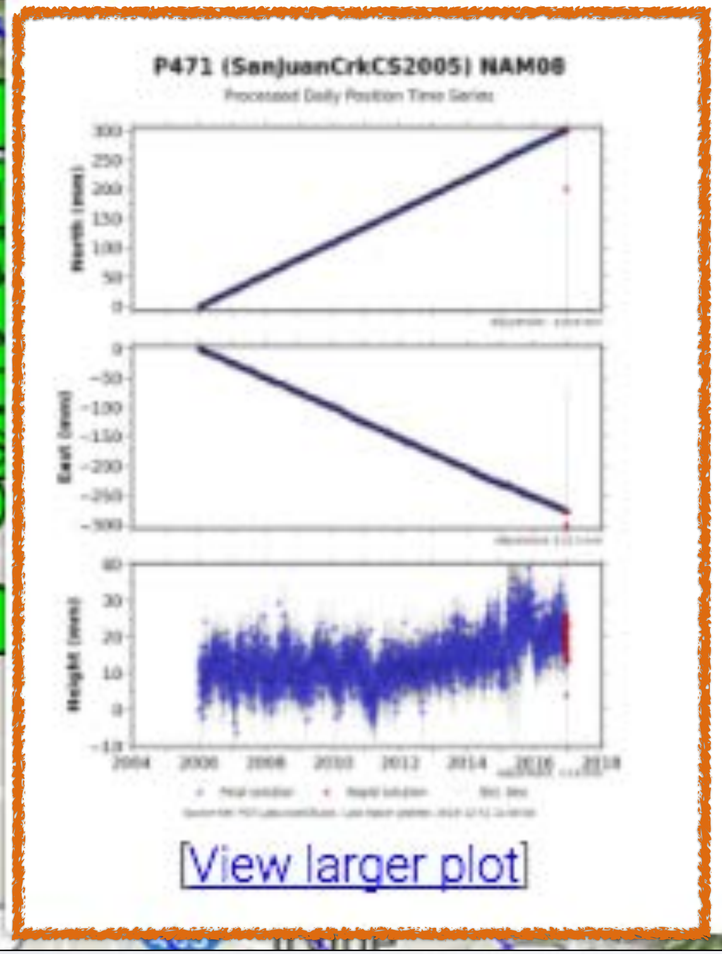
Download data file [csv]



[View larger plot]

GNSS velocity vectors
GNSS Data source: UNAVCO, NAM08: North America
Display vectors
Vector color: blue
Vector length (scaling): 0.5x
Station labels and data download
Display error ellipses
Display vertical rates
How many markers displayed: Show one in three
More types of data
Display volcanic centers
Display volcano labels
Display plate boundaries
Earthquakes area: North America
Display earthquakes
Fault ages: Historical
Display faults
Draw Map
Start Over

GPS Velocity Viewer

Station: P471 SanJuanCrkCS2005

Latitude: 33.56

Longitude: 242.46

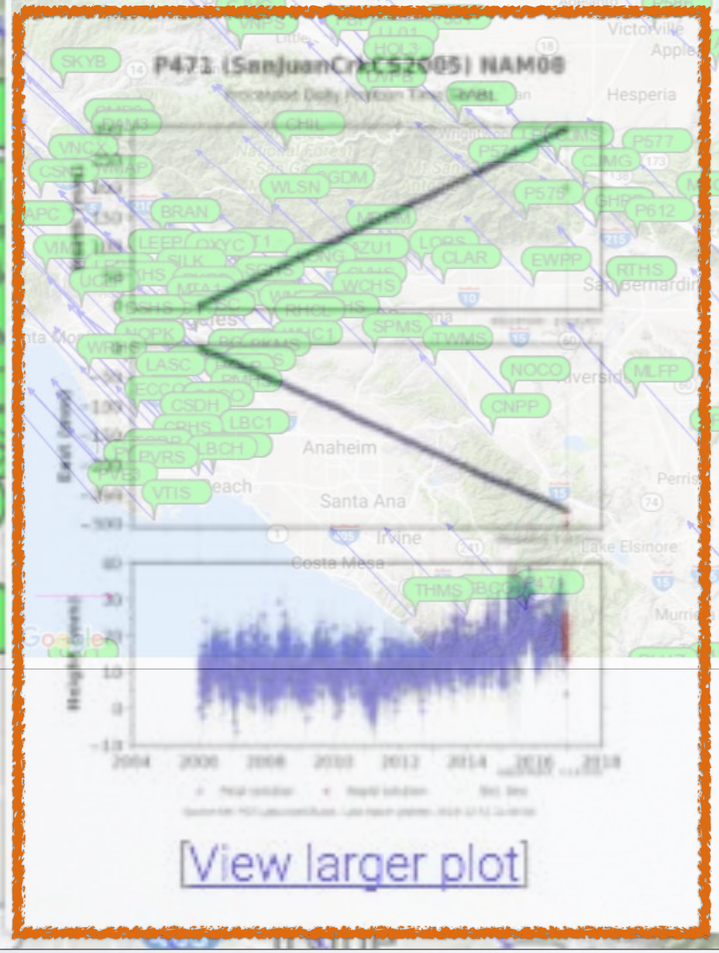
Horizontal speed: 37.14 mm/yr

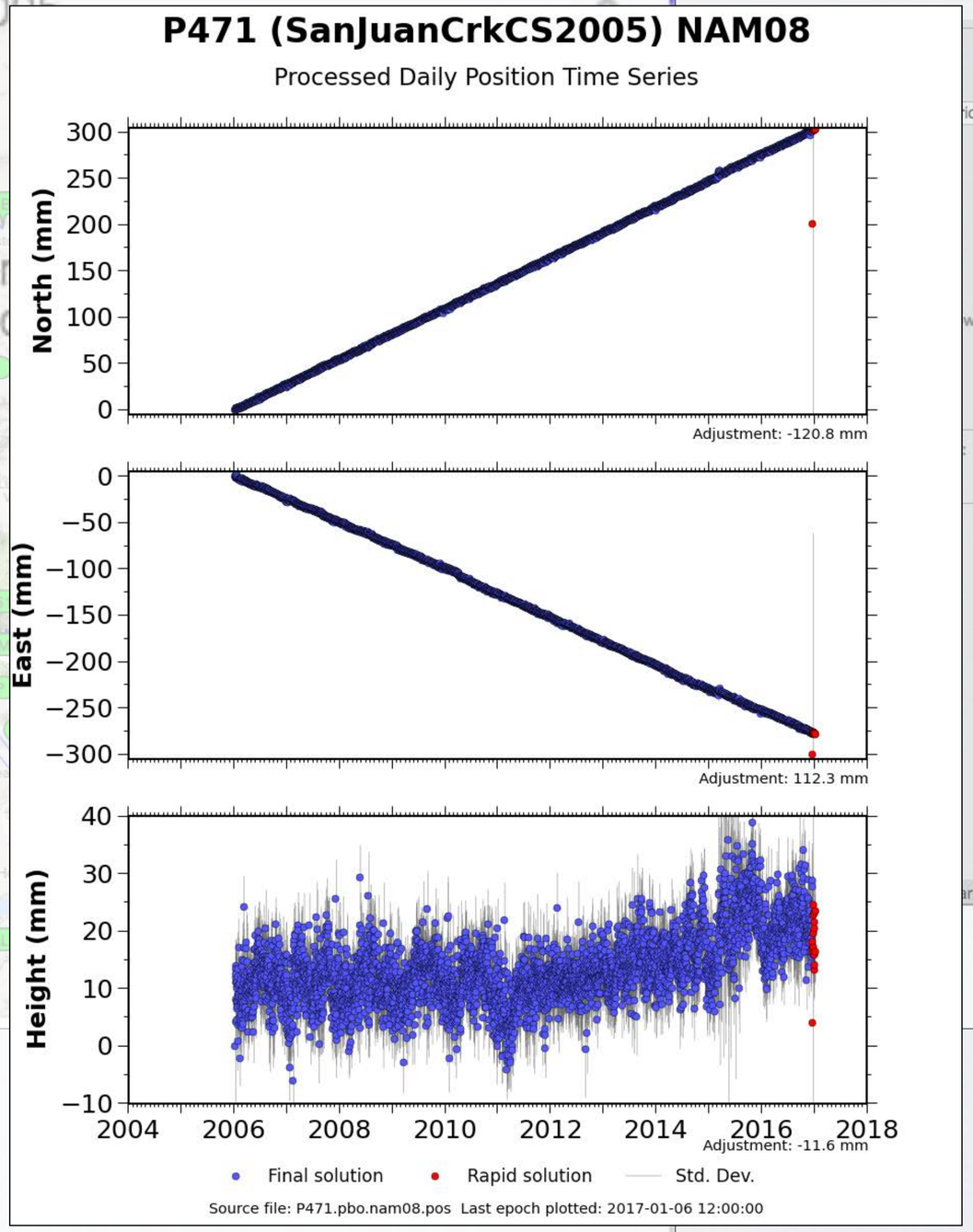
Direction: 317.51

Speed components: east -25.09, n

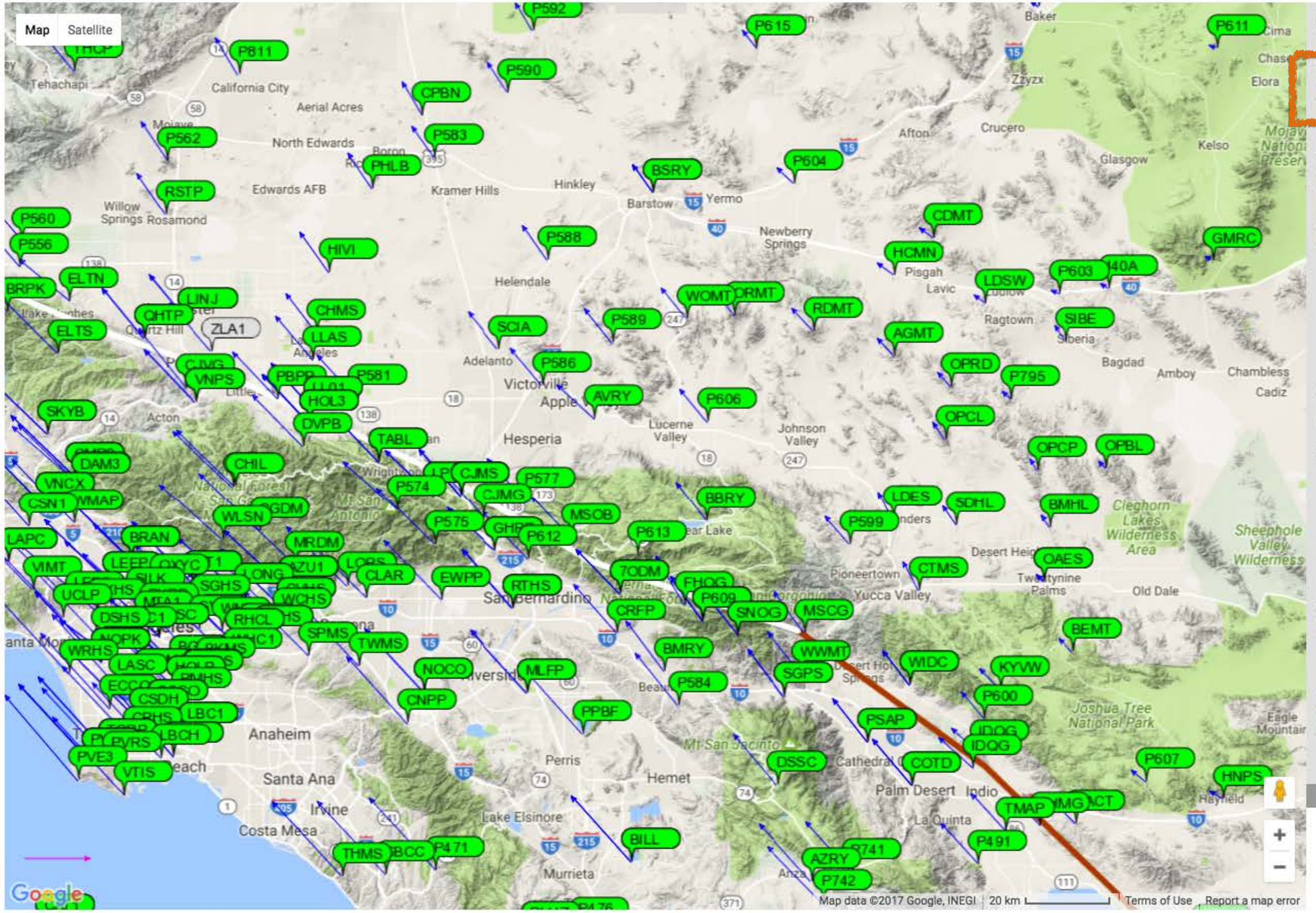
Standard deviations: east 0.14, n

Download data file [csv]





GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source:
UNAVCO, NAM08: North America

Vector color:
blue

Vector length (scaling):
0.5x

- [x] Station labels and data download
- [ ] Display error ellipses
- [ ] Display vertical rates

How many markers displayed:
Show one in three

More types of data

- [ ] Display volcanic centers
- [ ] Display volcano labels
- [x] Display plate boundaries

Earthquakes area:
North America

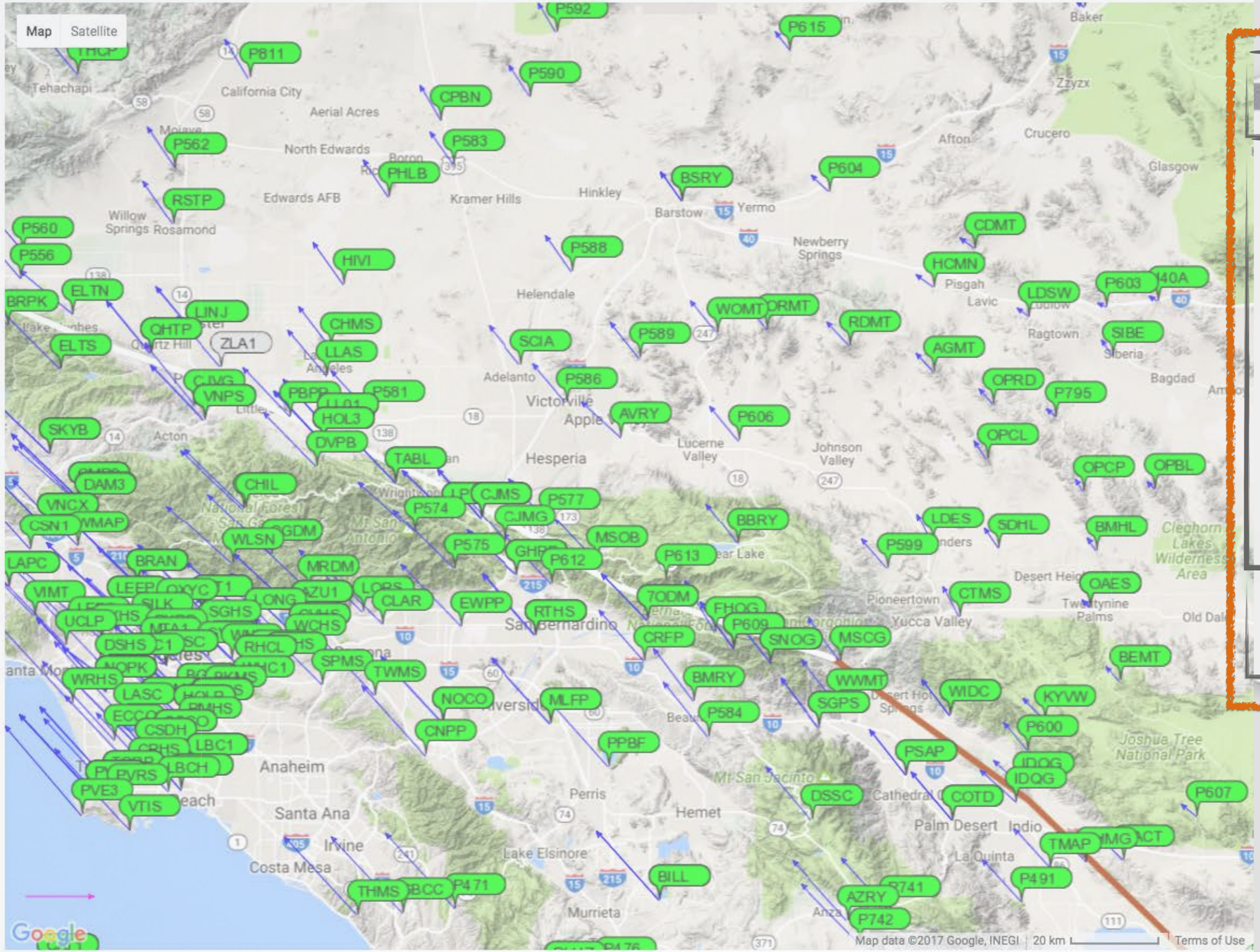
- [ ] Display earthquakes

Fault ages:
Historical

- [ ] Display faults

Draw Map | Start Over

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source:

- ✓ UNAVCO, NAM08: North America
- UNAVCO, IGS08: no net rotation
- GEM GSRM No net rotation
- GEM GSRM Africa
- GEM GSRM Antarctica
- GEM GSRM Arabia
- GEM GSRM Australia
- GEM GSRM Caribbean
- GEM GSRM Cocos
- GEM GSRM Eurasia
- GEM GSRM India
- GEM GSRM Juan de Fuca
- GEM GSRM Nazca
- GEM GSRM North America
- GEM GSRM Pacific
- GEM GSRM Philippine Sea
- GEM GSRM Scotia
- GEM GSRM South America
- GSRM model velocity global (IGS08)
- GSRM model velocity North American
- GSRM model velocity Pacific
- GSRM model velocity Juan de Fuca

☐ **Display volcano labels**

☐ **Display plate boundaries**

Earthquakes area:

North America ▲▼

☐ **Display earthquakes**

Fault ages:

DATA SOURCES & REFERENCE FRAMES

1. UNAVCO
   - NAM08 & IGS 08: IGS reference frames
   - Mostly United States, Caribbean, Greenland;
   - Downloadable processed data & time series plots

2. GEM GSREM:
   - Many regional reference frames
   - Worldwide coverage

3. GSRM model velocity
   - 4 reference frames available
   - Worldwide coverage
   - This is modeled data

GPS Velocity Viewer

Map Satellite

GNSS velocity vectors

GNSS Data source: GEM GSRM North America

Display vectors

Vector color: blue

Vector length (scaling): 1x

Station labels and data download

Display error ellipses

Display vertical rates

How many markers displayed: Show one in ten

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Display plate boundaries

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Display earthquakes

Fault ages: Historical

Display faults

Draw Map Start Over

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Station: P471 SanJuanCrkCS2005
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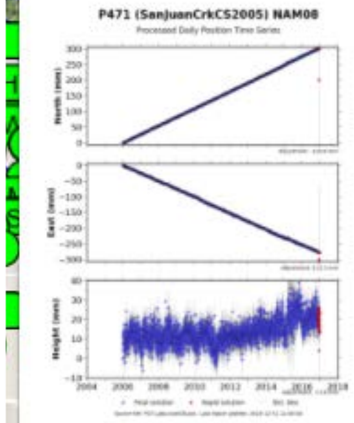
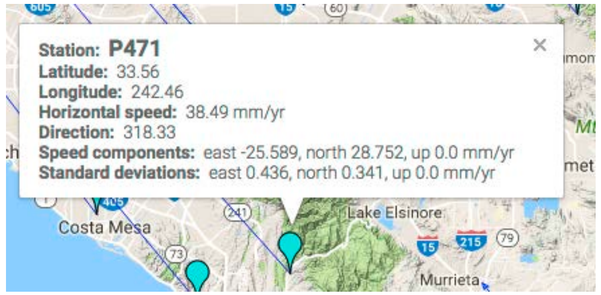


[View larger plot]

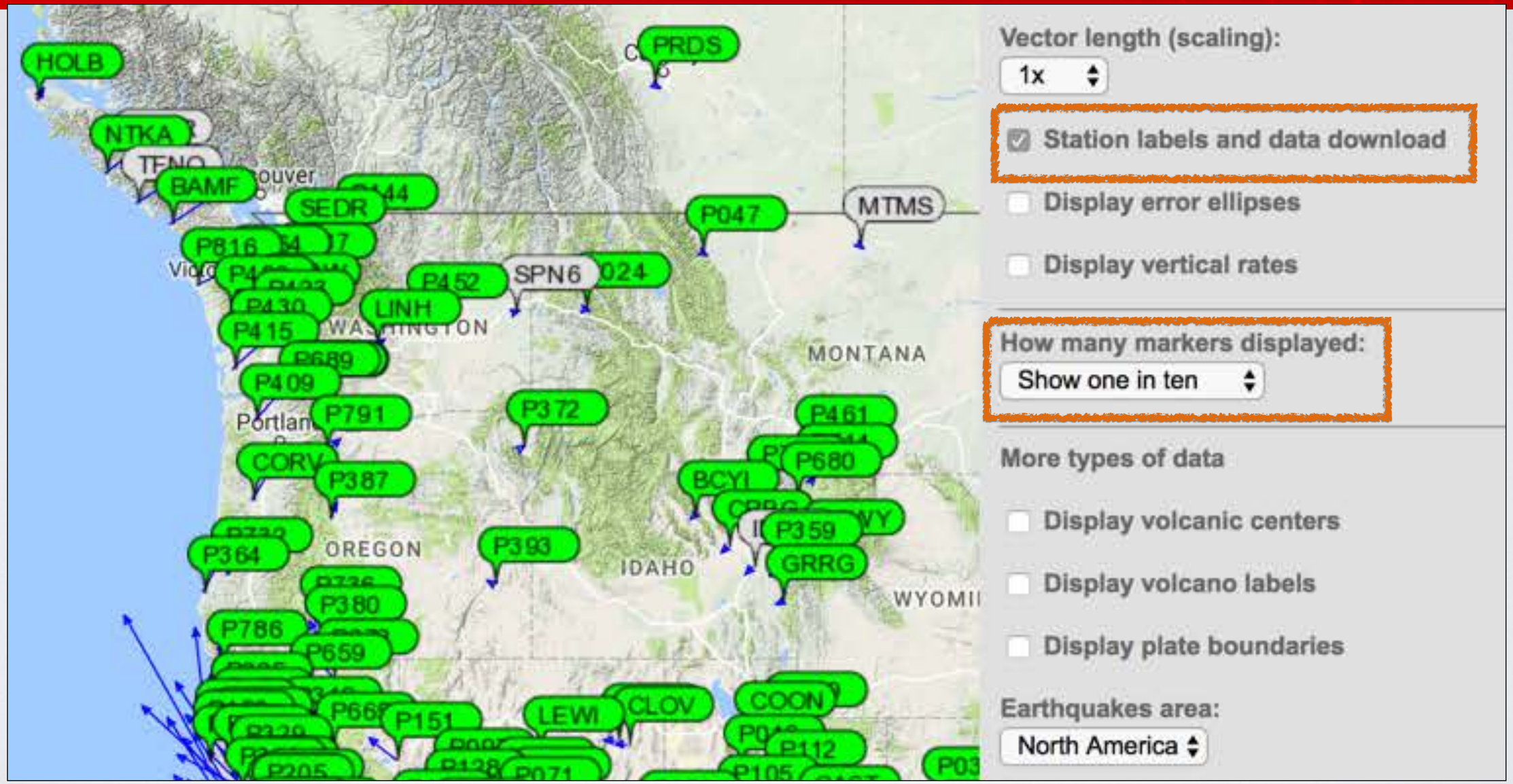
GEM GSRM Data:

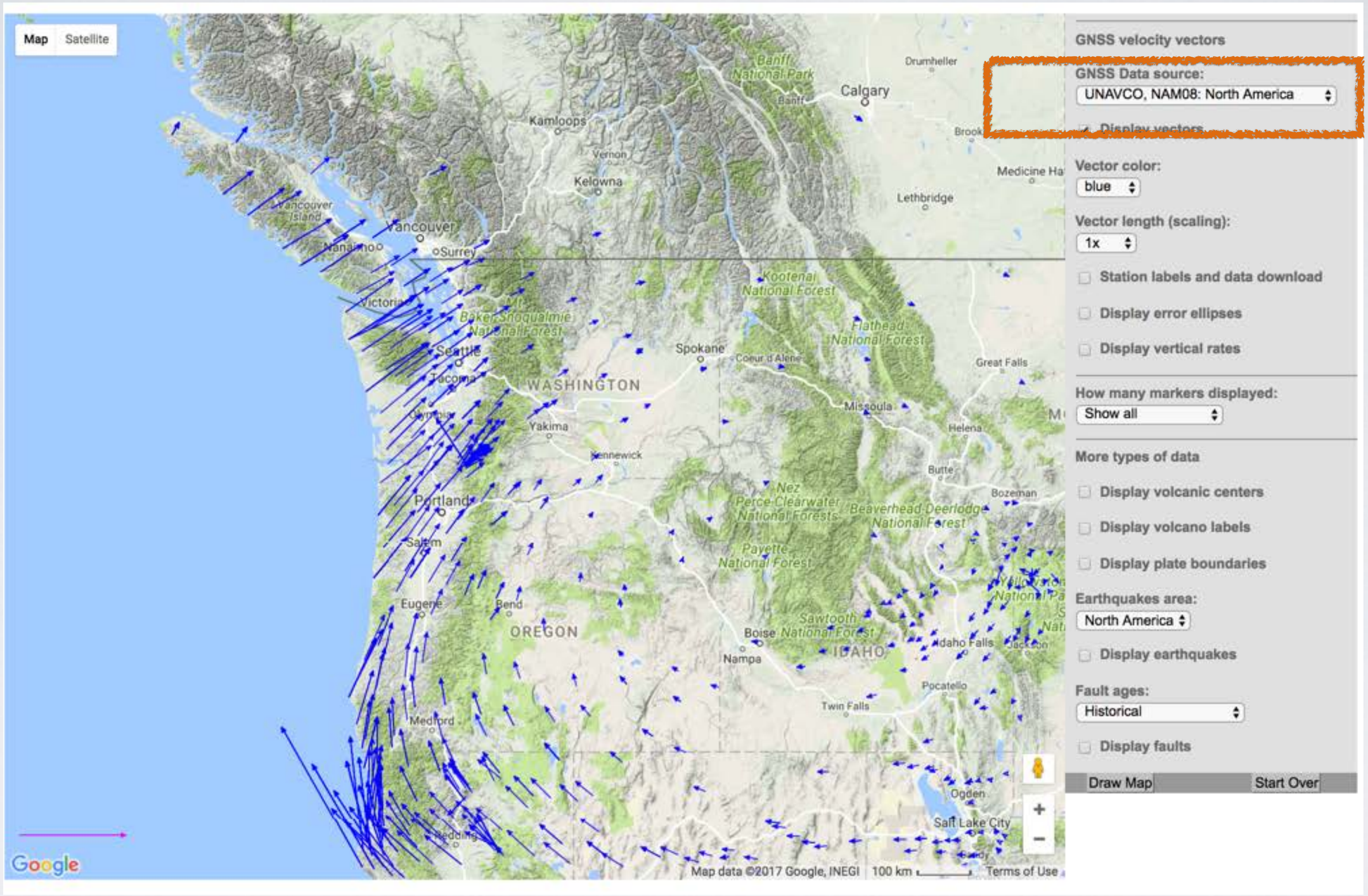


Station: P471
Latitude: 33.56
Longitude: 242.46
Horizontal speed: 38.49 mm/yr
Direction: 318.33
Speed components: east -25.589, north 28.752, up 0.0 mm/yr
Standard deviations: east 0.436, north 0.341, up 0.0 mm/yr

Map data ©2017 Google, INEGI 20 km Terms of Use Report a map error

MOVING TO CASCADIA




Map
Satellite
GNSS velocity vectors
GNSS Data source:
UNAVCO, NAM08: North America
Display vectors
Vector color:
blue
Vector length (scaling):
1x
Station labels and data download
Display error ellipses
Display vertical rates
How many markers displayed:
Show all
More types of data
Display volcanic centers
Display volcano labels
Display plate boundaries
Earthquakes area:
North America
Display earthquakes
Fault ages:
Historical
Display faults
Draw Map
Start Over
Banff National Park
Calgary
Drumheller
Kamloops
Vernon
Kelowna
Lethbridge
Vancouver Island
Vancouver
Nanaimo
Surrey
Victoria
Kootenai National Forest
Mt Baker-Snoqualmie National Forest
Flathead National Forest
Seattle
Tacoma
Spokane
Coeur d'Alene
Great Falls
WASHINGTON
Missoula
Olympia
Yakima
Helena
Kennewick
Butte
Nez Perce-Clearwater National Forests
Beaverhead-Deerlodge National Forest
Bozeman
Portland
Salem
Payette National Forest
Eugene
Bend
Sawtooth National Forest
Boise
Nampa
OREGON
IDAHO
Idaho Falls
Pocatello
Twin Falls
Medford
Ogden
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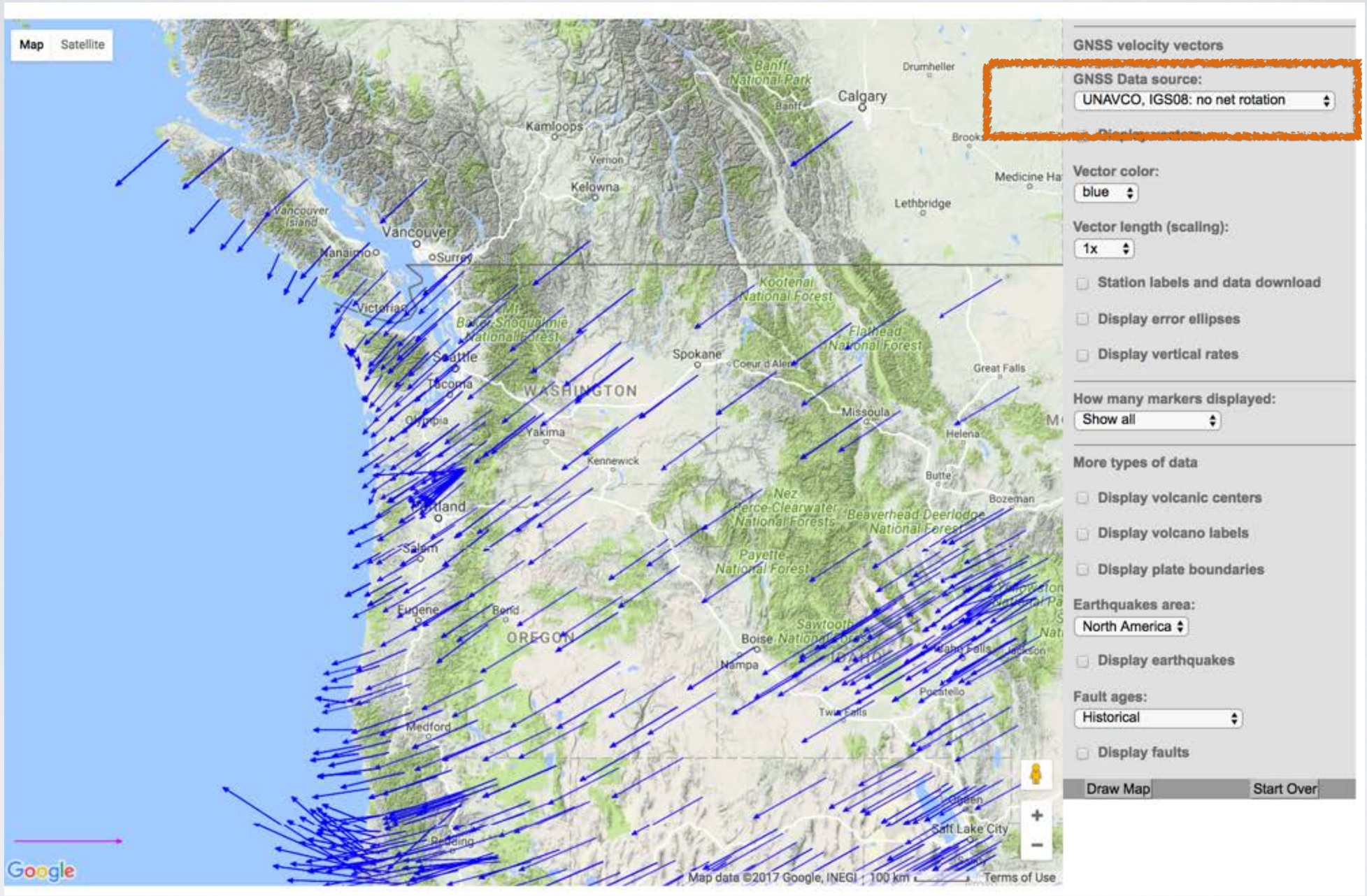
Map
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GNSS velocity vectors
GNSS Data source:
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Vector color:
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Vector length (scaling):
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Missoula
Great Falls
Helena
Butte
Bozeman
Boise
Salt Lake City
WASHINGTON
OREGON
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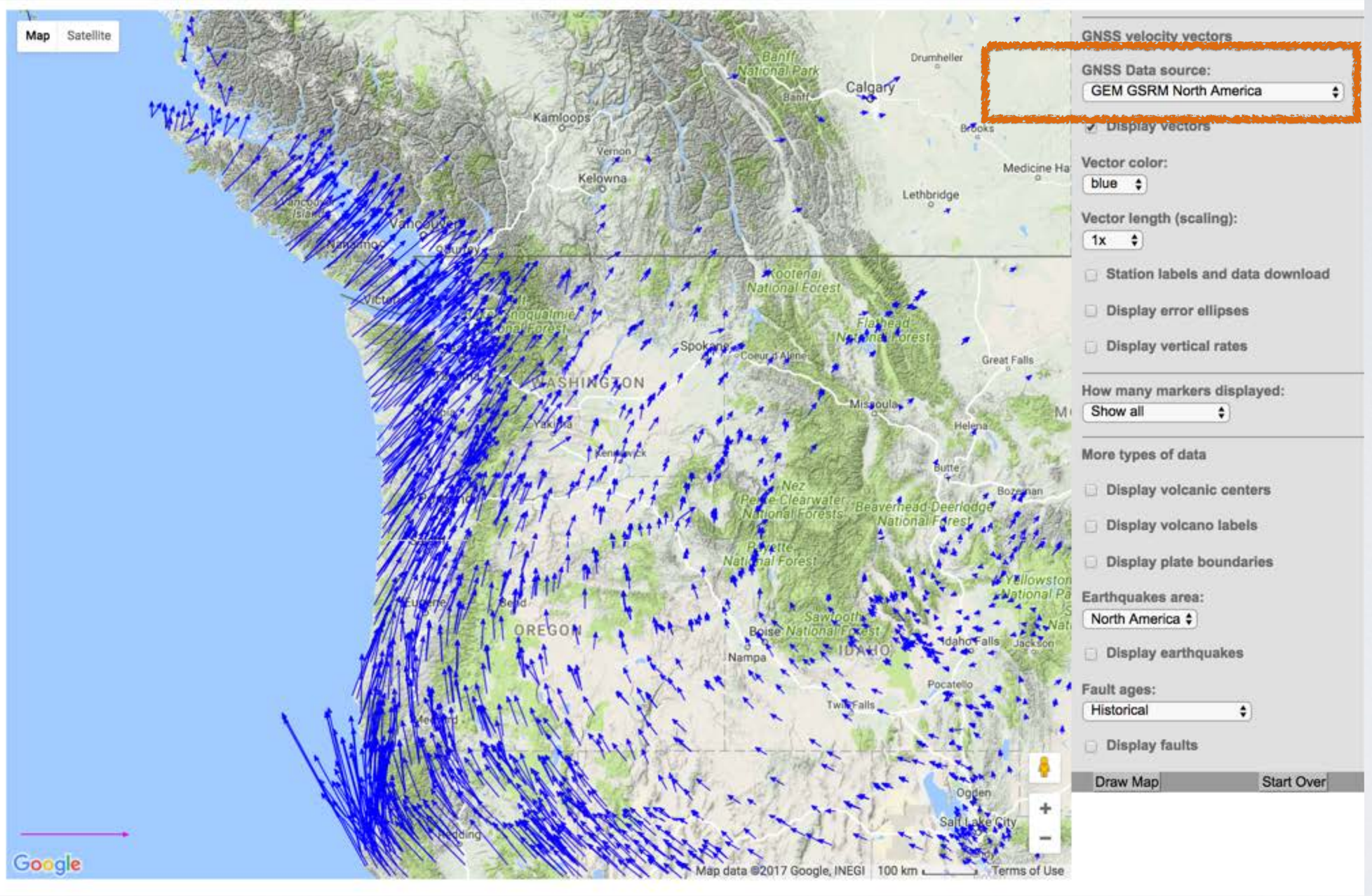
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Drumheller
Lethbridge
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Flathead National Forest
Spokane
Coeur d'Alene
Great Falls
WASHINGTON
Yakima
Missoula
Helena
Butte
Bozeman
Nez Perce-Clearwater National Forests
Beaverhead-Deerlodge National Forest
Yellowstone National Park
Eugene
Bend
OREGON
Boise National Forest
Sawtooth
IDAHO
Idaho Falls
Jackson
Nampa
Pocatello
Twin Falls
Ogden
Salt Lake City
Google
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100 km
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GNSS velocity vectors
GNSS Data source:
GEM GSRM North America
Display vectors
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Vector length (scaling):
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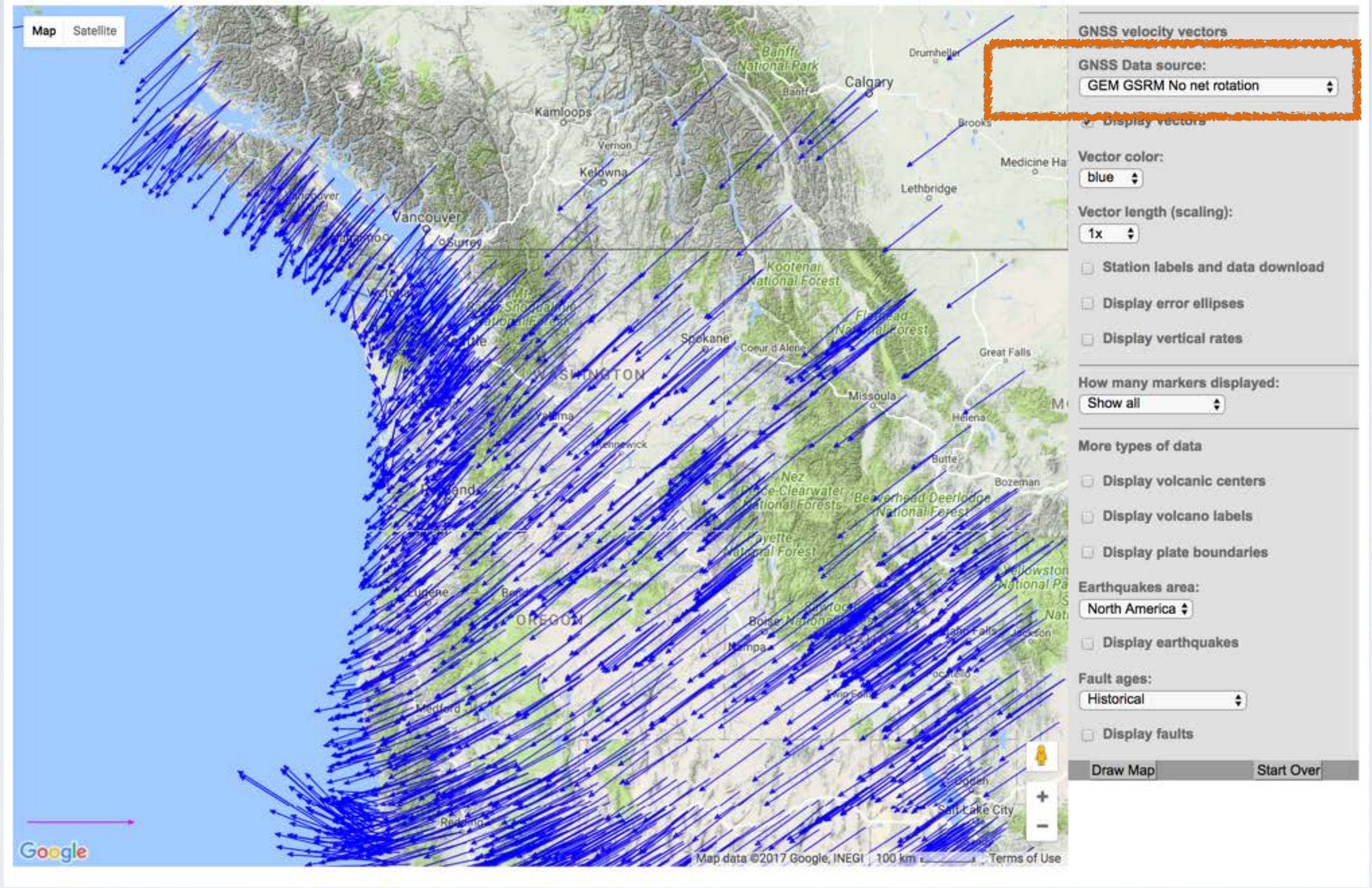
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Bozeman
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Boise
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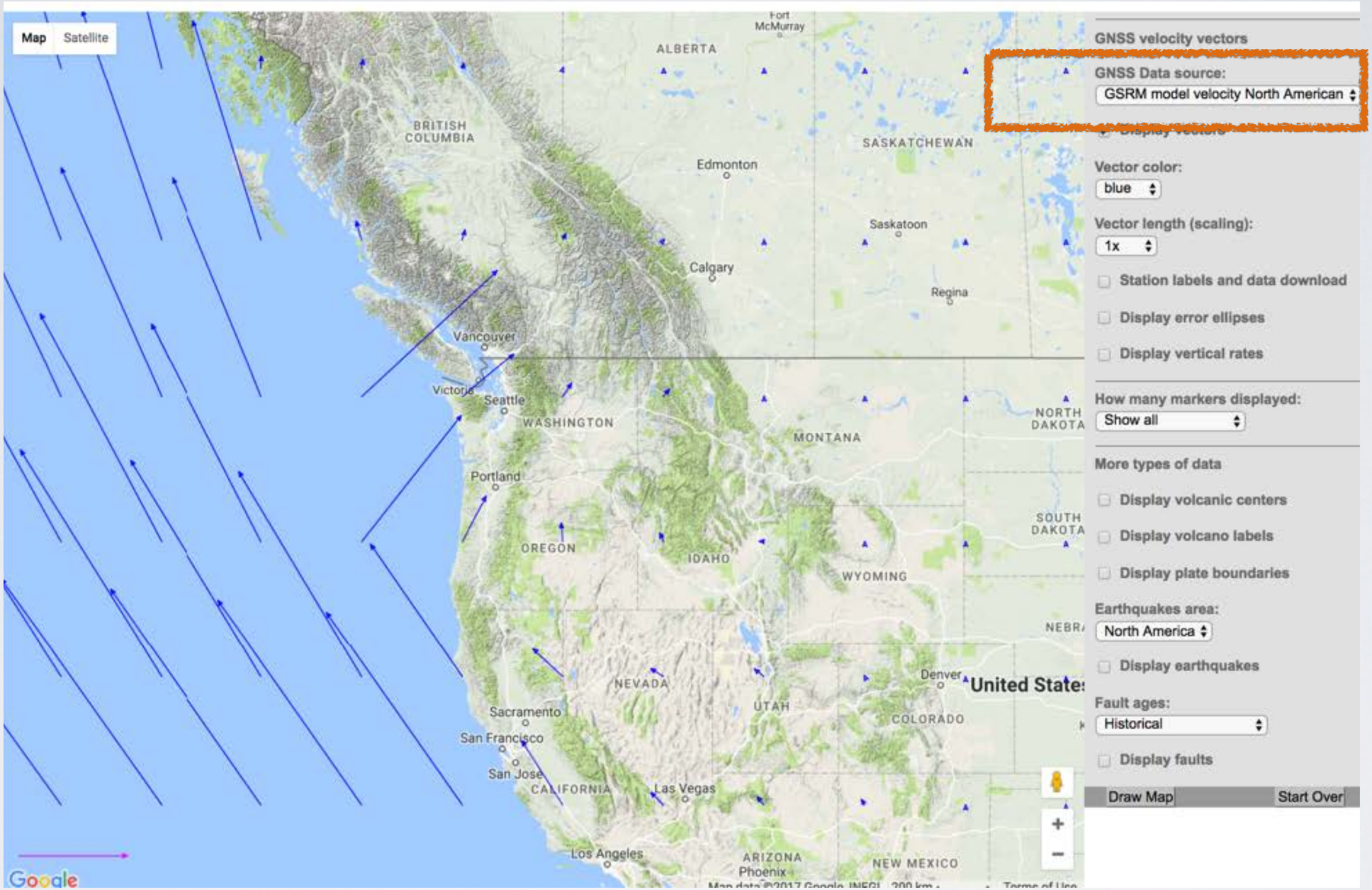
Map
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ALBERTA
Fort McMurray
BRITISH COLUMBIA
SASKATCHEWAN
Edmonton
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Calgary
Regina
Vancouver
Victoria
Seattle
WASHINGTON
MONTANA
NORTH DAKOTA
Portland
SOUTH DAKOTA
OREGON
IDAHO
WYOMING
NEBR
NEVADA
Denver
United State
Sacramento
UTAH
COLORADO
San Francisco
San Jose
CALIFORNIA
Las Vegas
Los Angeles
ARIZONA
NEW MEXICO
Phoenix
Google
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GNSS Data source:
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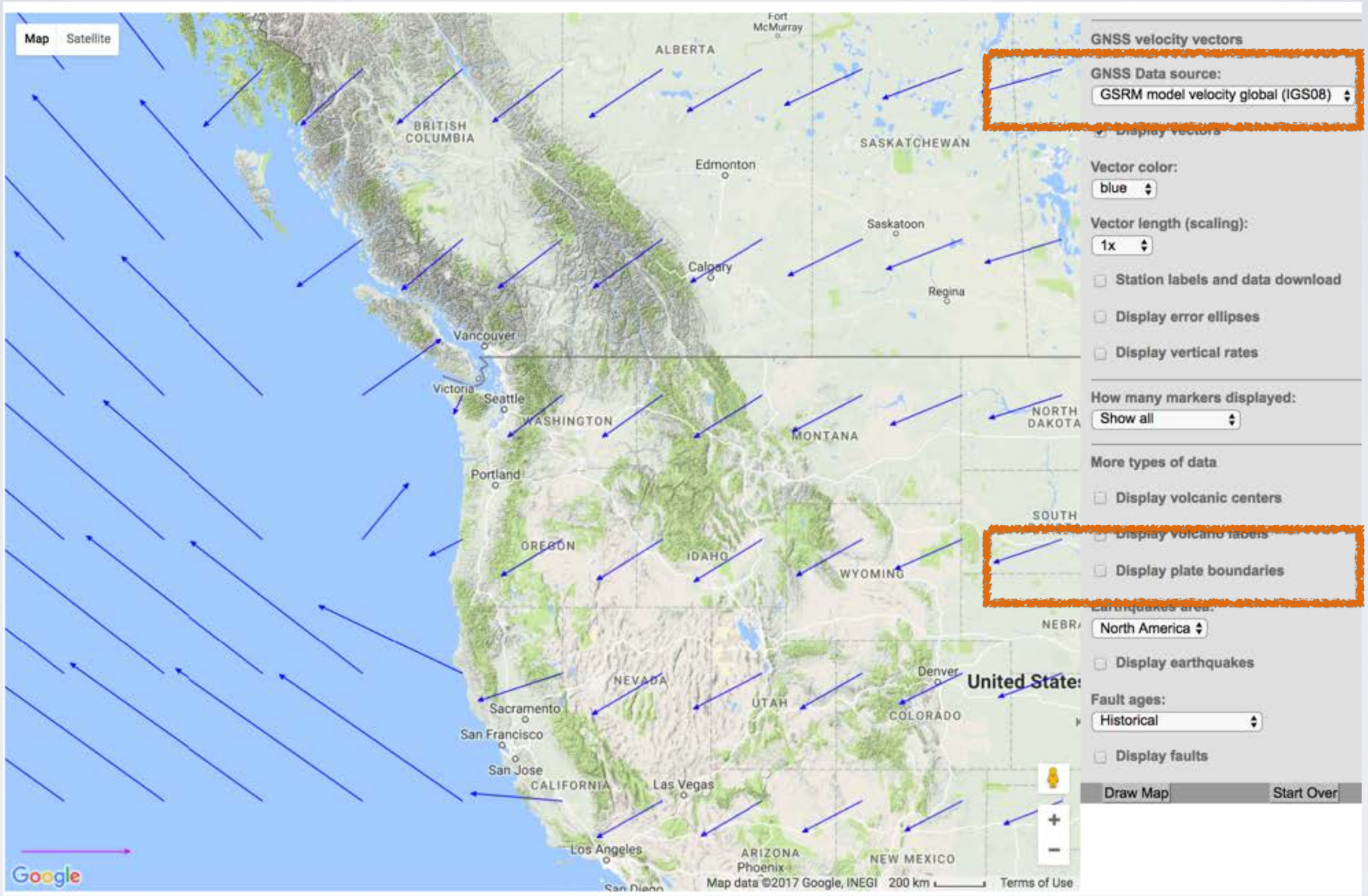
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OREGON
IDAHO
WYOMING
SOUTH
NEBR
NEVADA
UTAH
COLORADO
Denver
United States
Sacramento
San Francisco
San Jose
CALIFORNIA
Las Vegas
Los Angeles
ARIZONA
Phoenix
NEW MEXICO
Google
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200 km
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GNSS velocity vectors
GNSS Data source:
GSRM model velocity global (IGS08)
Vector color:
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Vector length (scaling):
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BRITISH COLUMBIA
SASKATCHEWAN
Edmonton
Saskatoon
Calgary
Regina
Vancouver
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WASHINGTON
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NORTH DAKOTA
Portland
OREGON
IDAHO
WYOMING
SOUTH
NEBR
NEVADA
UTAH
COLORADO
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United State
Sacramento
San Francisco
San Jose
CALIFORNIA
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Los Angeles
ARIZONA
Phoenix
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200 km
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GNSS velocity vectors
GNSS Data source:
GSRM model velocity global (IGS08)
Display vectors
Vector color:
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Vector length (scaling):
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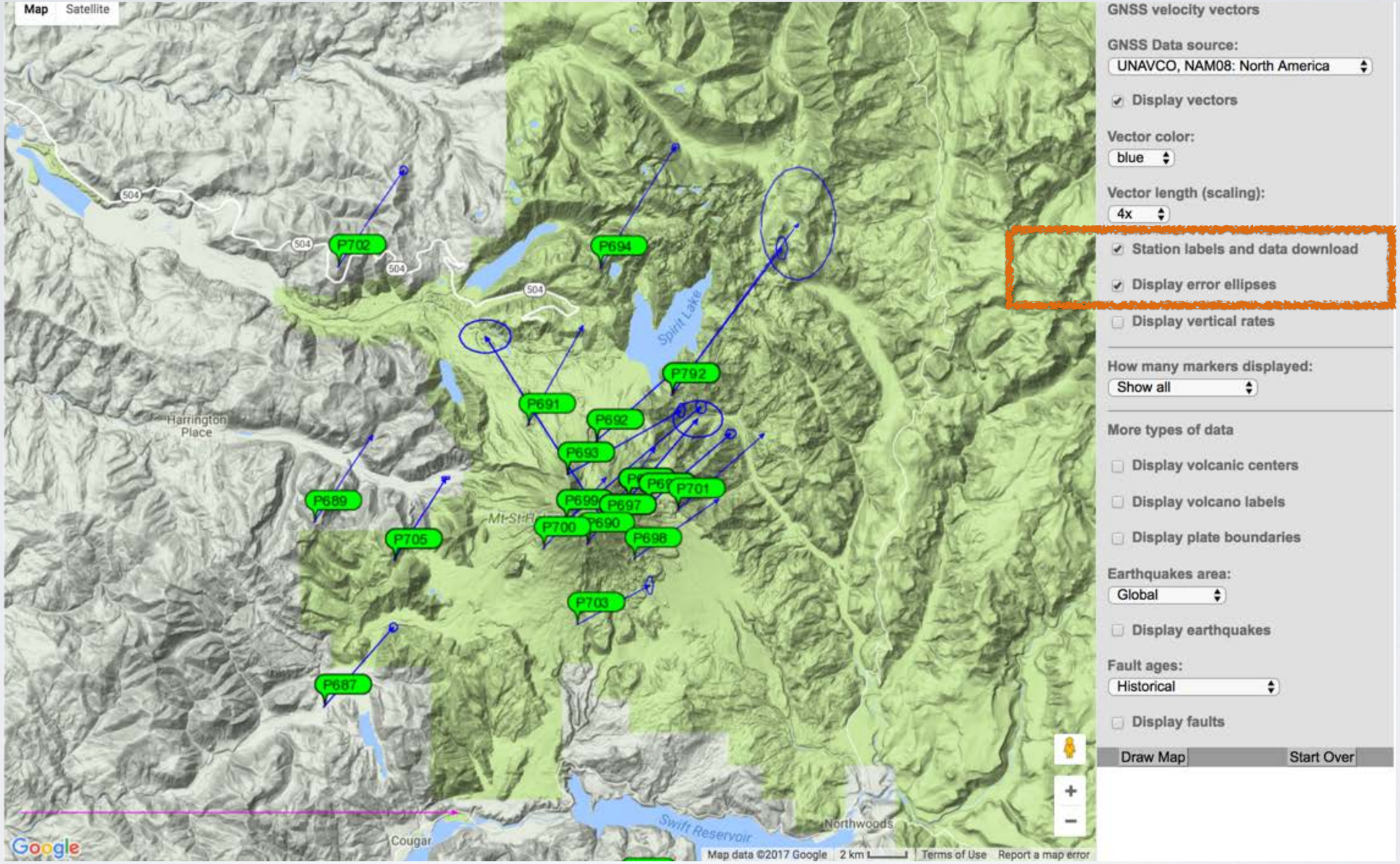
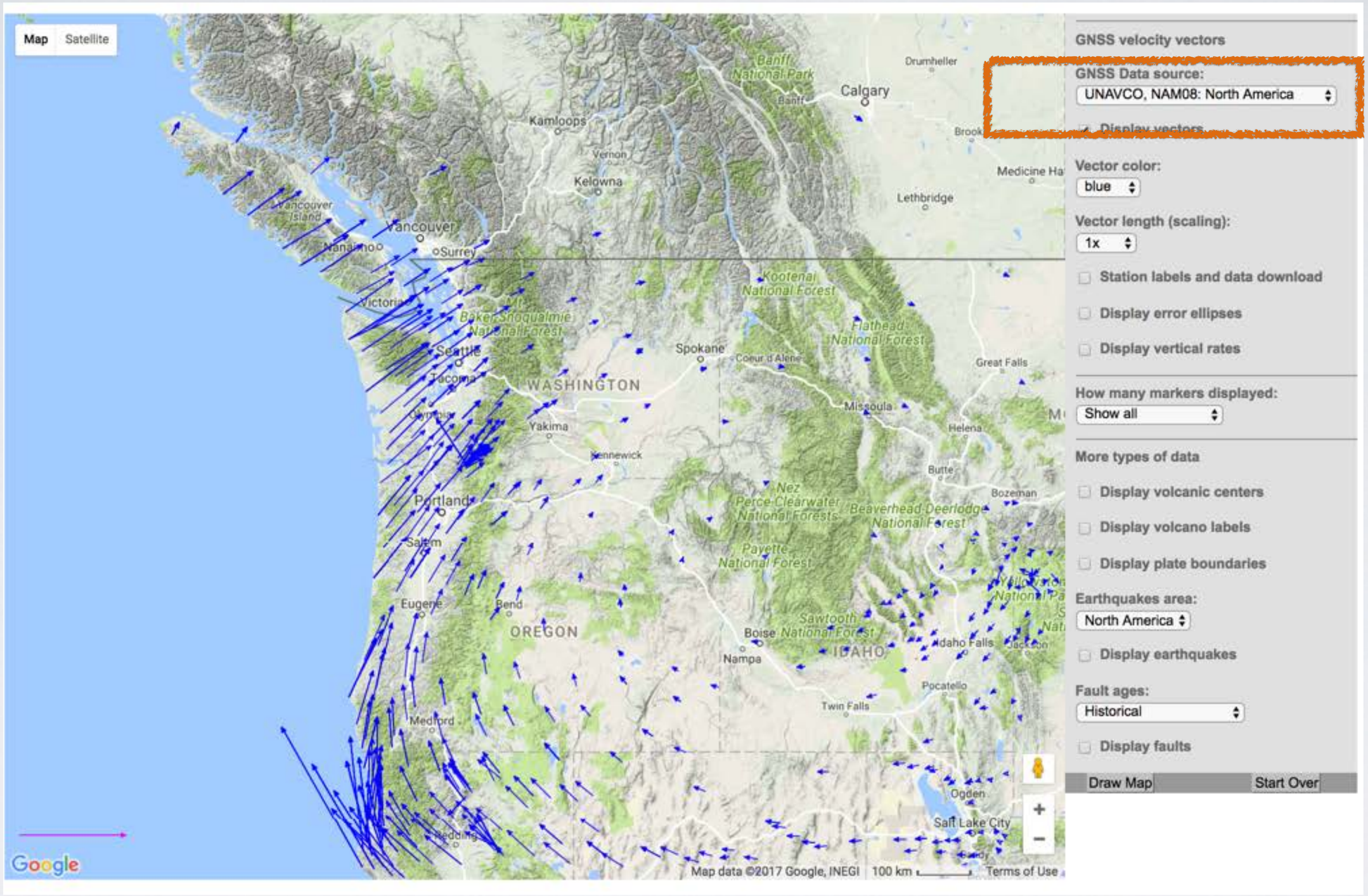
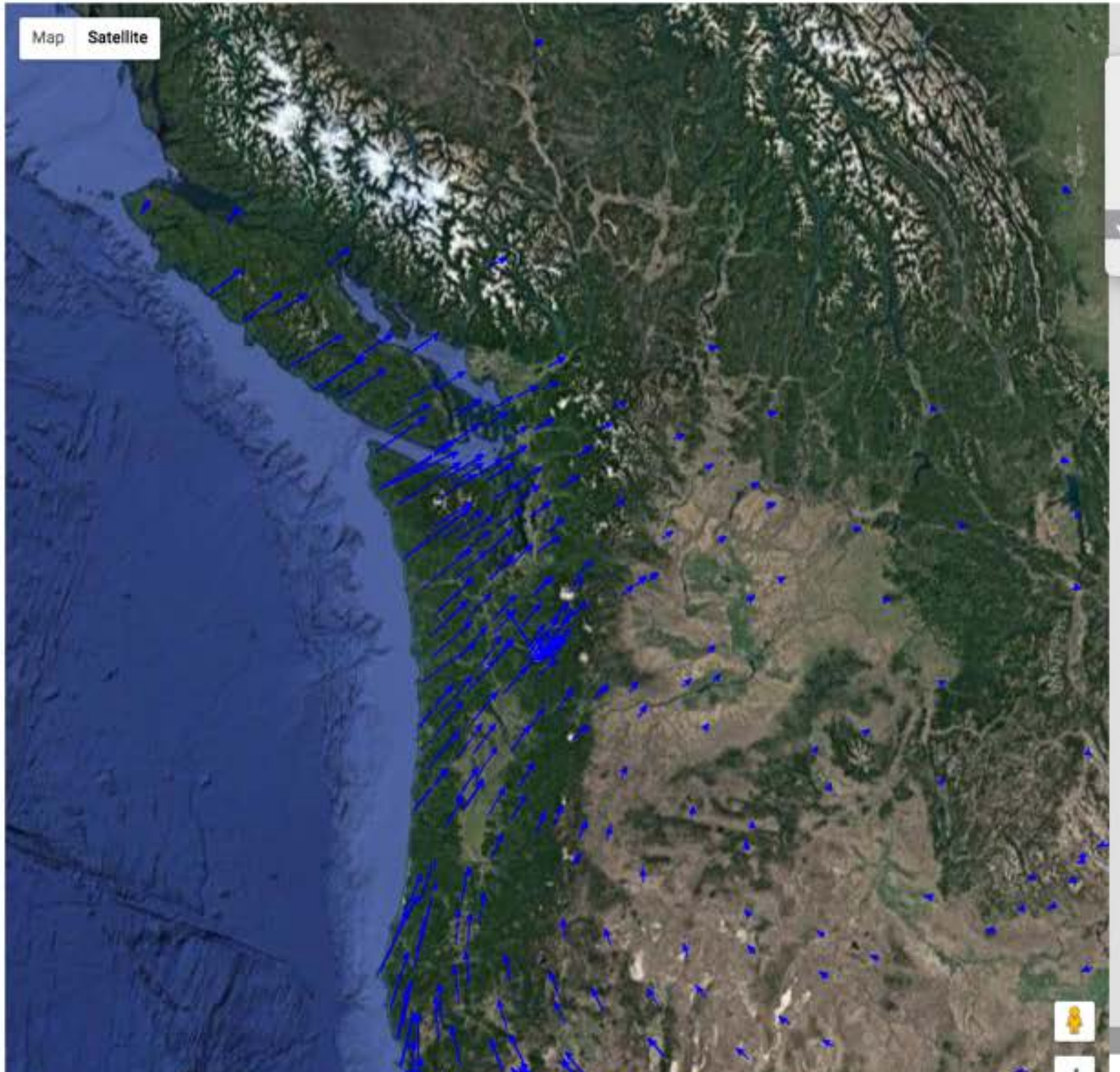
Draw Map
Start Over


Map
Satellite
P702
P694
P792
P691
P692
P693
P689
P705
P699
P697
P701
P700
P690
P698
P703
P687
504
Harrington Place
Spirit Lake
Mt St Helens
Swift Reservoir
Cougar
Northwoods
Google
Map data ©2017 Google
2 km
Terms of Use
Report a map error
GNSS velocity vectors
GNSS Data source:
UNAVCO, NAM08: North America
Display vectors
Vector color:
blue
Vector length (scaling):
4x
Station labels and data download
Display error ellipses
Display vertical rates
How many markers displayed:
Show all
More types of data
Display volcanic centers
Display volcano labels
Display plate boundaries
Earthquakes area:
Global
Display earthquakes
Fault ages:
Historical
Display faults
Draw Map
Start Over


Map
Satellite
GNSS velocity vectors
GNSS Data source:
UNAVCO, NAM08: North America
Display vectors
Vector color:
blue
Vector length (scaling):
1x
Station labels and data download
Display error ellipses
Display vertical rates
How many markers displayed:
Show all
More types of data
Display volcanic centers
Display volcano labels
Display plate boundaries
Earthquakes area:
North America
Display earthquakes
Fault ages:
Historical
Display faults
Draw Map
Start Over
Banff National Park
Calgary
Drumheller
Kamloops
Vernon
Kelowna
Lethbridge
Vancouver Island
Vancouver
Nanaimo
Surrey
Victoria
Kootenai National Forest
Mt Baker-Snoqualmie National Forest
Flathead National Forest
Seattle
Tacoma
Spokane
Coeur d'Alene
Great Falls
WASHINGTON
Missoula
Olympia
Yakima
Helena
Kennewick
Butte
Nez Perce-Clearwater National Forests
Beaverhead-Deerlodge National Forest
Bozeman
Portland
Salem
Payette National Forest
Eugene
Bend
Sawtooth National Forest
Boise
Nampa
OREGON
IDAHO
Idaho Falls
Pocatello
Twin Falls
Medford
Ogden
Salt Lake City
Google
Map data ©2017 Google, INEGI
100 km
Terms of Use

GPS Velocity Viewer



GNSS velocity vectors

ource:

AM08: North America

ectors

green
black
red
blue
yellow
white
purple

ector length (scaling):

1x

Station labels and data download

Display error ellipses

Display vertical rates

How many markers displayed:

Show all

More types of data

Display volcanic centers

Display volcano labels

Display plate boundaries

Earthquakes area:

North America

Display earthquakes

Fault ages:

Historical

Display faults

Draw Map

Start Over

GPS Velocity Viewer

GNSS velocity vectors

GNSS Data source:
UNAVCO, NAM08: North America

Display vectors

Vector color:
yellow

Vector length (scaling):
1x

Station labels and data download

Display error ellipses

Display vertical rates

How many markers displayed:
Show all

More types of data

Display volcanic centers

Display volcano labels

Display plate boundaries

Earthquakes area:
North America

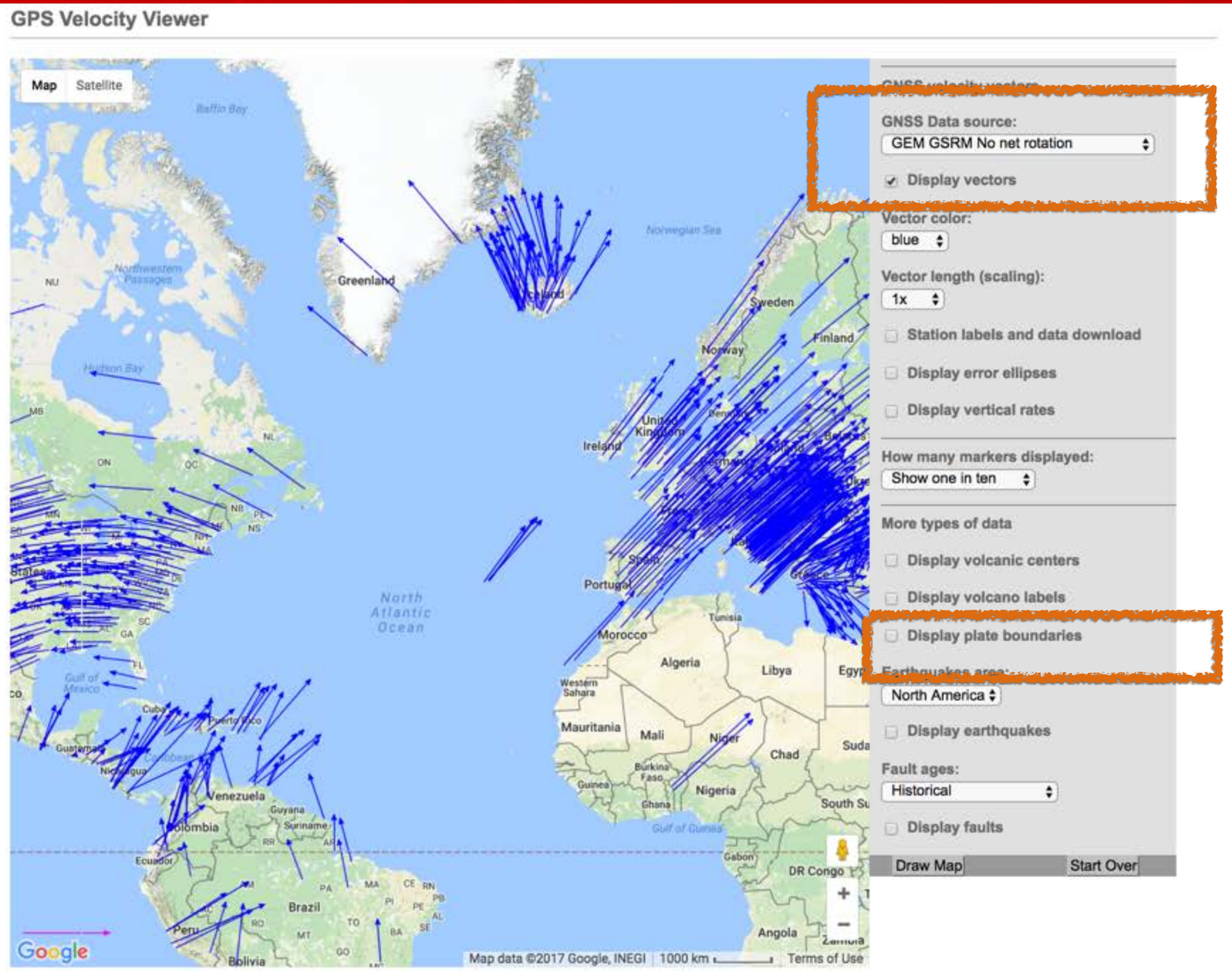
Display earthquakes

Fault ages:
Historical

Display faults

Draw Map | Start Over

WORLD VIEW


GPS Velocity Viewer
Map
Satellite
GNSS Data source:
GEM GSRM No net rotation
Display vectors
Vector color:
blue
Vector length (scaling):
1x
Station labels and data download
Display error ellipses
Display vertical rates
How many markers displayed:
Show one in ten
More types of data
Display volcanic centers
Display volcano labels
Display plate boundaries
North America
Display earthquakes
Fault ages:
Historical
Display faults
Draw Map
Start Over
Greenland
Iceland
Sweden
Finland
Norway
Ireland
Portugal
Morocco
Algeria
Libya
Tunisia
Mauritania
Mali
Niger
Chad
Nigeria
Guinea
Ghana
Burkina Faso
Western Sahara
Gabon
DR Congo
Angola
Venezuela
Guyana
Suriname
Colombia
Ecuador
Brazil
Peru
Bolivia
Cuba
Guatemala
Nicaragua
North Atlantic Ocean
Gulf of Mexico
Gulf of Guinea
Baffin Bay
Hudson Bay
Norwegian Sea
Northwestern Passages
Google
Map data ©2017 Google, INEGI
1000 km
Terms of Use

GPS Velocity Viewer

GNSS velocity vectors

GNSS Data source: GEM GSRM No net rotation

- [x] Display vectors

Vector color: blue

Vector length (scaling): 1x

- [ ] Station labels and data download
- [ ] Display error ellipses
- [ ] Display vertical rates

How many markers displayed: Show one in ten

More types of data

- [ ] Display volcanic centers
- [ ] Display volcano labels
- [x] Display plate boundaries

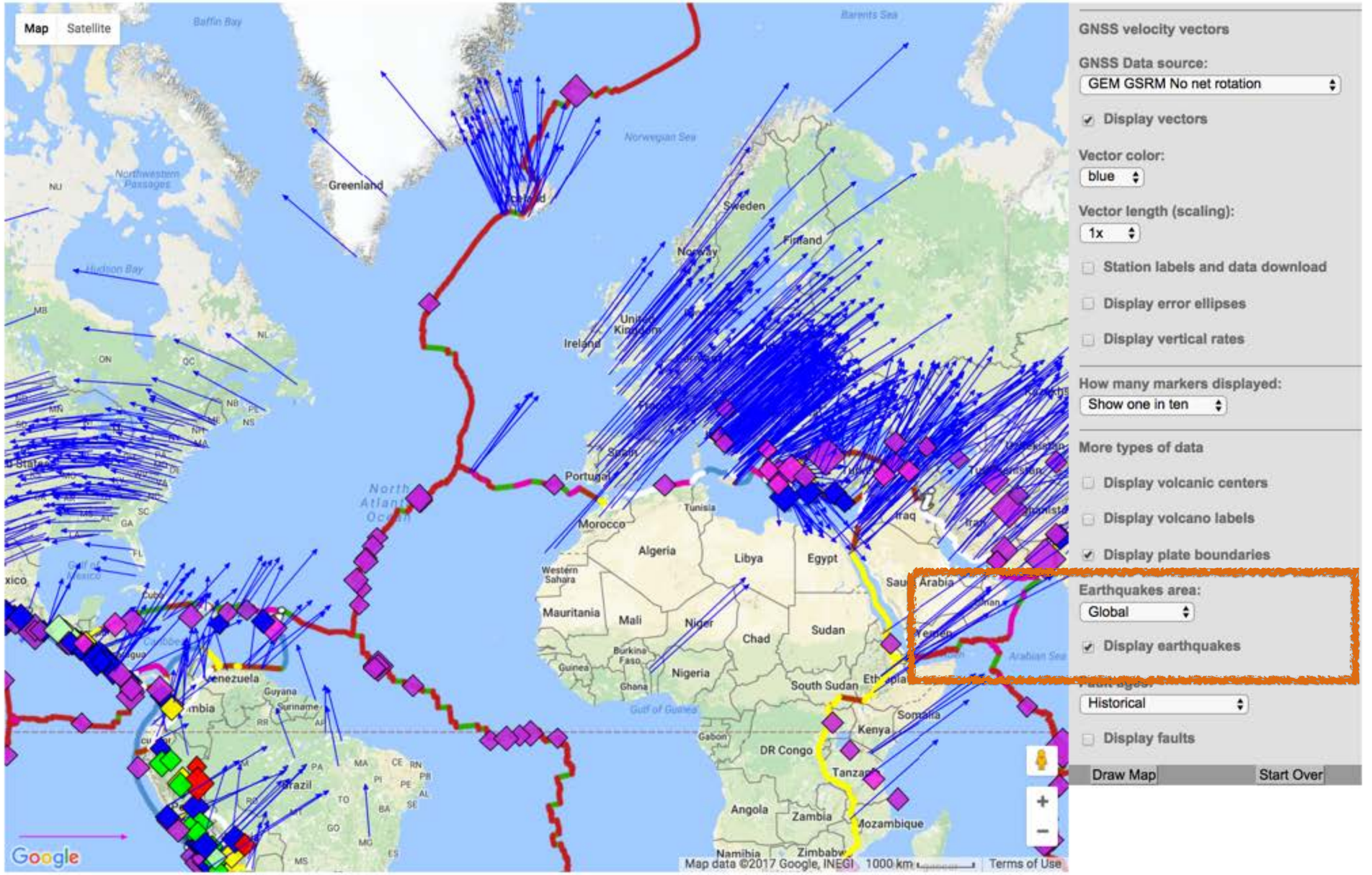
Earthquakes area: North America

- [ ] Display earthquakes

Fault ages: Historical

- [ ] Display faults

Draw Map | Start Over


Map
Satellite
GNSS velocity vectors
GNSS Data source:
GEM GSRM No net rotation
Display vectors
Vector color:
blue
Vector length (scaling):
1x
Station labels and data download
Display error ellipses
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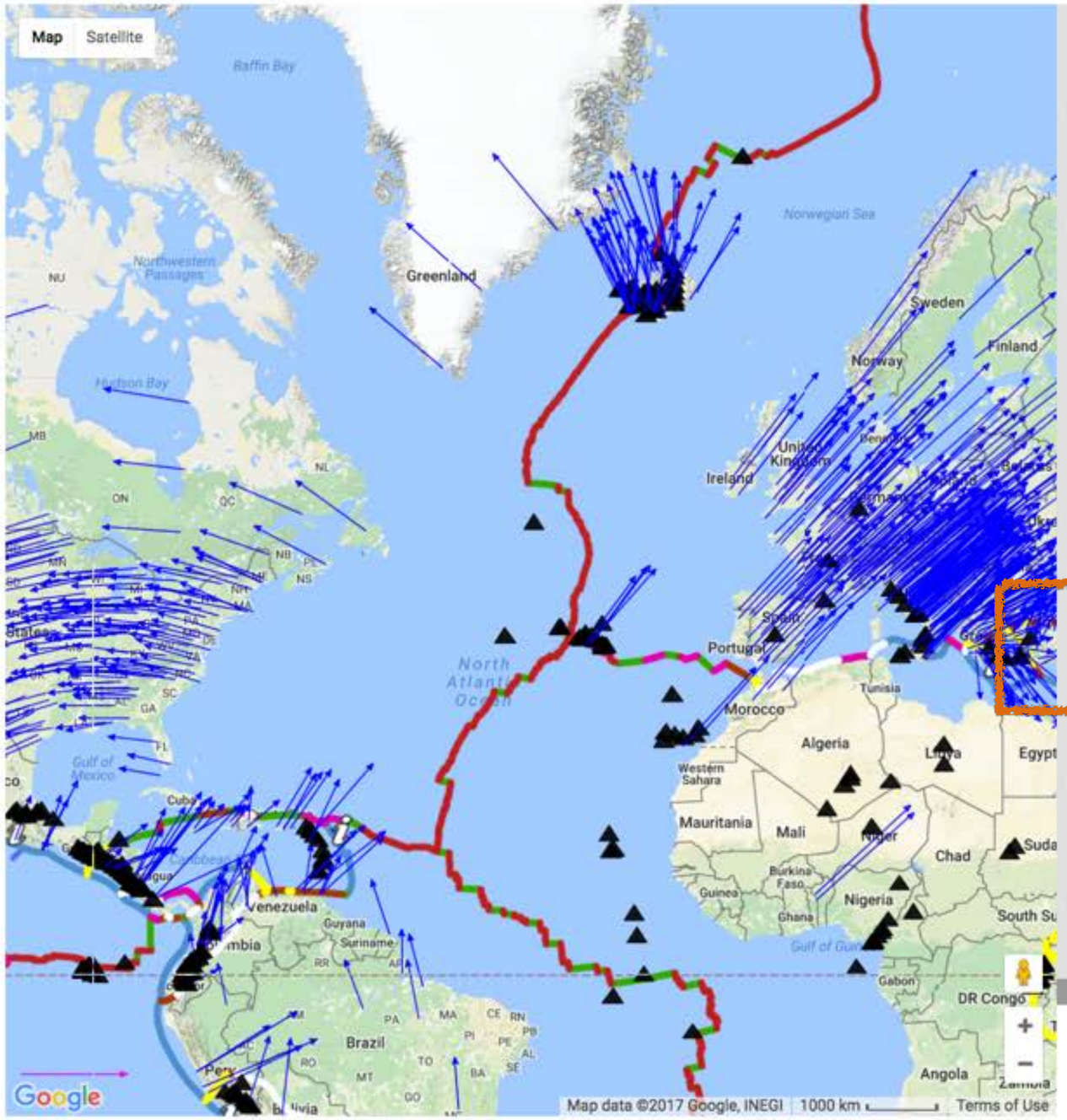
How many markers displayed:
Show one in ten
More types of data
Display volcanic centers
Display volcano labels
Display plate boundaries
Earthquakes area:
Global
Display earthquakes
Historical
Display faults
Draw Map
Start Over
Greenland
Iceland
Sweden
Norway
Finland
Ireland
Portugal
Morocco
Algeria
Tunisia
Libya
Egypt
Mauritania
Mali
Niger
Chad
Sudan
Nigeria
South Sudan
Kenya
DR Congo
Angola
Zambia
Mozambique
Namibia
Zimbabwe
Somalia
Venezuela
Guyana
Suriname
Brazil
Iraq
Arabia
Yemen
Western Sahara
Guinea
Ghana
Burkina Faso
Gabon
Baffin Bay
Hudson Bay
Barents Sea
Norwegian Sea
Arabian Sea
Gulf of Guinea
Google
Map data ©2017 Google, INEGI
1000 km
Terms of Use

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source: GEM GSRM No net rotation

- [x] Display vectors

Vector color: blue

Vector length (scaling): 1x

- [ ] Station labels and data download
- [ ] Display error ellipses
- [ ] Display vertical rates

How many markers displayed: Show one in ten

More types of data

- [x] Display volcanic centers
- [ ] Display volcano labels

Earthquakes area: North America

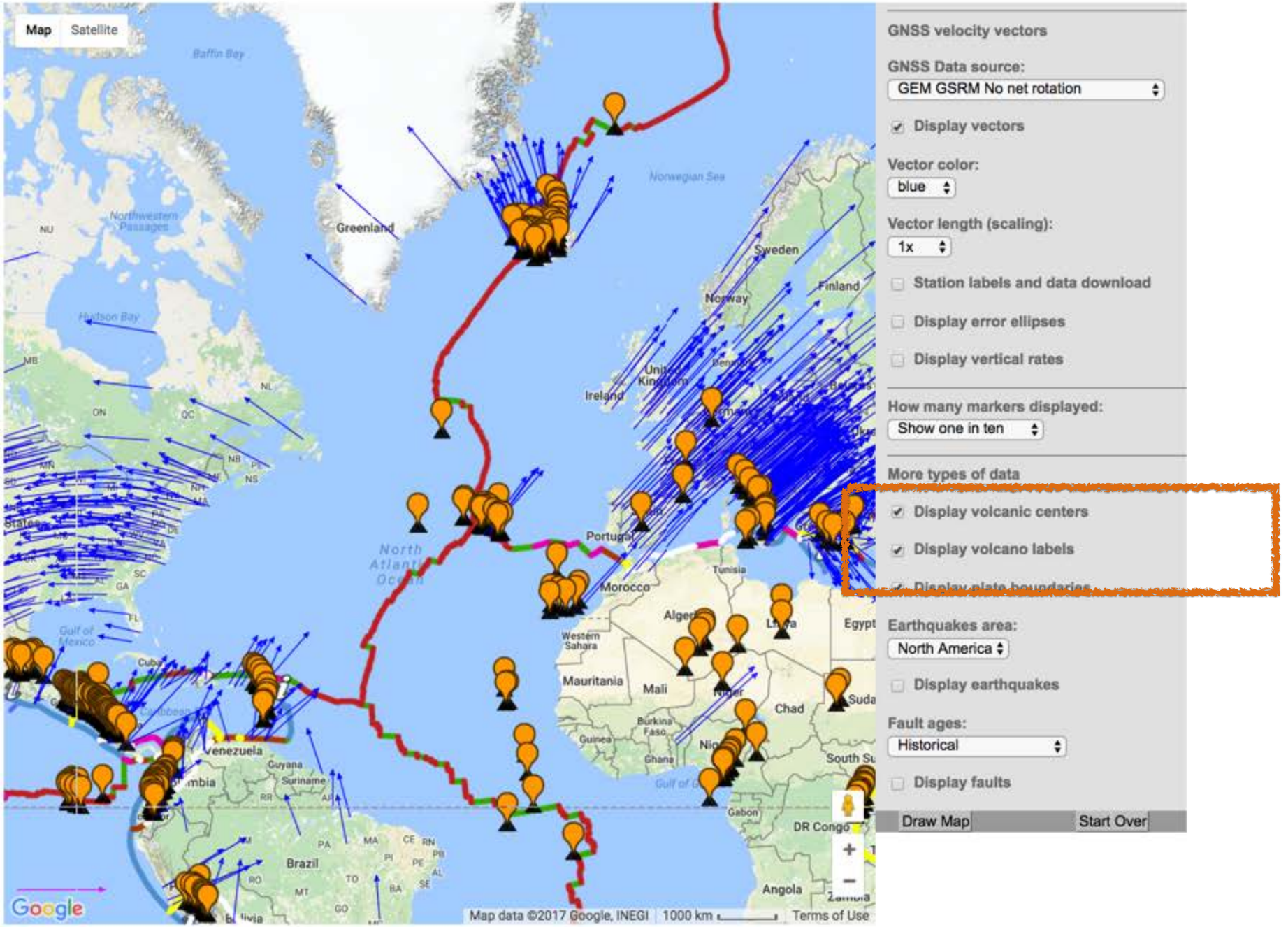
- [ ] Display earthquakes

Fault ages: Historical

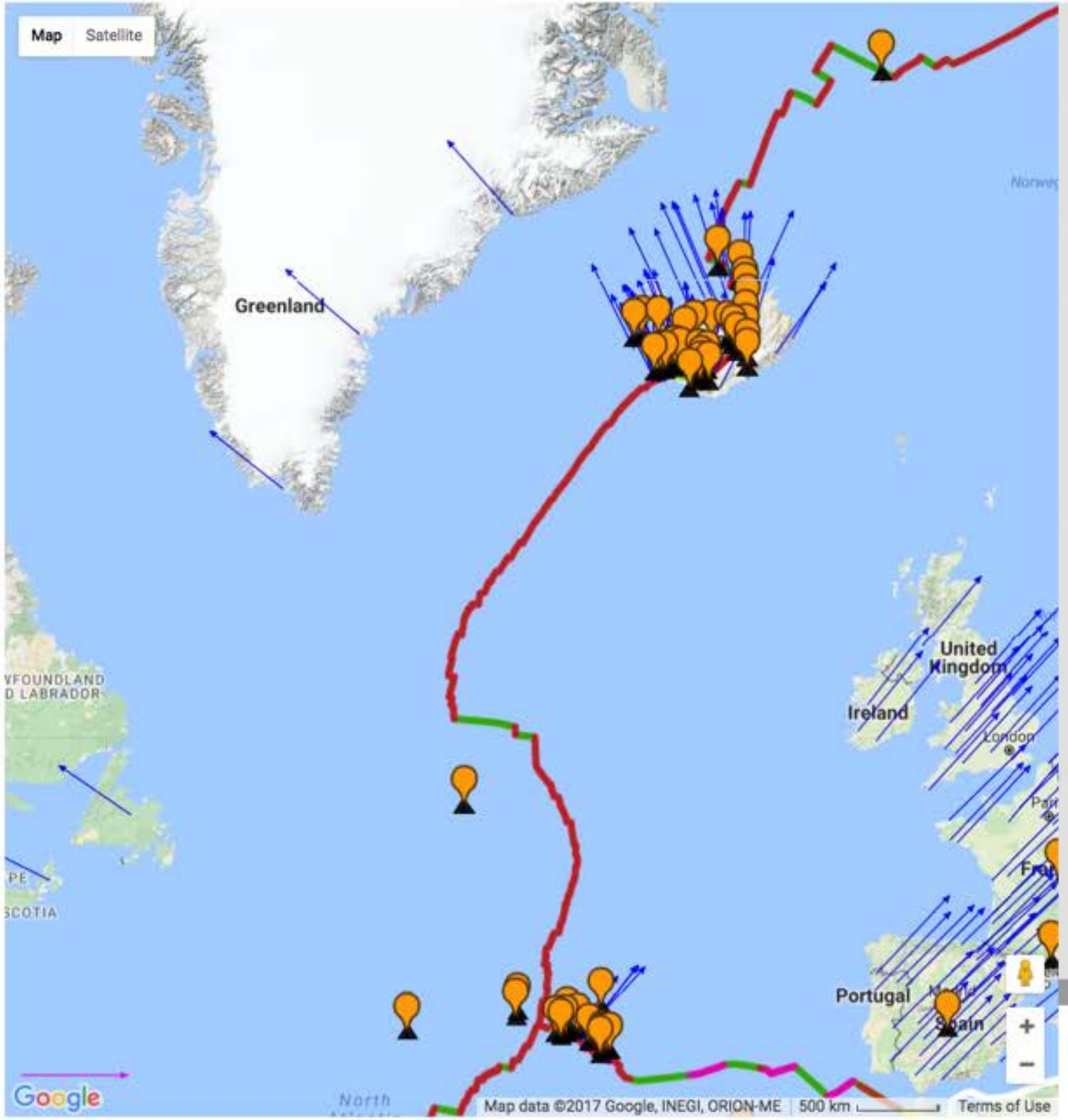
- [ ] Display faults

Draw Map | Start Over

GPS Velocity Viewer



GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source: GEM GSRM No net rotation

Display vectors

Vector color: blue

Vector length (scaling): 1x

Station labels and data download

Display error ellipses

Display vertical rates

How many markers displayed: Show one in ten

More types of data

Display volcanic centers

Display volcano labels

Display plate boundaries

Earthquakes area: North America

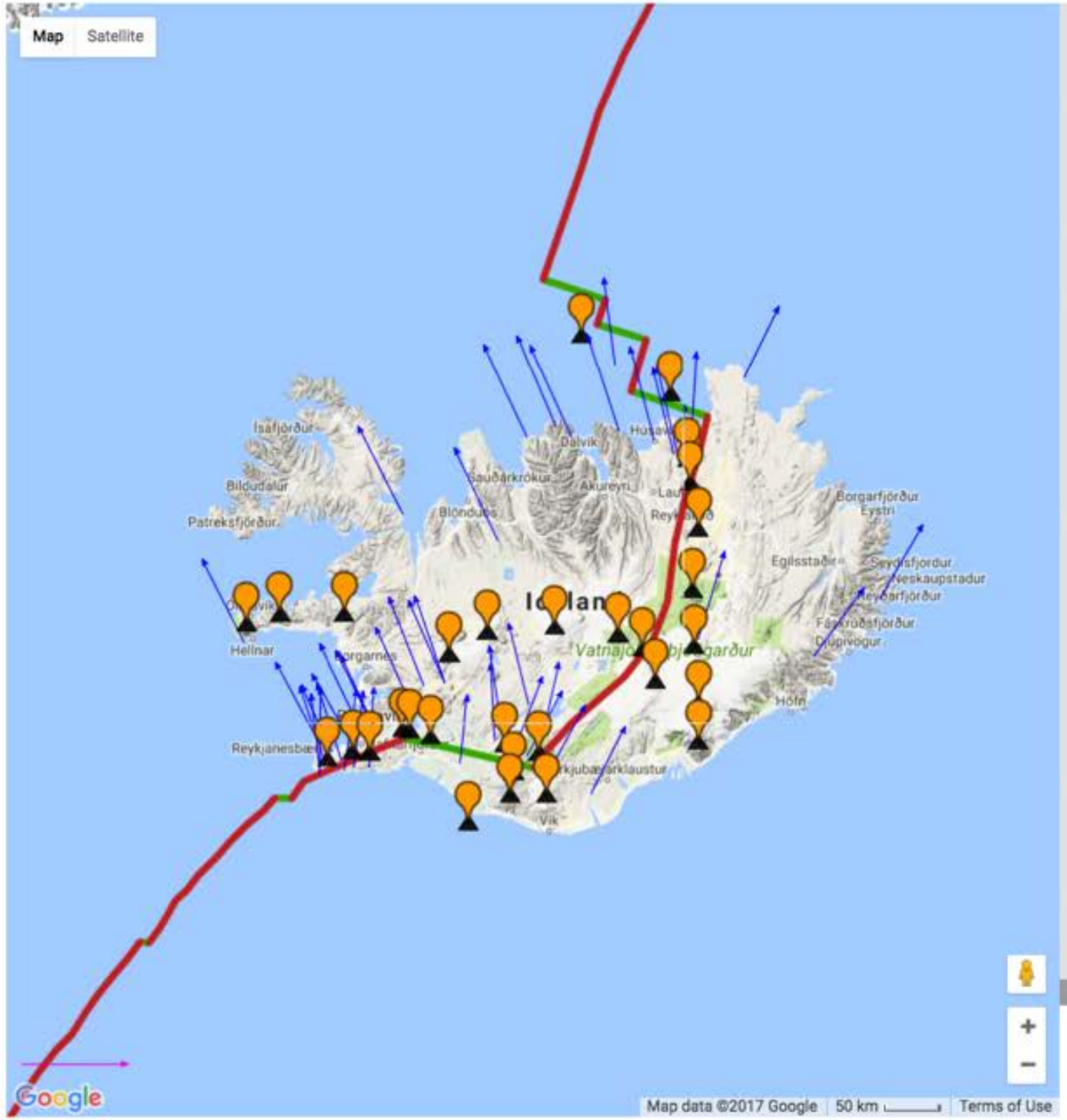
Display earthquakes

Fault ages: Historical

Display faults

Draw Map | Start Over

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source:
GEM GSRM No net rotation

- [x] Display vectors

Vector color:
blue

Vector length (scaling):
1x

- [ ] Station labels and data download
- [ ] Display error ellipses
- [ ] Display vertical rates

How many markers displayed:
Show one in ten

More types of data

- [x] Display volcanic centers
- [x] Display volcano labels
- [x] Display plate boundaries

Earthquakes area:
North America

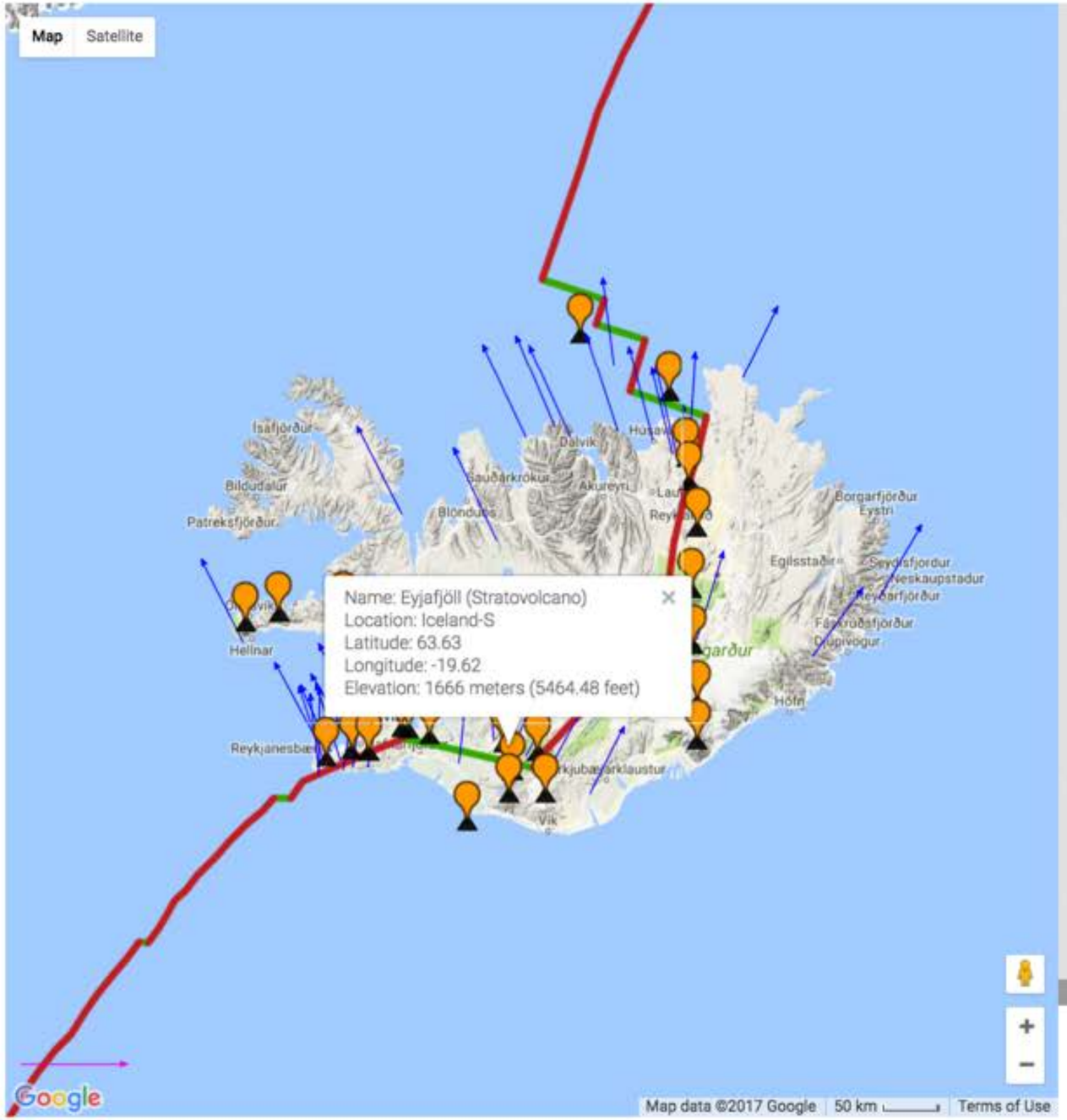
- [ ] Display earthquakes

Fault ages:
Historical

- [ ] Display faults

Draw Map | Start Over

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source: GEM GSRM No net rotation

- [x] Display vectors

Vector color: blue

Vector length (scaling): 1x

- [ ] Station labels and data download
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- [ ] Display vertical rates

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- [x] Display plate boundaries

Earthquakes area: North America

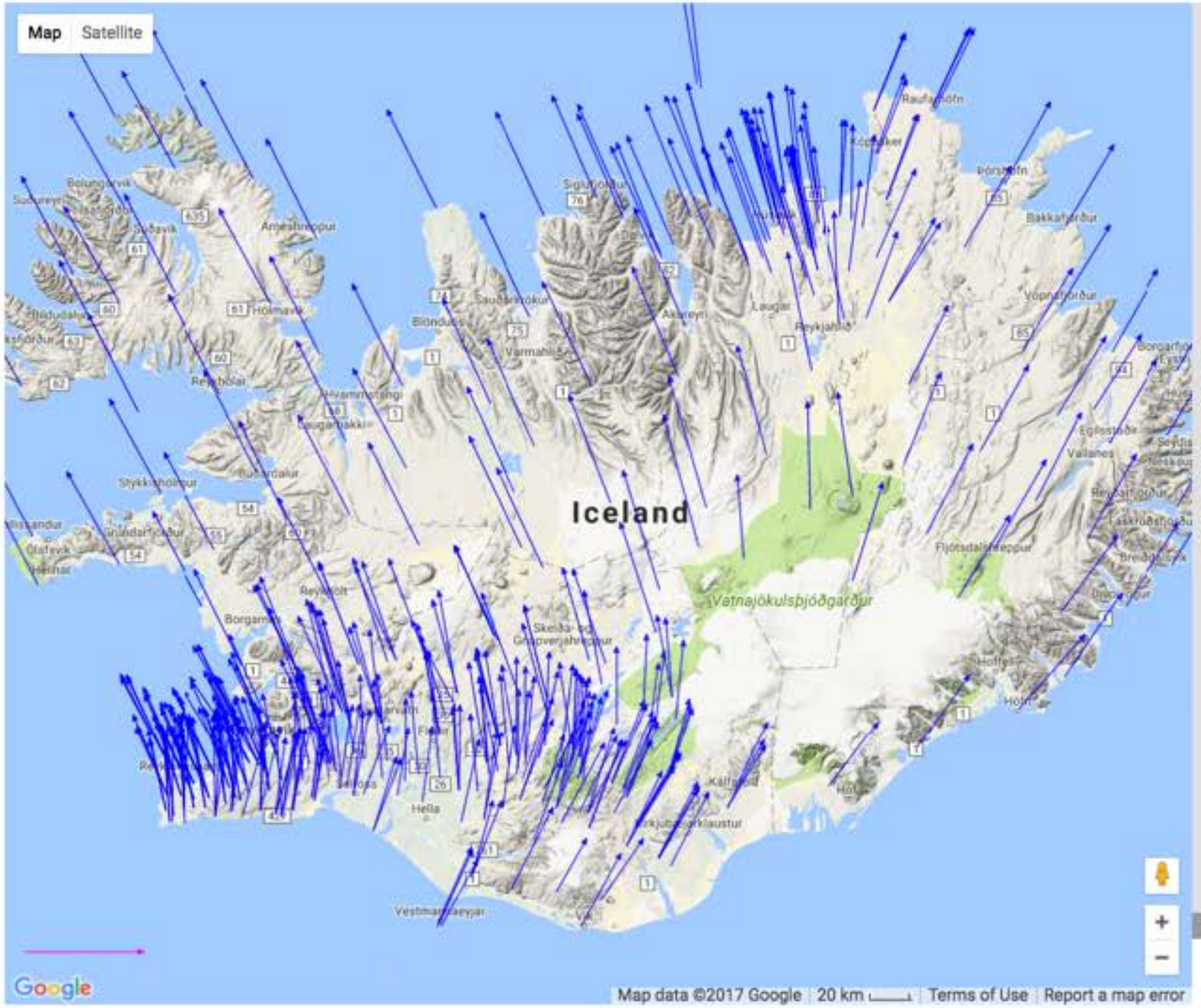
- [ ] Display earthquakes

Fault ages: Historical

- [ ] Display faults

Draw Map | Start Over

GPS Velocity Viewer



GNSS velocity vectors

GNSS Data source:
GEM GSRM No net rotation

- [x] Display vectors

Vector color:
blue

Vector length (scaling):
1x

- [ ] Station labels and data download
- [ ] Display error ellipses
- [ ] Display vertical rates

How many markers displayed:
Show all

More types of data

- [ ] Display volcanic centers
- [ ] Display volcano labels
- [ ] Display plate boundaries

Earthquakes area:
Global

- [ ] Display earthquakes

Fault ages:
Historical

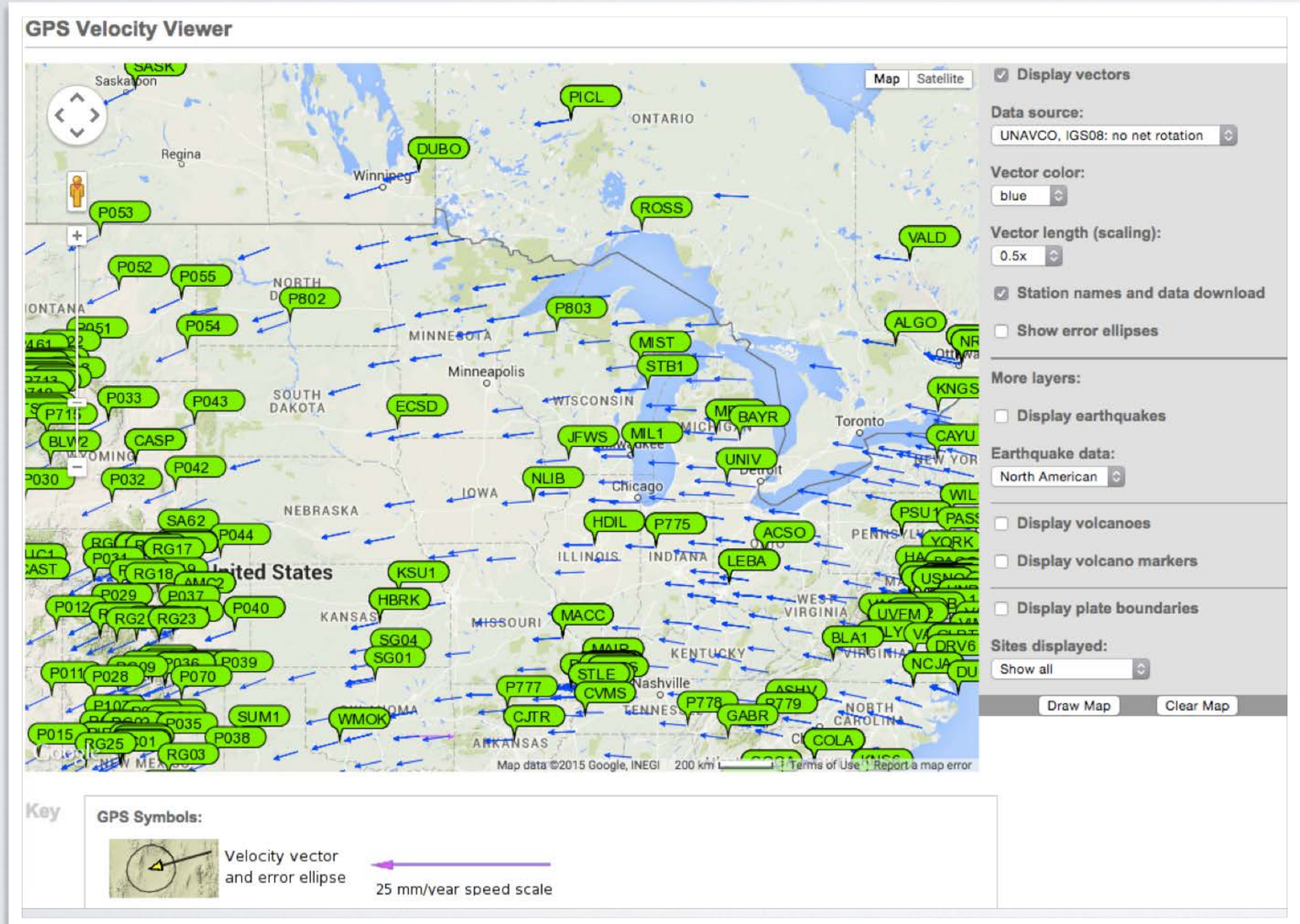
- [ ] Display faults

Draw Map | Start Over

VELOCITY VIEWER REVIEW

- UNAVCO GPS Velocity Viewer
  - Displays ground motion at each GPS location
  - Find this tool: use a Google Search: UNAVCO GPS Velocity Viewer
- Add and hide layers & features
- Processed data is downloadable as .csv files:
  - Display UNAVCO Data source

TOOLS YOU CAN USE IN YOUR CLASSROOM



Tools & Data Products

- GPS Velocity Viewer
- Processed GPS data, reformatted for ease of use
- PBO H2O & GPS Spotlight
- EarthScope Voyager Jr & Jules Vern Voyager suite

UNAVCO

THANK YOU!

Shelley Olds
olds -at- unavco.org