Kinematic processing with track
Tutorial 03 and 04

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Tutorial

• There are 2 tutorial folders for this exercise.
  – BajaEQ
    • This set of data contains 5 Hz GPS data at the time of the El Major Cucapah earthquake in April 2010.
    • We demonstrate long baseline processing with these data and methods of using time-dependent process noise to improve ambiguity resolution on long baselines.
    • Start with the track_shrt.cmd file in std folder.
  – kineMIT
    • This data set is a kinematic experiment carried out at MIT and when displayed in Google Earth it becomes clear what was being measured.
    • We can process this data has a short baseline and has a long baseline using Algonquin Park in Canada has the reference station.
Some results

• Examine the short/long baseline MIT results: Look at this example in more detail later

• April 4, 2010 El-Mayor Cucapah earthquake in Baja California: 5-Hz results. Look later at long baseline processing for these sites.
MIT long baseline Example

Analysis with LC data type: Base 685 km away
MIT track run
Coseismic offsets

- Offsets based on 2-days before and after earthquake.
- Two days used is reduce leakage of postseismic motions.
- Red Star is epicenter; blue circle is 60 km (15-20 seconds surface wave speed)
Zoom around border

Sites near the epicenter.
Blue circle is 60 km radius
Displacements
P494 200 mm
P496 182 mm
P497 97 mm
...
P491 9 mm
High-rate GPS site download

- High rate data from these sites downloaded after event.
- Most sites are 5-Hz; more distant sites are 1-Hz.
Sites in coseismic region

- Sites shown have 5-Hz data for 3-days before and after the earthquake
- Examine sequence of sites along US/Mexico border and North
P496

![Graph showing DNorth and DEast movements over time](image)

- **DNorth p496 (mm)**
- **DEast p496 (mm)**

Seconds from event:

- 0
- 80
- 160
- 240
- 320
- 400
- 480
- 560

Values:

- DNorth (mm): -800, -600, -400, -200, 0, 200, 400, 600
- DEast (mm): -400, -200, 0, 200, 400

04/05/2012
Surface wave arrival at P725

- P725 is ~600 km from epicenter. This signal common to sites is the arrival at the “reference site”