

## Supporting Information for

# Geodetic constraints on a 25-year magmatic inflation episode near Three Sisters, central Oregon

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## METHODS

### Symbols

$\phi_s$  – longitude of source  
 $\lambda_s$  – latitude of source  
 $Z_s$  – depth of source below sea-level (km)  
 $\phi_o$  – longitude of observation point  
 $\lambda_o$  – latitude of observation point  
 $Z_o$  – height of observation point above sea-level (km)  
 $\alpha$  – azimuth to observation site from source  
 $R_e$  – radius of Earth = 6371 km  
 $f$  = kilometers per degree =  $2 \pi R_e / 360.0 = 111.195$   
 $\eta$  = viscosity  
 $t_R$  relaxation time  
 $\mu$  = shear modulus (40GPa)  
 $\nu$  Poisson's ratio (0.25)  
 $P$  pressure  
 $V$  – volume change in  $10^6 \text{ m}^3$   
 $v$  – volume rate change in  $10^6 \text{ m}^3$  per year  
 $a$  – radius of sphere (km)  
 $\tau$  – time step (years)

### Conversion of longitude $\phi$ and latitude $\lambda$ to Cartesian co-ordinates X, Y, Z

$$X = (\phi_o - \phi_s) f \cos \lambda_s$$

$$Y = (\lambda_o - \lambda_s) f$$

$$Z = Z_s + Z_o$$

where X is East and Y is North.

### Mogi source in elastic half-space

The surface deformation from a buried sphere is:

$$U_x = [(1 - \nu) P a^3 / \mu] \rho \sin \alpha / \delta$$

$$U_y = [(1 - \nu) P a^3 / \mu] \rho \cos \alpha / \delta$$

$$U_z = [(1 - \nu) P a^3 / \mu] Z / \delta$$

where

$$\rho = (X^2 + Y^2)^{1/2}$$

$$\delta = (X^2 + Y^2 + Z^2)^{3/2}$$

and if volume change  $V = \pi P a^3 / \mu$  (Segall 2010; eqn 7.13) and  $\nu = 0.25$  then

$$A = 3V/(4\pi) \text{ and}$$

$$U_x = A \rho \sin \alpha / \delta$$

$$U_y = A \rho \cos \alpha / \delta$$

$$U_z = A Z / \delta$$

For most inversions we estimate the longitude, latitude, depth and history of the volume change rate.

### Dipping finite prolate spheroid in elastic half-space

The dipping, prolate spheroid source we adopt is described by Yang et al. (1988). It is described by longitude, latitude, depth, dip angle, strike angle, volume change, A semi-minor axis, and B/A, ratio of semi- to semi-minor axis. The horizontal cross-section is circular and the spheroid is elongated in the vertical direction,  $B/A \geq 1$ .

### Sill

For the case of a horizontal sill that opens vertically, we use the Okada planar source. The strike of the plane is fixed at zero and the dip at 0.1 degrees. We estimate the longitude, latitude and depth along with two dimensions of the plane, and the opening rate as a function of time in mm/yr.

### Viscoelastic shell

From Segall (2010; equation 7.105) the displacement history at the surface due to a volume injection event into a Mogi sphere of radius  $R_1$  and embedded in a Maxwell viscoelastic shell of radius  $R_2$  is:

$$D(t) = A [ \exp(-t/t_R) + (R_2/R_1)^3 (1 - \exp(-t/t_R)) ] M(X, Y, Z)$$

$$\text{where } A = (1 - v) P R_1^3 / \mu$$

which has units of volume.  $M$  is the Mogi response at a surface position offset from the source by  $(X, Y, Z)$  such that the elastic half-space deformation for a Mogi source is  $AM$  which is also the response at time  $t = 0$ . At large times, the displacement increases to  $A M (R_2/R_1)^3$ . The relaxation time is:

$$t_R = [3 \eta (1 - v) R_2^3] / [\mu (1 + v) R_1^3]$$

Because we use the rate of deformation  $S(t)$  in the modeling we calculate the time derivative:

$$S(t) = -A / t_R [\exp(-t/t_R) - (R_2/R_1)^3 (1 - \exp(-t/t_R))] M$$

For the time-dependent model, we take successive time steps of  $\tau$  and calculate a volume input by multiplying the input rate  $v_i$  times  $\tau$  at time  $t_i$ . The total response  $S_T$  is calculated by summing  $S(t)$  with each time step offset by  $\tau$ .

$$S_T(t) = \sum_{i=1,N} \left\{ -V_i / t_R [\exp(-(t+i\tau)/t_R) - (R_2/R_1)^3 (1 - \exp(-(t+i\tau)/t_R))] \right\} M$$

where  $N$  is the number of time steps. For model sisF,  $\tau = 204.5$  days (0.56 years) and  $N = 50$ , spanning  $t_0 = 1992.5$  to  $t_e = 2020.5$ .

To get the displacement history at a surface point at time  $t$  we then integrate  $S_T(t)$  from  $t_0$  to  $t$ .

In the inversion we estimate source depth, longitude, latitude,  $R_2$ ,  $V_i$ , and the log of the viscosity.

### Time dependence

We use three types of representations of time dependence: triangular elements, boxcar elements and exponential decay (as described above). They are used to estimate the rate of volume change or rate of opening in the case of a sill.

Each *boxcar* represents a constant rate  $v_1$  over a specified period of time from  $t_0$  to  $t_1$ . The contribution of this boxcar to the displacement increases from 0 at  $t_0$  to  $v_1 (t_1 - t_0)$  at  $t_1$ . The next boxcar with a rate of  $v_2$  extends from  $t_1$  to  $t_2$  and its displacement is added to the previous displacement, and so on. The duration ( $t_n - t_{n-1}$ ) of the boxcar is fixed and  $v_n$  is estimated for each.

The *triangles* represent a linearly increasing rate:

$$v(t) = V t / \tau \quad \text{for } 0 \leq t < \tau$$

$$v(t) = V [1 - (t - \tau) / \tau] \quad \text{for } \tau \leq t \leq 2\tau$$

where  $\tau$  is the half-duration of the triangle. For multiple triangles offset by  $\tau$ , this is equivalent to linear change in  $v$  between the peaks of the triangles, or a sampling of  $v(t)$  at time steps of  $\tau$ :

$$\begin{aligned} v(t=0) &= 0 \\ v(t=n\tau) &= V_n \\ v(t=(n+1)\tau) &= 0 \end{aligned}$$

where  $n$  is the number of samples and the duration of the time series is  $\tau(n+1)$ . The total volume at any time  $t$  is found by integrating  $v(t)$  from  $t_0$  to  $t$  where  $t_0$  is the start time of the transient source.

## Precipitation

To address the possible impact of surface loading by precipitation, we first downloaded from the SNOTEL site ([www.wcc.nrcs.usda.gov](http://www.wcc.nrcs.usda.gov)) the precipitation histories from the three sites closest to the Three Sisters Bulge (McKenzie, Three Creeks Meadow and Roaring River). We averaged the total precipitation of the three sites on a yearly basis (Fig. S-1m, red curve, in meters). The precipitation was converted to apparent volume change in the Mogi source by first estimating the expected vertical ground deformation per meter of precipitation using Fu et al. (2015), who estimated 2.8 mm. Then the volume change ( $Mm^3$ ) at the Mogi source due to a mm vertical motion of HUSB was estimated by dividing the total uplift at HUSB (150 mm) by the total volume change from 2001.5 to 2020.5 ( $29 Mm^3$ ). The apparent volume change  $\Delta V$  in  $Mm^3$  per mm of precipitation is  $2.8 * 29 / 150 = 0.54$ , but negative since precipitation pushes the ground down which maps to a decrease in apparent magma volume change  $\Delta V$ . The blue curve in Fig. S-1m shows the yearly expected apparent volume change by this calculation and the green curve is the rate of volume change.

The green curve should be compared to the estimated volume rate (brown curve) from model sis1 (Mogi source). In the early 1990s the precipitation should have pushed the ground down resulting in apparent deflation, yet the opposite is observed. From 1997-2012 the precipitation is fairly uniform and should have had little impact on the inflation rate estimates. From 2012-2014 there is a wiggle in the precipitation that maps to an apparent fluctuation in volume change rate but the beginning (2012) is in the opposite sense of that observed. By 2014 the precipitation and volume change agree in sign but still have different periodicities.

## GPS DATA PRECISION

The *a priori* error in our daily station position time series is that output by the GIPSY software as run by the USGS. For a station with a good view of the sky and 24-hours of tracking, the typical standard deviation in its position is ~3 mm in the horizontal components (E, N) and ~ 9 mm in the vertical component (U). Our TDEFNODE analysis weights the GPS data based on the *a priori* error, and in the following discussion we compare these values with those derived directly from examining the time series using the techniques of Langbein (2004, 2008, 2012). Of primary importance in this comparison is that our TDEFNODE results are generally based on the deformation measured over a 270-day (0.74 yr) interval.

As detailed by Murray and Svanc (2017), the USGS runs a time series analysis for each station with a noise model including white noise, flicker noise, and random walk noise. Default component amplitudes for cGPS and sGPS time series are given in Table S-5. Noise in SPGPS time series was estimated by Dzurisin et. al. (2017), and the values are close to the default amplitudes for cGPS with the random walk noise amplitude increased to  $\sim 1 \text{ mm/yr}^{0.5}$ . Random walk noise is thought to result from small motions of the antenna mount, and it is possible that this increase could be due to small wobbles from the removal and replacement of the antenna every year.

We used the same technique and noise model to estimate noise amplitudes (Table S-6) in the station HUSB time series shown in Figure 3. In this analysis the random walk noise amplitude was set to default values for cGPS from Table S-5. The estimated flicker noise amplitudes are slightly higher than the default values most likely due to the station being located high in mountainous region subject to seasonal ice and snow. Obvious outliers in the were identified and removed, but likely some marginal values slipped by thus increasing the flicker noise.

The derived white noise amplitudes for cGPS data are about 1/3 of the *a priori* standard deviations used to weight the data for the TDEFNODE analysis. Using a modified noise model that only includes white noise on a 270-day interval of station HUSB time series, we estimate white noise amplitudes of 1.5 mm East, 1.3 mm North, and 5.7 mm Vertical. These values are about half of the *a priori* values. We conclude that our *a priori* standard deviations for cGPS and SPGPS data should be decreased by half. No change is recommended for the sGPS data. We conclude that implementing a GPS data weighting scheme that includes the temporally-correlated flicker and random walk noise might be important for TDEFNODE runs where parameters are fit to long-term rates of deformation, but it is not needed for our study of incremental volcanic deformation.

Caption is below figure, which has several parts. Search for "Figure S" to locate caption.

## Site: husb Model: MSH1

East V: 2.44 +/- 0.24 Wrms: 1.2618 Nrms 0.4626  
North V: 6.00 +/- 0.24 Wrms: 1.5669 Nrms 0.5448  
Up V: 1.62 +/- 0.27 Wrms: 4.5288 Nrms 0.5233  
Lon: 238.1506 Lat: 44.1195 DT: 17.5419 N: 493

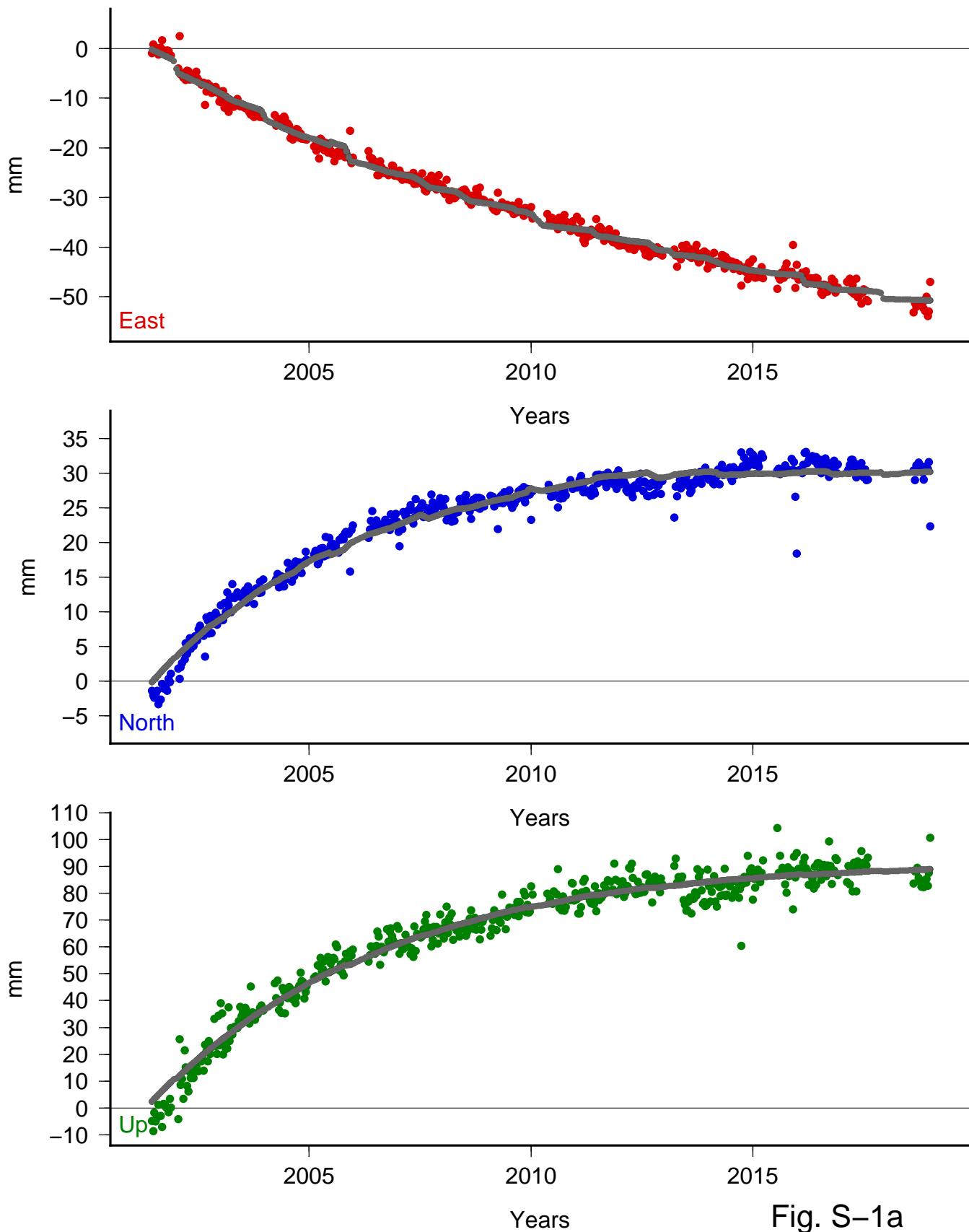
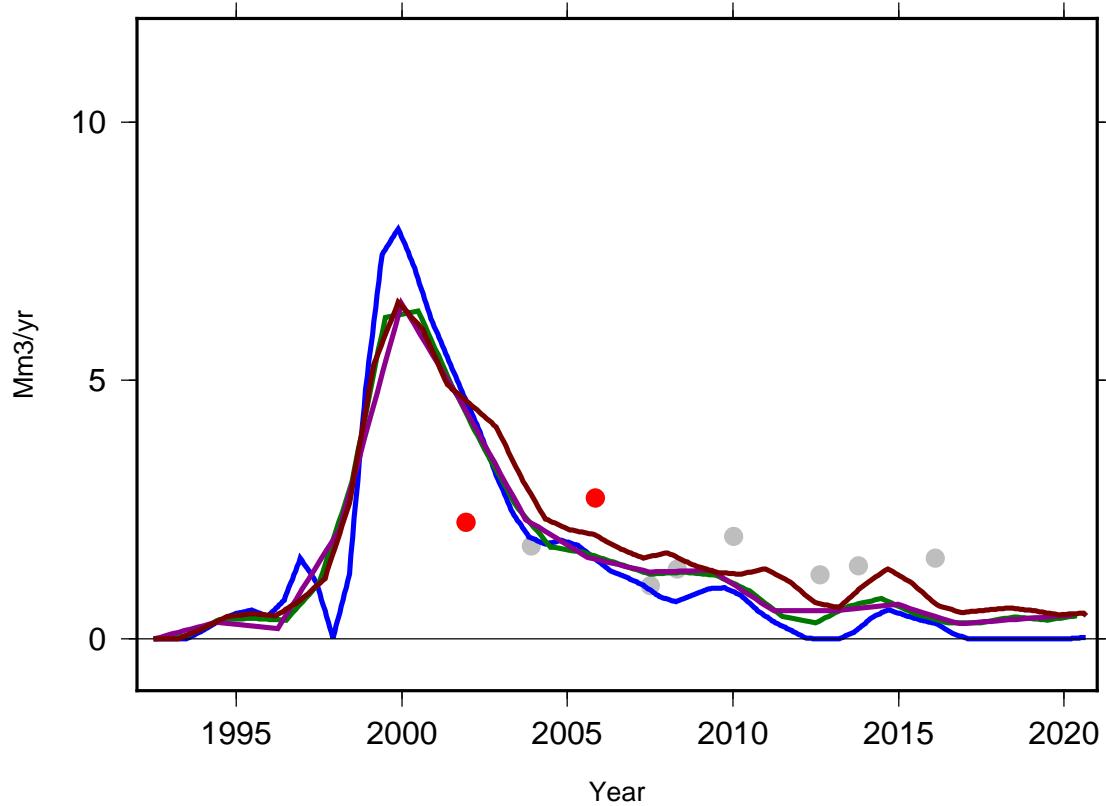


Fig. S-1a

Model: sis1 Rate



Volume

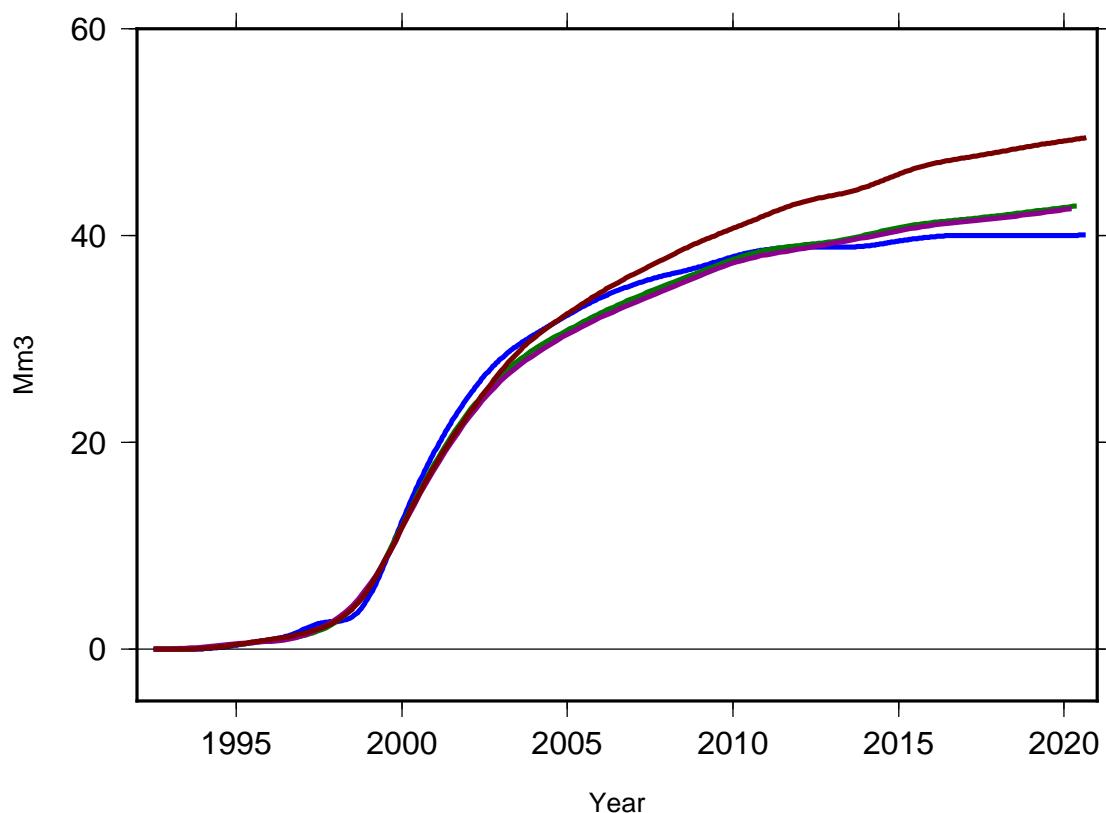
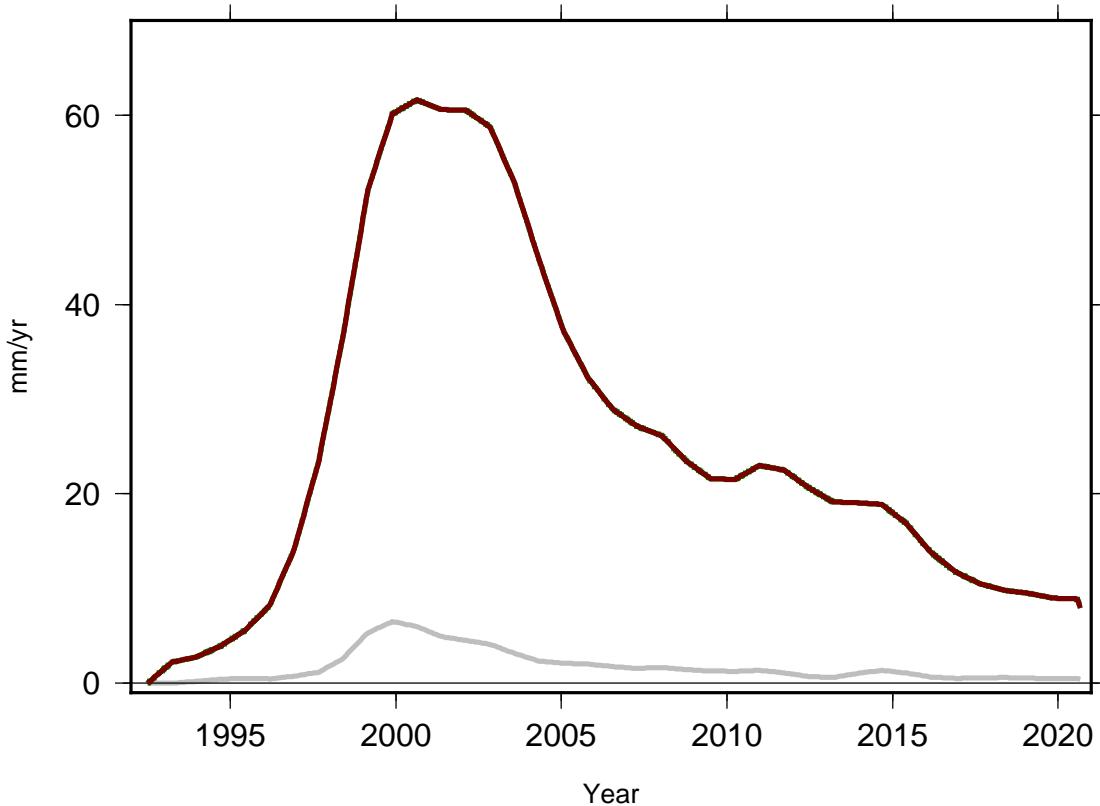


Fig. S-1b

Model: sis8 Velocity



Displacement

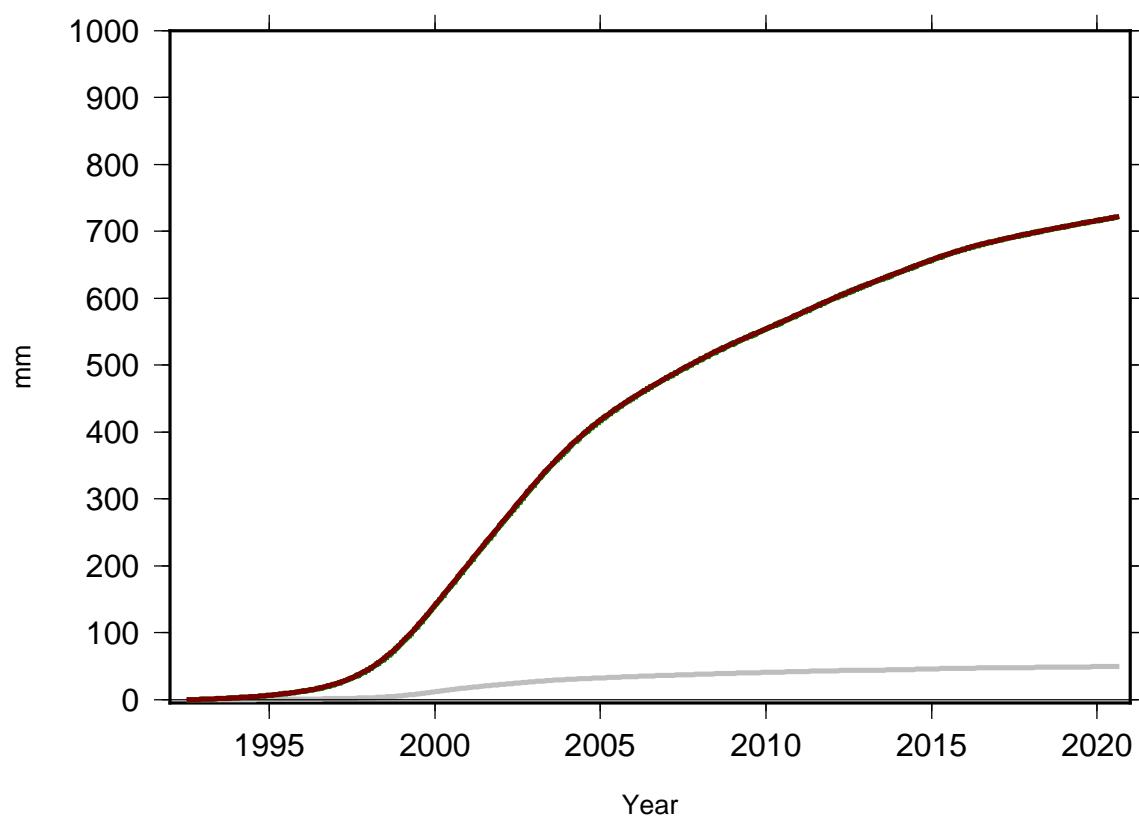
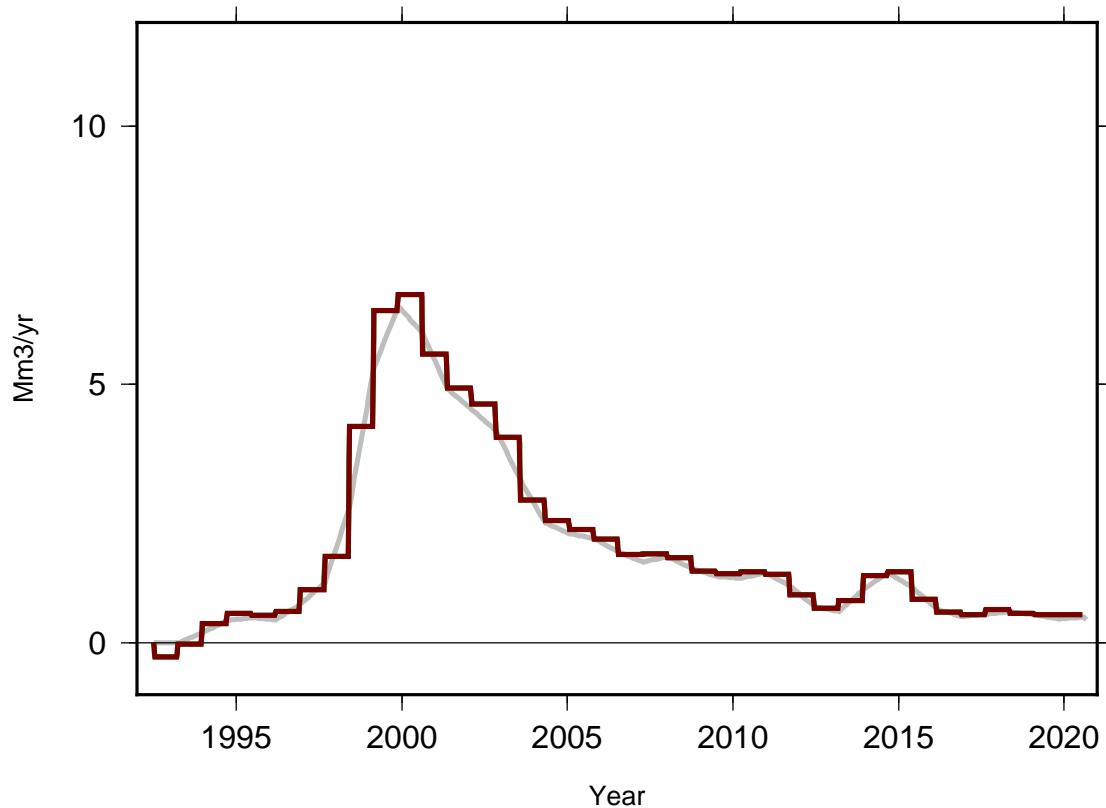


Fig. S-1c

Model: sisL Rate



Volume

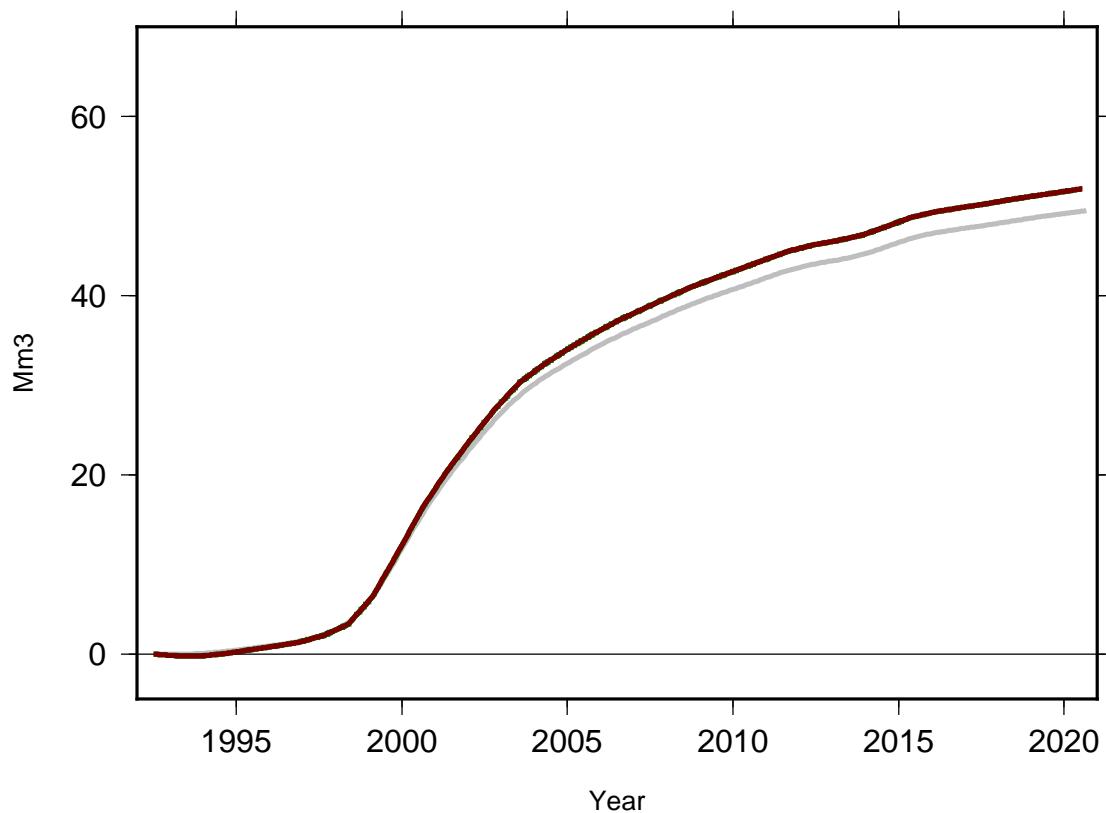


Fig. S-1d

# Site: husb Model: sisU

East V: 1.10 +/- 0.23 Wrms: 1.5627 Nrms 1.1470  
North V: 4.60 +/- 0.23 Wrms: 1.2393 Nrms 0.8651  
Up V: -1.00 +/- 0.23 Wrms: 4.1085 Nrms 0.9493  
Lon: 238.1506 Lat: 44.1195 DT: 19.2064 N: 2083

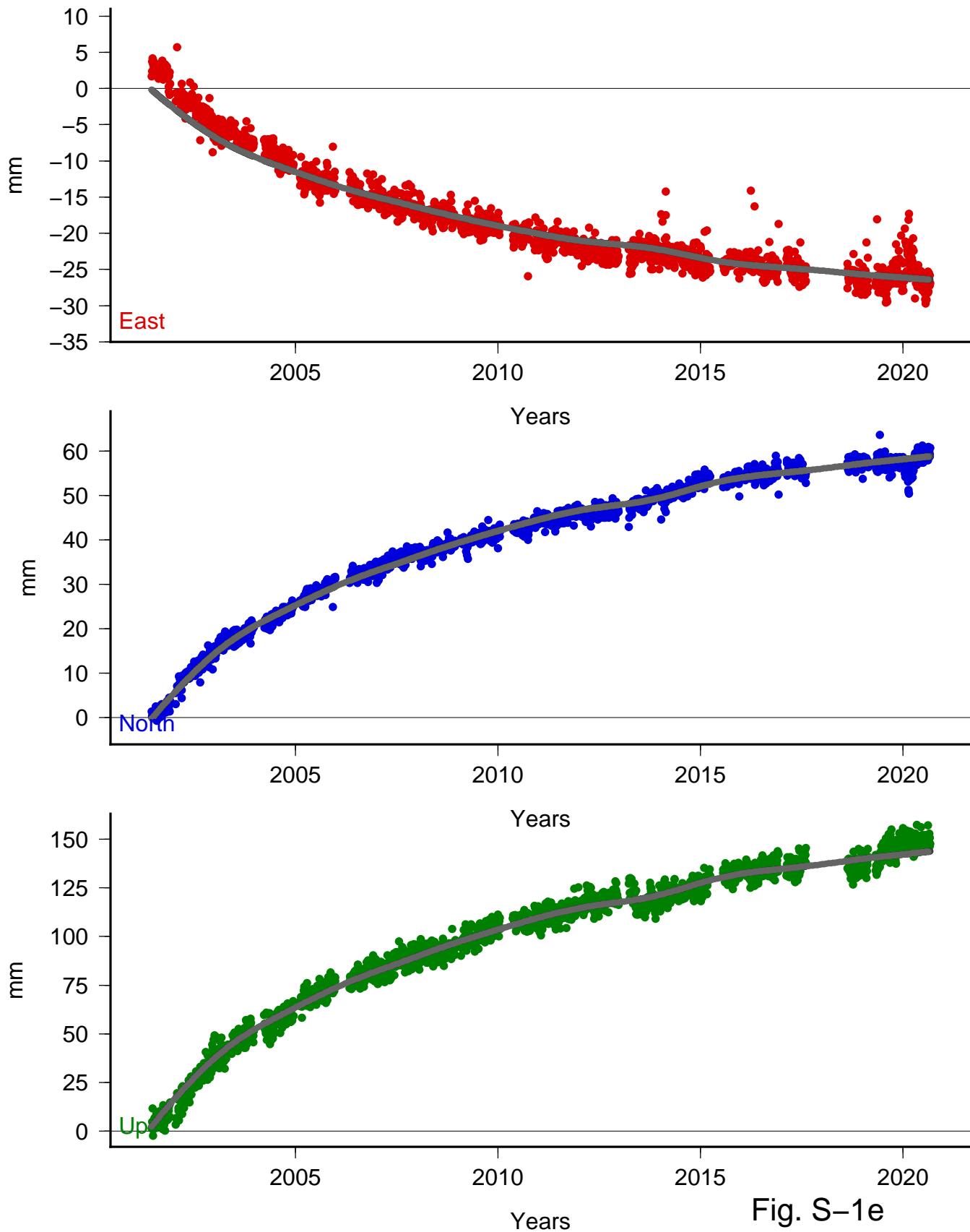


Fig. S-1e

# Site: husb Model: sis8

East V: 1.10 +/- 0.23 Wrms: 2.3900 Nrms 1.7542  
 North V: 4.60 +/- 0.23 Wrms: 2.3864 Nrms 1.6659  
 Up V: -1.00 +/- 0.23 Wrms: 5.3345 Nrms 1.2326  
 Lon: 238.1506 Lat: 44.1195 DT: 19.2064 N: 2083

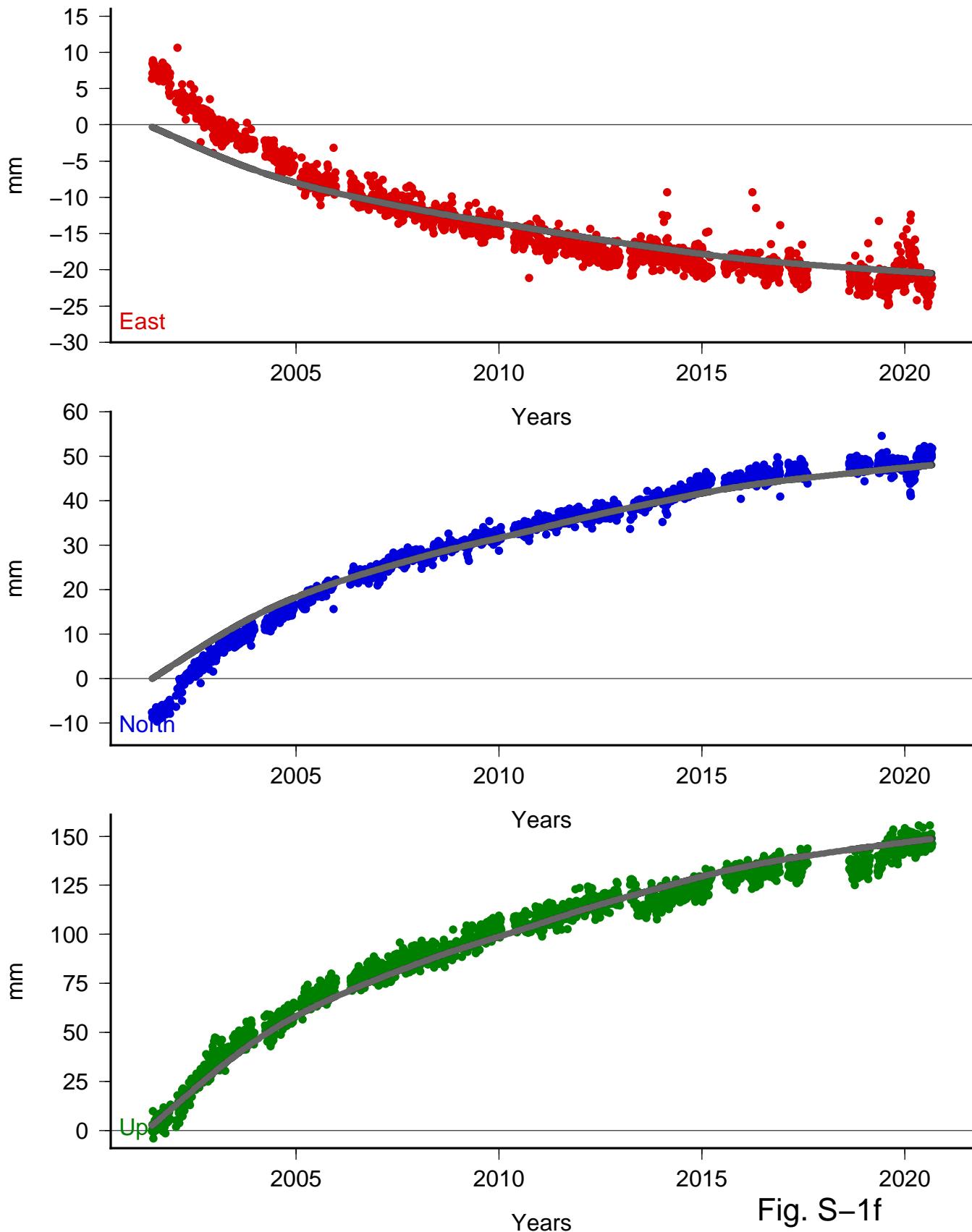


Fig. S-1f

# Site: husb Model: sisD

East V: 1.10 +/- 0.23 Wrms: 1.6615 Nrms 1.2195  
North V: 4.60 +/- 0.23 Wrms: 1.6404 Nrms 1.1451  
Up V: -1.00 +/- 0.23 Wrms: 4.4245 Nrms 1.0223  
Lon: 238.1506 Lat: 44.1195 DT: 19.2064 N: 2083

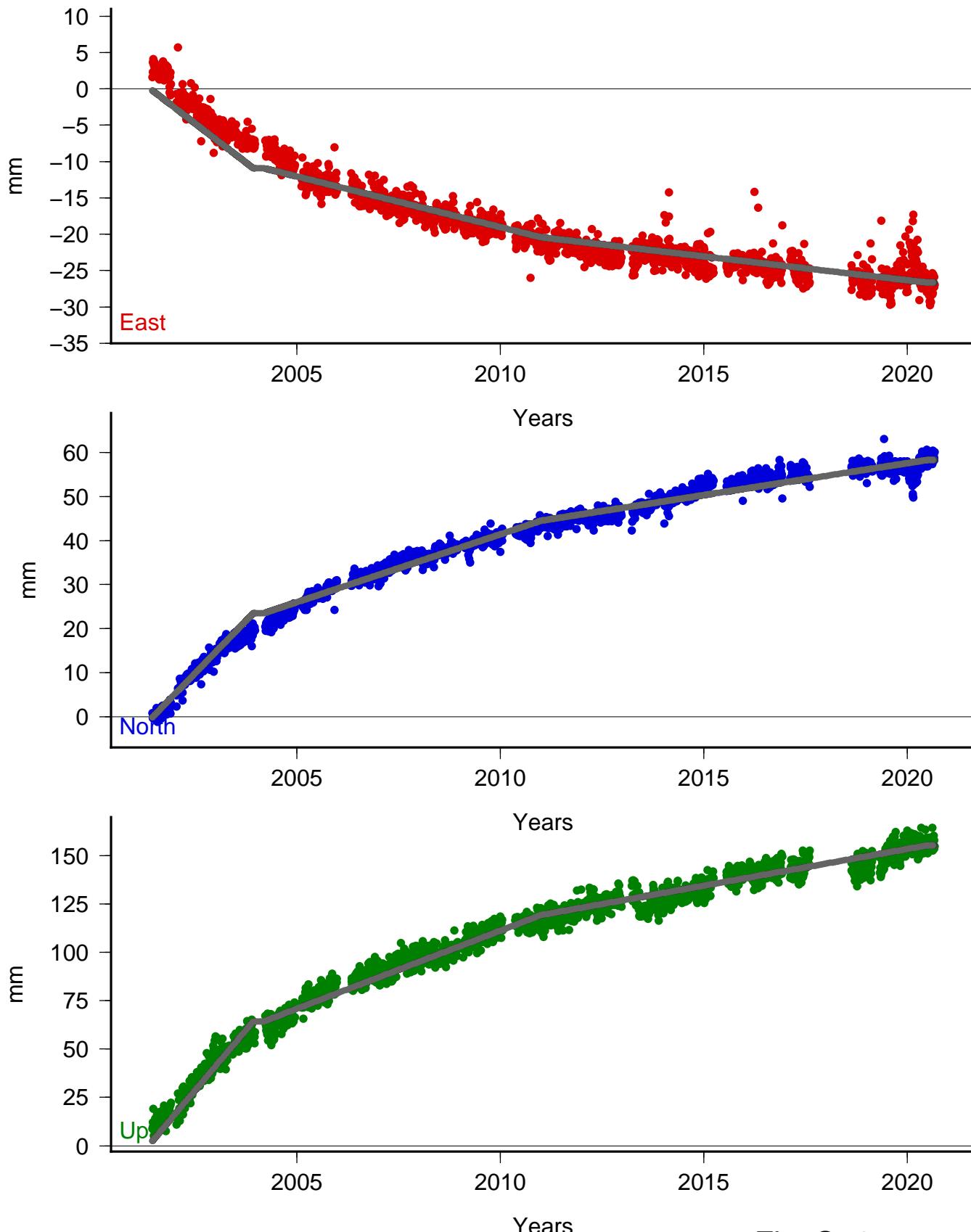


Fig. S-1g

# Site: husb Model: sisE

East V: 1.10 +/- 0.23 Wrms: 1.4066 Nrms 1.0331  
North V: 4.60 +/- 0.23 Wrms: 1.2815 Nrms 0.8948  
Up V: -1.00 +/- 0.23 Wrms: 4.0460 Nrms 0.9357  
Lon: 238.1506 Lat: 44.1195 DT: 19.0422 N: 2062

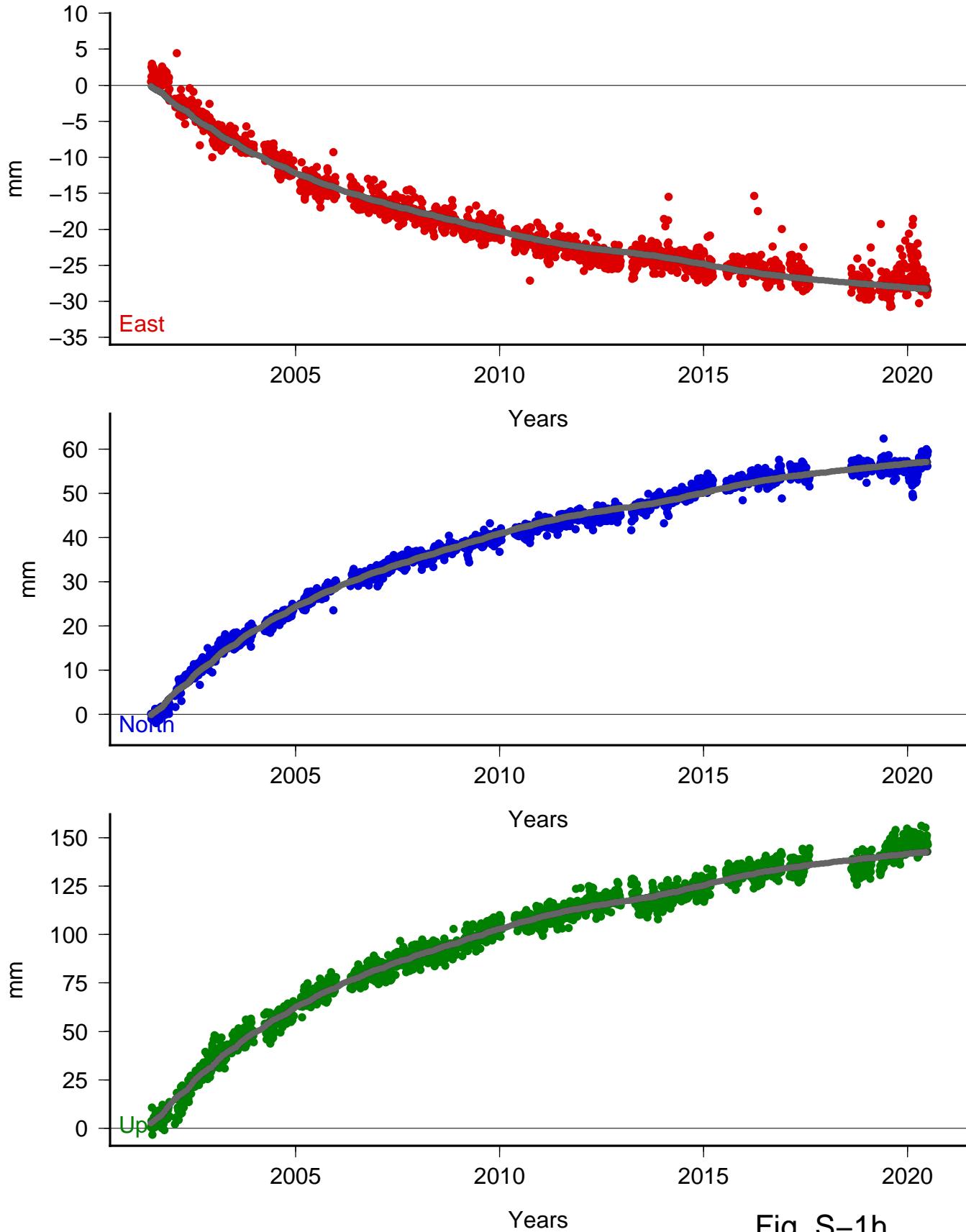


Fig. S-1h

# Site: husb Model: sisF

East V: 1.10 +/- 0.23 Wrms: 1.6942 Nrms 1.2435  
North V: 4.60 +/- 0.23 Wrms: 1.4151 Nrms 0.9879  
Up V: -1.00 +/- 0.23 Wrms: 4.3230 Nrms 0.9989  
Lon: 238.1506 Lat: 44.1195 DT: 19.2064 N: 2083

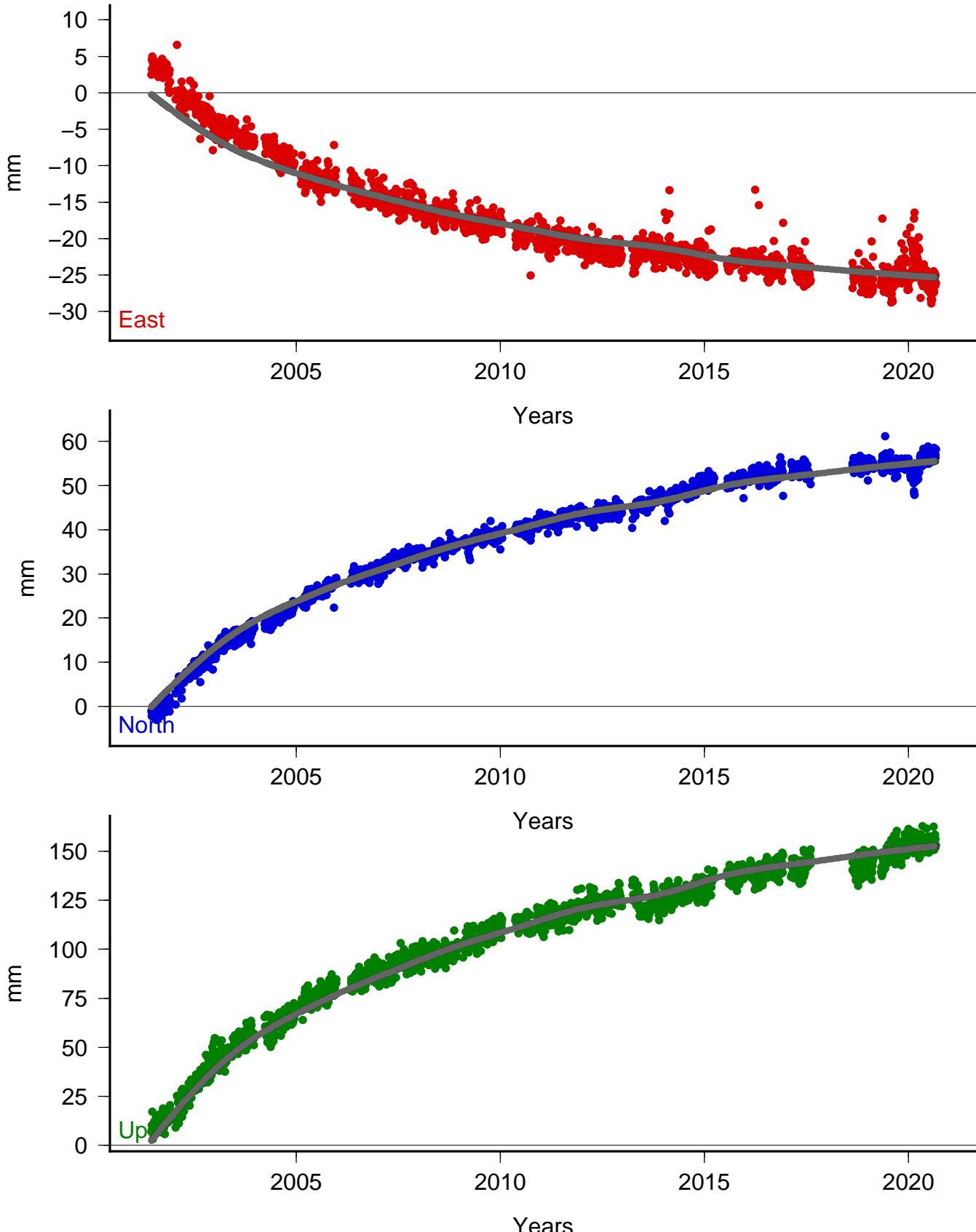
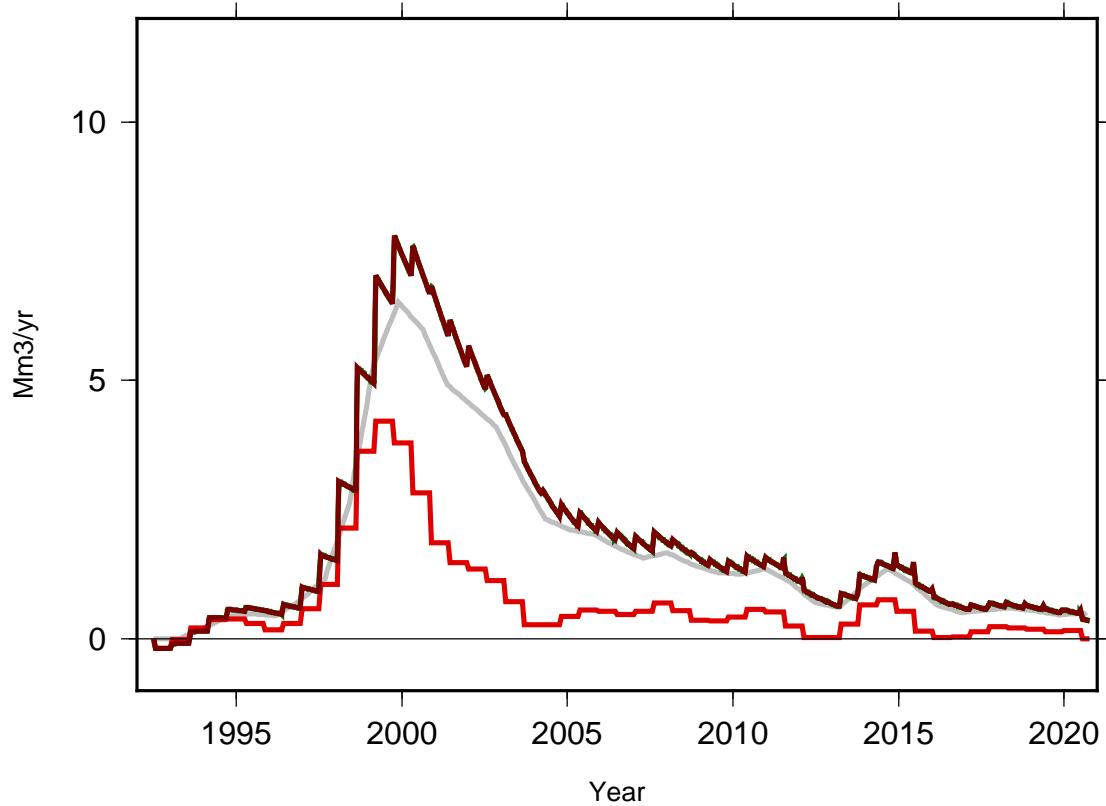


Fig. S-1i

Model: sisF Rate



Volume

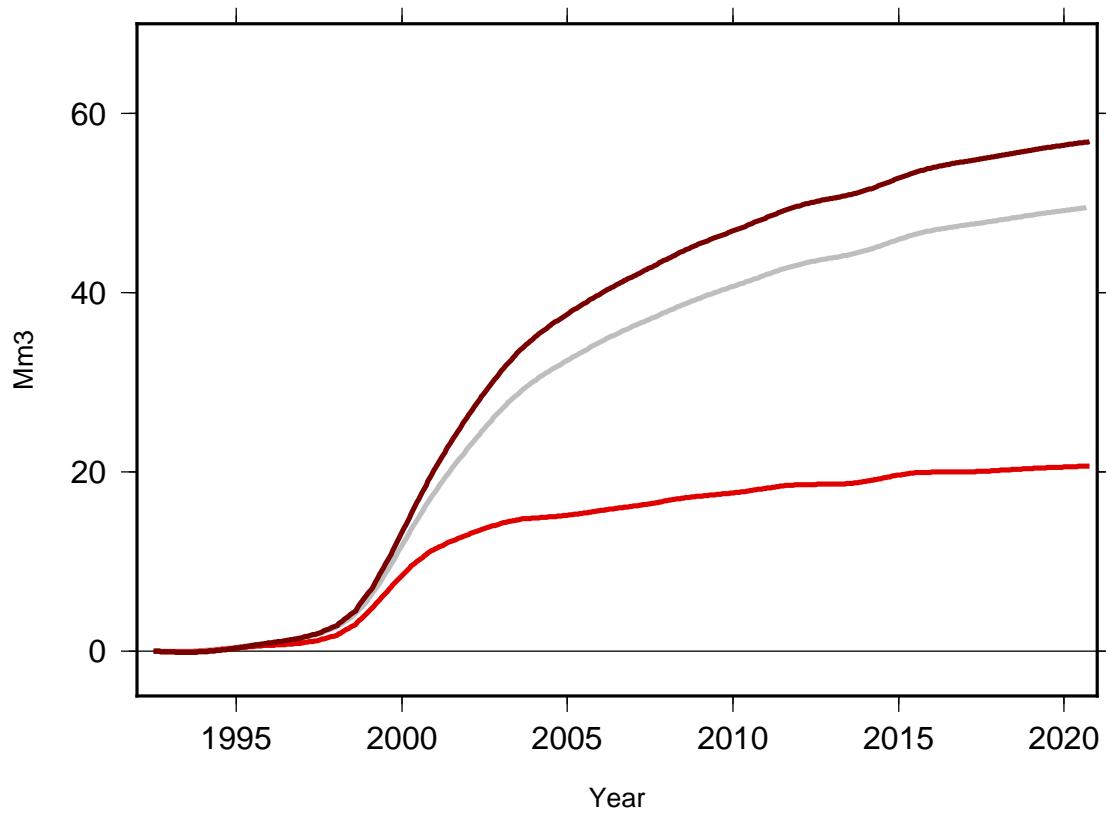
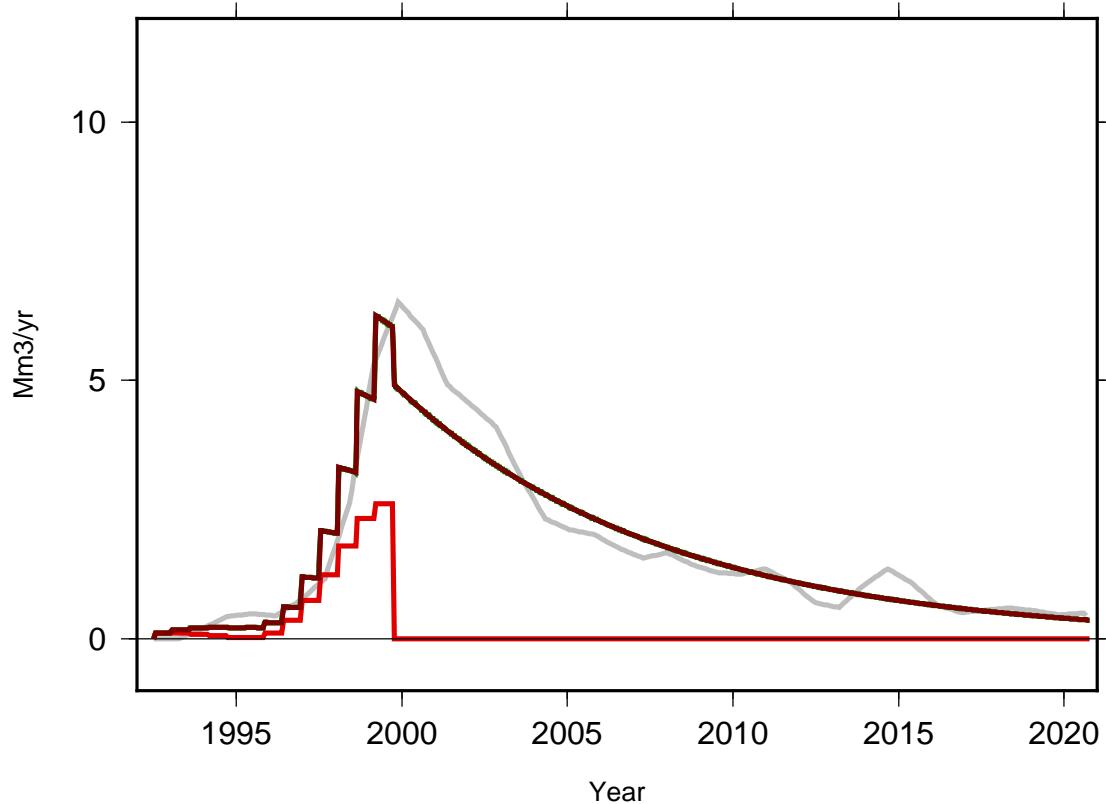


Fig. S-1j

Model: sisO Rate



Volume

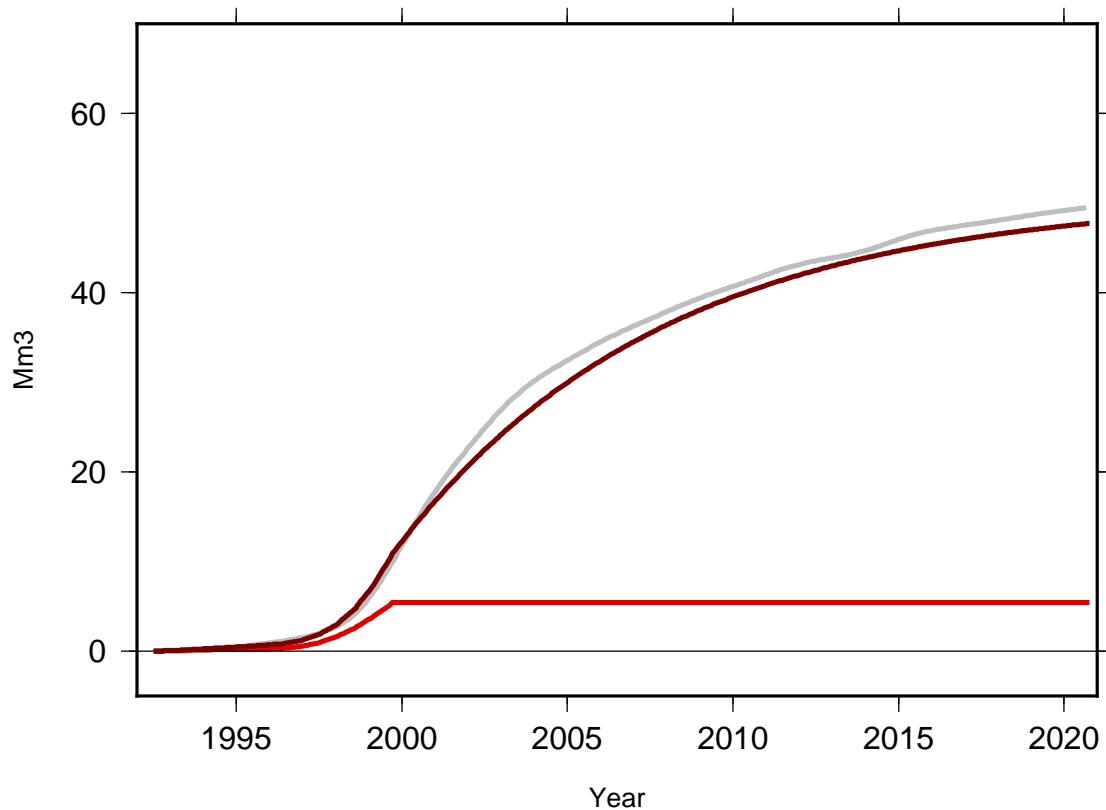
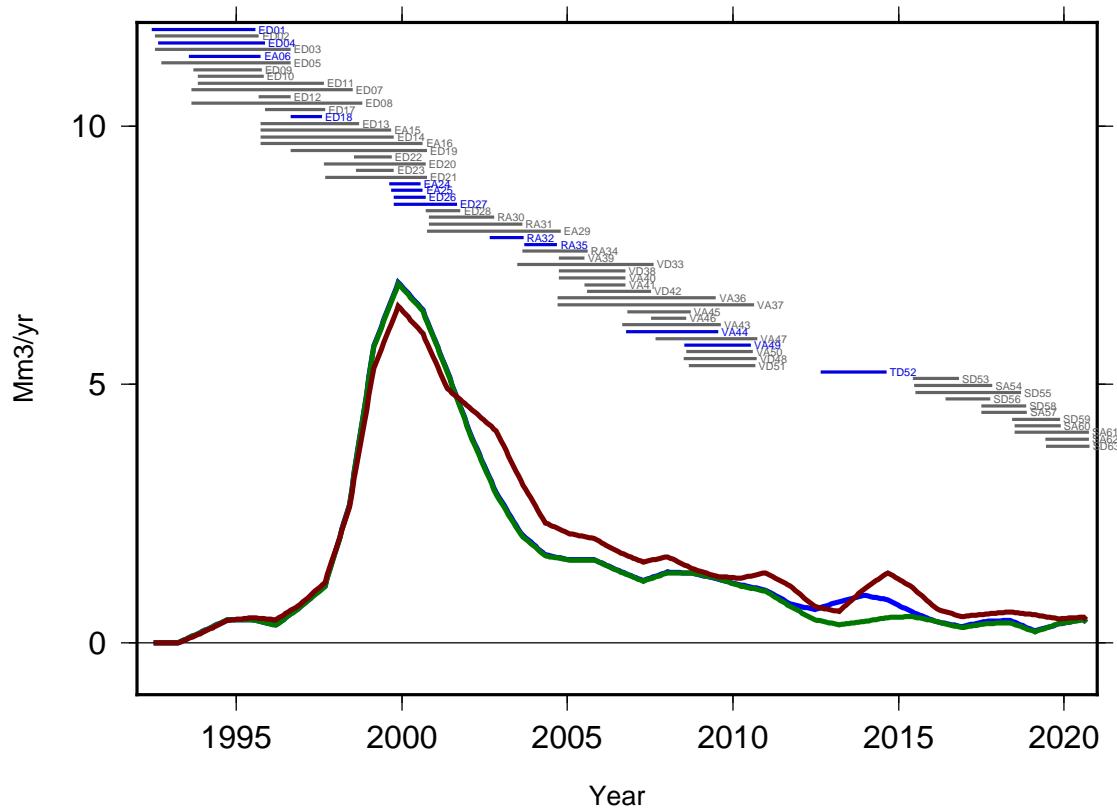


Fig. S-1k

Model: sis1 Rate



Volume

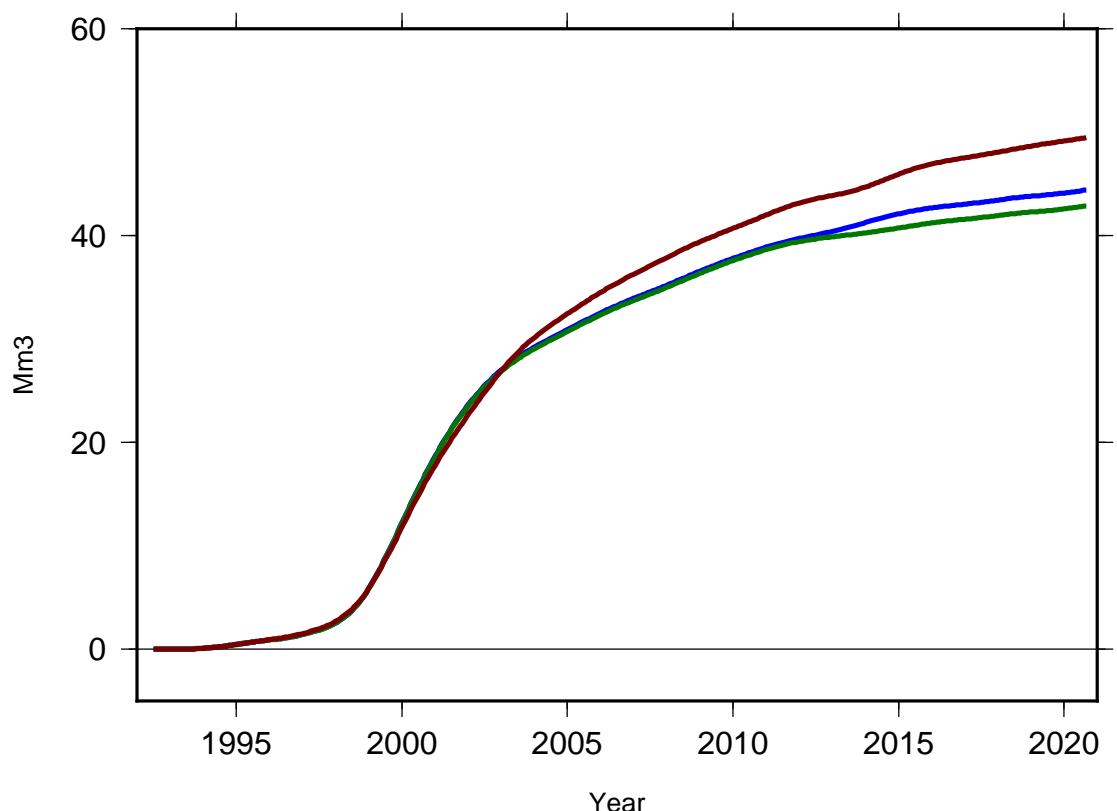


Fig. S-1I

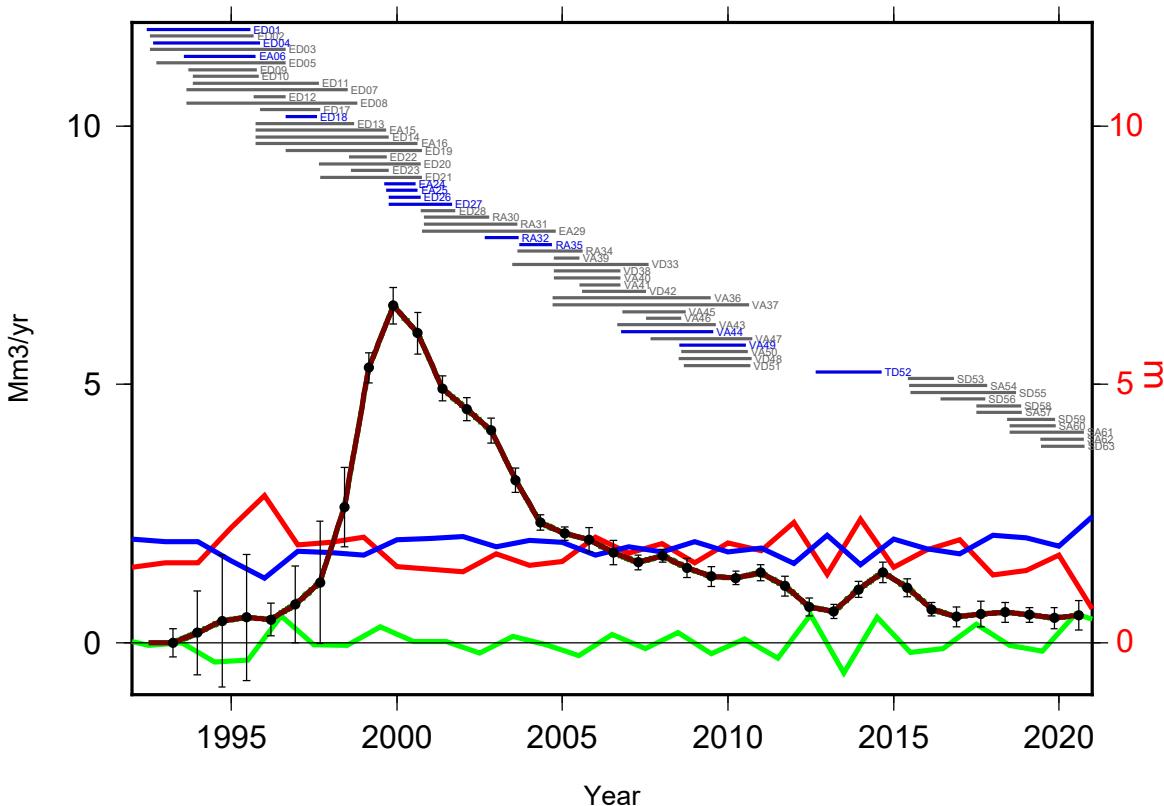


Fig. S-1m

**Figure S-1.** (a) HUSB GPS time series that includes (dark gray curve) predicted deflections from several slow slip events (SSE) superimposed on an exponential fit to the data. Note that the SSEs produce very small deflections at this site which is 300 km from the Cascadia subduction zone. SSEs are from Schmalzle et al. (2014) and an unpublished catalog compiled by McCaffrey. See Schmalzle et al. (2014) for an explanation of the modeling.

(b) (Top) Tests of estimating inflation rate history of a Mogi source using different sampling intervals; 180 days – blue, 270 days – red, 365 days – green, 684 days – purple. Y-axis is the volume rate in  $\text{Mm}^3/\text{yr} = 10^6 \text{ m}^3/\text{yr}$ . Gray and red dots show times of slow-slip events at and vertical offset shows their displacement amplitude in mm at HUSB. (Bottom) Change in volume ( $\text{Mm}^3$ ) through time associated with the four tests.

(c) Inflation rate (top, in  $\text{mm}/\text{yr}$ ) and inflation history (bottom, in mm) for model sis8 where the buried source is a horizontal plane (sill) that expands in a vertical direction.

(d) Inflation rate (top, in  $\text{Mm}^3/\text{yr}$ ) and inflation history (bottom, in  $\text{Mm}^3$ ) for model sisL using a boxcar time history (the expansion rate is constant during each 270-day period). Gray curve is from model sis1 (Mogi source using triangular time elements).

(e) Observed and predicted GPS time series for site HUSB resulting from the oblate spheroid model (sisU). Top (red) is East component, middle (blue) is North component, and bottom (green) is vertical component. Gray are predicted curves. Seasonal signals have been removed. Legend includes East, North and Up velocities (V:) and their one-sigma uncertainties (time series are de-trended using this velocity), weighted rms misfit (Wrms) and normalized RMS misfit (Nrms). Lon. = site East longitude, Lat. = site North latitude, DT: = duration of time series in years, N = number of points (time series have been decimated).

(f) Observed and predicted GPS time series for site HUSB resulting from the sill model (sis8).

(g) Observed and predicted GPS time series for site HUSB resulting from the Riddick and Schmidt (2011) model of piecewise inflation of a Mogi source (sisD).

(h) Observed and predicted GPS time series for site HUSB resulting from the viscoelastic model sisE in which inflation does not start until 2000 and InSAR data are omitted.

(i) Observed and predicted GPS time series for site HUSB resulting from the viscoelastic model (sisF) where a spherical source at depth is surrounded by a viscoelastic spherical shell.

(j) Inflation rate (top, in  $\text{Mm}^3/\text{yr}$ ) and inflation history (bottom, in  $\text{Mm}^3$ ) for model sisF where a spherical source at depth is surrounded by a viscoelastic spherical shell. The source volume change is represented by 205-day time periods during which influx is constant (boxcar) followed by relaxation of the outer shell. Red curve shows the influx rate in  $\text{Mm}^3/\text{yr}$  and the brown is corresponding signal in the elastic region outside the viscoelastic shell. In 2000, the influx largely ends and the shell relaxes, giving the exponential decay with small pulses superimposed. Light gray curves show the results of purely elastic response (sis1).

(k) Inflation rate (top, in  $\text{Mm}^3/\text{yr}$ ) and inflation history (bottom, in  $\text{Mm}^3$ ) for model sisO where a spherical source at depth is surrounded by a viscoelastic spherical shell. Up until 2000, the source volume change is represented by 205-day time periods during which influx is constant (boxcar) followed by relaxation of the outer shell. This differs from sisF (Fig. S-1j) in that no influx is allowed after 2000. Red curve shows the influx rate in  $\text{Mm}^3/\text{yr}$  and the brown is corresponding signal in the elastic region outside the viscoelastic shell. In 2000, the influx ends and the shell relaxes, giving the exponential decay. Light gray curves show the results of purely elastic response (sis1).

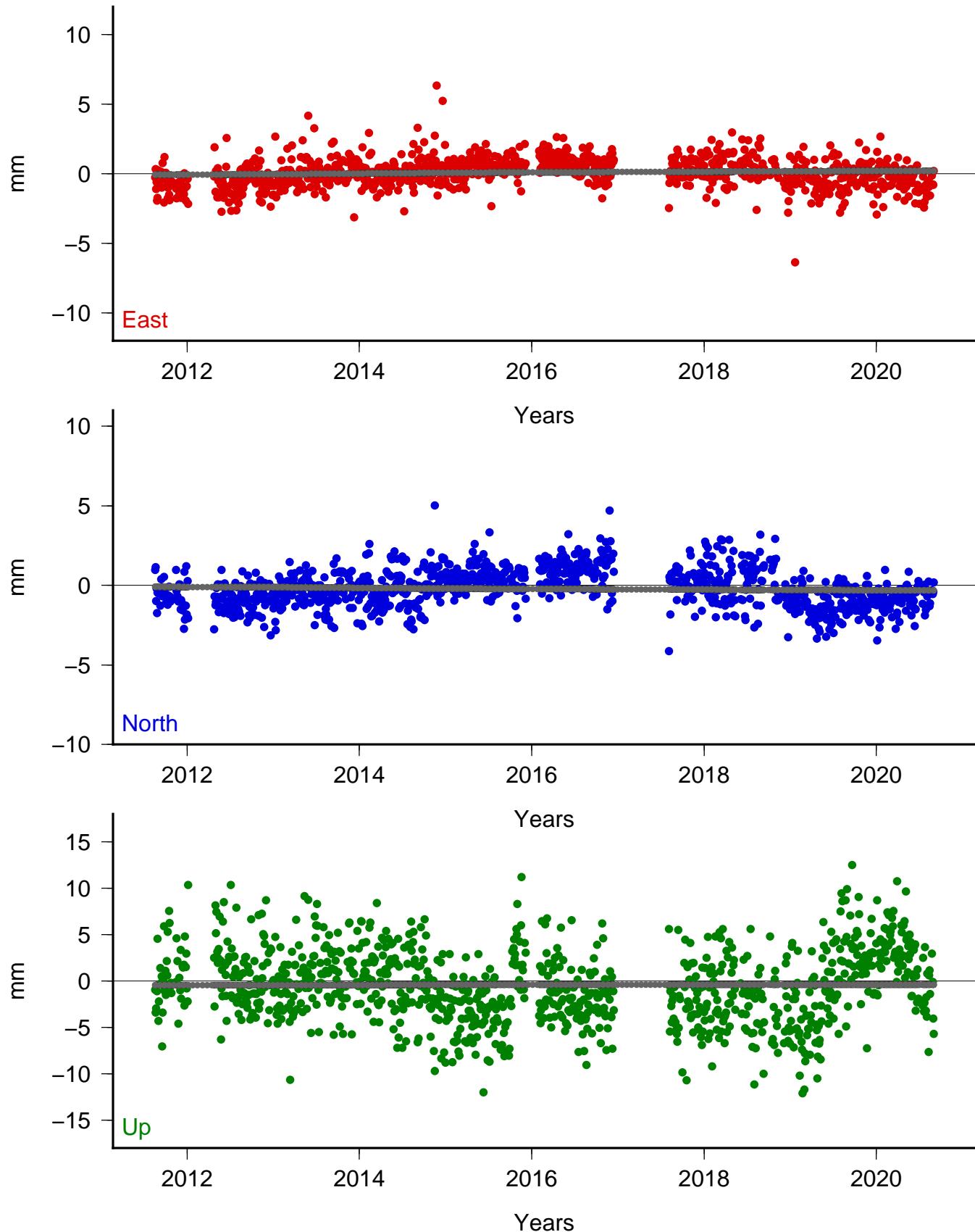
(l) Test of removing data to see impact on oscillations post-2010 using a Mogi source. Brown curve includes all data (sis1), blue is excluding CGPS sites PMAR and HUSB and sCGPS sites CUT2 and POTH (si1a), and green is excluding those 4 GPS plus the sole interferogram TD52 (Fig. 5H) spanning 2012-2014.

(m) Red curve shows the yearly precipitation near the Three Sisters Bulge, in meters. Blue curve is the expected apparent inflation in  $\text{Mm}^3$  of a Mogi source due to the ground displacement resulting from precipitation. Green curve is the expected rate of inflation in  $\text{Mm}^3/\text{yr}$  of a Mogi source due to the ground displacement resulting from precipitation. Brown curve is the modeled rate of inflation of the Mogi source at the Three Sisters Bulge, with 1-sigma error bars. Horizontal lines at top of figure show the time spans of the interferograms used.

Caption is below figure, which has several parts. Search for "Figure S" to locate caption.

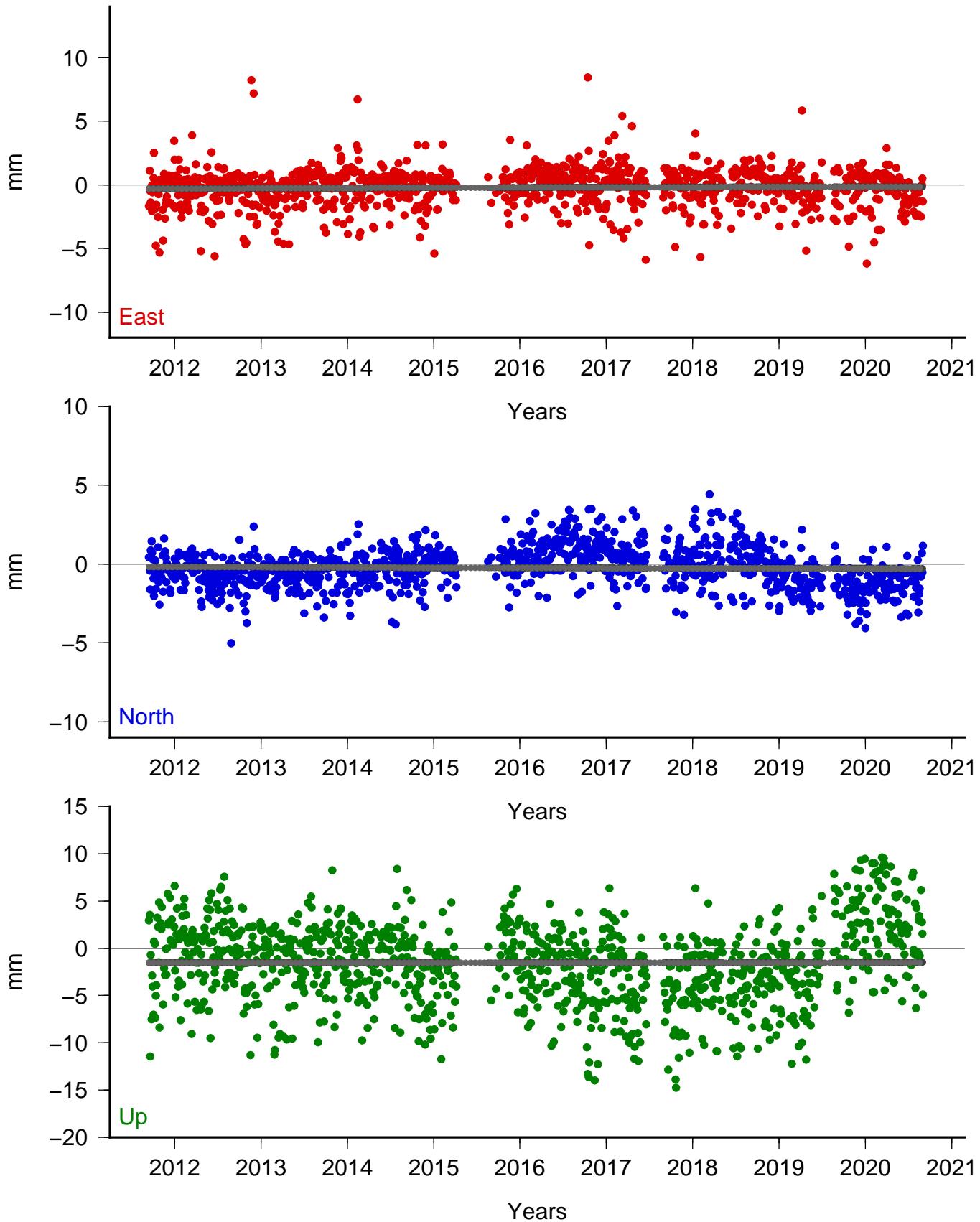
## Site: asbu Model: sis1

East V: 0.20 +/- 0.34 Wrms: 1.0289 Nrms 0.3506  
North V: 3.71 +/- 0.34 Wrms: 1.1909 Nrms 0.4032  
Up V: -0.99 +/- 0.37 Wrms: 3.9369 Nrms 0.4036  
Lon: 238.6315 Lat: 43.8206 DT: 9.0351 N: 1030



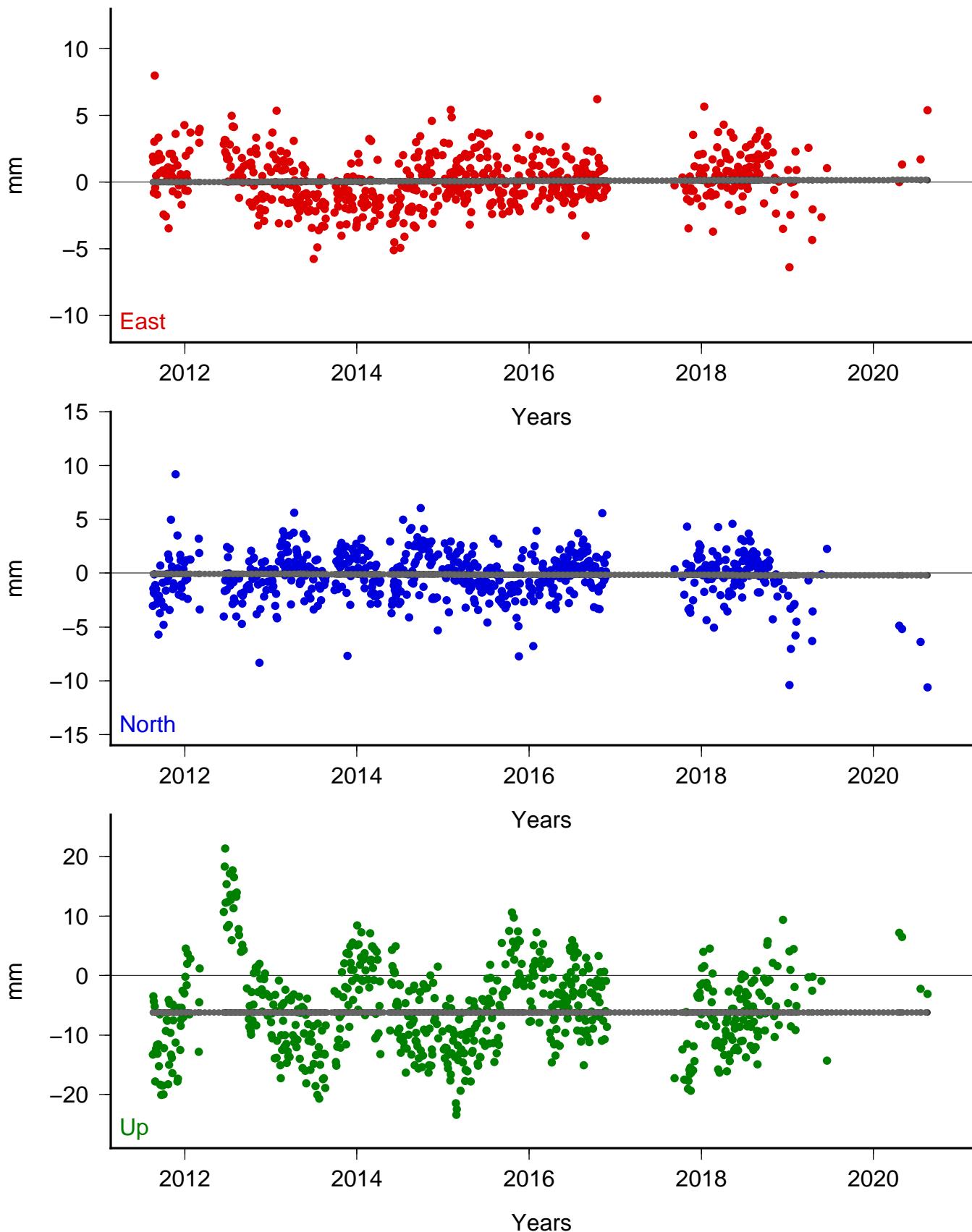
# Site: cihl Model: sis1

East V: -0.16 +/- 0.34 Wrms: 1.5018 Nrms 0.5916  
North V: 3.37 +/- 0.34 Wrms: 1.2660 Nrms 0.4992  
Up V: 0.09 +/- 0.36 Wrms: 4.1950 Nrms 0.5627  
Lon: 238.8513 Lat: 43.7509 DT: 8.9611 N: 1091



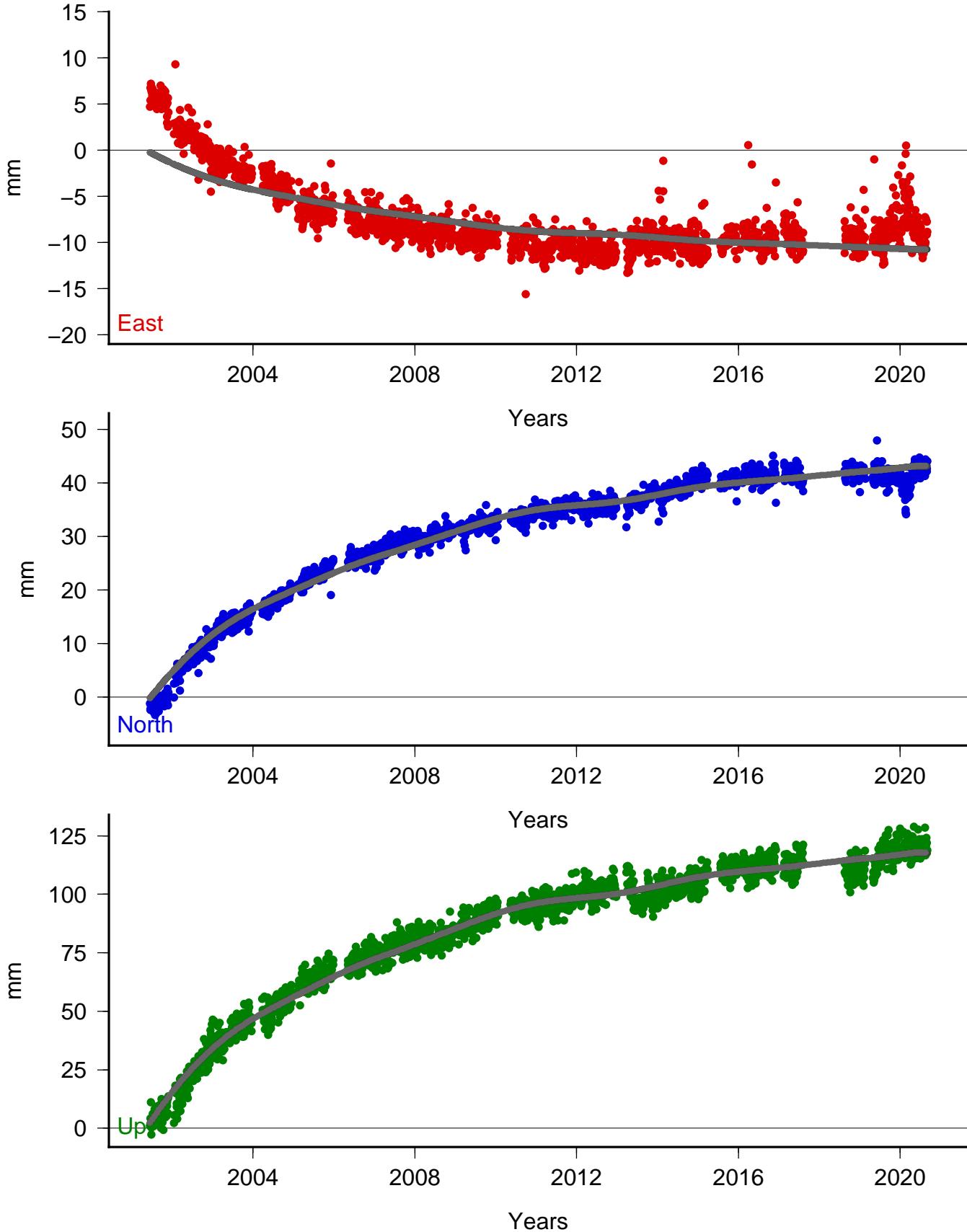
# Site: cpc0 Model: sis1

East V: -0.52 +/- 0.35 Wrms: 1.7898 Nrms 0.4420  
North V: 4.19 +/- 0.35 Wrms: 2.1417 Nrms 0.5860  
Up V: -1.83 +/- 0.49 Wrms: 7.0817 Nrms 0.5001  
Lon: 238.7668 Lat: 43.7221 DT: 8.9995 N: 653



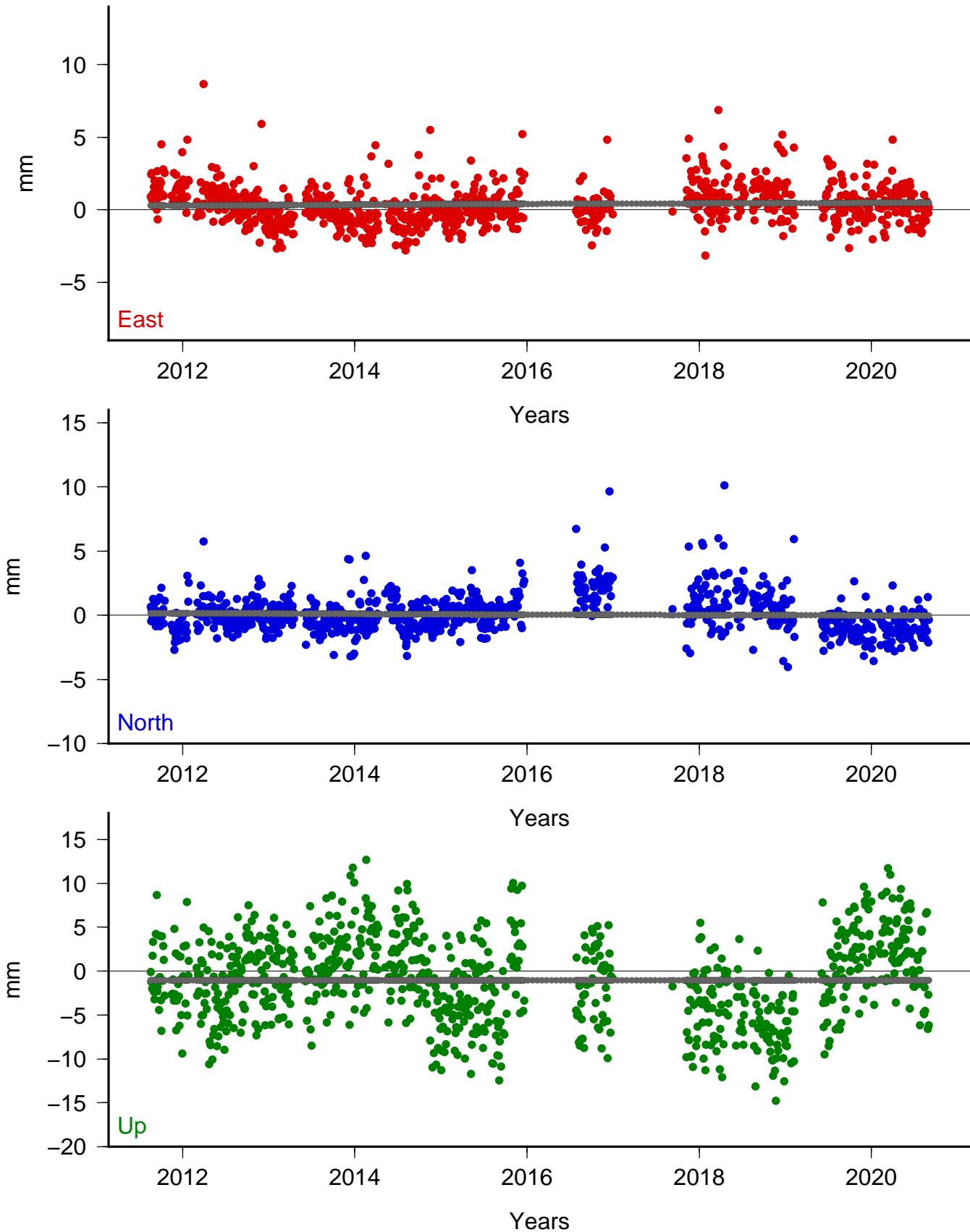
# Site: husb Model: sis1

East V: 0.32 +/- 0.23 Wrms: 2.1543 Nrms 0.7906  
North V: 5.34 +/- 0.23 Wrms: 1.4465 Nrms 0.5049  
Up V: 0.47 +/- 0.23 Wrms: 4.1606 Nrms 0.4807  
Lon: 238.1506 Lat: 44.1195 DT: 19.2064 N: 2083



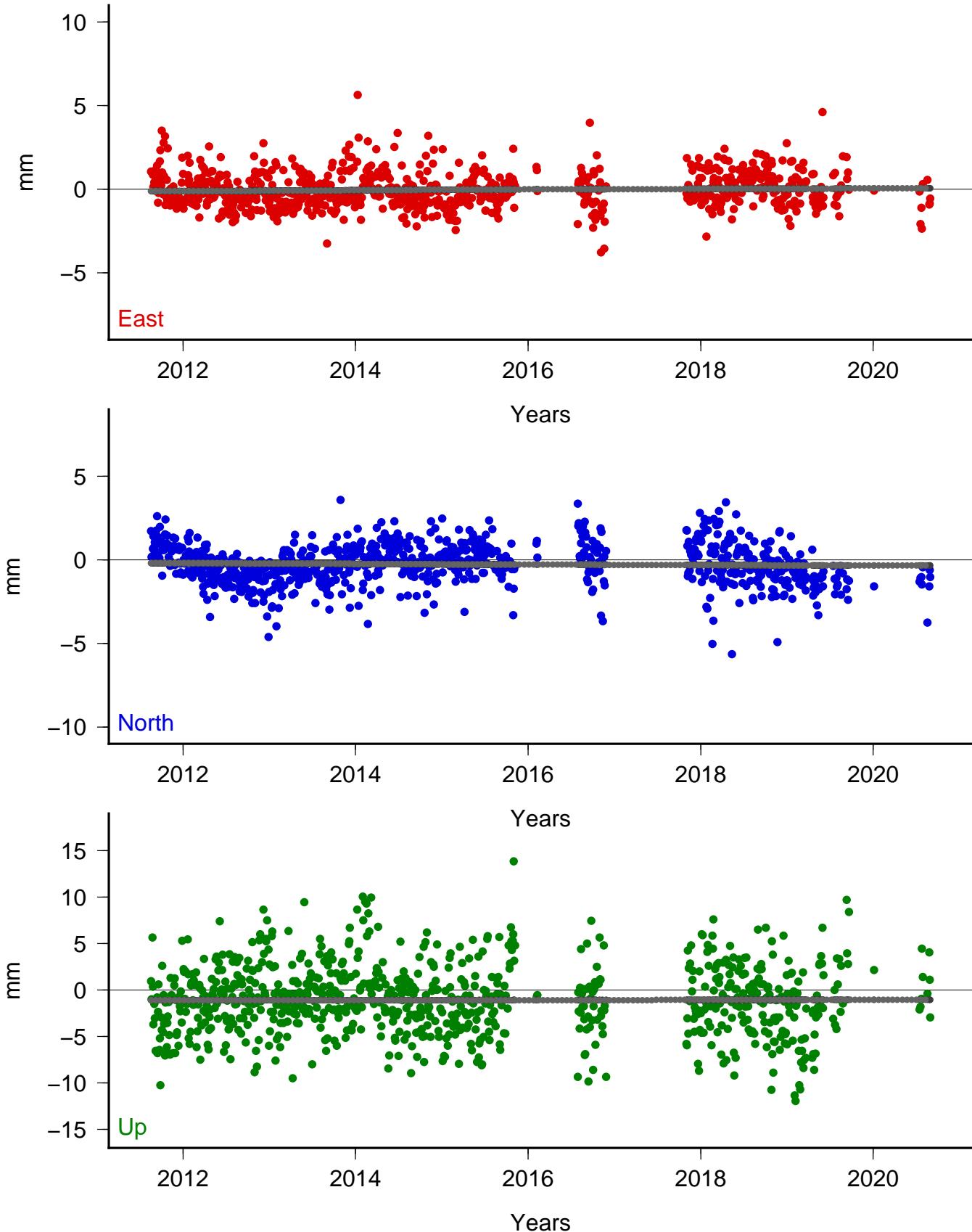
# Site: kwbu Model: sis1

East V: 0.09 +/- 0.34 Wrms: 1.3303 Nrms 0.3938  
North V: 4.06 +/- 0.34 Wrms: 1.4501 Nrms 0.4665  
Up V: -1.22 +/- 0.39 Wrms: 4.7012 Nrms 0.3885  
Lon: 238.6880 Lat: 43.7524 DT: 9.0351 N: 880



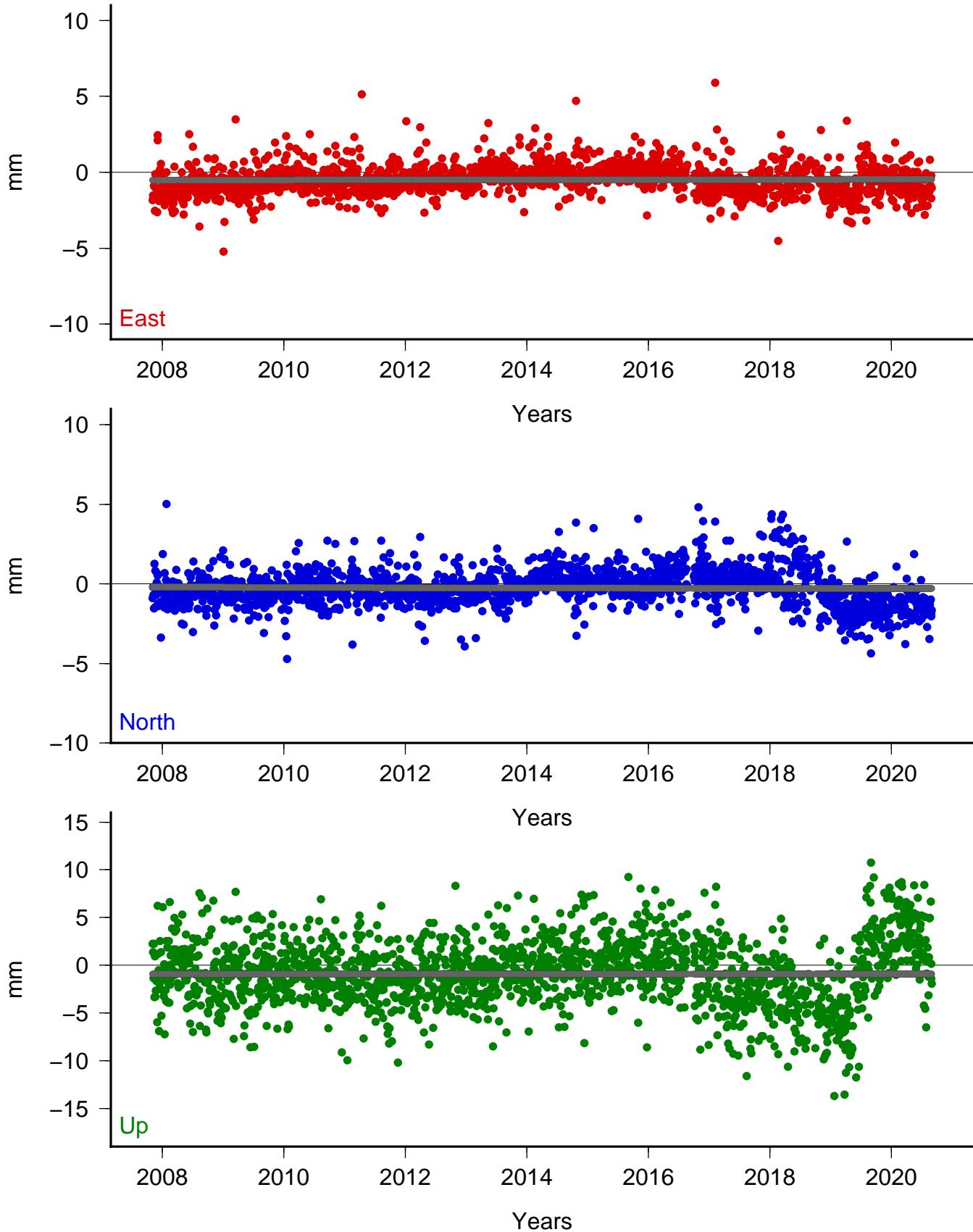
# Site: norm Model: sis1

East V: -0.22 +/- 0.34 Wrms: 1.0231 Nrms 0.3683  
North V: 3.75 +/- 0.34 Wrms: 1.1998 Nrms 0.4192  
Up V: -0.34 +/- 0.38 Wrms: 3.6679 Nrms 0.3976  
Lon: 238.7473 Lat: 43.7389 DT: 9.0297 N: 837



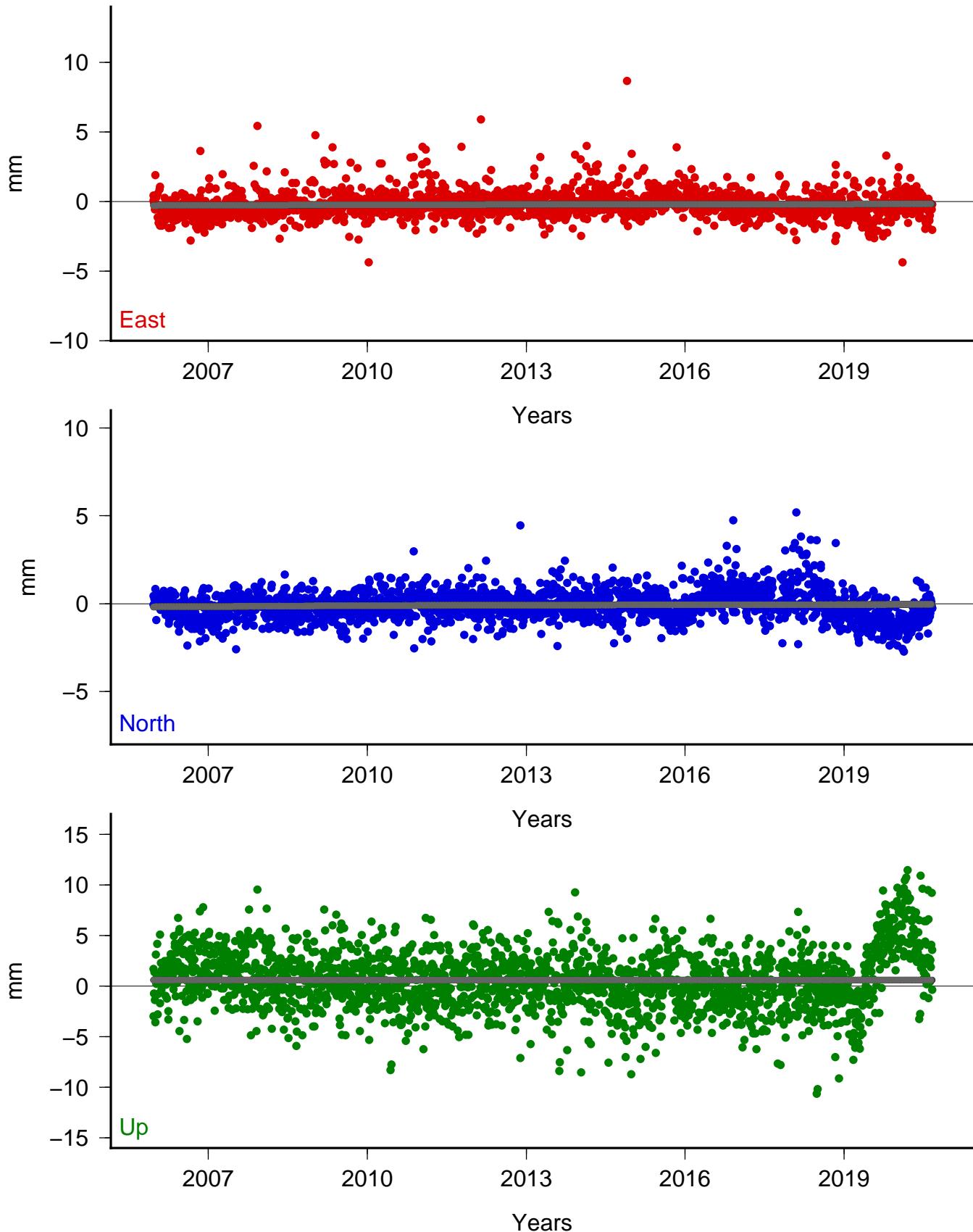
# Site: p062 Model: sis1

East V: -1.19 +/- 0.28 Wrms: 0.9591 Nrms 0.3750  
North V: 3.89 +/- 0.28 Wrms: 1.1517 Nrms 0.4459  
Up V: -0.32 +/- 0.29 Wrms: 3.4608 Nrms 0.4543  
Lon: 238.9093 Lat: 43.1124 DT: 12.8243 N: 1735



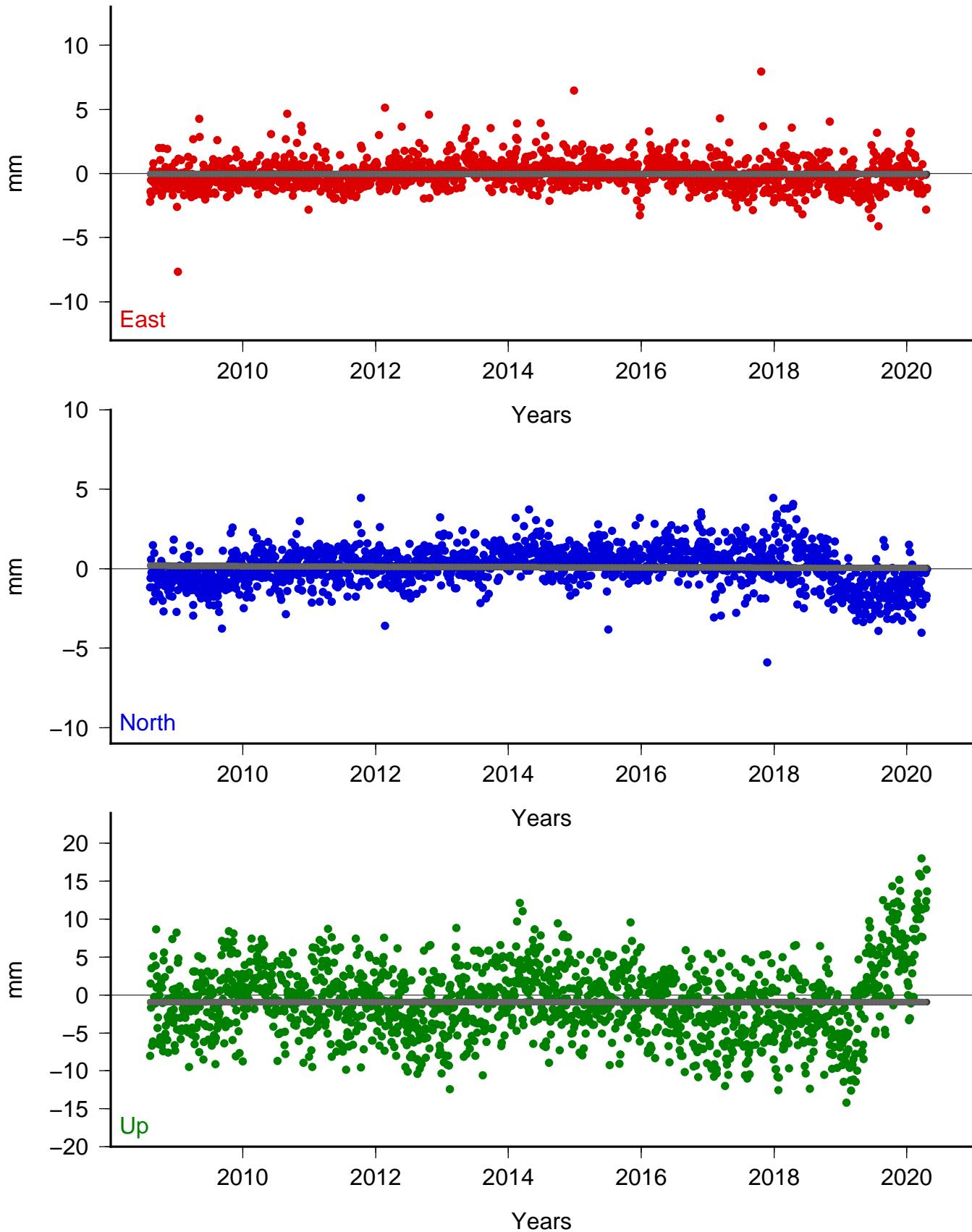
# Site: p063 Model: sis1

East V: 1.34 +/- 0.26 Wrms: 0.9120 Nrms 0.3539  
North V: 2.64 +/- 0.26 Wrms: 0.8478 Nrms 0.3209  
Up V: -1.02 +/- 0.27 Wrms: 2.8717 Nrms 0.3698  
Lon: 239.0538 Lat: 44.9227 DT: 14.7024 N: 2011



# Site: p382 Model: sis1

East V: -0.60 +/- 0.29 Wrms: 1.1016 Nrms 0.3484  
North V: 4.50 +/- 0.29 Wrms: 1.2091 Nrms 0.4236  
Up V: -0.68 +/- 0.32 Wrms: 4.6099 Nrms 0.4052  
Lon: 238.2304 Lat: 43.1771 DT: 11.6991 N: 1586



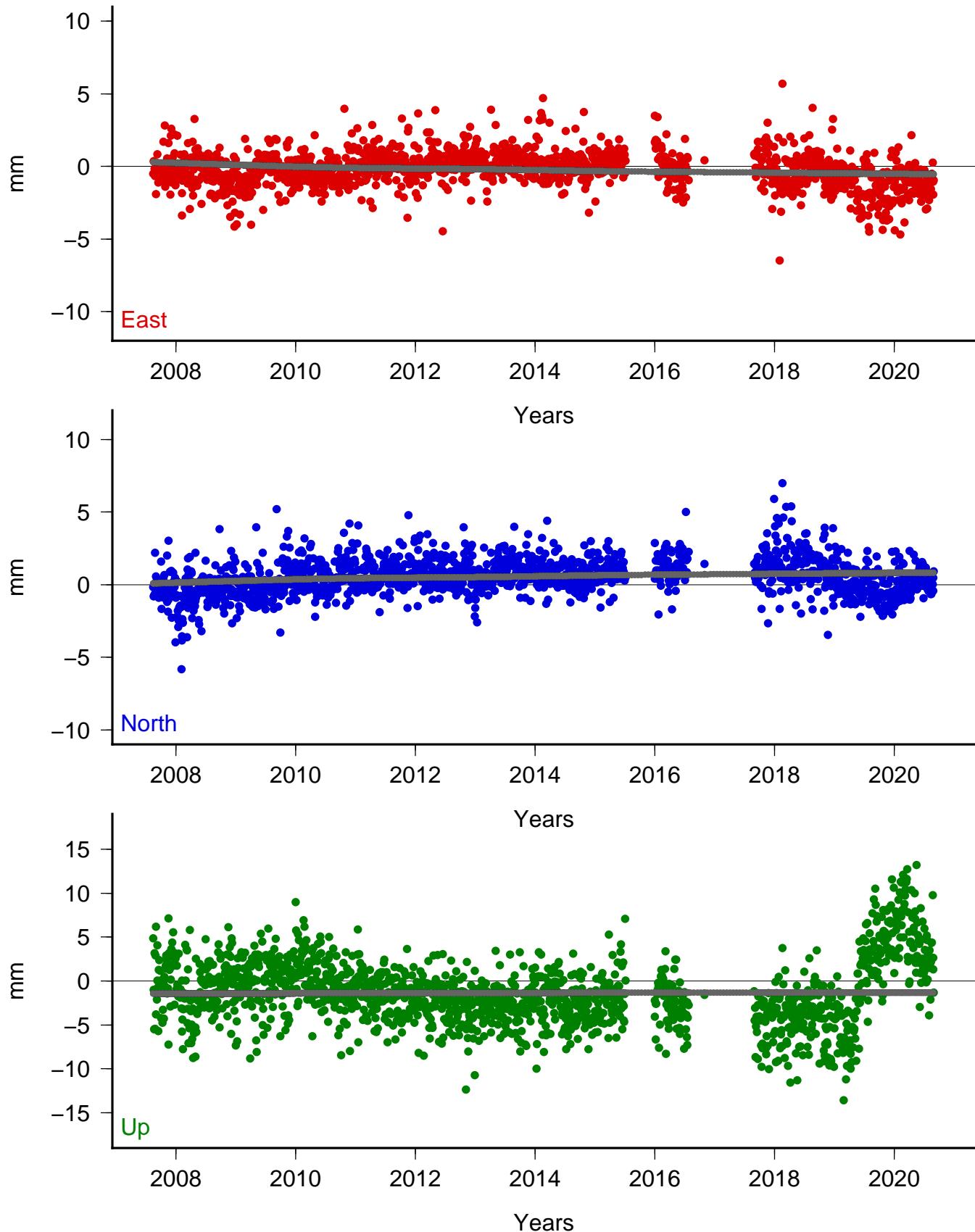
# Site: p383 Model: sis1

East V: 2.23 +/- 0.28 Wrms: 1.1888 Nrms 0.4681

North V: 4.57 +/- 0.28 Wrms: 1.2137 Nrms 0.4687

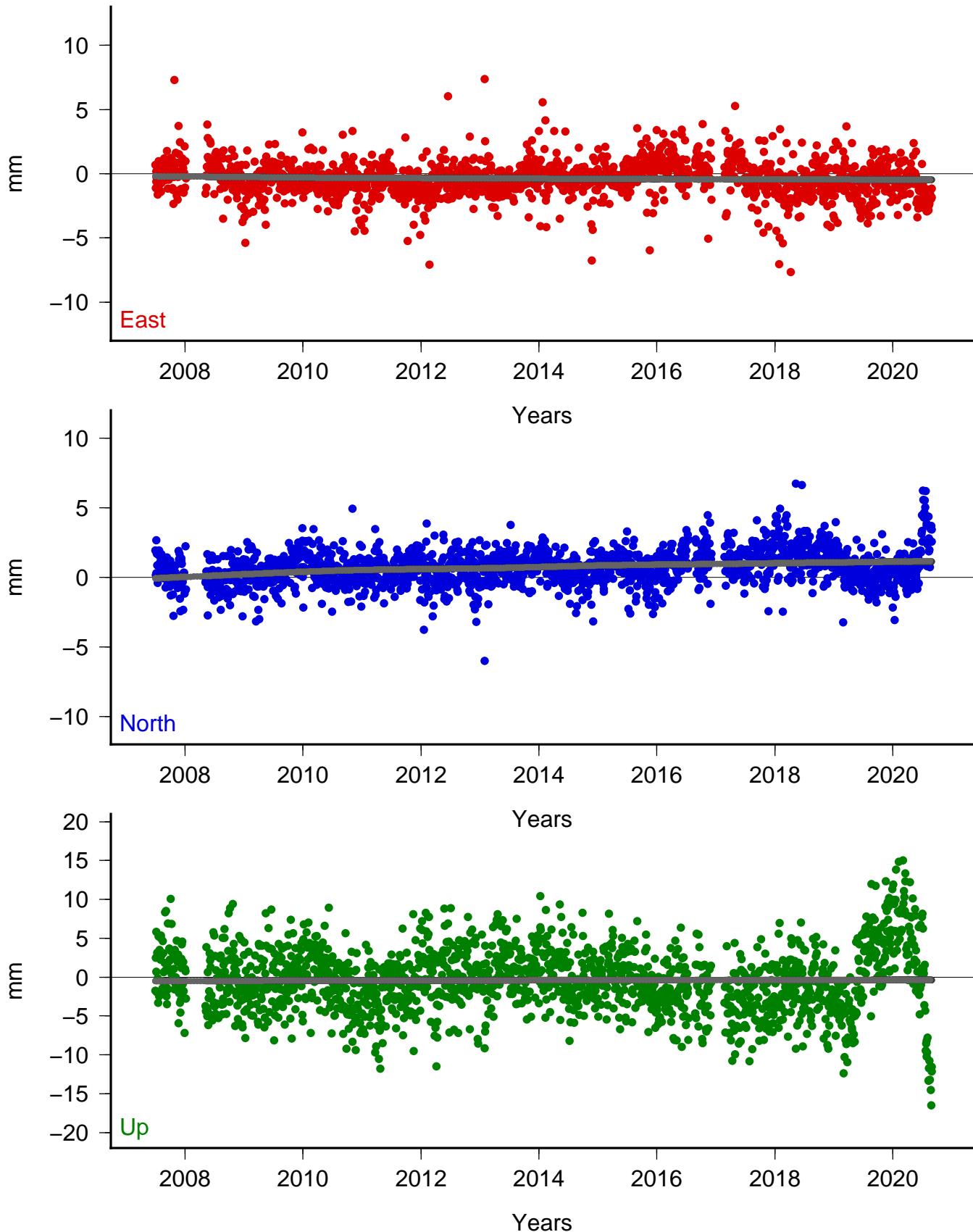
Up V: -0.48 +/- 0.29 Wrms: 3.7360 Nrms 0.5018

Lon: 237.7828 Lat: 44.3422 DT: 13.0406 N: 1574



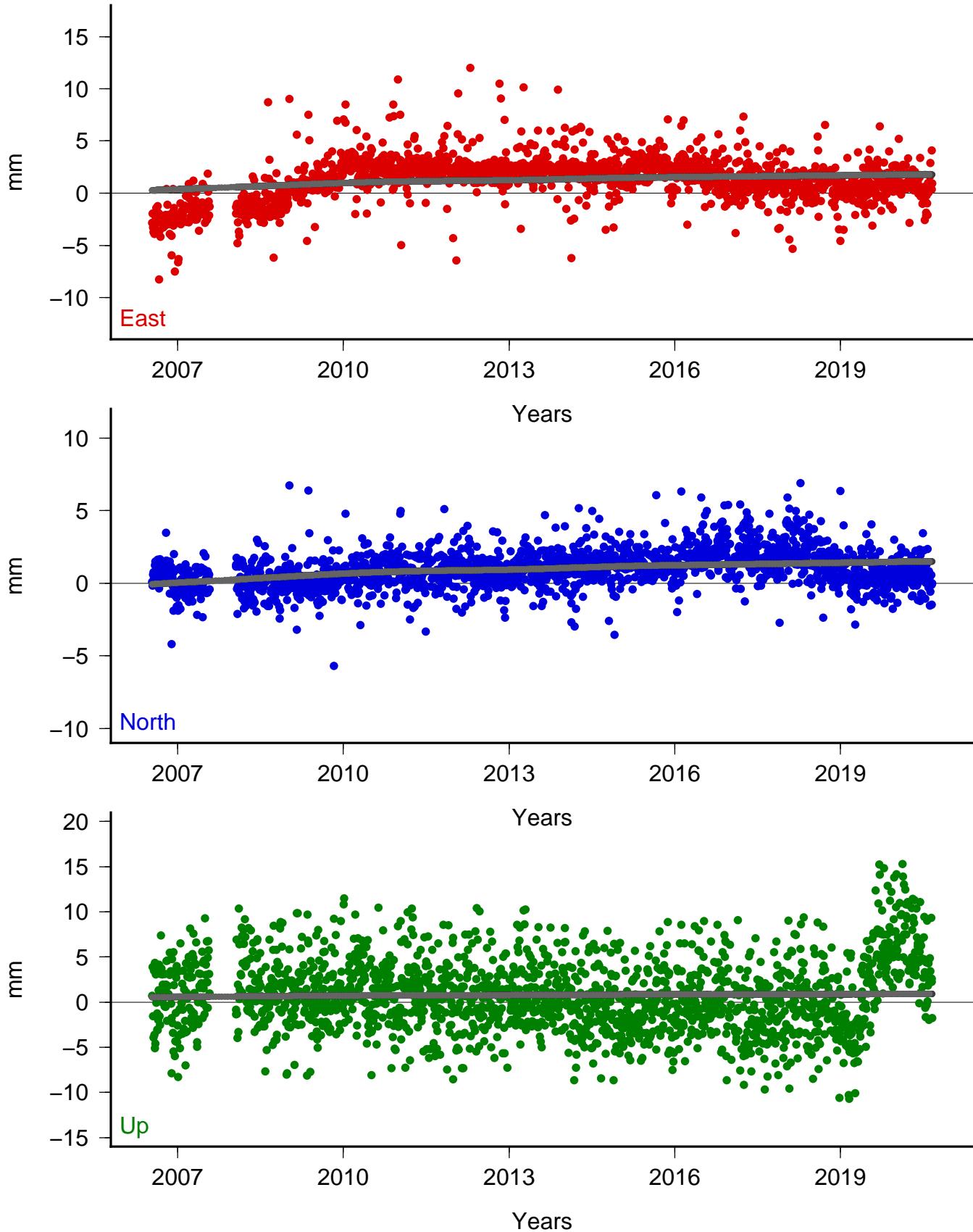
# Site: p385 Model: sis1

East V: 2.28 +/- 0.28 Wrms: 1.3695 Nrms 0.5198  
North V: 4.04 +/- 0.28 Wrms: 1.2179 Nrms 0.4333  
Up V: -0.58 +/- 0.29 Wrms: 4.1395 Nrms 0.4967  
Lon: 238.0542 Lat: 44.4348 DT: 13.172 N: 1714



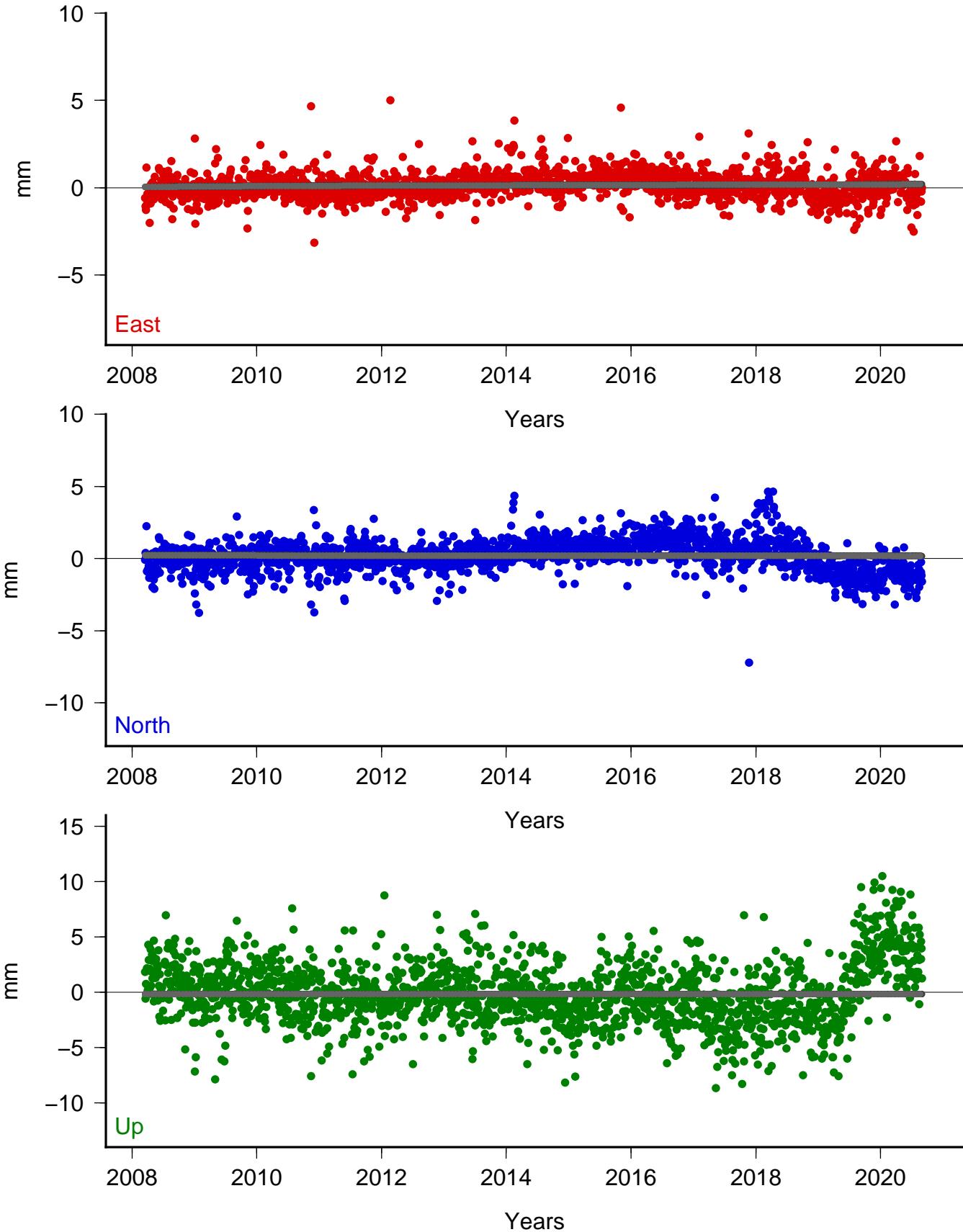
# Site: p387 Model: sis1

East V: 1.48 +/- 0.27 Wrms: 1.9581 Nrms 0.7301  
North V: 3.51 +/- 0.27 Wrms: 1.2501 Nrms 0.4690  
Up V: -1.26 +/- 0.27 Wrms: 4.0570 Nrms 0.5030  
Lon: 238.4255 Lat: 44.2968 DT: 14.1248 N: 1839



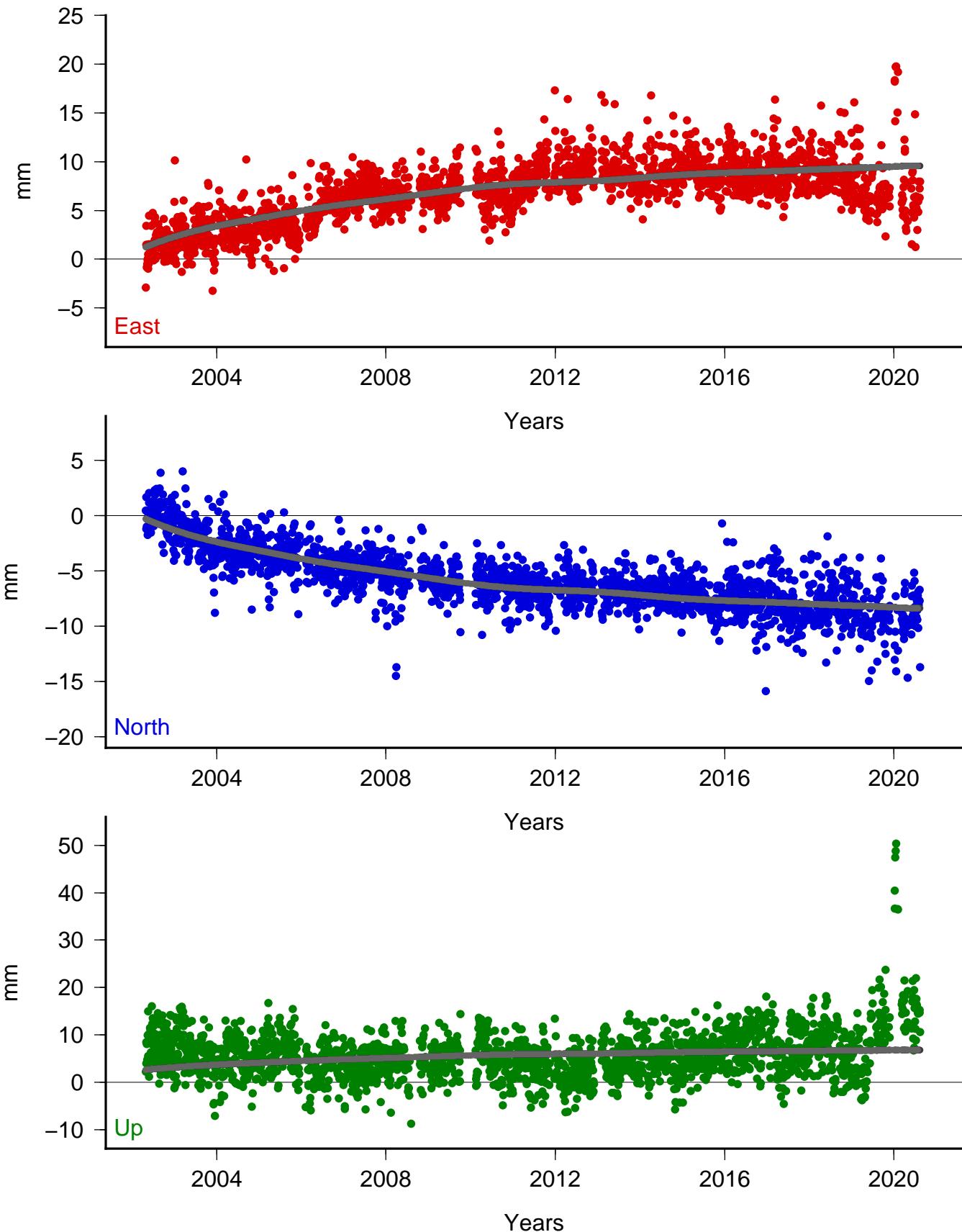
# Site: p389 Model: sis1

East V: -0.09 +/- 0.28 Wrms: 0.7223 Nrms 0.2833  
North V: 2.87 +/- 0.28 Wrms: 1.1145 Nrms 0.4326  
Up V: 0.09 +/- 0.29 Wrms: 2.7469 Nrms 0.3627  
Lon: 239.3967 Lat: 43.8120 DT: 12.4547 N: 1710



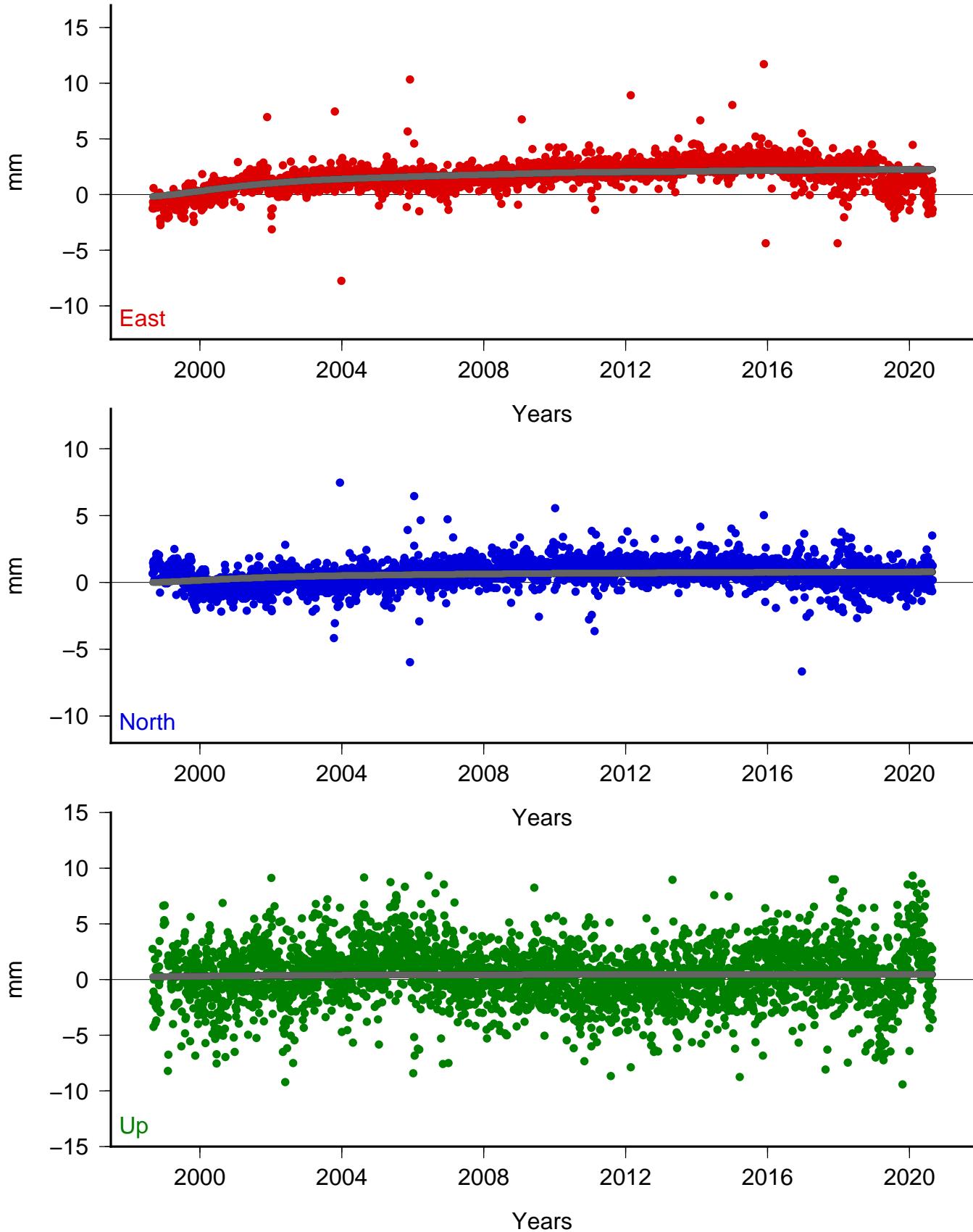
# Site: pmar Model: sis1

East V: 1.47 +/- 0.23 Wrms: 2.0326 Nrms 0.7276  
North V: 3.39 +/- 0.23 Wrms: 1.5219 Nrms 0.5311  
Up V: -1.39 +/- 0.24 Wrms: 4.9150 Nrms 0.5652  
Lon: 238.3132 Lat: 43.9907 DT: 18.2865 N: 2102



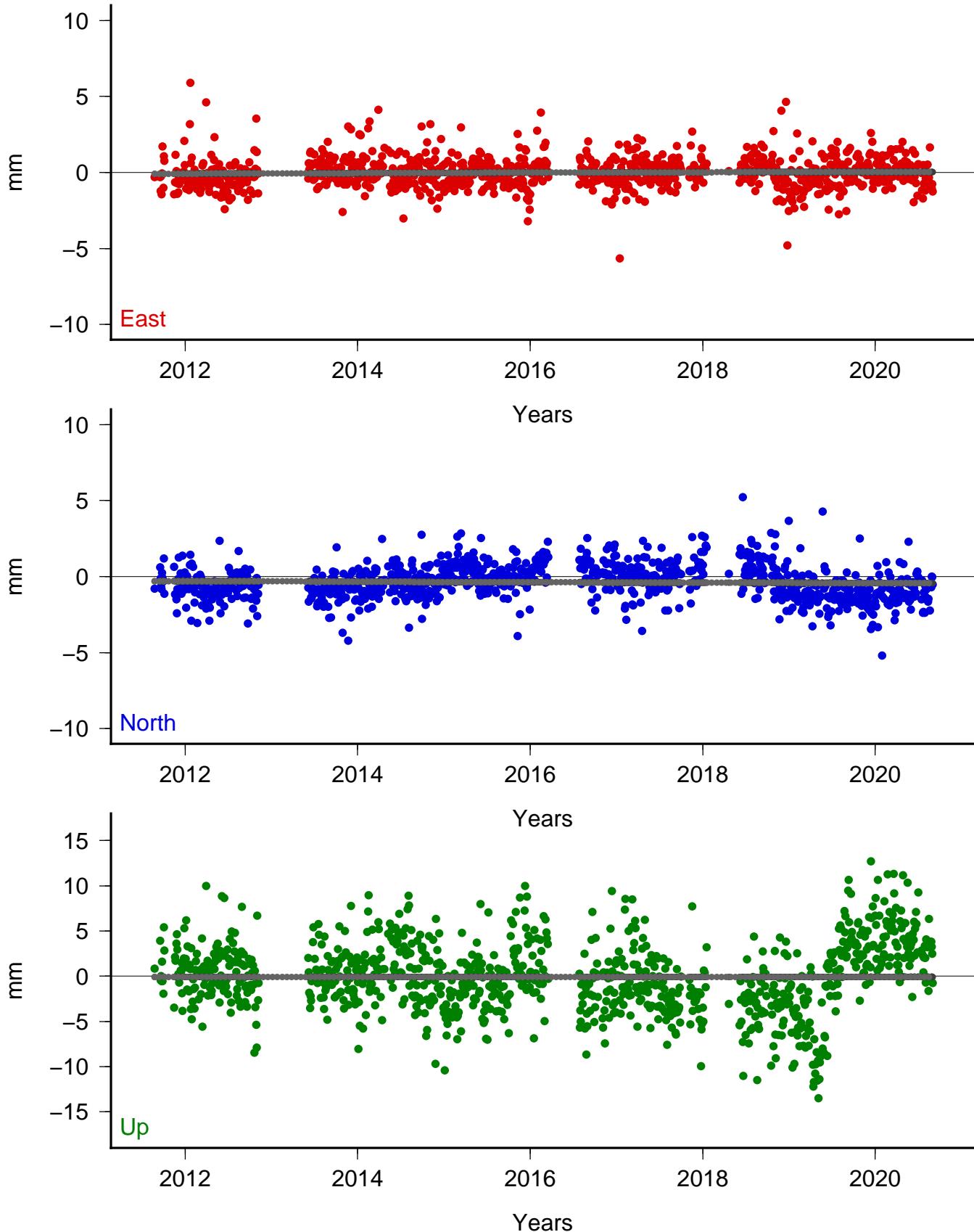
# Site: redm Model: sis1

East V: 0.63 +/- 0.21 Wrms: 1.0009 Nrms 0.3642  
North V: 3.11 +/- 0.21 Wrms: 0.9030 Nrms 0.3267  
Up V: -1.29 +/- 0.22 Wrms: 2.5776 Nrms 0.3086  
Lon: 238.8521 Lat: 44.2598 DT: 21.9908 N: 2966



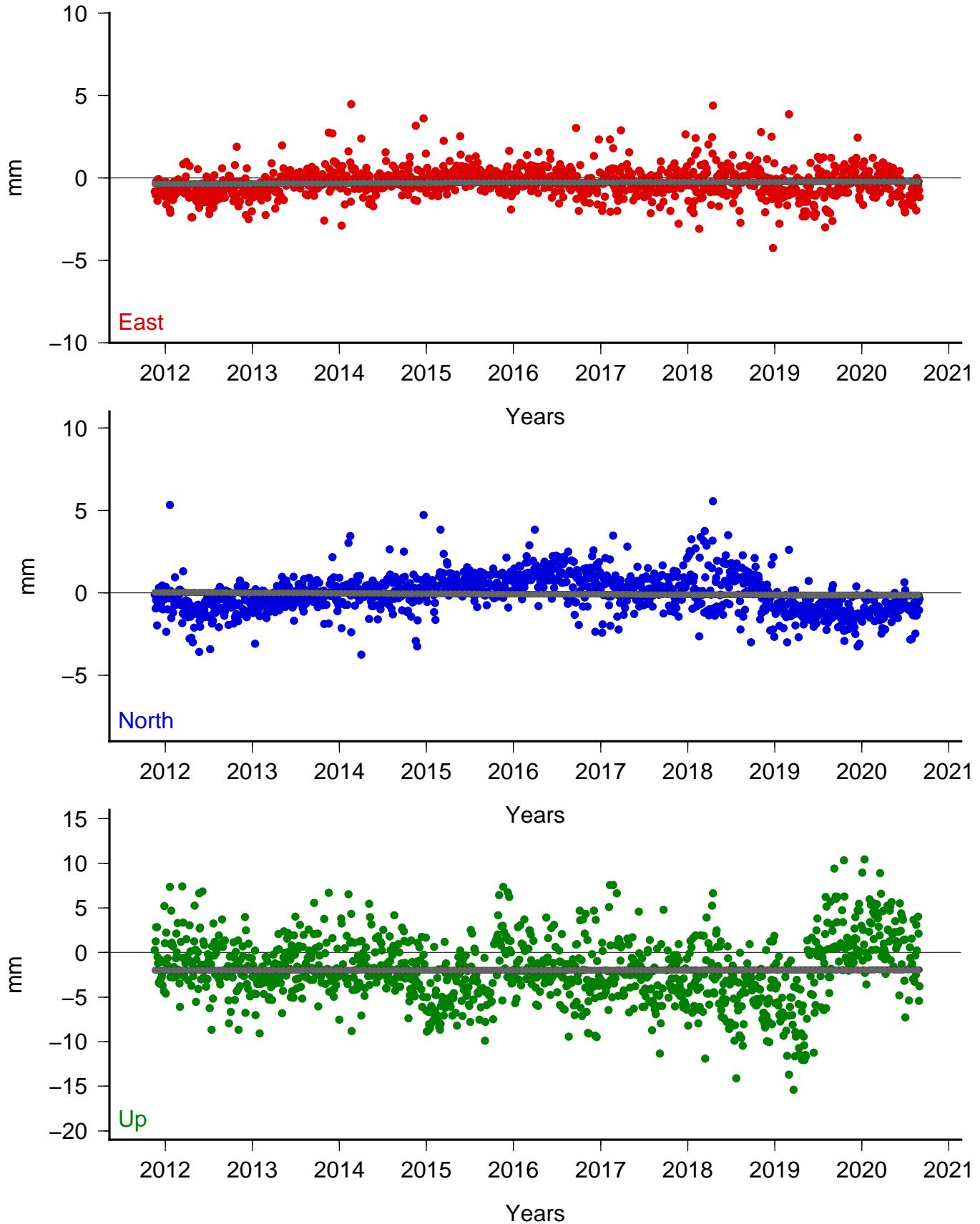
# Site: svic Model: sis1

East V: -0.37 +/- 0.34 Wrms: 1.0255 Nrms 0.3938  
North V: 3.72 +/- 0.34 Wrms: 1.1400 Nrms 0.4406  
Up V: -0.17 +/- 0.36 Wrms: 3.9783 Nrms 0.5134  
Lon: 238.7467 Lat: 43.6431 DT: 9.0186 N: 986



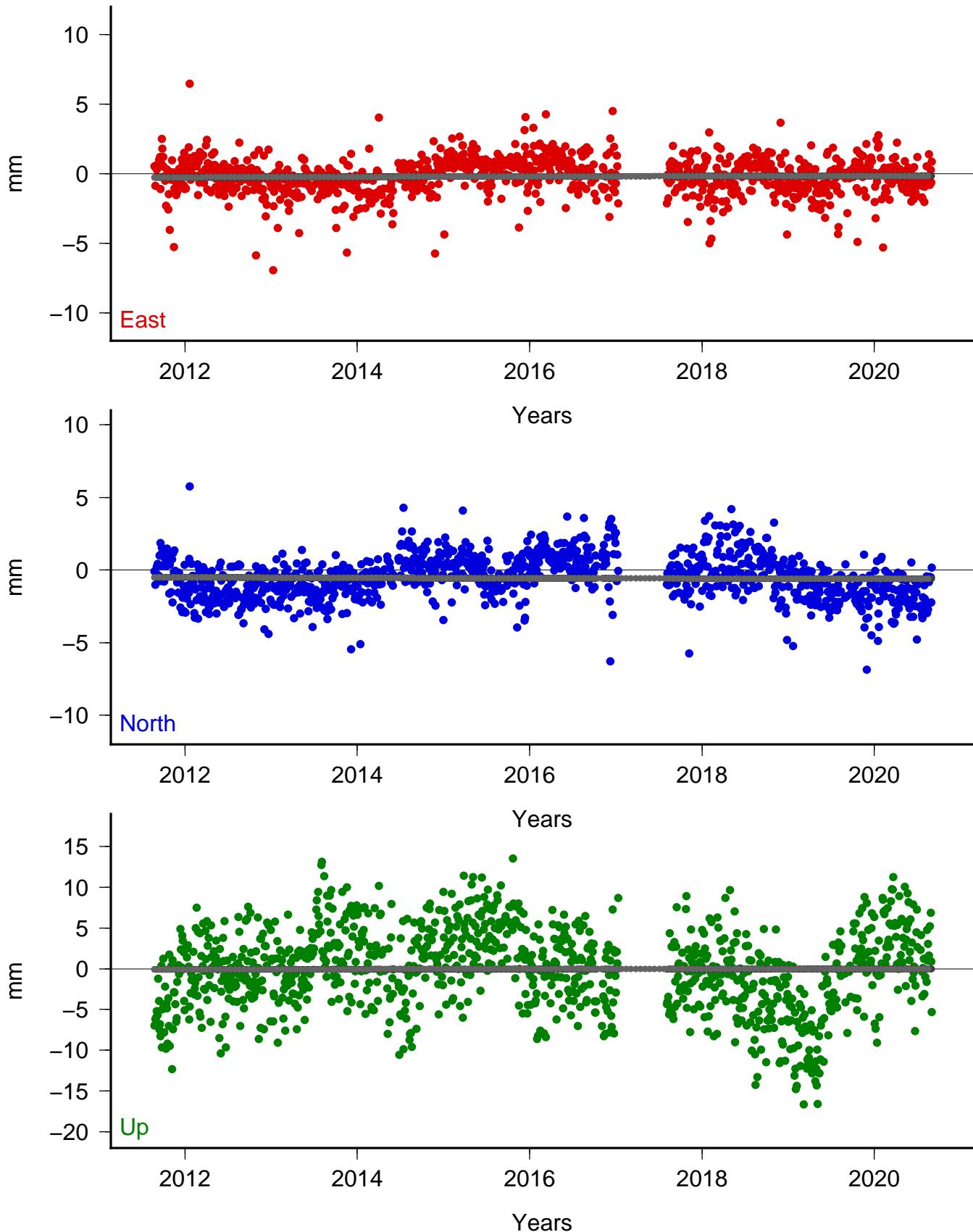
# Site: swnb Model: sis1

East V: -0.04 +/- 0.34 Wrms: 0.8621 Nrms 0.3440  
North V: 3.87 +/- 0.34 Wrms: 1.1510 Nrms 0.4561  
Up V: -0.35 +/- 0.36 Wrms: 3.5654 Nrms 0.4853  
Lon: 238.6446 Lat: 43.6727 DT: 8.7831 N: 1186



# Site: tmbu Model: sis1

East V: -0.39 +/- 0.34 Wrms: 1.2882 Nrms 0.4084  
North V: 3.50 +/- 0.34 Wrms: 1.5055 Nrms 0.4714  
Up V: -0.41 +/- 0.38 Wrms: 4.8935 Nrms 0.4017  
Lon: 238.8554 Lat: 43.6018 DT: 9.0186 N: 1089

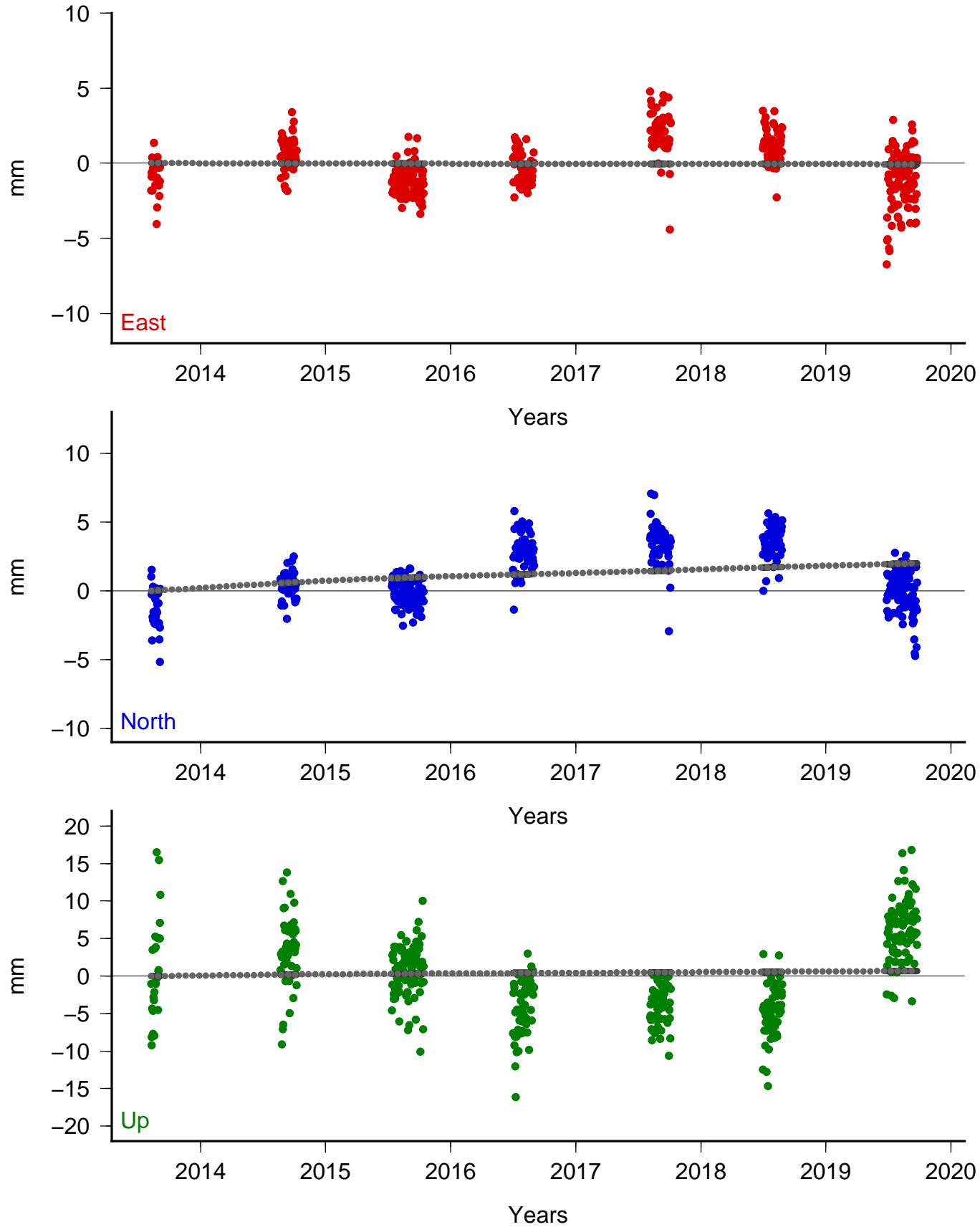


**Figure S-2.** Plots of de-trended continuous GPS (cGPS) data and predicted values for model sis1 (Mogi source). Top (red) is East component, middle (blue) is North component, and bottom (green) is vertical component. Gray are predicted curves. Seasonal signals have also been removed. Site code is at top. Legend includes East, North and Up velocities (V) and their one-sigma uncertainties (time series are de-trended using this velocity), weighted rms misfit (Wrms) and normalized RMS misfit (Nrms). Lon. = site East longitude, Lat. = site North latitude, DT: = duration of time series in years, N = number of points.

Caption is below figure, which has several parts. Search for "Figure S" to locate caption.

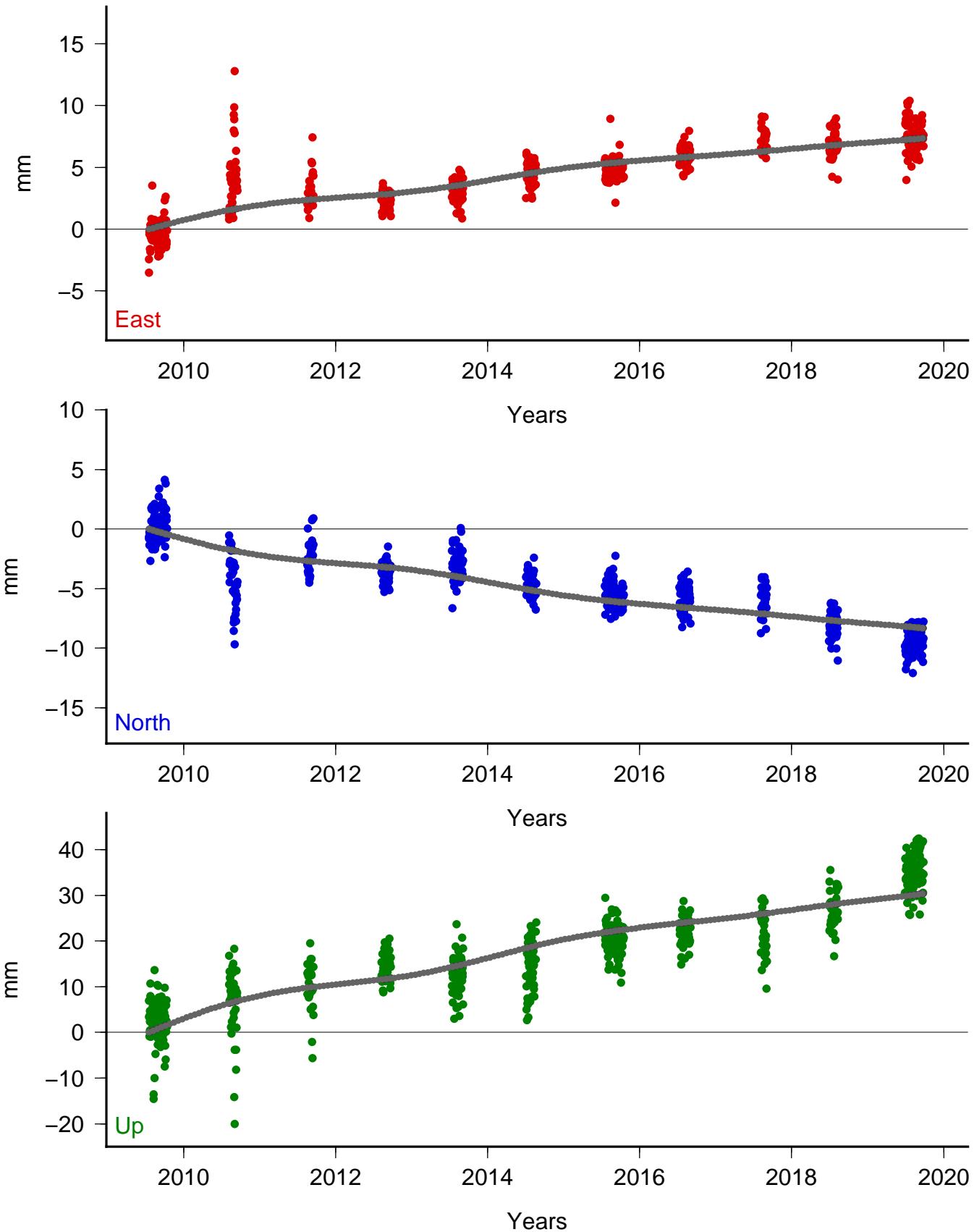
## Site: blnp Model: sis1

East V: 1.33 +/- 0.40 Wrms: 1.7628 Nrms 0.7266  
North V: 4.32 +/- 0.40 Wrms: 1.9844 Nrms 0.8097  
Up V: -0.34 +/- 0.40 Wrms: 5.6501 Nrms 0.7958  
Lon: 238.1502 Lat: 44.2458 DT: 6.1247 N: 430



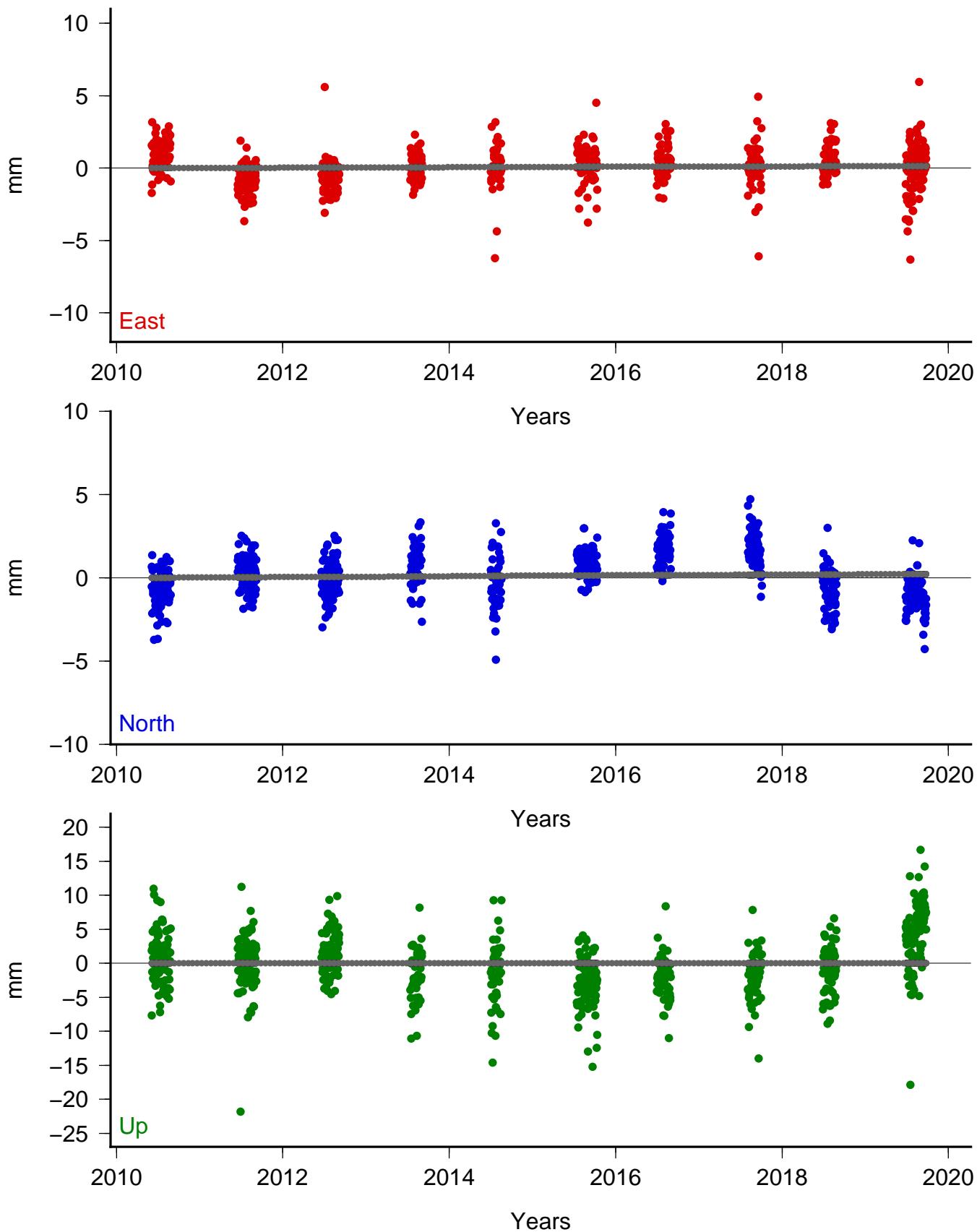
# Site: cut2 Model: sis1

East V: 1.61 +/- 0.31 Wrms: 1.4849 Nrms 0.6564  
North V: 3.51 +/- 0.31 Wrms: 1.5883 Nrms 0.7026  
Up V: 2.30 +/- 0.31 Wrms: 5.4604 Nrms 0.7669  
Lon: 238.1748 Lat: 44.0853 DT: 10.196 N: 606



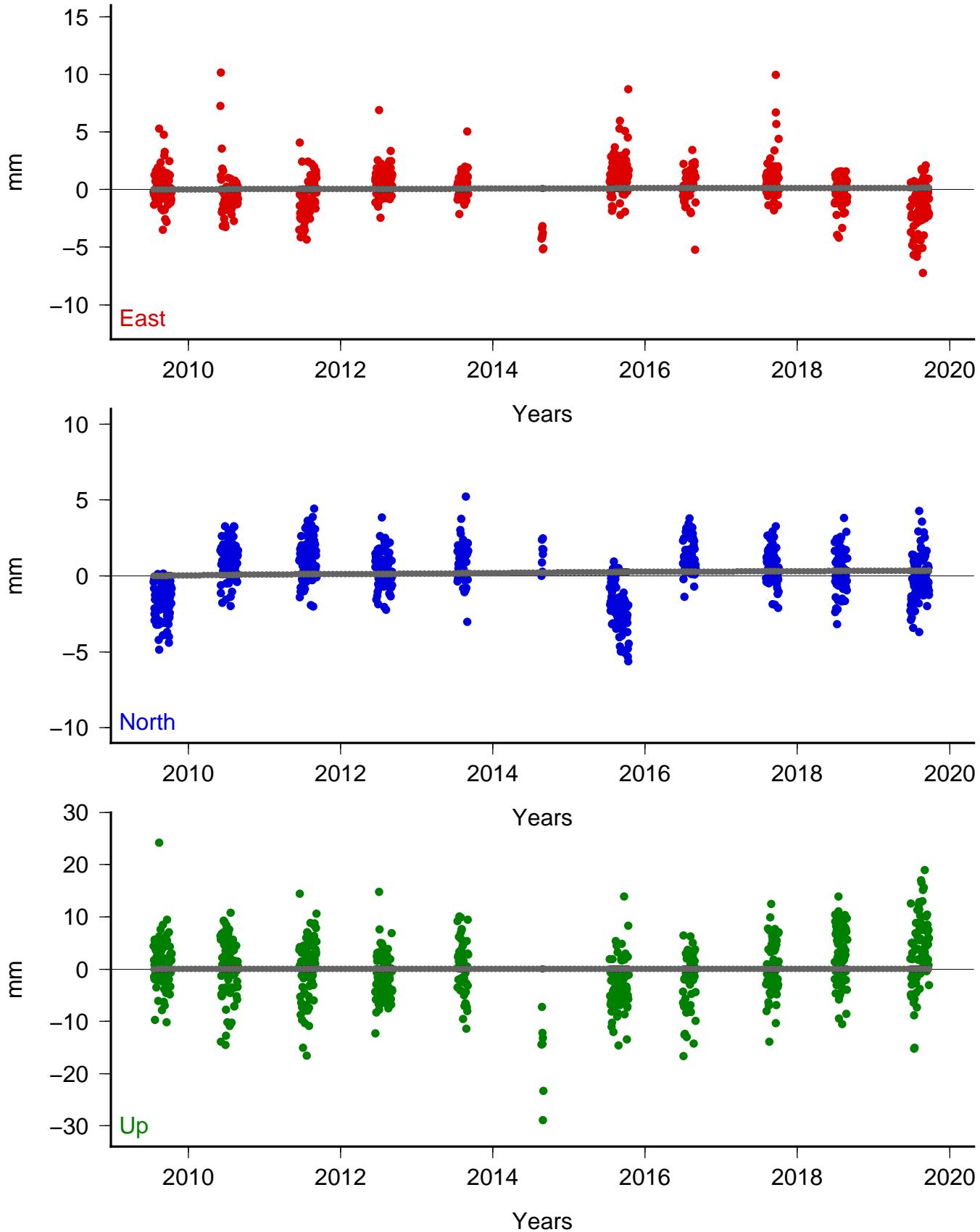
# Site: gbn1 Model: sis1

East V: 1.38 +/- 0.33 Wrms: 1.3076 Nrms 0.6239  
North V: 3.58 +/- 0.33 Wrms: 1.3595 Nrms 0.6298  
Up V: -1.50 +/- 0.33 Wrms: 4.3136 Nrms 0.6955  
Lon: 238.5607 Lat: 44.5646 DT: 9.3088 N: 706



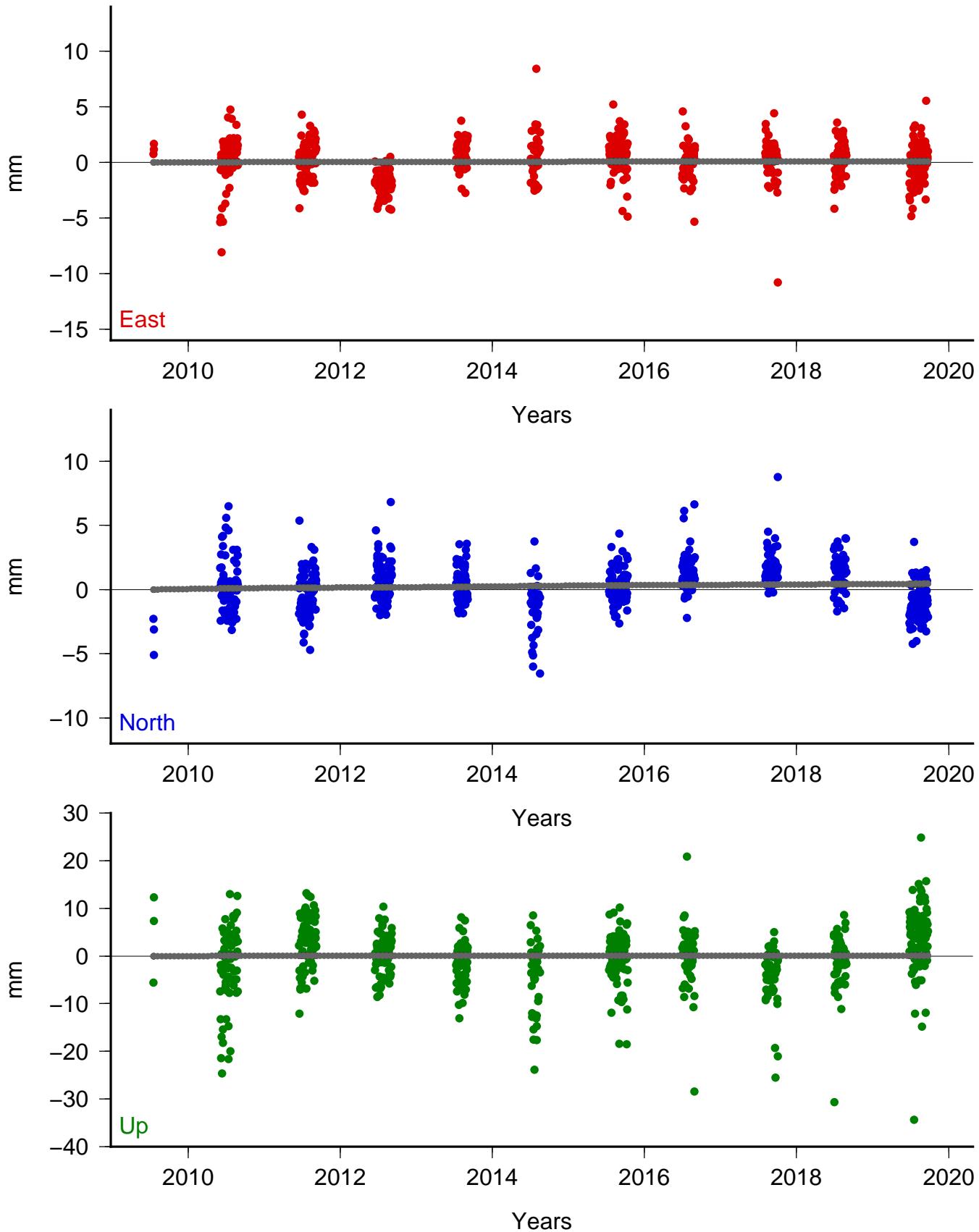
# Site: gbn2 Model: sis1

East V: 1.62 +/- 0.31 Wrms: 1.7418 Nrms 0.6865  
North V: 3.55 +/- 0.31 Wrms: 1.7438 Nrms 0.7040  
Up V: -2.86 +/- 0.31 Wrms: 5.5483 Nrms 0.6676  
Lon: 238.4347 Lat: 44.5592 DT: 10.1877 N: 748



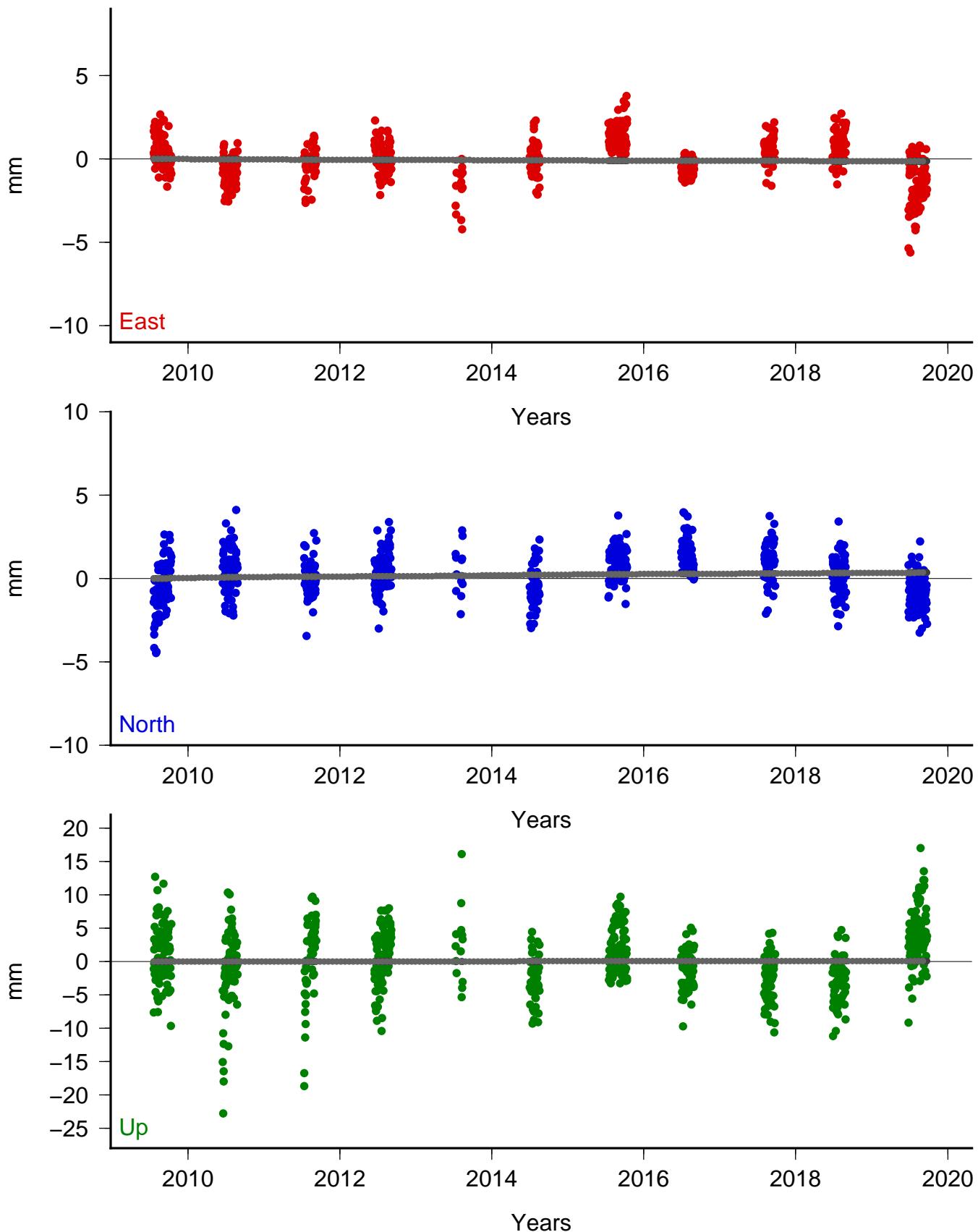
# Site: gbn3 Model: sis1

East V: 2.08 +/- 0.31 Wrms: 1.8032 Nrms 0.8330  
North V: 3.55 +/- 0.31 Wrms: 1.7764 Nrms 0.8219  
Up V: -0.98 +/- 0.31 Wrms: 6.1446 Nrms 0.9544  
Lon: 238.2874 Lat: 44.5484 DT: 10.185 N: 702



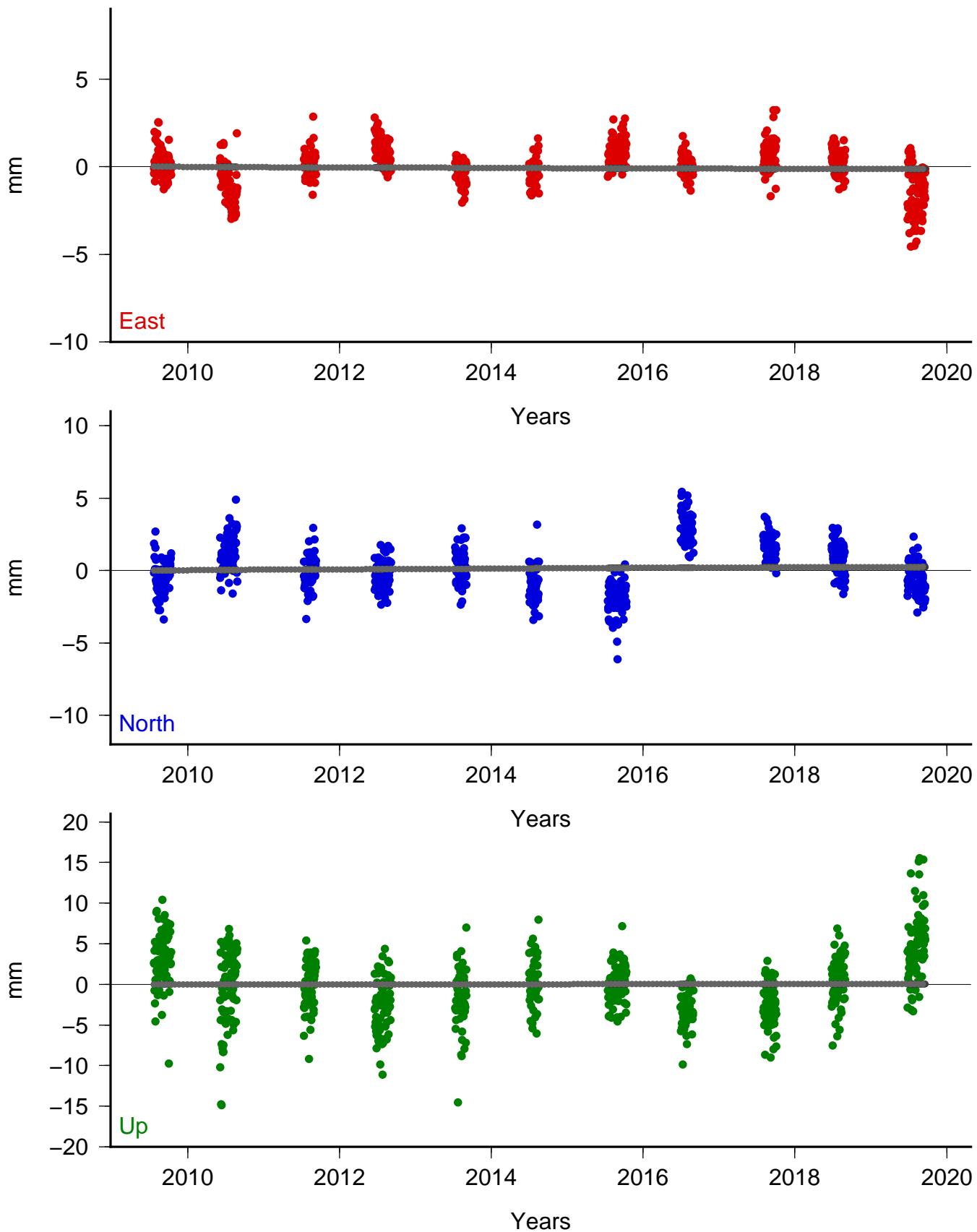
# Site: gbn4 Model: sis1

East V: 2.46 +/- 0.31 Wrms: 1.2350 Nrms 0.5436  
North V: 4.57 +/- 0.31 Wrms: 1.3569 Nrms 0.5706  
Up V: -0.57 +/- 0.31 Wrms: 4.9240 Nrms 0.6371  
Lon: 237.8979 Lat: 44.5680 DT: 10.1823 N: 699



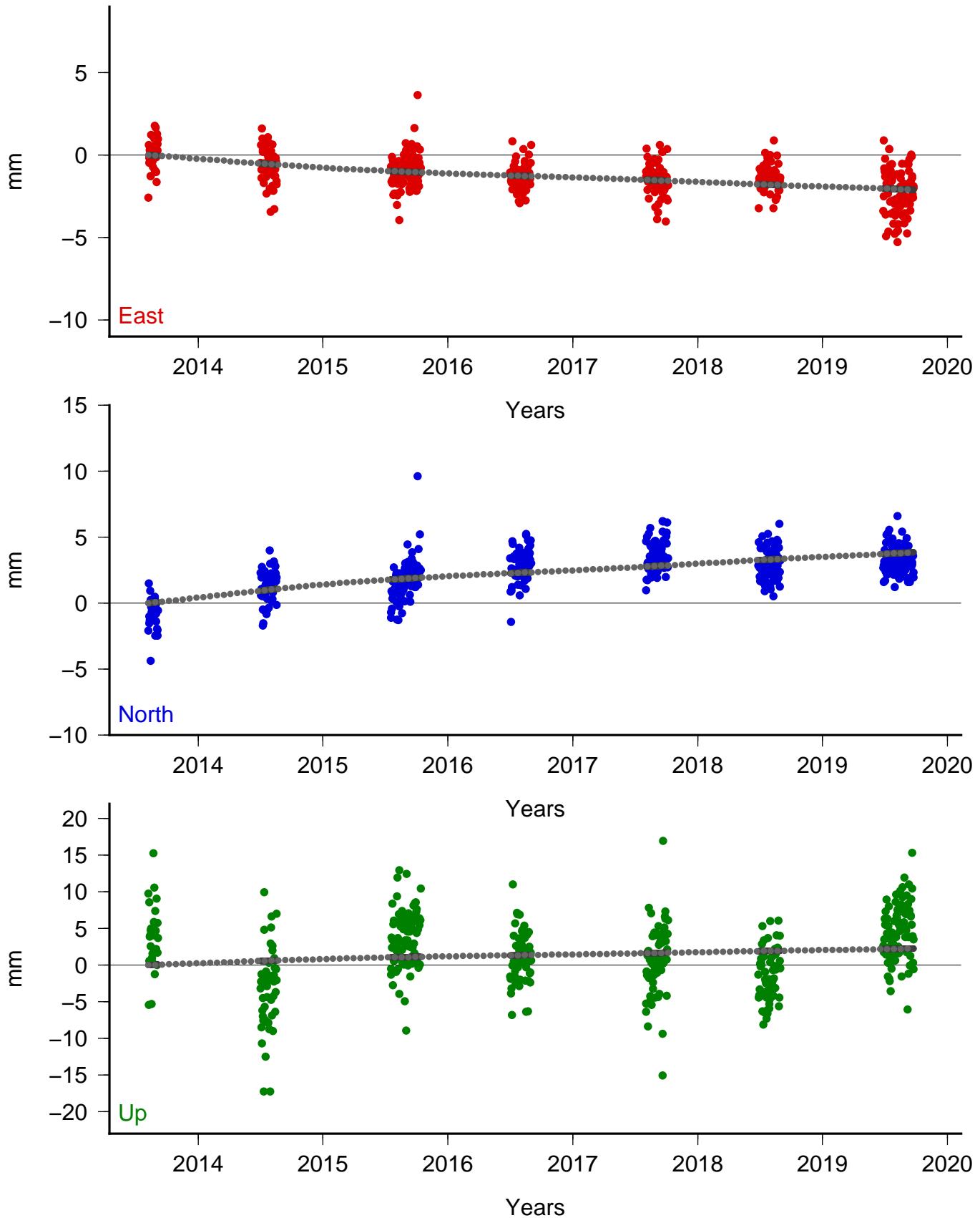
# Site: gbn5 Model: sis1

East V: 3.02 +/- 0.31 Wrms: 1.1386 Nrms 0.5517  
North V: 4.78 +/- 0.31 Wrms: 1.5288 Nrms 0.7343  
Up V: -0.67 +/- 0.31 Wrms: 3.9815 Nrms 0.6677  
Lon: 237.7640 Lat: 44.6021 DT: 10.1659 N: 770



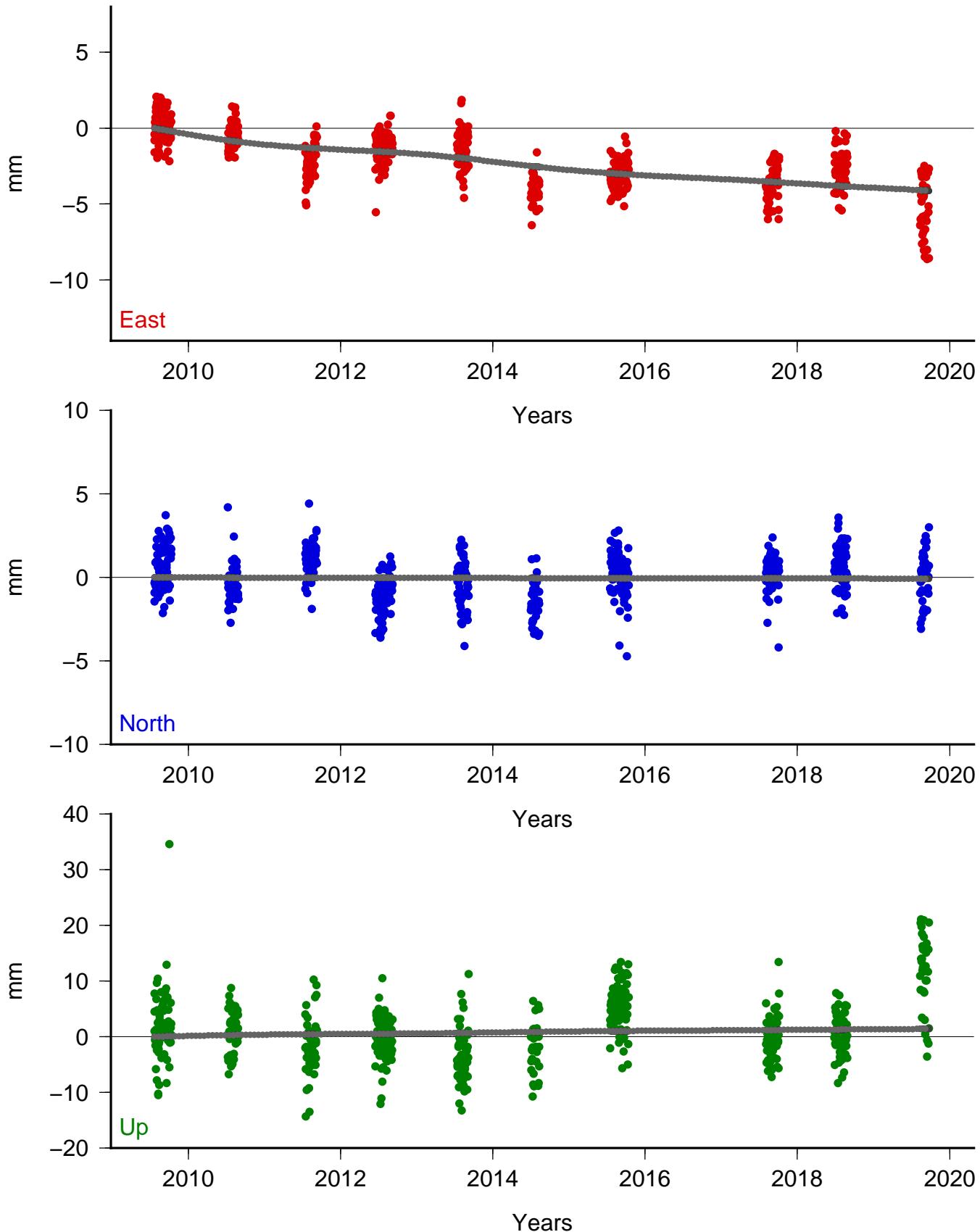
# Site: lin1 Model: sis1

East V: 0.79 +/- 0.40 Wrms: 1.0749 Nrms 0.3945  
North V: 5.15 +/- 0.40 Wrms: 1.3399 Nrms 0.4812  
Up V: 0.06 +/- 0.40 Wrms: 5.0624 Nrms 0.5492  
Lon: 238.0973 Lat: 44.1786 DT: 6.1274 N: 442



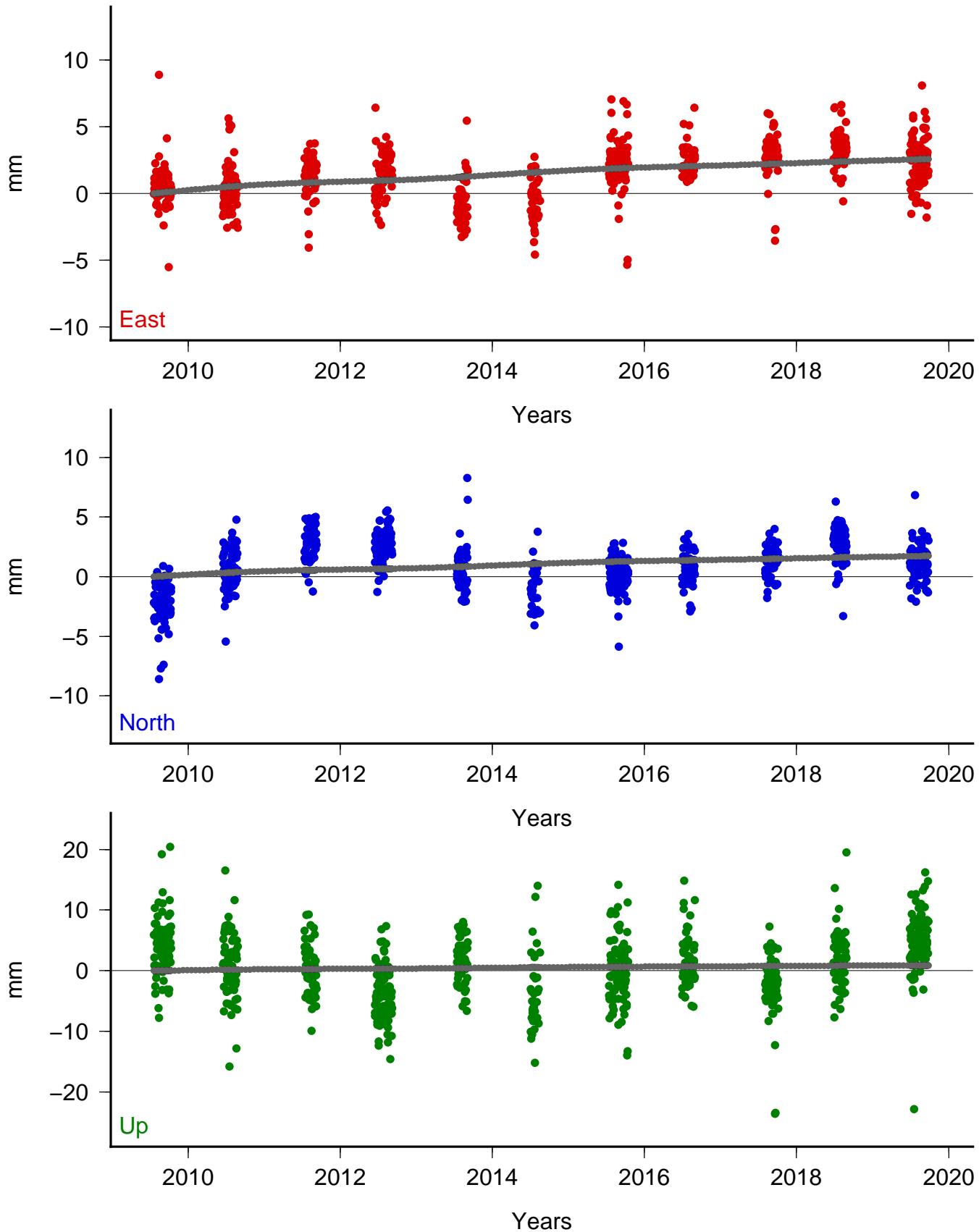
# Site: poth Model: sis1

East V: 1.35 +/- 0.31 Wrms: 1.2406 Nrms 0.5022  
North V: 5.79 +/- 0.31 Wrms: 1.4208 Nrms 0.5778  
Up V: -3.01 +/- 0.31 Wrms: 5.1065 Nrms 0.6268  
Lon: 237.9602 Lat: 44.0969 DT: 10.1795 N: 604



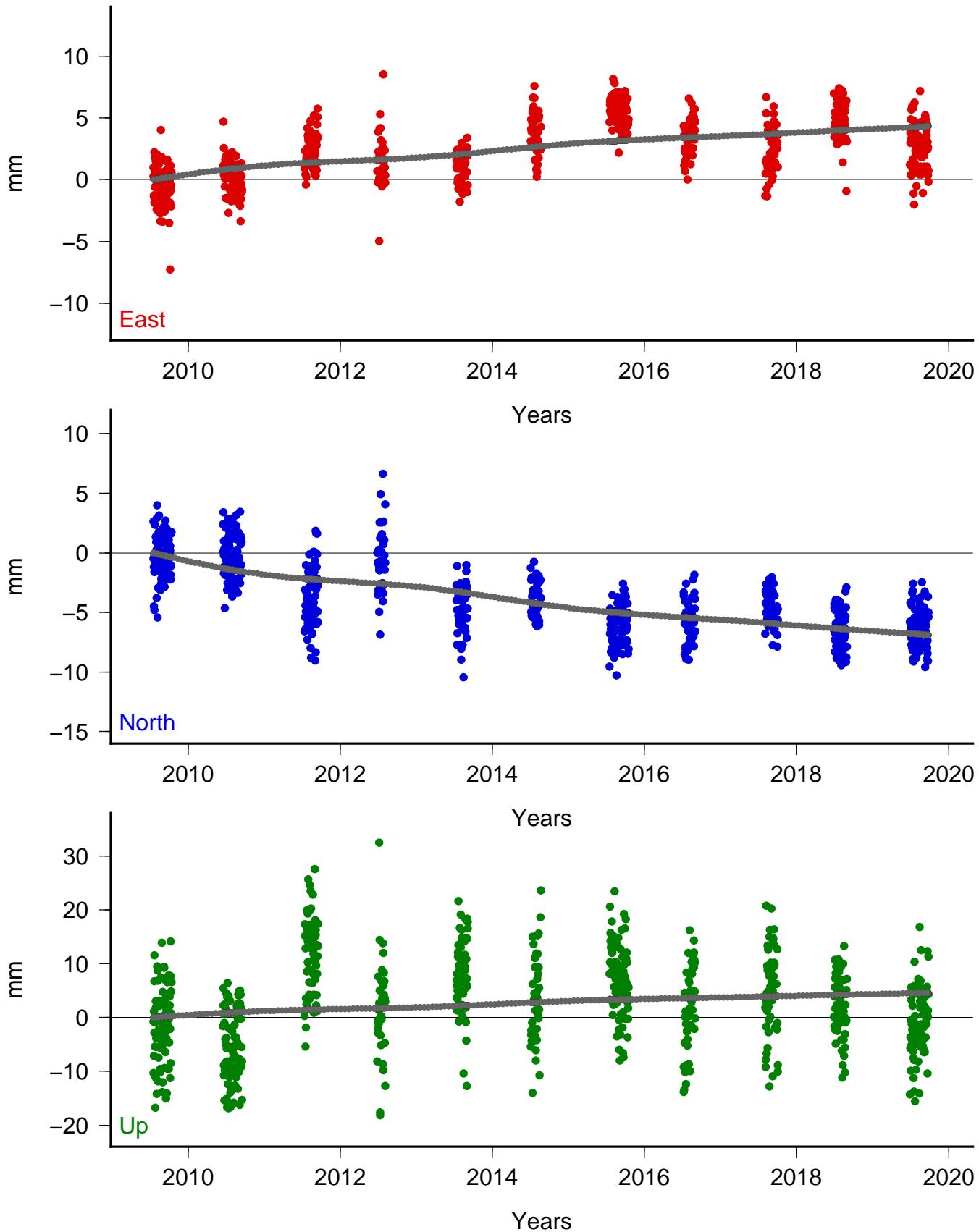
# Site: sqaw Model: sis1

East V: 1.39 +/- 0.31 Wrms: 1.7934 Nrms 0.7855  
North V: 3.33 +/- 0.31 Wrms: 2.1266 Nrms 0.9314  
Up V: 0.13 +/- 0.31 Wrms: 5.4884 Nrms 0.7824  
Lon: 238.3495 Lat: 44.1924 DT: 10.185 N: 747



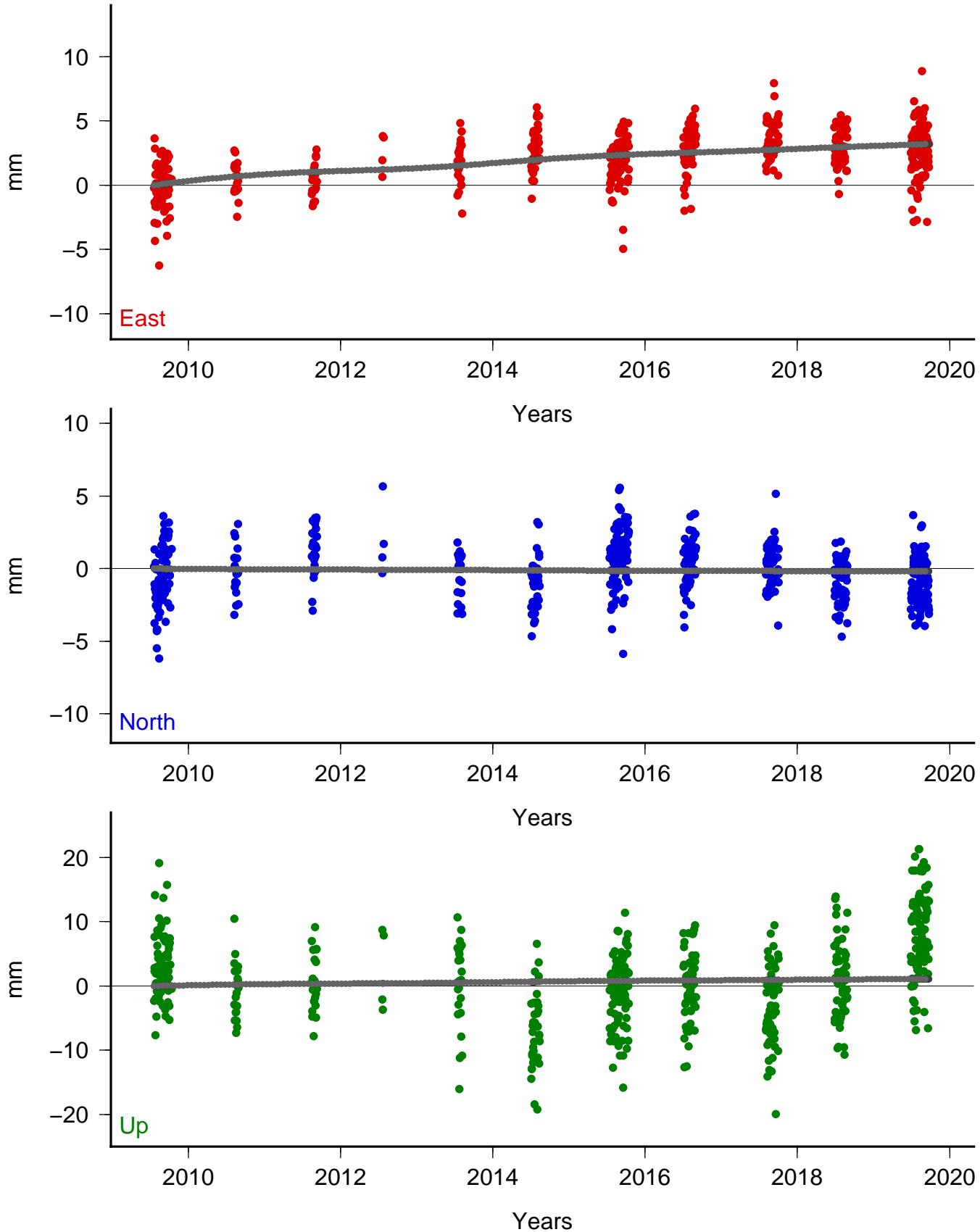
# Site: sync Model: sis1

East V: 2.37 +/- 0.31 Wrms: 1.8965 Nrms 0.5316  
North V: 2.51 +/- 0.31 Wrms: 2.1447 Nrms 0.5801  
Up V: 1.17 +/- 0.31 Wrms: 8.6688 Nrms 0.6582  
Lon: 238.2233 Lat: 44.0239 DT: 10.196 N: 722



# Site: tamr Model: sis1

East V: 1.67 +/- 0.31 Wrms: 1.6990 Nrms 0.4778  
North V: 3.42 +/- 0.31 Wrms: 1.8898 Nrms 0.5932  
Up V: -1.44 +/- 0.31 Wrms: 6.7271 Nrms 0.6642  
Lon: 238.3804 Lat: 44.0898 DT: 10.1823 N: 542



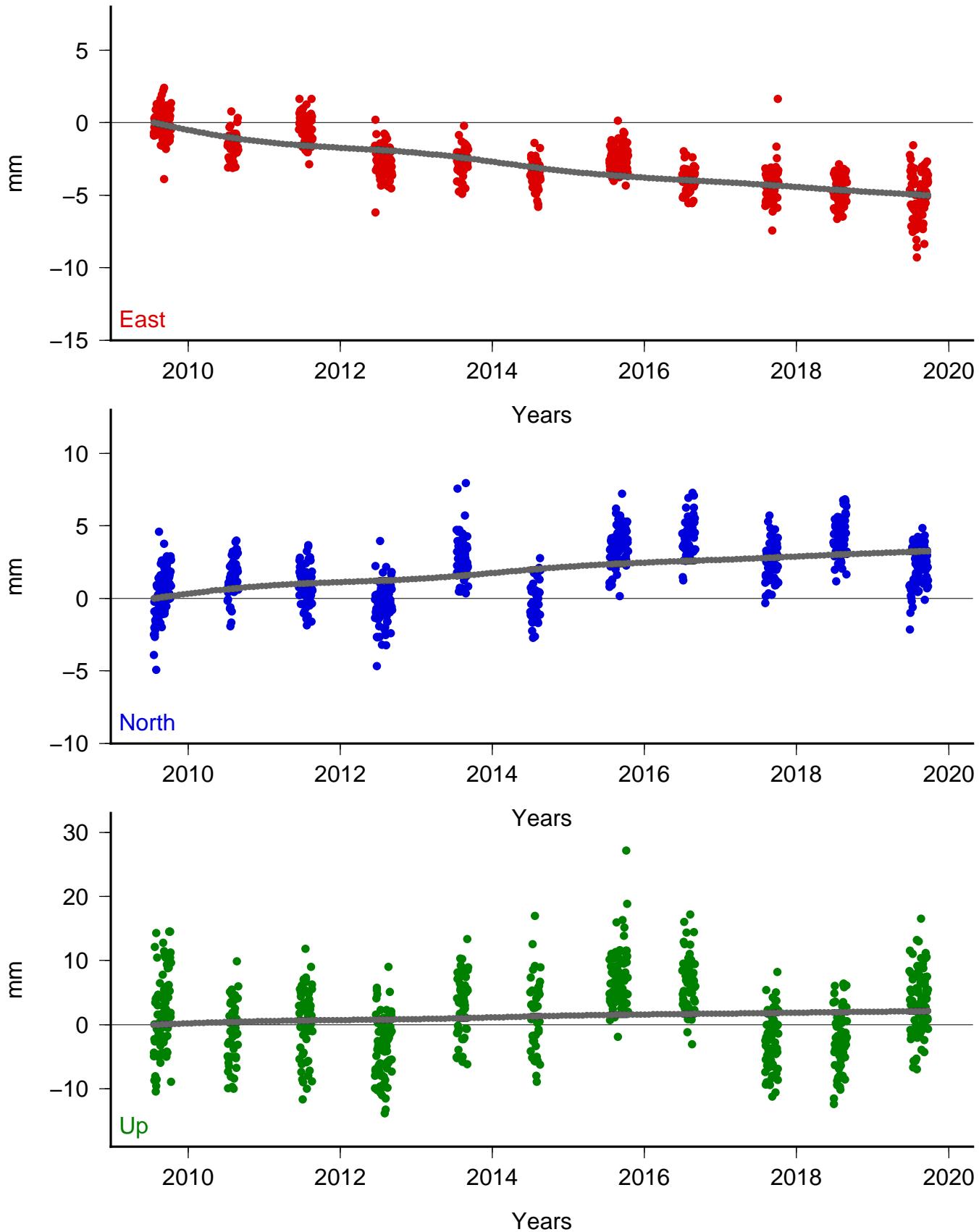
# Site: whbr Model: sis1

East V: 0.72 +/- 0.31 Wrms: 1.2145 Nrms 0.4333

North V: 4.69 +/- 0.31 Wrms: 1.8538 Nrms 0.5724

Up V: -0.14 +/- 0.31 Wrms: 5.9250 Nrms 0.5773

Lon: 238.0214 Lat: 44.1632 DT: 10.185 N: 754



**Figure S-3.** Plots of de-trended semi-permanent GPS (SPGPS) time series. Format as described for S-2 except seasonal signals have not been removed.

Caption is below figure, which has several parts. Search for "Figure S" to locate caption.

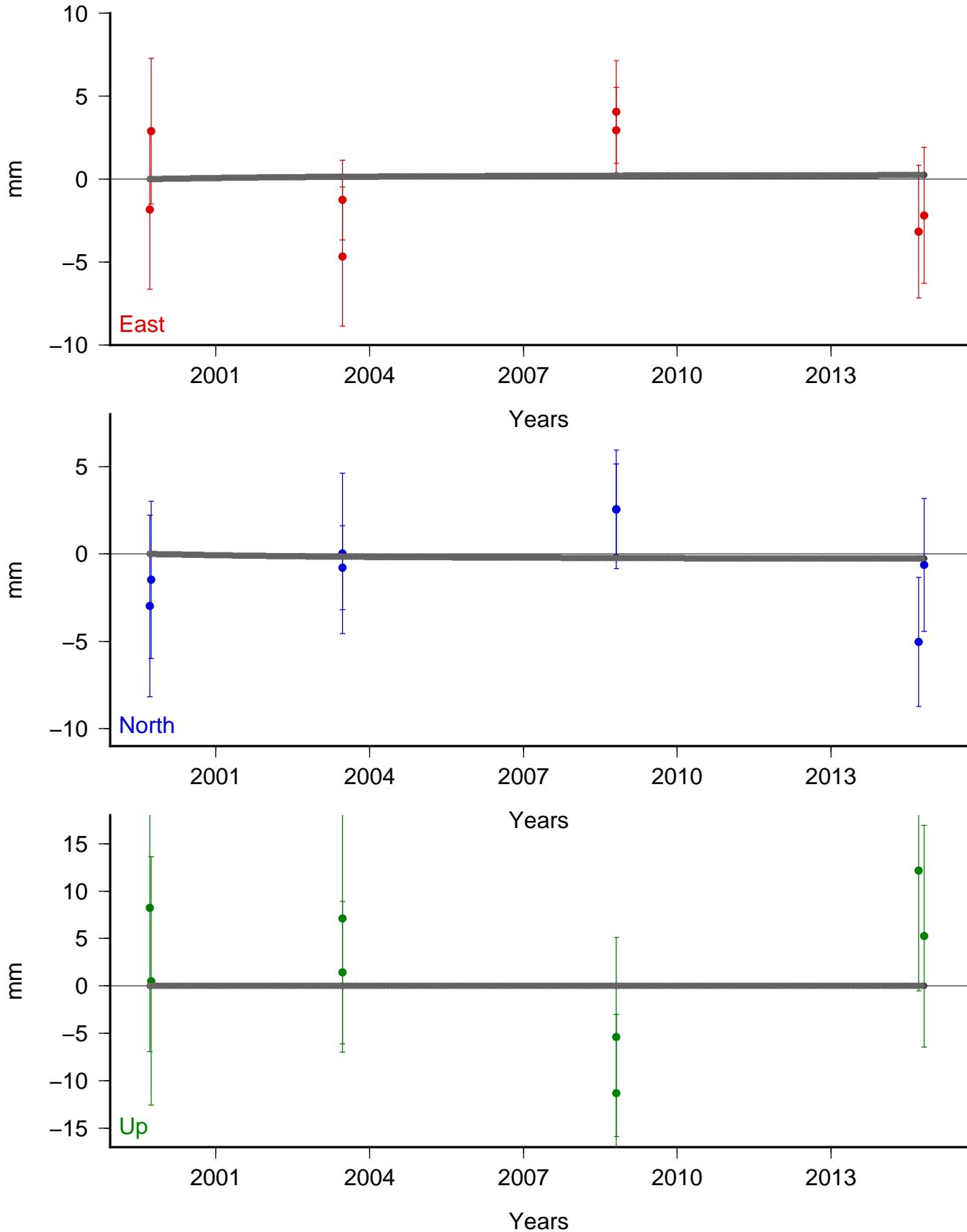
## Site: 7mir Model: sis1

East V: -0.84 +/- 0.26 Wrms: 2.9168 Nrms 0.8624

North V: 3.64 +/- 0.26 Wrms: 2.4180 Nrms 0.7070

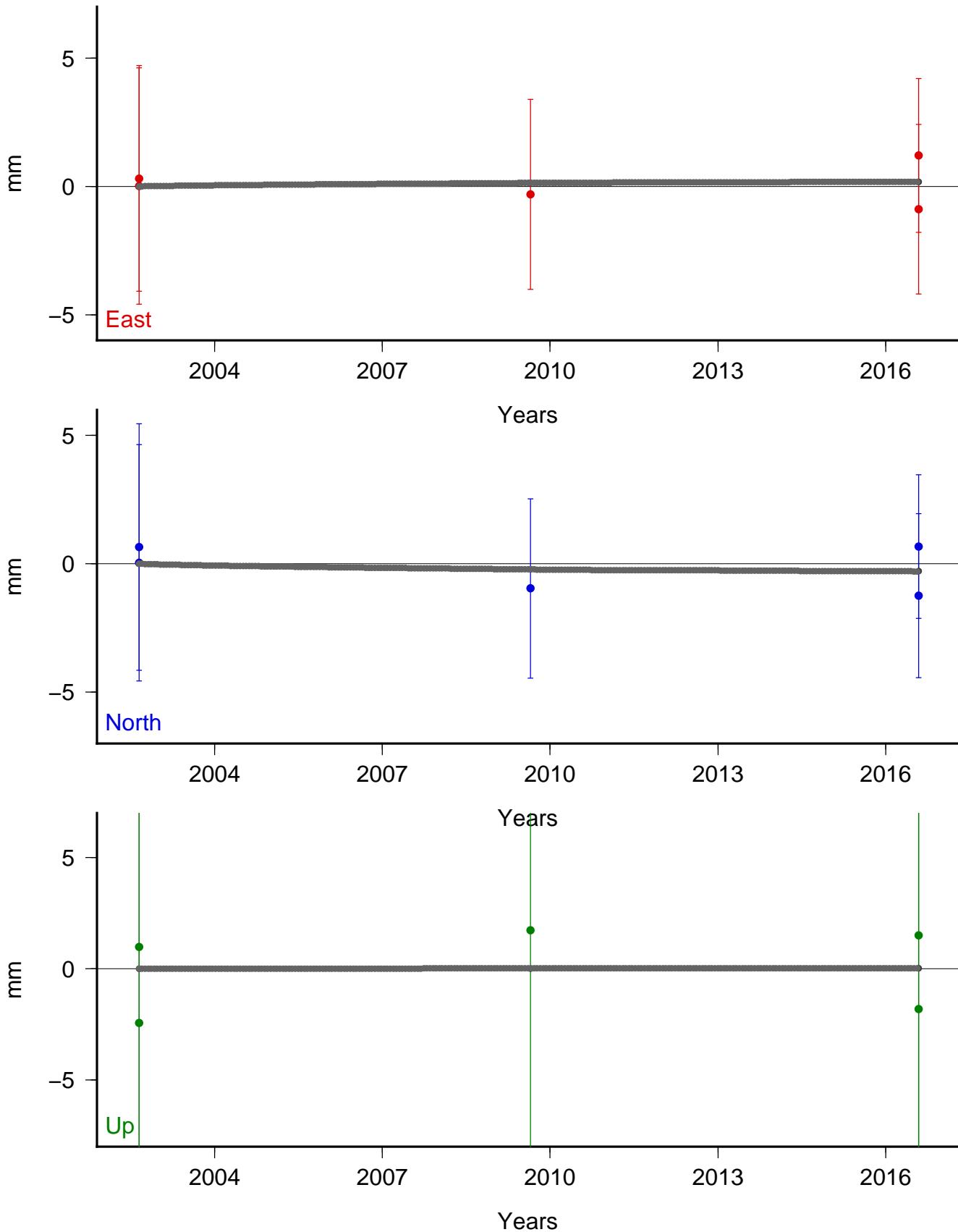
Up V: -2.44 +/- 0.26 Wrms: 7.3834 Nrms 0.6909

Lon: 239.3107 Lat: 43.1689 DT: 15.1078 N: 8



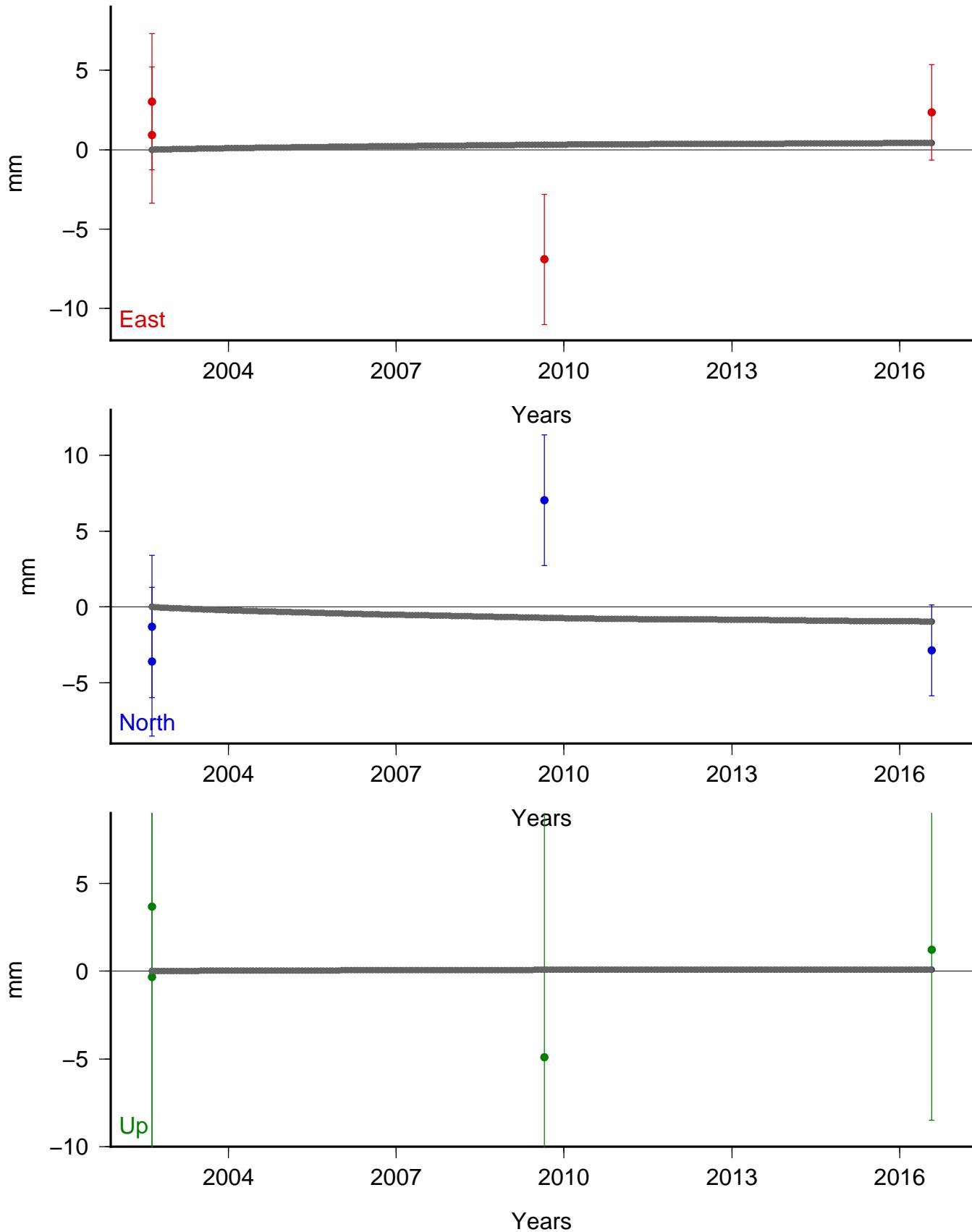
# Site: a074 Model: sis1

East V: -0.44 +/- 0.27 Wrms: 0.8054 Nrms 0.2205  
North V: 3.69 +/- 0.27 Wrms: 0.8232 Nrms 0.2321  
Up V: -1.41 +/- 0.27 Wrms: 1.7312 Nrms 0.1503  
Lon: 238.8249 Lat: 43.3132 DT: 13.9387 N: 5



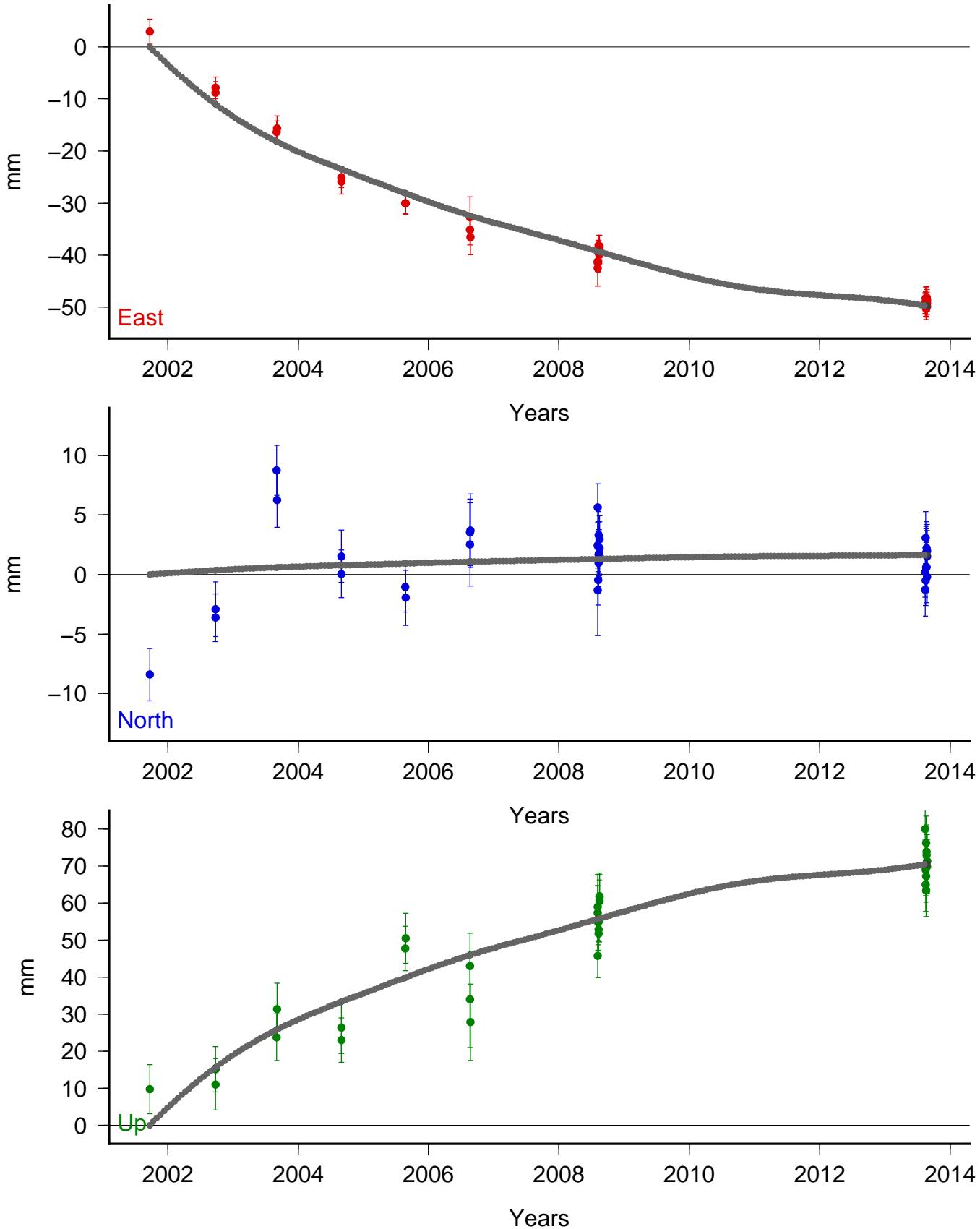
# Site: beal Model: sis1

East V: -0.14 +/- 0.27 Wrms: 3.8139 Nrms 1.0068  
North V: 4.04 +/- 0.27 Wrms: 4.1130 Nrms 1.0326  
Up V: -2.46 +/- 0.27 Wrms: 2.8003 Nrms 0.2118  
Lon: 238.4525 Lat: 43.6165 DT: 13.936 N: 4



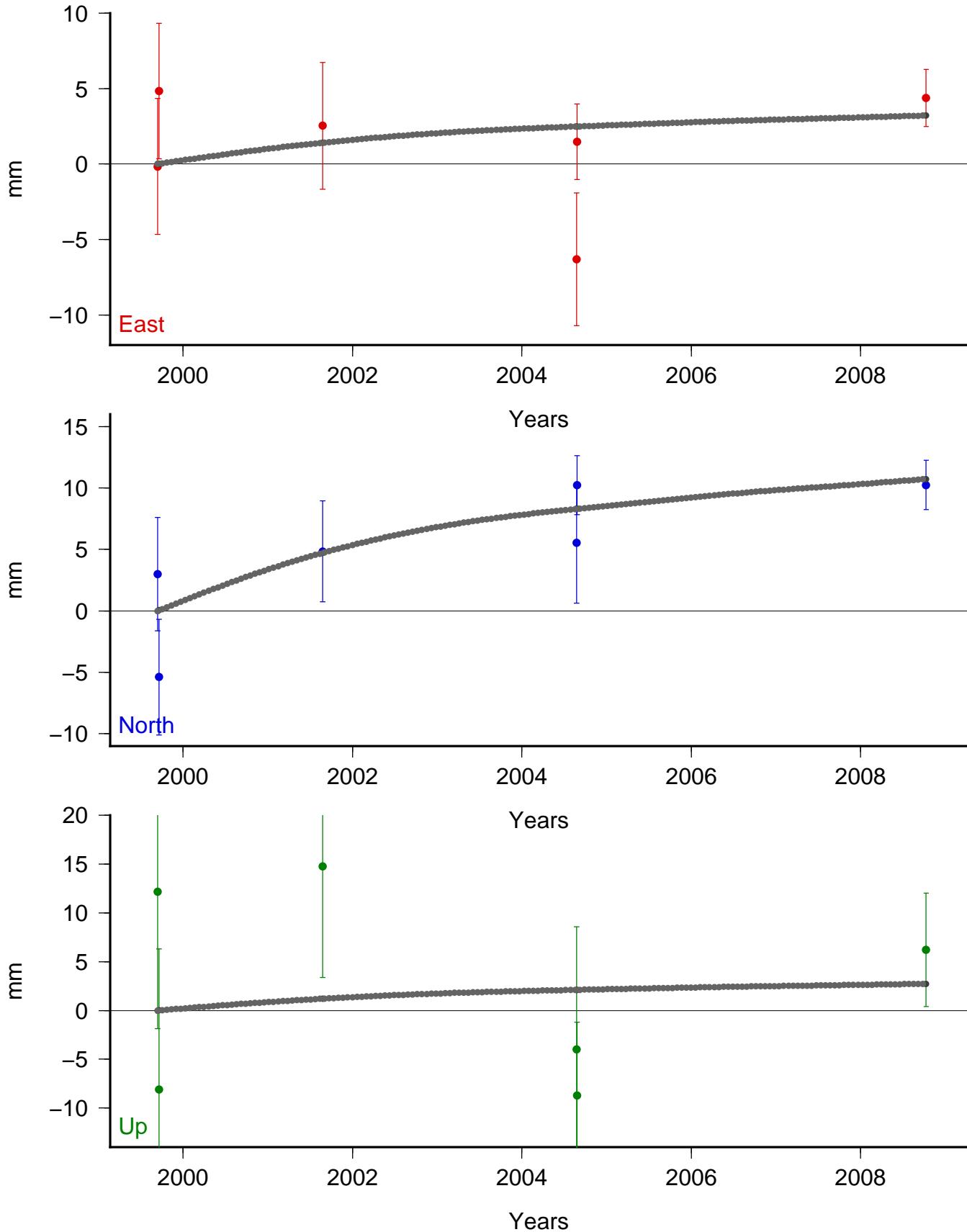
# Site: bkmw Model: sis1

East V: -0.51 +/- 0.29 Wrms: 1.5387 Nrms 0.7292  
 North V: 4.17 +/- 0.29 Wrms: 2.7530 Nrms 1.2711  
 Up V: 0.16 +/- 0.29 Wrms: 5.6576 Nrms 0.8540  
 Lon: 238.1078 Lat: 44.1006 DT: 11.9263 N: 37



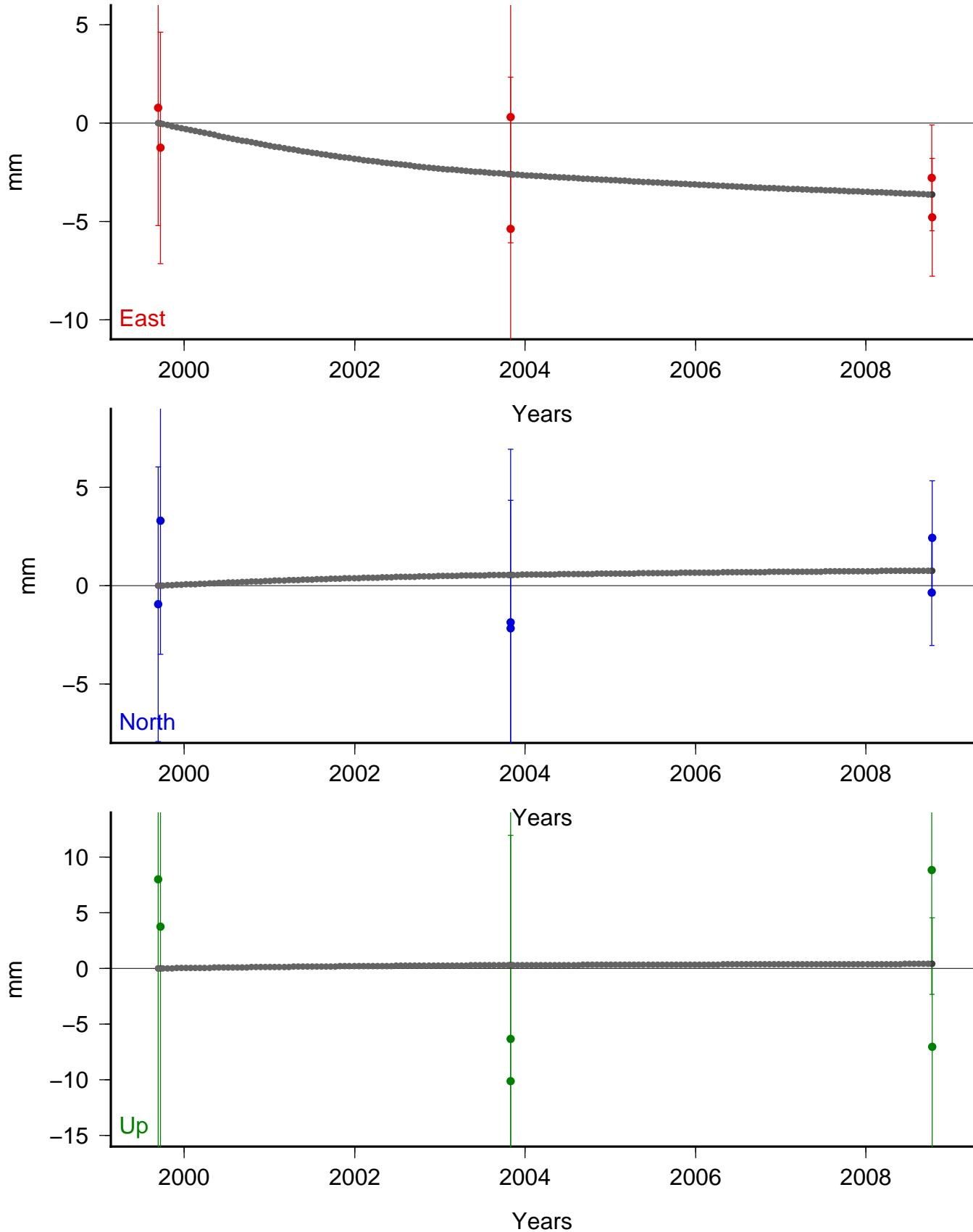
# Site: blck Model: sis1

East V: 0.42 +/- 0.33 Wrms: 2.9884 Nrms 0.9792  
 North V: 4.24 +/- 0.33 Wrms: 2.1212 Nrms 0.6804  
 Up V: -3.81 +/- 0.33 Wrms: 8.4978 Nrms 0.9271  
 Lon: 238.2370 Lat: 44.2902 DT: 9.0734 N: 6



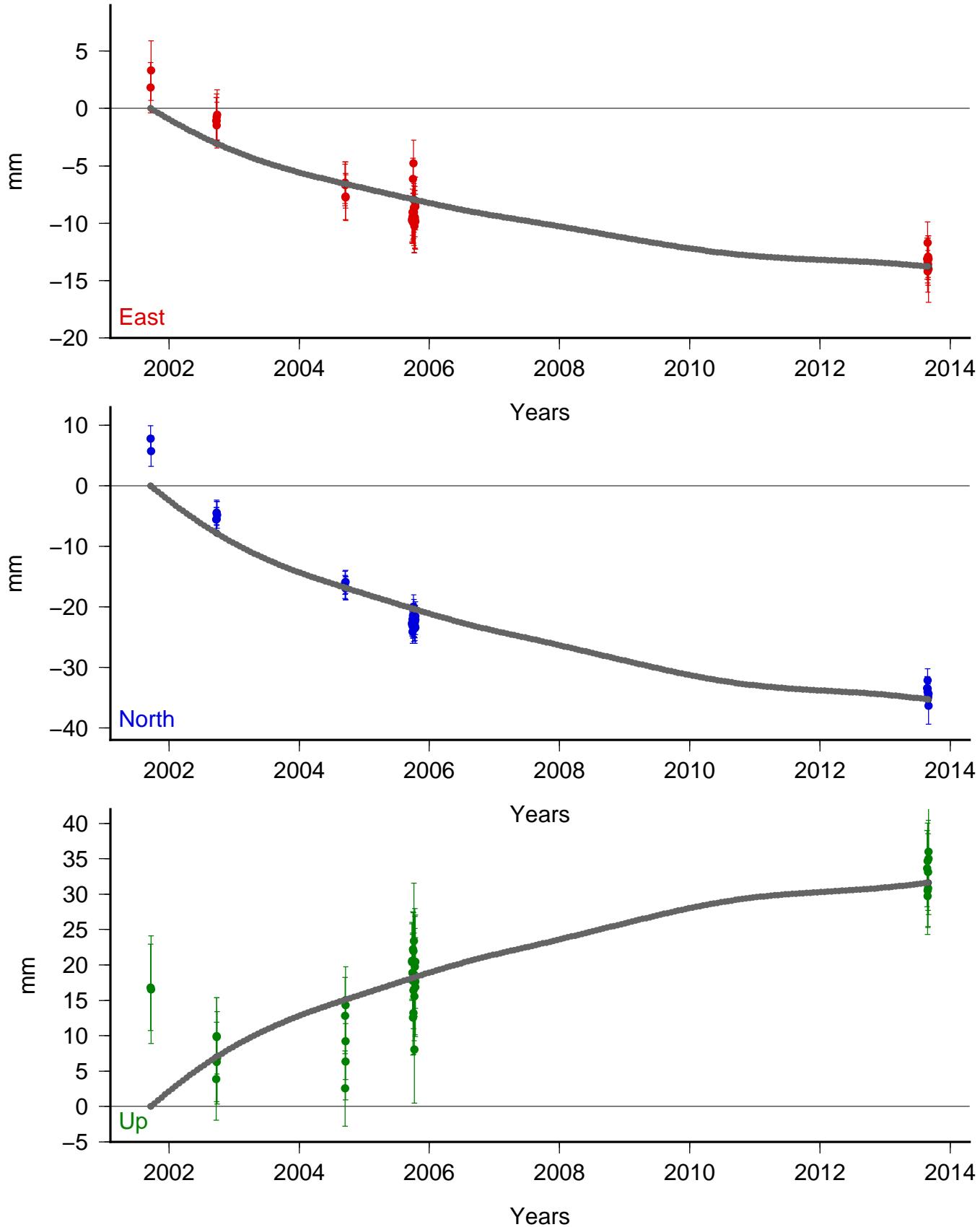
# Site: br02 Model: sis1

East V: 1.42 +/- 0.33 Wrms: 1.3661 Nrms 0.3281  
North V: 5.18 +/- 0.33 Wrms: 1.7319 Nrms 0.4091  
Up V: -2.48 +/- 0.33 Wrms: 8.0158 Nrms 0.4706  
Lon: 237.6694 Lat: 44.1738 DT: 9.0816 N: 6



# Site: brnt Model: sis1

East V: 0.56 +/- 0.29 Wrms: 1.5694 Nrms 0.7666  
 North V: 2.61 +/- 0.29 Wrms: 2.5017 Nrms 1.2252  
 Up V: 0.63 +/- 0.29 Wrms: 5.1312 Nrms 0.8808  
 Lon: 238.1256 Lat: 44.0409 DT: 11.9483 N: 39



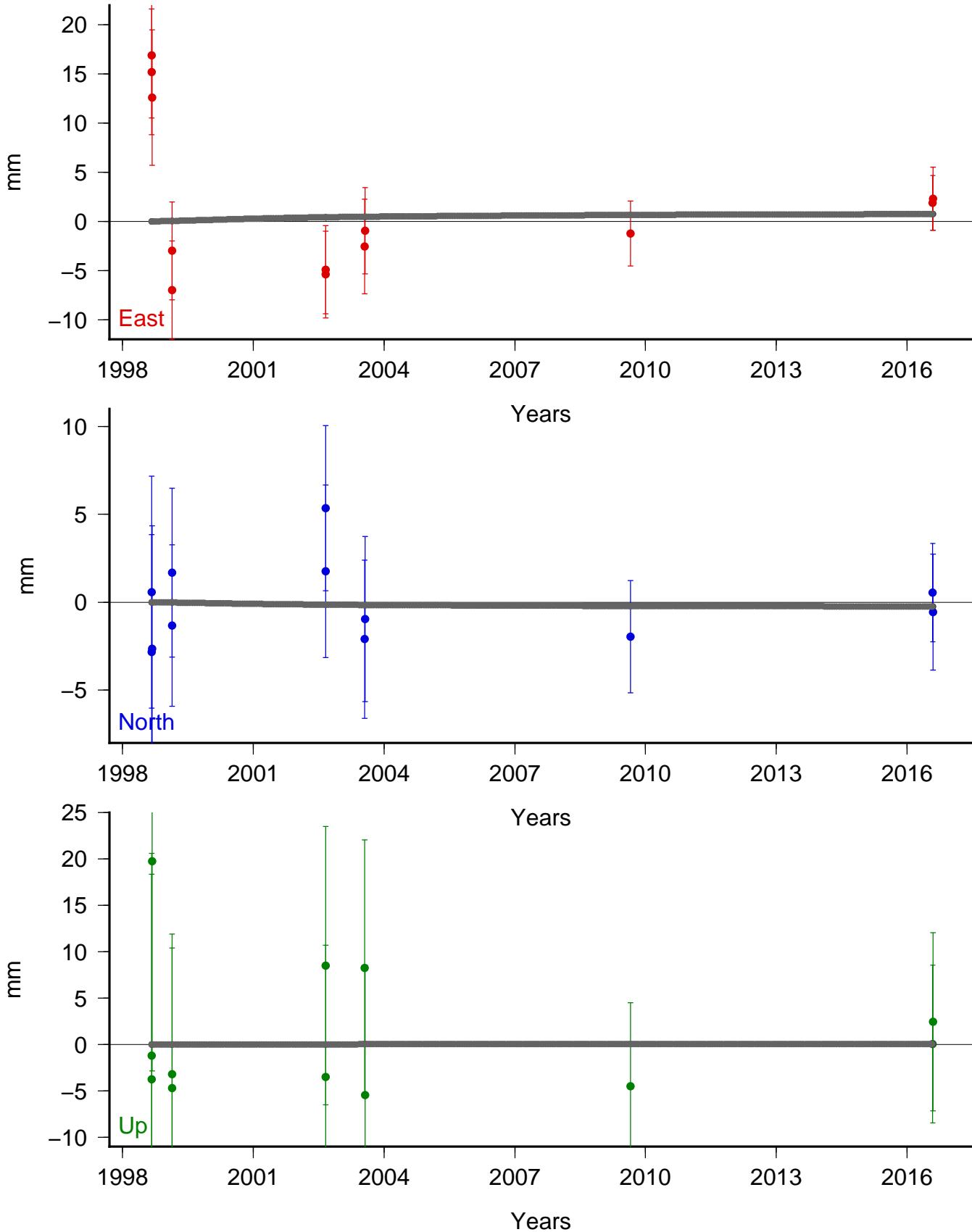
# Site: brot Model: sis1

East V: -0.40 +/- 0.24 Wrms: 5.8571 Nrms 1.3767

North V: 3.19 +/- 0.24 Wrms: 2.0114 Nrms 0.4699

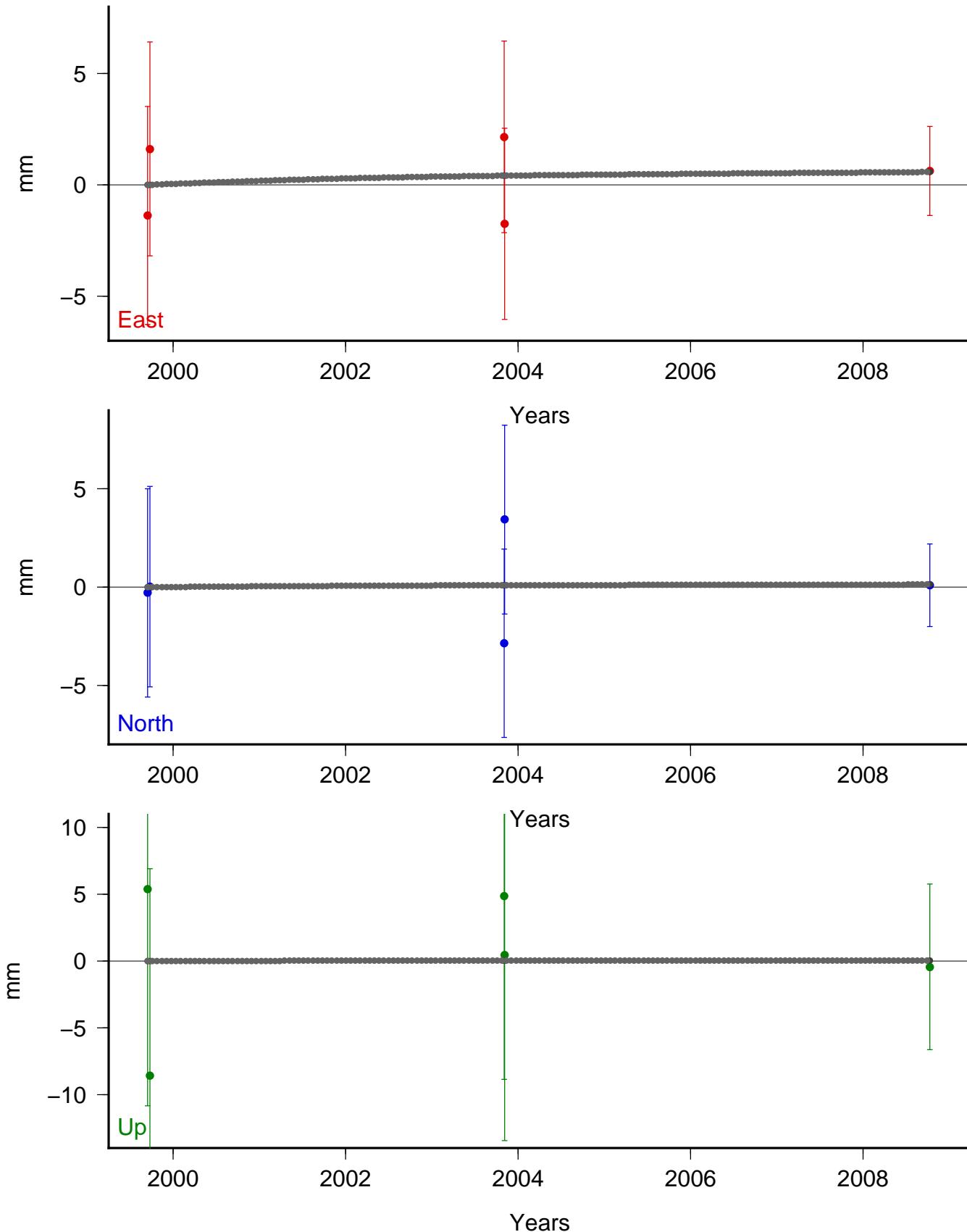
Up V: -1.93 +/- 0.24 Wrms: 5.4636 Nrms 0.4223

Lon: 239.3997 Lat: 43.8138 DT: 17.9224 N: 12



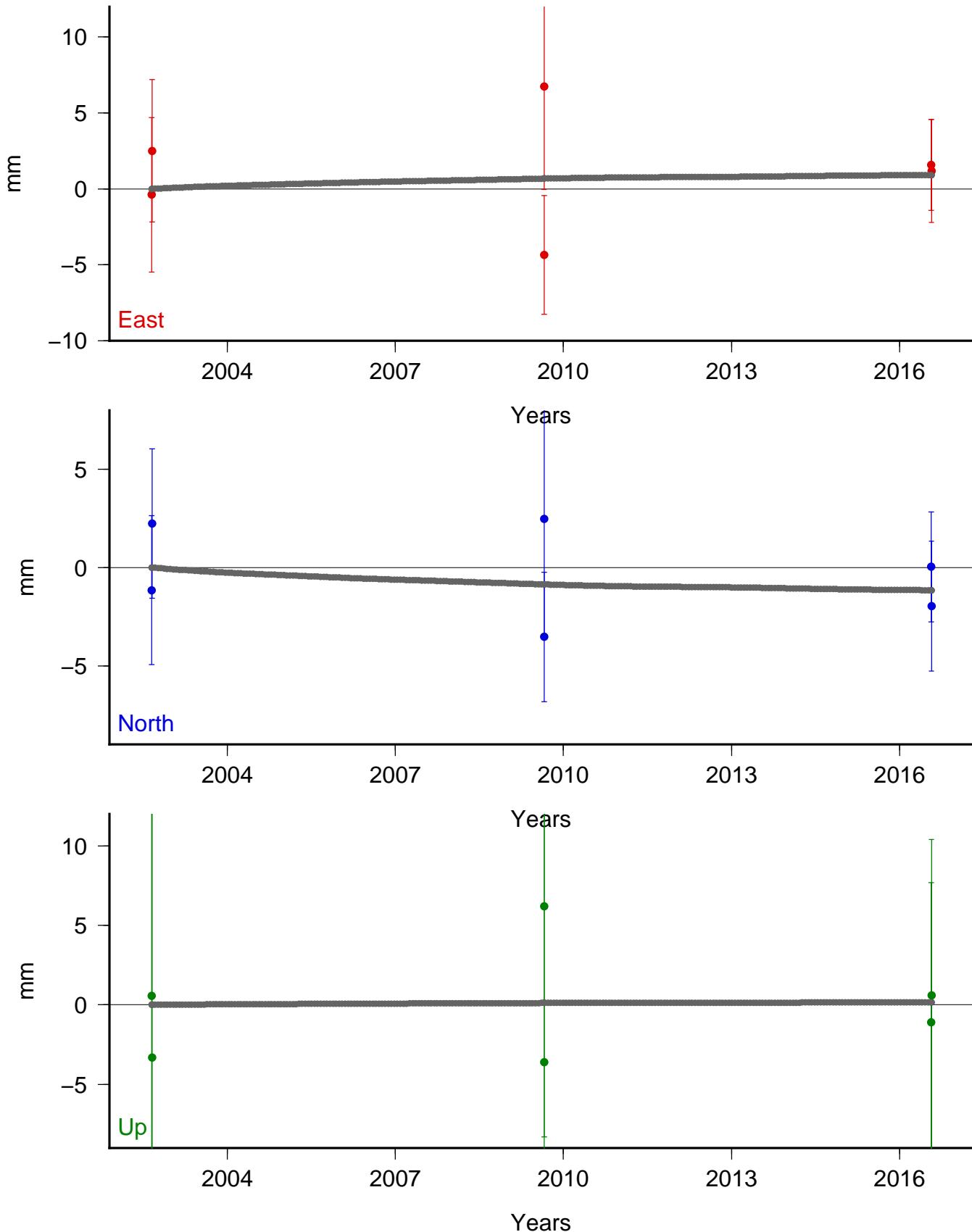
# Site: c753 Model: sis1

East V: 0.45 +/- 0.33 Wrms: 1.1711 Nrms 0.3487  
North V: 3.09 +/- 0.33 Wrms: 1.4943 Nrms 0.4161  
Up V: -2.05 +/- 0.33 Wrms: 3.5046 Nrms 0.3306  
Lon: 239.3811 Lat: 44.3070 DT: 9.0707 N: 5



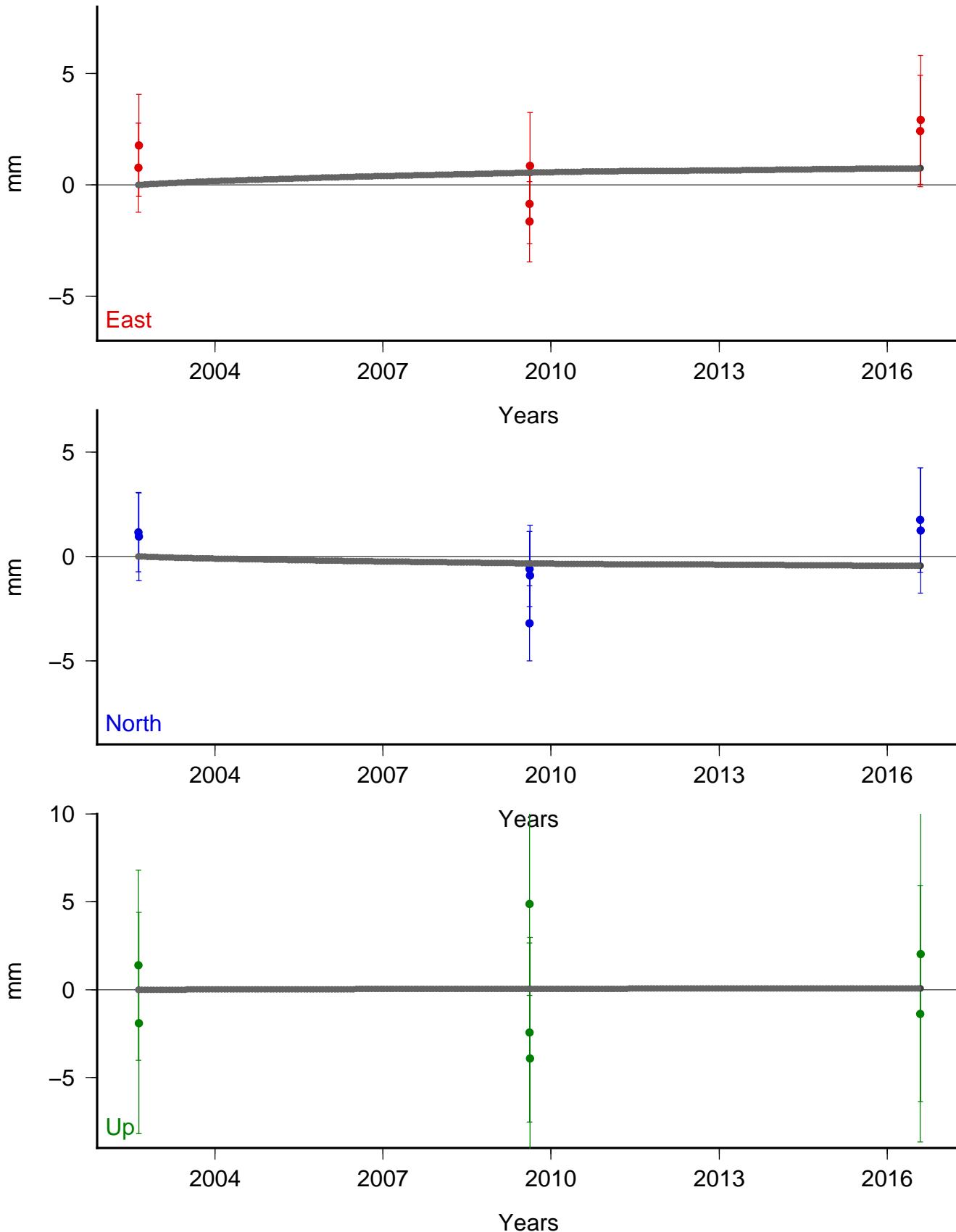
# Site: cary Model: sis1

East V: 0.01 +/- 0.27 Wrms: 2.7601 Nrms 0.6842  
North V: 3.81 +/- 0.27 Wrms: 1.8576 Nrms 0.5240  
Up V: -2.83 +/- 0.27 Wrms: 2.6799 Nrms 0.2109  
Lon: 238.5387 Lat: 43.7529 DT: 13.9113 N: 6



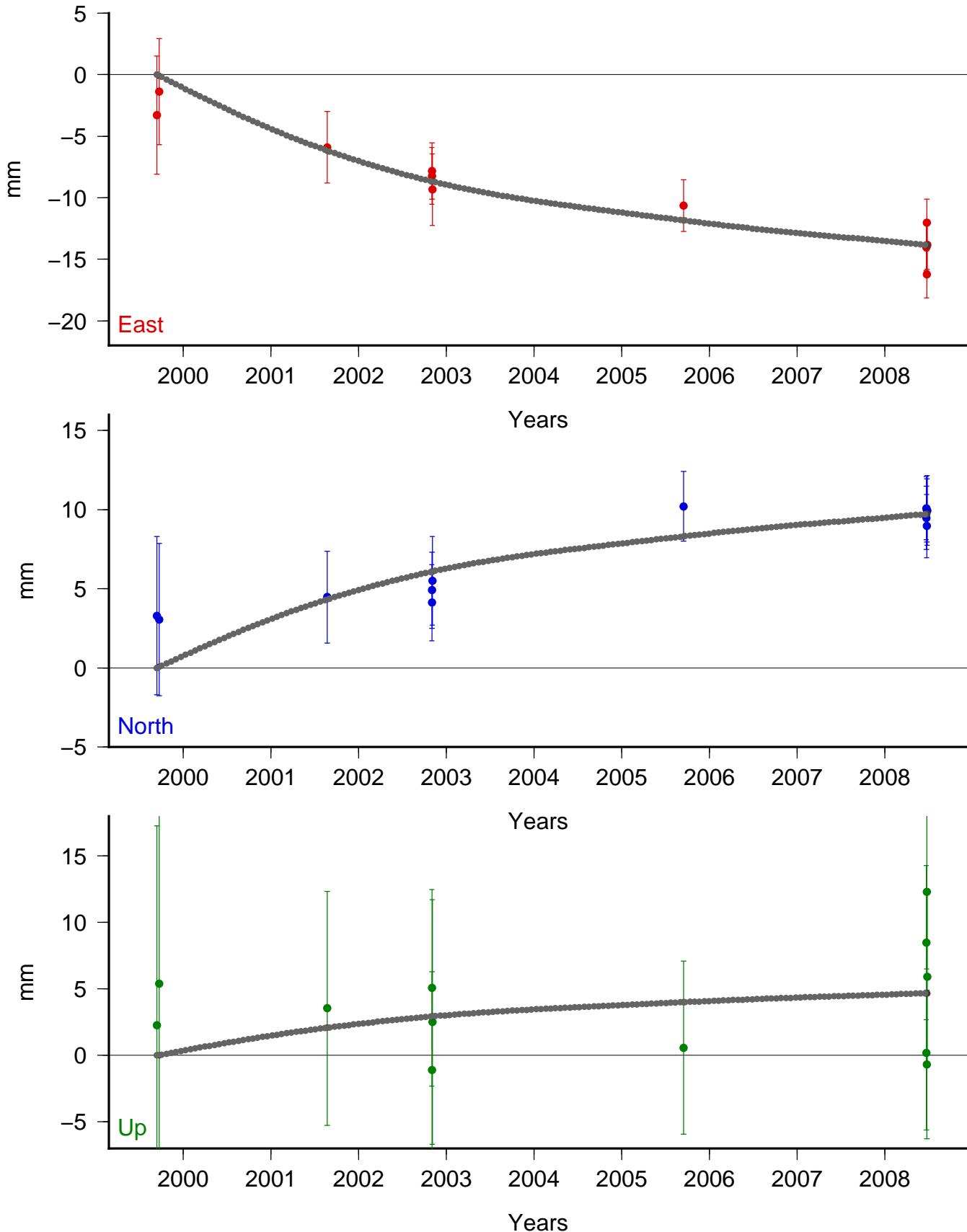
# Site: cmpy Model: sis1

East V: -0.13 +/- 0.27 Wrms: 1.6035 Nrms 0.7444  
North V: 3.39 +/- 0.27 Wrms: 1.6579 Nrms 0.7841  
Up V: -1.96 +/- 0.27 Wrms: 2.9823 Nrms 0.4899  
Lon: 238.8475 Lat: 43.8002 DT: 13.9524 N: 7



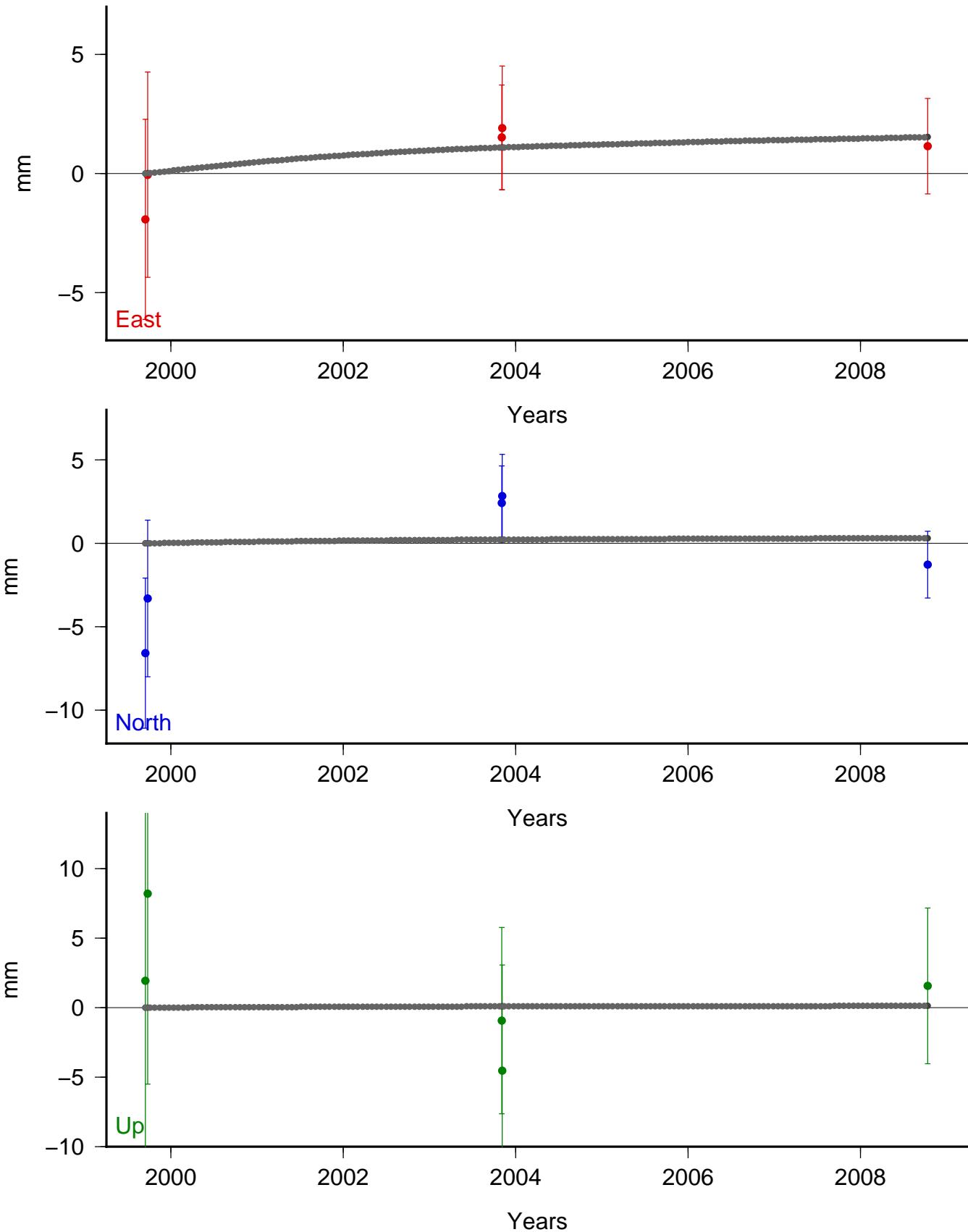
# Site: cupo Model: sis1

East V: 0.53 +/- 0.34 Wrms: 1.2519 Nrms 0.5479  
 North V: 5.06 +/- 0.34 Wrms: 1.1422 Nrms 0.4767  
 Up V: -3.80 +/- 0.34 Wrms: 4.3703 Nrms 0.6168  
 Lon: 237.9762 Lat: 44.1907 DT: 8.7832 N: 12



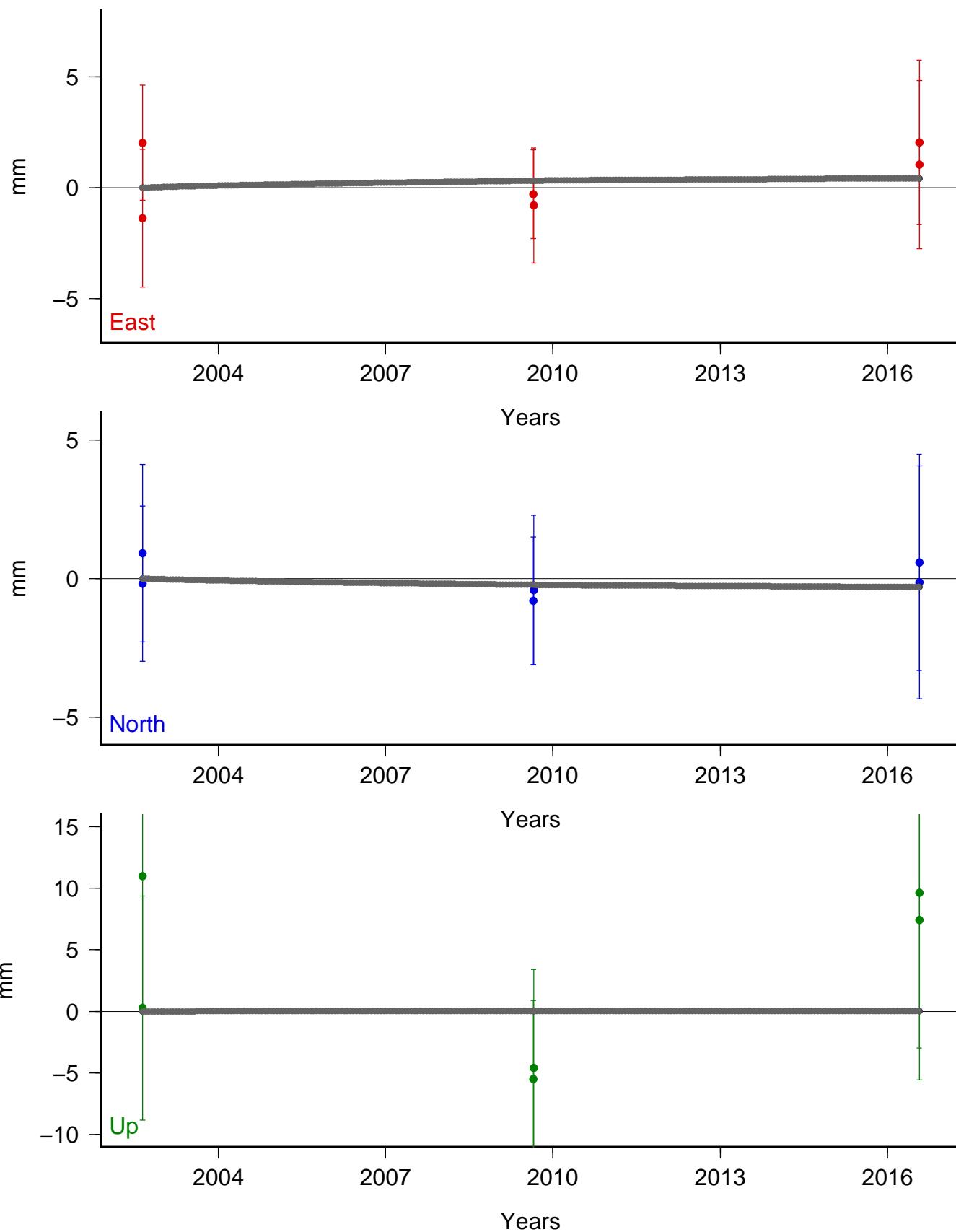
# Site: dryx Model: sis1

East V: 0.86 +/- 0.33 Wrms: 0.7284 Nrms 0.2755  
North V: 4.88 +/- 0.33 Wrms: 2.7438 Nrms 1.0349  
Up V: -3.42 +/- 0.33 Wrms: 3.1788 Nrms 0.4098  
Lon: 238.9143 Lat: 44.2105 DT: 9.0734 N: 5



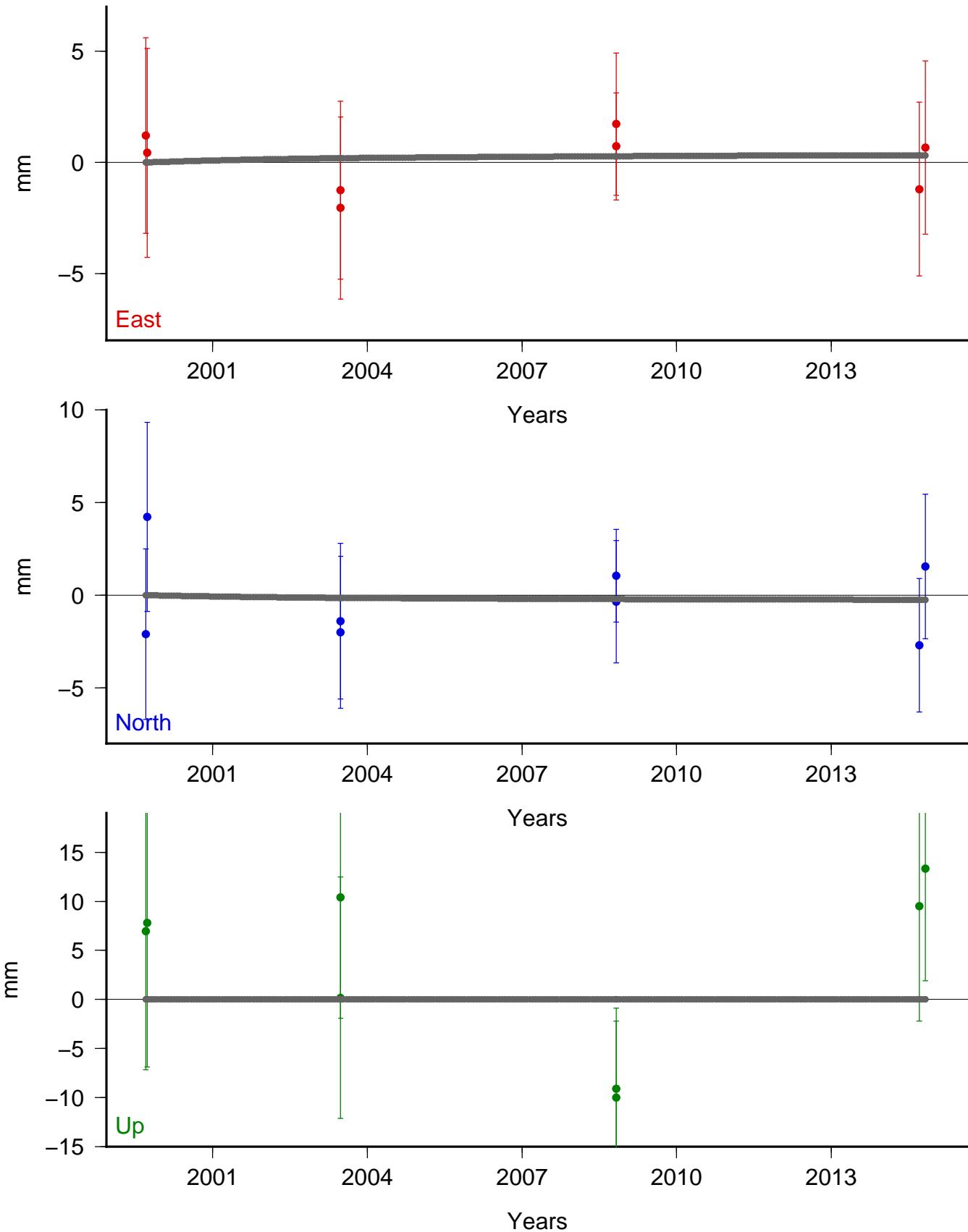
# Site: eabu Model: sis1

East V: -0.21 +/- 0.27 Wrms: 1.2832 Nrms 0.4663  
North V: 3.27 +/- 0.27 Wrms: 0.5511 Nrms 0.1847  
Up V: -2.37 +/- 0.27 Wrms: 6.4713 Nrms 0.7158  
Lon: 239.0042 Lat: 43.6672 DT: 13.925 N: 6



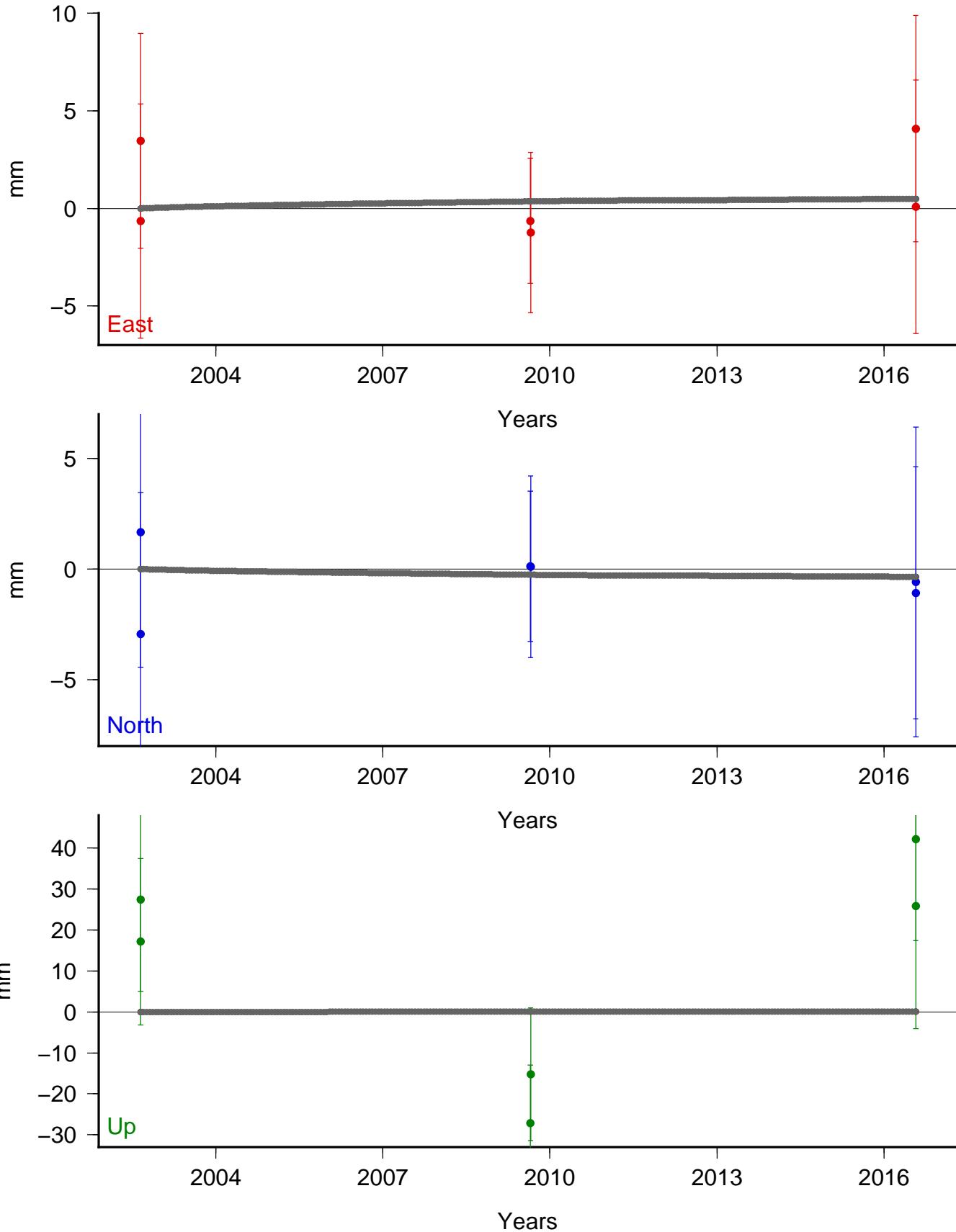
# Site: f091 Model: sis1

East V: -0.59 +/- 0.26 Wrms: 1.2089 Nrms 0.3370  
North V: 2.97 +/- 0.26 Wrms: 1.8827 Nrms 0.5141  
Up V: -1.84 +/- 0.26 Wrms: 9.3521 Nrms 0.8808  
Lon: 239.4635 Lat: 43.3850 DT: 15.1188 N: 8



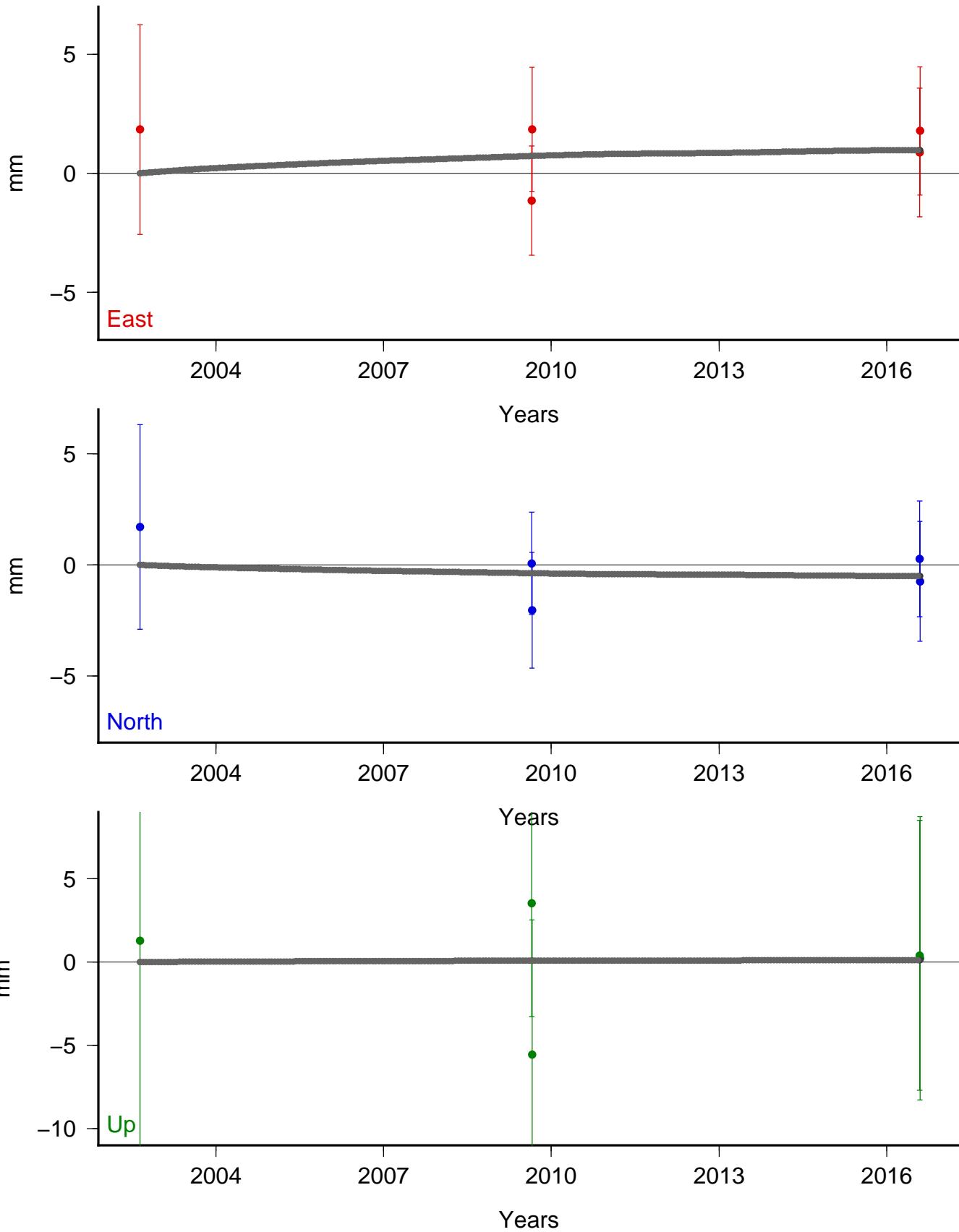
# Site: f12x Model: sis1

East V: 0.20 +/- 0.27 Wrms: 1.9623 Nrms 0.4173  
North V: 2.93 +/- 0.27 Wrms: 1.1419 Nrms 0.2324  
Up V: -1.43 +/- 0.27 Wrms: 25.5300 Nrms 1.3198  
Lon: 238.9468 Lat: 43.6927 DT: 13.9196 N: 6



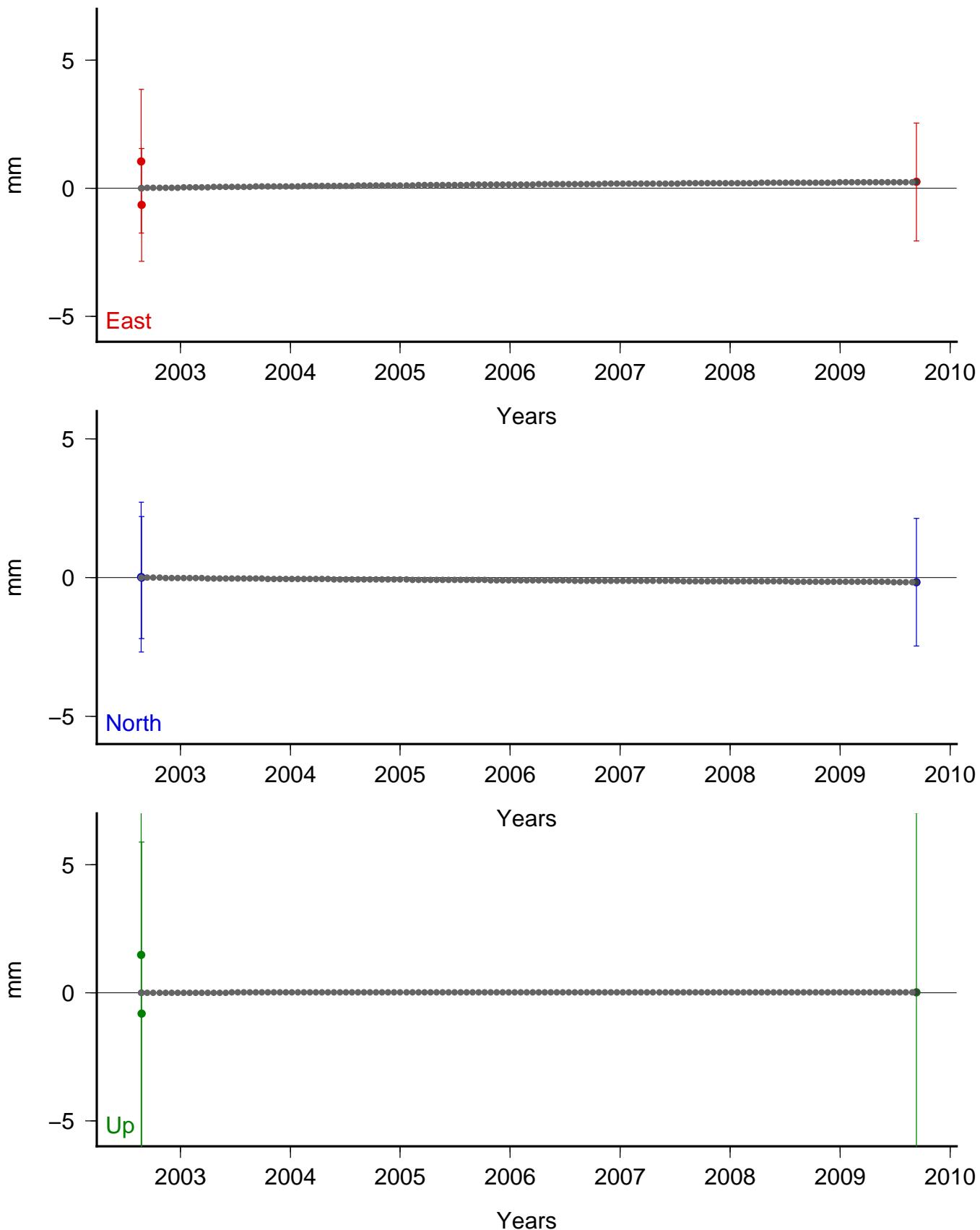
# Site: fuzz Model: sis1

East V: 0.27 +/- 0.27 Wrms: 1.2979 Nrms 0.4726  
North V: 3.52 +/- 0.27 Wrms: 1.0093 Nrms 0.3693  
Up V: -2.49 +/- 0.27 Wrms: 3.2688 Nrms 0.3877  
Lon: 238.7907 Lat: 43.8661 DT: 13.9469 N: 5



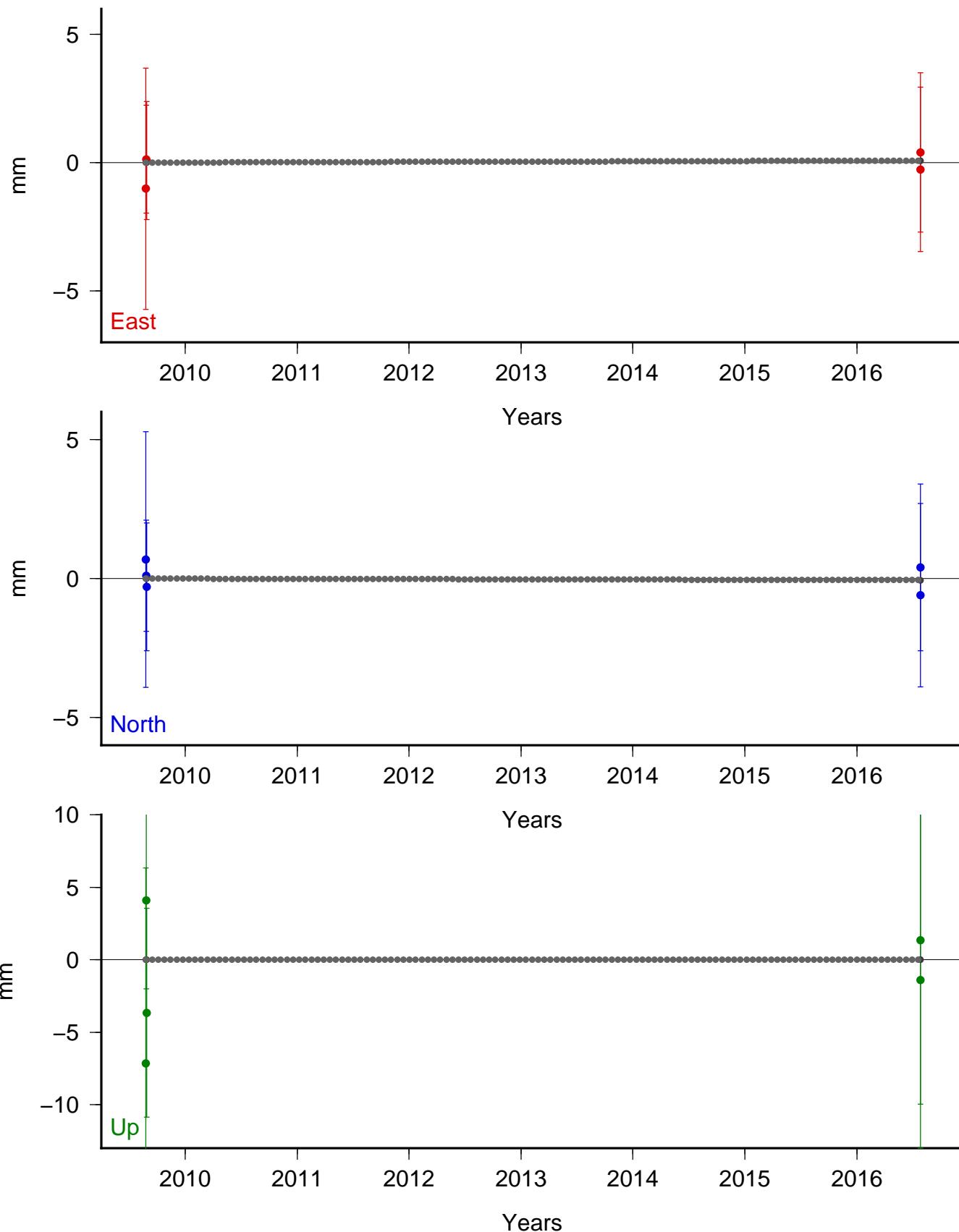
# Site: fxbu Model: sis1

East V: -0.62 +/- 0.38 Wrms: 0.6594 Nrms 0.2754  
North V: 4.20 +/- 0.38 Wrms: 0.0044 Nrms 0.0019  
Up V: -0.43 +/- 0.38 Wrms: 0.8734 Nrms 0.1183  
Lon: 239.1571 Lat: 43.6105 DT: 7.0473 N: 3



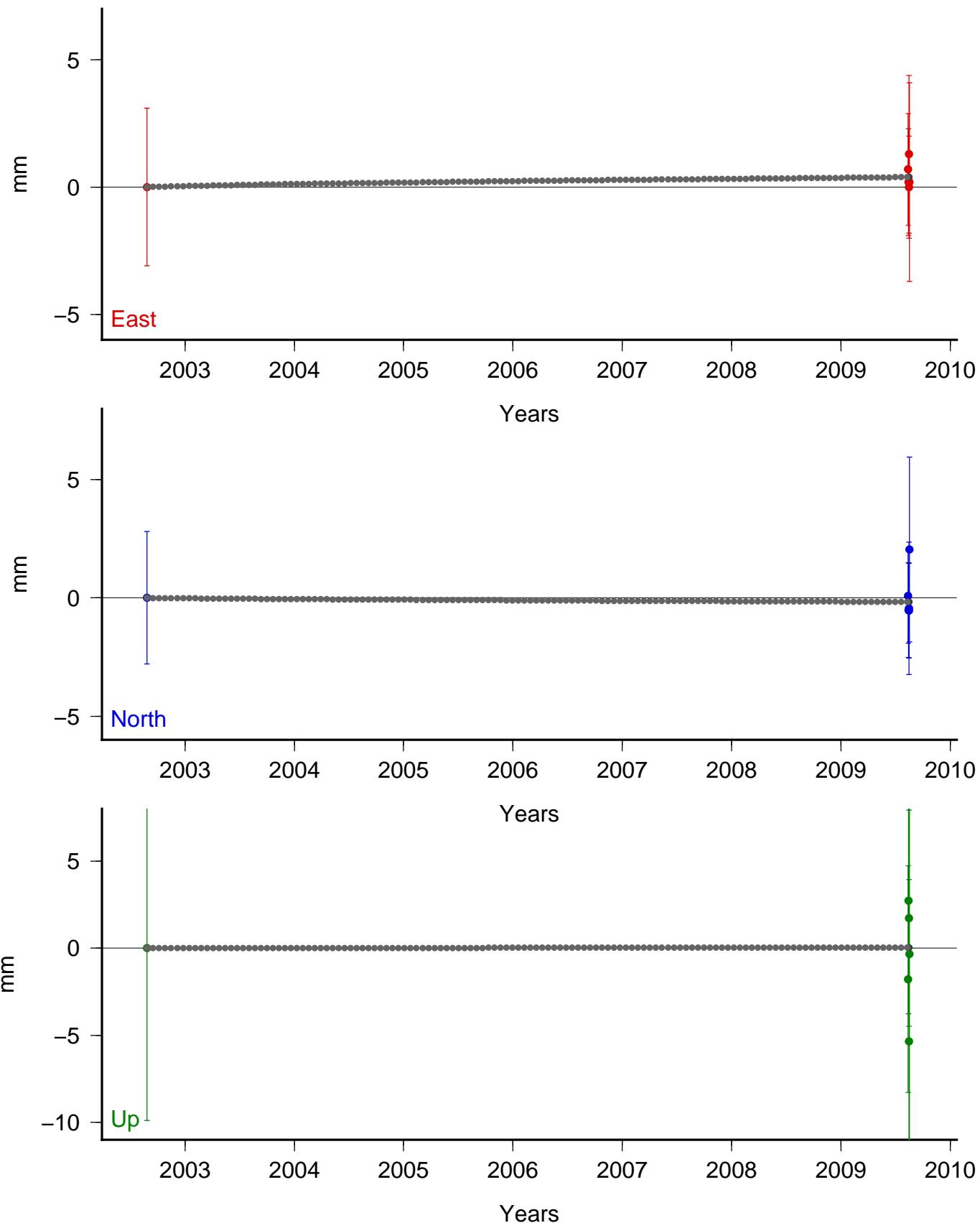
# Site: fxda Model: sis1

East V: -16.19 +/- 0.38 Wrms: 0.3321 Nrms 0.1209  
North V: -0.78 +/- 0.38 Wrms: 0.3660 Nrms 0.1359  
Up V: 19.54 +/- 0.38 Wrms: 3.9008 Nrms 0.4513  
Lon: 239.1573 Lat: 43.6105 DT: 6.9215 N: 5



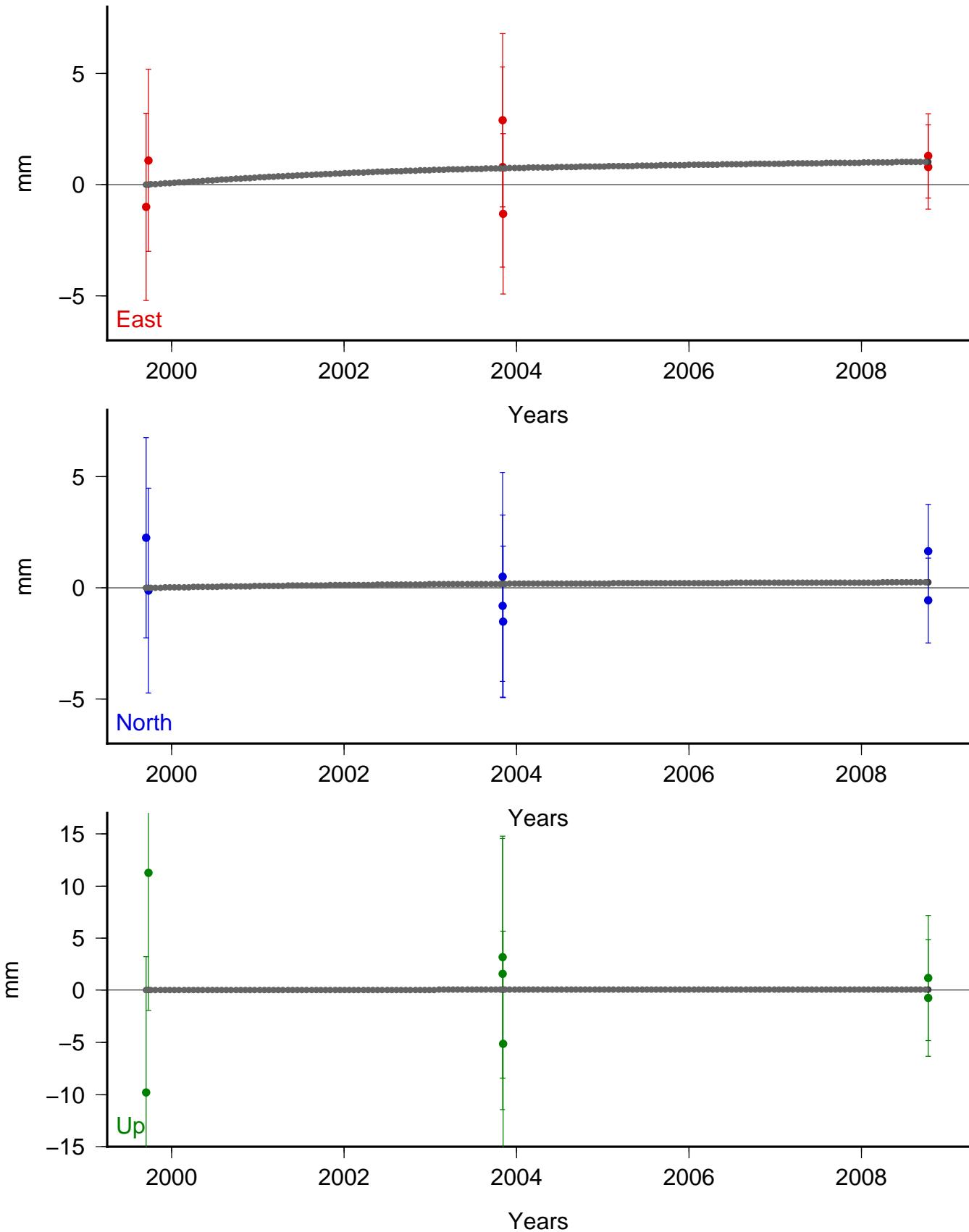
# Site: hang Model: sis1

East V: 0.33 +/- 0.38 Wrms: 0.4019 Nrms 0.1605  
North V: 3.38 +/- 0.38 Wrms: 0.6215 Nrms 0.2626  
Up V: -3.28 +/- 0.38 Wrms: 2.5436 Nrms 0.3321  
Lon: 239.0658 Lat: 43.8168 DT: 6.9734 N: 6



# Site: hstn Model: sis1

East V: 0.61 +/- 0.33 Wrms: 0.9567 Nrms 0.3358  
North V: 2.85 +/- 0.33 Wrms: 1.2253 Nrms 0.4121  
Up V: -2.53 +/- 0.33 Wrms: 4.2270 Nrms 0.4879  
Lon: 239.0702 Lat: 44.2564 DT: 9.0707 N: 7



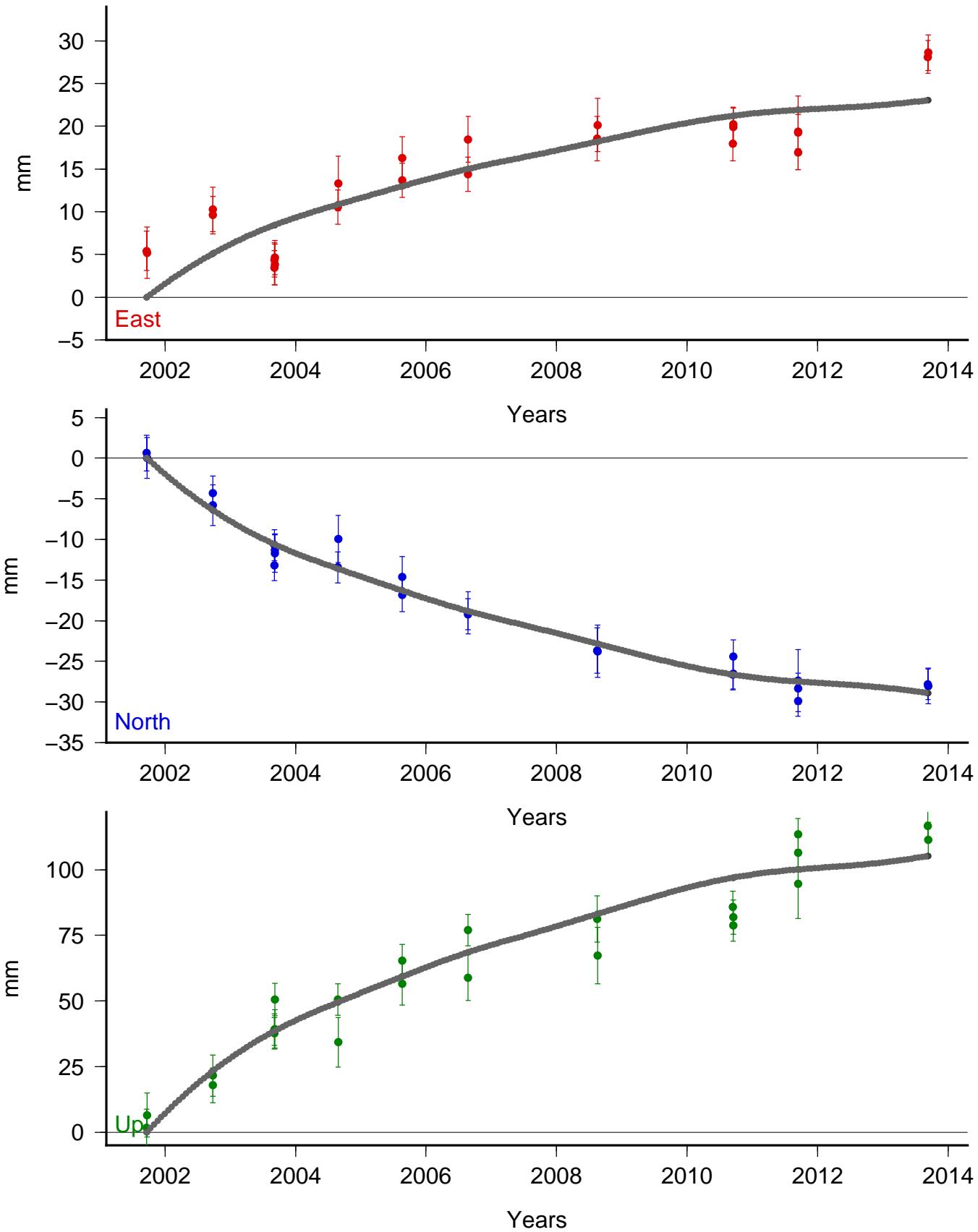
# Site: jacr Model: sis1

East V: 2.18 +/- 0.29 Wrms: 3.6967 Nrms 1.6428

North V: 4.46 +/- 0.29 Wrms: 1.3381 Nrms 0.6148

Up V: -1.04 +/- 0.29 Wrms: 9.2176 Nrms 1.3409

Lon: 238.1731 Lat: 44.0853 DT: 11.9757 N: 24



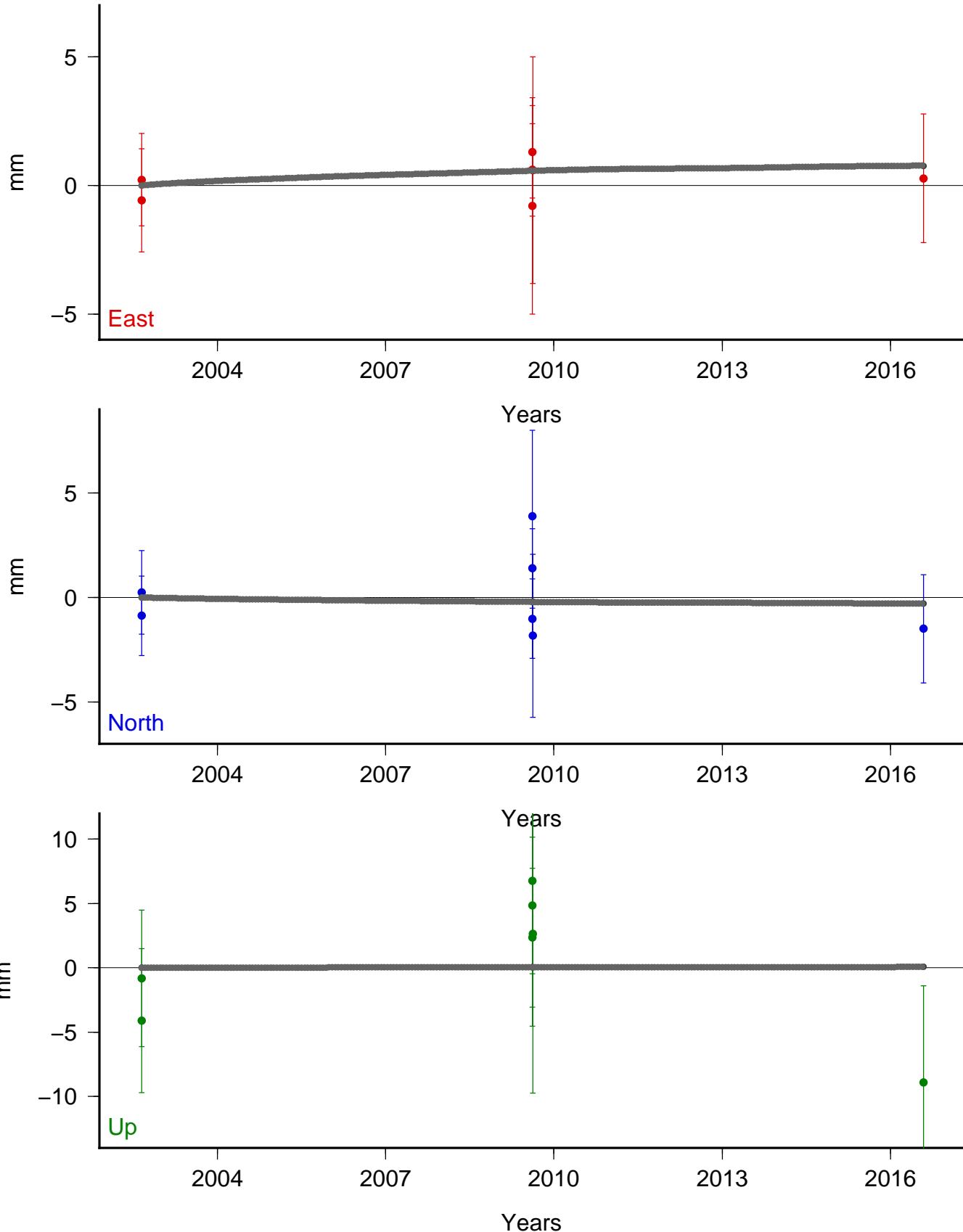
# Site: jnjp Model: sis1

East V: 0.35 +/- 0.27 Wrms: 0.5321 Nrms 0.2417

North V: 3.55 +/- 0.27 Wrms: 1.3616 Nrms 0.5989

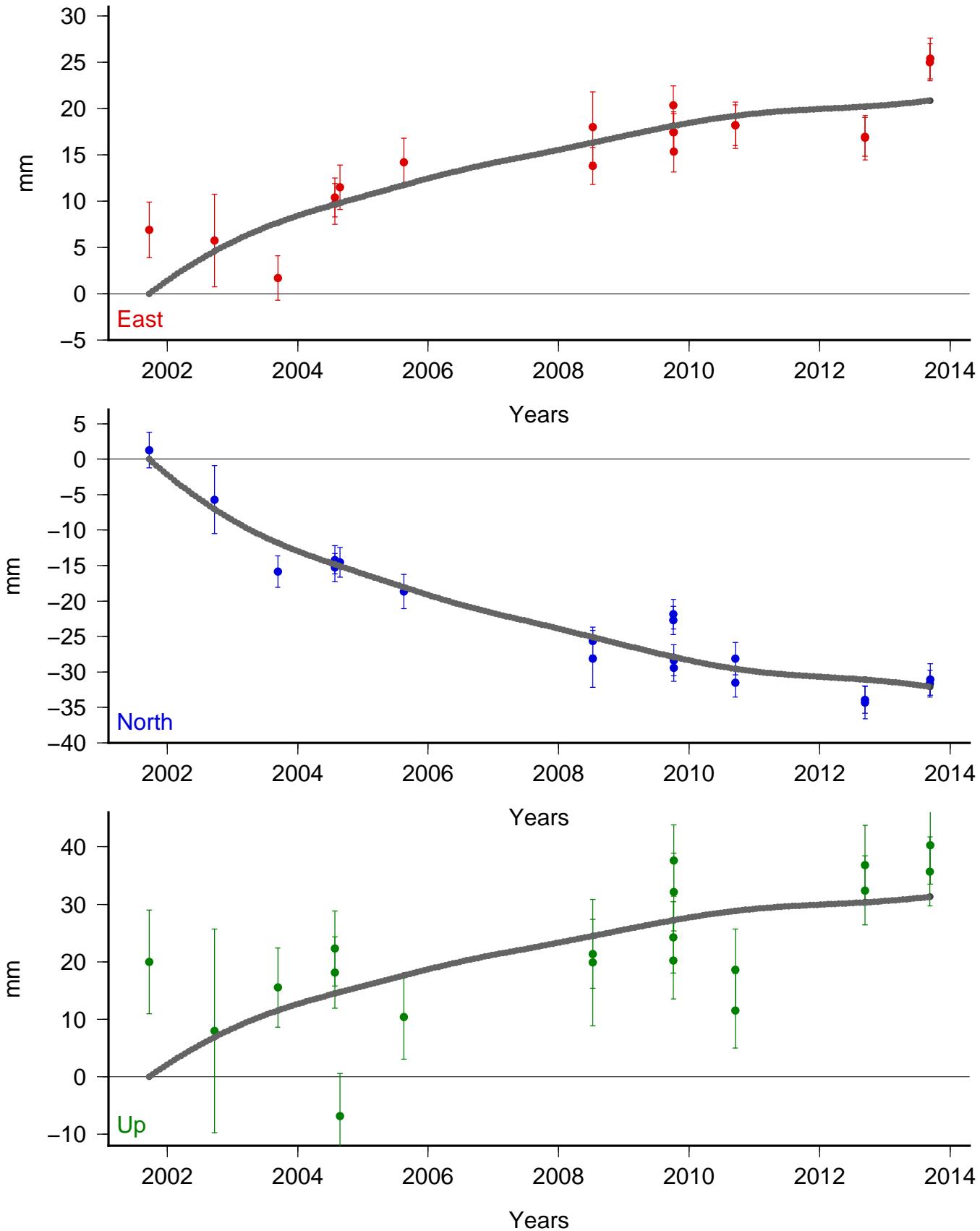
Up V: -0.27 +/- 0.27 Wrms: 4.4689 Nrms 0.6954

Lon: 238.9332 Lat: 43.8909 DT: 13.9359 N: 7



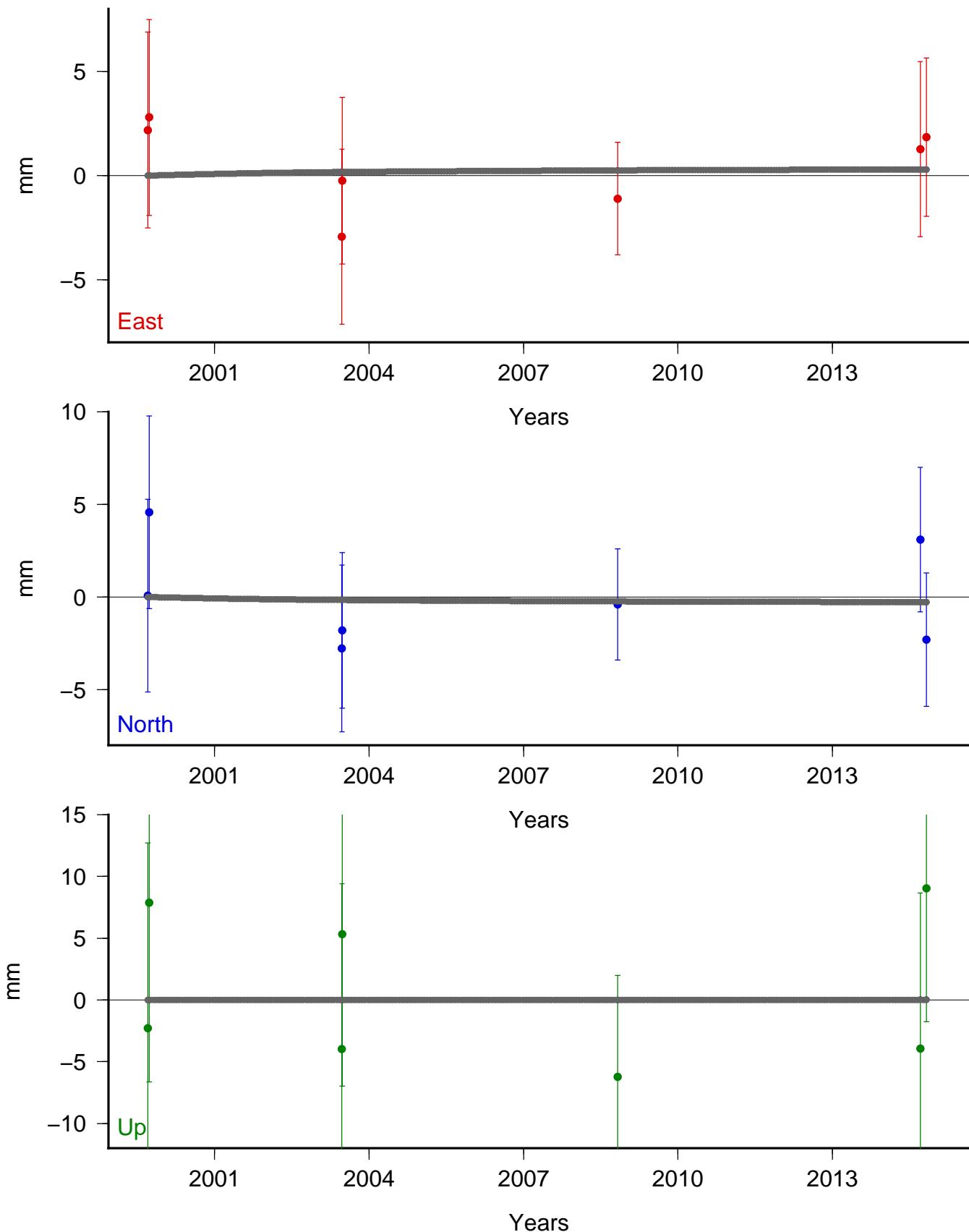
# Site: koko Model: sis1

East V: 2.94 +/- 0.29 Wrms: 2.9802 Nrms 1.2814  
 North V: 3.46 +/- 0.29 Wrms: 2.5625 Nrms 1.1716  
 Up V: 0.90 +/- 0.29 Wrms: 9.2757 Nrms 1.3407  
 Lon: 238.2055 Lat: 44.0463 DT: 11.9729 N: 19



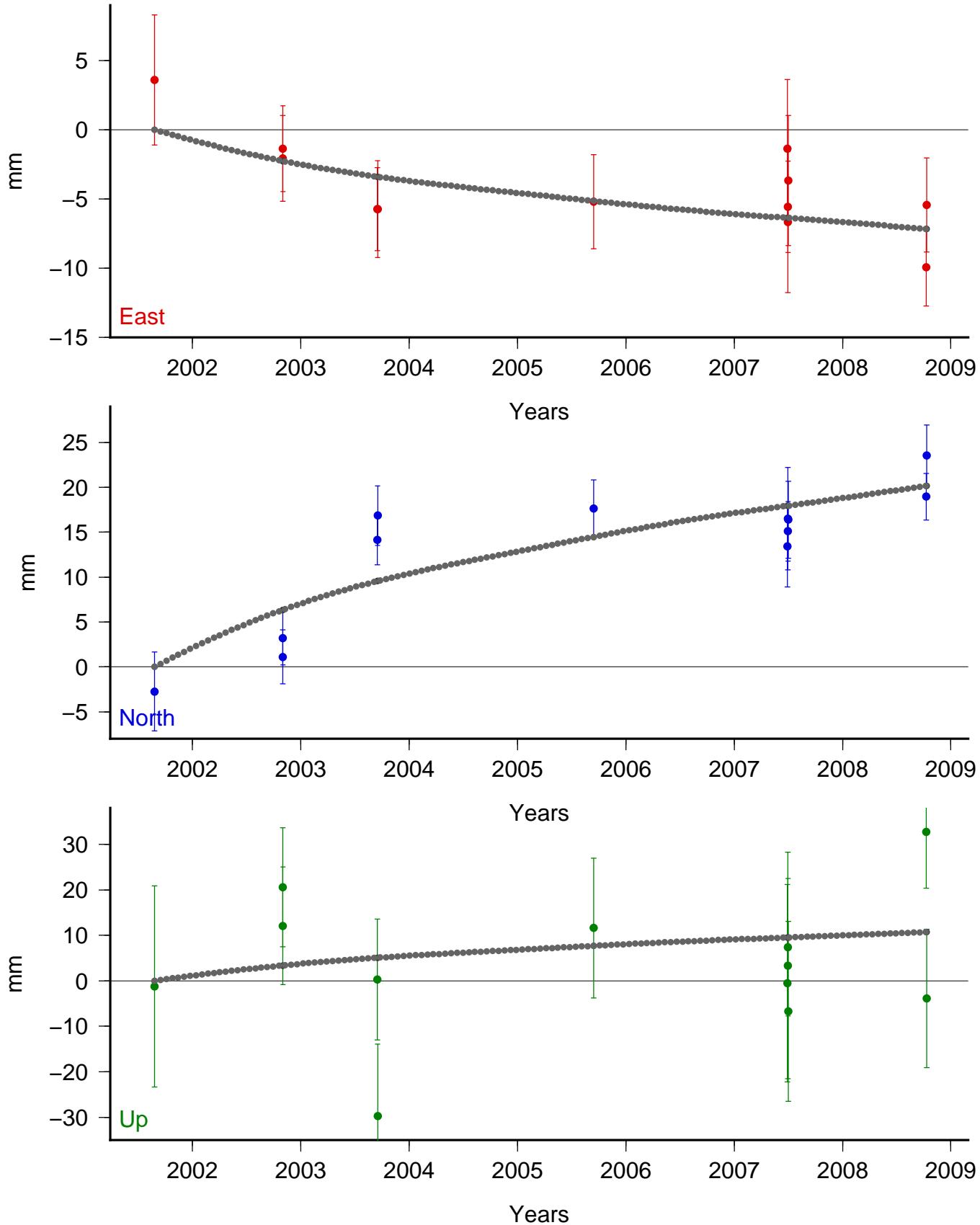
# Site: I091 Model: sis1

East V: -0.61 +/- 0.26 Wrms: 1.8360 Nrms 0.4772  
North V: 3.44 +/- 0.26 Wrms: 2.3214 Nrms 0.5781  
Up V: -2.18 +/- 0.26 Wrms: 6.2013 Nrms 0.5300  
Lon: 239.3597 Lat: 43.2885 DT: 15.1132 N: 7



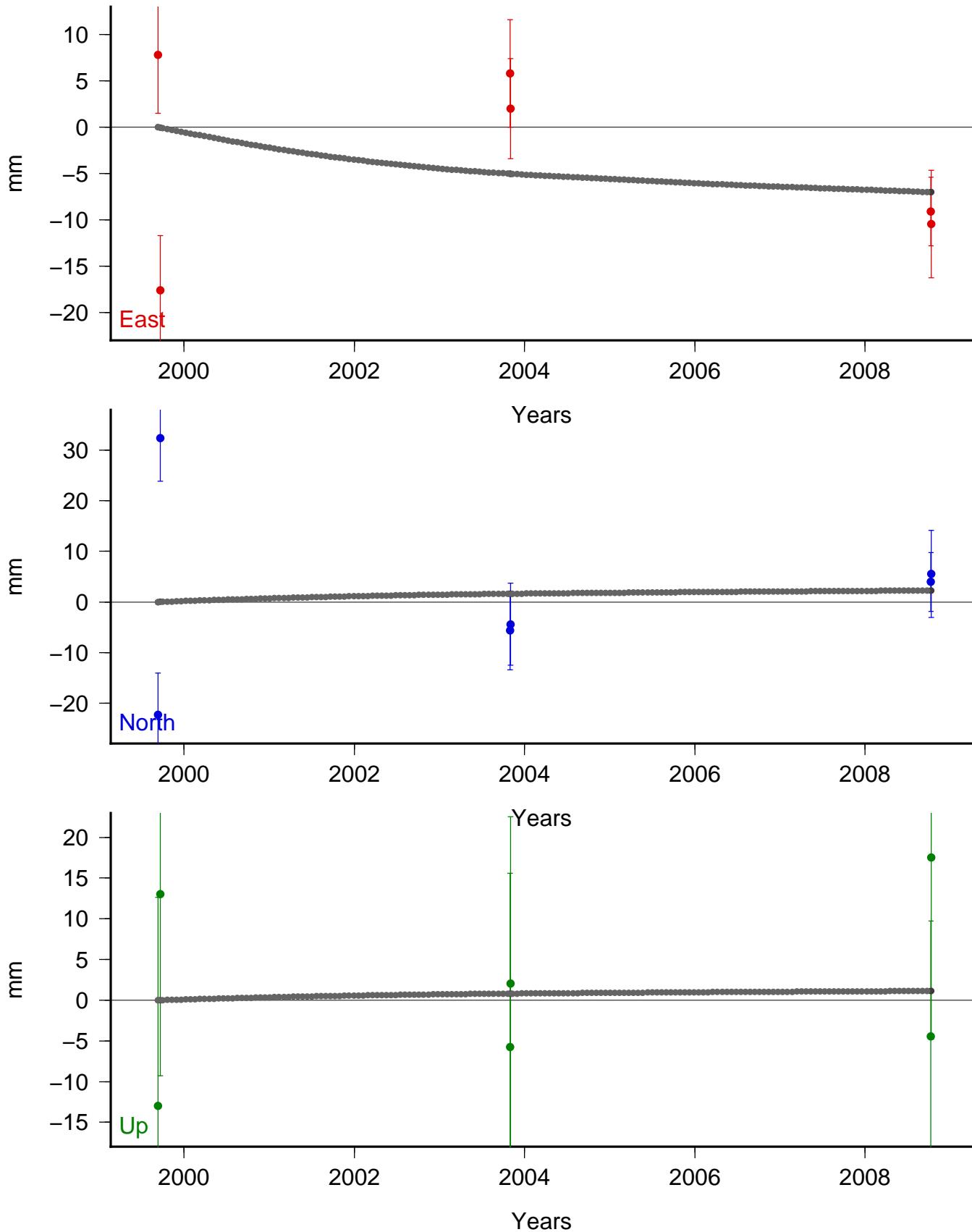
# Site: Iala Model: sis1

East V: 0.98 +/- 0.37 Wrms: 2.1279 Nrms 0.6026  
 North V: 4.42 +/- 0.37 Wrms: 3.9298 Nrms 1.1632  
 Up V: -7.50 +/- 0.37 Wrms: 15.7550 Nrms 1.0090  
 Lon: 238.1130 Lat: 44.1891 DT: 7.1267 N: 12



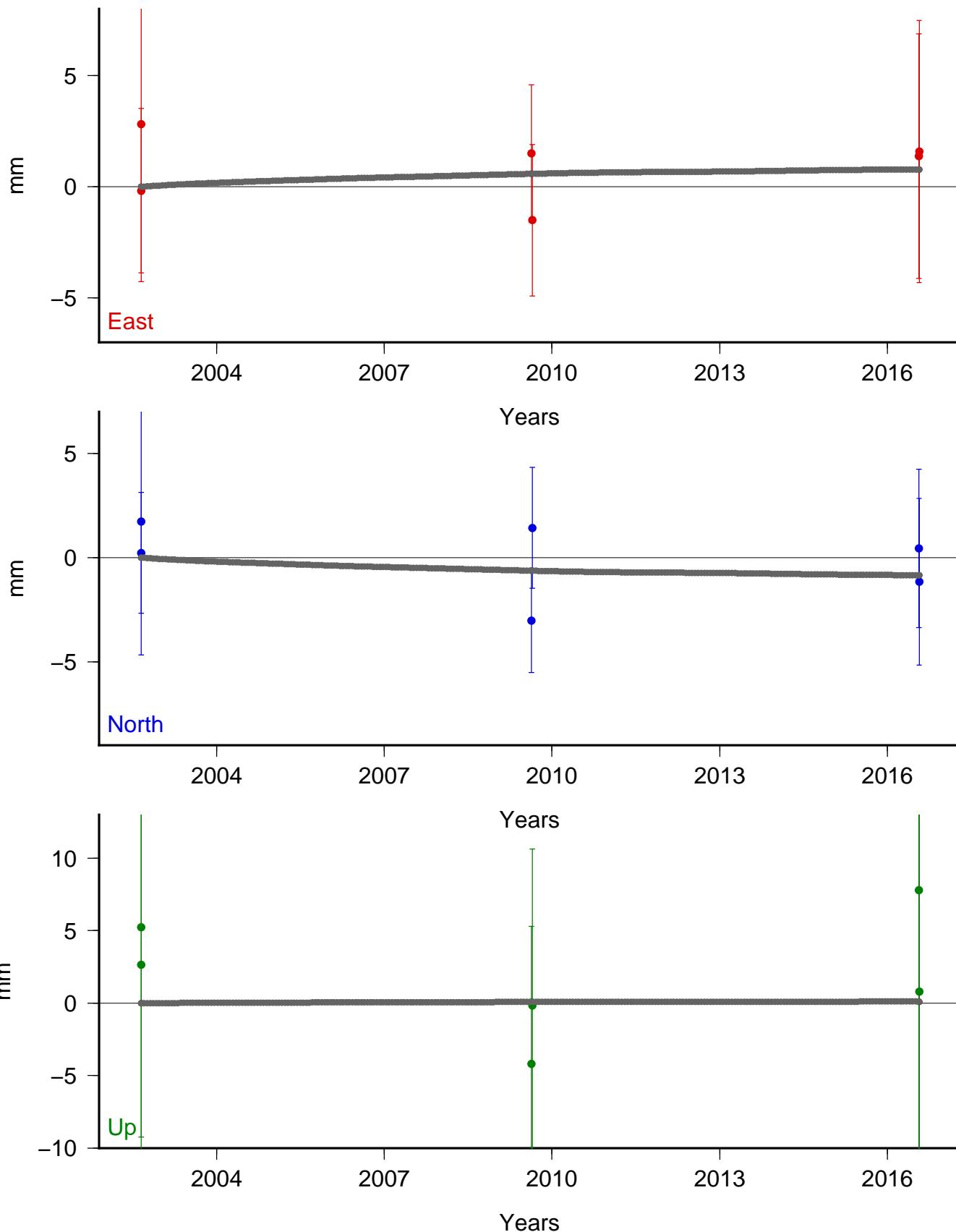
# Site: lccm Model: sis1

East V: 3.43 +/- 0.33 Wrms: 8.5788 Nrms 1.6454  
North V: 3.14 +/- 0.33 Wrms: 15.0777 Nrms 1.9816  
Up V: 0.48 +/- 0.33 Wrms: 9.6086 Nrms 0.4816  
Lon: 237.8236 Lat: 44.1770 DT: 9.0816 N: 6



# Site: mcky Model: sis1

East V: 0.29 +/- 0.27 Wrms: 1.3782 Nrms 0.3306  
North V: 4.13 +/- 0.27 Wrms: 1.7093 Nrms 0.5194  
Up V: -2.83 +/- 0.27 Wrms: 3.6986 Nrms 0.2777  
Lon: 238.6312 Lat: 43.7317 DT: 13.9168 N: 6



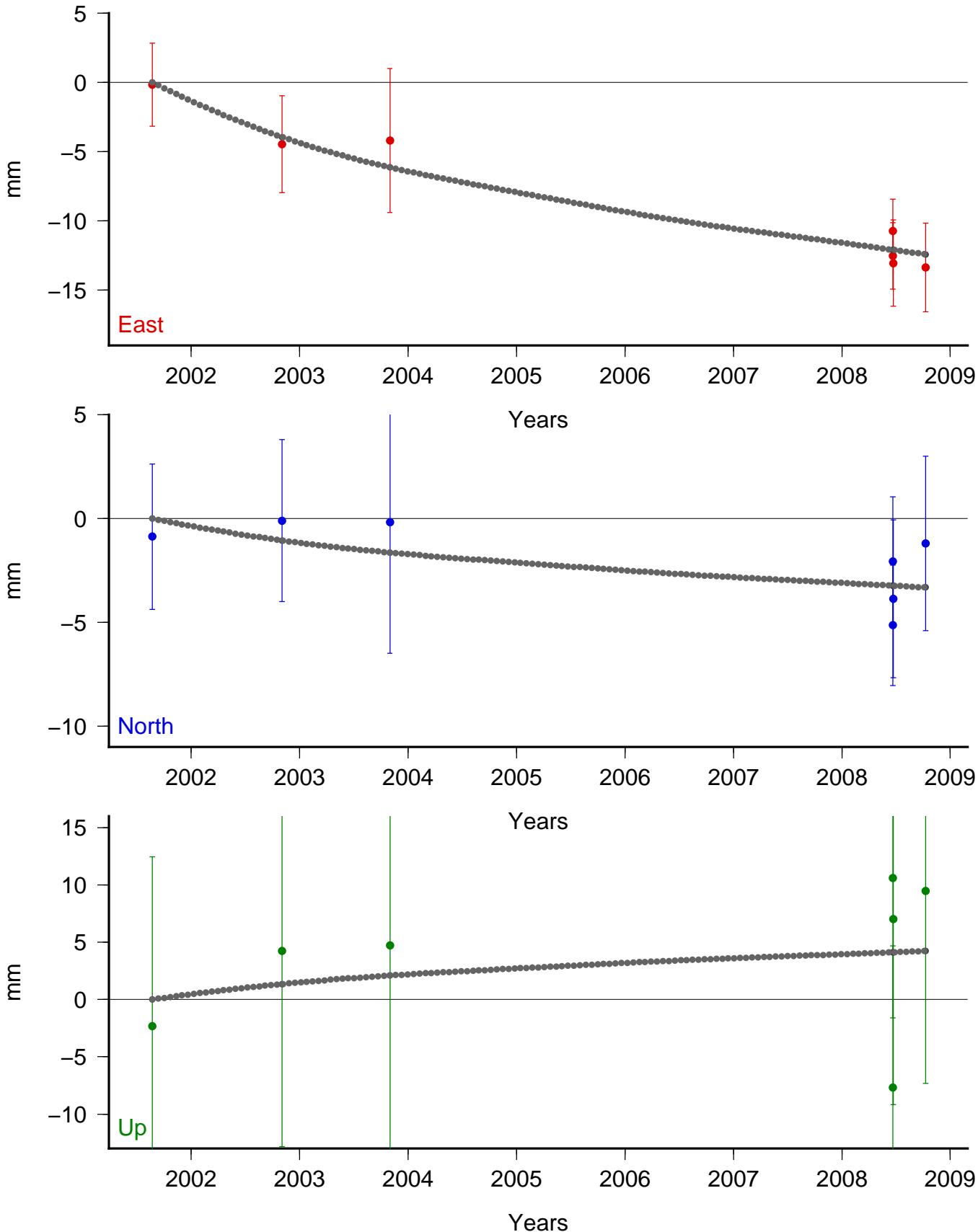
# Site: mosq Model: sis1

East V: 1.75 +/- 0.37 Wrms: 0.9557 Nrms 0.3219

North V: 4.80 +/- 0.37 Wrms: 1.4084 Nrms 0.3844

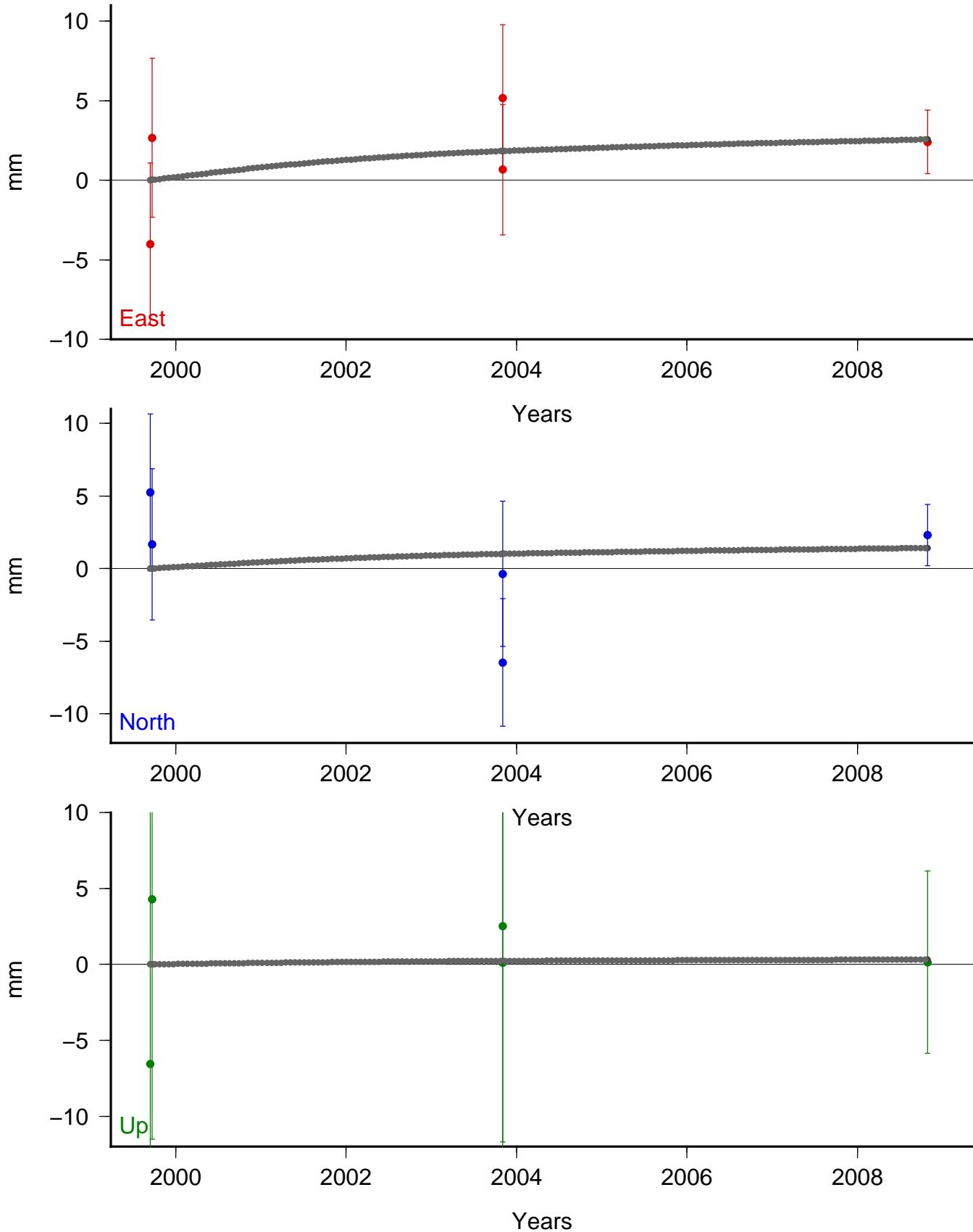
Up V: -3.58 +/- 0.37 Wrms: 6.7521 Nrms 0.4449

Lon: 237.9764 Lat: 44.0646 DT: 7.1323 N: 7



# Site: n735 Model: sis1

East V: 0.88 +/- 0.33 Wrms: 1.8639 Nrms 0.5499  
North V: 2.86 +/- 0.33 Wrms: 3.2777 Nrms 0.9150  
Up V: -1.97 +/- 0.33 Wrms: 2.3248 Nrms 0.2241  
Lon: 238.6481 Lat: 44.2948 DT: 9.12 N: 5



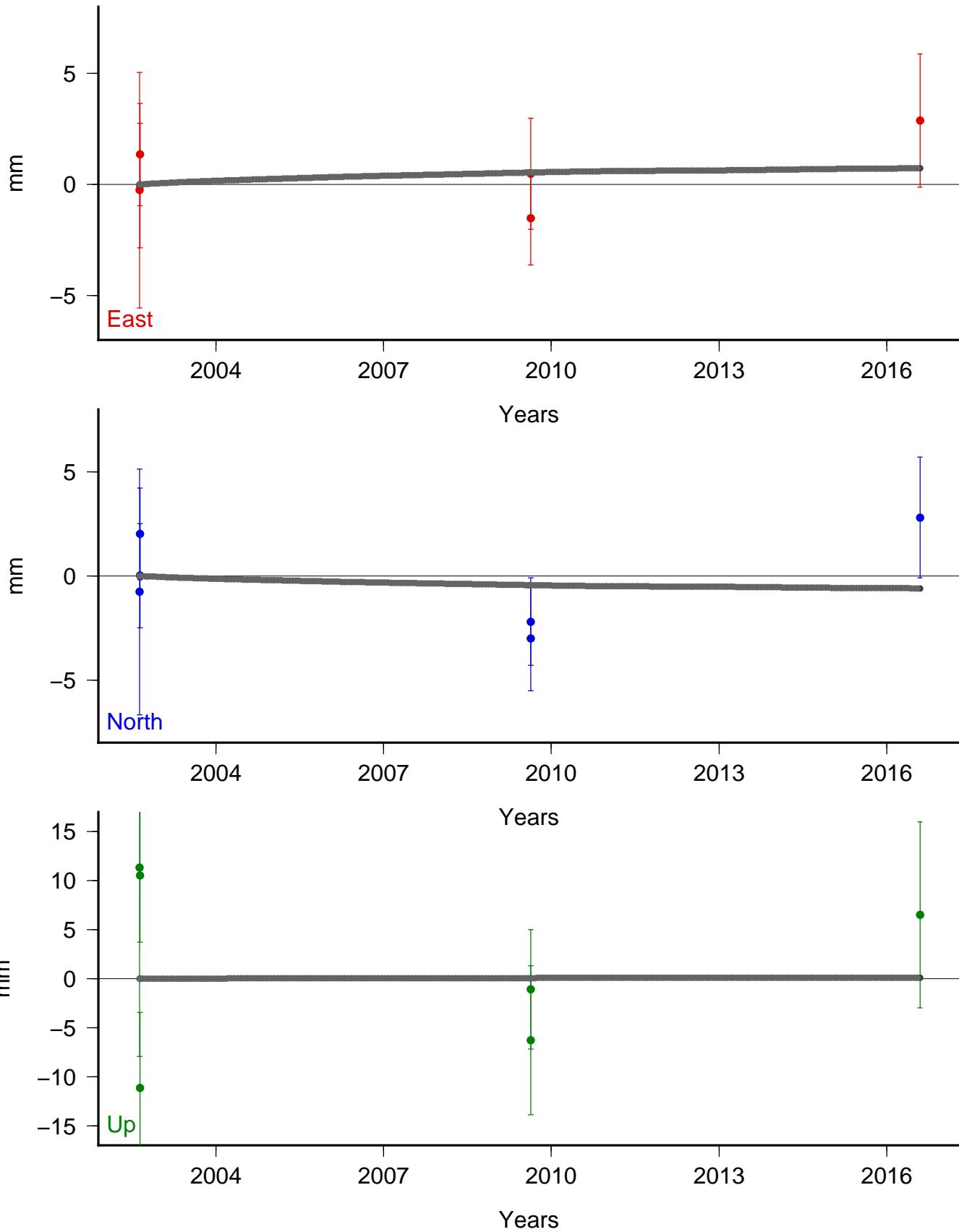
# Site: npln Model: sis1

East V: -0.62 +/- 0.27 Wrms: 1.4672 Nrms 0.5523

North V: 3.82 +/- 0.27 Wrms: 2.1028 Nrms 0.8149

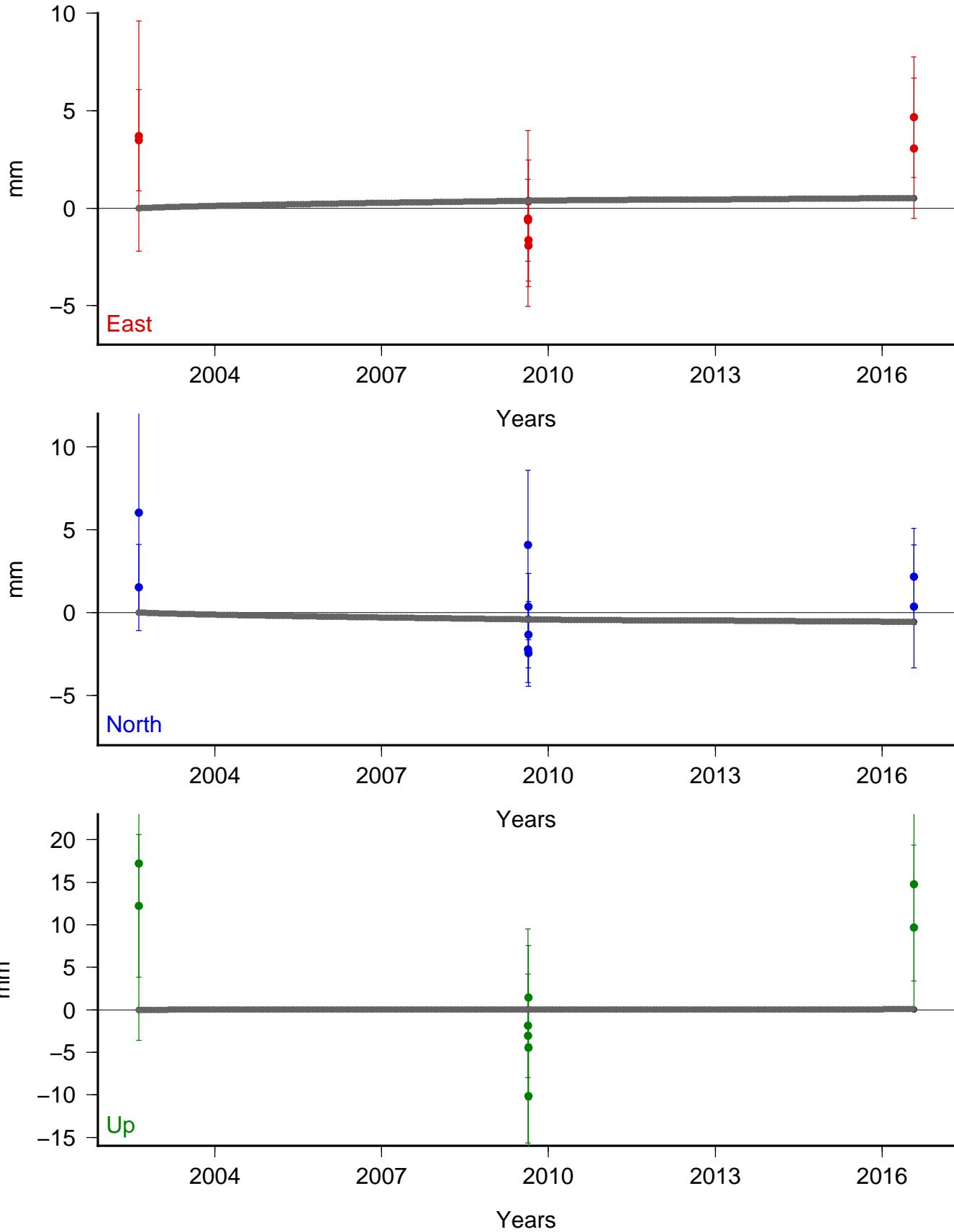
Up V: -1.02 +/- 0.27 Wrms: 7.9167 Nrms 1.0037

Lon: 238.7563 Lat: 43.7483 DT: 13.9524 N: 6



# Site: nw01 Model: sis1

East V: 0.00 +/- 0.27 Wrms: 2.2863 Nrms 0.8737  
North V: 3.81 +/- 0.27 Wrms: 1.9662 Nrms 0.7799  
Up V: -2.52 +/- 0.27 Wrms: 7.7847 Nrms 1.0003  
Lon: 238.7467 Lat: 43.6426 DT: 13.9333 N: 9



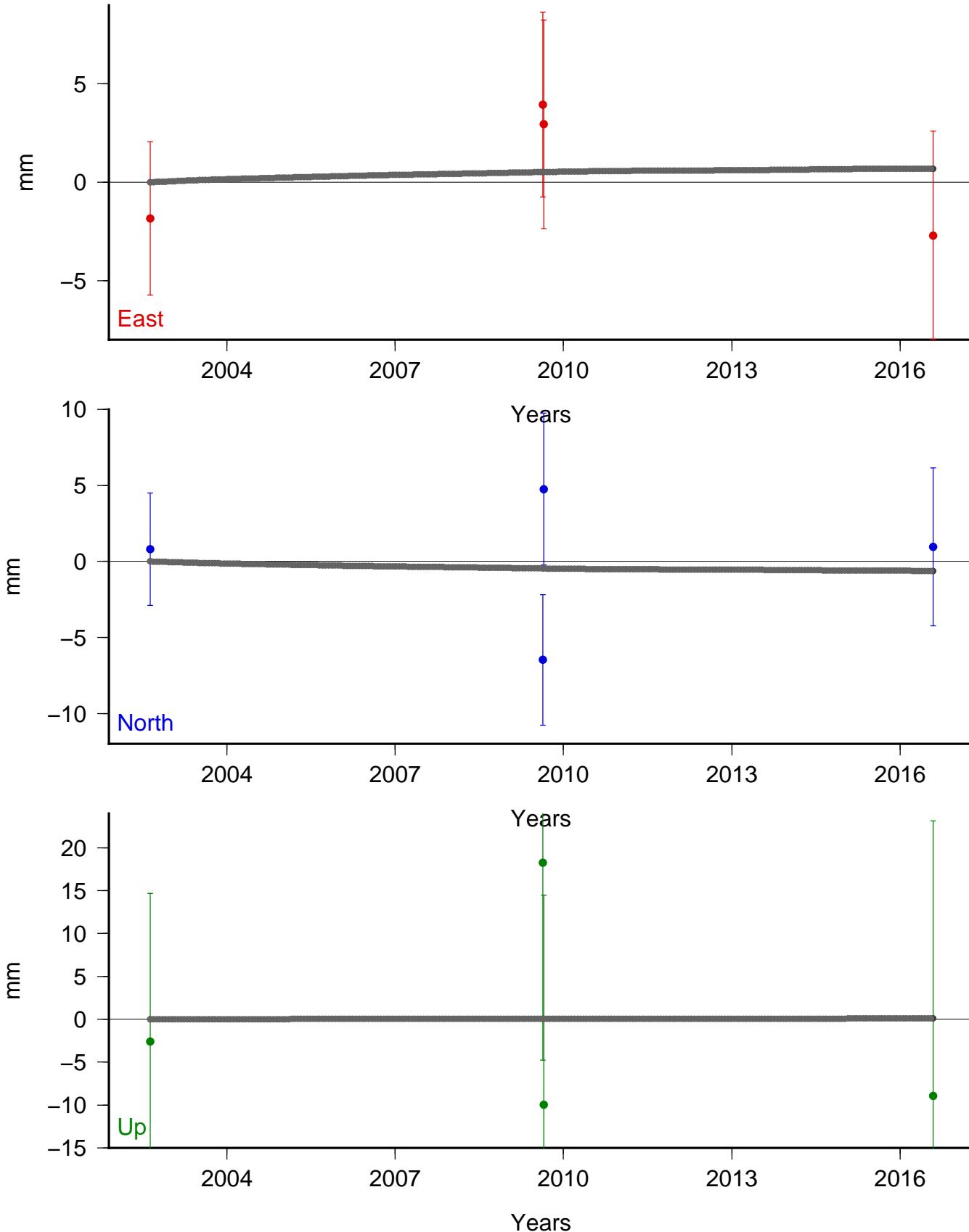
# Site: nw02 Model: sis1

East V: -0.38 +/- 0.27 Wrms: 2.7434 Nrms 0.5855

North V: 3.63 +/- 0.27 Wrms: 3.9509 Nrms 0.8925

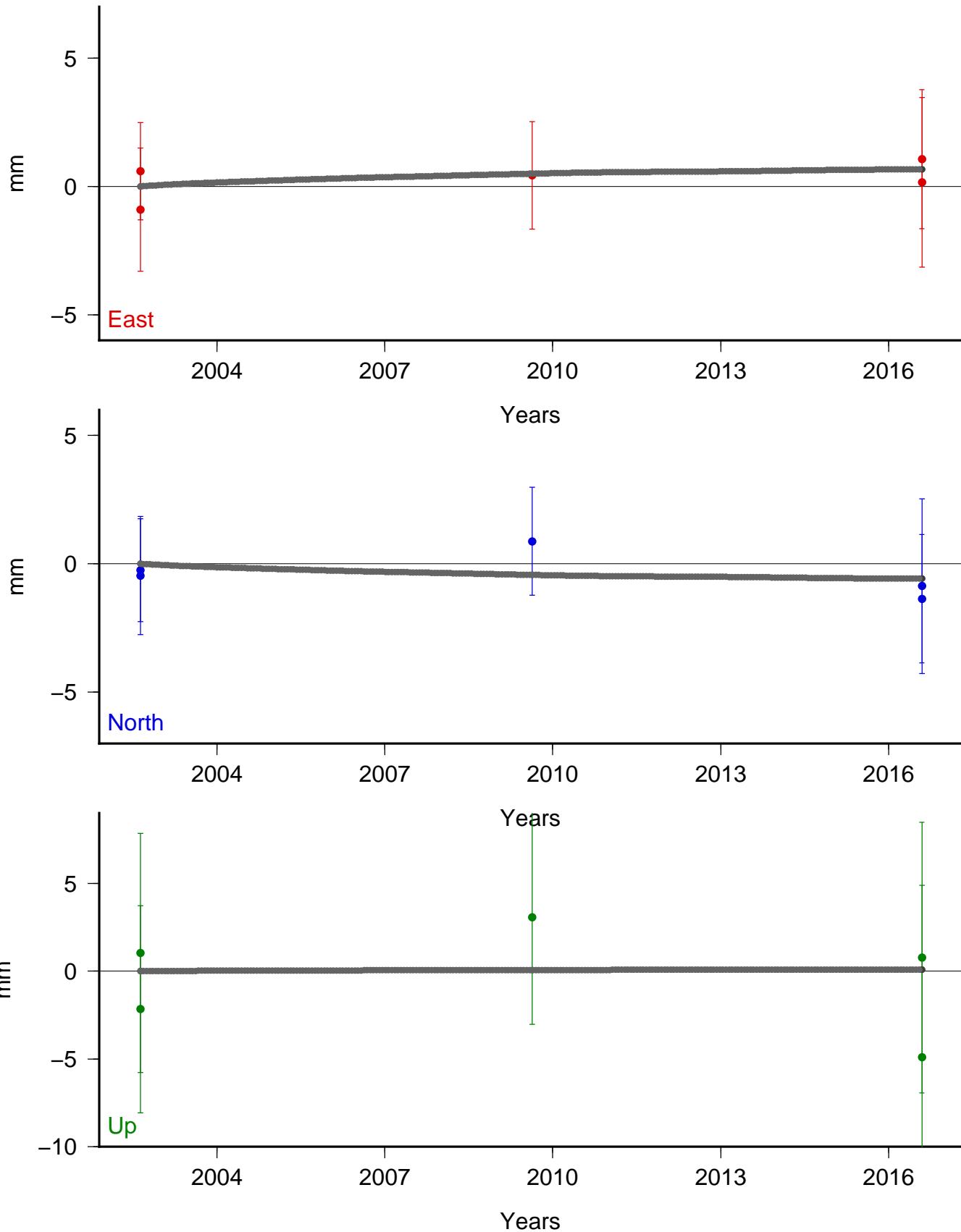
Up V: -1.11 +/- 0.27 Wrms: 10.6534 Nrms 0.4729

Lon: 238.7350 Lat: 43.7309 DT: 13.9496 N: 4



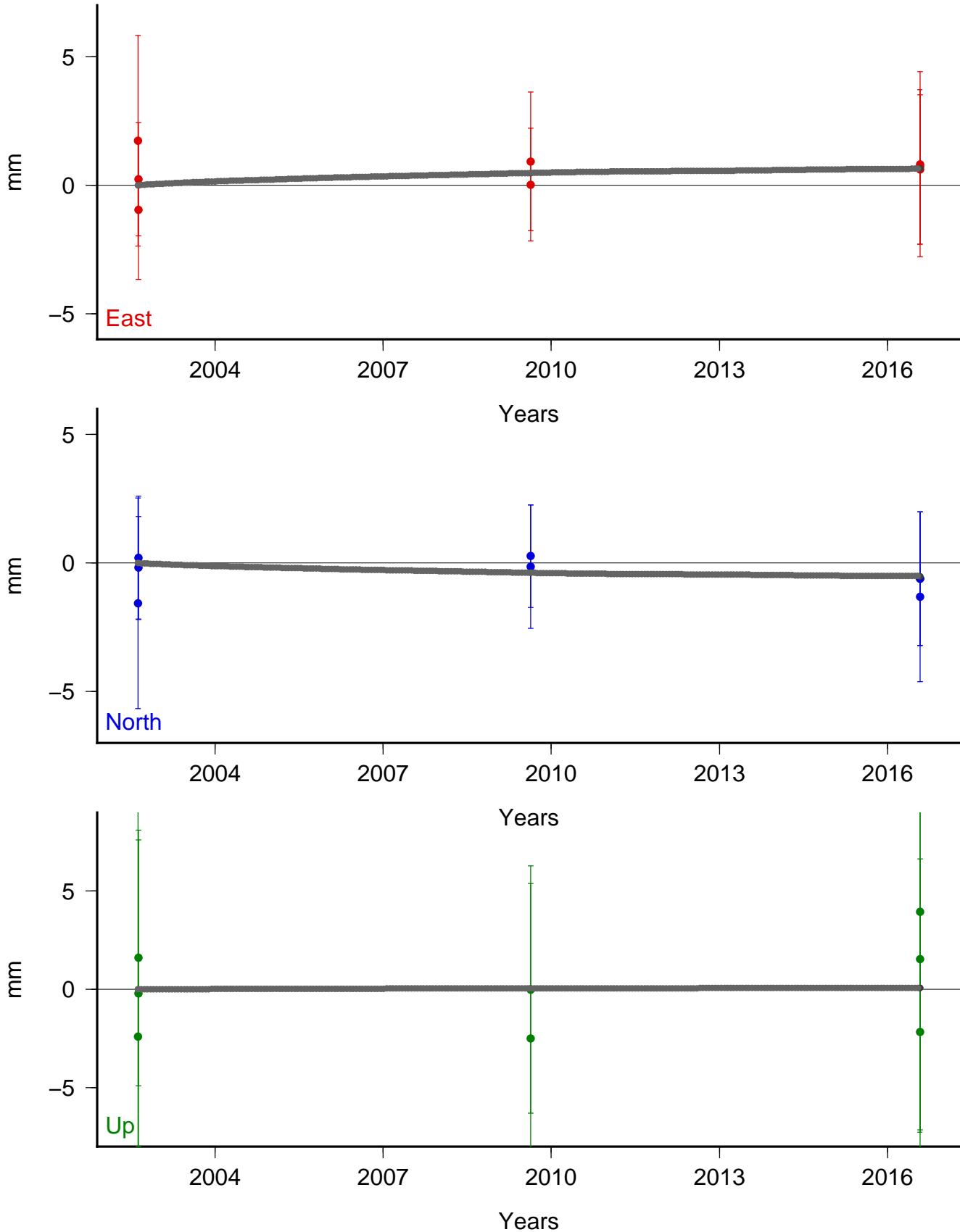
# Site: nw03 Model: sis1

East V: 0.02 +/- 0.27 Wrms: 0.5620 Nrms 0.2393  
North V: 3.67 +/- 0.27 Wrms: 0.7742 Nrms 0.3307  
Up V: -0.79 +/- 0.27 Wrms: 2.5324 Nrms 0.3661  
Lon: 238.7588 Lat: 43.7234 DT: 13.9606 N: 5



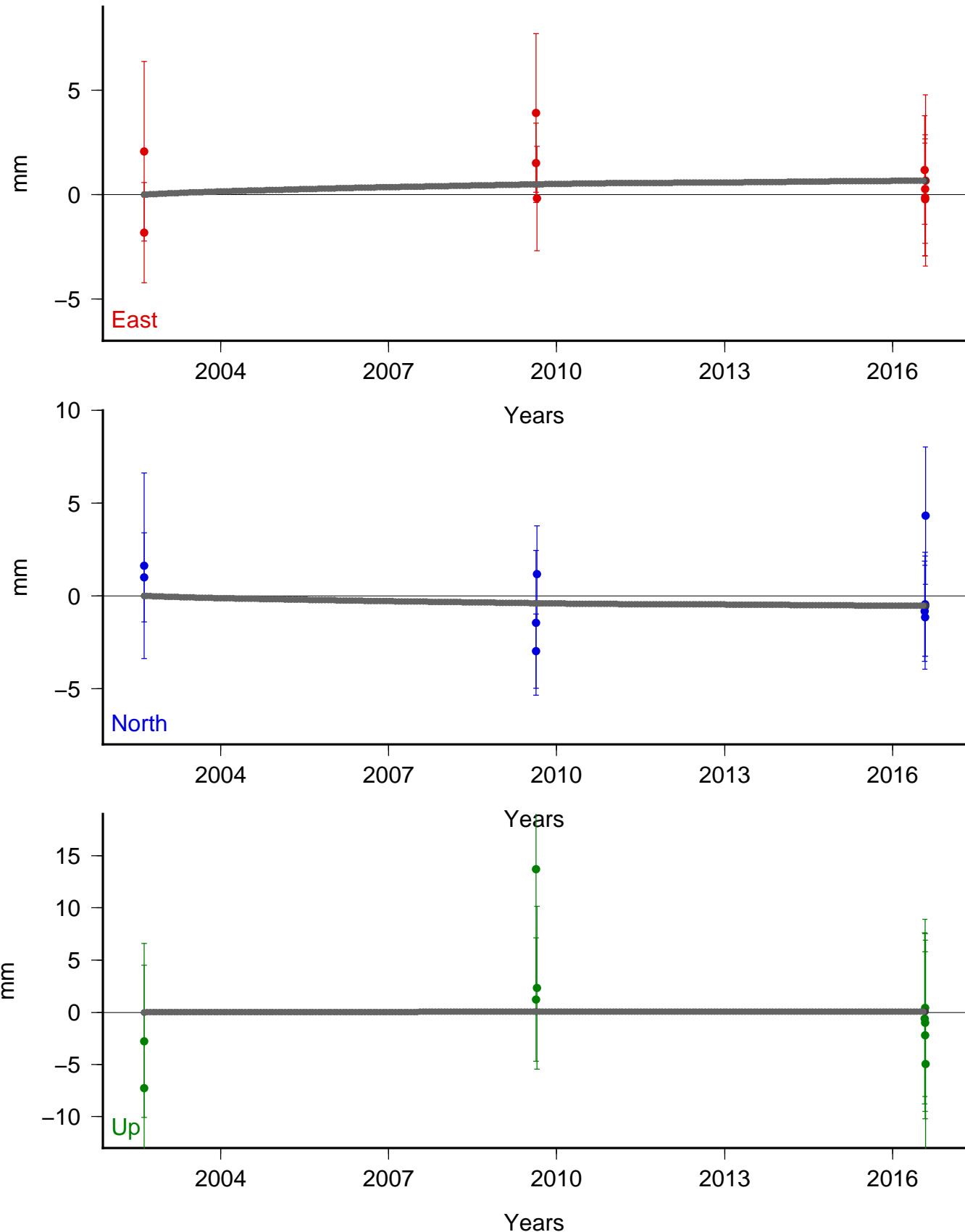
# Site: nw05 Model: sis1

East V: 0.09 +/- 0.27 Wrms: 0.6092 Nrms 0.2212  
North V: 3.59 +/- 0.27 Wrms: 0.5104 Nrms 0.2053  
Up V: -0.89 +/- 0.27 Wrms: 1.8461 Nrms 0.2268  
Lon: 238.8061 Lat: 43.7279 DT: 13.9496 N: 8



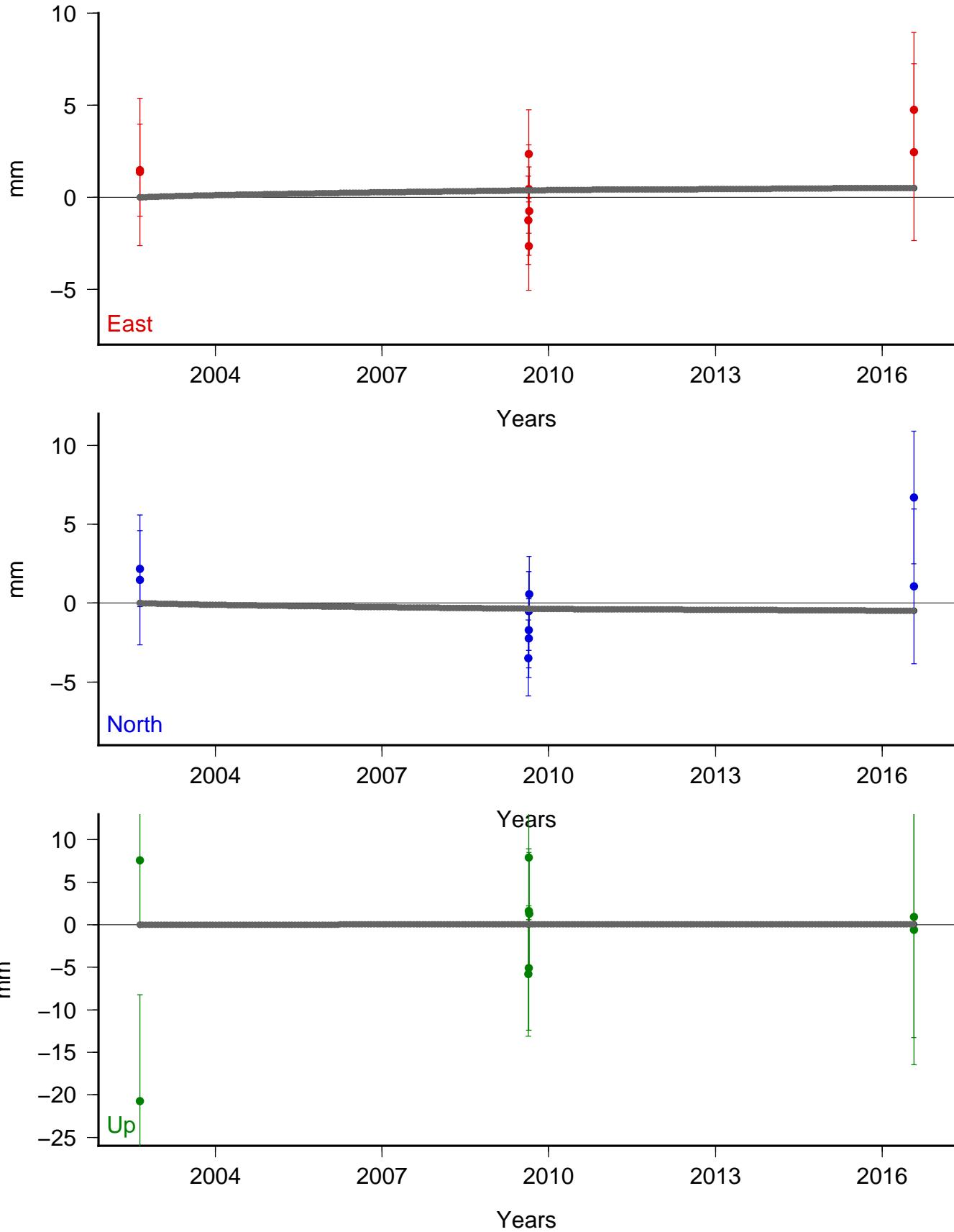
# Site: nw07 Model: sis1

East V: -0.04 +/- 0.27 Wrms: 1.2869 Nrms 0.4735  
North V: 3.99 +/- 0.27 Wrms: 1.8025 Nrms 0.6448  
Up V: -0.56 +/- 0.27 Wrms: 4.0369 Nrms 0.4816  
Lon: 238.7935 Lat: 43.7358 DT: 13.9497 N: 10



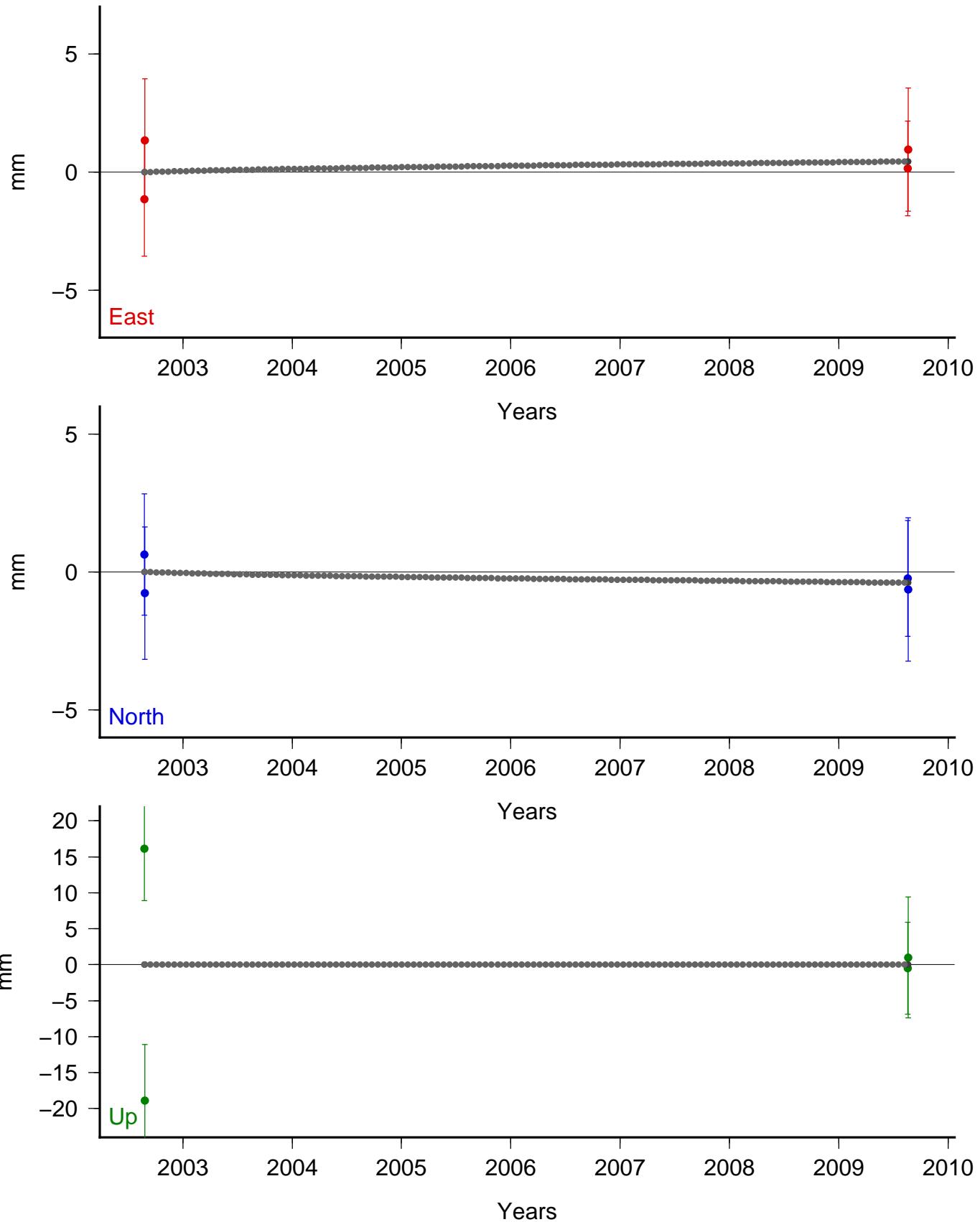
# Site: nw09 Model: sis1

East V: 0.02 +/- 0.27 Wrms: 1.9619 Nrms 0.7136  
North V: 3.90 +/- 0.27 Wrms: 2.3883 Nrms 0.8620  
Up V: -0.49 +/- 0.27 Wrms: 6.9446 Nrms 0.8264  
Lon: 238.8105 Lat: 43.6565 DT: 13.9278 N: 9



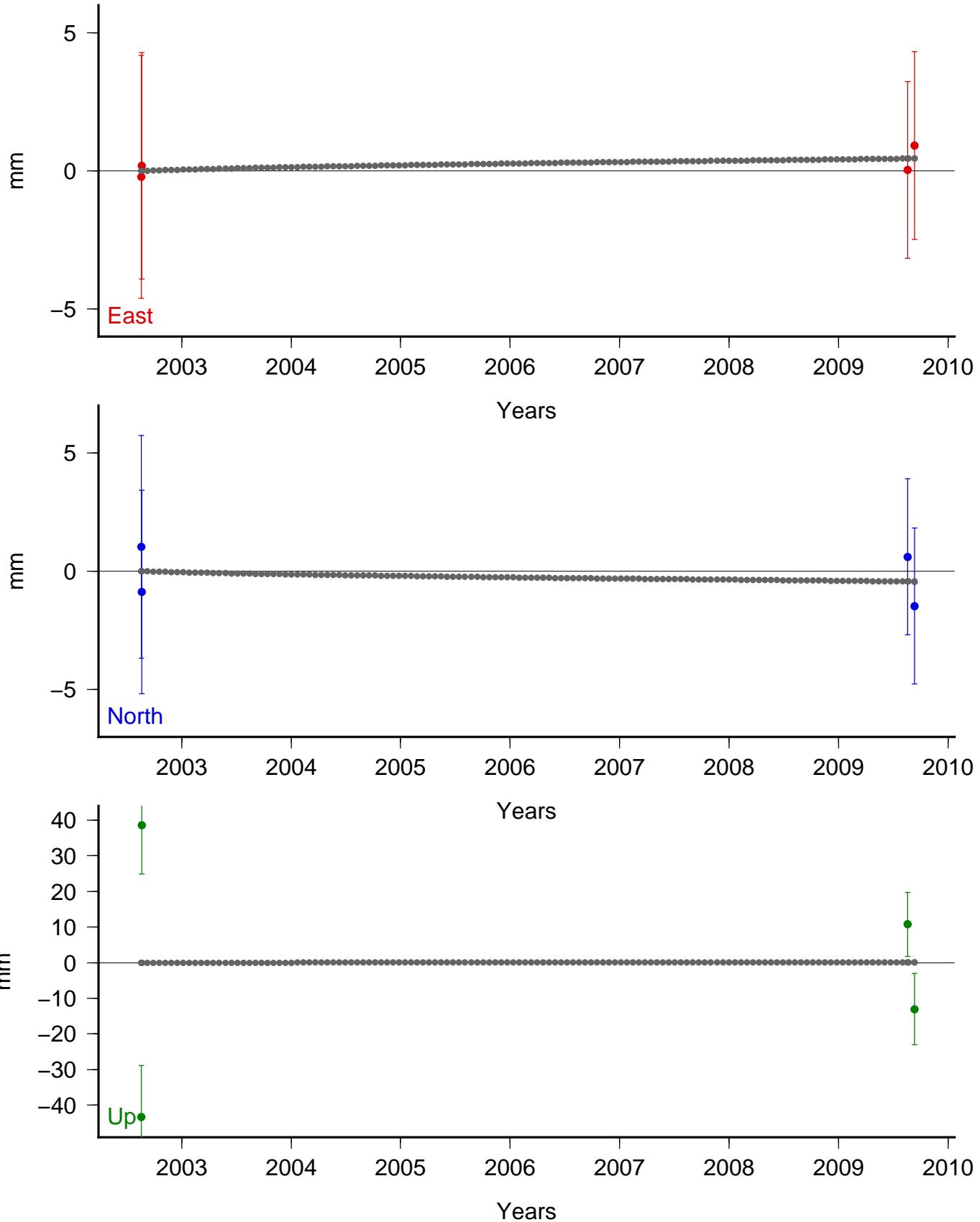
# Site: nw10 Model: sis1

East V: -0.50 +/- 0.38 Wrms: 0.8817 Nrms 0.3739  
North V: 3.80 +/- 0.38 Wrms: 0.5181 Nrms 0.2251  
Up V: 0.27 +/- 0.38 Wrms: 12.1066 Nrms 1.6502  
Lon: 238.7887 Lat: 43.7059 DT: 6.9871 N: 4



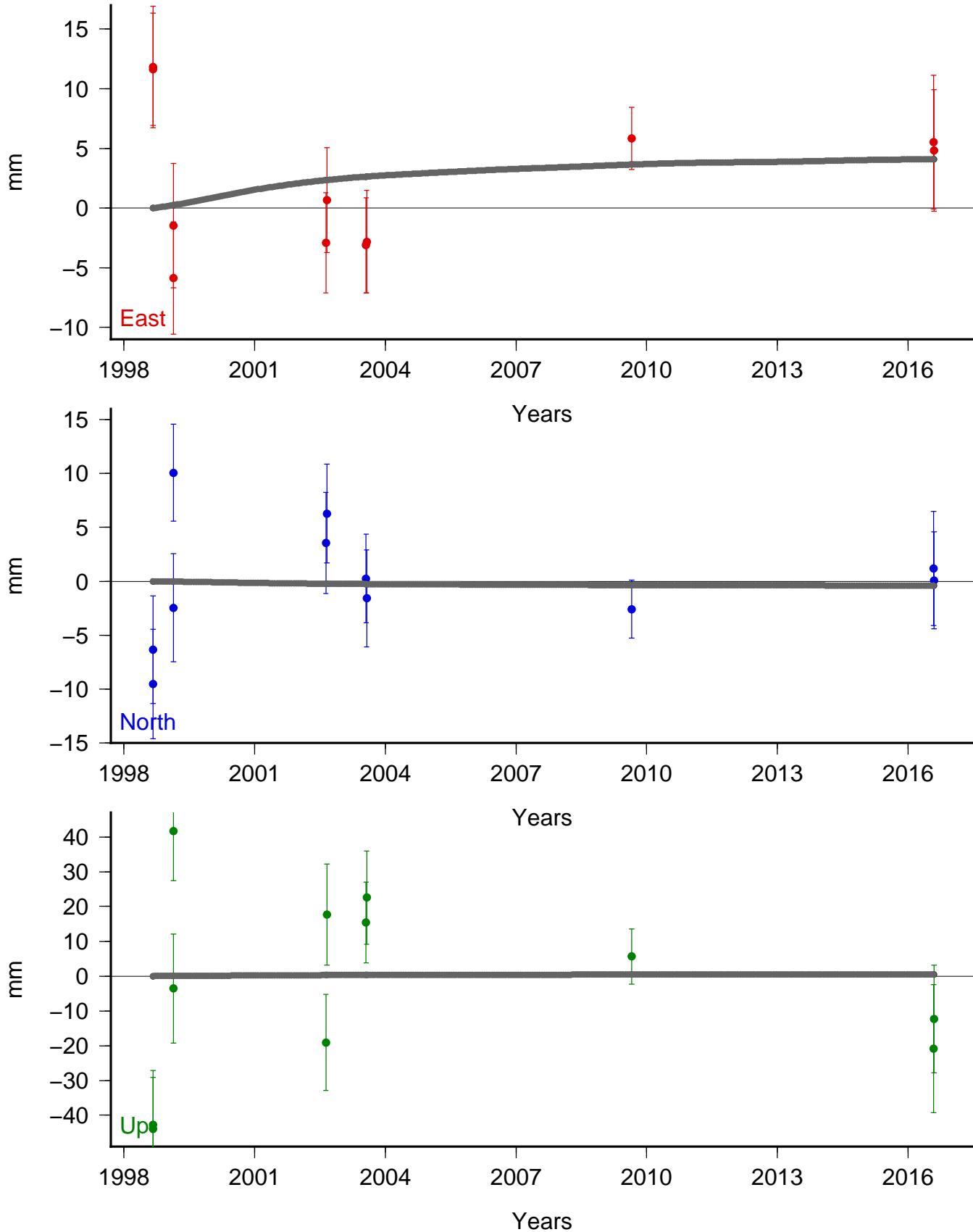
# Site: paul Model: sis1

East V: -1.45 +/- 0.38 Wrms: 0.3713 Nrms 0.1009  
North V: 4.40 +/- 0.38 Wrms: 1.0082 Nrms 0.2682  
Up V: 0.59 +/- 0.38 Wrms: 24.8305 Nrms 2.2358  
Lon: 238.7451 Lat: 43.6892 DT: 7.0638 N: 4



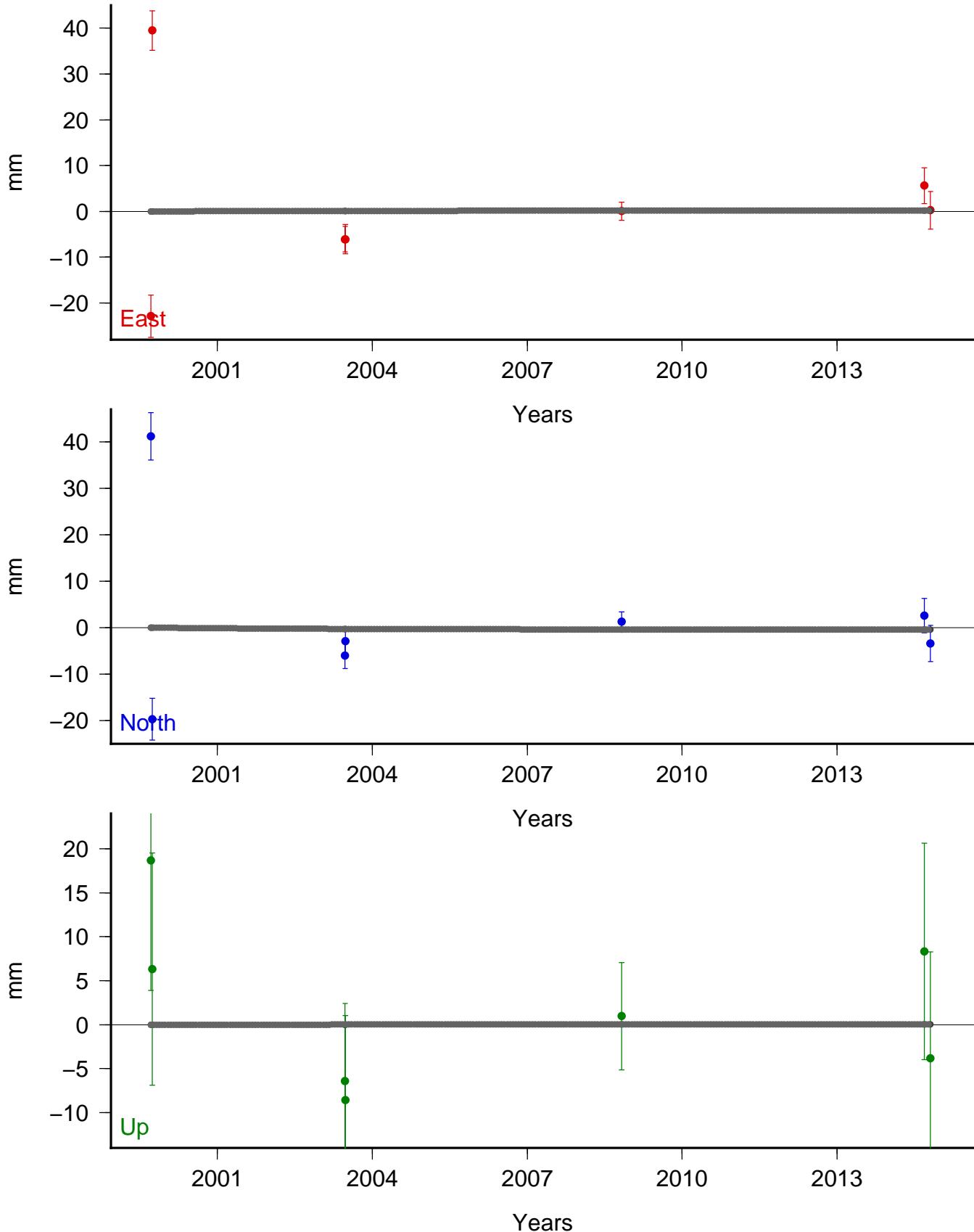
# Site: pibu Model: sis1

East V: 0.66 +/- 0.24 Wrms: 5.6552 Nrms 1.3308  
 North V: 3.68 +/- 0.24 Wrms: 4.8499 Nrms 1.1245  
 Up V: -0.39 +/- 0.24 Wrms: 23.5014 Nrms 1.7902  
 Lon: 238.7168 Lat: 44.0605 DT: 17.9224 N: 11



# Site: rodm Model: sis1

East V: -1.86 +/- 0.26 Wrms: 13.0541 Nrms 4.1333  
North V: 3.93 +/- 0.26 Wrms: 11.4843 Nrms 3.6110  
Up V: -1.15 +/- 0.26 Wrms: 7.0860 Nrms 0.7304  
Lon: 238.7345 Lat: 43.1096 DT: 15.0968 N: 7



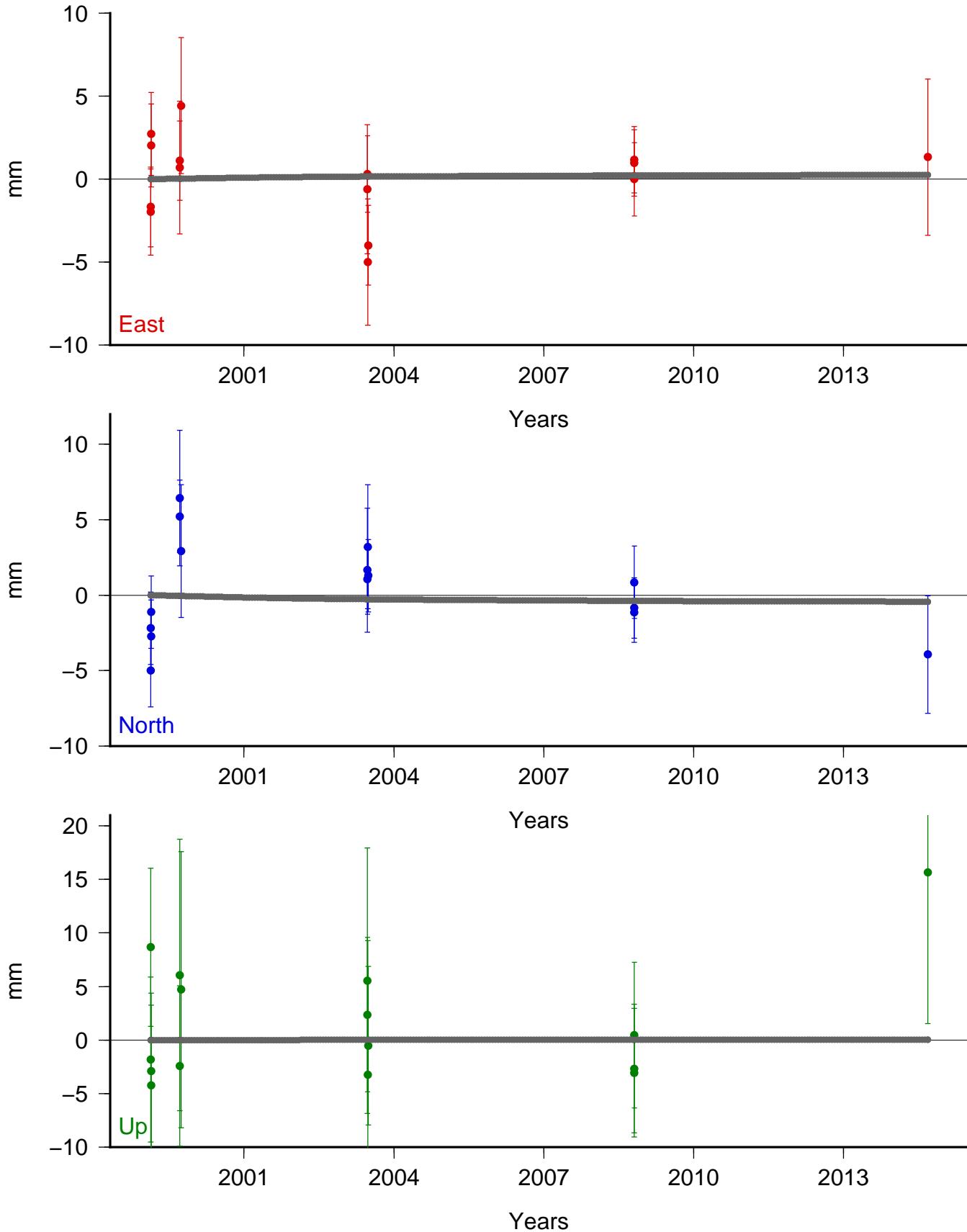
# Site: silv Model: sis1

East V: -1.01 +/- 0.25 Wrms: 2.0961 Nrms 0.8003

North V: 4.62 +/- 0.25 Wrms: 2.7824 Nrms 1.0632

Up V: -1.38 +/- 0.25 Wrms: 4.3569 Nrms 0.5446

Lon: 238.9385 Lat: 43.1248 DT: 15.5567 N: 15



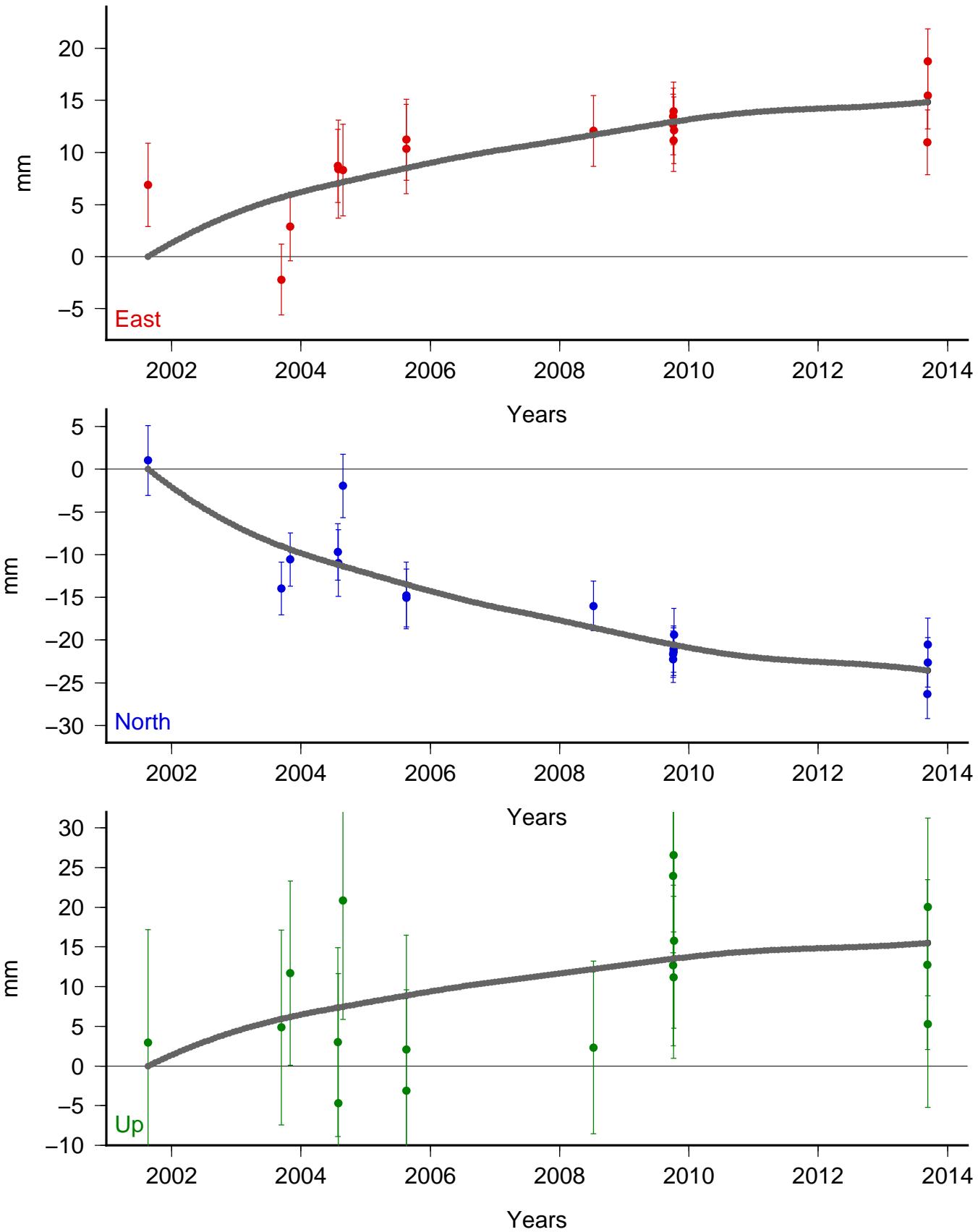
# Site: sink Model: sis1

East V: 2.82 +/- 0.29 Wrms: 3.0375 Nrms 0.9094

North V: 3.68 +/- 0.29 Wrms: 2.7537 Nrms 0.8846

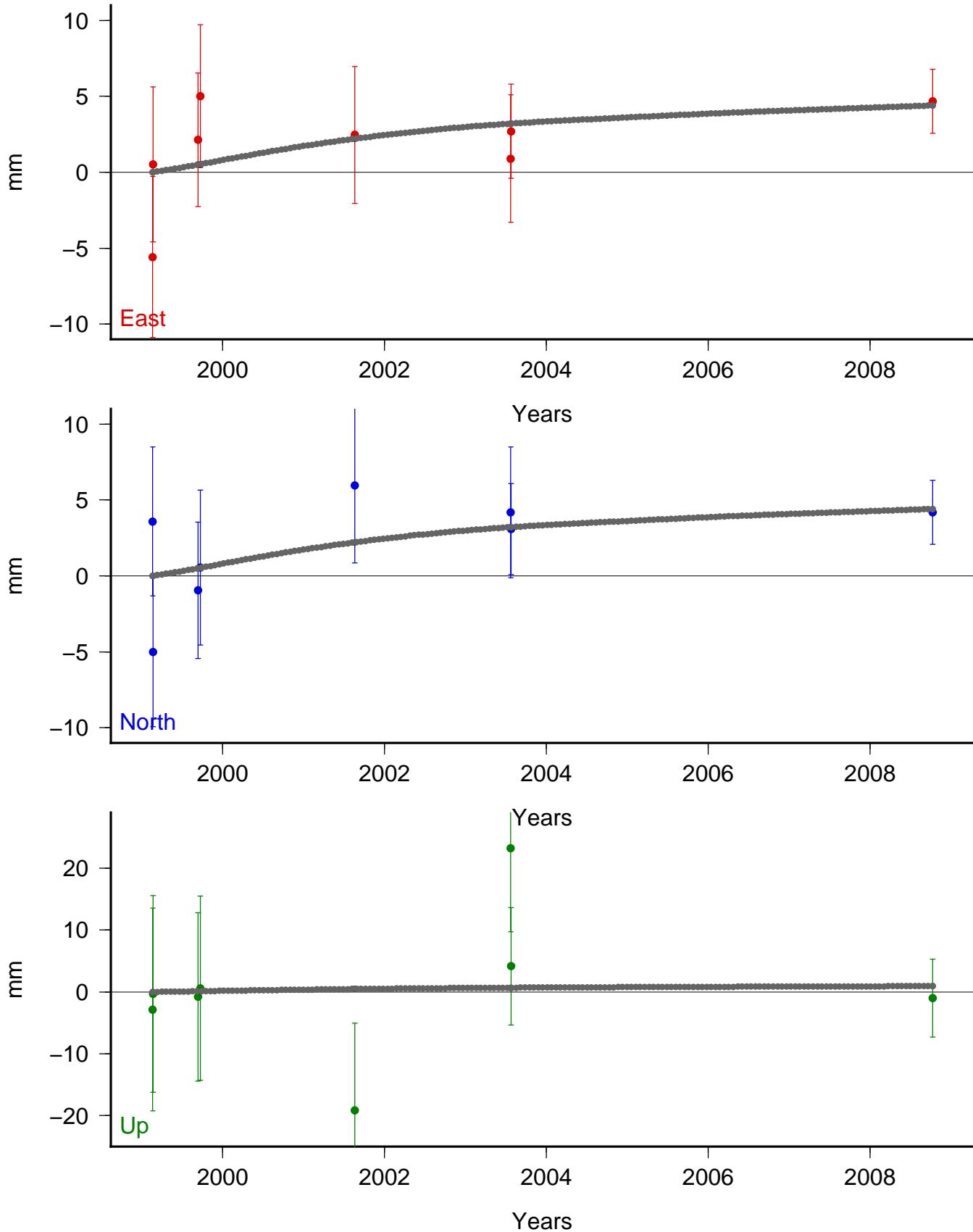
Up V: -0.43 +/- 0.29 Wrms: 7.8621 Nrms 0.6833

Lon: 238.2243 Lat: 44.0232 DT: 12.0605 N: 17



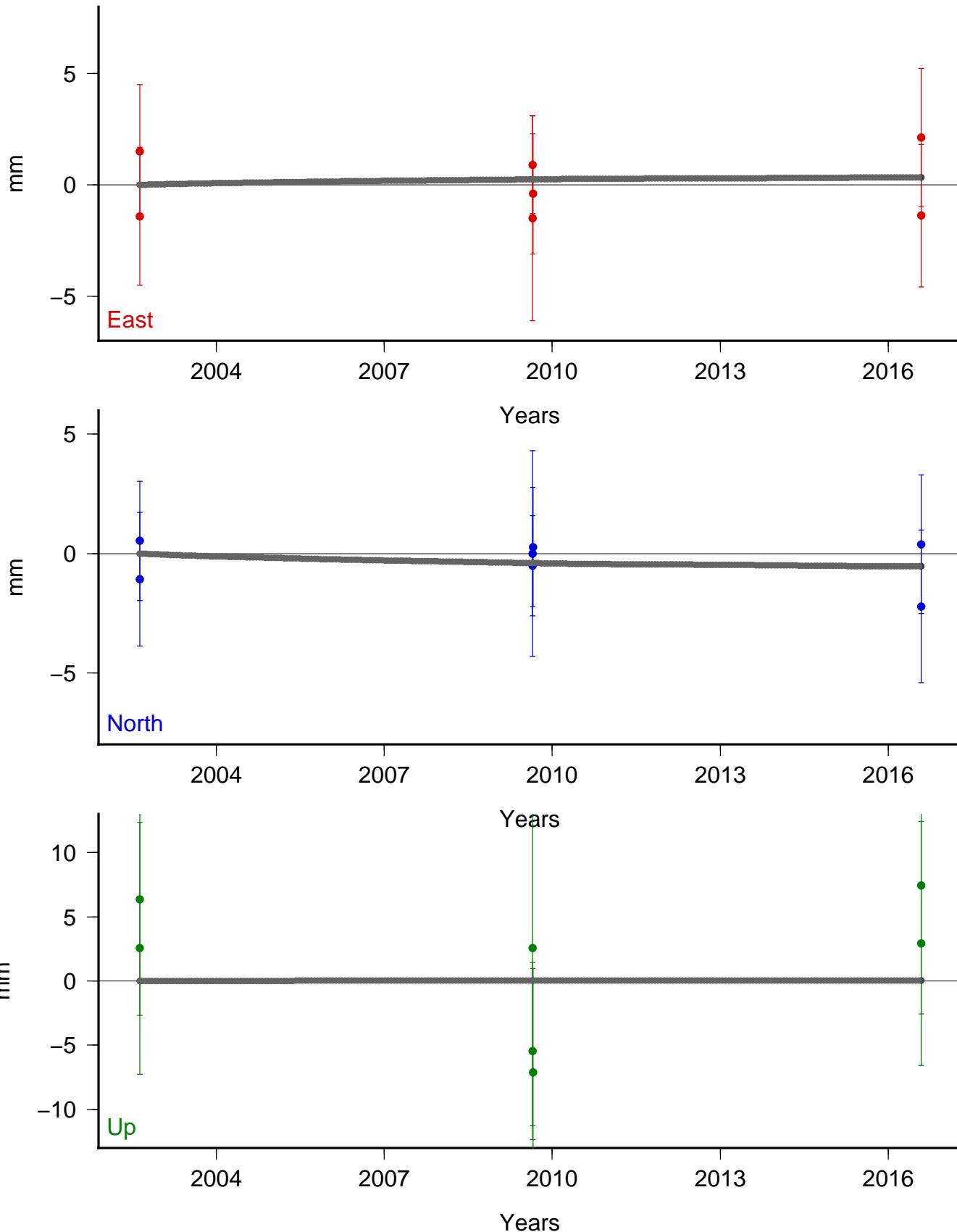
# Site: sist Model: sis1

East V: 1.02 +/- 0.32 Wrms: 2.0348 Nrms 0.5609  
 North V: 3.82 +/- 0.32 Wrms: 1.9537 Nrms 0.5357  
 Up V: -4.54 +/- 0.32 Wrms: 8.7990 Nrms 0.7893  
 Lon: 238.4441 Lat: 44.3057 DT: 9.6373 N: 8



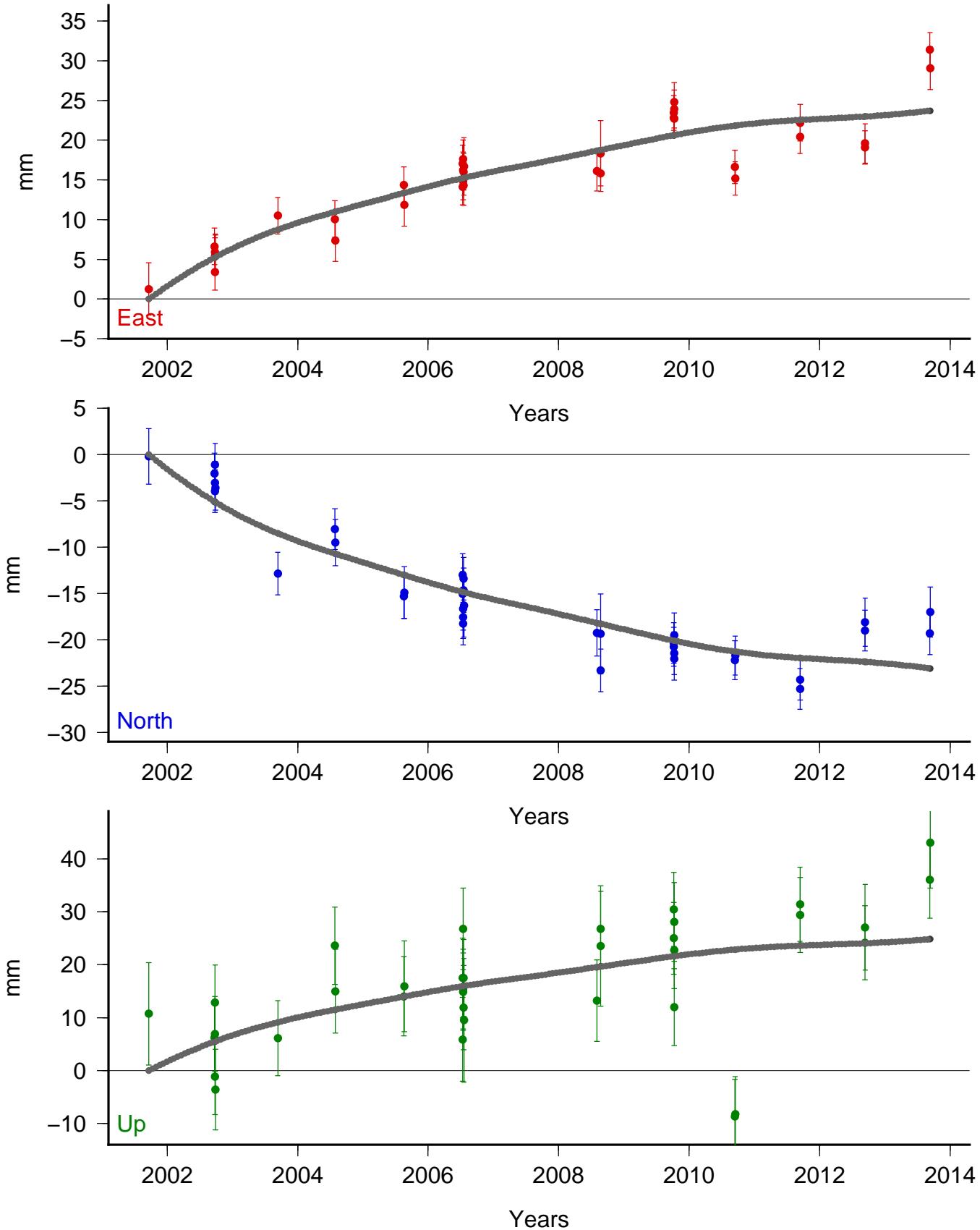
# Site: spbu Model: sis1

East V: 0.26 +/- 0.27 Wrms: 1.2989 Nrms 0.4413  
North V: 4.31 +/- 0.27 Wrms: 0.8340 Nrms 0.3064  
Up V: -2.92 +/- 0.27 Wrms: 5.5726 Nrms 0.6153  
Lon: 238.6519 Lat: 43.5234 DT: 13.9551 N: 7



# Site: ss01 Model: sis1

East V: 3.12 +/- 0.29 Wrms: 3.0292 Nrms 1.2723  
 North V: 3.81 +/- 0.29 Wrms: 2.5738 Nrms 1.0859  
 Up V: -0.31 +/- 0.29 Wrms: 10.4187 Nrms 1.3799  
 Lon: 238.2288 Lat: 44.0495 DT: 11.9757 N: 35



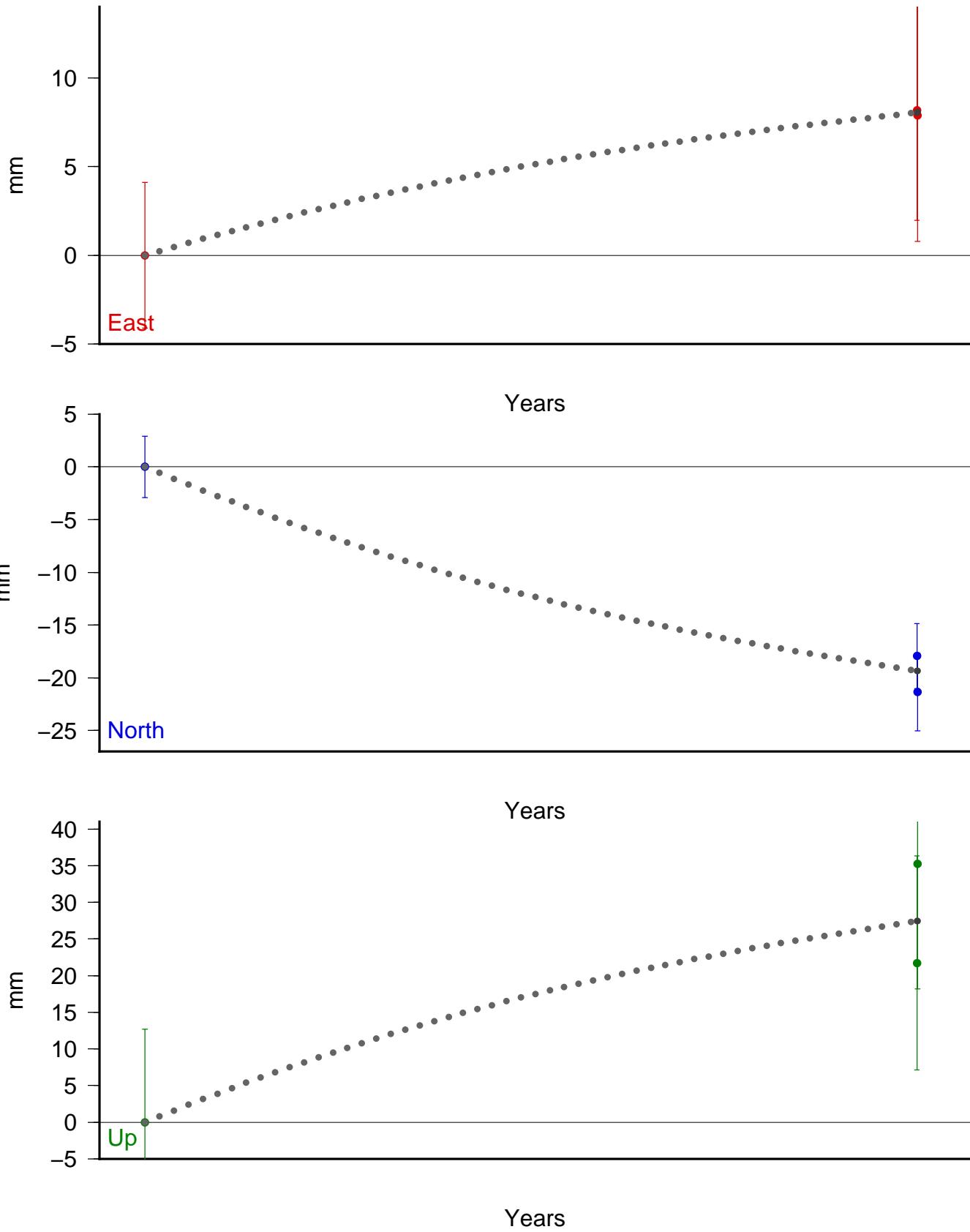
# Site: ss02 Model: sis1

East V: -1.56 +/- 0.58 Wrms: 0.0981 Nrms 0.0184

North V: 4.46 +/- 0.58 Wrms: 1.2951 Nrms 0.4068

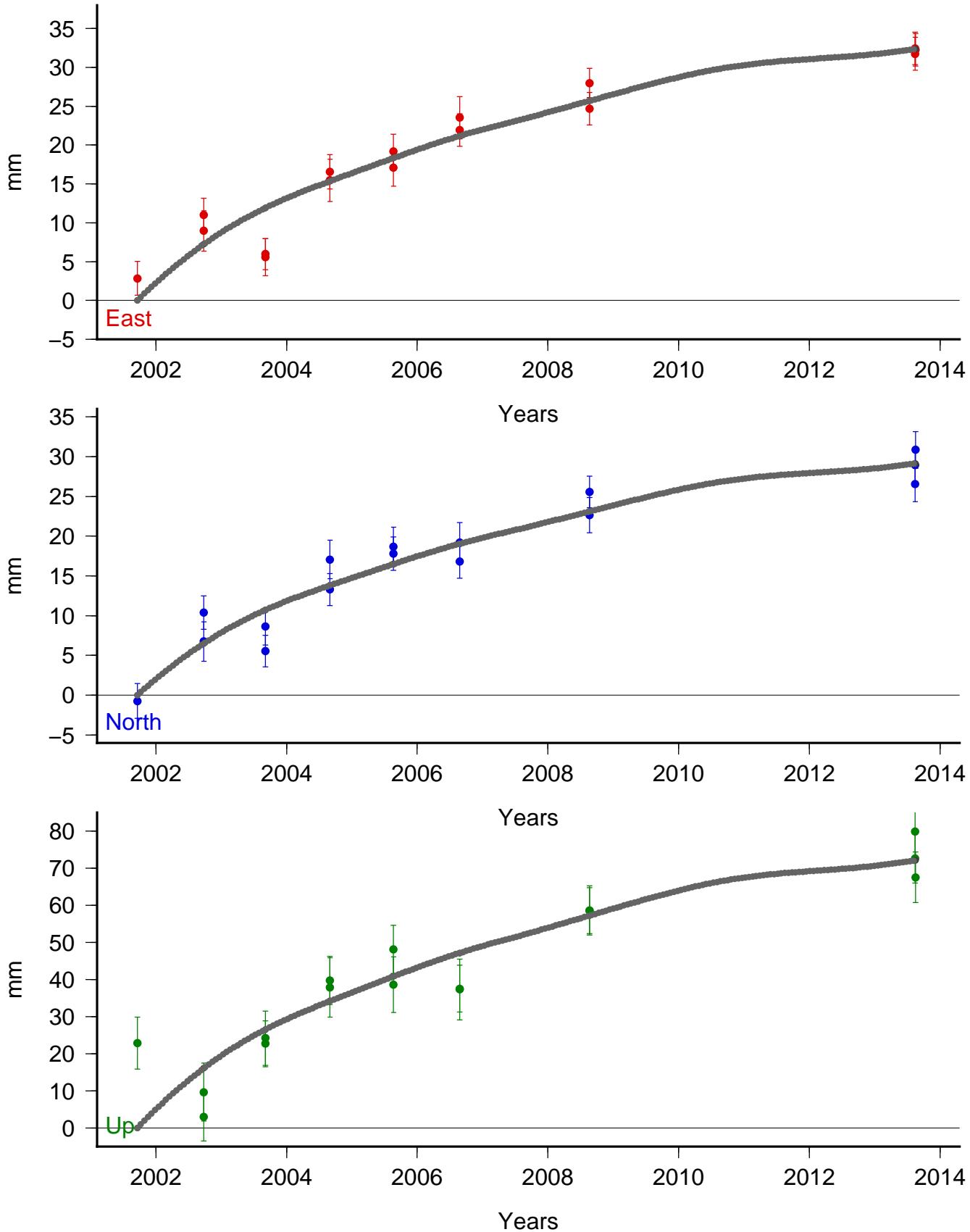
Up V: -12.52 +/- 0.58 Wrms: 5.0258 Nrms 0.3471

Lon: 238.1792 Lat: 44.0618 DT: 2.9268 N: 3



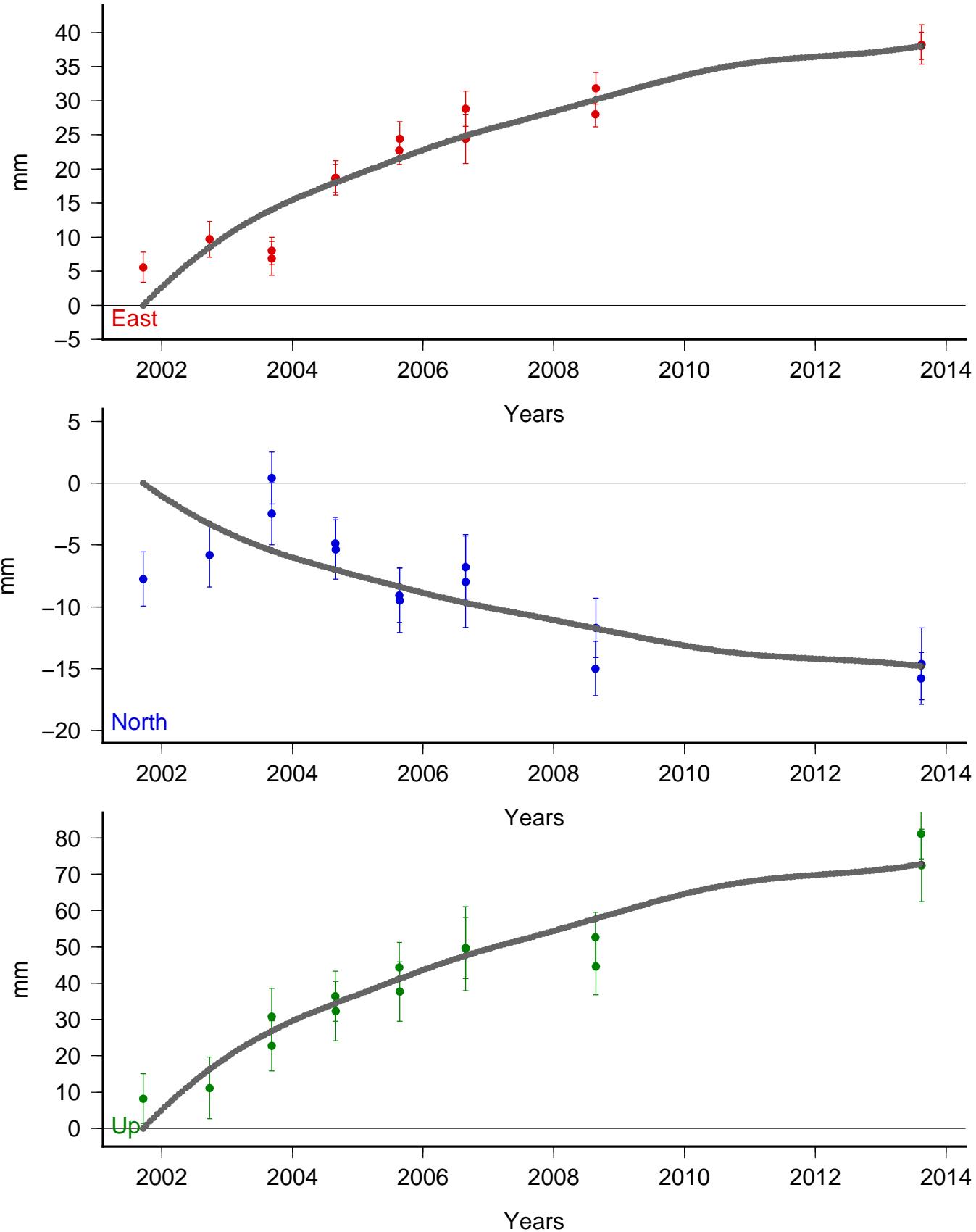
# Site: ss03 Model: sis1

East V: 2.23 +/- 0.29 Wrms: 2.7292 Nrms 1.2313  
 North V: 5.02 +/- 0.29 Wrms: 2.3764 Nrms 1.0828  
 Up V: 0.46 +/- 0.29 Wrms: 8.3537 Nrms 1.2224  
 Lon: 238.1910 Lat: 44.1211 DT: 11.9099 N: 16



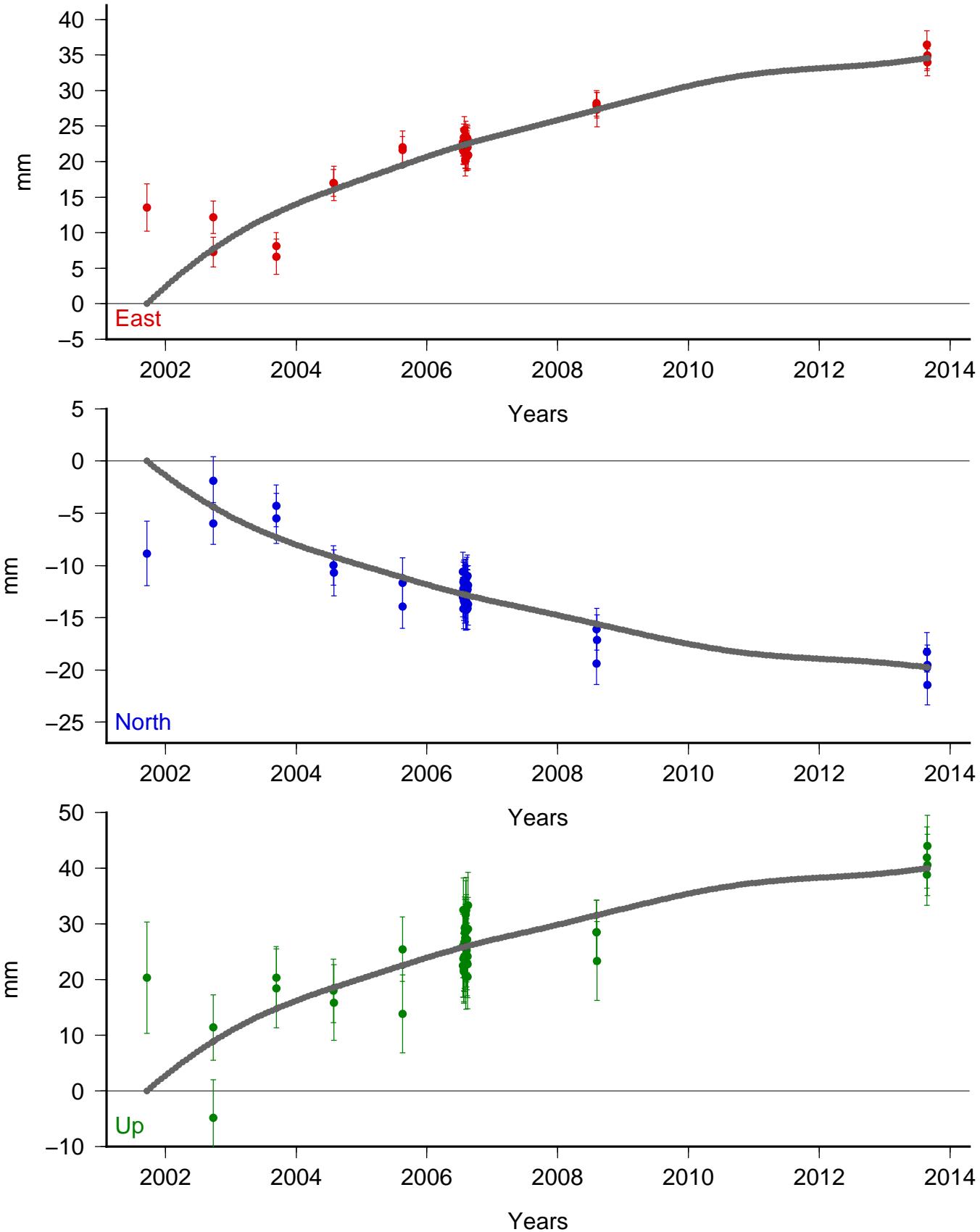
# Site: ss15 Model: sis1

East V: 2.85 +/- 0.29 Wrms: 3.3733 Nrms 1.4596  
 North V: 3.67 +/- 0.29 Wrms: 3.3993 Nrms 1.4200  
 Up V: 0.37 +/- 0.29 Wrms: 5.8175 Nrms 0.7532  
 Lon: 238.1974 Lat: 44.0882 DT: 11.9099 N: 14



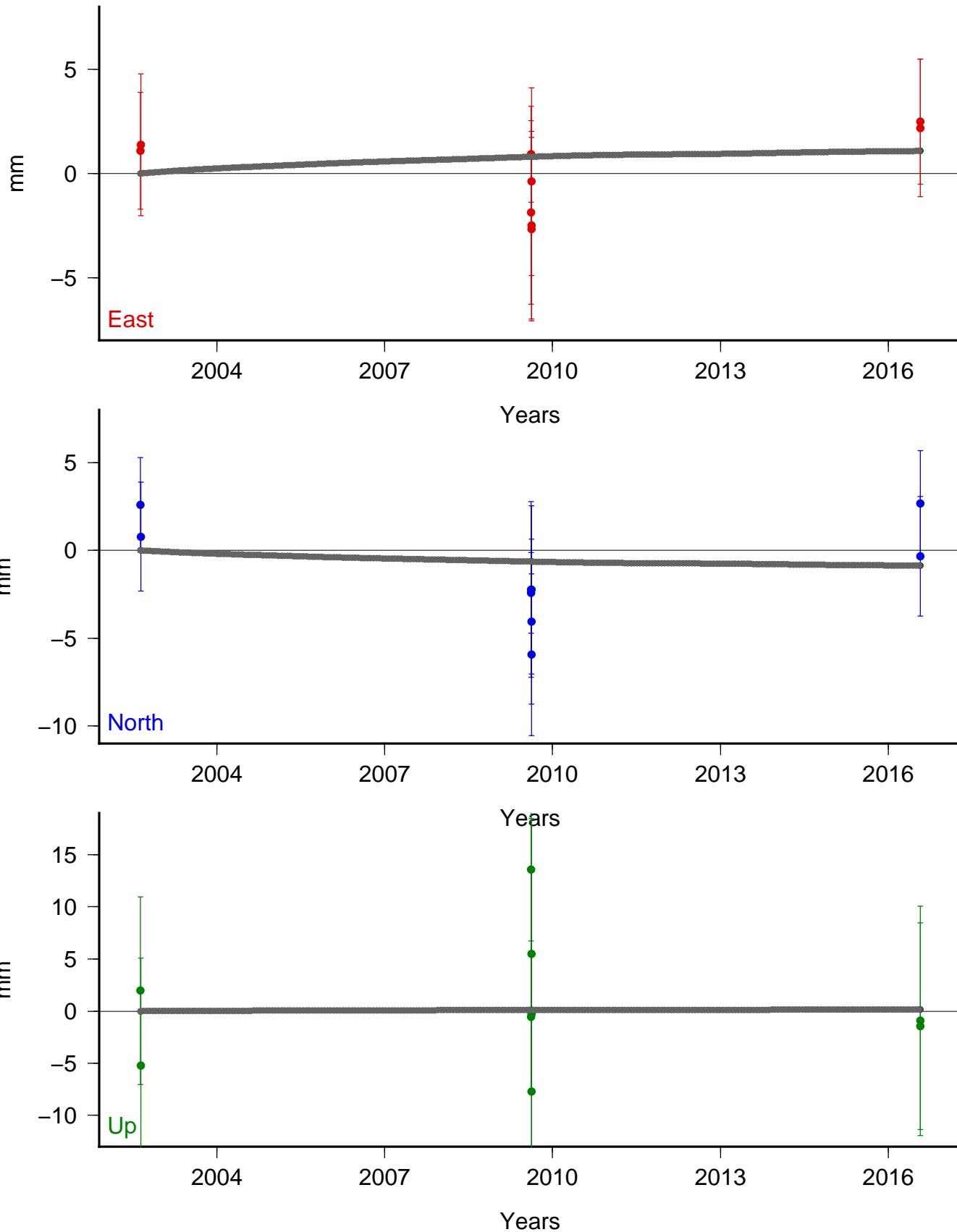
# Site: ss16 Model: sis1

East V: 2.74 +/- 0.29 Wrms: 1.9736 Nrms 0.9920  
 North V: 3.76 +/- 0.29 Wrms: 1.6112 Nrms 0.8061  
 Up V: -0.63 +/- 0.29 Wrms: 4.4024 Nrms 0.7445  
 Lon: 238.2228 Lat: 44.0726 DT: 11.9373 N: 46



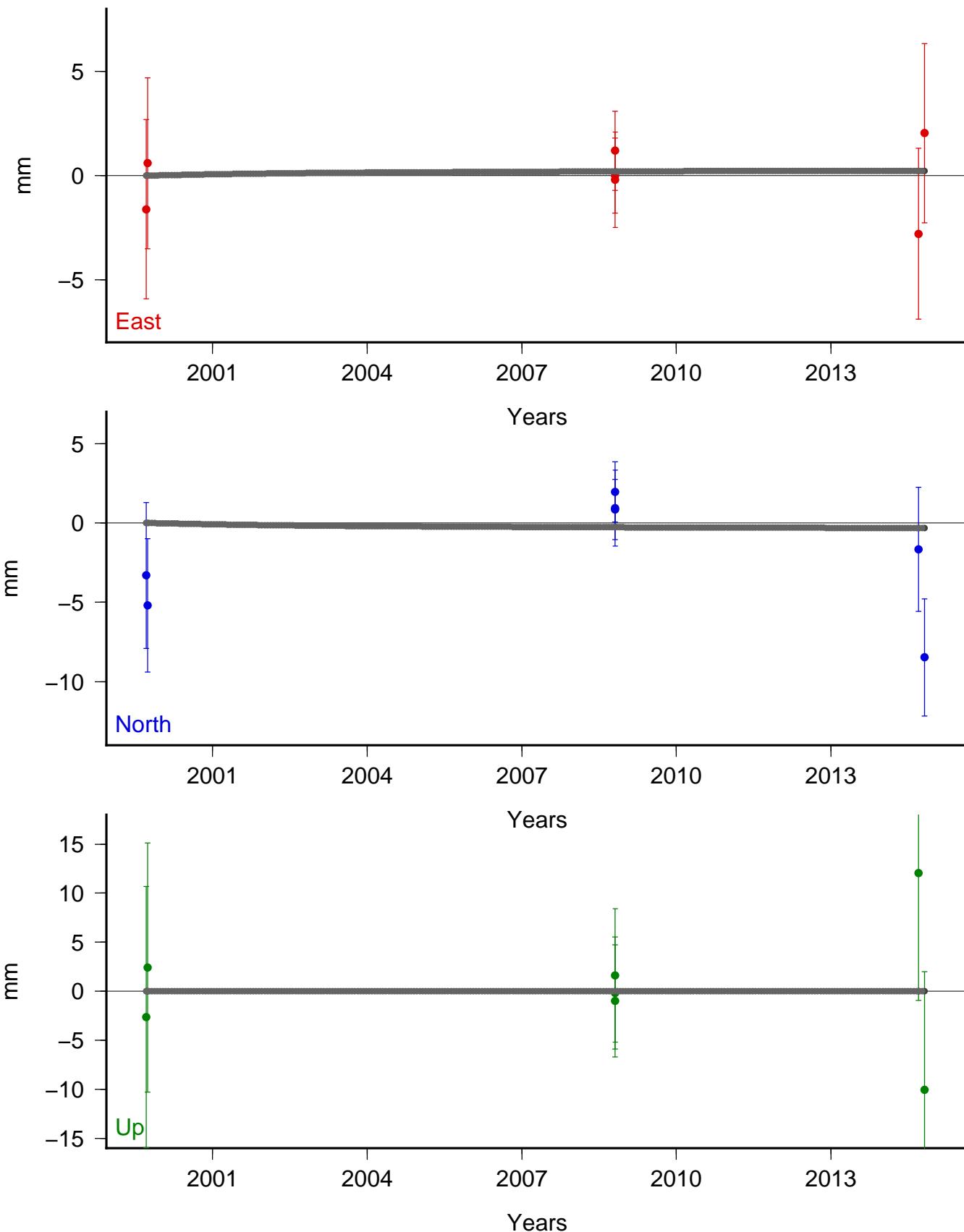
# Site: sugr Model: sis1

East V: 0.34 +/- 0.27 Wrms: 1.6647 Nrms 0.4988  
North V: 3.80 +/- 0.27 Wrms: 2.5058 Nrms 0.7489  
Up V: -3.37 +/- 0.27 Wrms: 4.8342 Nrms 0.4600  
Lon: 238.6528 Lat: 43.8141 DT: 13.9332 N: 9



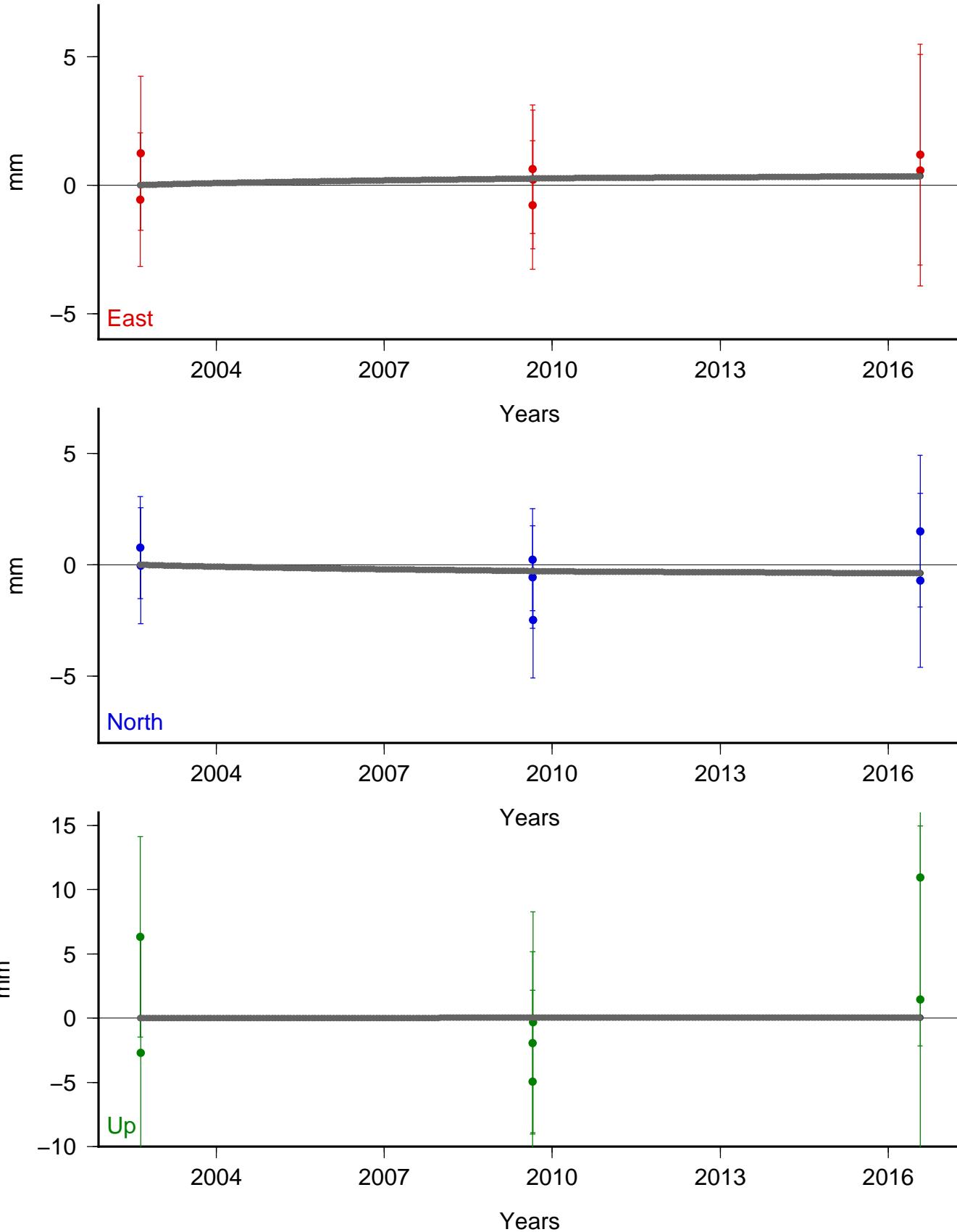
# Site: thrn Model: sis1

East V: -1.09 +/- 0.26 Wrms: 1.0940 Nrms 0.4139  
North V: 3.53 +/- 0.26 Wrms: 3.0441 Nrms 1.1334  
Up V: -1.81 +/- 0.26 Wrms: 3.9957 Nrms 0.4961  
Lon: 239.1332 Lat: 43.1337 DT: 15.1051 N: 7



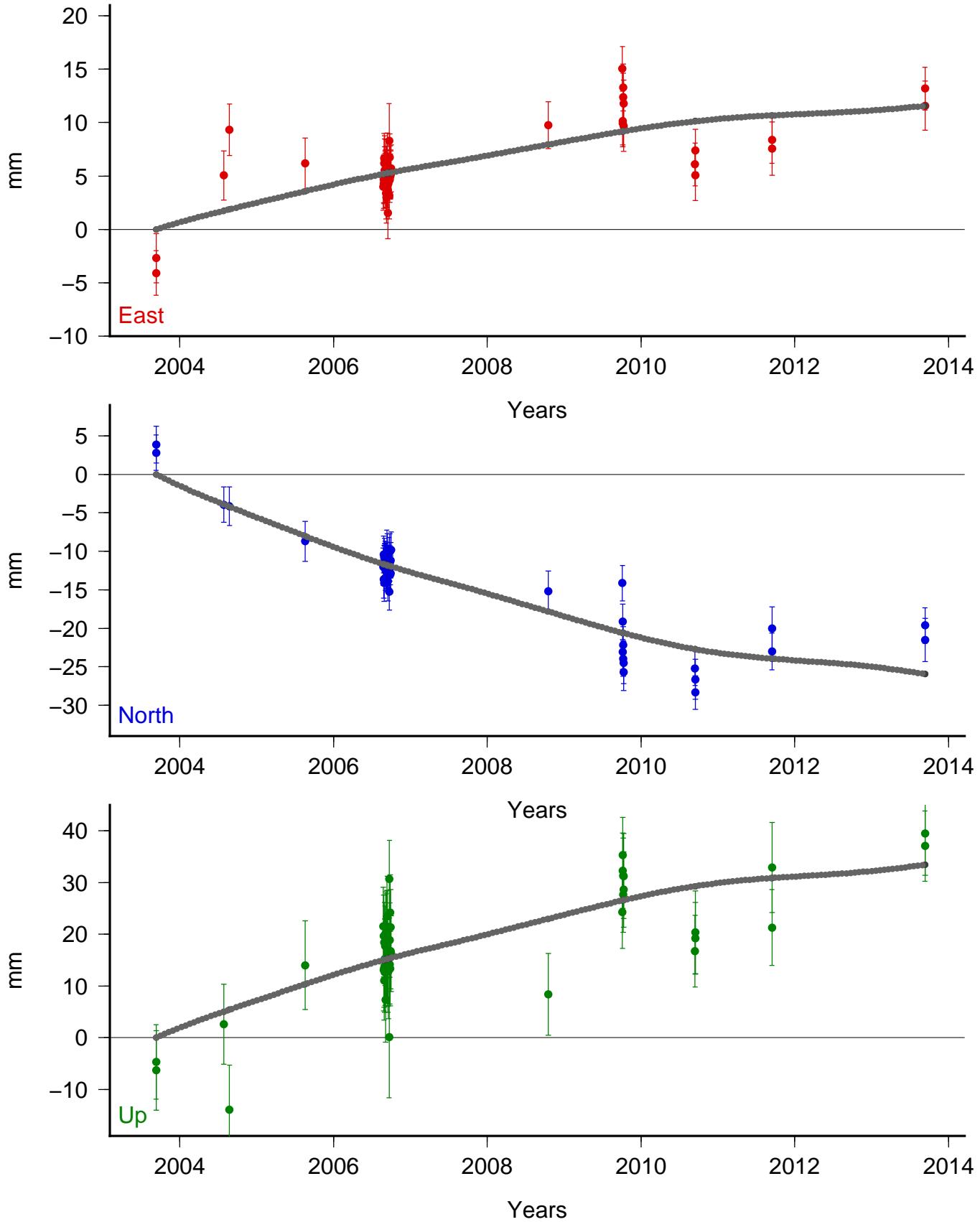
# Site: trng Model: sis1

East V: -0.25 +/- 0.27 Wrms: 0.7416 Nrms 0.2538  
North V: 3.68 +/- 0.27 Wrms: 1.0903 Nrms 0.4152  
Up V: -1.11 +/- 0.27 Wrms: 4.6438 Nrms 0.5361  
Lon: 238.8617 Lat: 43.5429 DT: 13.9223 N: 7



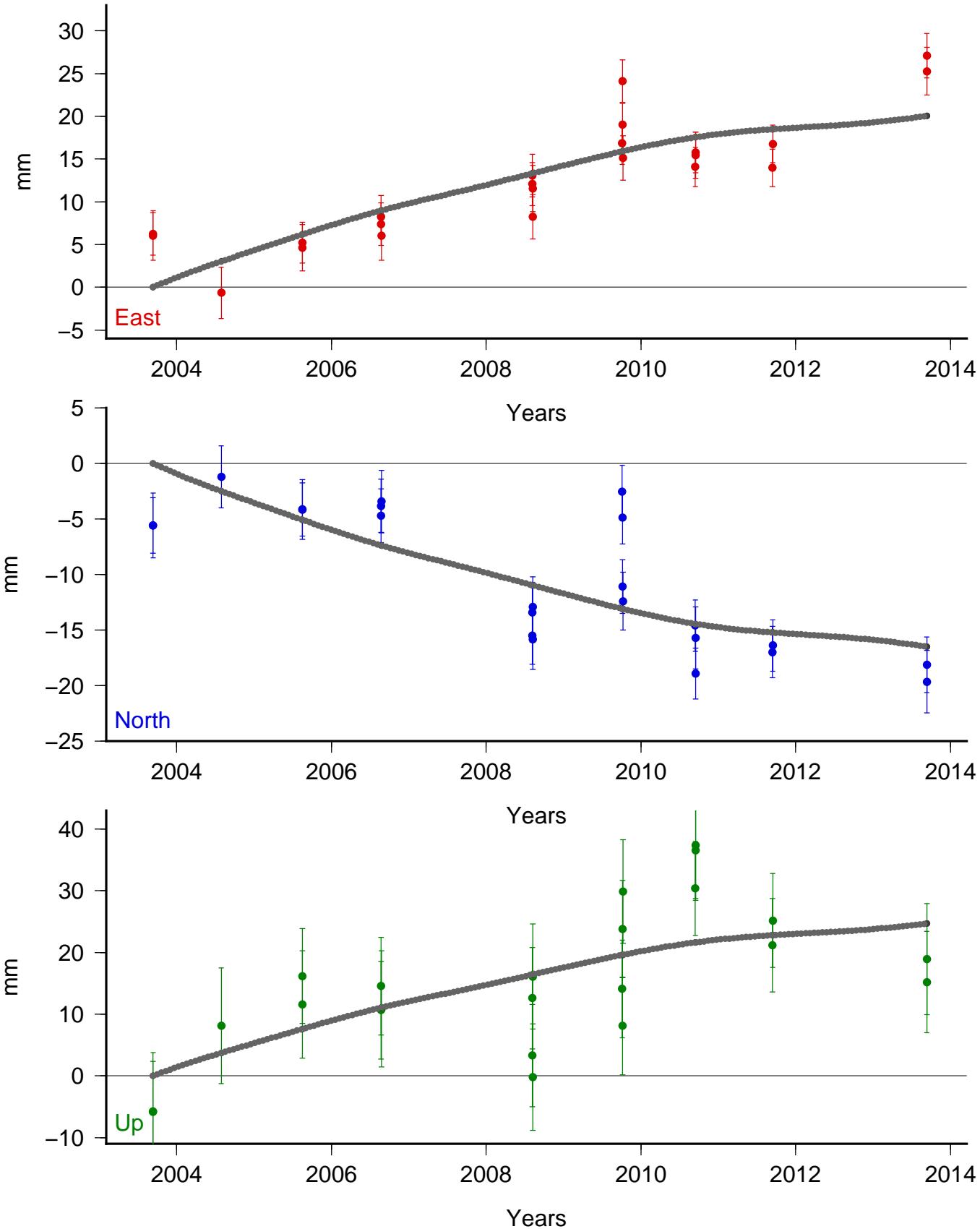
# Site: ts10 Model: sis1

East V: 3.01 +/- 0.32 Wrms: 2.3407 Nrms 1.0408  
 North V: 2.97 +/- 0.32 Wrms: 2.4522 Nrms 1.0146  
 Up V: 1.22 +/- 0.32 Wrms: 6.3740 Nrms 0.8301  
 Lon: 238.1828 Lat: 44.0586 DT: 10.0044 N: 53



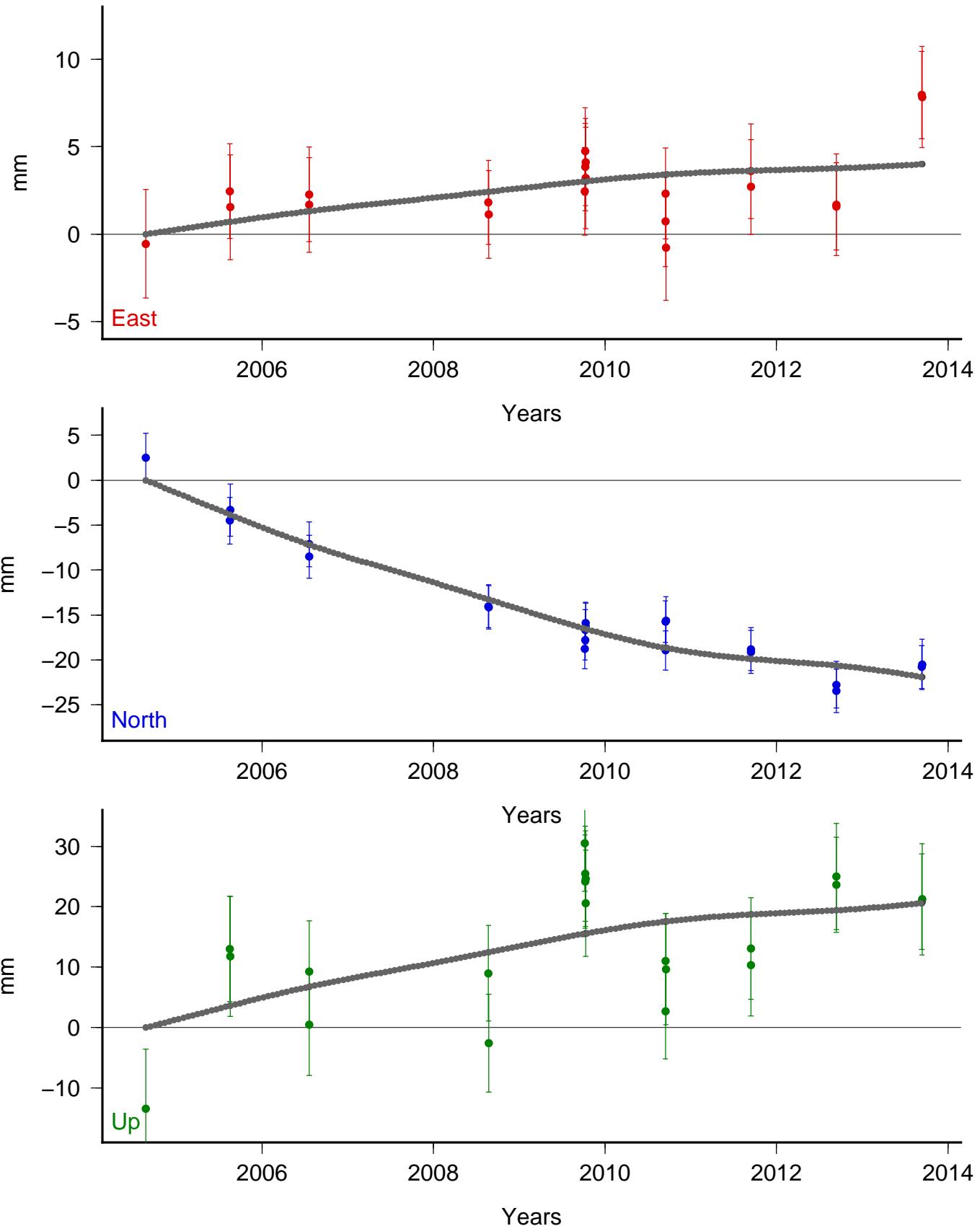
# Site: ts11 Model: sis1

East V: 2.61 +/- 0.32 Wrms: 3.7564 Nrms 1.4781  
 North V: 4.70 +/- 0.32 Wrms: 4.1033 Nrms 1.6215  
 Up V: 1.30 +/- 0.32 Wrms: 8.3520 Nrms 1.0126  
 Lon: 238.2169 Lat: 44.0642 DT: 10.0016 N: 23



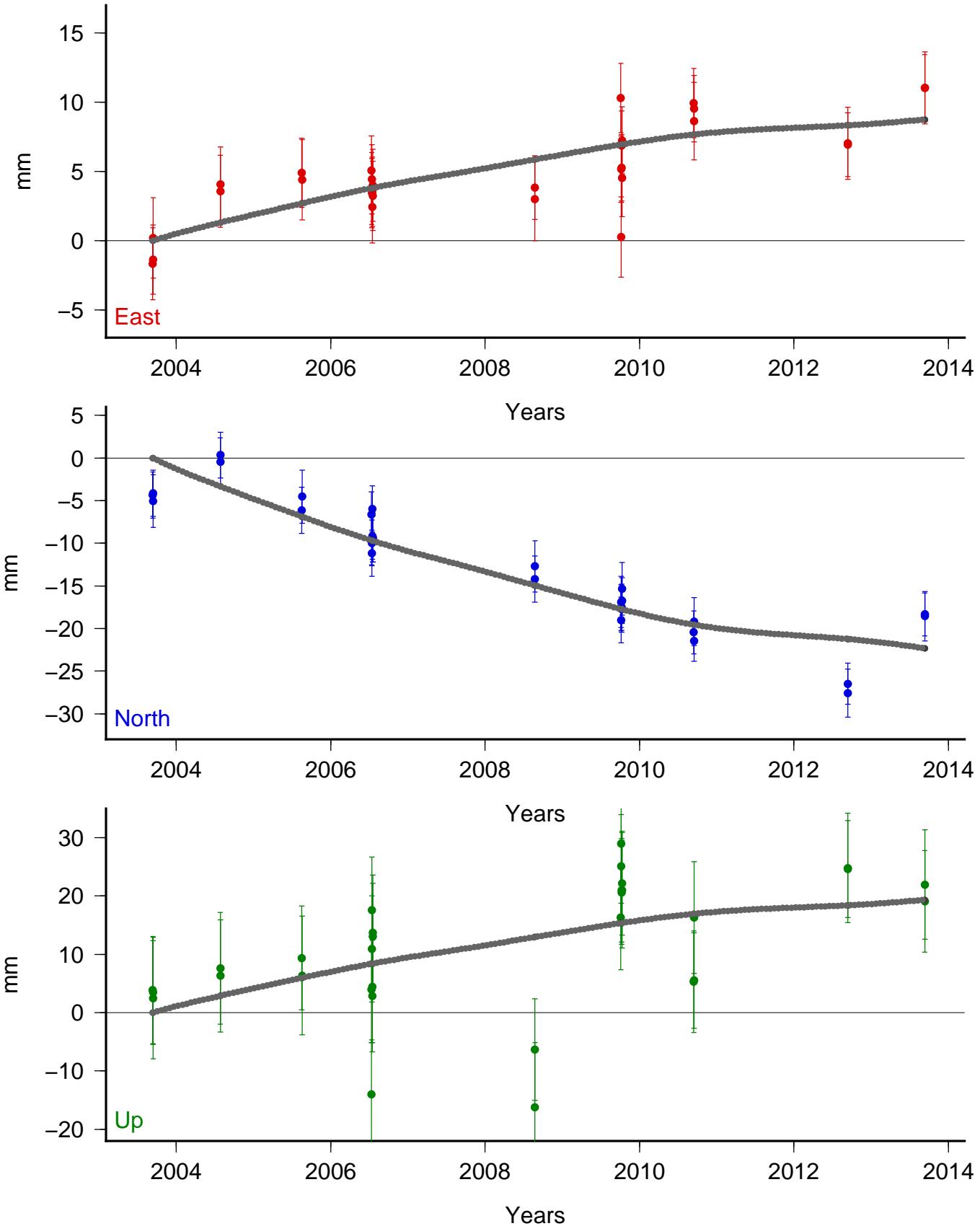
# Site: ts12 Model: sis1

East V: 2.03 +/- 0.33 Wrms: 1.9005 Nrms 0.7133  
 North V: 3.16 +/- 0.33 Wrms: 1.5650 Nrms 0.6413  
 Up V: 1.89 +/- 0.33 Wrms: 8.7855 Nrms 1.0502  
 Lon: 238.1714 Lat: 44.0445 DT: 9.0488 N: 21



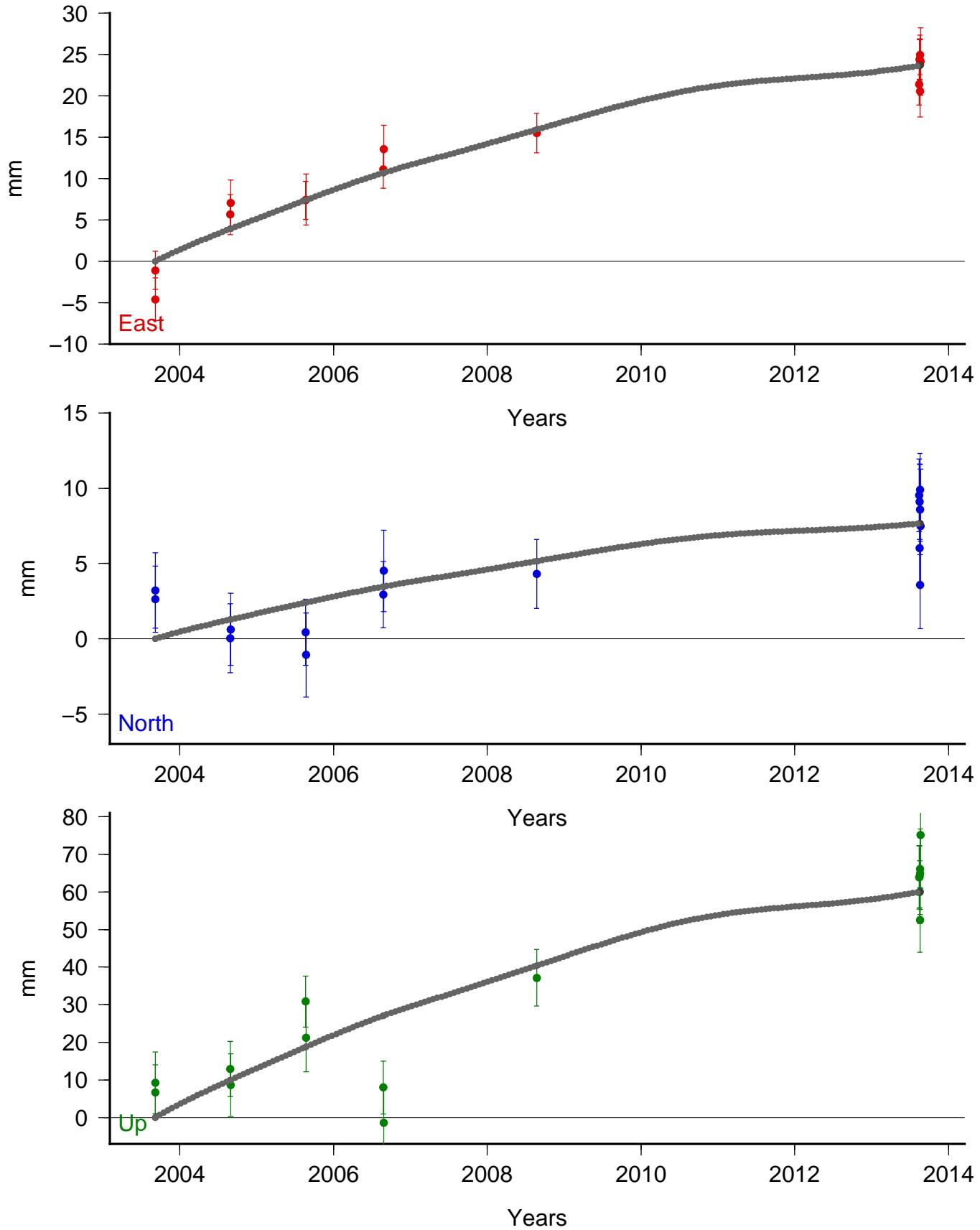
# Site: ts14 Model: sis1

East V: 2.81 +/- 0.32 Wrms: 1.9877 Nrms 0.7774  
 North V: 3.57 +/- 0.32 Wrms: 2.7469 Nrms 1.0044  
 Up V: 1.56 +/- 0.32 Wrms: 9.1412 Nrms 0.9888  
 Lon: 238.1900 Lat: 44.0397 DT: 9.9989 N: 31



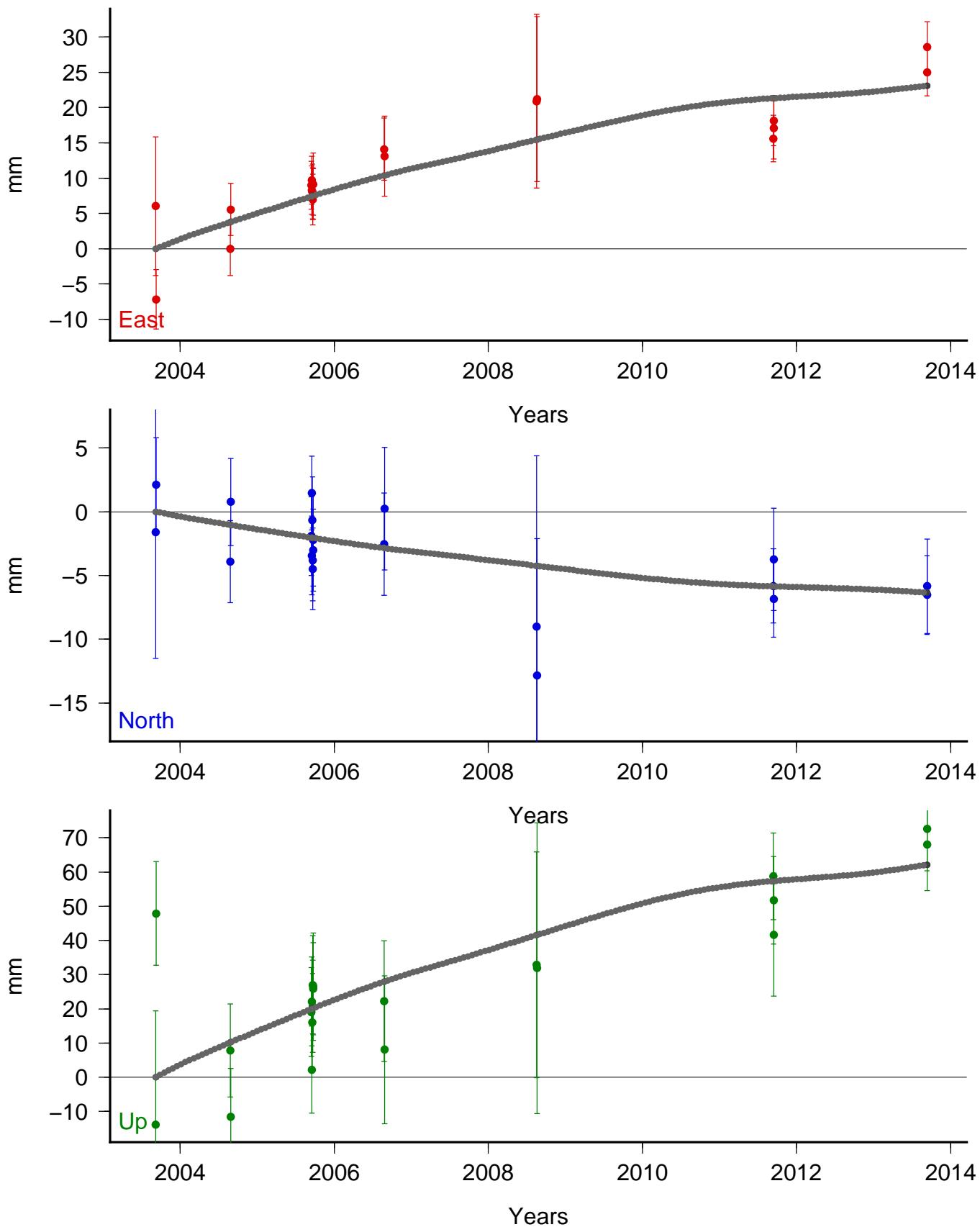
# Site: ts15 Model: sis1

East V: 2.12 +/- 0.32 Wrms: 1.8919 Nrms 0.7258  
 North V: 3.67 +/- 0.32 Wrms: 2.0167 Nrms 0.8093  
 Up V: 1.93 +/- 0.32 Wrms: 10.4803 Nrms 1.2554  
 Lon: 238.1862 Lat: 44.1061 DT: 9.955 N: 16



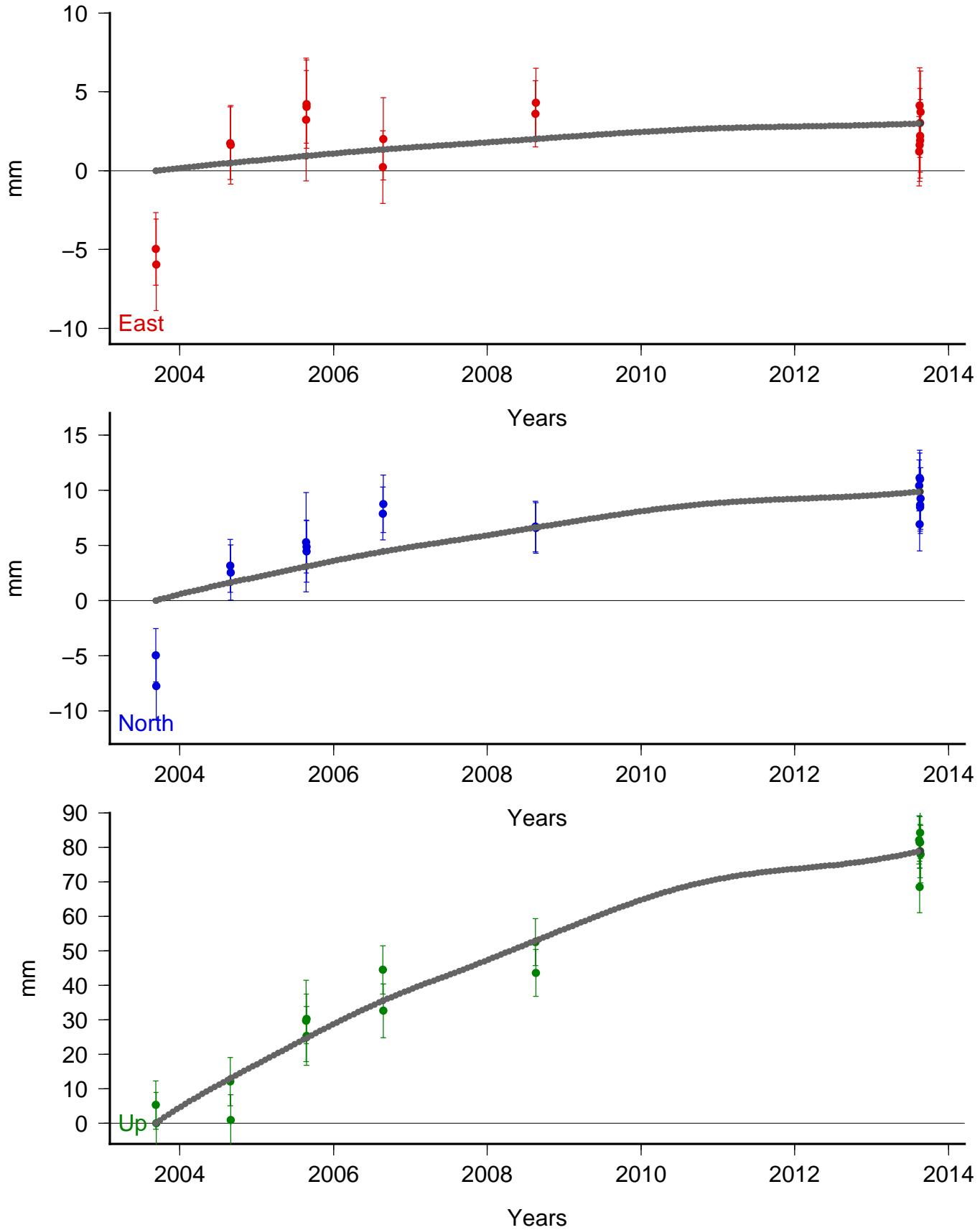
# Site: ts16 Model: sis1

East V: 2.53 +/- 0.32 Wrms: 3.2966 Nrms 0.8228  
 North V: 4.27 +/- 0.32 Wrms: 1.8851 Nrms 0.5270  
 Up V: 1.13 +/- 0.32 Wrms: 14.0117 Nrms 0.9316  
 Lon: 238.1845 Lat: 44.0941 DT: 10.0126 N: 21



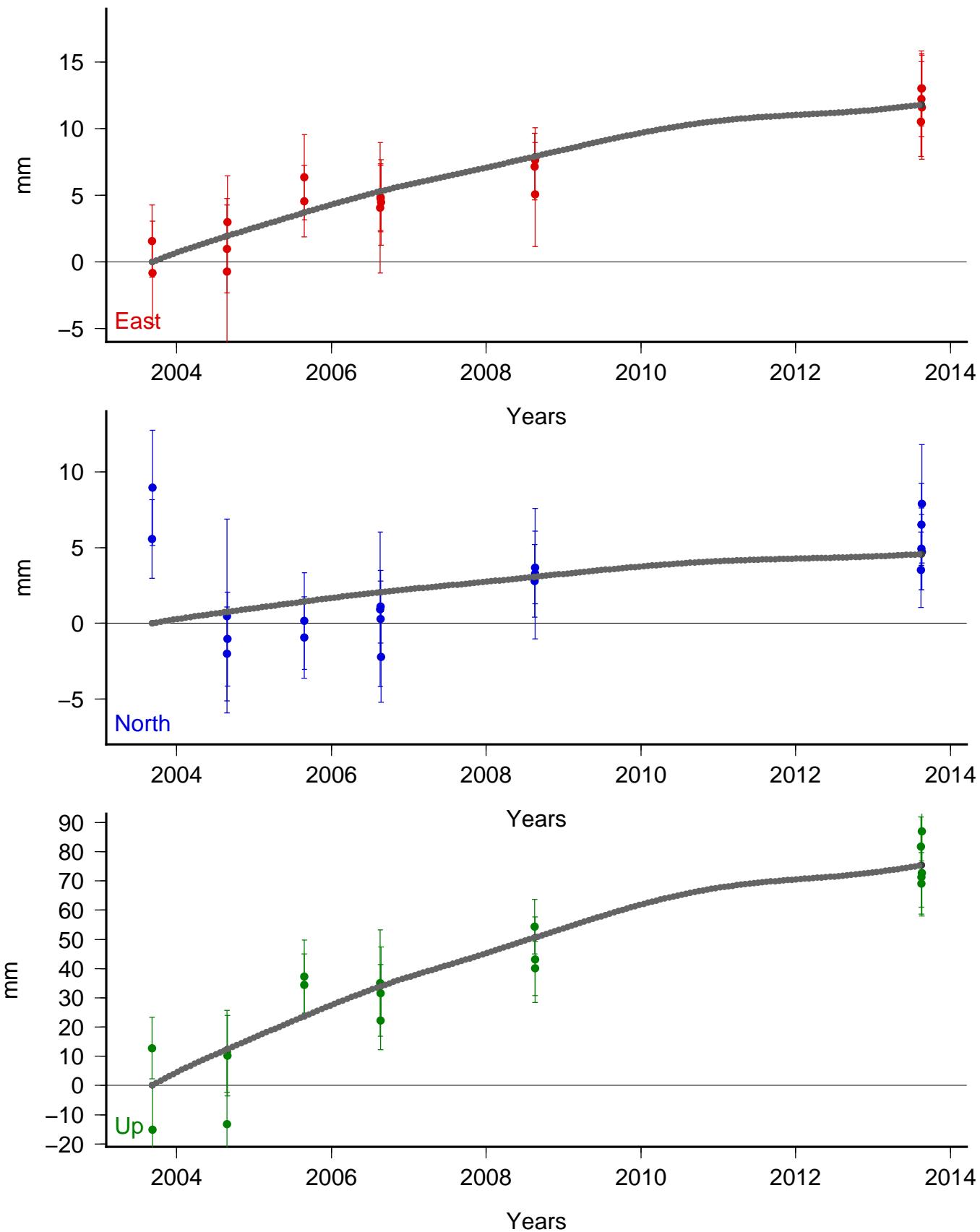
# Site: ts17 Model: sis1

East V: 0.51 +/- 0.32 Wrms: 2.3077 Nrms 0.9571  
 North V: 4.52 +/- 0.32 Wrms: 2.6585 Nrms 1.0559  
 Up V: 1.00 +/- 0.32 Wrms: 5.8132 Nrms 0.7690  
 Lon: 238.1601 Lat: 44.1057 DT: 9.9468 N: 18



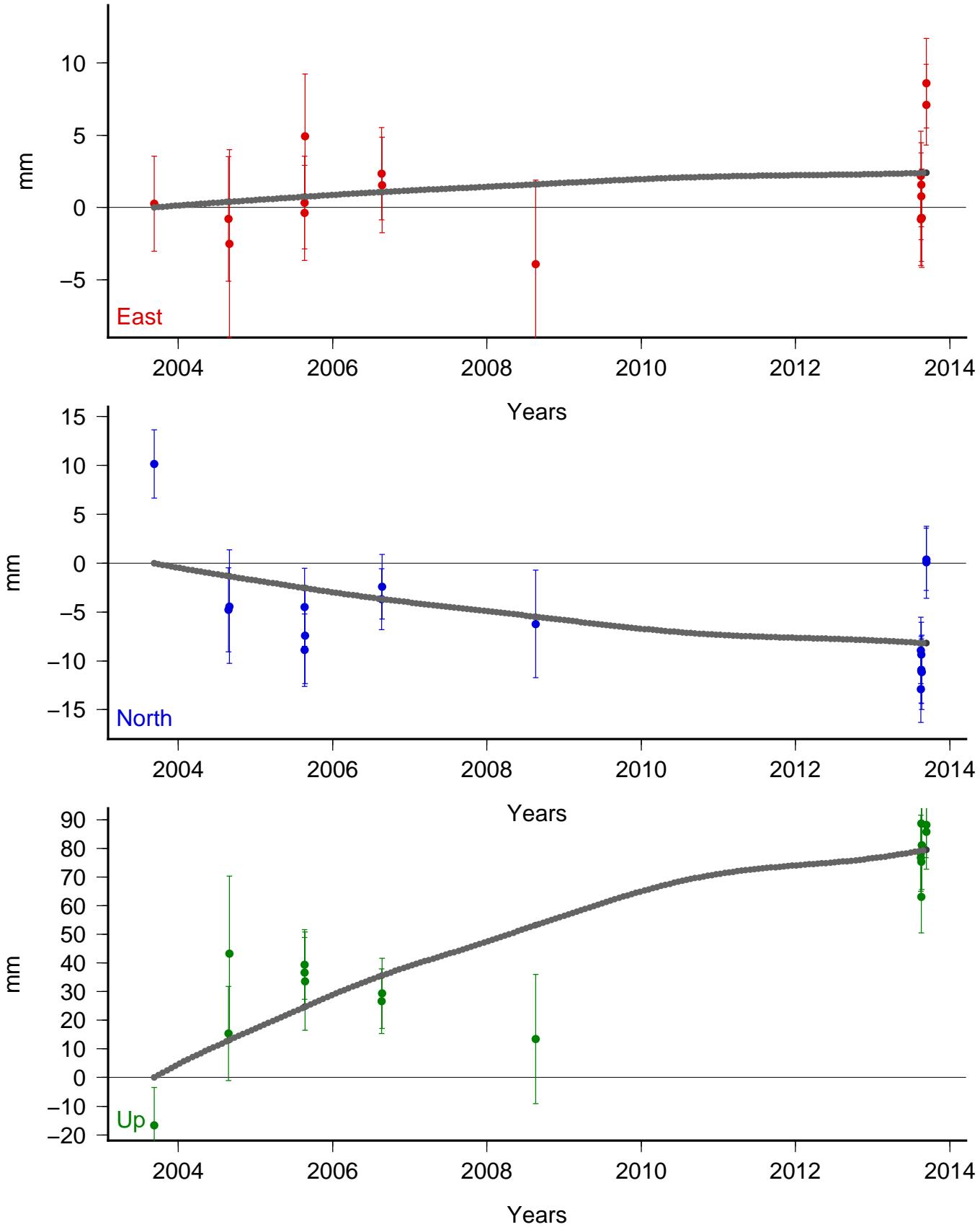
# Site: ts18 Model: sis1

East V: 0.61 +/- 0.32 Wrms: 1.2125 Nrms 0.4050  
North V: 4.12 +/- 0.32 Wrms: 2.7161 Nrms 0.9303  
Up V: -0.06 +/- 0.32 Wrms: 8.9341 Nrms 0.7671  
Lon: 238.1687 Lat: 44.1025 DT: 9.9468 N: 19



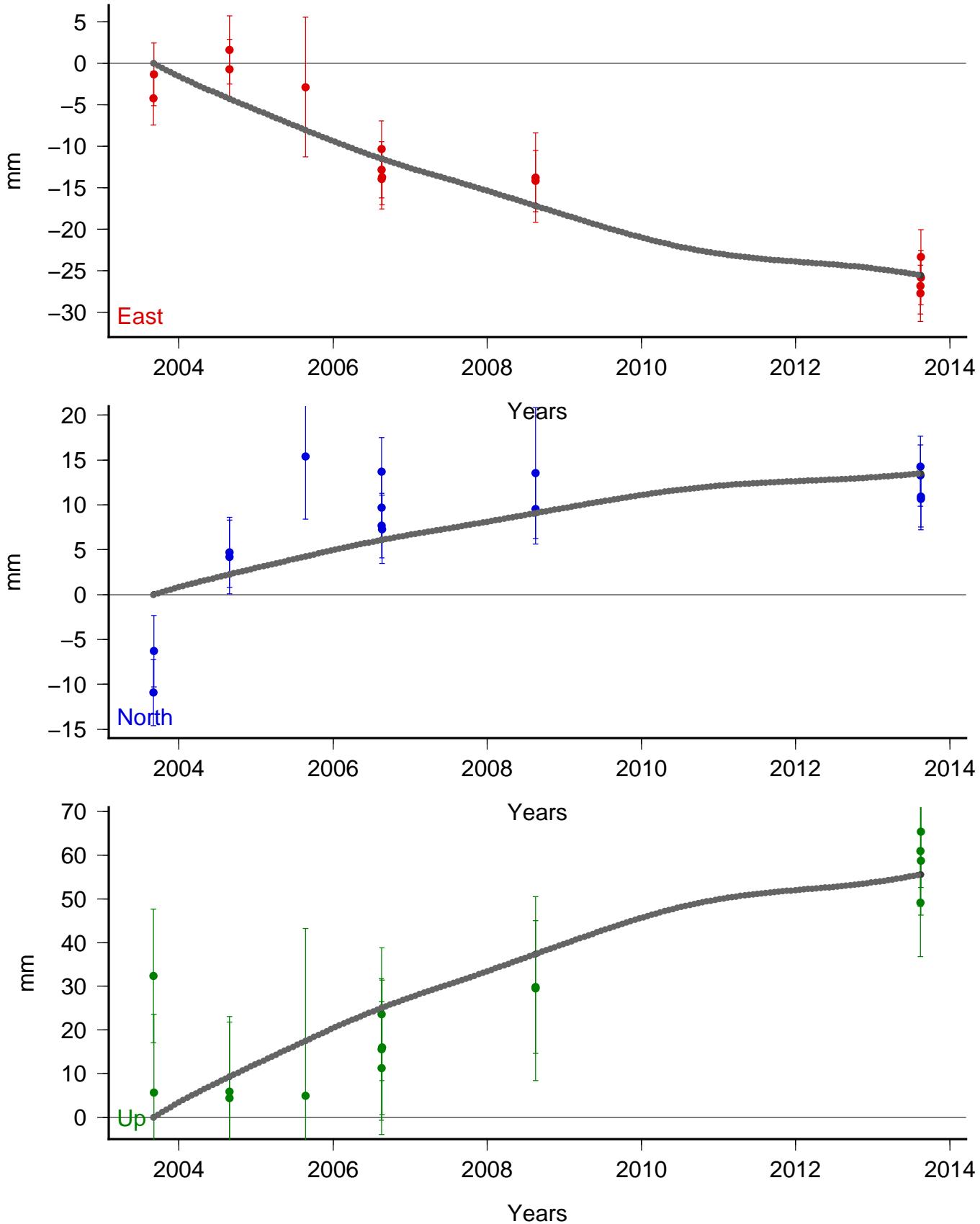
# Site: ts19 Model: sis1

East V: 0.88 +/- 0.32 Wrms: 2.9054 Nrms 0.8611  
 North V: 4.28 +/- 0.32 Wrms: 4.8930 Nrms 1.3293  
 Up V: 0.26 +/- 0.32 Wrms: 11.6909 Nrms 0.8625  
 Lon: 238.1596 Lat: 44.0941 DT: 10.0071 N: 17



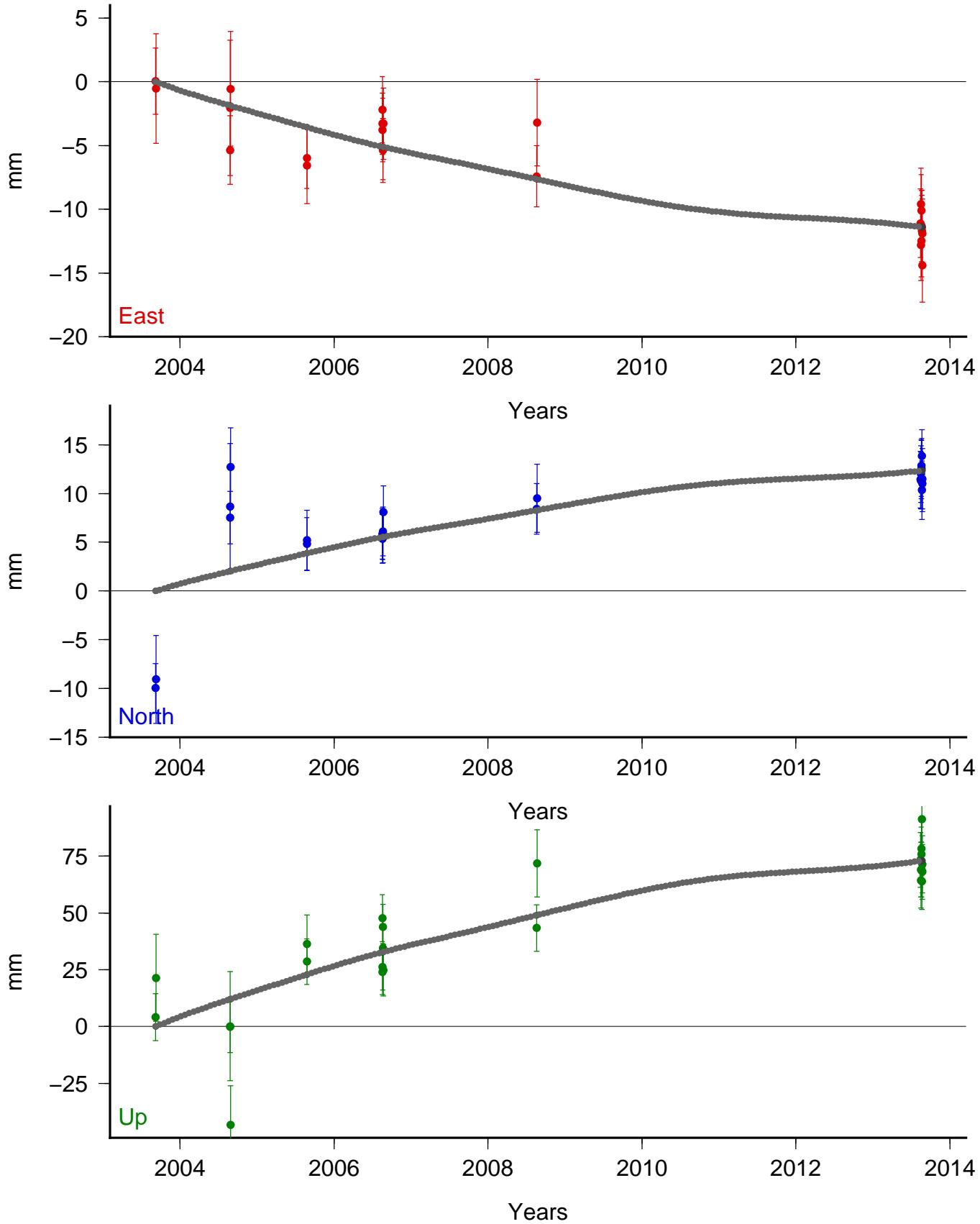
# Site: ts20 Model: sis1

East V: 0.07 +/- 0.32 Wrms: 2.7552 Nrms 0.7541  
 North V: 5.88 +/- 0.32 Wrms: 4.6185 Nrms 1.1928  
 Up V: 4.26 +/- 0.32 Wrms: 11.0950 Nrms 0.7211  
 Lon: 238.1246 Lat: 44.1119 DT: 9.9523 N: 15



# Site: ts21 Model: sis1

East V: 0.12 +/- 0.32 Wrms: 1.7896 Nrms 0.6392  
 North V: 4.75 +/- 0.32 Wrms: 3.4123 Nrms 1.1825  
 Up V: 1.27 +/- 0.32 Wrms: 12.1107 Nrms 1.0213  
 Lon: 238.1462 Lat: 44.1081 DT: 9.9605 N: 25



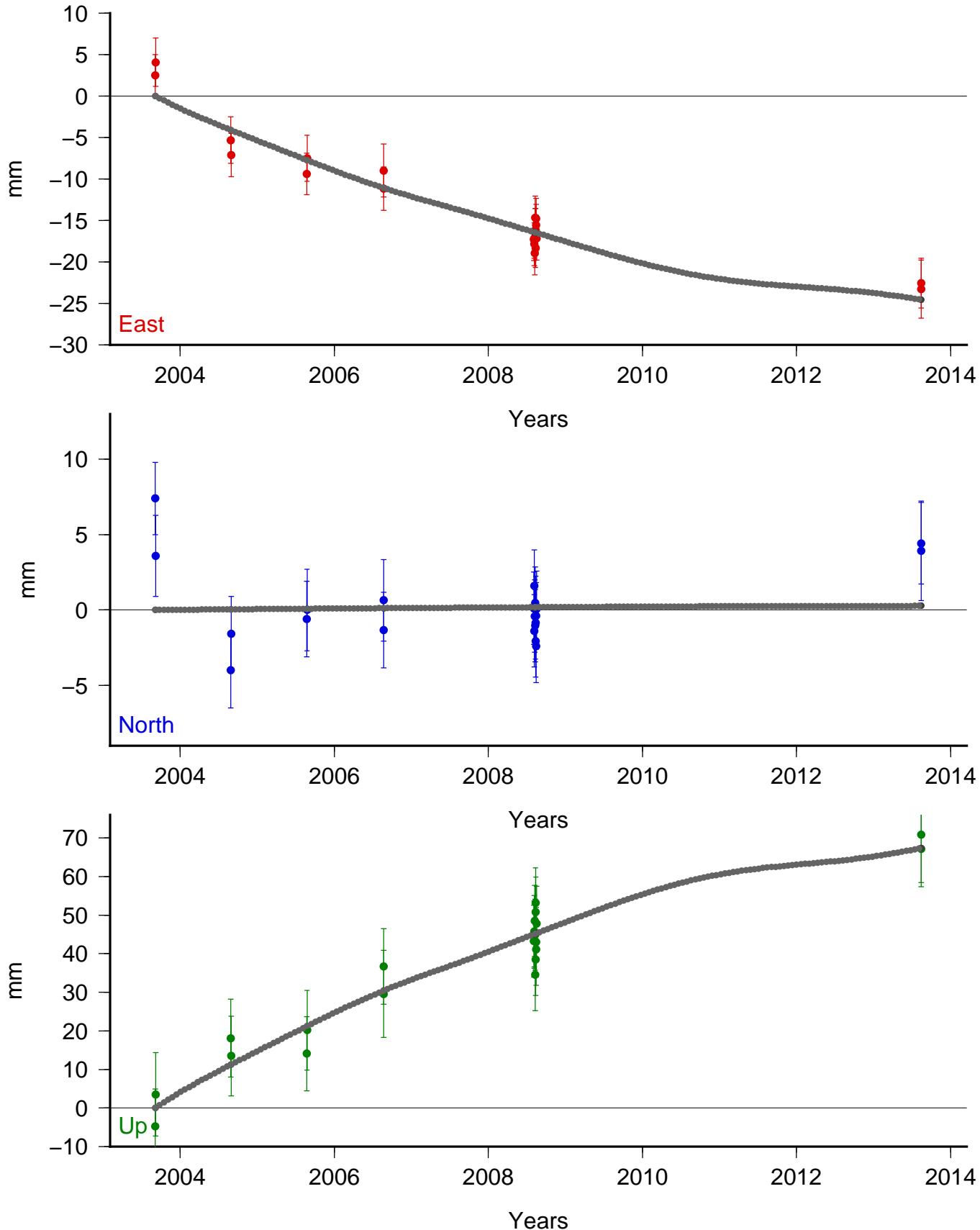
# Site: ts22 Model: sis1

East V: -0.32 +/- 0.32 Wrms: 1.7127 Nrms 0.6517

North V: 3.86 +/- 0.32 Wrms: 2.4607 Nrms 0.9940

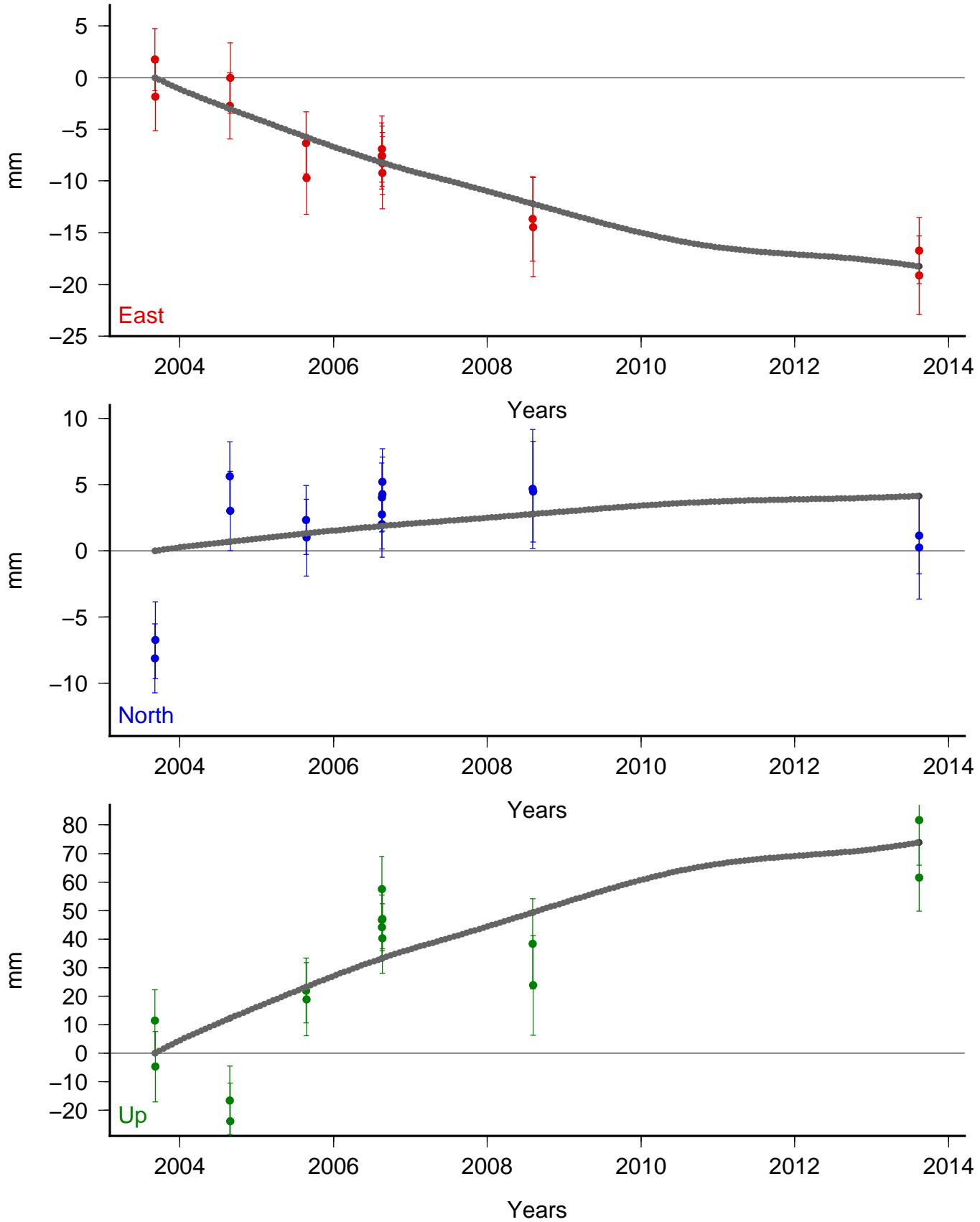
Up V: -0.39 +/- 0.32 Wrms: 4.7796 Nrms 0.4952

Lon: 238.1317 Lat: 44.0996 DT: 9.9413 N: 22



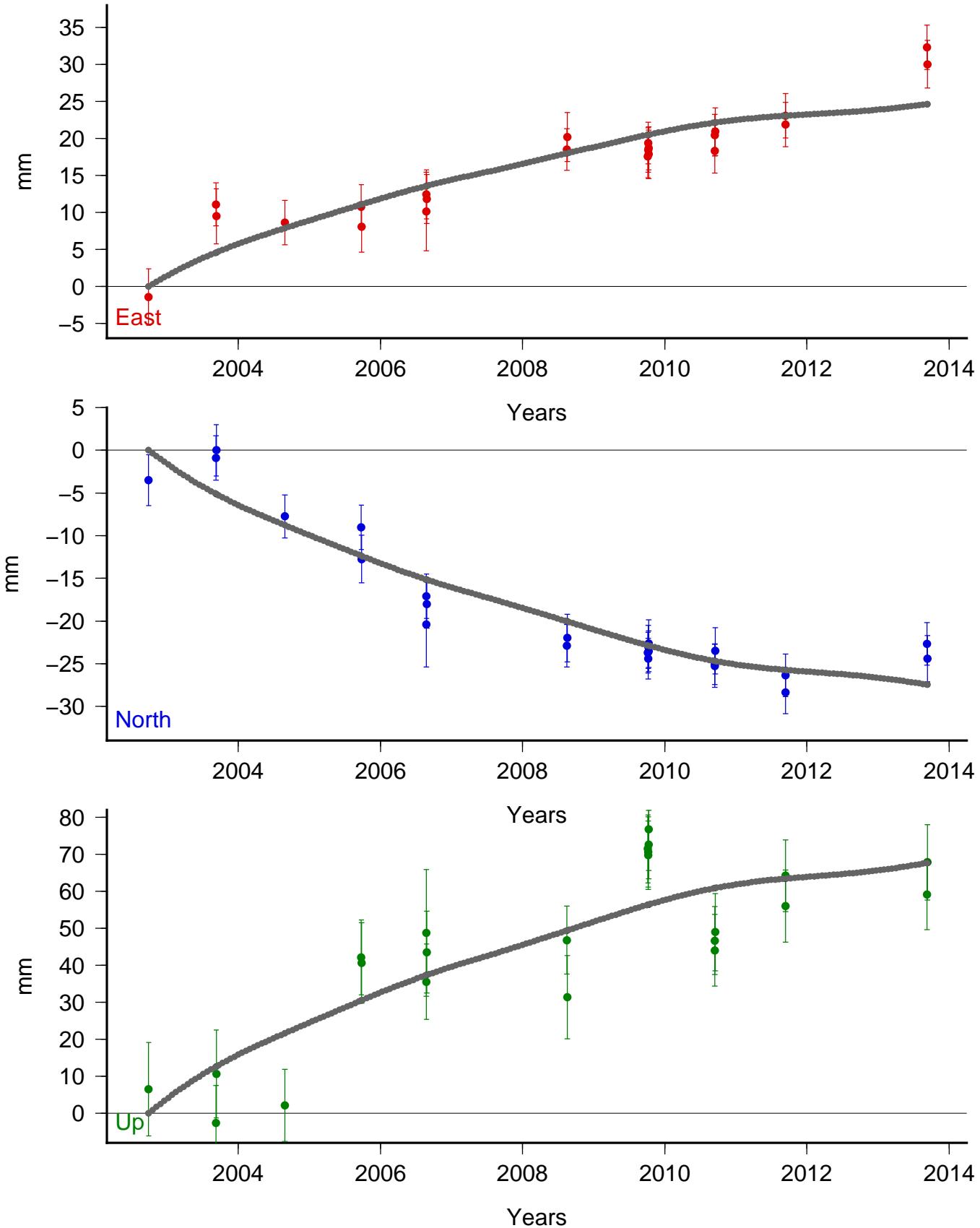
# Site: ts23 Model: sis1

East V: 0.39 +/- 0.32 Wrms: 1.6574 Nrms 0.4984  
 North V: 4.86 +/- 0.32 Wrms: 3.7116 Nrms 1.2997  
 Up V: 3.96 +/- 0.32 Wrms: 16.5792 Nrms 1.3545  
 Lon: 238.1400 Lat: 44.1022 DT: 9.9413 N: 15



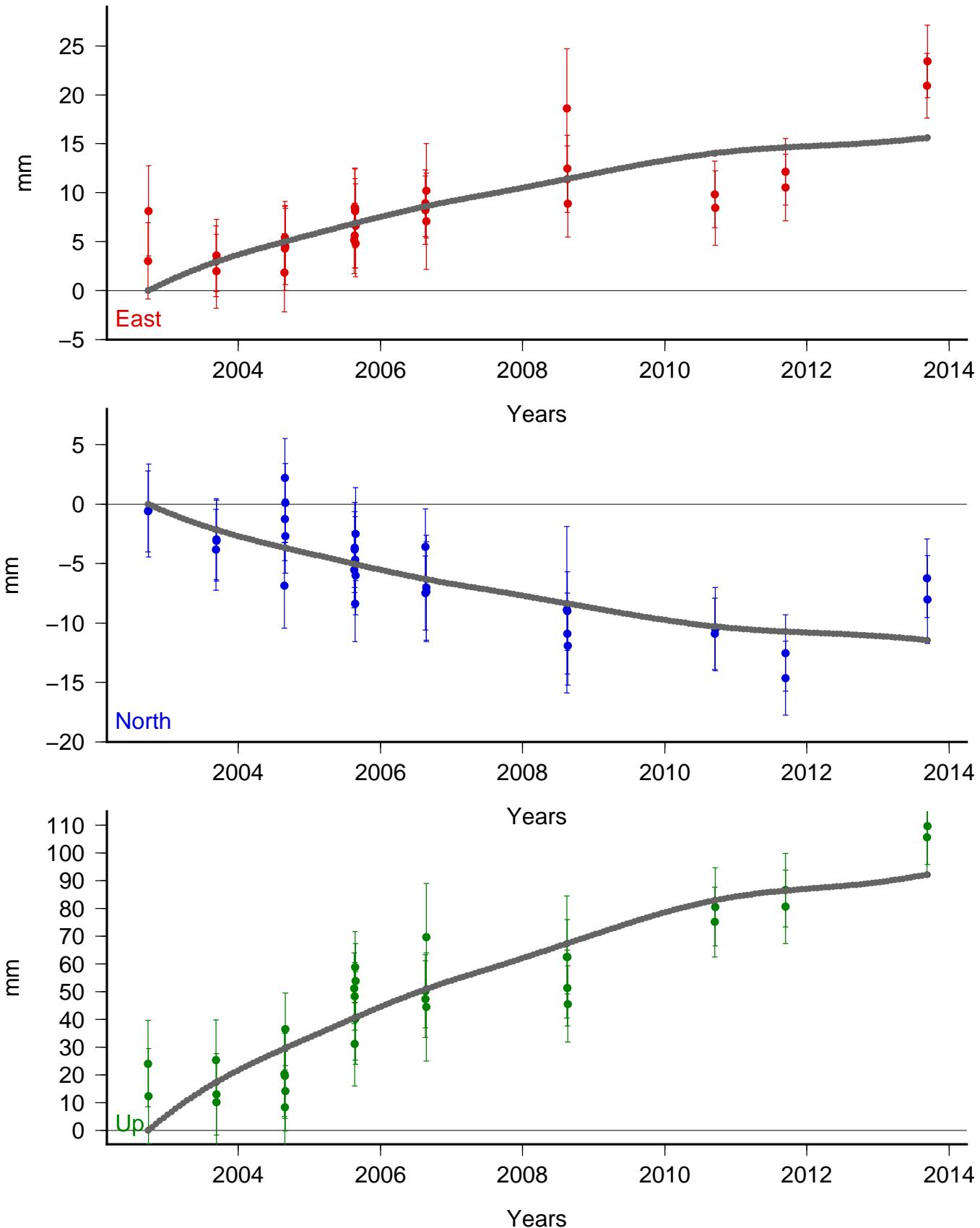
# Site: tsxj Model: sis1

East V: 1.43 +/- 0.30 Wrms: 3.1717 Nrms 1.0126  
 North V: 3.79 +/- 0.30 Wrms: 2.4736 Nrms 0.9377  
 Up V: 0.74 +/- 0.30 Wrms: 12.3679 Nrms 1.2126  
 Lon: 238.1831 Lat: 44.0788 DT: 10.9572 N: 23



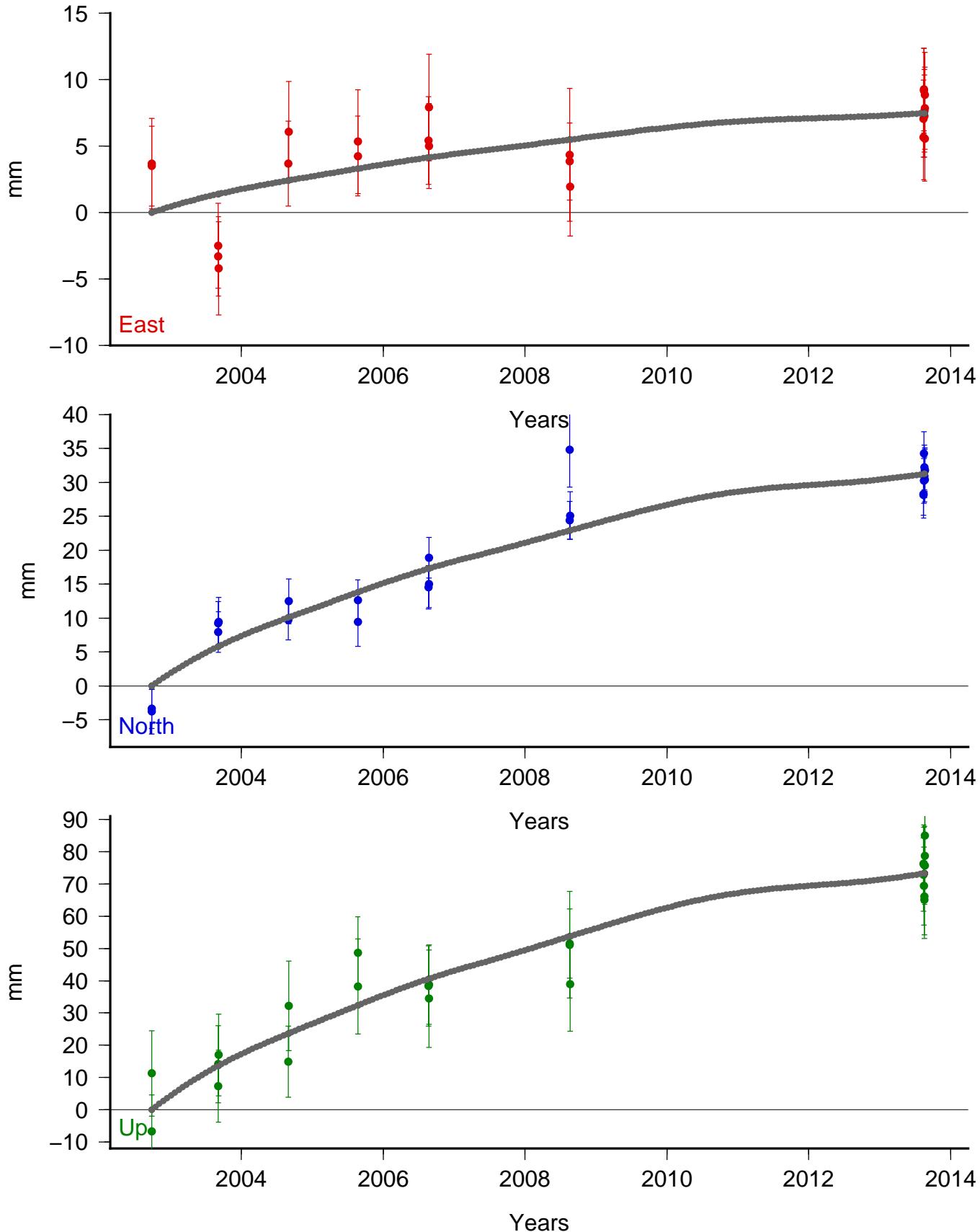
# Site: tsxo Model: sis1

East V: 1.32 +/- 0.30 Wrms: 3.0421 Nrms 0.8175  
 North V: 4.76 +/- 0.30 Wrms: 2.4887 Nrms 0.7228  
 Up V: 1.19 +/- 0.30 Wrms: 11.8337 Nrms 0.8257  
 Lon: 238.1695 Lat: 44.0931 DT: 10.9654 N: 31



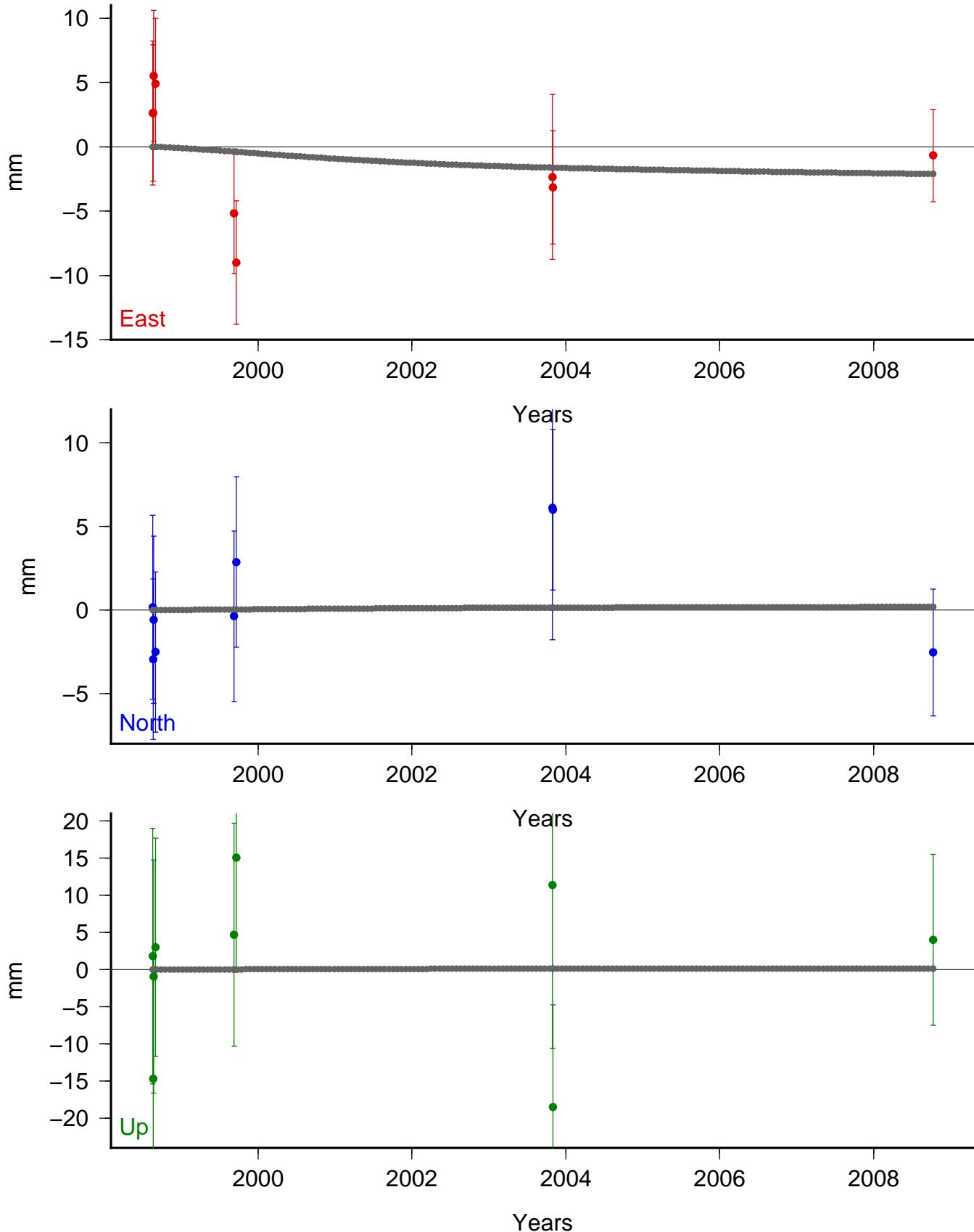
# Site: tsxv Model: sis1

East V: 0.64 +/- 0.30 Wrms: 2.5332 Nrms 0.7742  
 North V: 4.58 +/- 0.30 Wrms: 2.7481 Nrms 0.8480  
 Up V: 2.07 +/- 0.30 Wrms: 7.2395 Nrms 0.5889  
 Lon: 238.1648 Lat: 44.1215 DT: 10.9078 N: 24



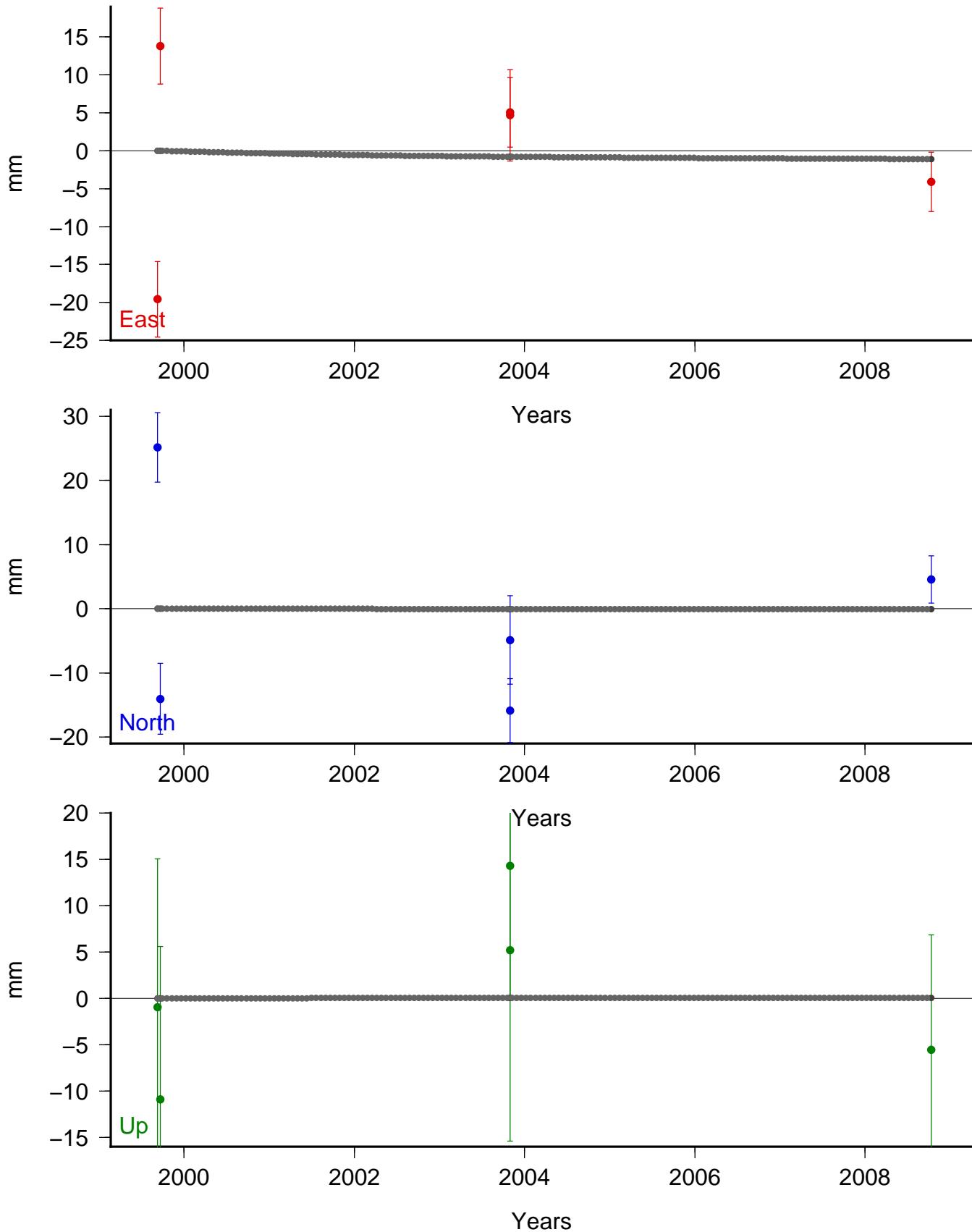
# Site: vida Model: sis1

East V: 0.96 +/- 0.31 Wrms: 4.2944 Nrms 0.8897  
North V: 5.25 +/- 0.31 Wrms: 3.1181 Nrms 0.6283  
Up V: -4.90 +/- 0.31 Wrms: 10.2476 Nrms 0.6795  
Lon: 237.4294 Lat: 44.1456 DT: 10.1385 N: 9



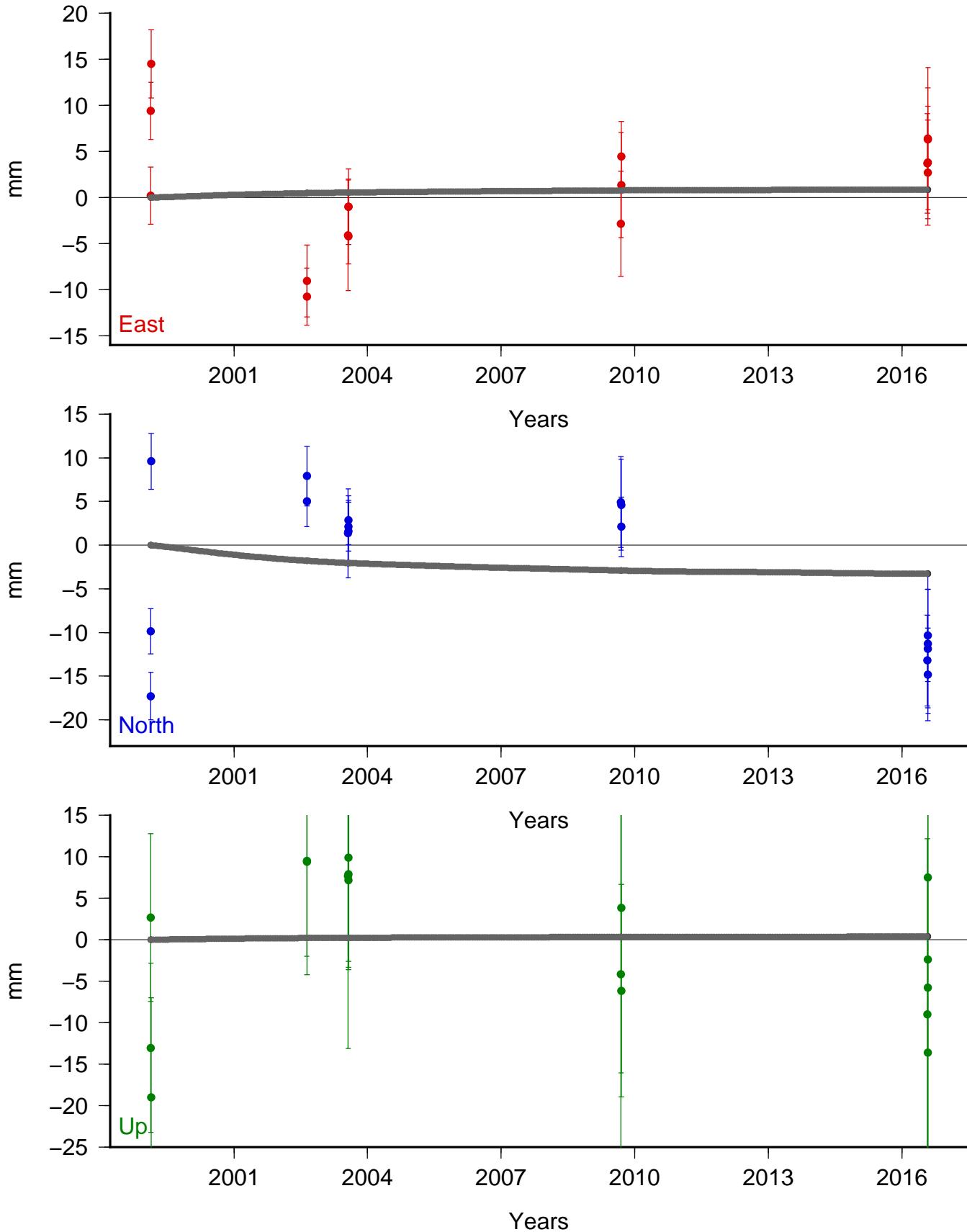
# Site: walt Model: sis1

East V: 3.90 +/- 0.33 Wrms: 10.8554 Nrms 2.2811  
North V: 3.25 +/- 0.33 Wrms: 14.1488 Nrms 2.8396  
Up V: -3.75 +/- 0.33 Wrms: 8.8898 Nrms 0.5788  
Lon: 237.2369 Lat: 44.0778 DT: 9.0843 N: 5



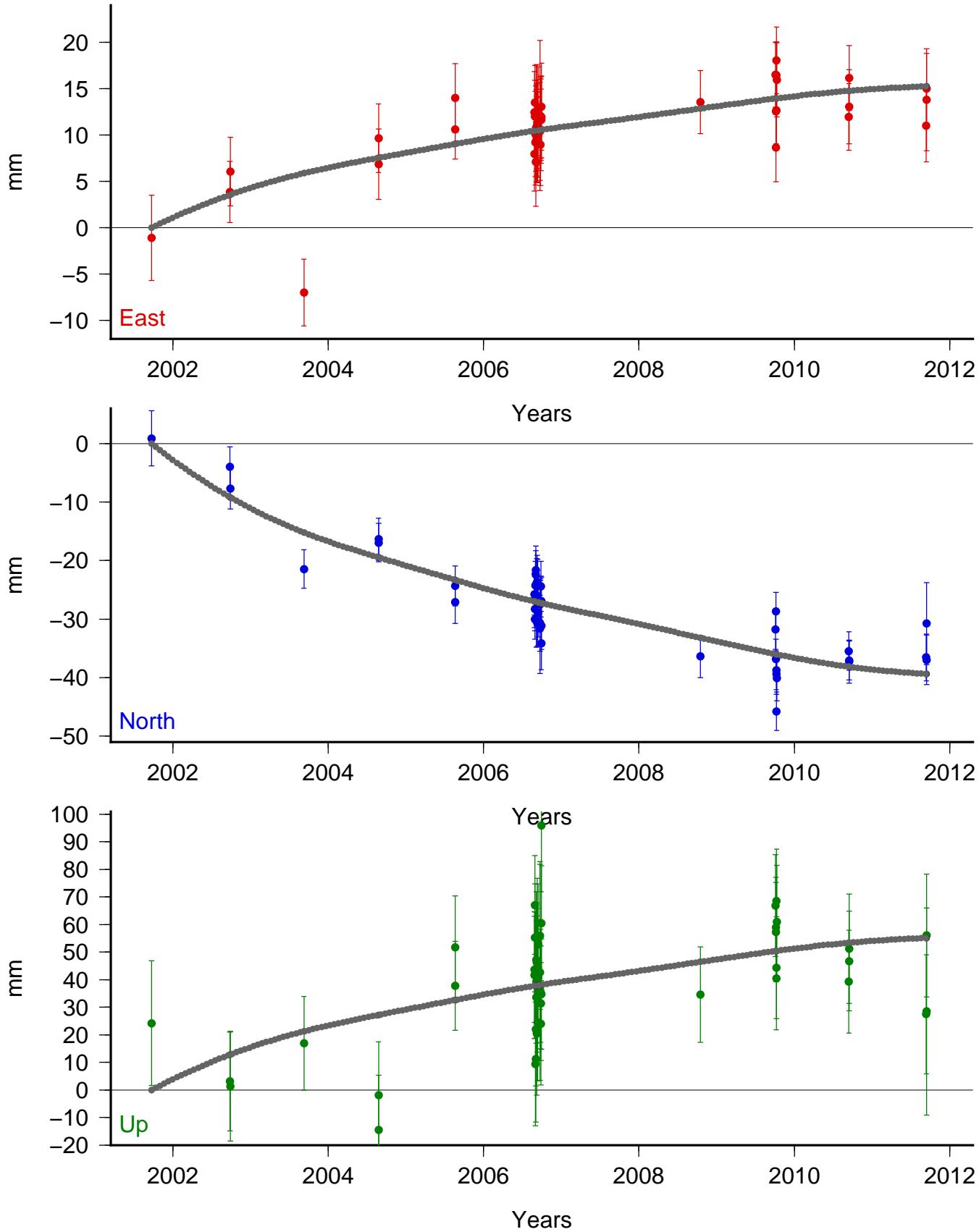
# Site: wick Model: sis1

East V: -0.92 +/- 0.24 Wrms: 7.0050 Nrms 1.7259  
 North V: 5.66 +/- 0.24 Wrms: 9.0553 Nrms 2.4743  
 Up V: -2.46 +/- 0.24 Wrms: 9.7039 Nrms 0.6902  
 Lon: 238.3123 Lat: 43.6824 DT: 17.4514 N: 17



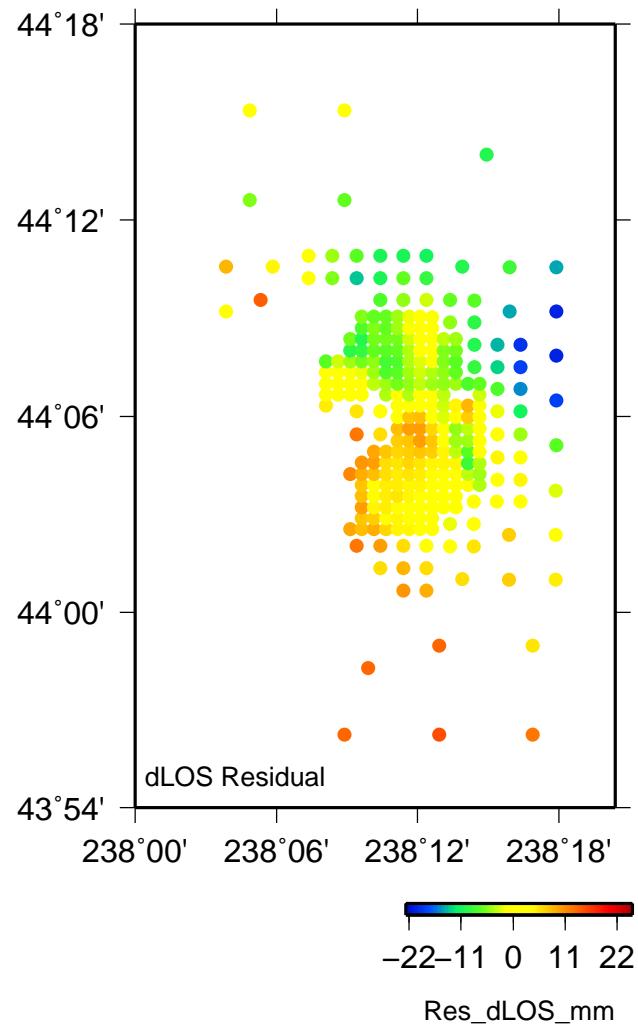
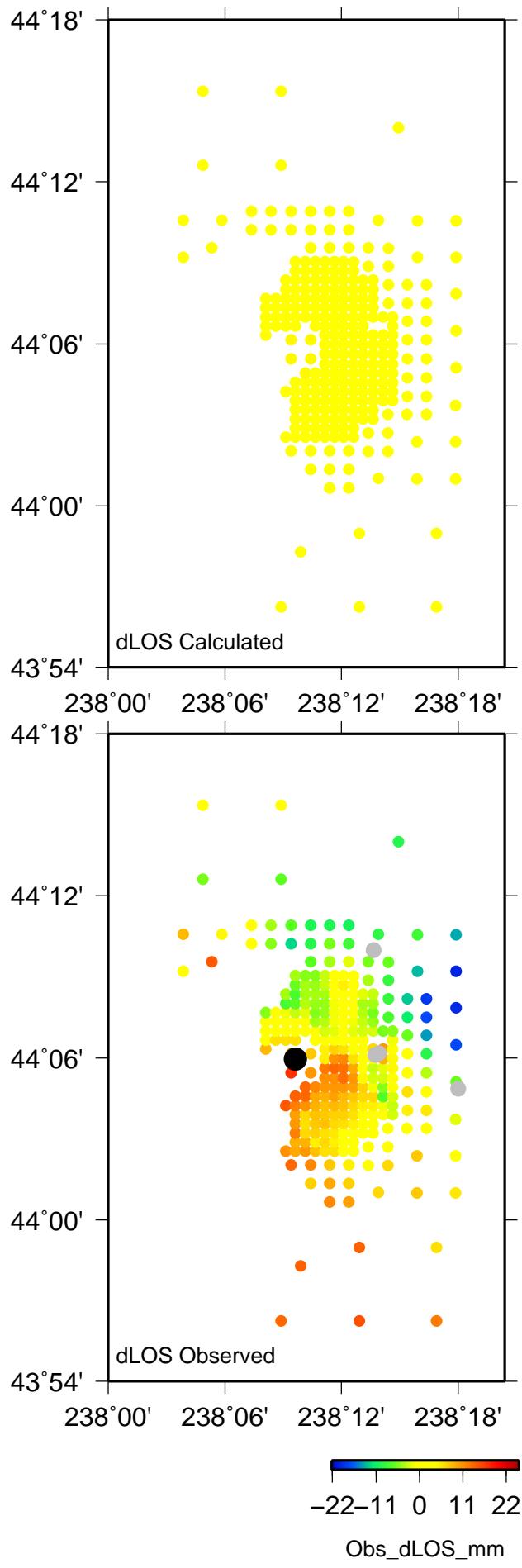
# Site: wife Model: sis1

East V: 2.05 +/- 0.32 Wrms: 2.9965 Nrms 0.7229  
 North V: 2.91 +/- 0.32 Wrms: 3.6289 Nrms 0.9321  
 Up V: 1.01 +/- 0.32 Wrms: 16.8225 Nrms 0.8174  
 Lon: 238.1780 Lat: 44.0613 DT: 9.9824 N: 50



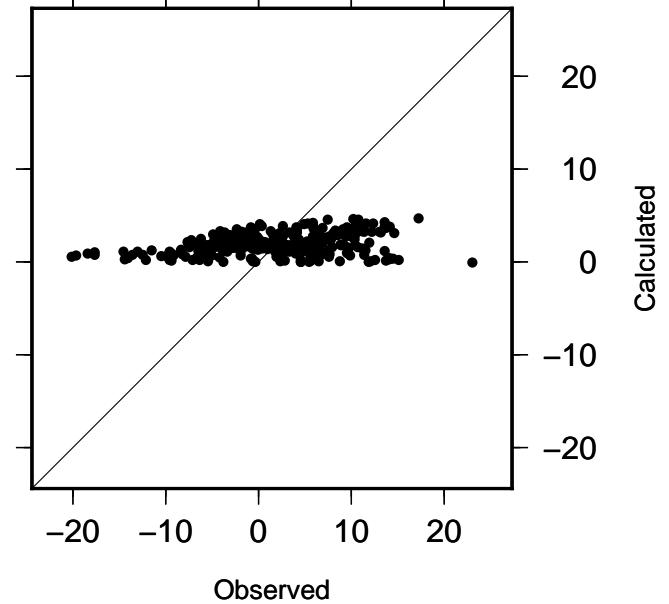
**Figure S-4.** Plots of de-trended survey mode GPS (SGPS) time series. Format as described for Fig. S-2 except seasonal signals have not been removed and one-sigma error bars are shown for daily observations.

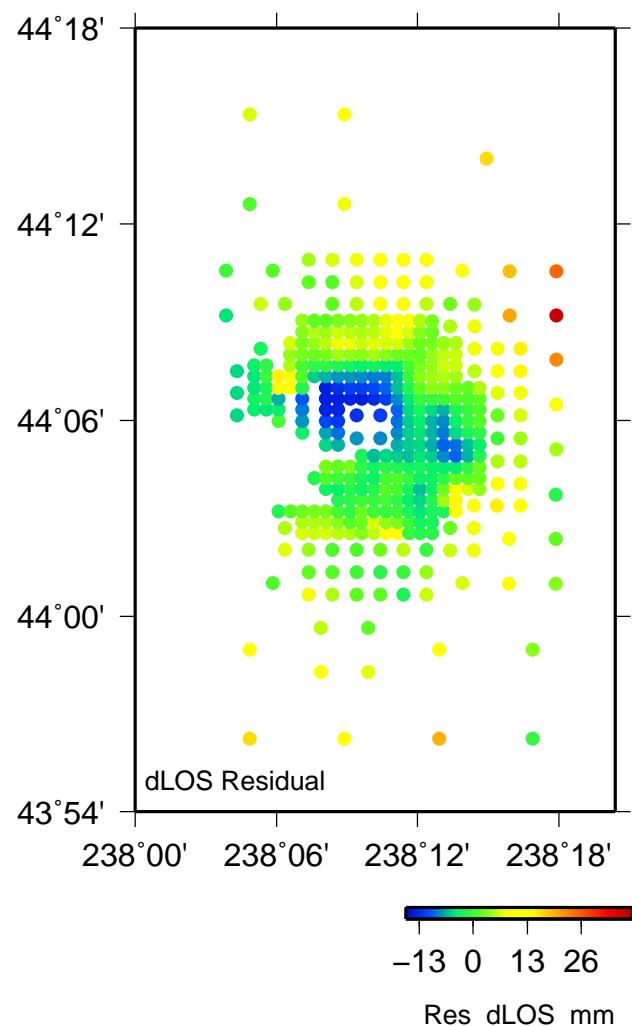
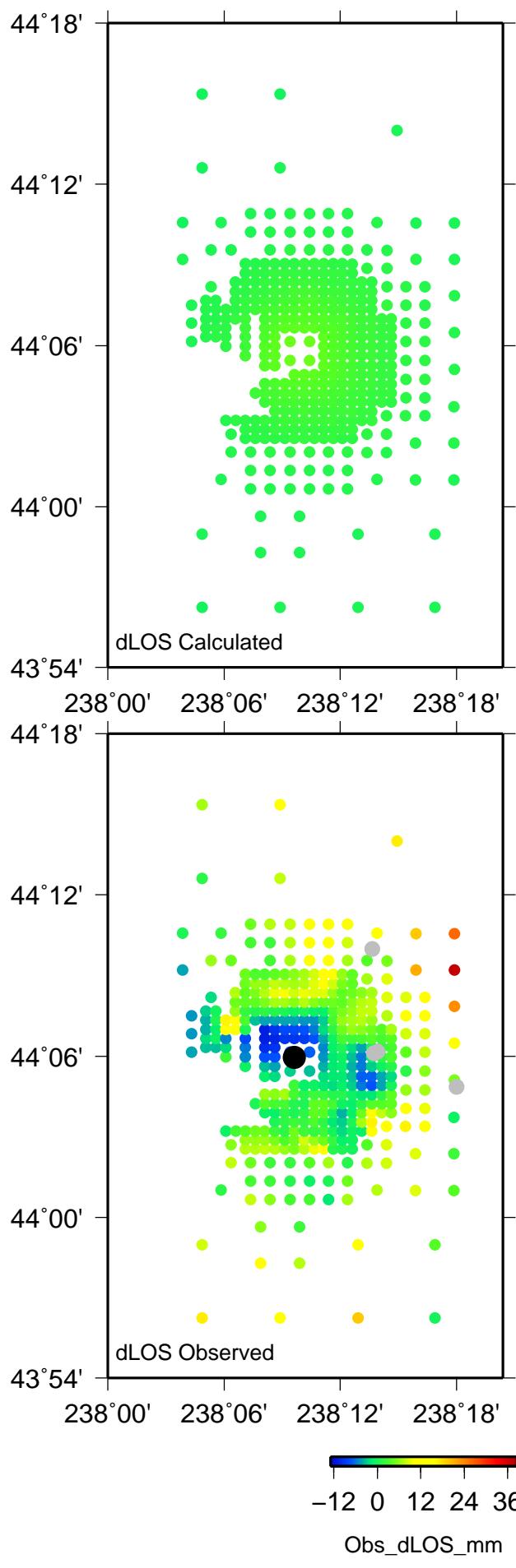
Caption is below figure, which has several parts. Search for "Figure S" to locate caption.



Name: ED01 : Time 1992.450 – 1995.580

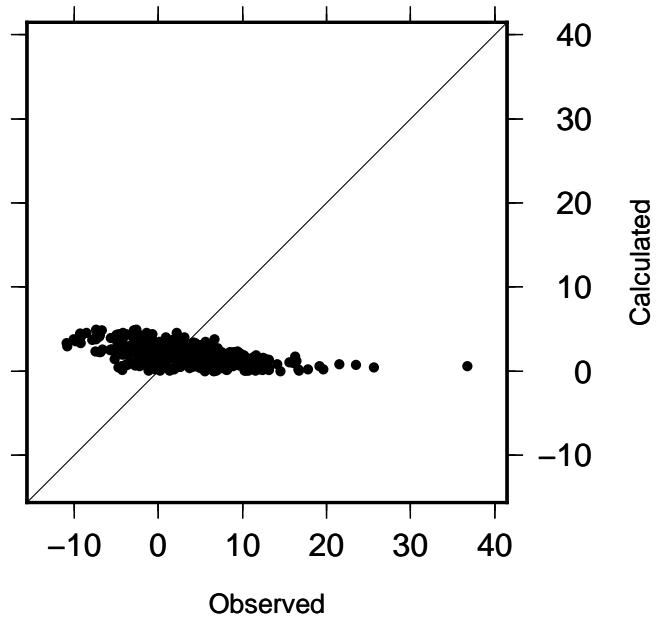
Model: sis1 N: 293 Nrms: 1.371 Wrms: 5.116  
H: -167.800 I: 24.500 Offset: 6.044

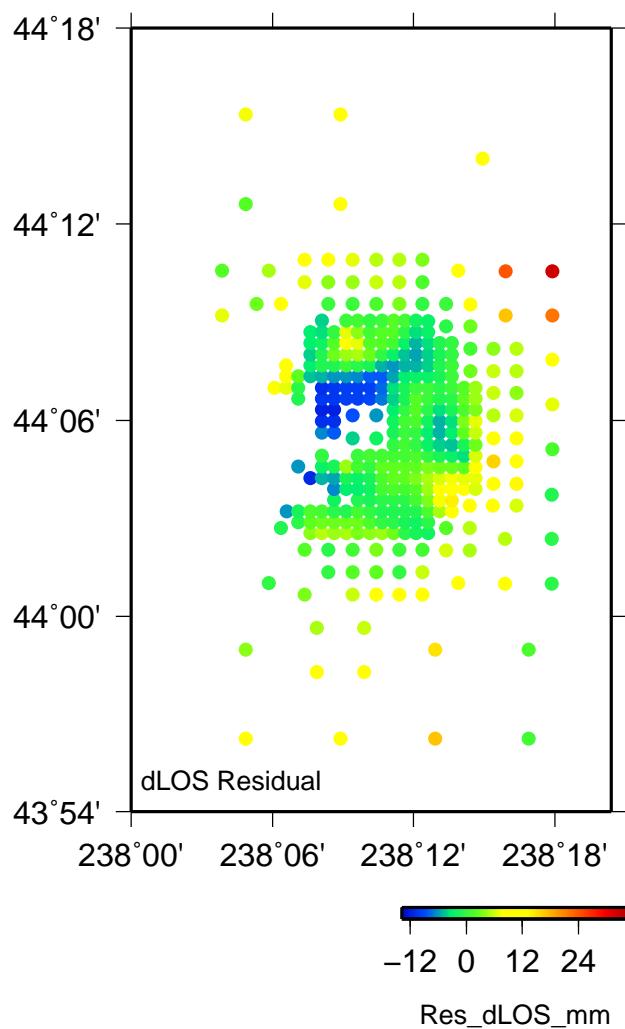
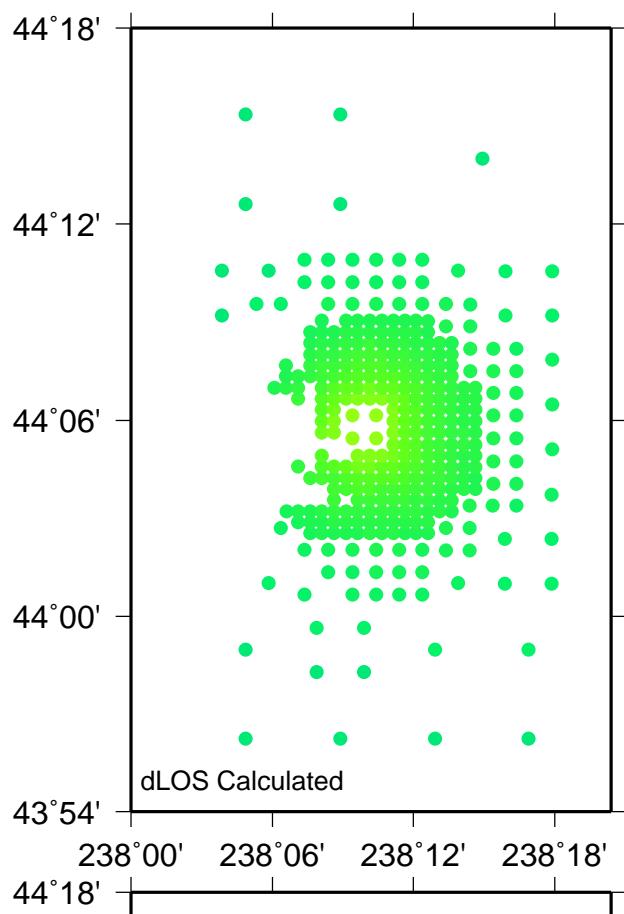




Name: ED02 : Time 1992.546 – 1995.676

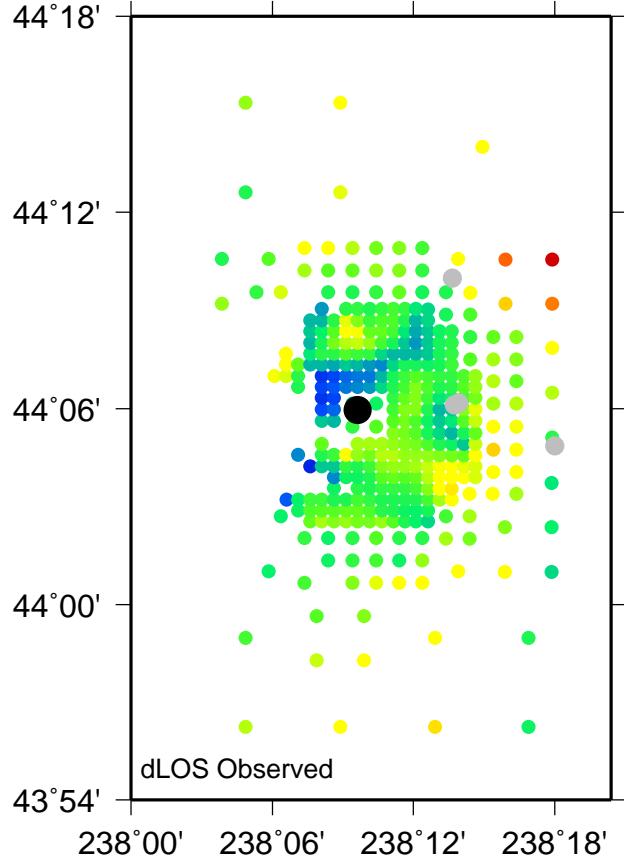
Model: sis1 N: 401 Nrms: 0.862 Wrms: 6.945  
H: -167.800 I: 24.500 Offset: 7.619



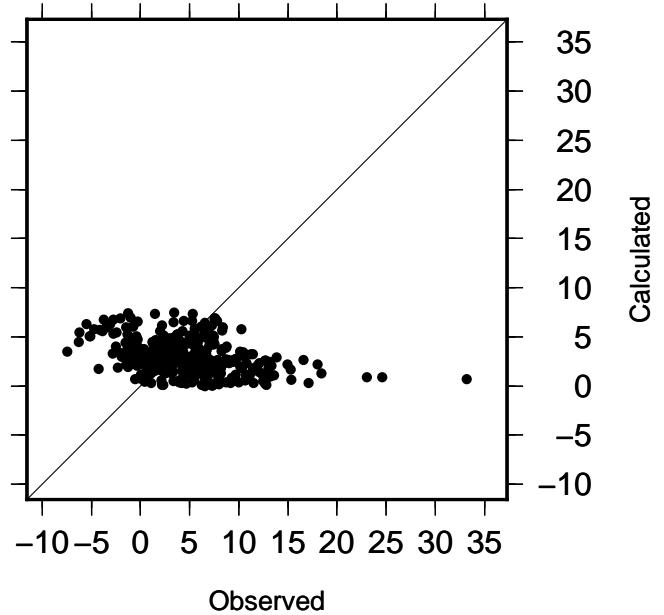


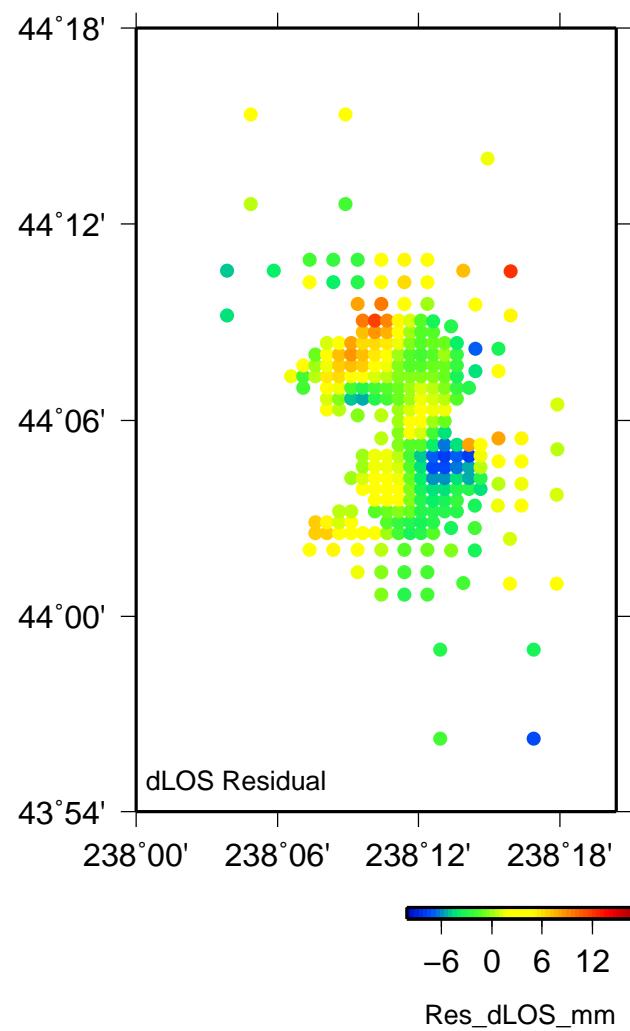
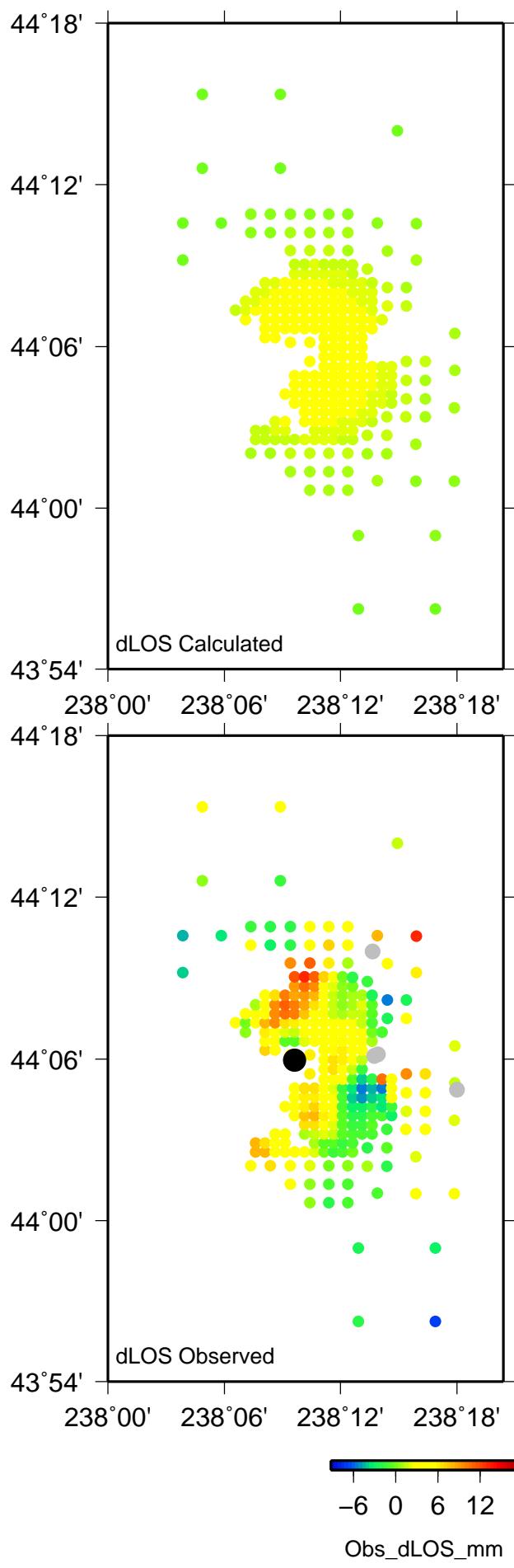
Name: ED03 : Time 1992.546 – 1996.636

Model: sis1 N: 359 Nrms: 0.528 Wrms: 1.453  
H: -167.800 I: 24.500 Offset: 6.584



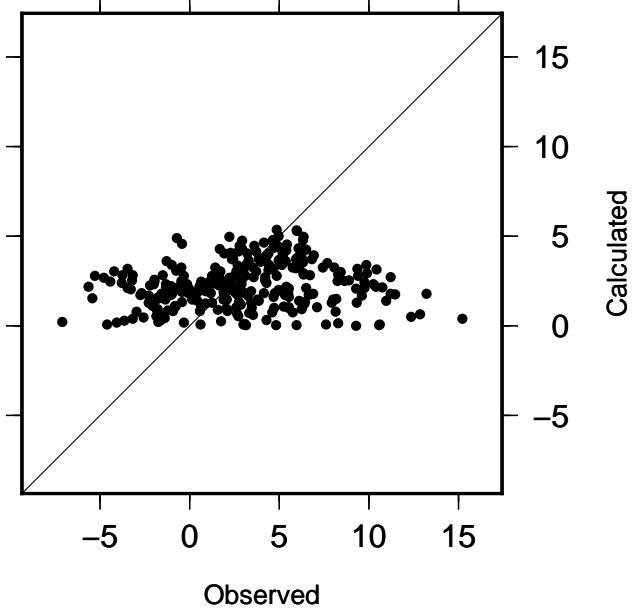
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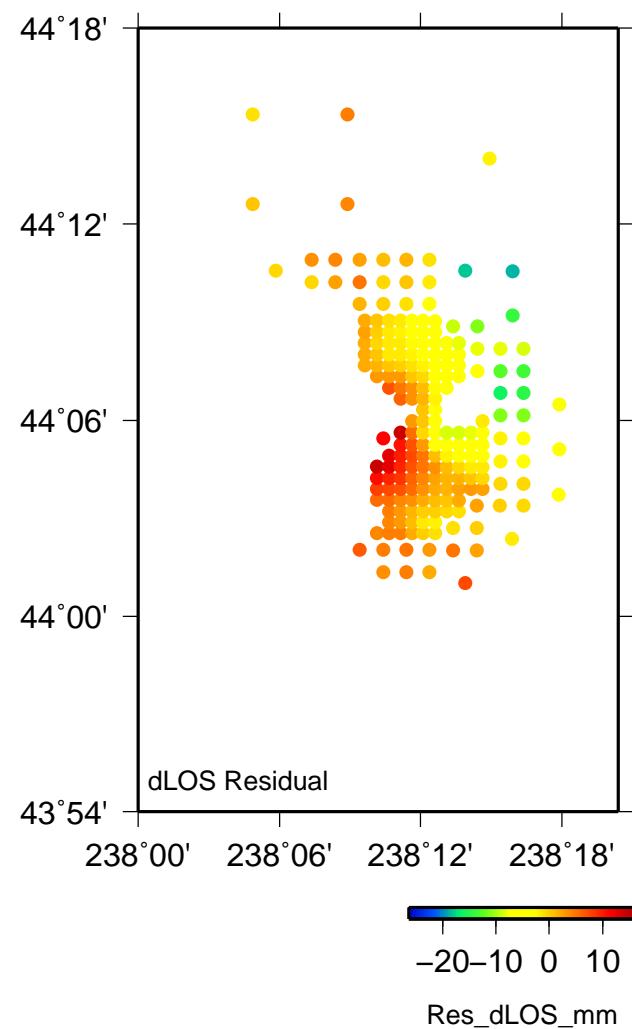
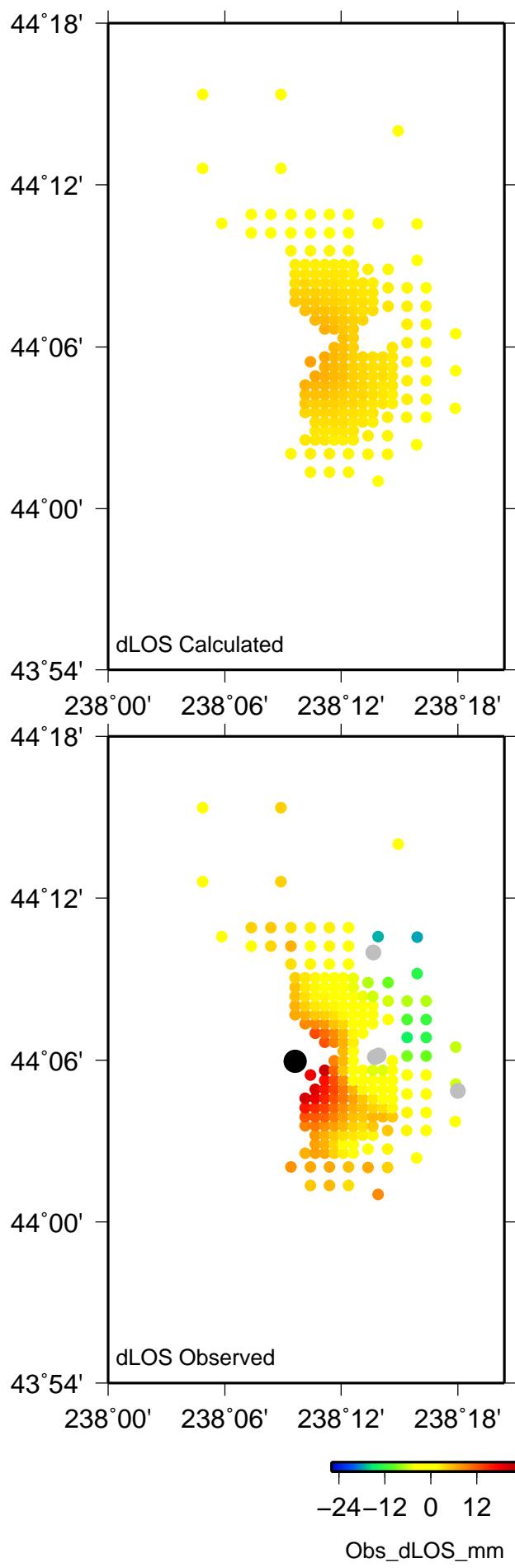




Name: ED04 : Time 1992.641 – 1995.868

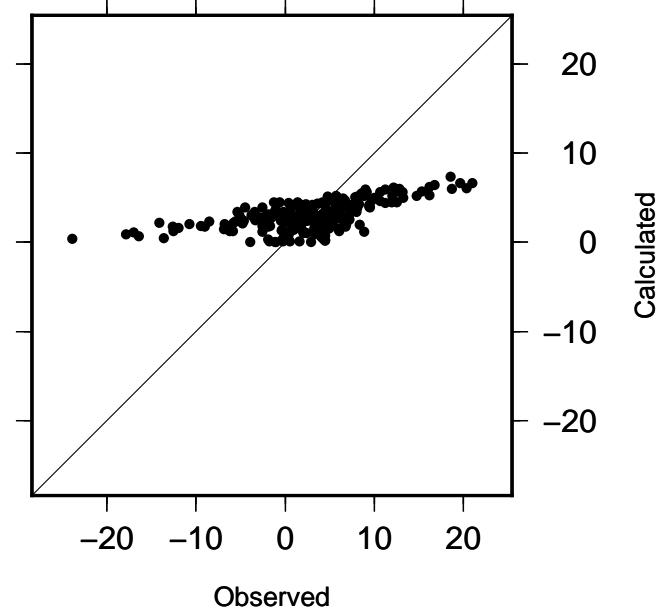
Model: sis1 N: 287 Nrms: 1.604 Wrms: 4.192  
H: -167.800 I: 24.500 Offset: 5.140

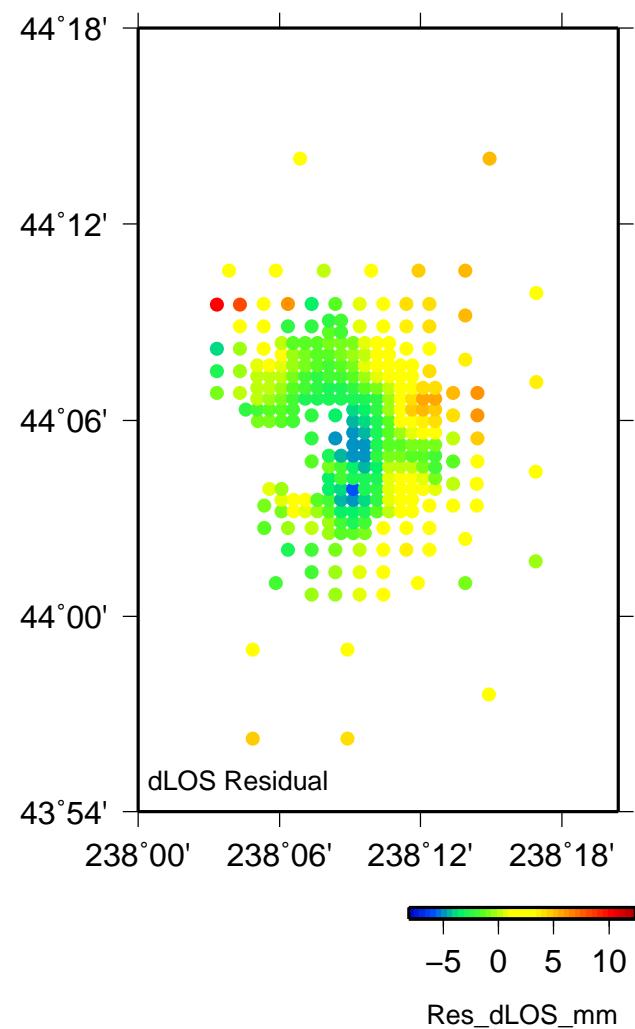
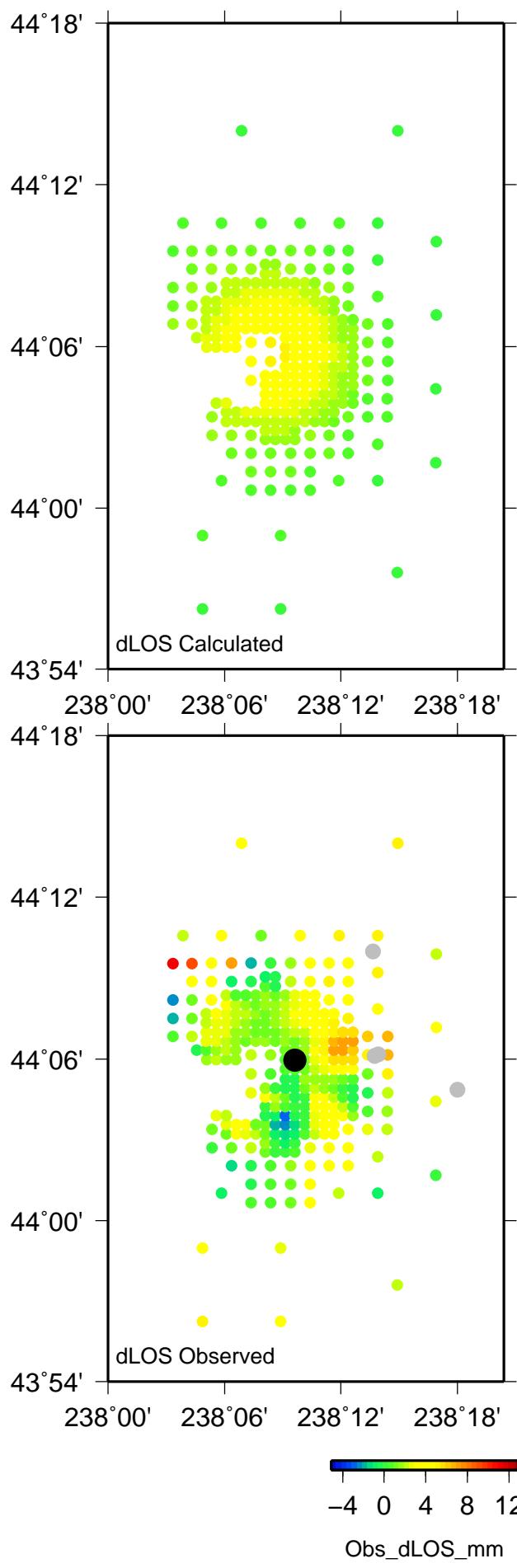




Name: ED05 : Time 1992.737 – 1996.636

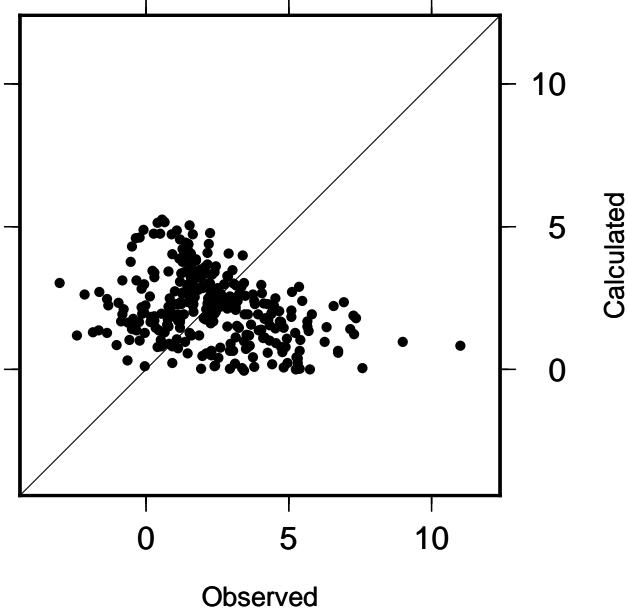
Model: sis1 N: 219 Nrms: 0.152 Wrms: 0.416  
H: -167.800 I: 24.500 Offset: -0.790

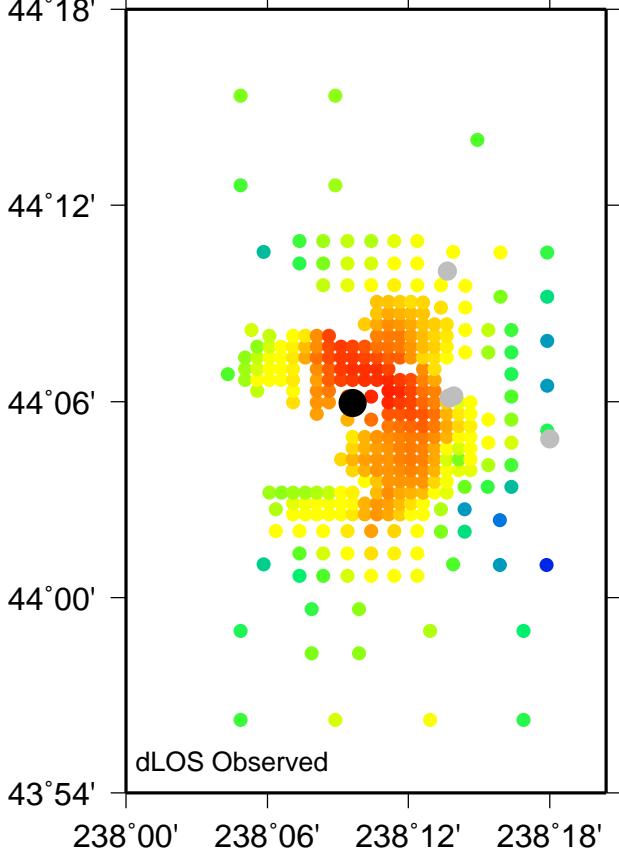
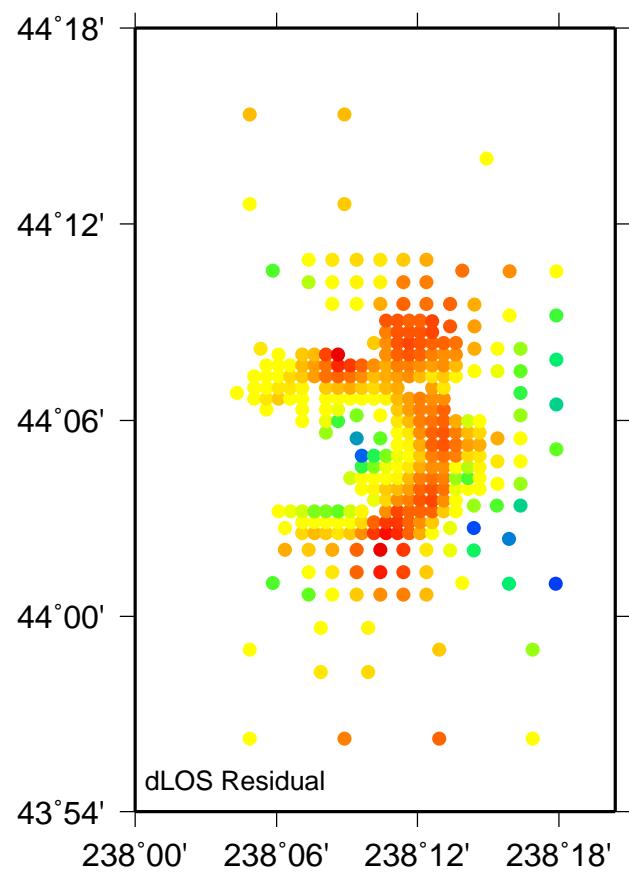
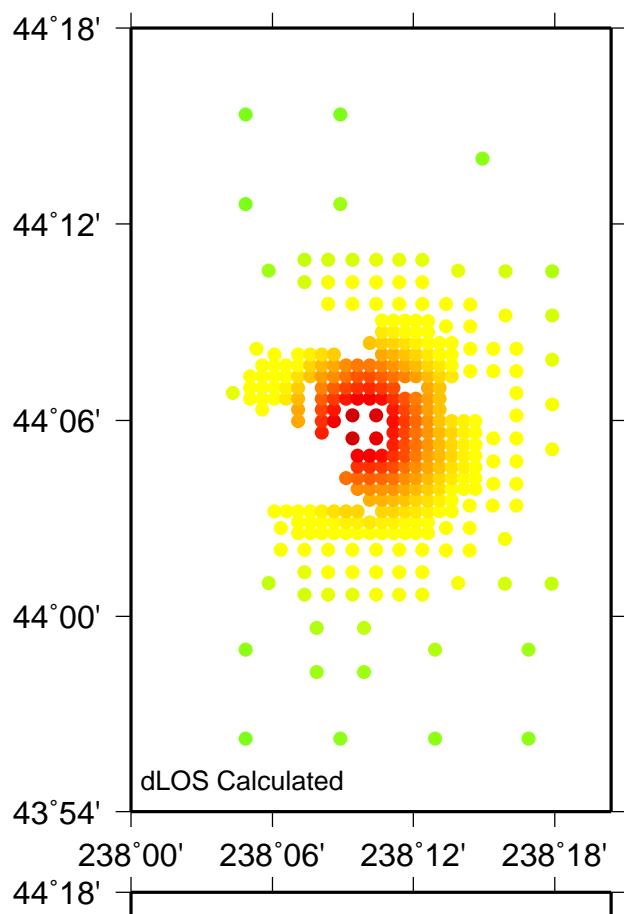




Name: EA06 : Time 1993.565 – 1995.740

Model: sis1 N: 298 Nrms: 1.016 Wrms: 4.490  
H: -11.900 I: 26.700 Offset: 3.161

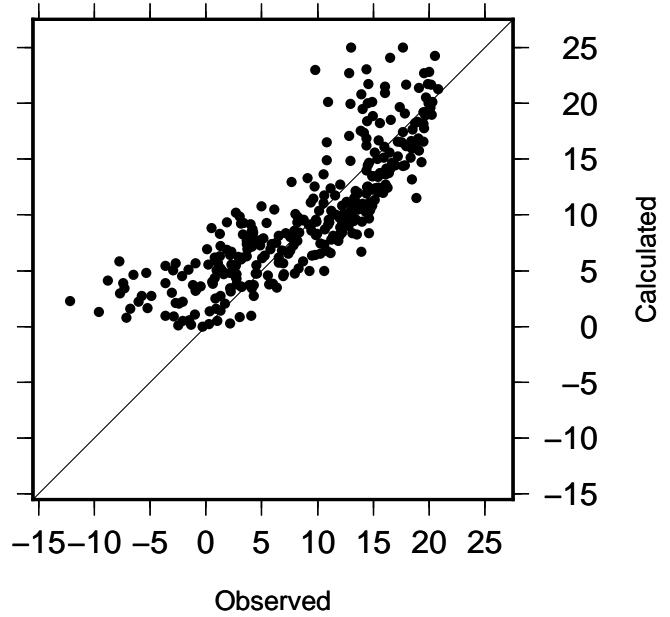


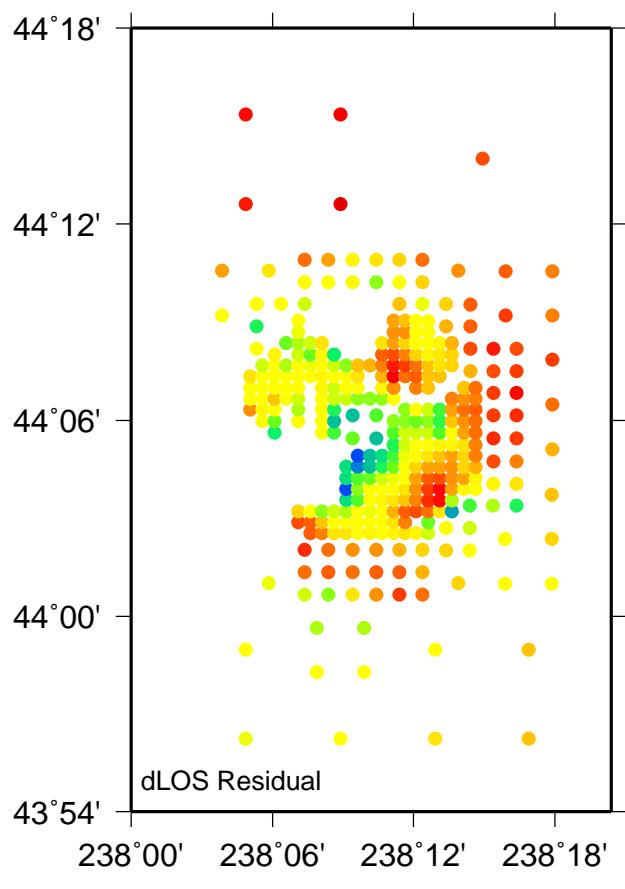
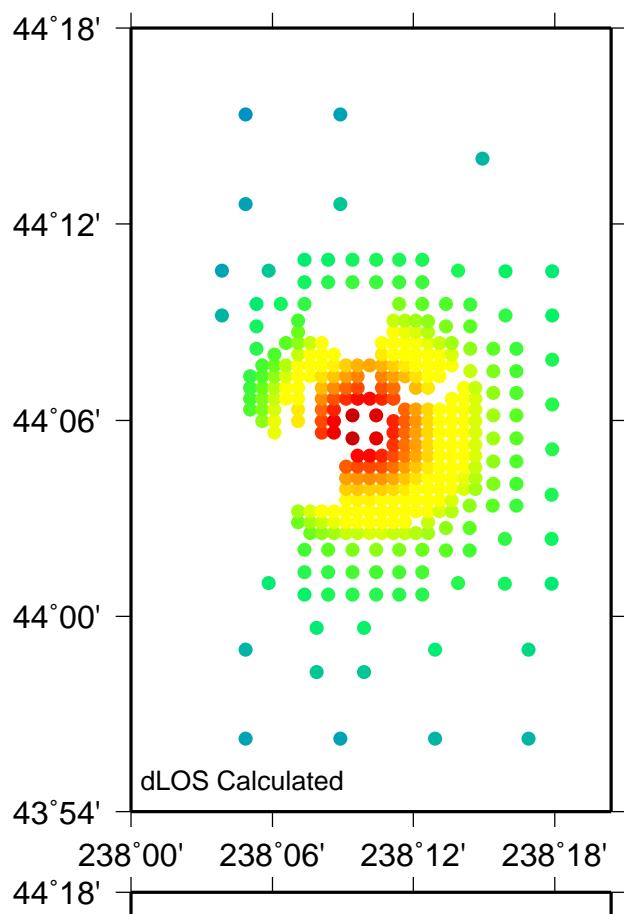


-10 0 10 20  
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Name: ED07 : Time 1993.651 – 1998.509

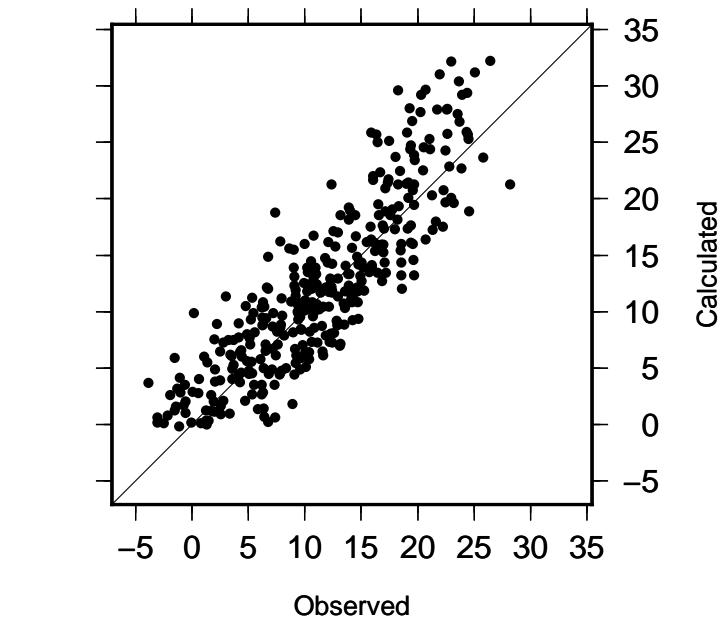
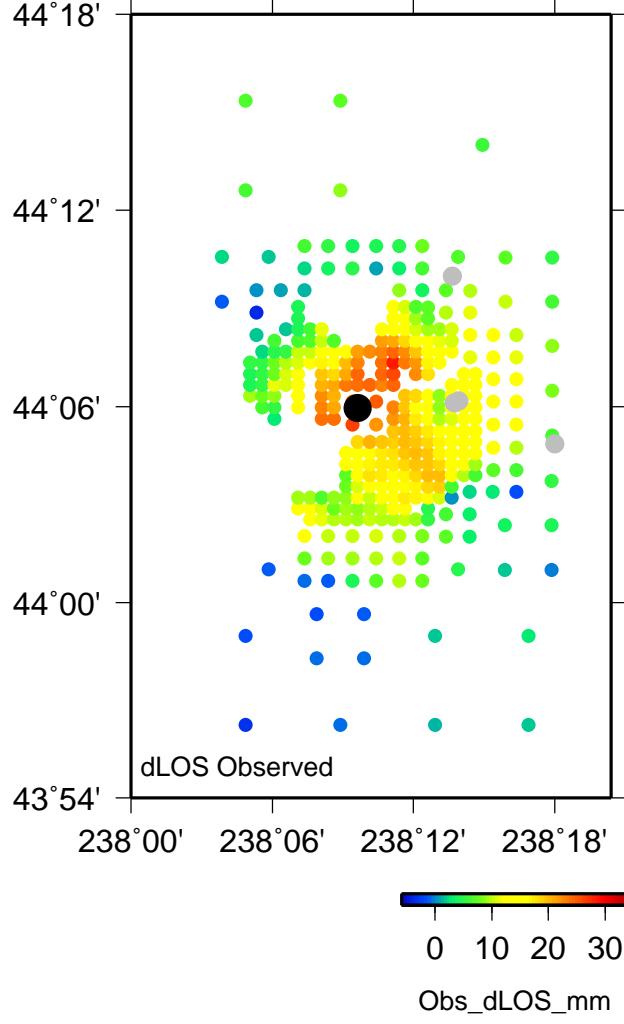
Model: sis1 N: 328 Nrms: 0.329 Wrms: 0.871  
H: -167.300 I: 20.500 Offset: -0.015

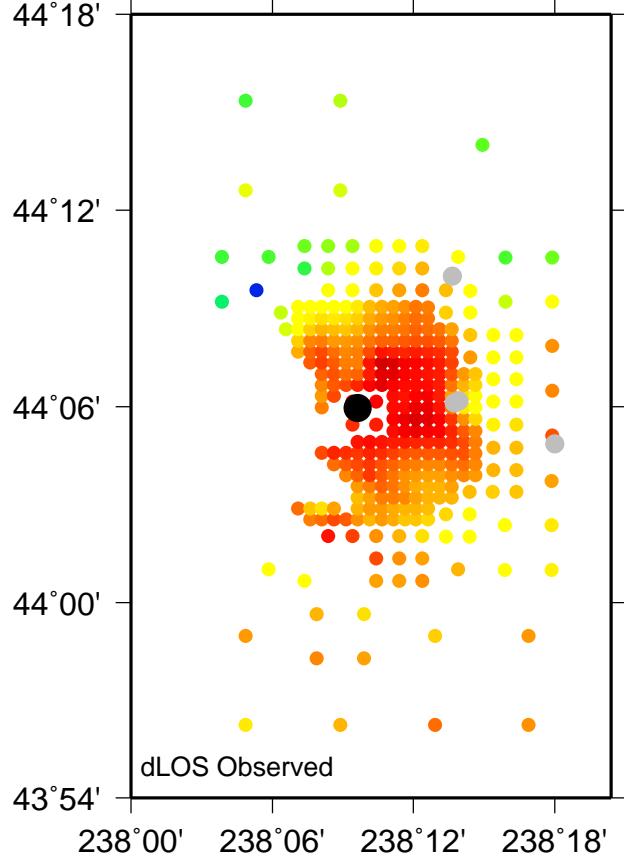
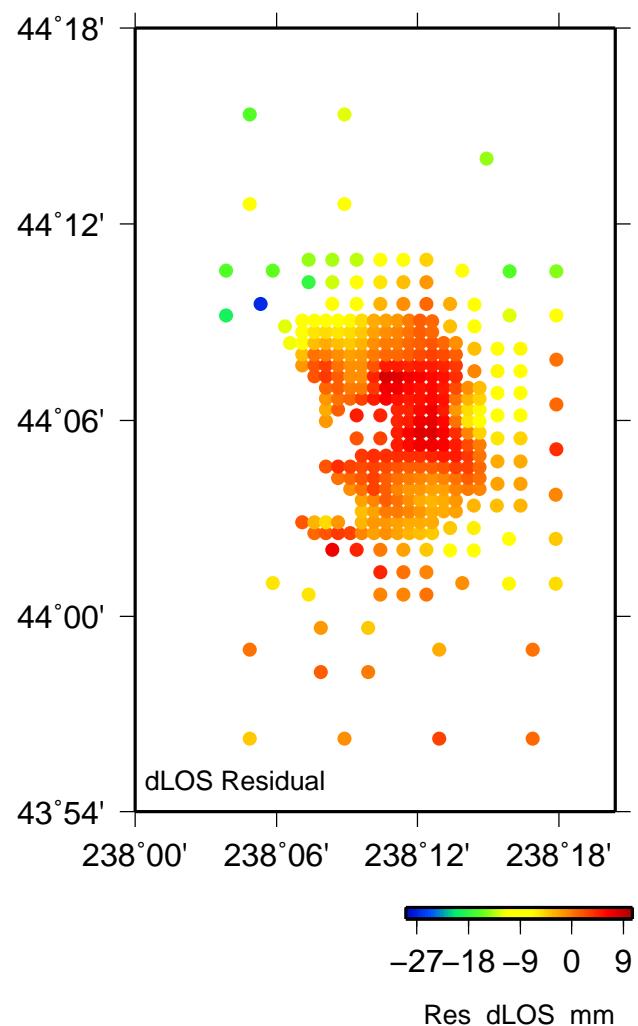
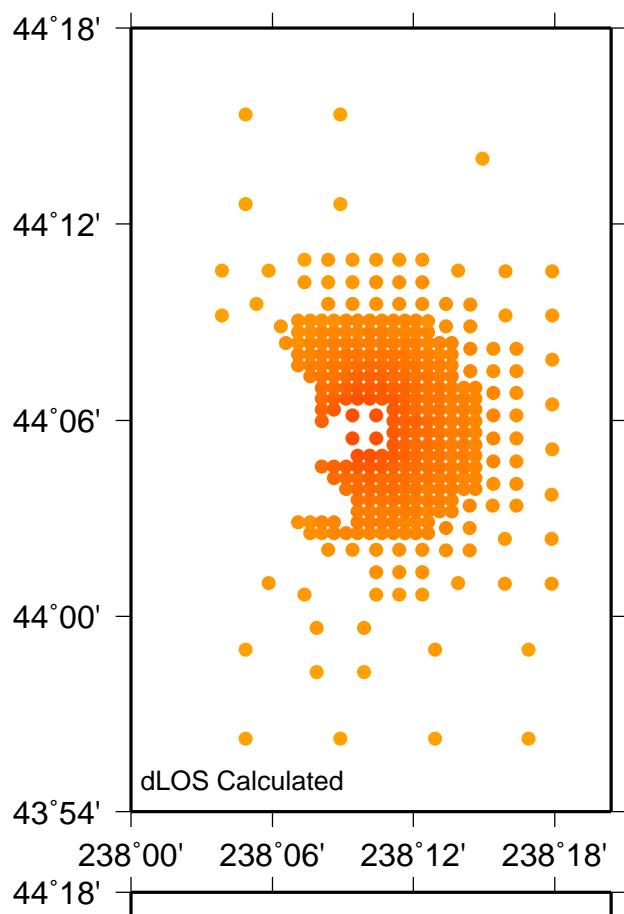




Name: ED08 : Time 1993.651 – 1998.797

Model: sis1 N: 351 Nrms: 0.104 Wrms: 0.363  
H: -167.300 I: 20.500 Offset: 1.996

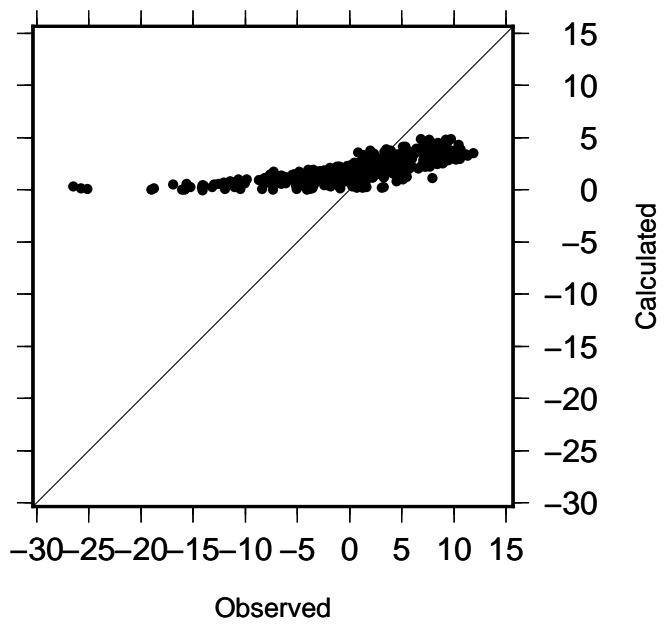


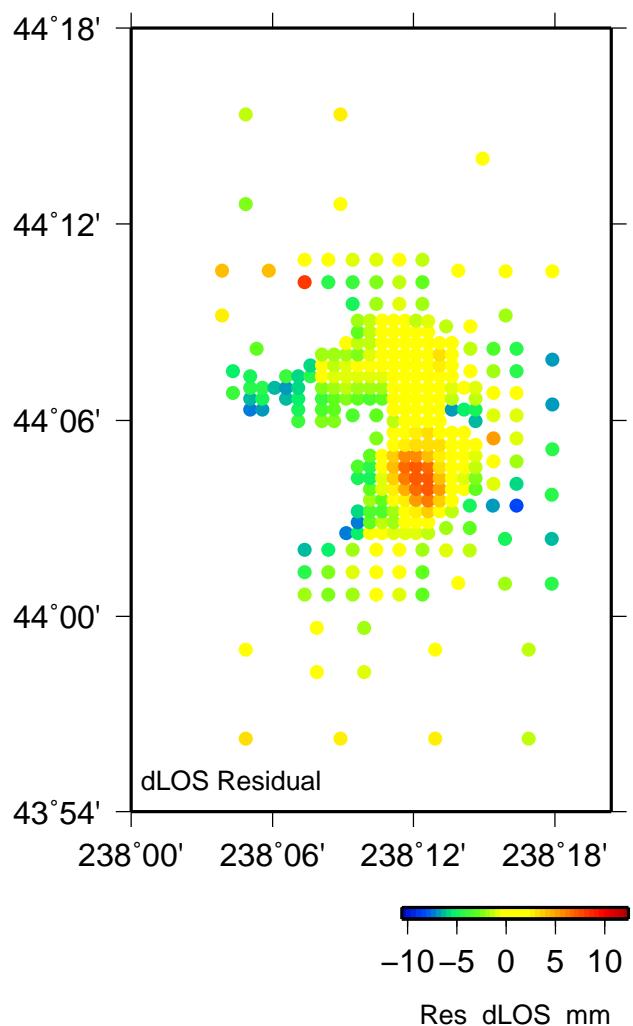
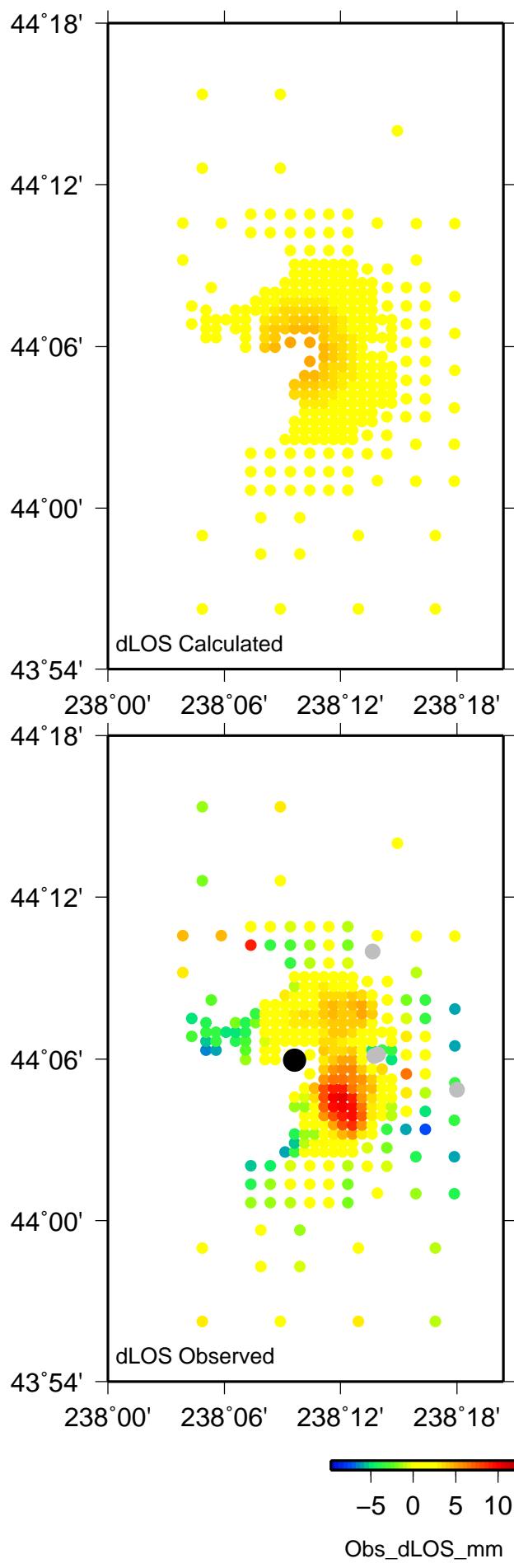


-20 -10 0 10  
Obs\_dLOS\_mm

Name: ED09 : Time 1993.695 – 1995.772

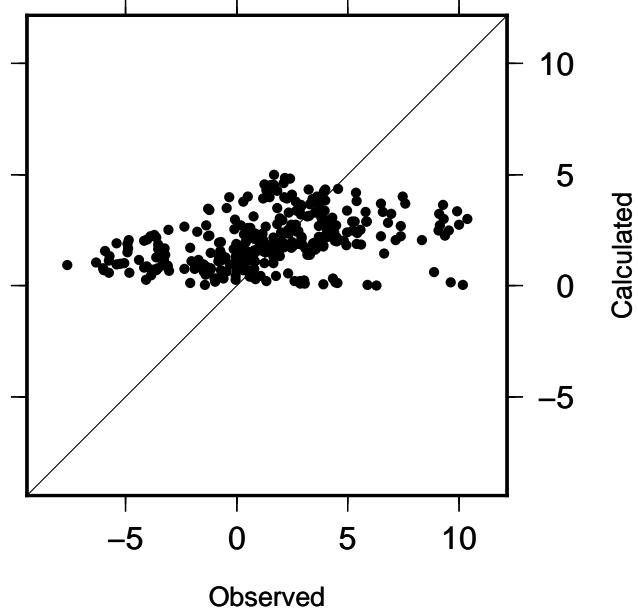
Model: sis1 N: 344 Nrms: 0.486 Wrms: 1.201  
H: -167.800 I: 24.500 Offset: -11.019

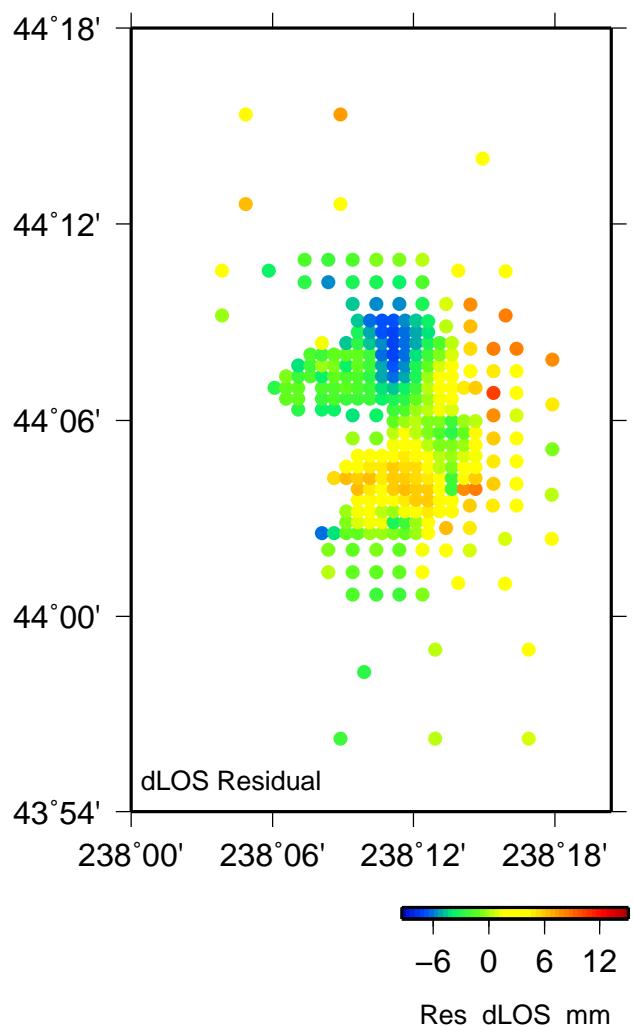
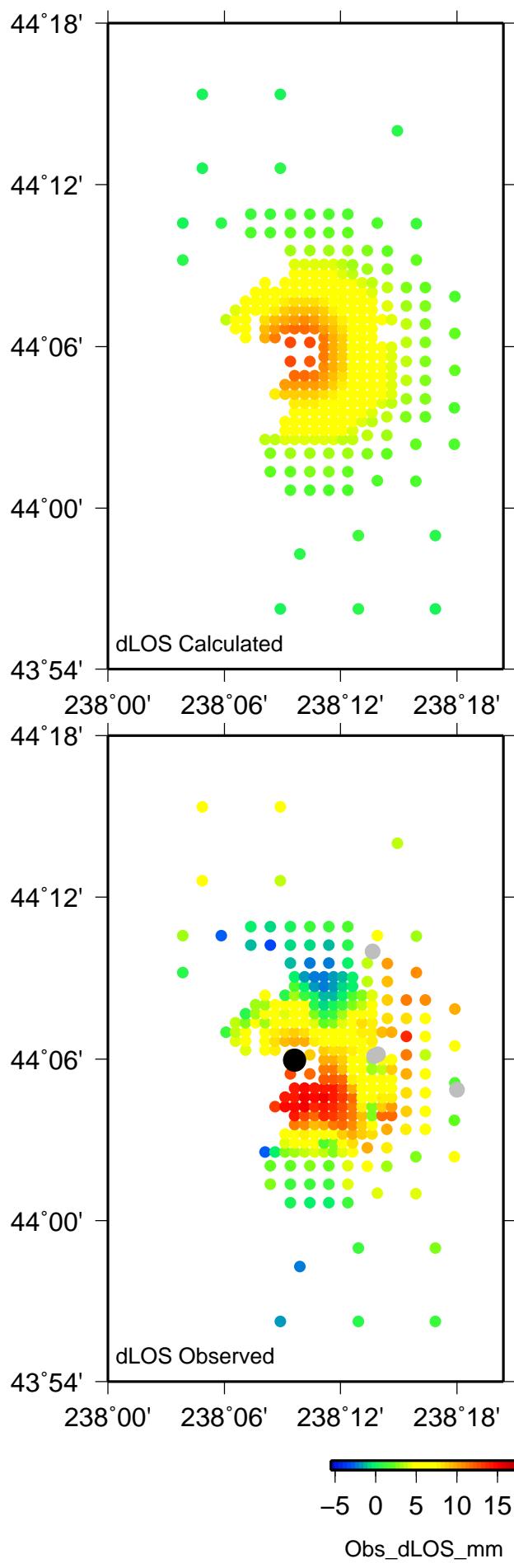




Name: ED10 : Time 1993.843 – 1995.824

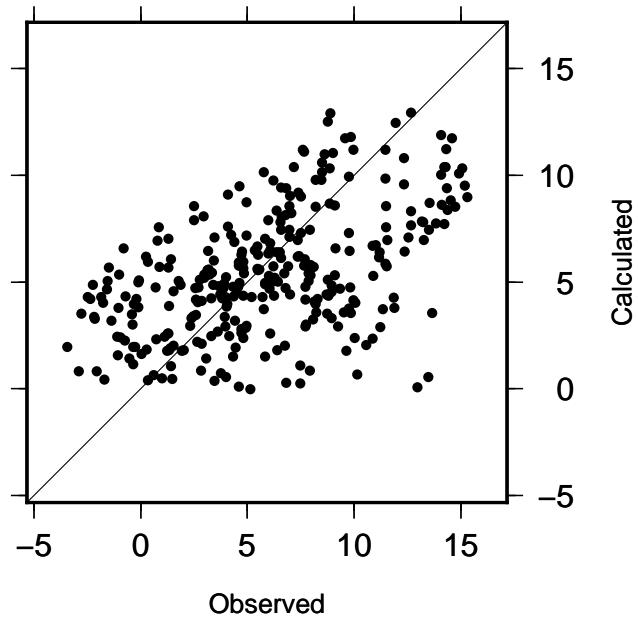
Model: sis1 N: 318 Nrms: 0.770 Wrms: 1.899  
H: -167.300 I: 20.500 Offset: 0.200

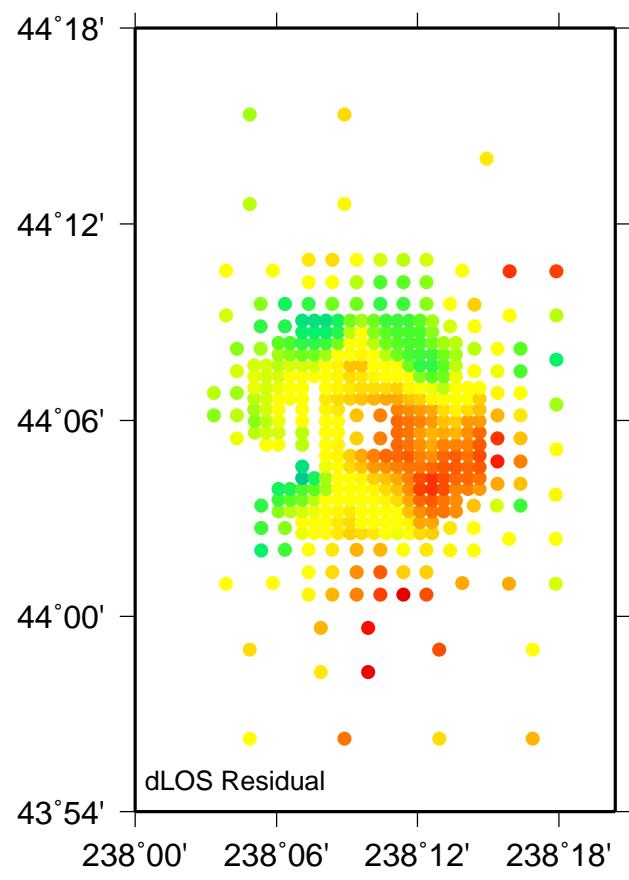
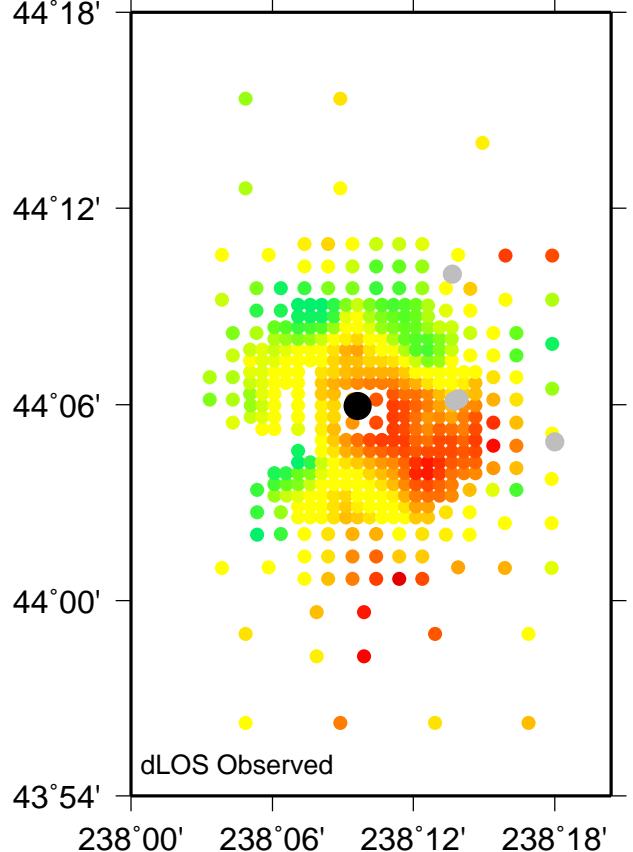
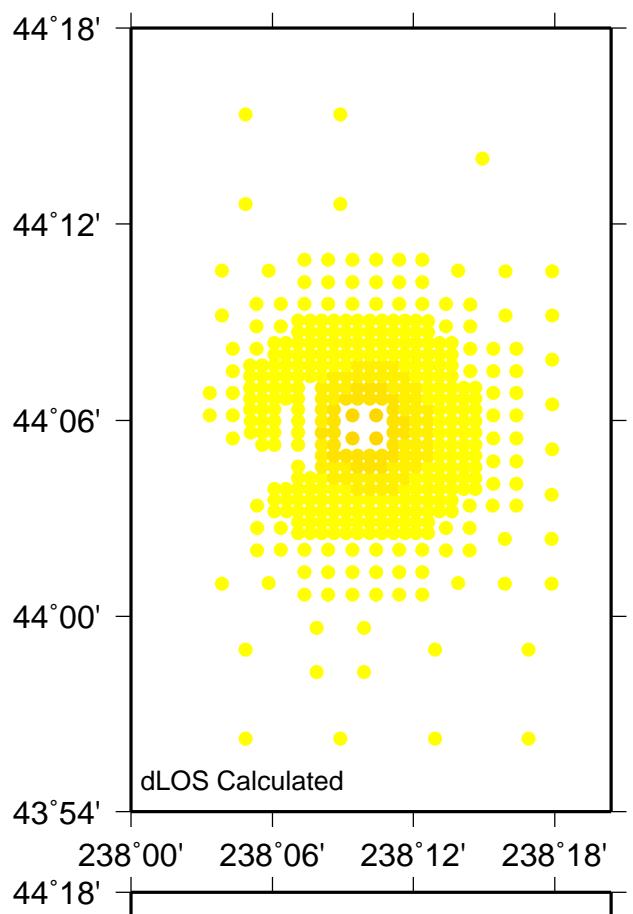




Name: ED11 : Time 1993.843 – 1997.646

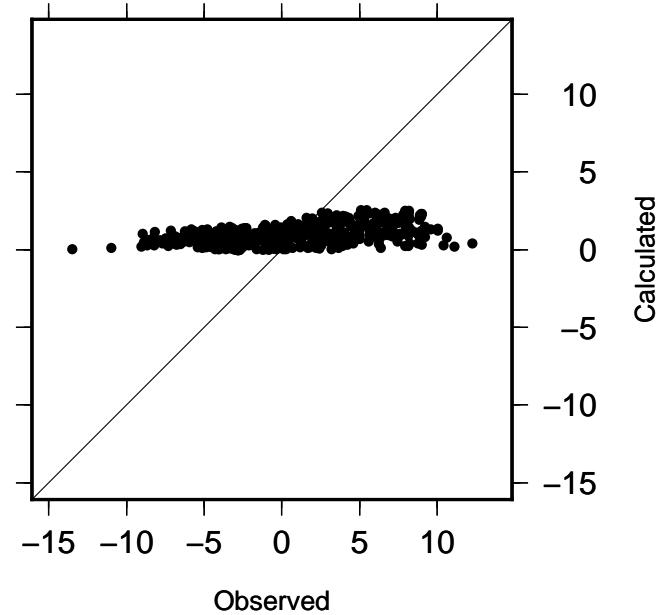
Model: sis1 N: 308 Nrms: 0.657 Wrms: 1.636  
H: -167.300 I: 20.500 Offset: 5.080

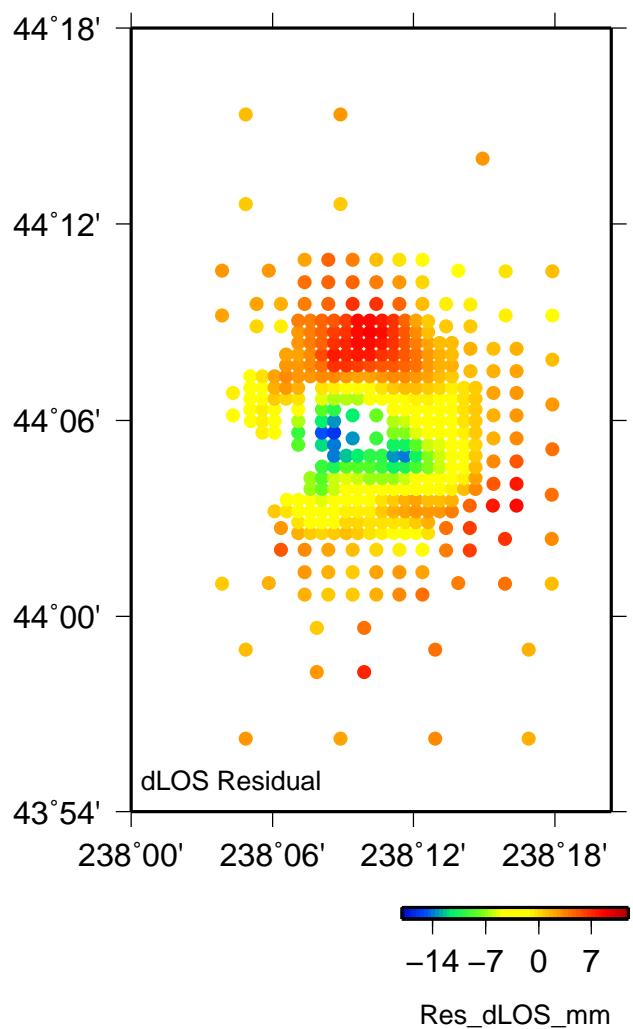
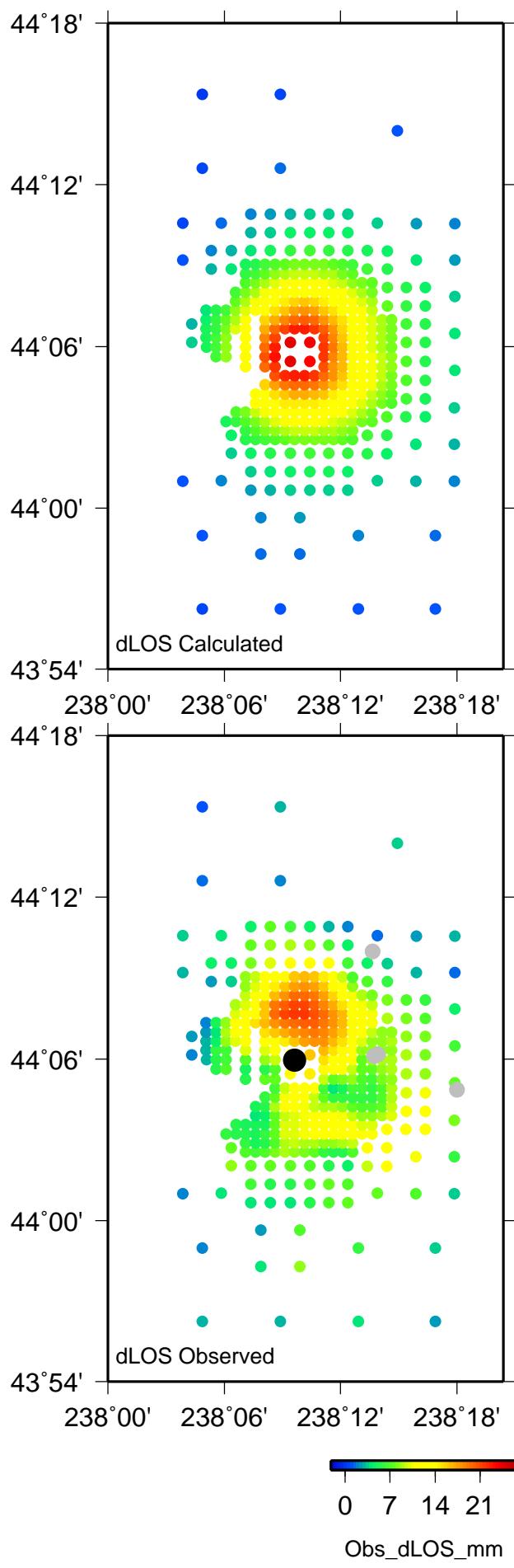




Name: ED12 : Time 1995.676 – 1996.636

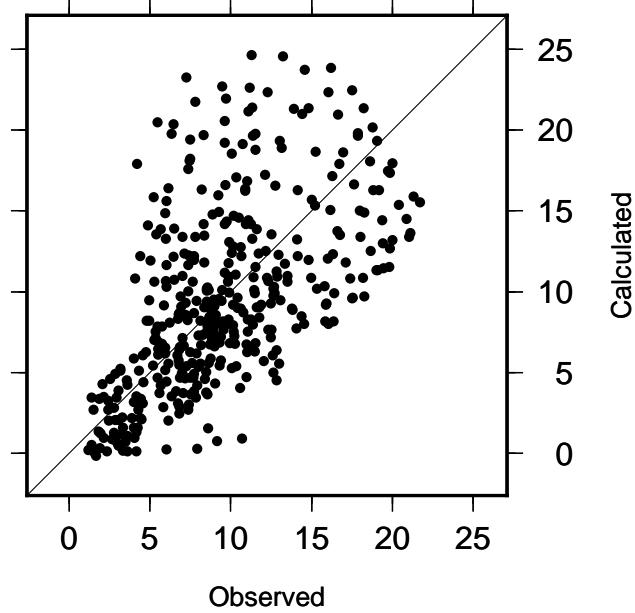
Model: sis1 N: 444 Nrms: 0.109 Wrms: 0.247  
H: -167.800 I: 24.500 Offset: -0.874

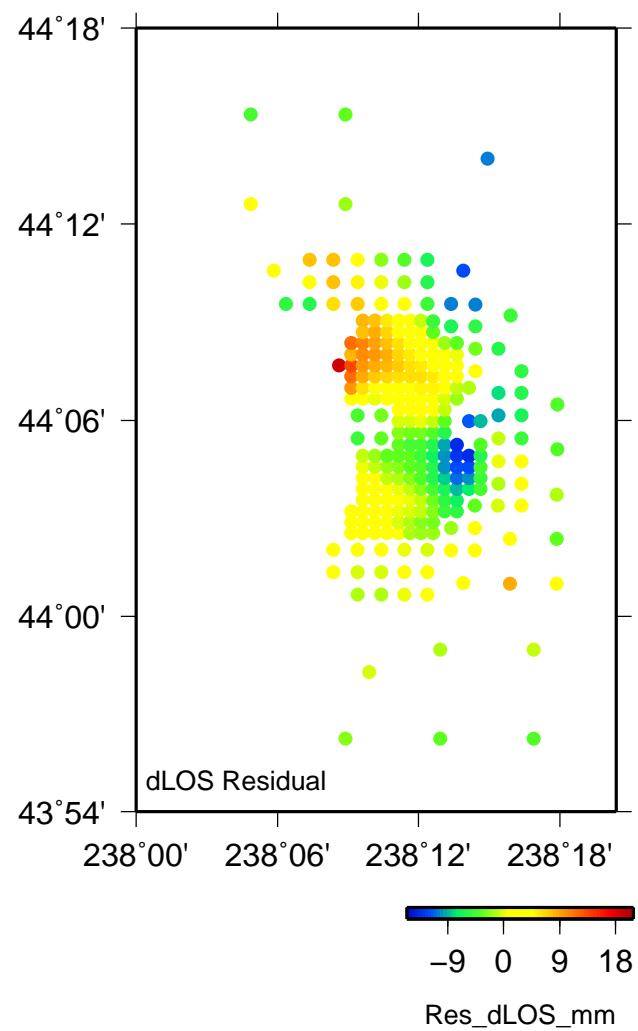
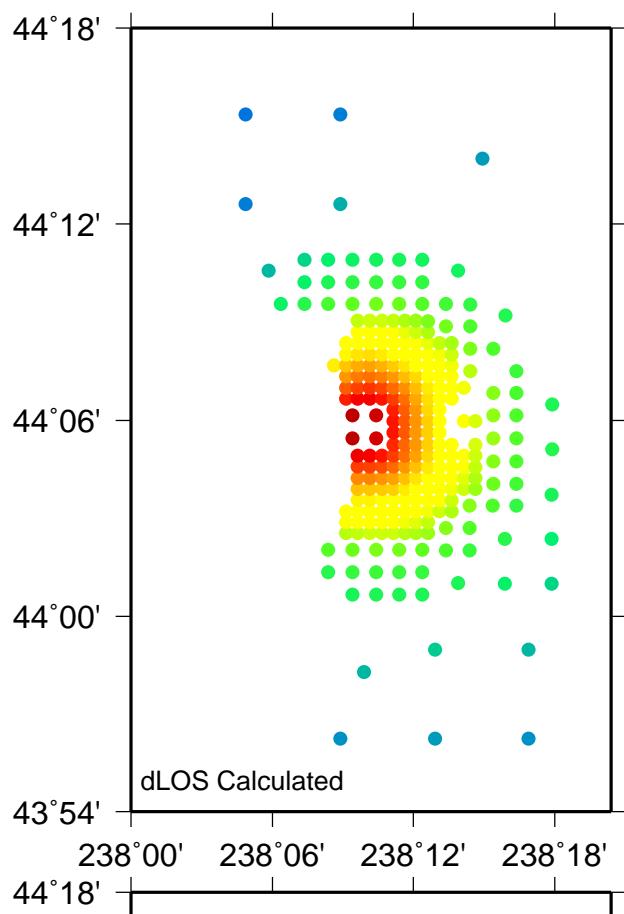




Name: ED13 : Time 1995.728 – 1998.701

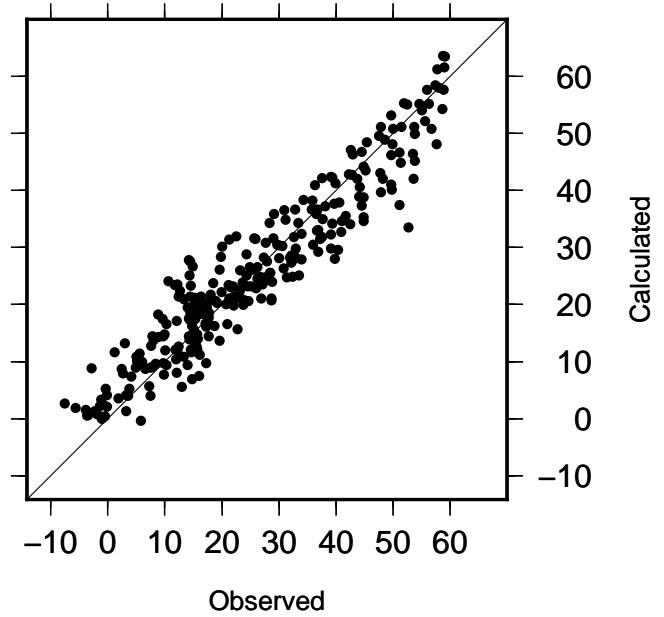
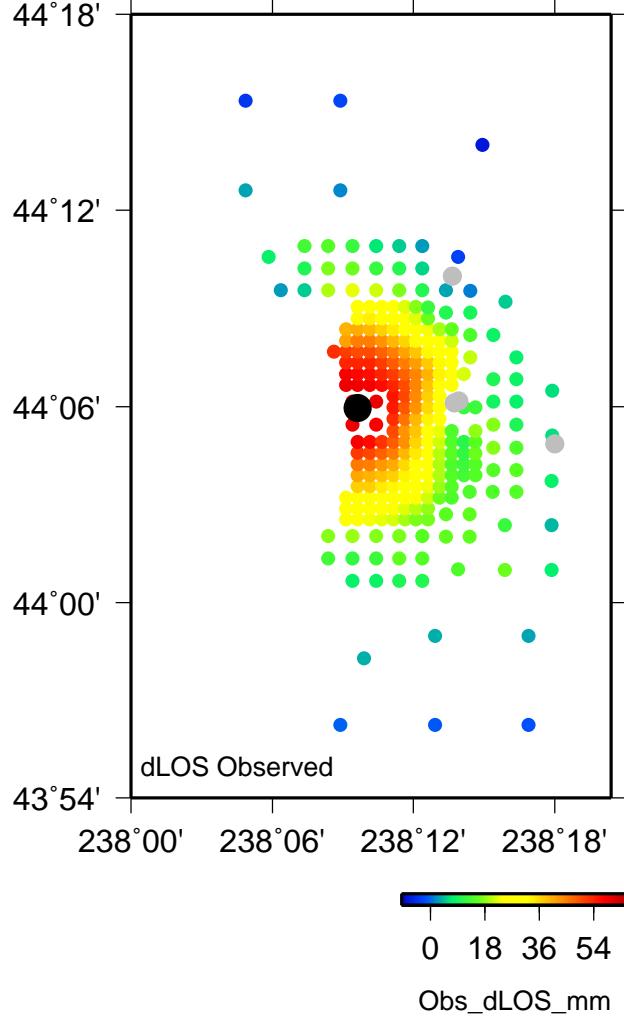
Model: sis1 N: 414 Nrms: 0.659 Wrms: 1.488  
H: -167.300 I: 20.500 Offset: 0.187

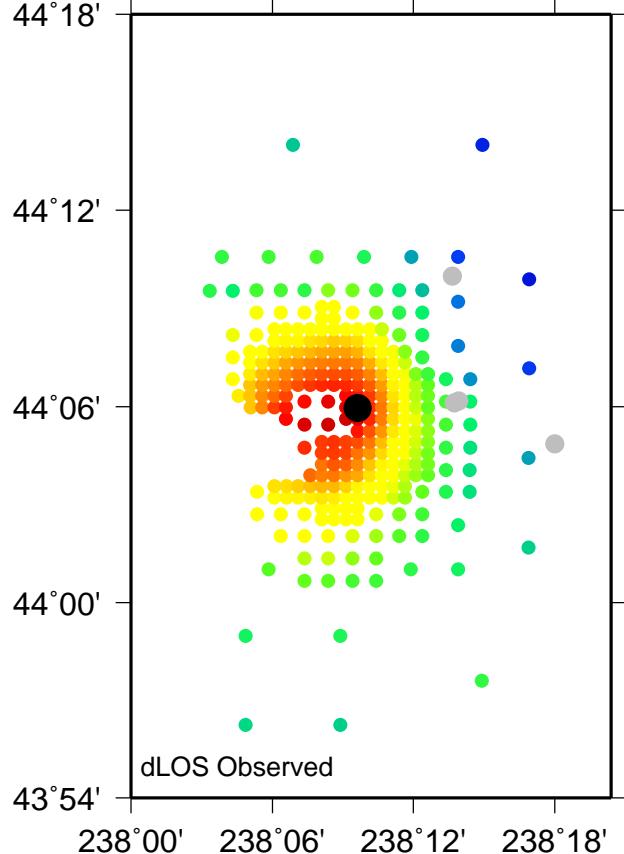
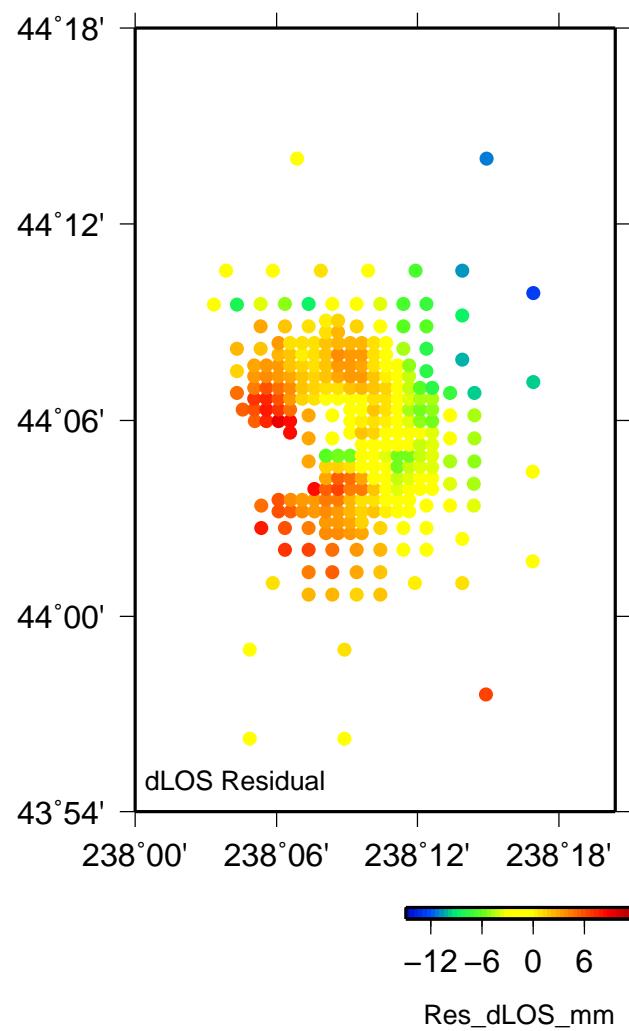
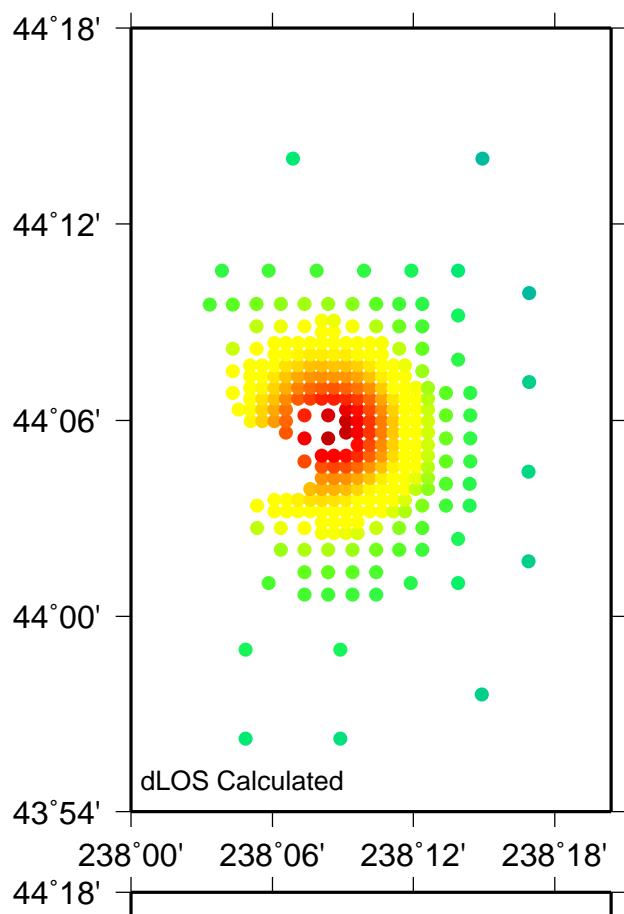




Name: ED14 : Time 1995.728 – 1999.756

Model: sis1 N: 274 Nrms: 0.151 Wrms: 0.466  
H: -167.300 I: 20.500 Offset: -0.997

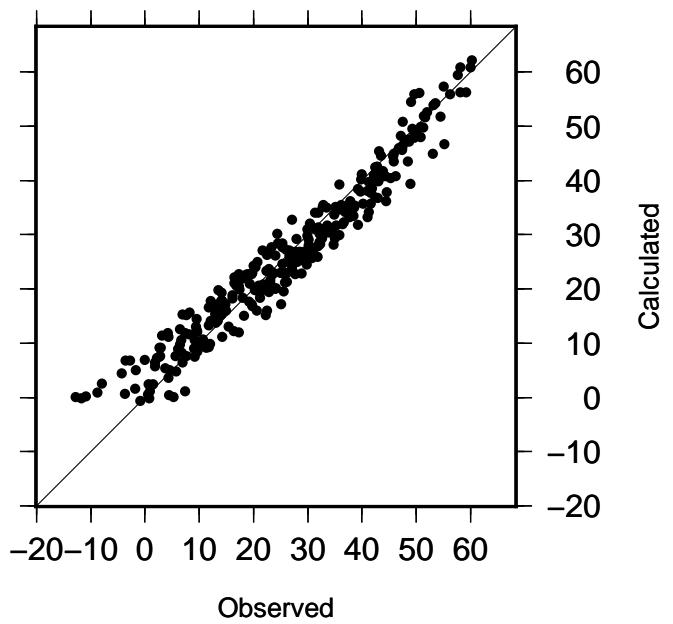


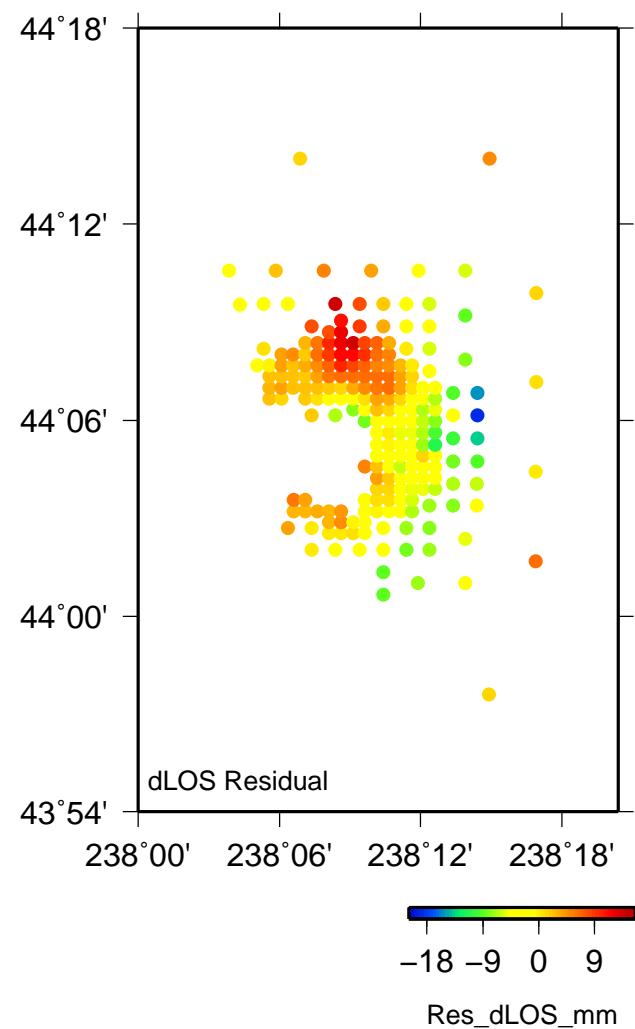
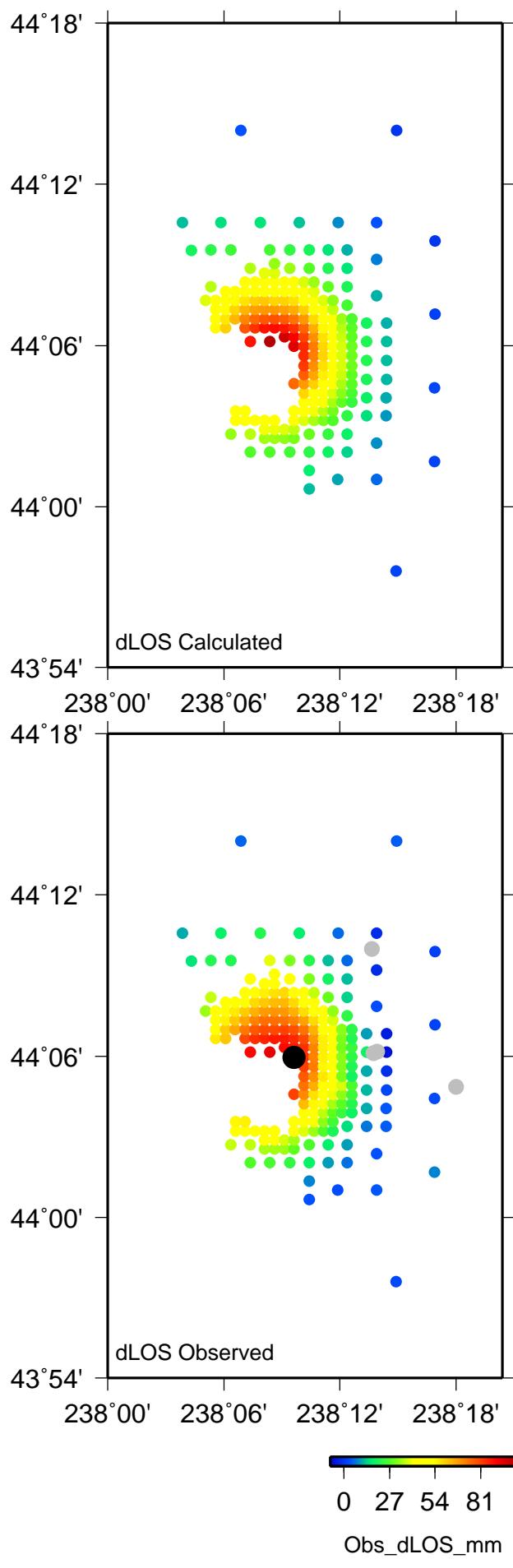


0 19 38 57  
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Name: EA15 : Time 1995.738 – 1999.669

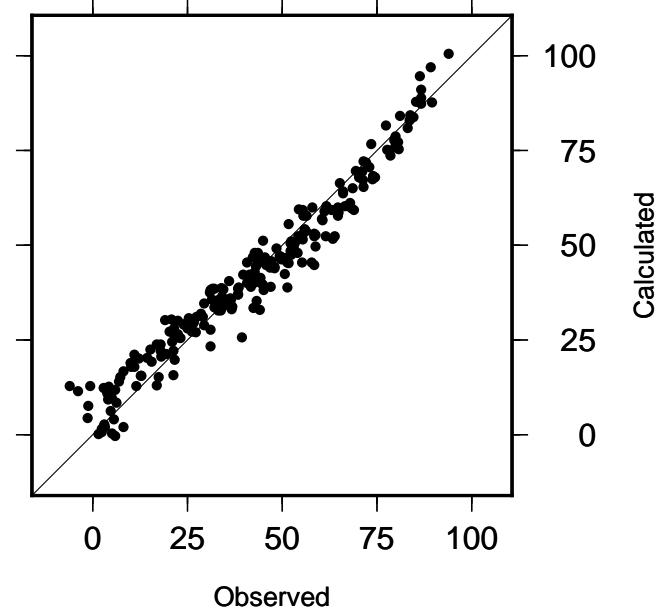
Model: sis1 N: 292 Nrms: 0.004 Wrms: 0.015  
H: -11.900 I: 26.700 Offset: 0.513

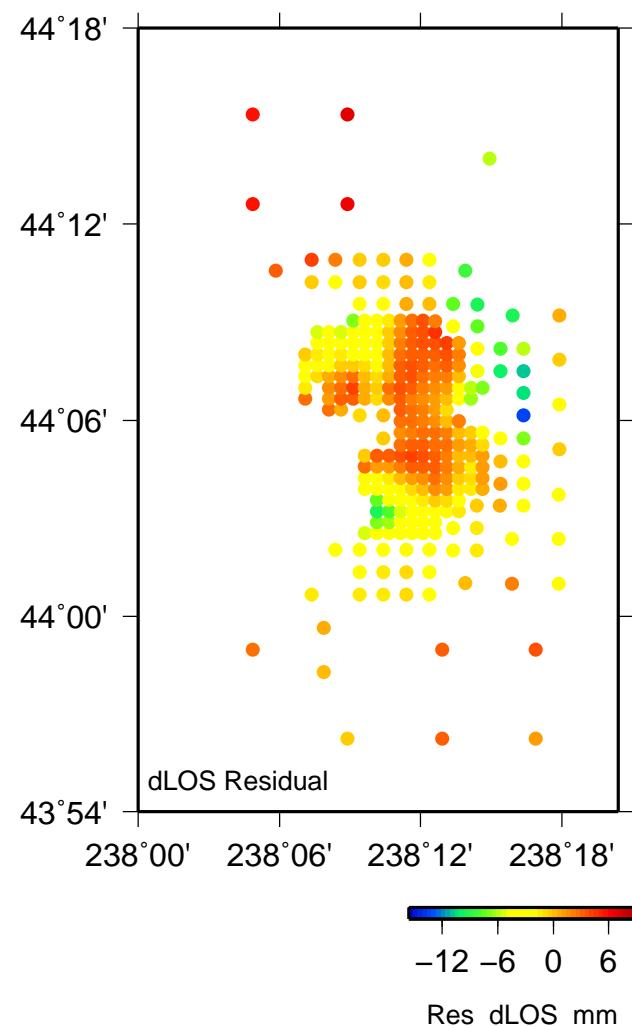
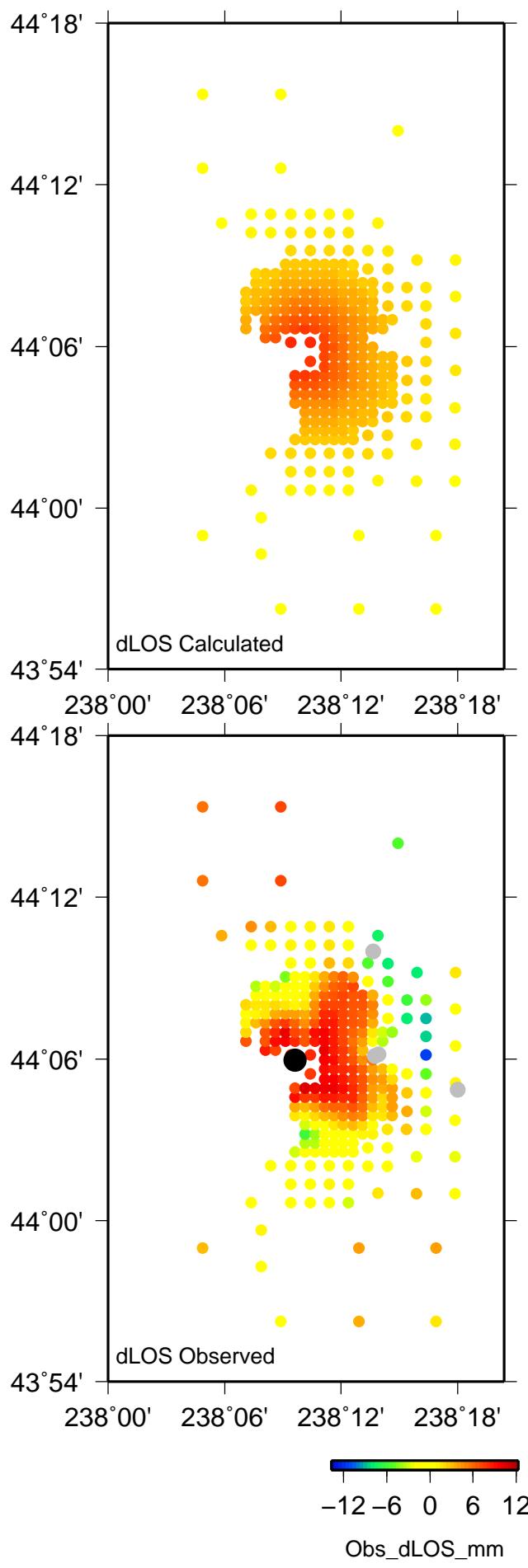




Name: EA16 : Time 1995.740 – 2000.626

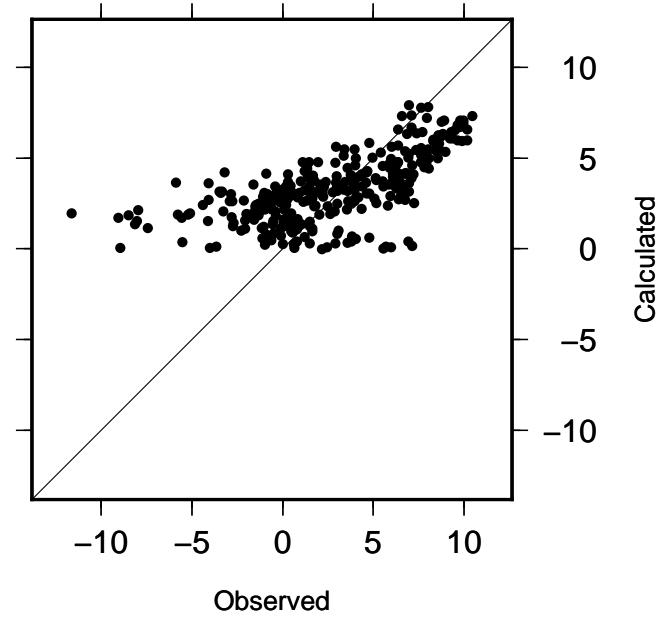
Model: sis1 N: 219 Nrms: 0.134 Wrms: 1.433  
H: -11.900 I: 26.700 Offset: 3.694

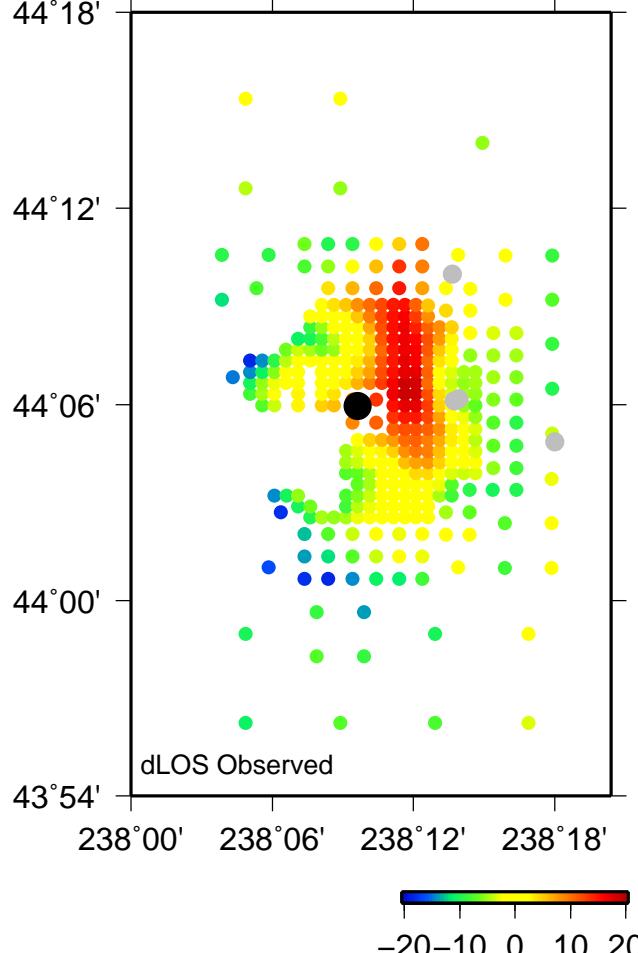
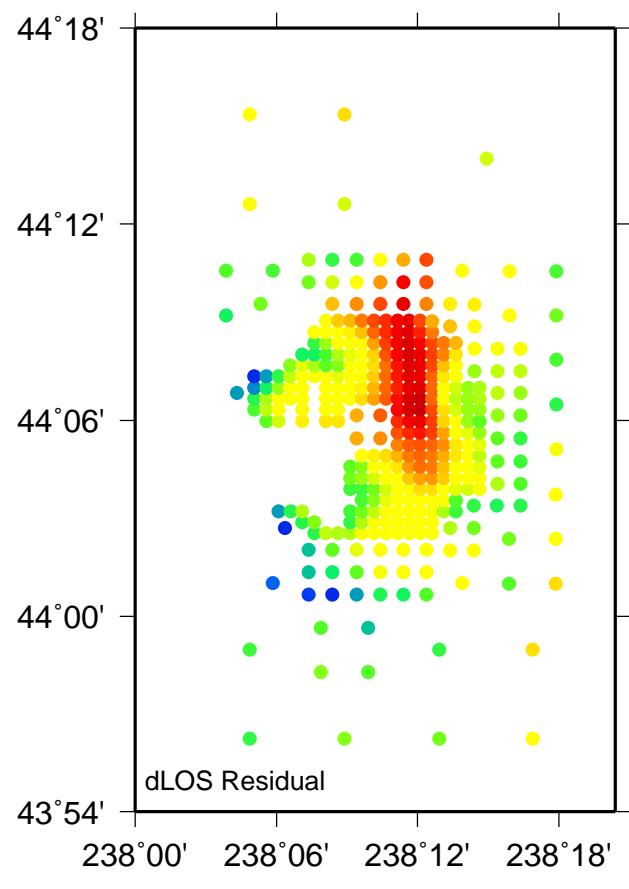
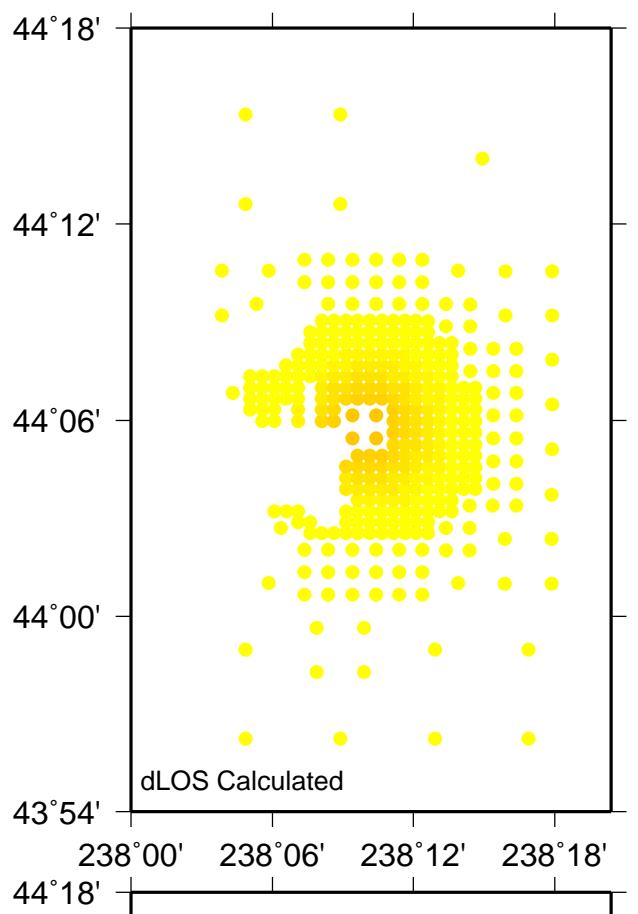




Name: ED17 : Time 1995.868 – 1997.690

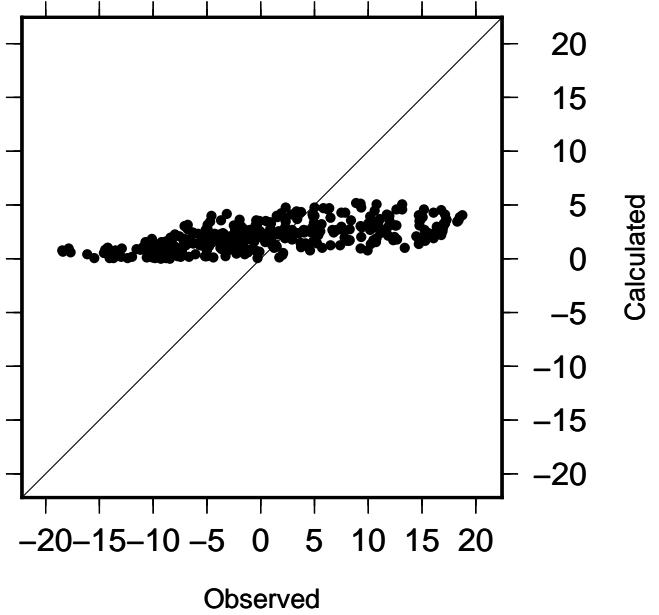
Model: sis1 N: 301 Nrms: 0.217 Wrms: 0.559  
H: -167.800 I: 24.500 Offset: 0.853

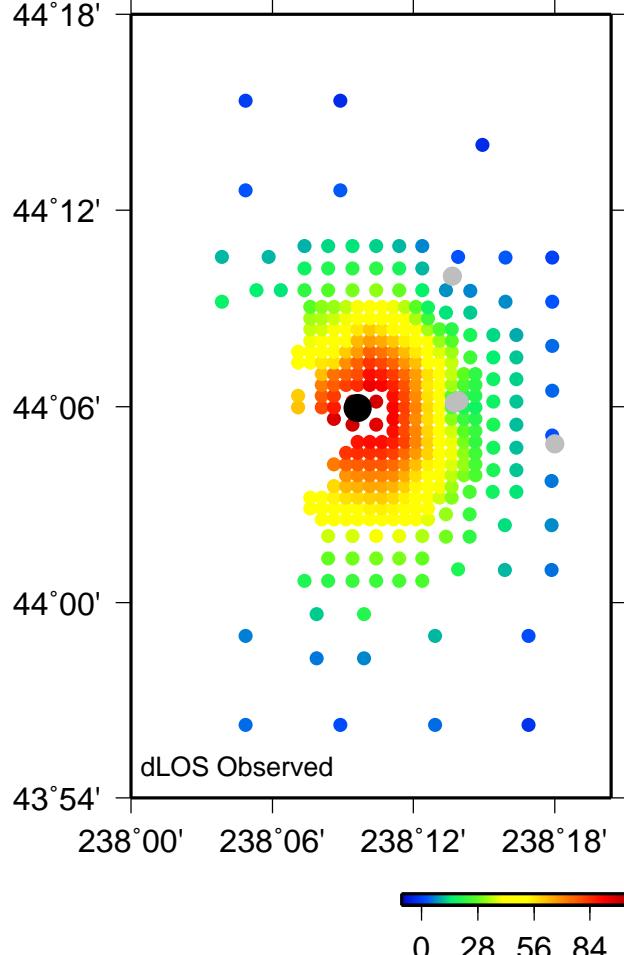
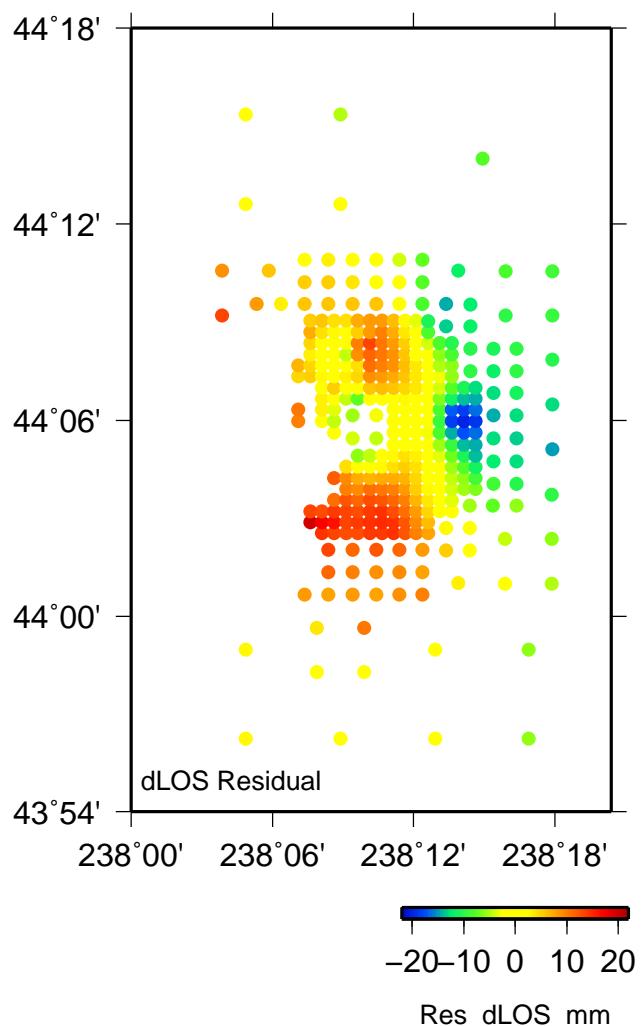
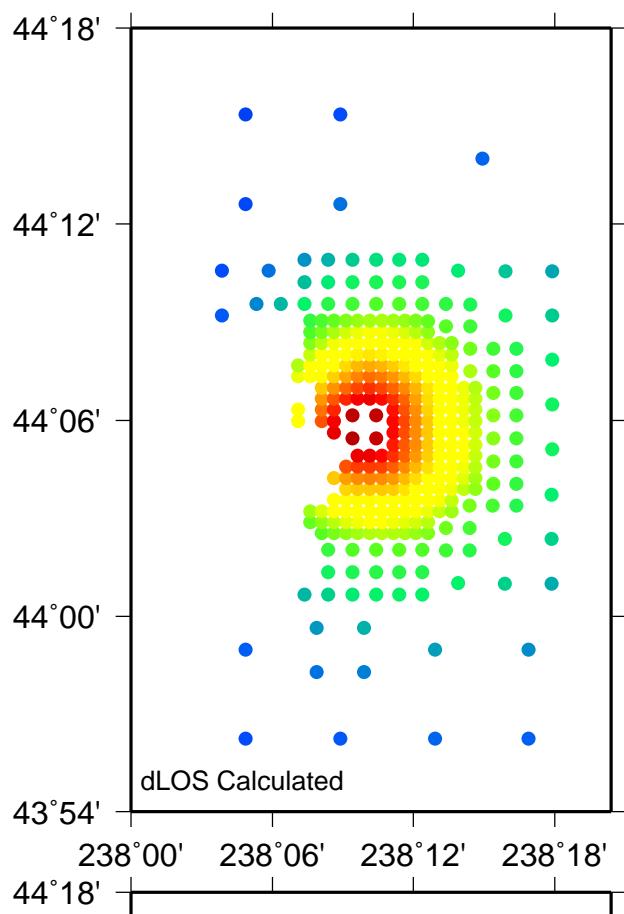




Name: ED18 : Time 1996.636 – 1997.594

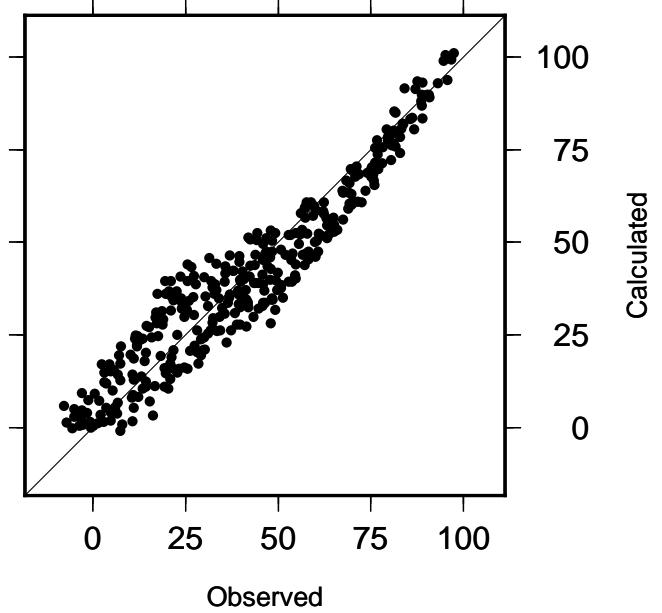
Model: sis1 N: 371 Nrms: 1.287 Wrms: 3.422  
H: -167.800 I: 24.500 Offset: -11.661

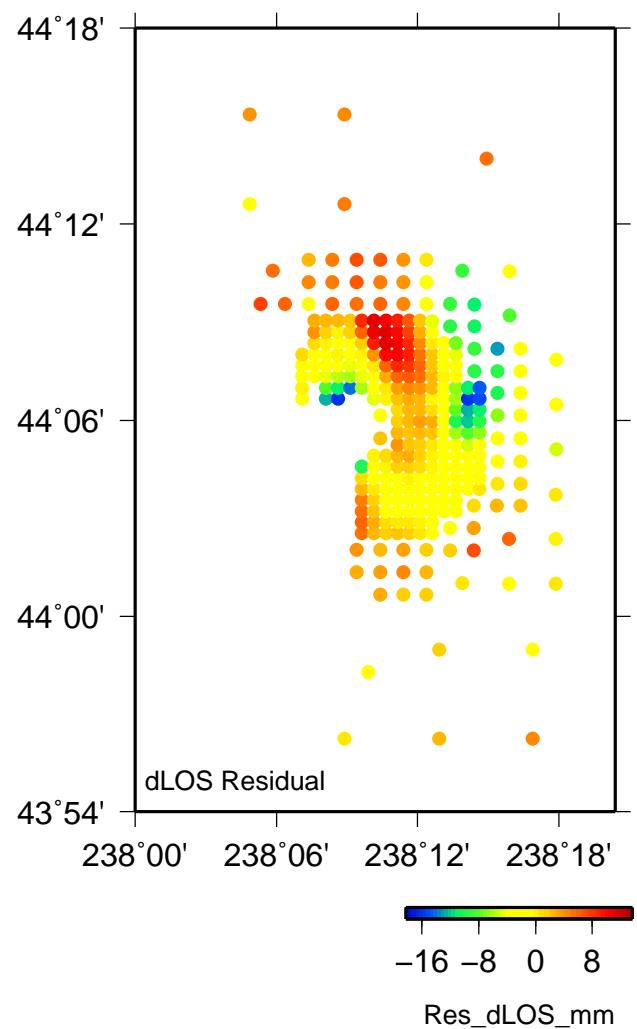
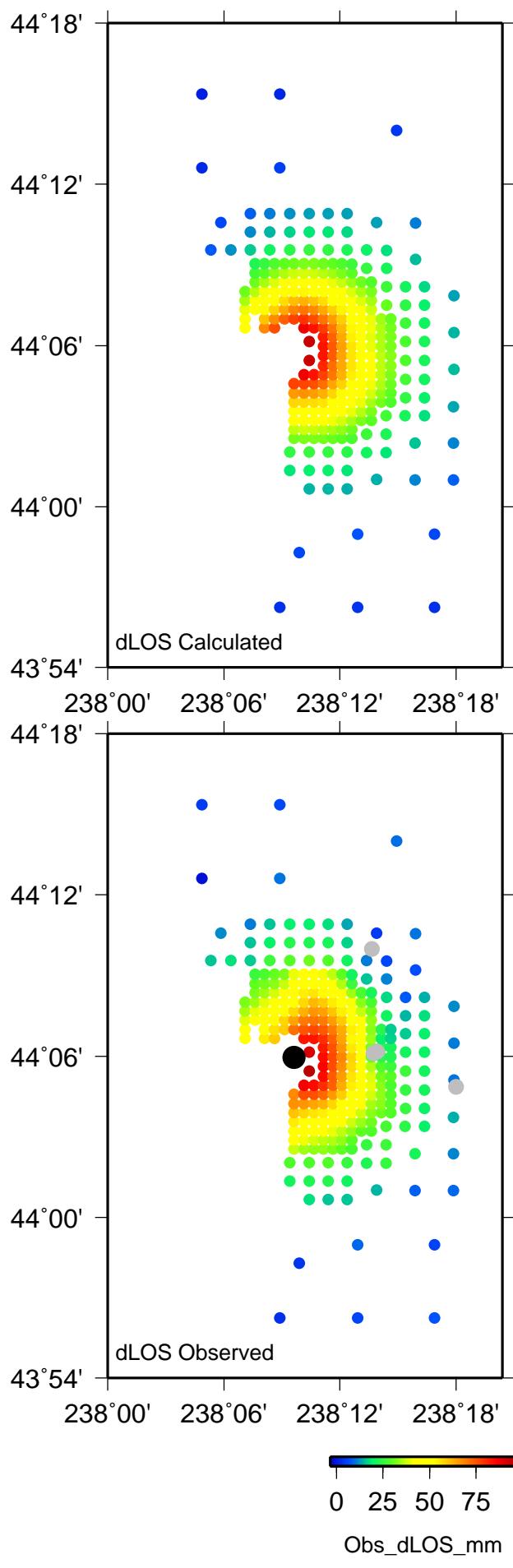




Name: ED19 : Time 1996.637 – 2000.757

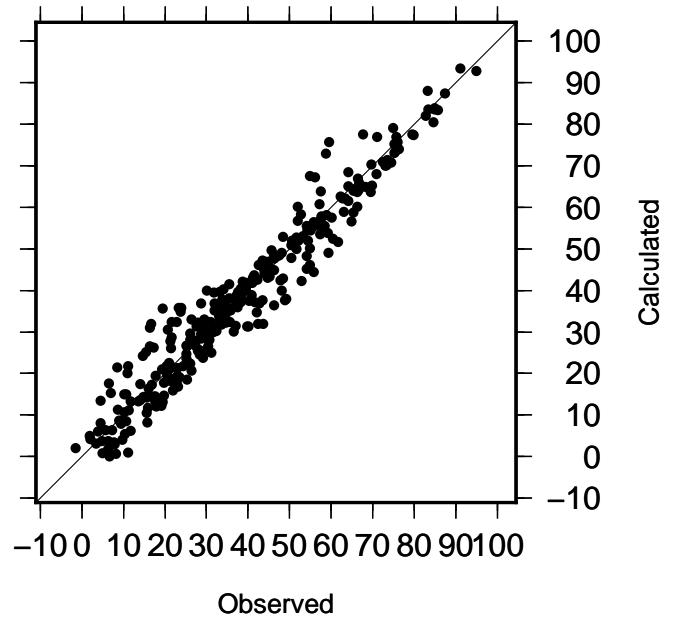
Model: sis1 N: 353 Nrms: 0.925 Wrms: 7.880  
H: -167.800 I: 24.500 Offset: -2.175

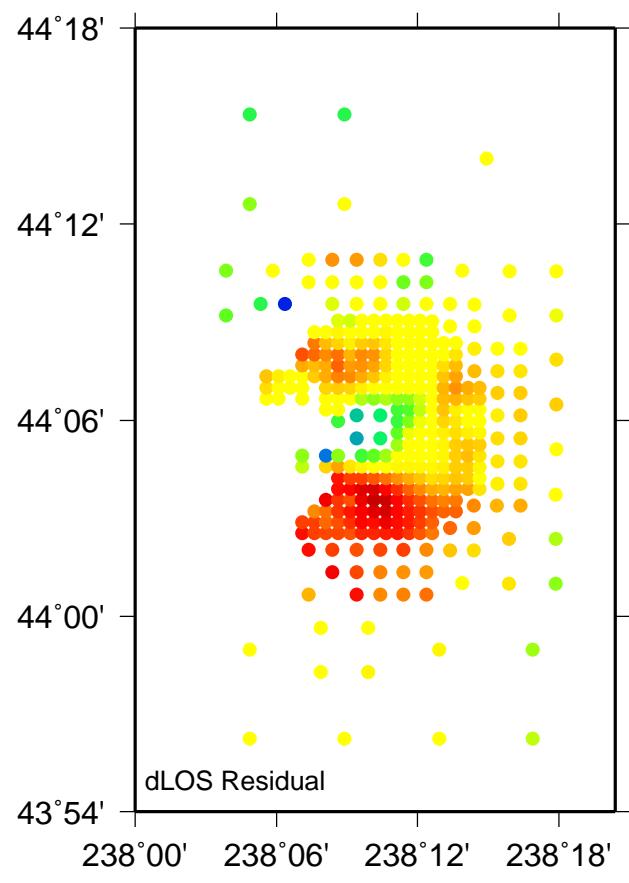
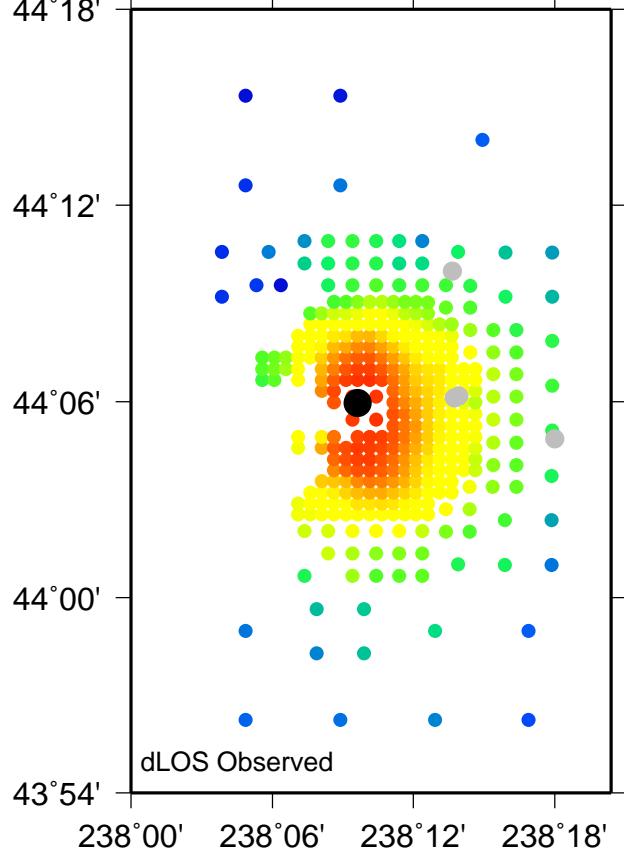
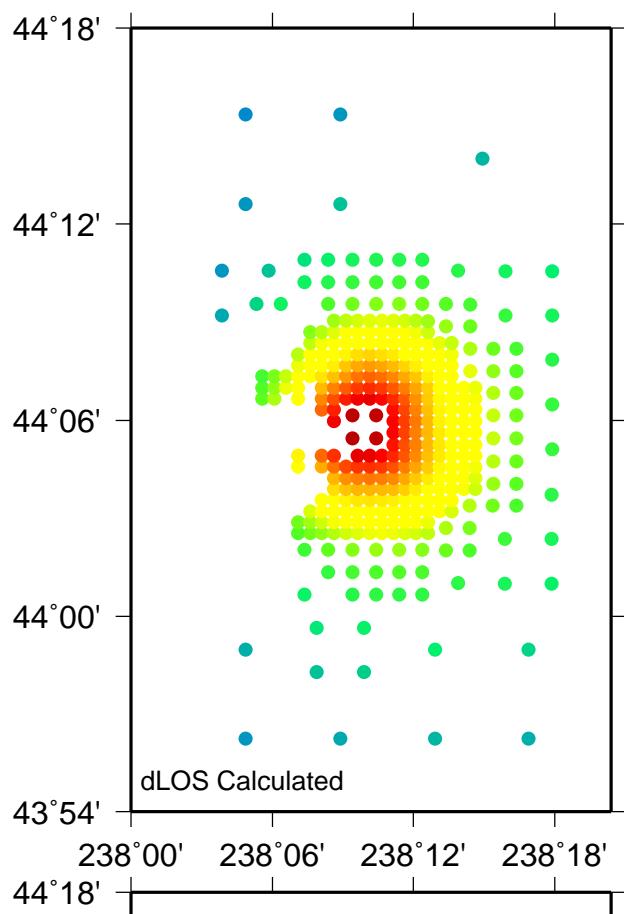




Name: ED20 : Time 1997.646 – 2000.713

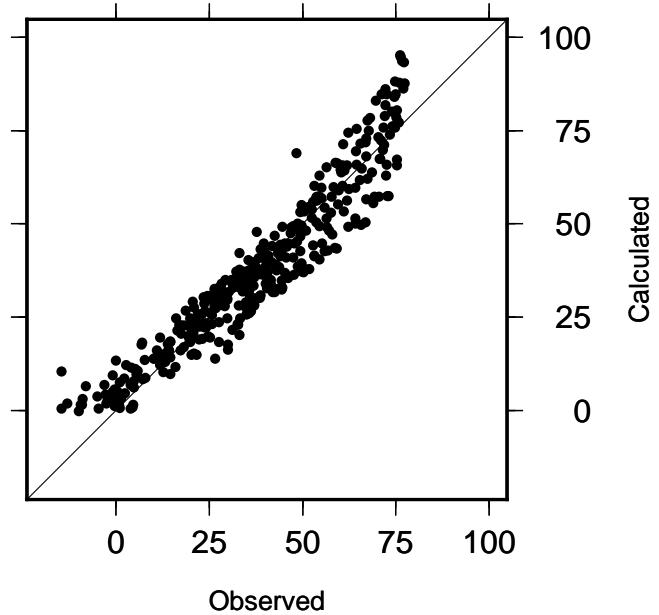
Model: sis1 N: 305 Nrms: 0.841 Wrms: 3.347  
H: -167.300 I: 20.500 Offset: 6.762

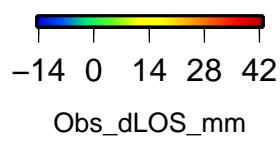
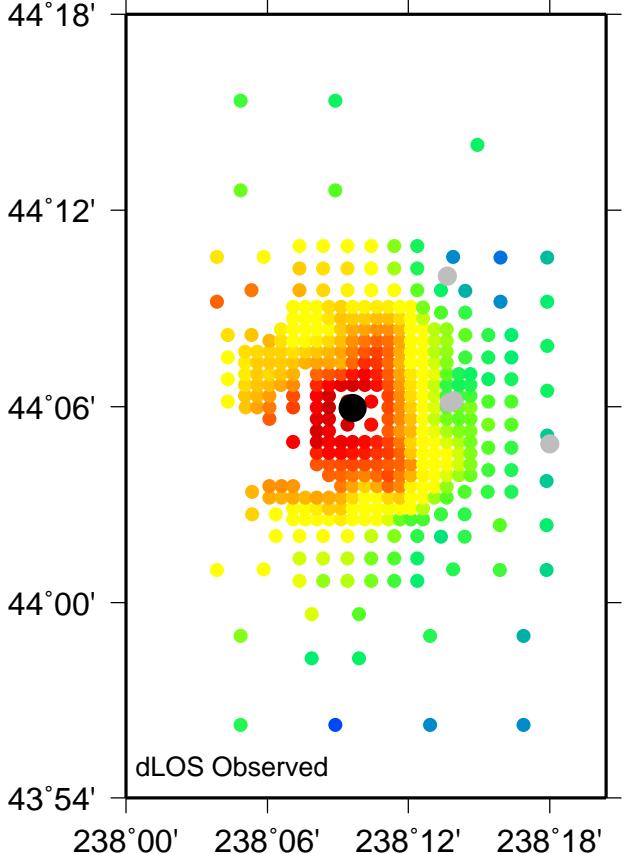
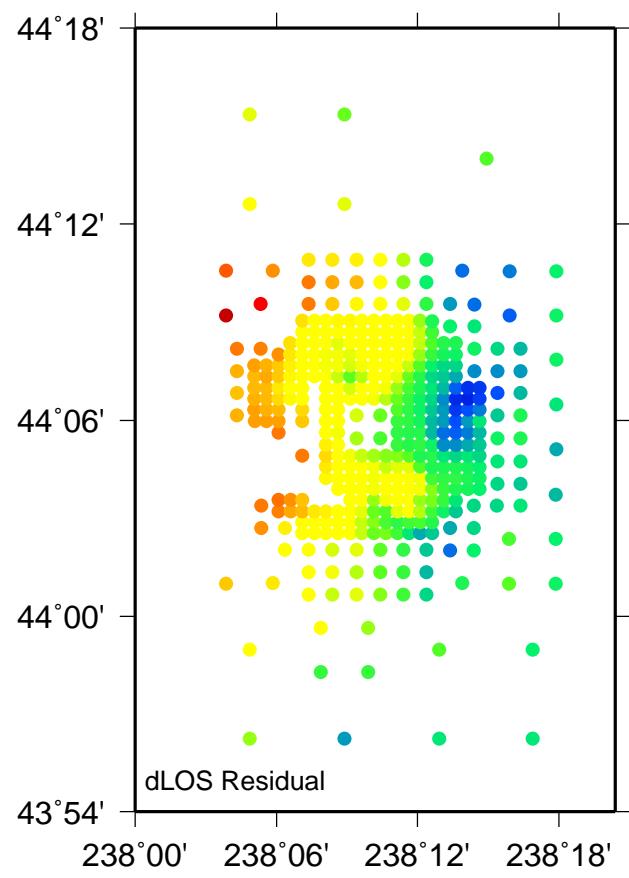
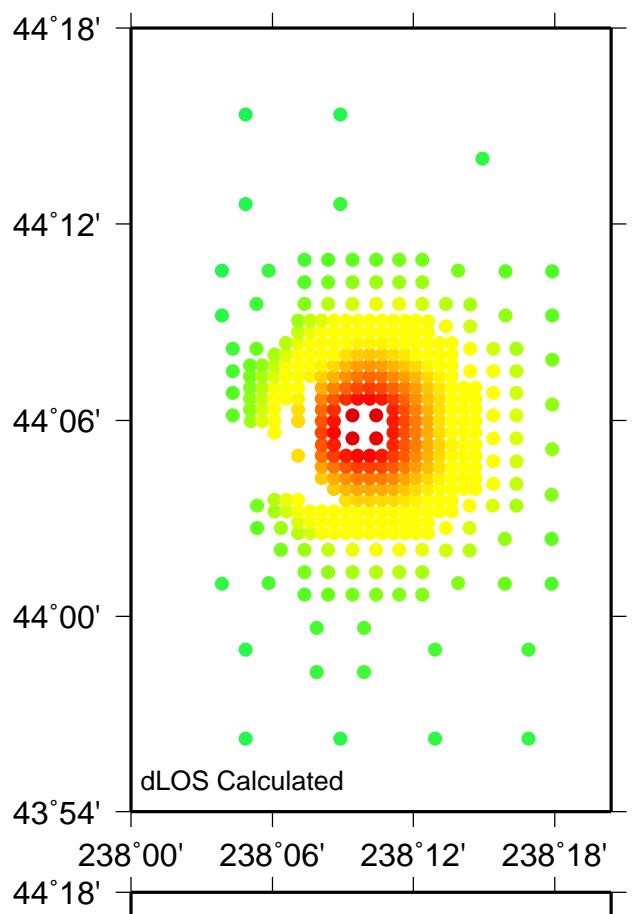




Name: ED21 : Time 1997.679 – 2000.756

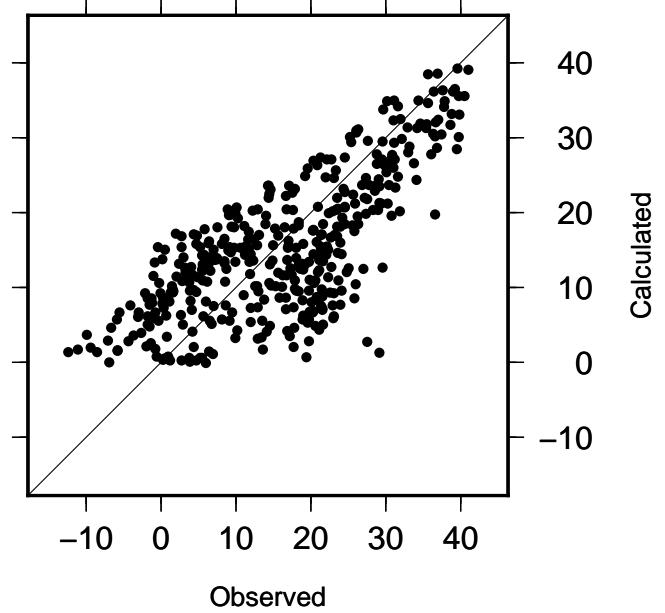
Model: sis1 N: 366 Nrms: 0.343 Wrms: 2.694  
H: -167.800 I: 24.500 Offset: 3.659

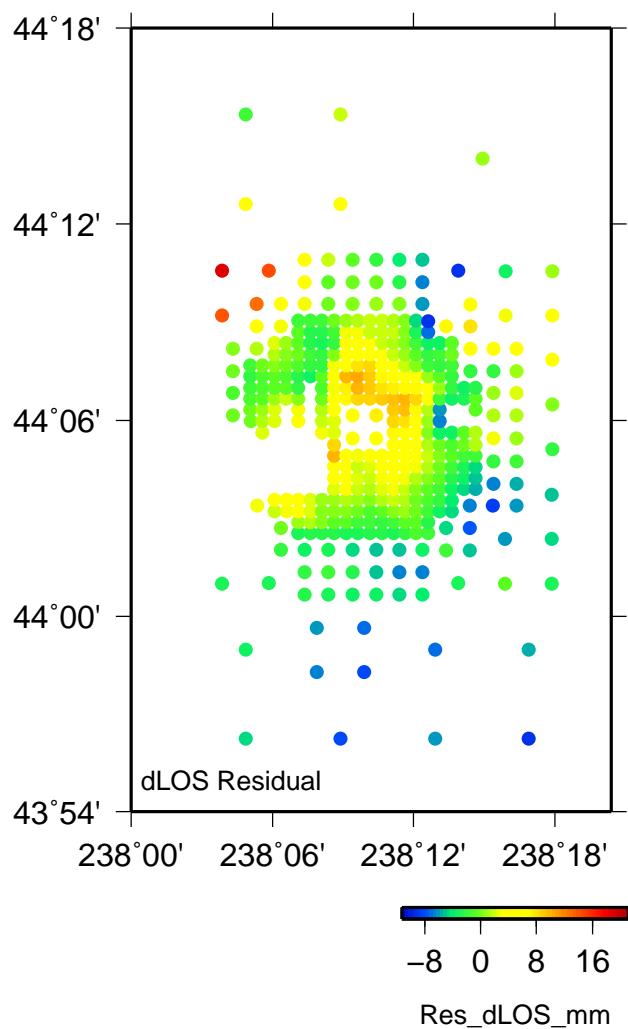
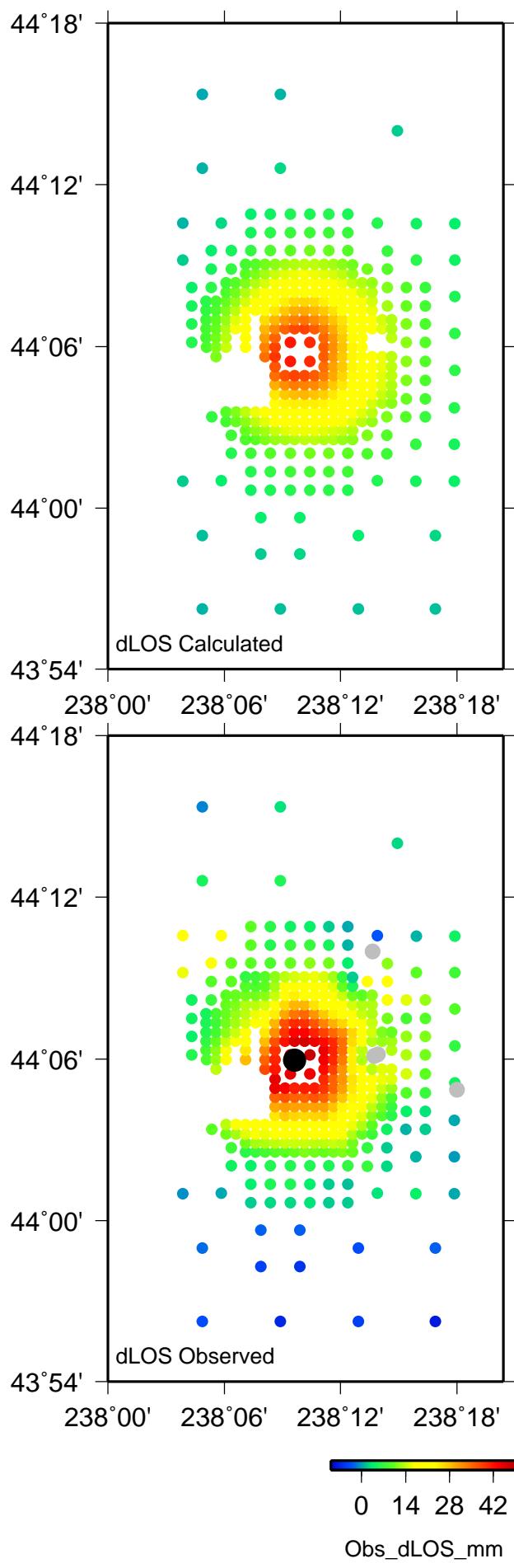




Name: ED22 : Time 1998.553 – 1999.704

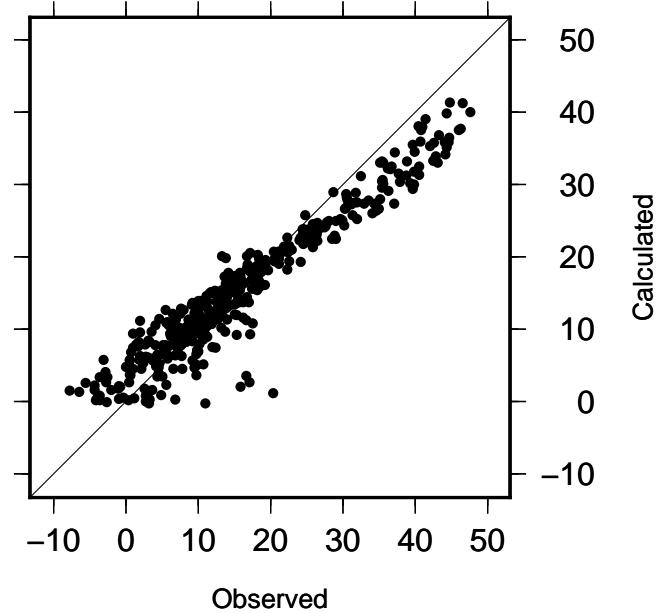
Model: sis1 N: 416 Nrms: 0.665 Wrms: 1.822  
H: -167.800 I: 24.500 Offset: 1.865

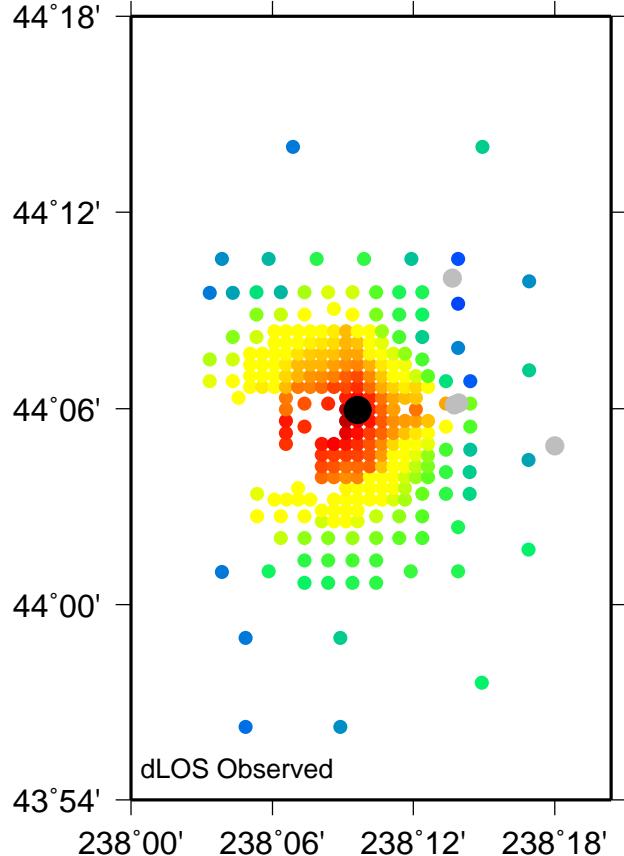
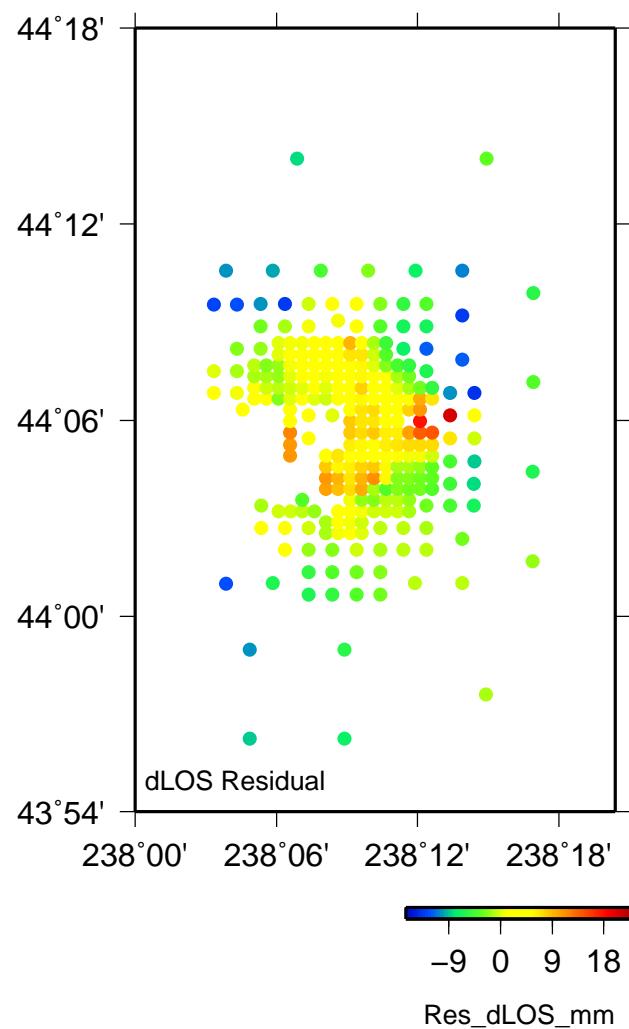
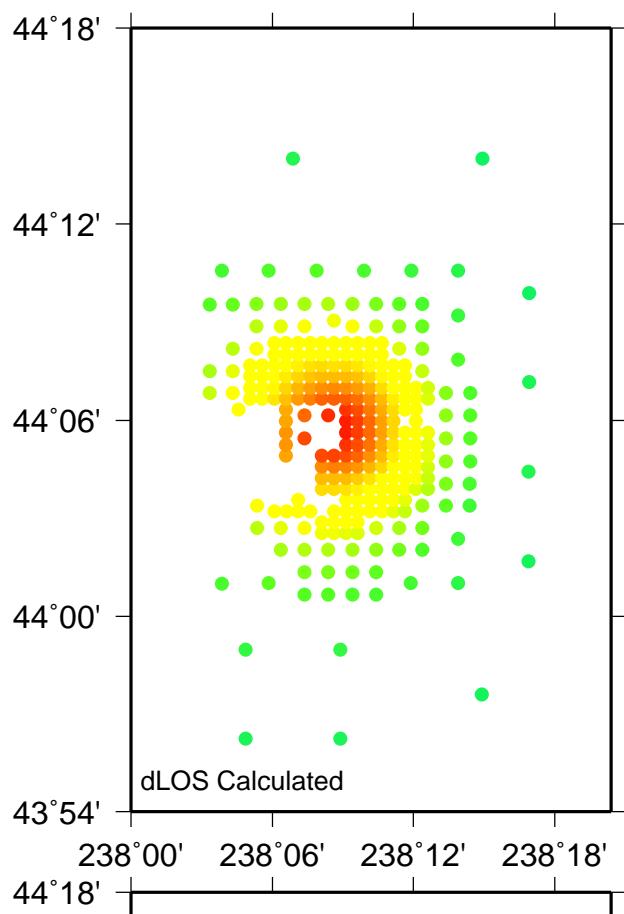




Name: ED23 : Time 1998.605 – 1999.756

Model: sis1 N: 413 Nrms: 0.416 Wrms: 1.107  
H: -167.300 I: 20.500 Offset: 0.083

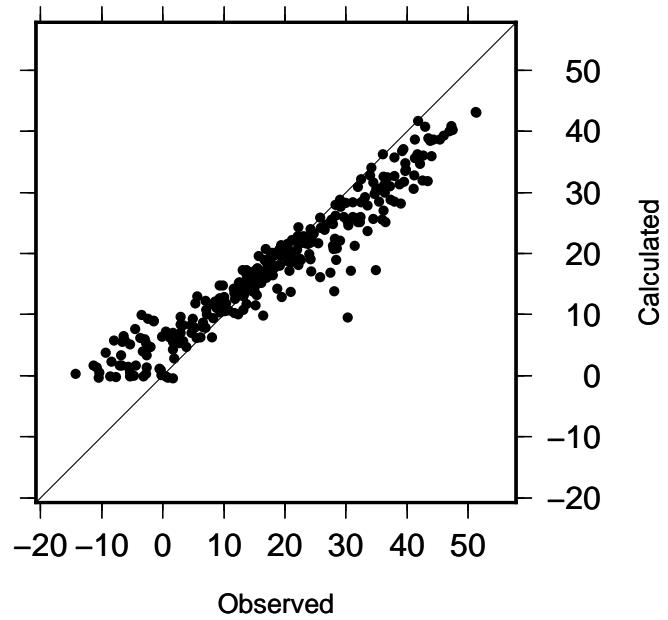


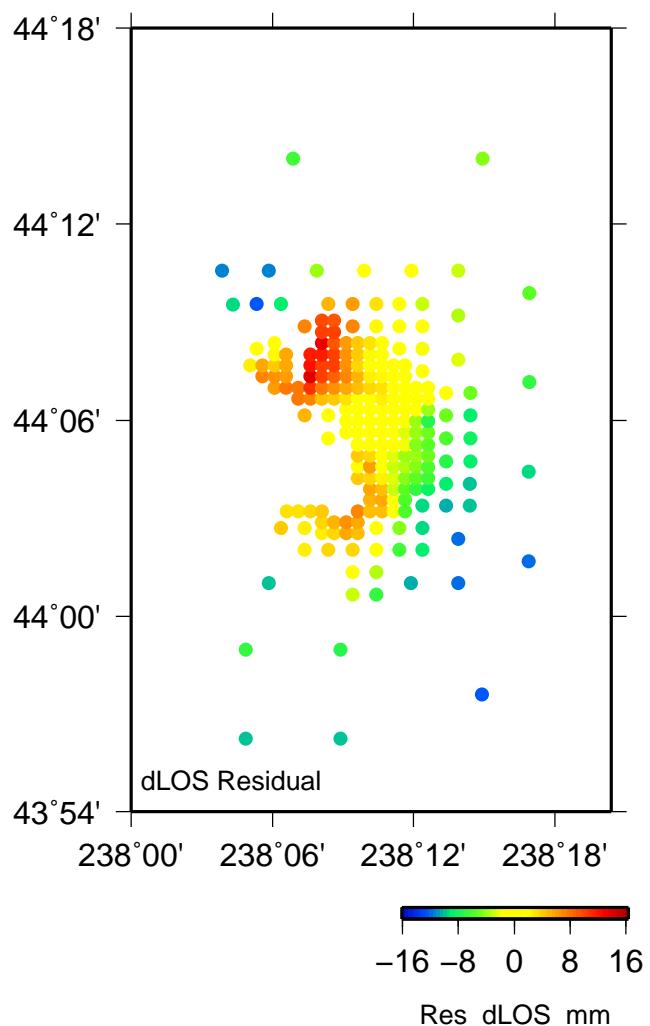
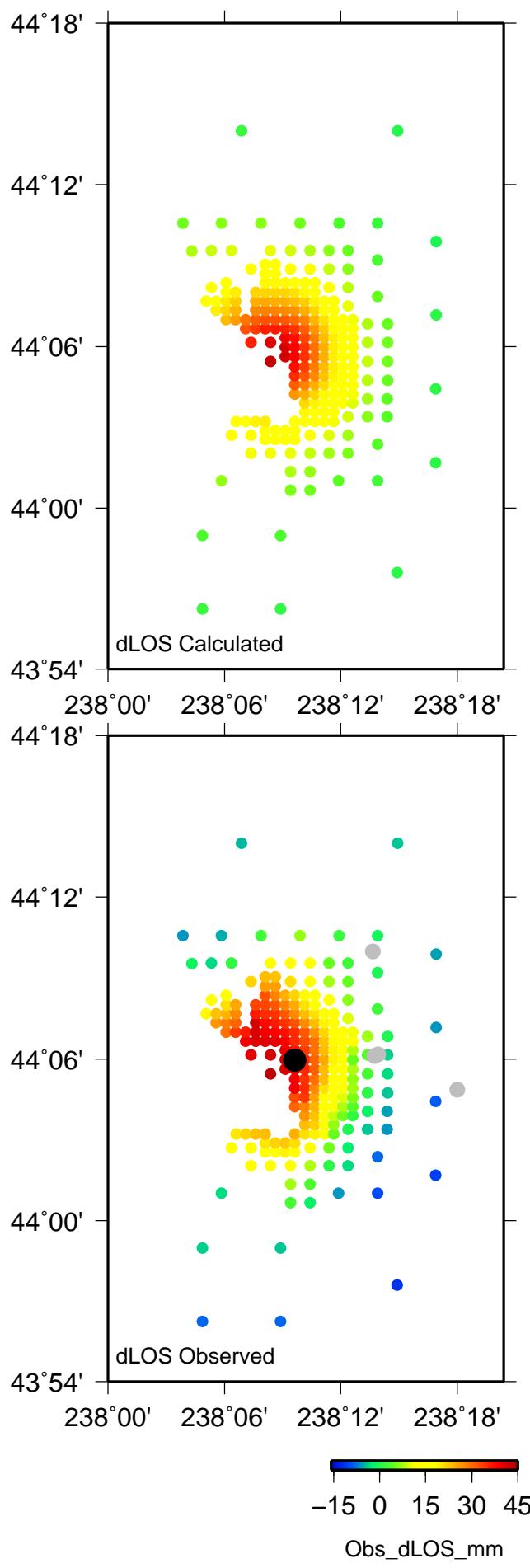


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0 17 34 51

Name: EA24 : Time 1999.617 – 2000.574

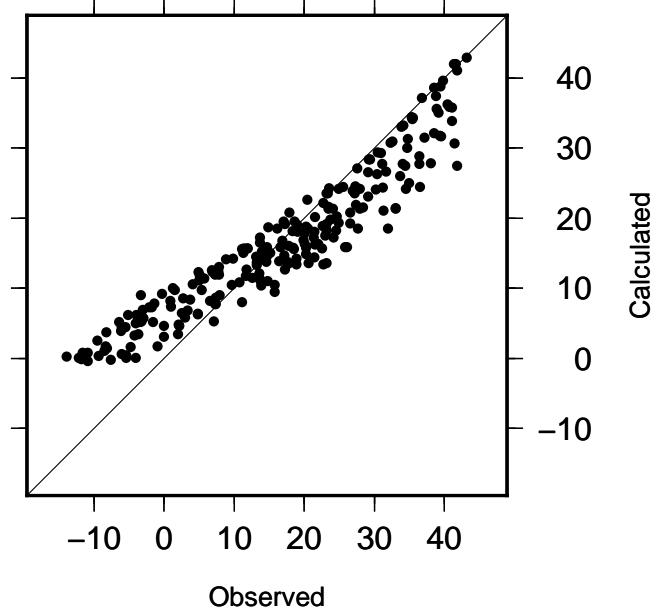
Model: sis1 N: 284 Nrms: 1.685 Wrms: 6.262  
H: -12.400 I: 22.800 Offset: -5.928

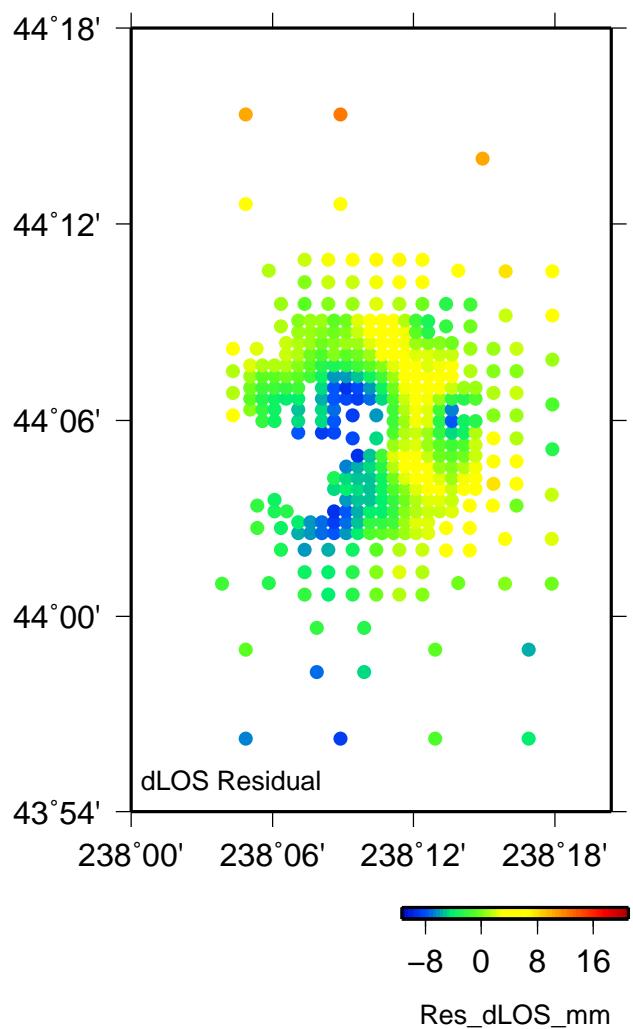
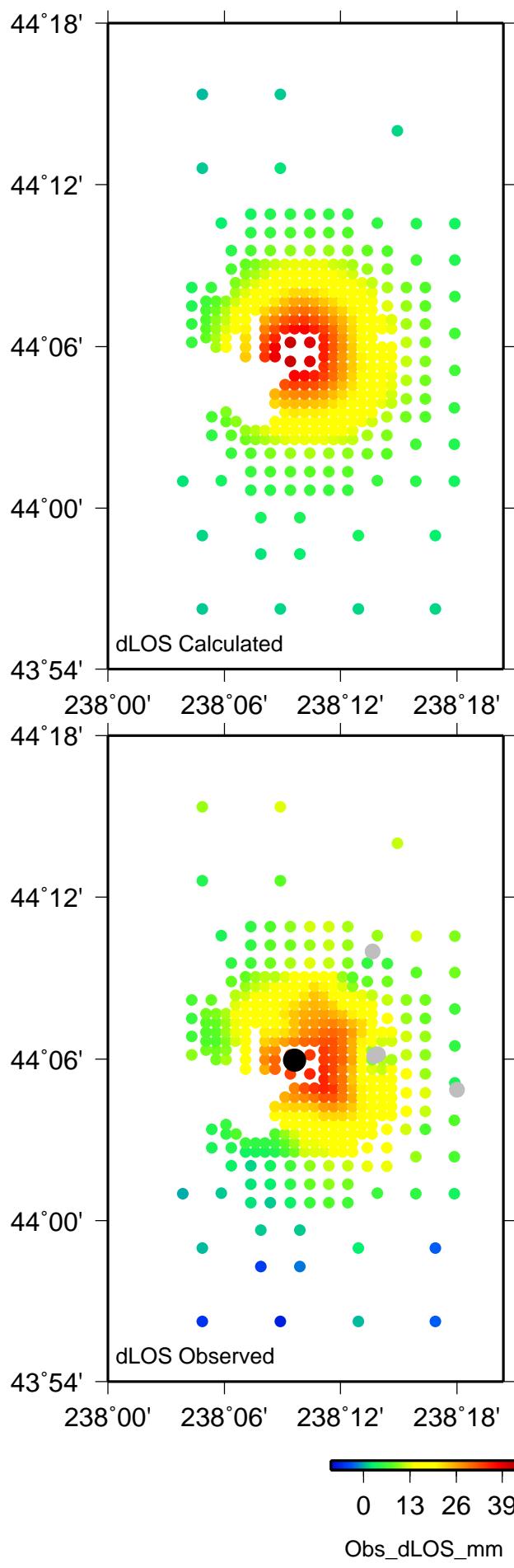




Name: EA25 : Time 1999.669 – 2000.626

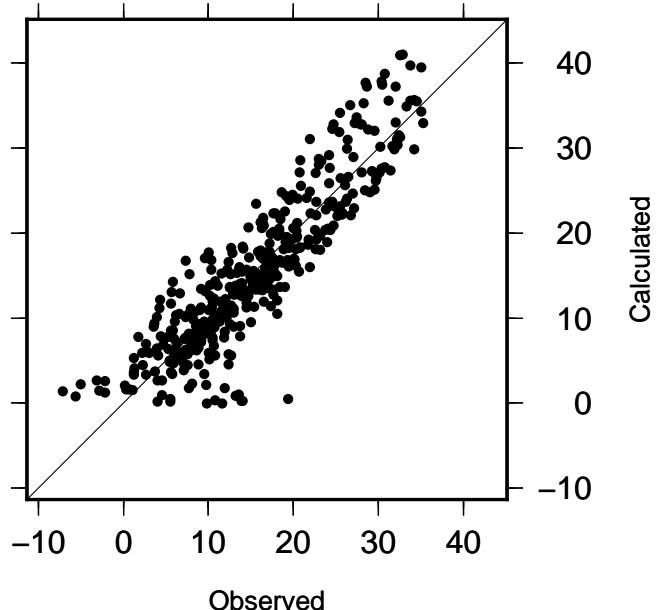
Model: sis1 N: 228 Nrms: 1.243 Wrms: 4.217  
H: -11.900 I: 26.700 Offset: -7.152

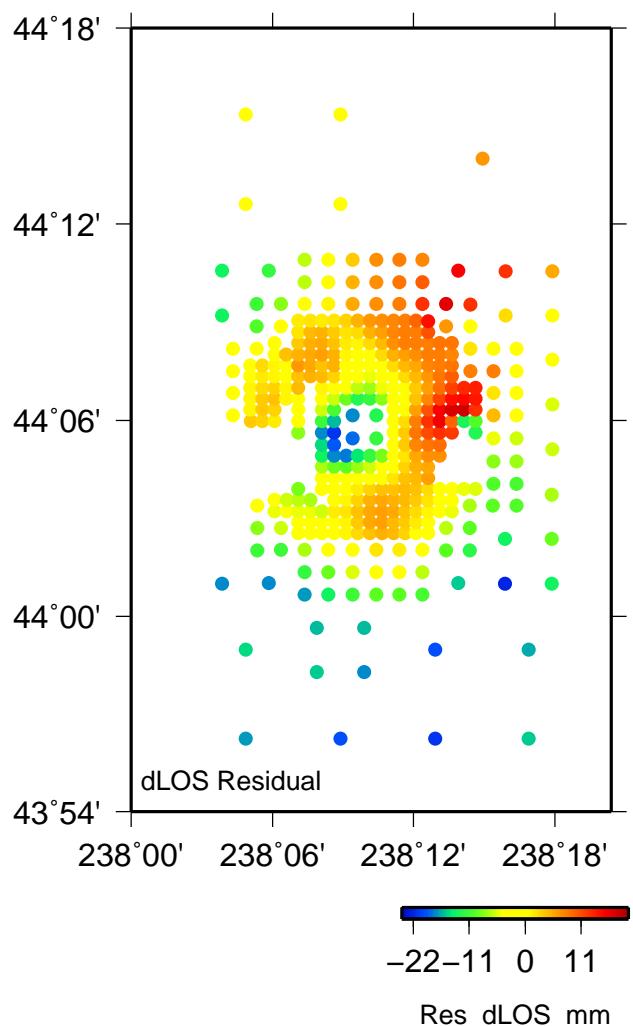
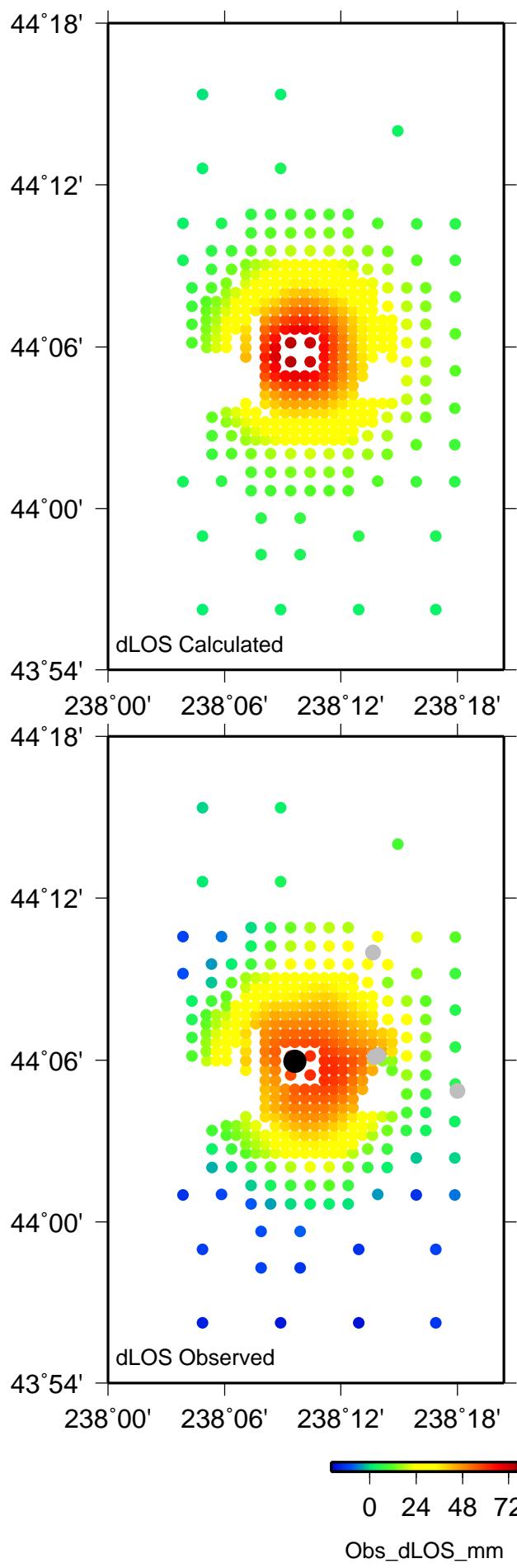




Name: ED26 : Time 1999.756 – 2000.713

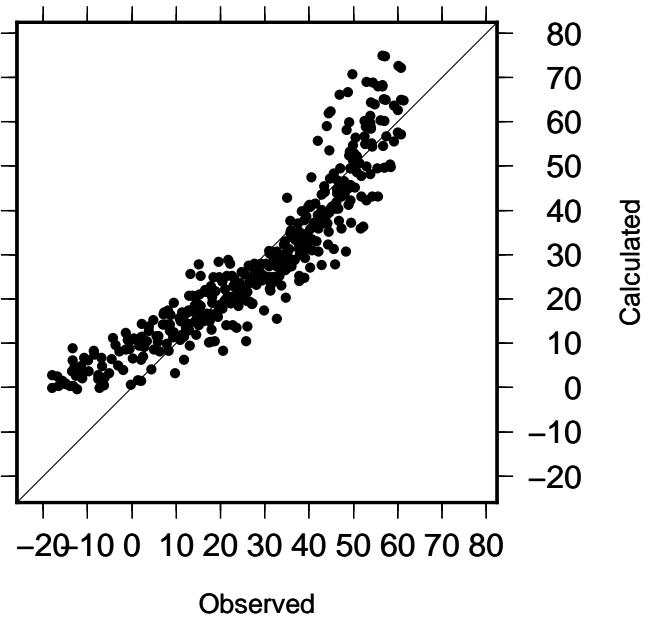
Model: sis1 N: 395 Nrms: 1.127 Wrms: 5.495  
H: -167.300 I: 20.500 Offset: 7.518

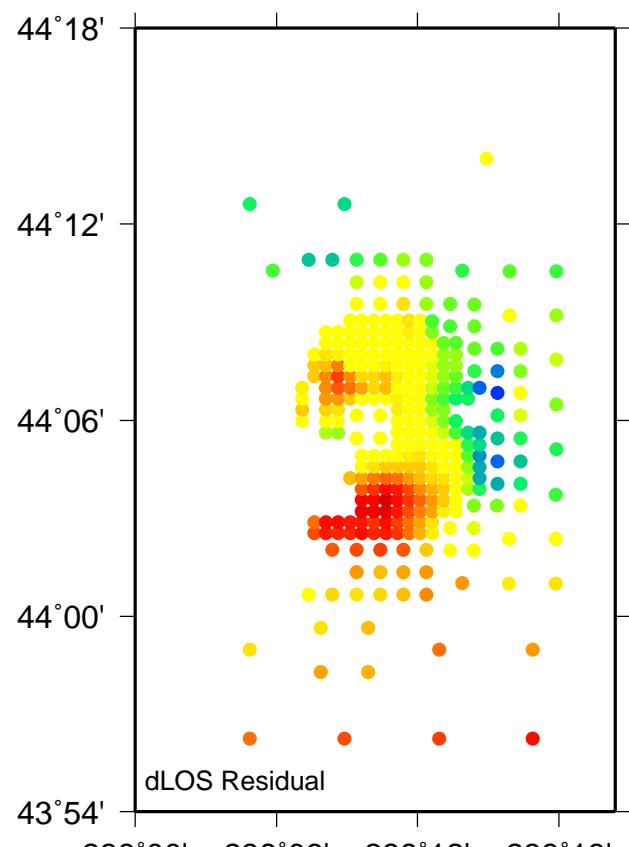
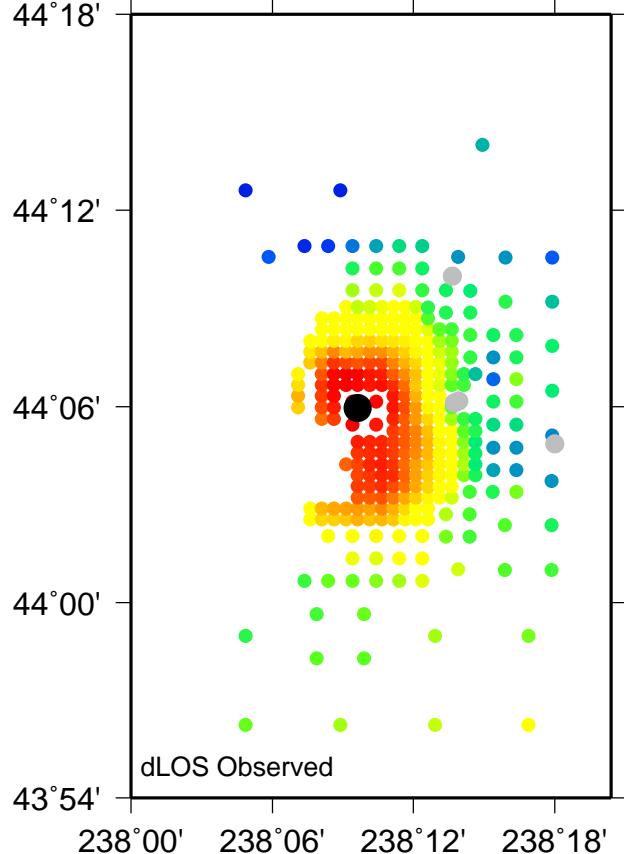
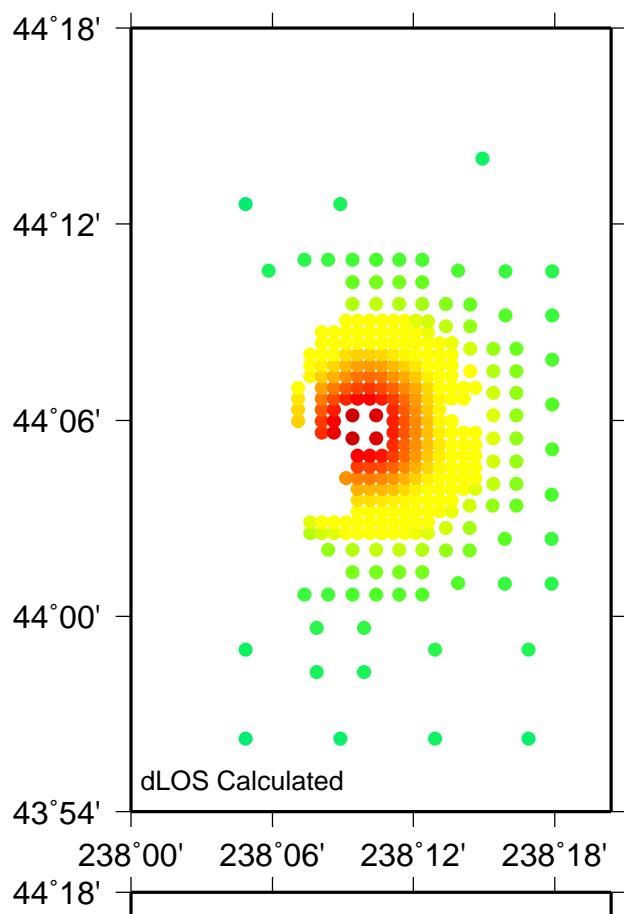




Name: ED27 : Time 1999.756 – 2001.671

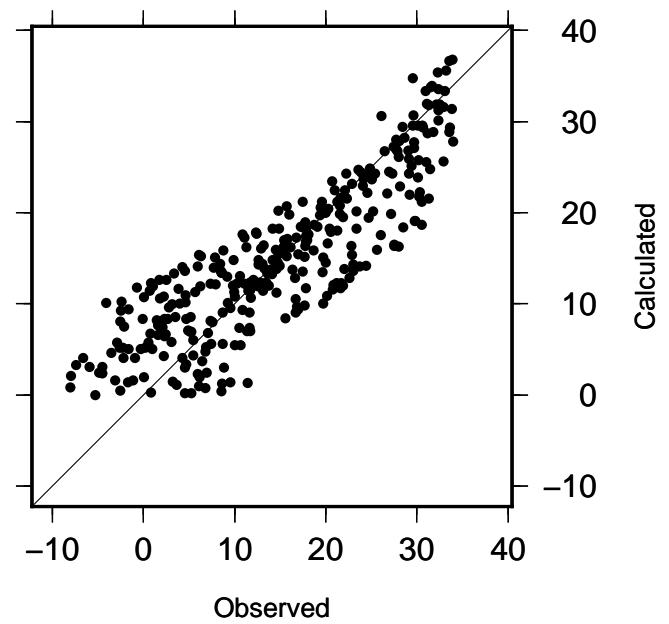
Model: sis1 N: 407 Nrms: 1.030 Wrms: 11.723  
H: -167.300 I: 20.500 Offset: -12.329

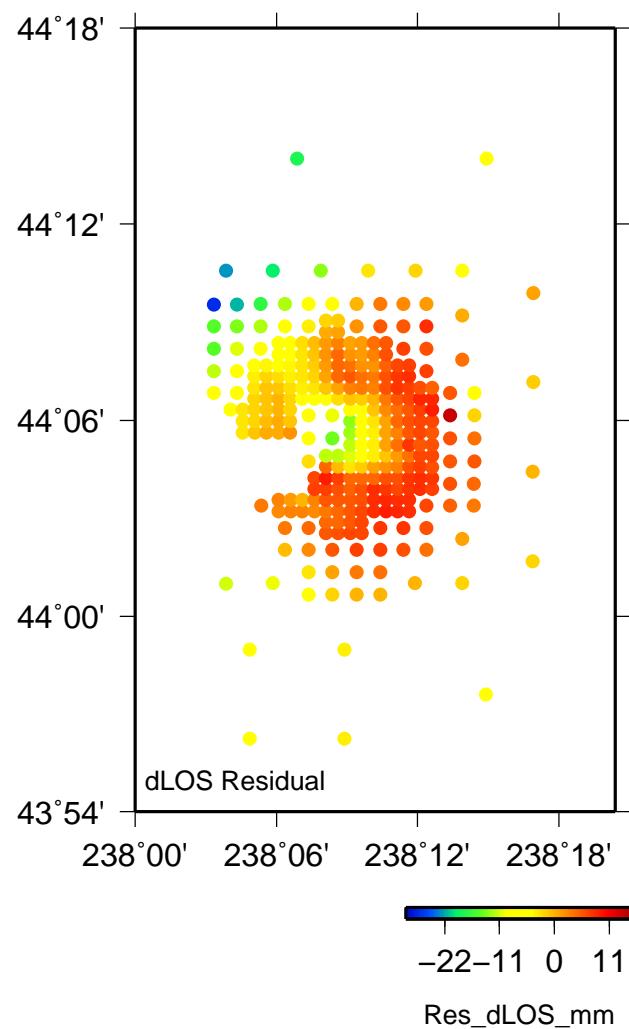
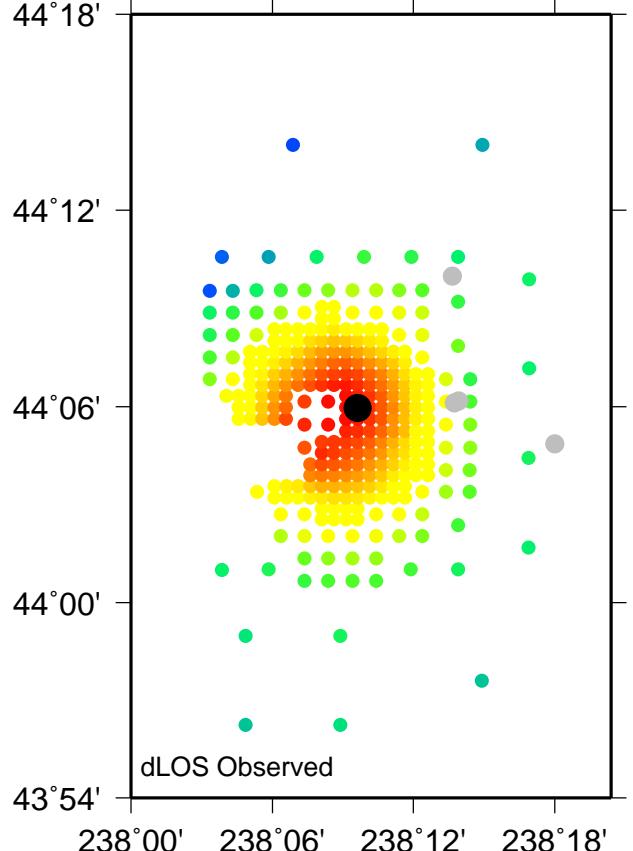
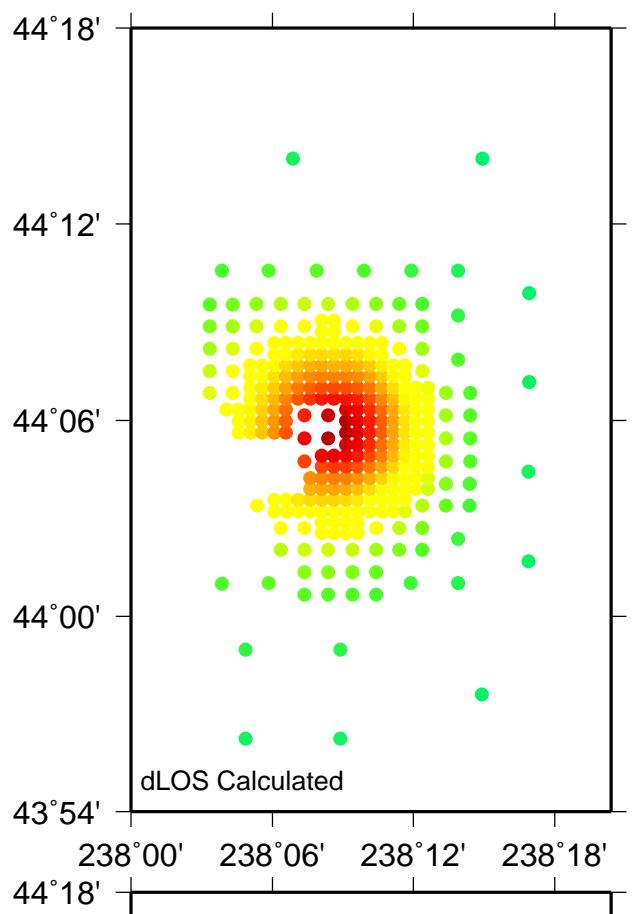




Name: ED28 : Time 2000.713 – 2001.767

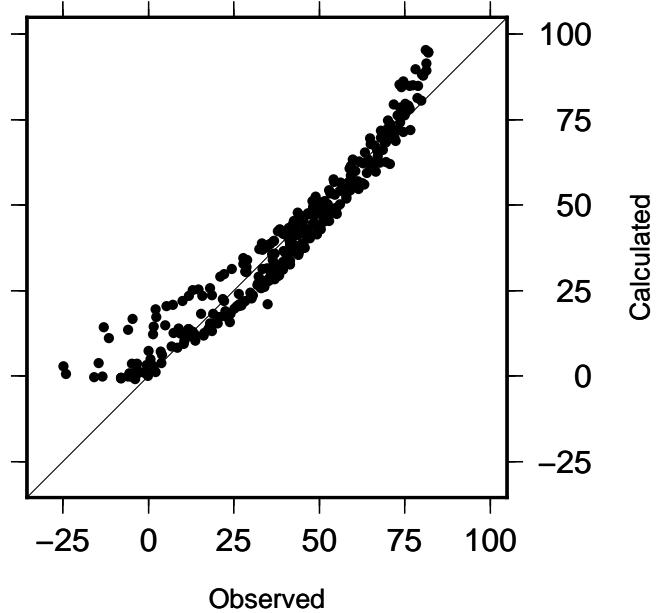
Model: sis1 N: 320 Nrms: 0.738 Wrms: 2.252  
H: -167.300 I: 20.500 Offset: 6.205

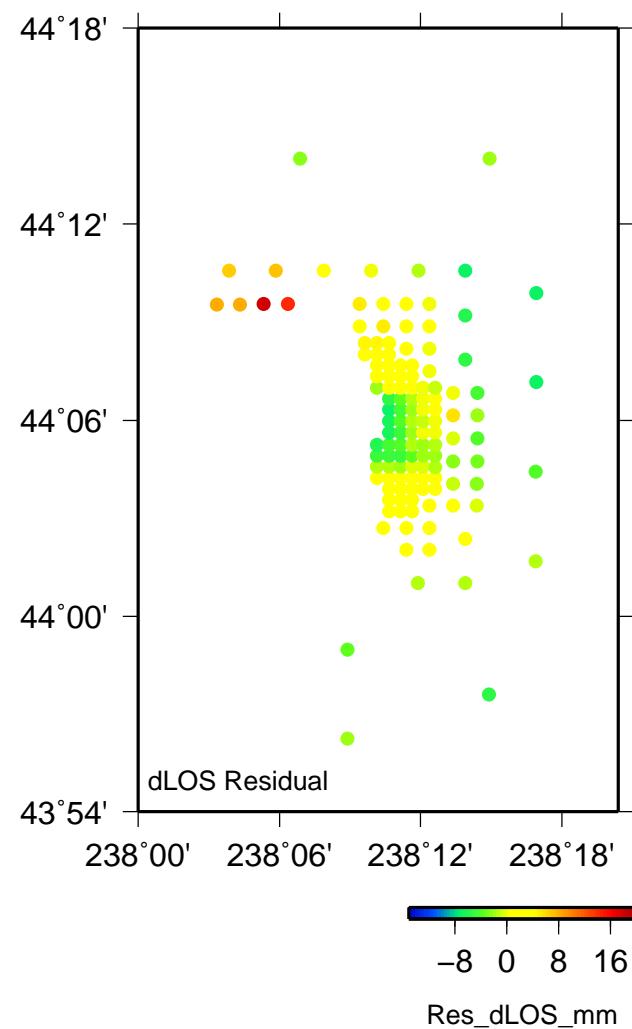
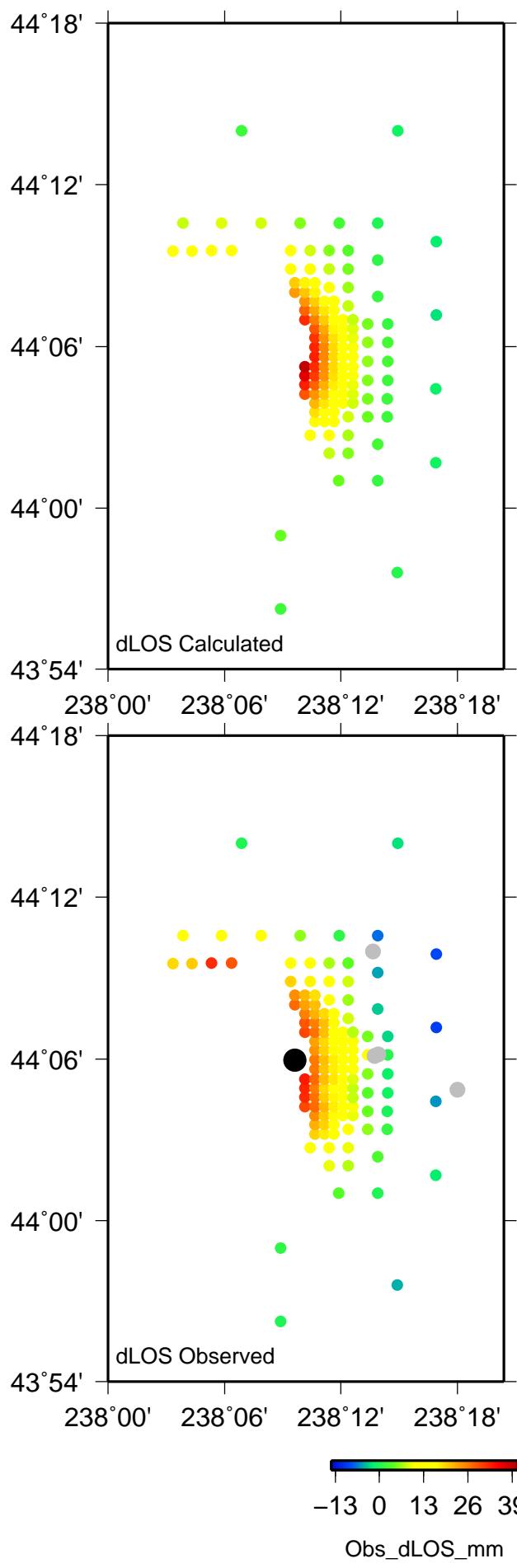




Name: EA29 : Time 2000.766 – 2004.790

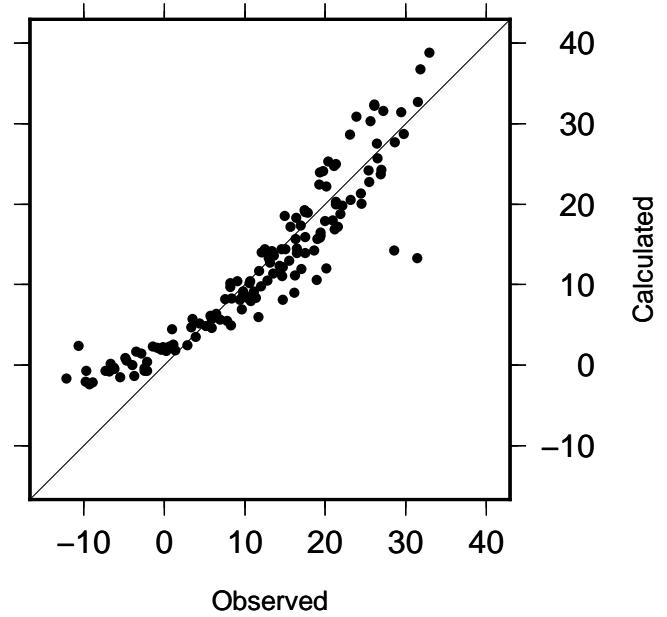
Model: sis1 N: 313 Nrms: 0.827 Wrms: 3.396  
H: -12.400 I: 22.800 Offset: -7.814

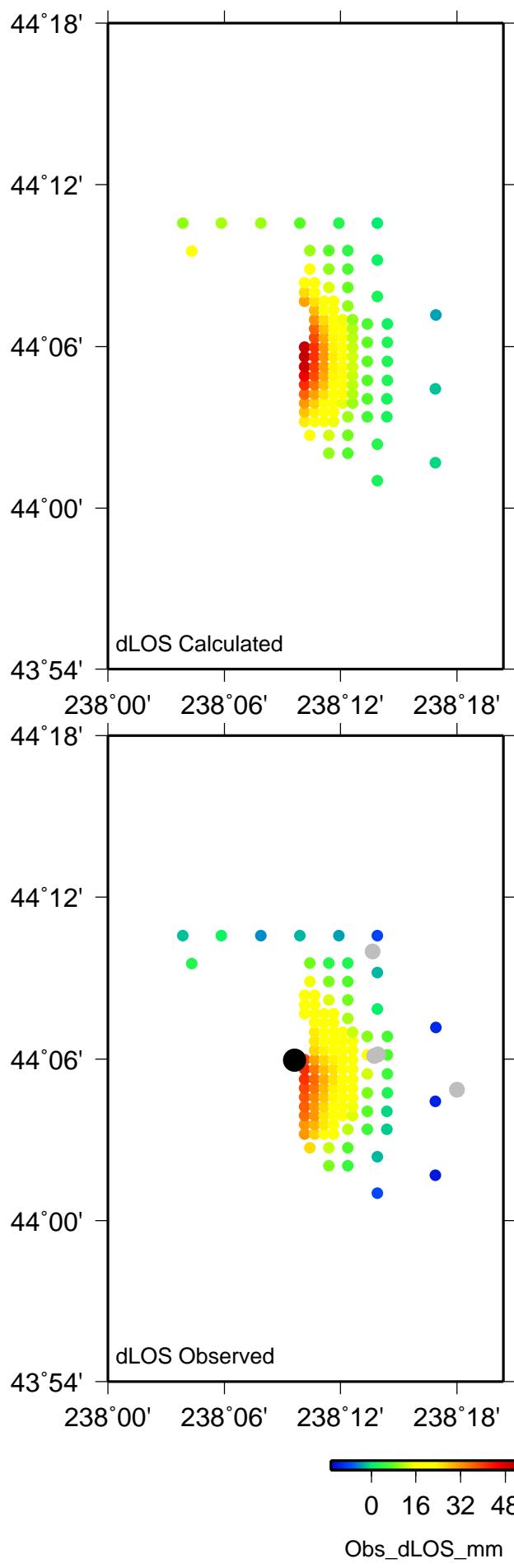


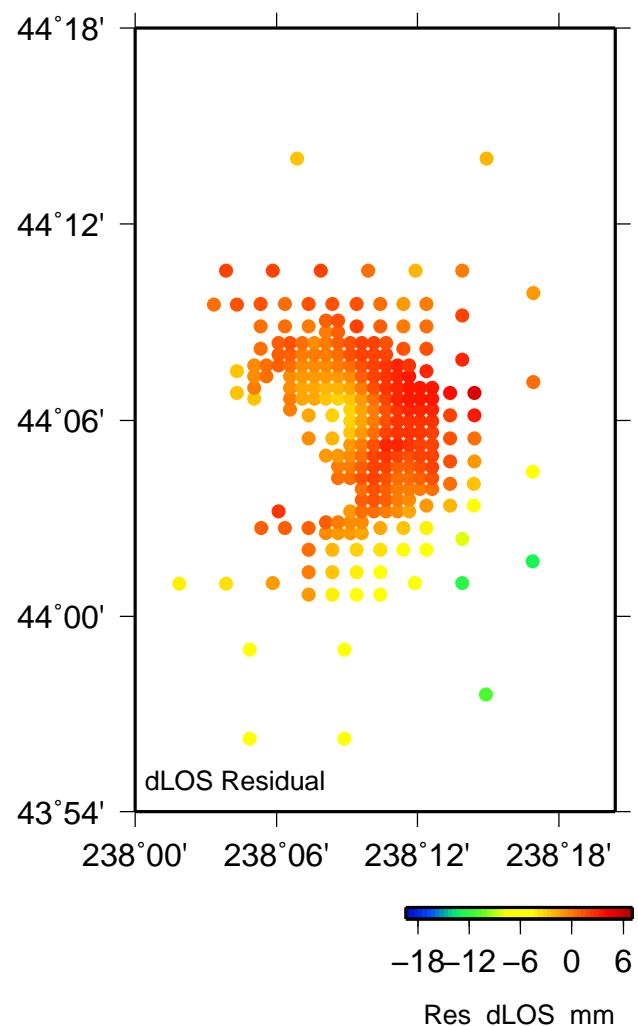
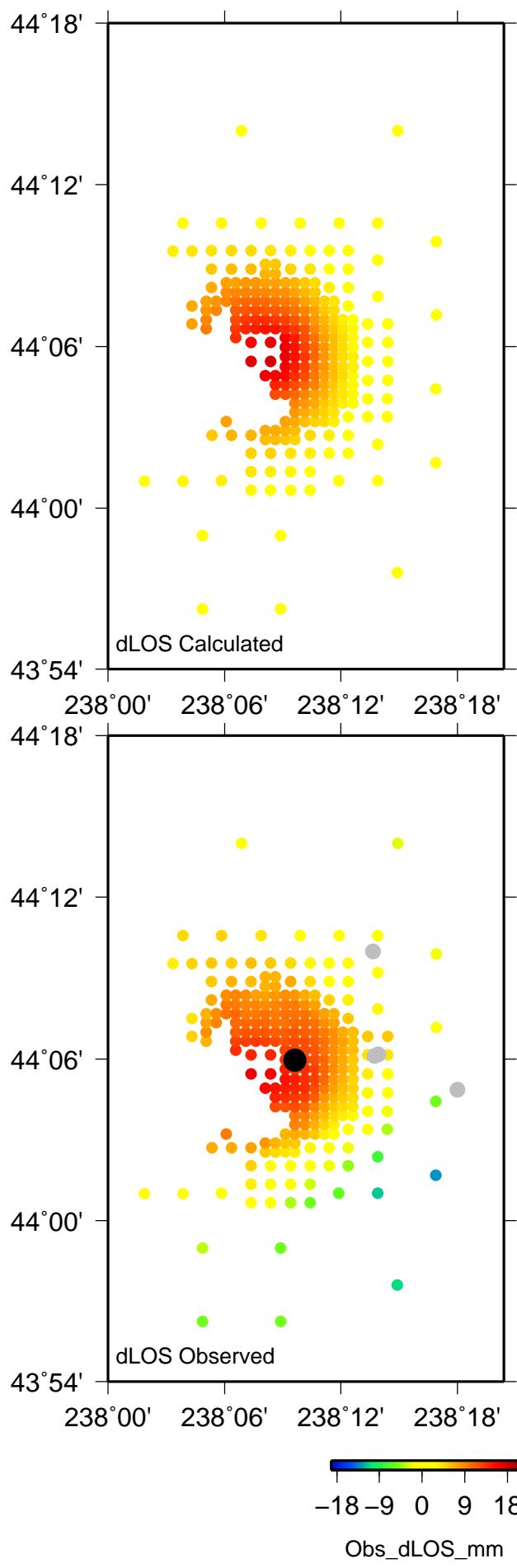


Name: RA30 : Time 2000.812 – 2002.784

Model: sis1 N: 140 Nrms: 0.506 Wrms: 1.579  
H: -10.000 I: 39.700 Offset: -7.830

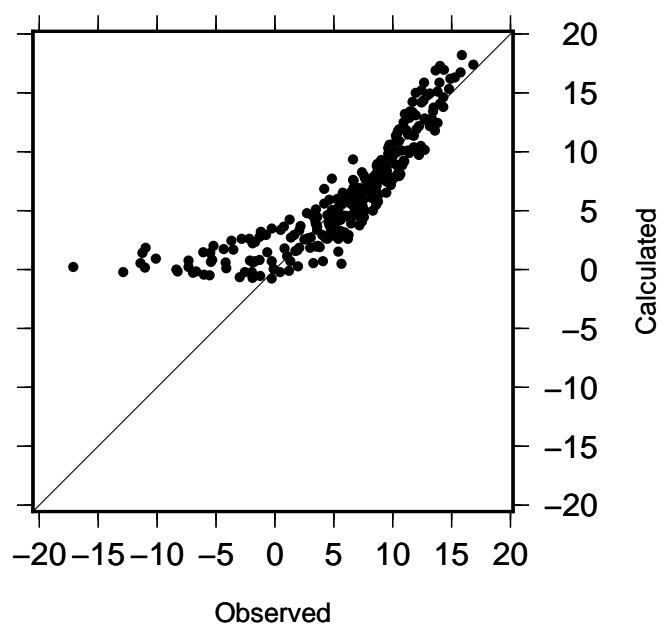


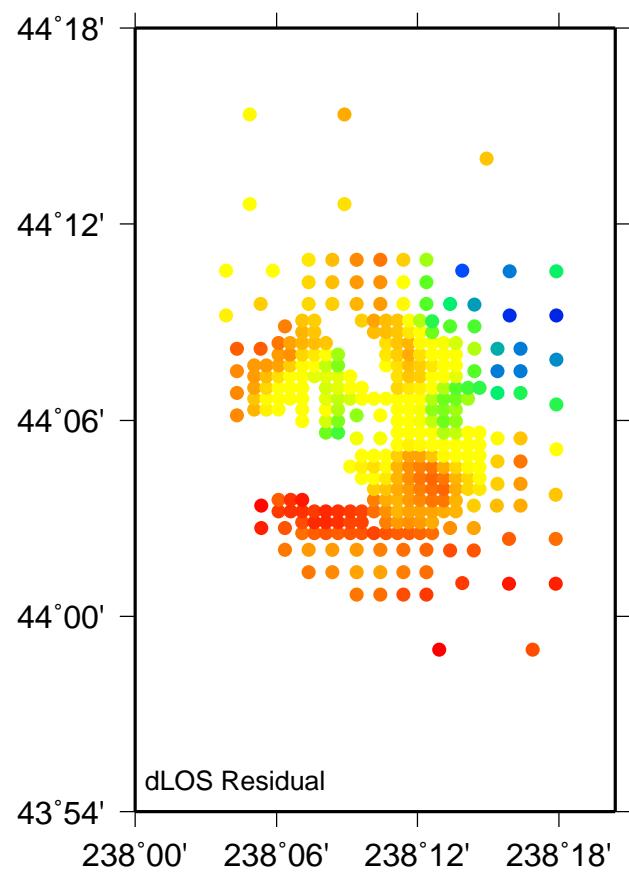
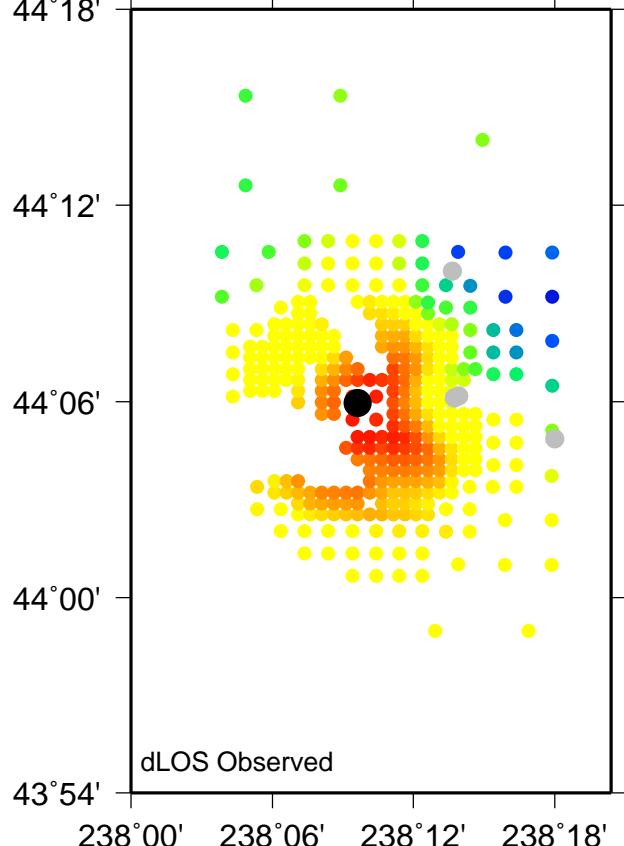
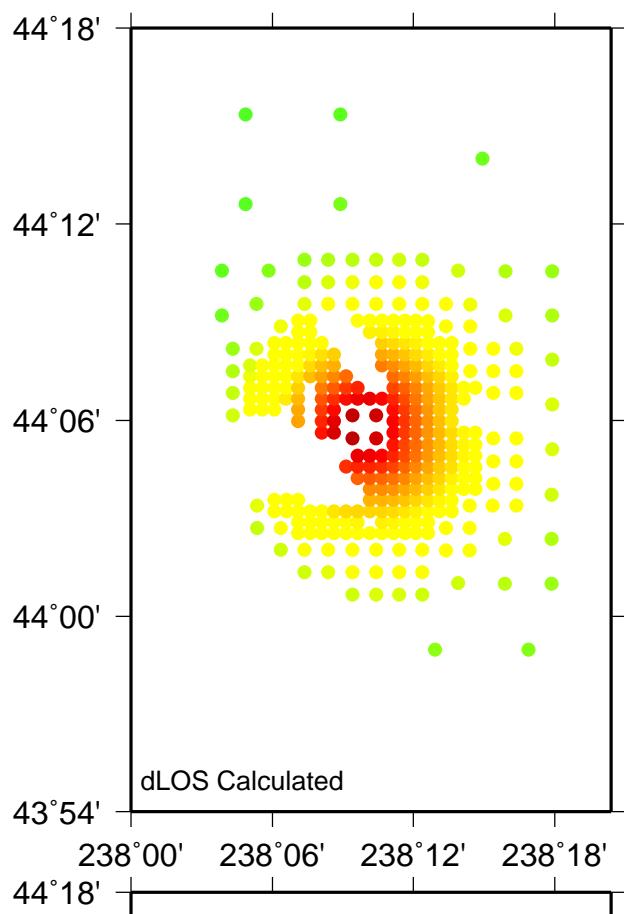




Name: RA32 : Time 2002.652 – 2003.671

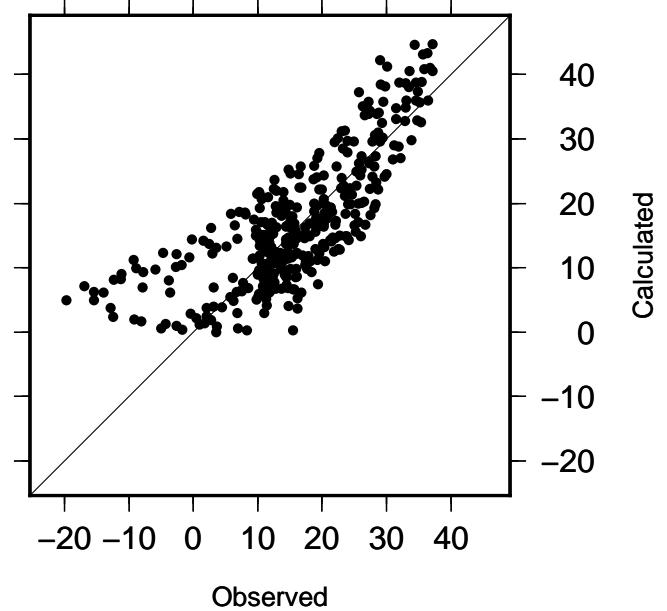
Model: sis1 N: 269 Nrms: 1.517 Wrms: 6.627  
H: -10.000 I: 39.700 Offset: -2.988

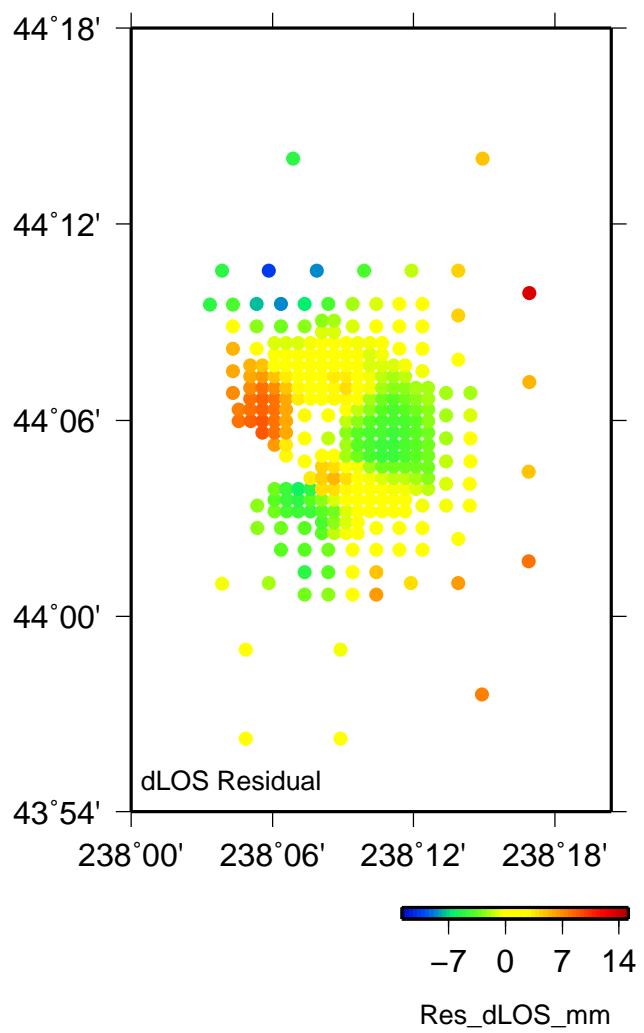
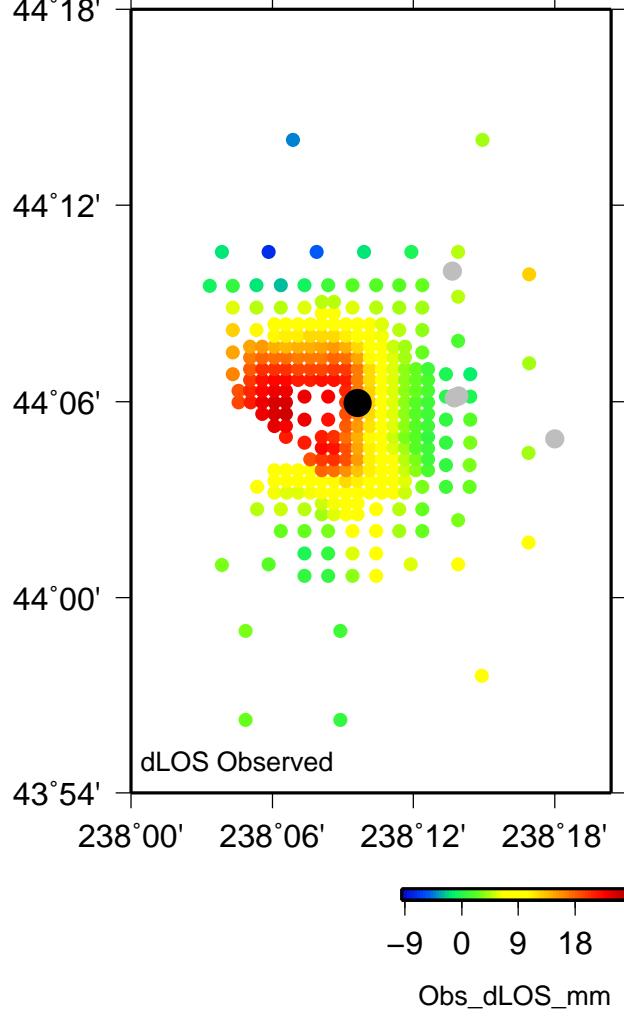
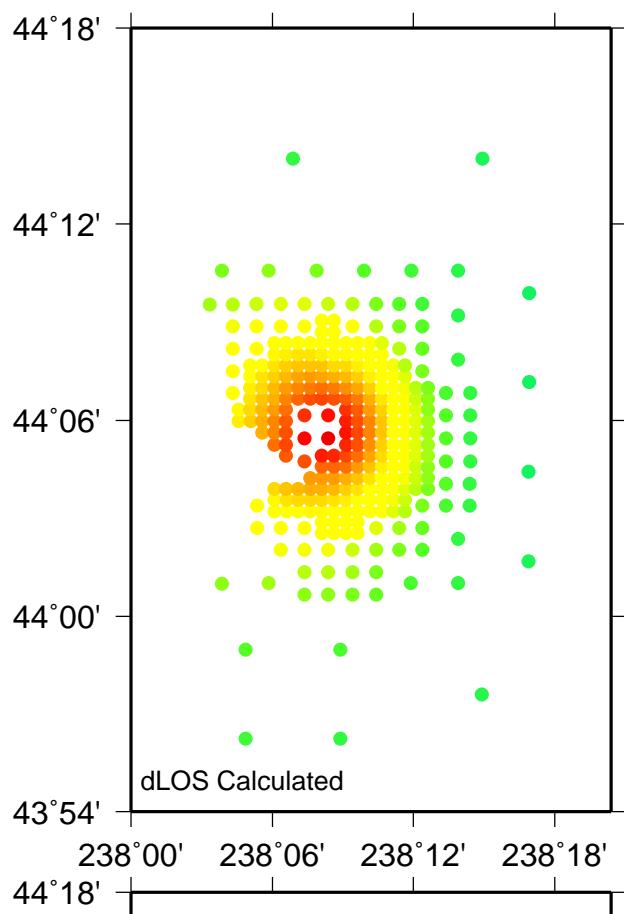




Name: VD33 : Time 2003.493 – 2007.599

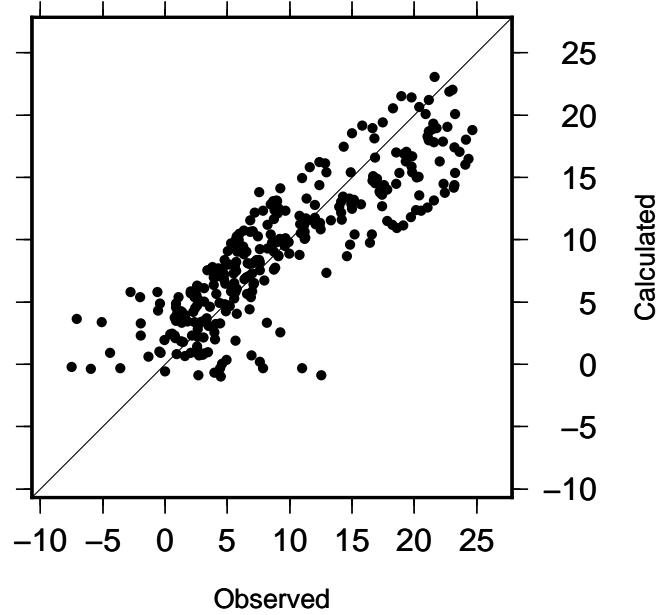
Model: sis1 N: 350 Nrms: 0.386 Wrms: 1.156  
H: -167.300 I: 20.500 Offset: 3.783

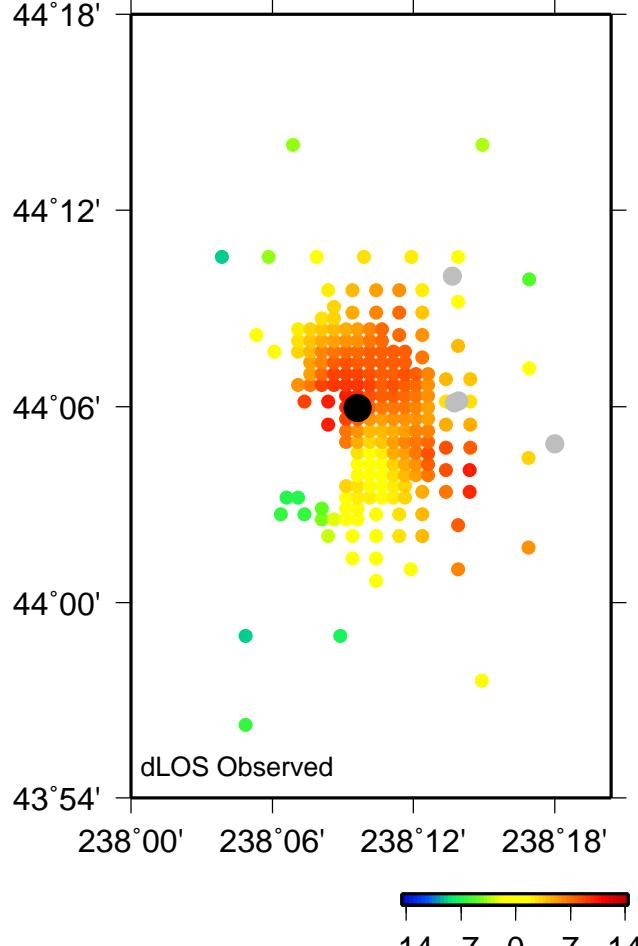
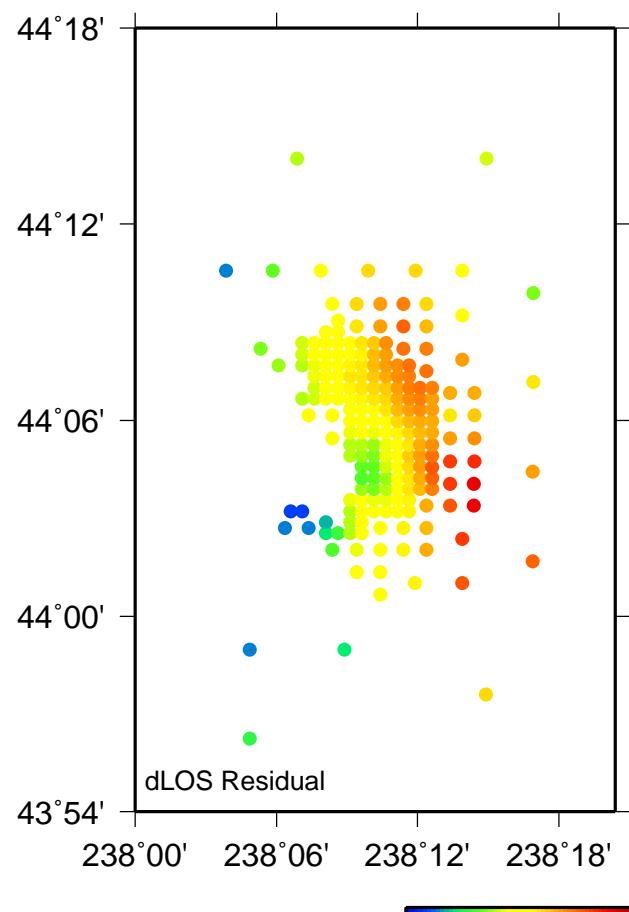
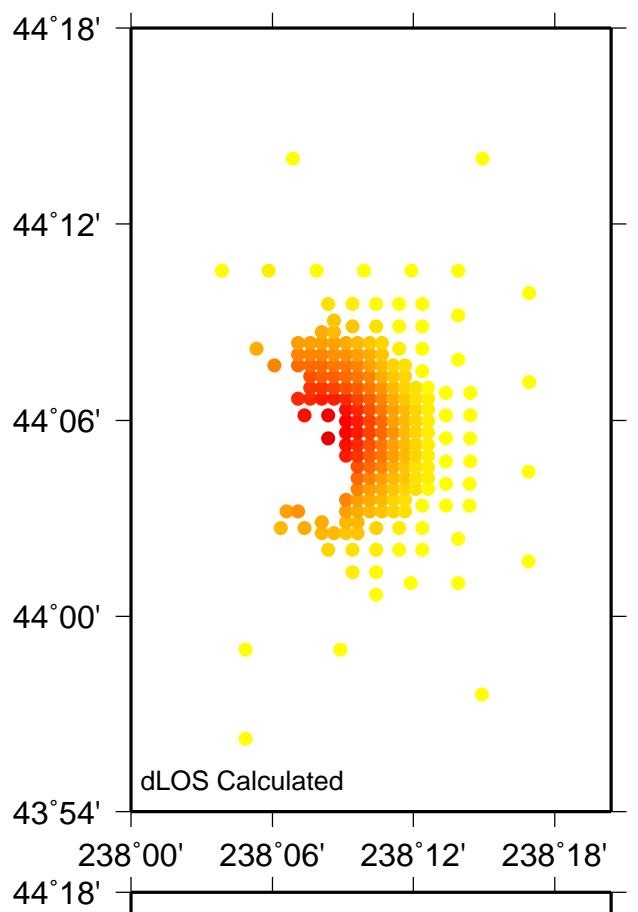




Name: RA34 : Time 2003.639 – 2005.608

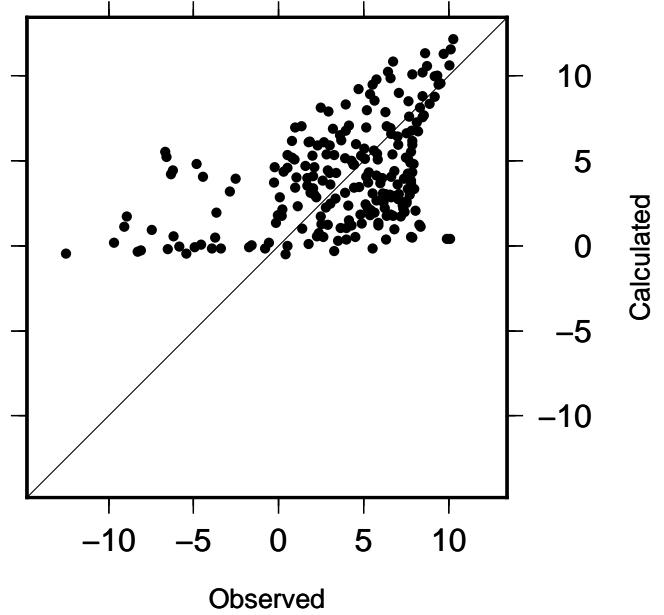
Model: sis1 N: 305 Nrms: 0.218 Wrms: 0.476  
H: -10.000 I: 39.700 Offset: 1.589

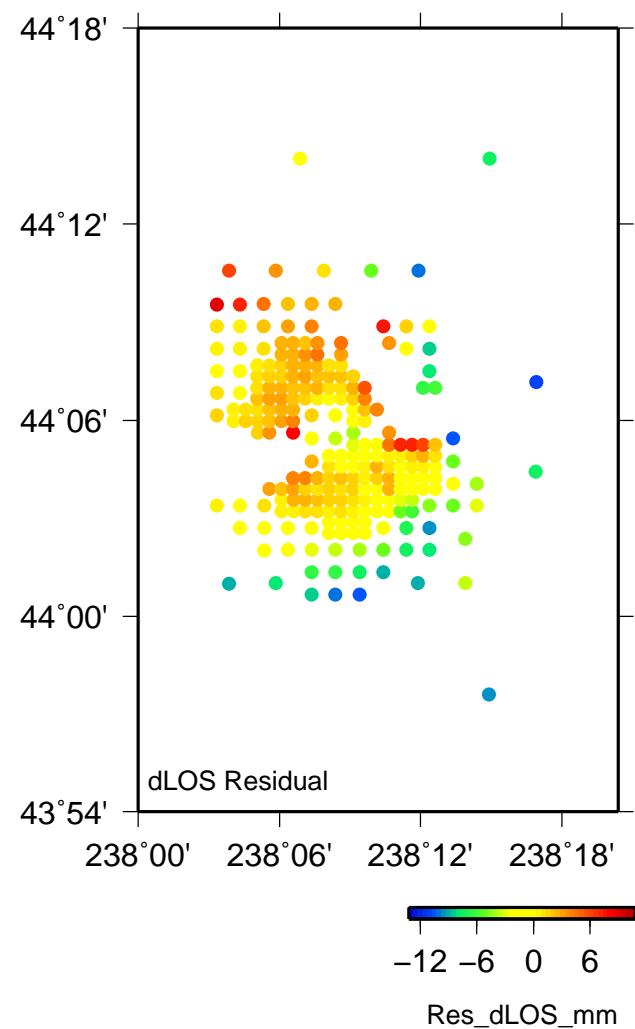
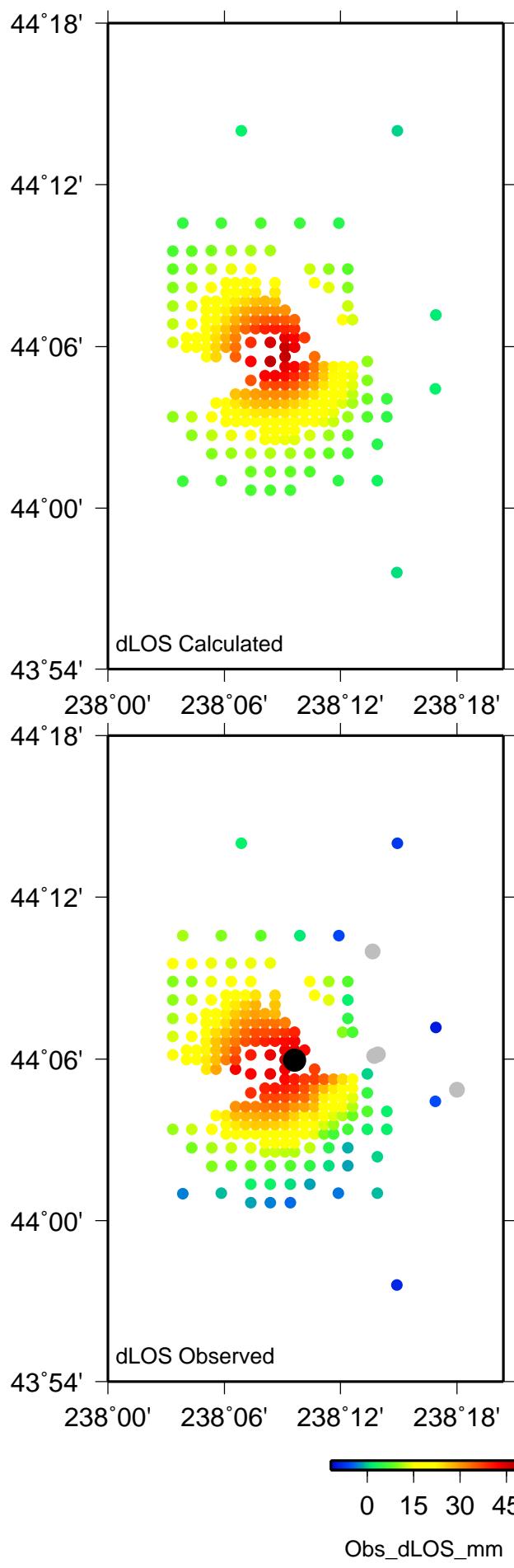




Name: RA35 : Time 2003.704 – 2004.689

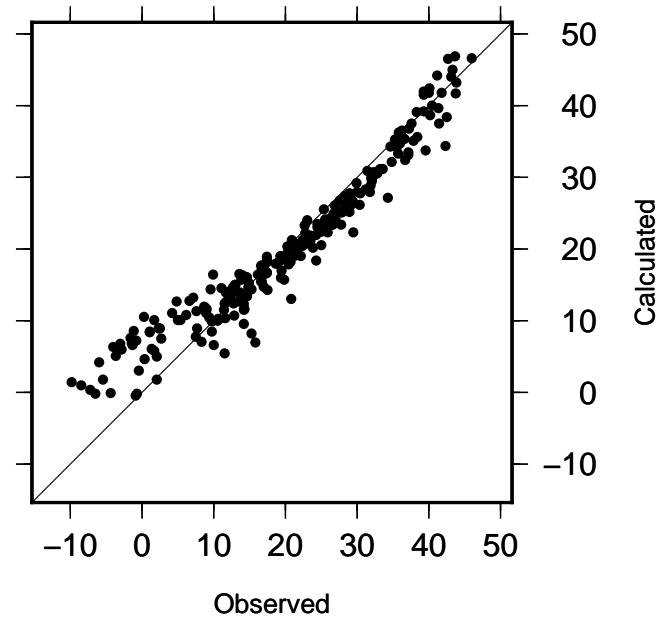
Model: sis1 N: 219 Nrms: 1.416 Wrms: 3.052  
H: -10.000 I: 39.700 Offset: -4.120

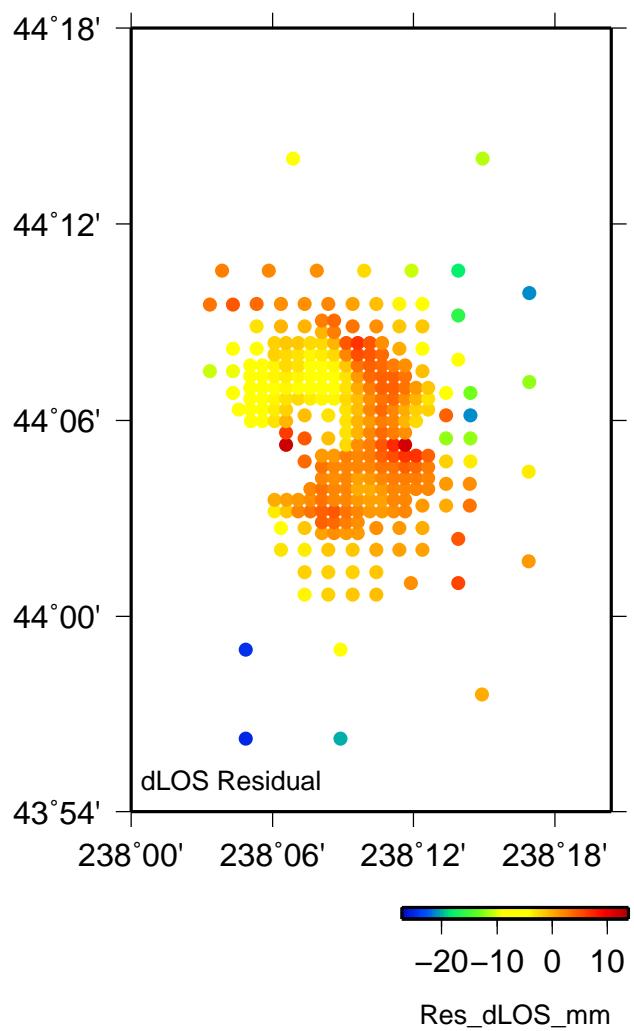
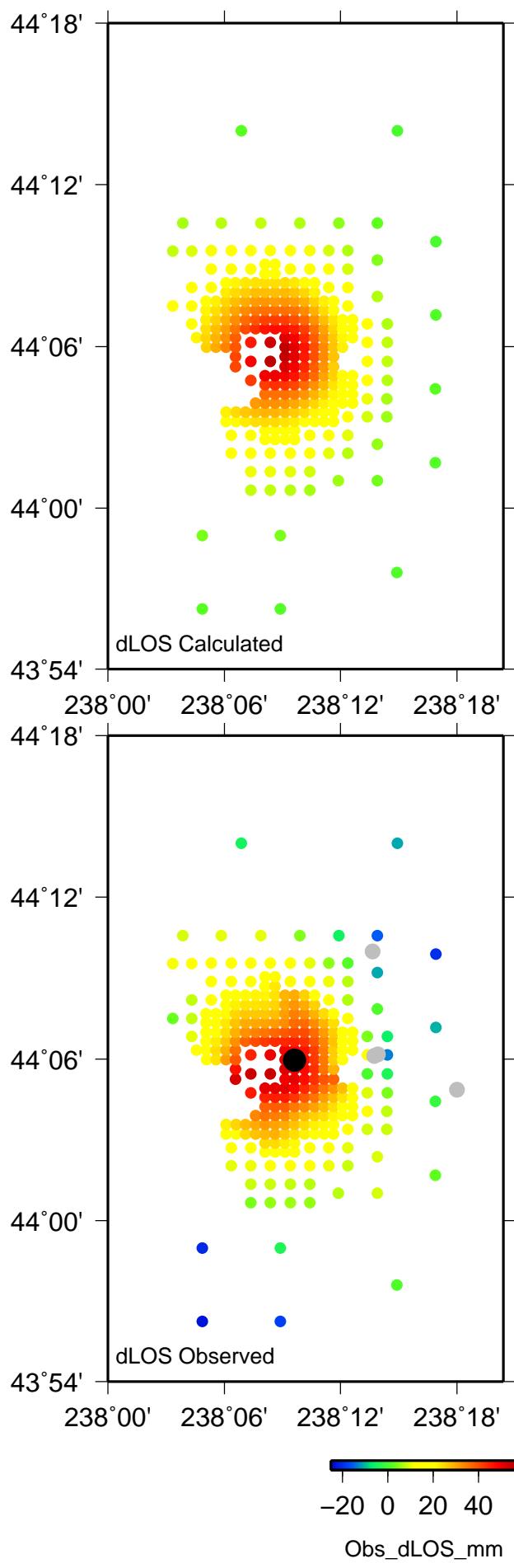




Name: VA36 : Time 2004.695 – 2009.486

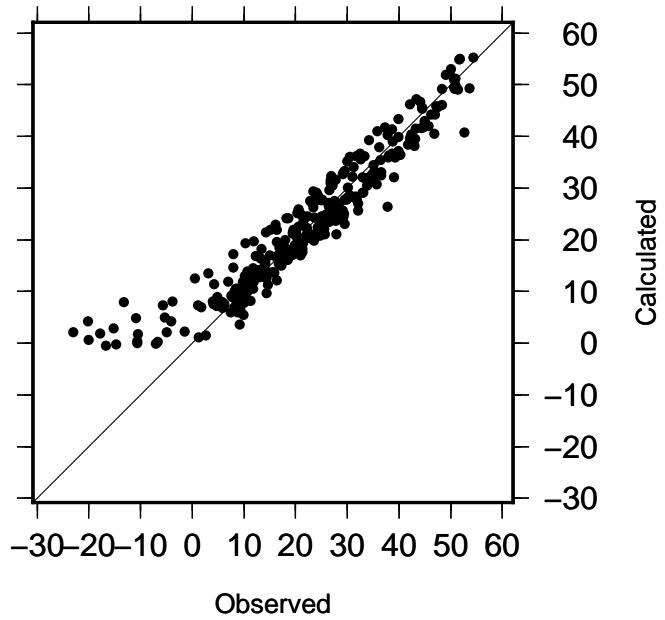
Model: sis1 N: 241 Nrms: 0.051 Wrms: 0.181  
H: -12.400 I: 22.800 Offset: -6.194

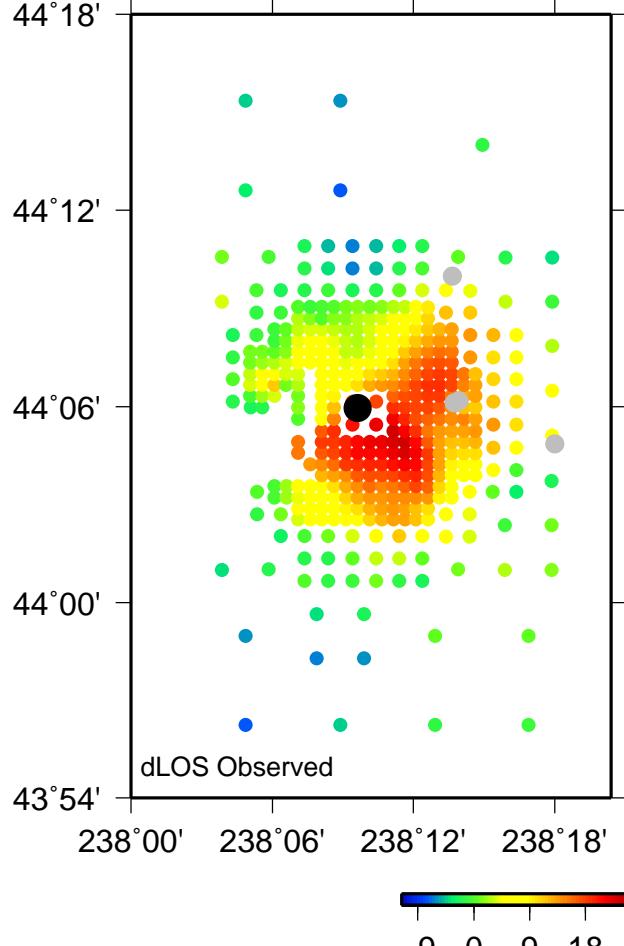
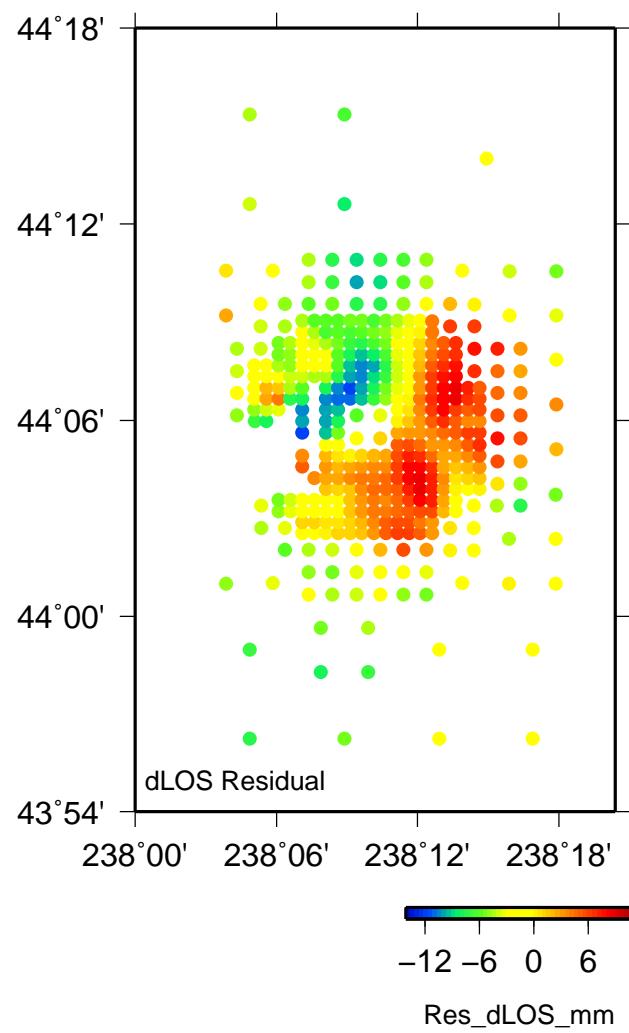
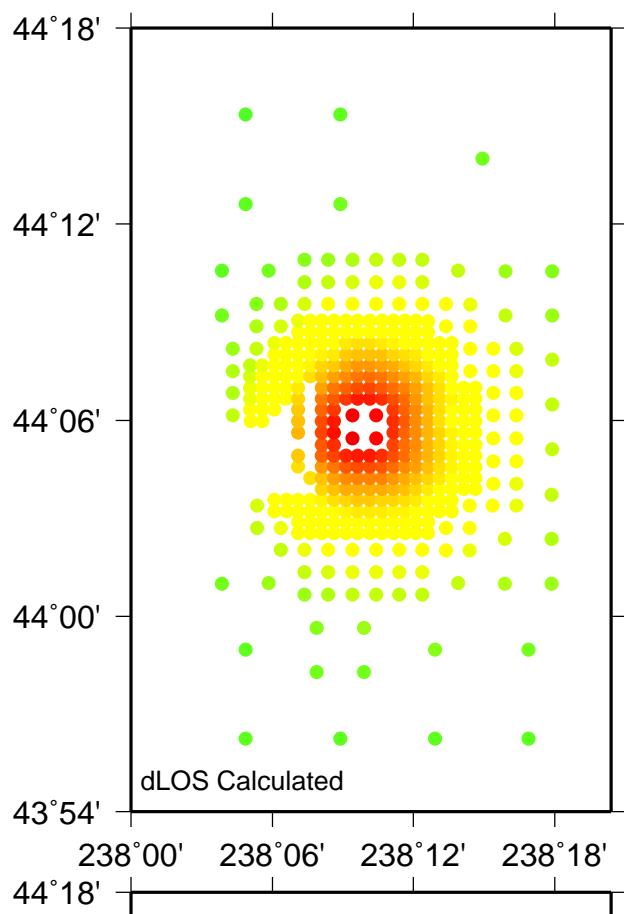




Name: VA37 : Time 2004.695 – 2010.636

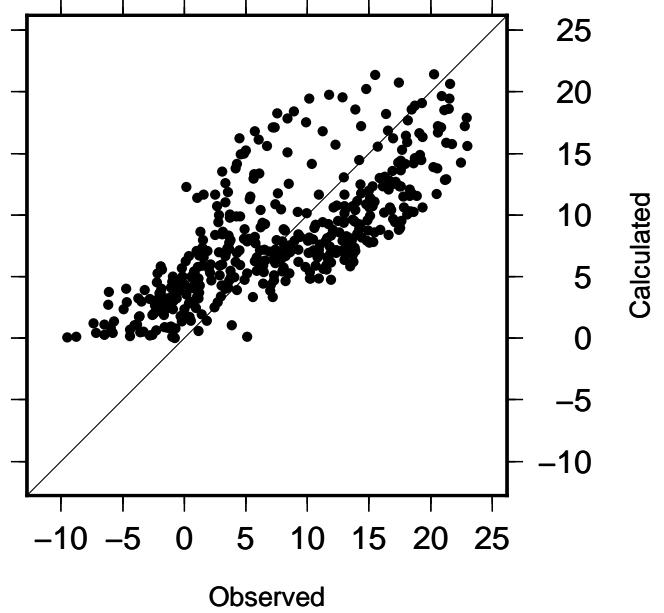
Model: sis1 N: 285 Nrms: 0.689 Wrms: 2.168  
H: -12.400 I: 22.800 Offset: -8.154

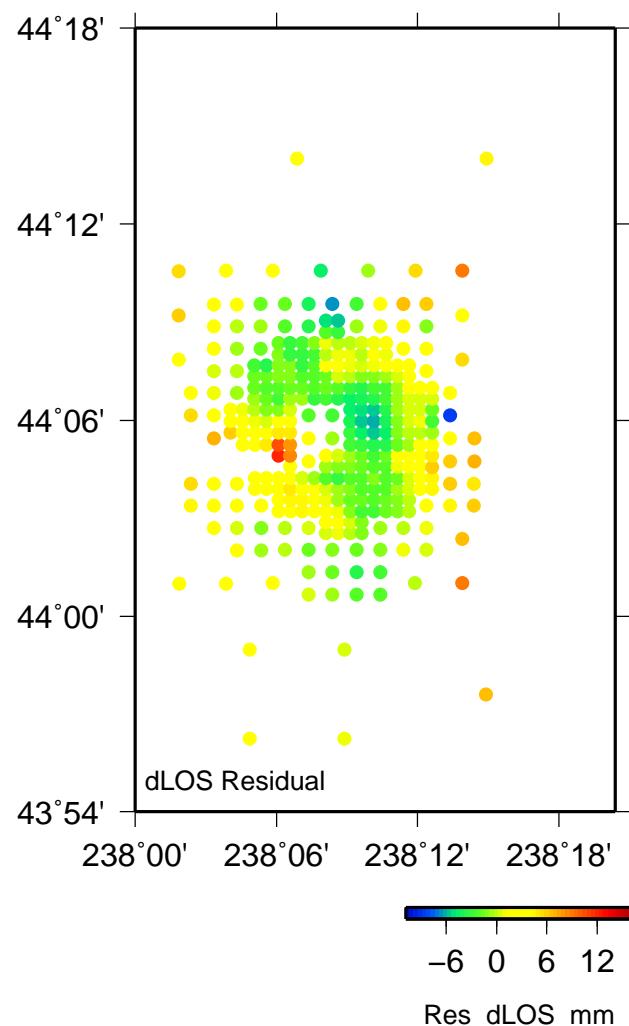
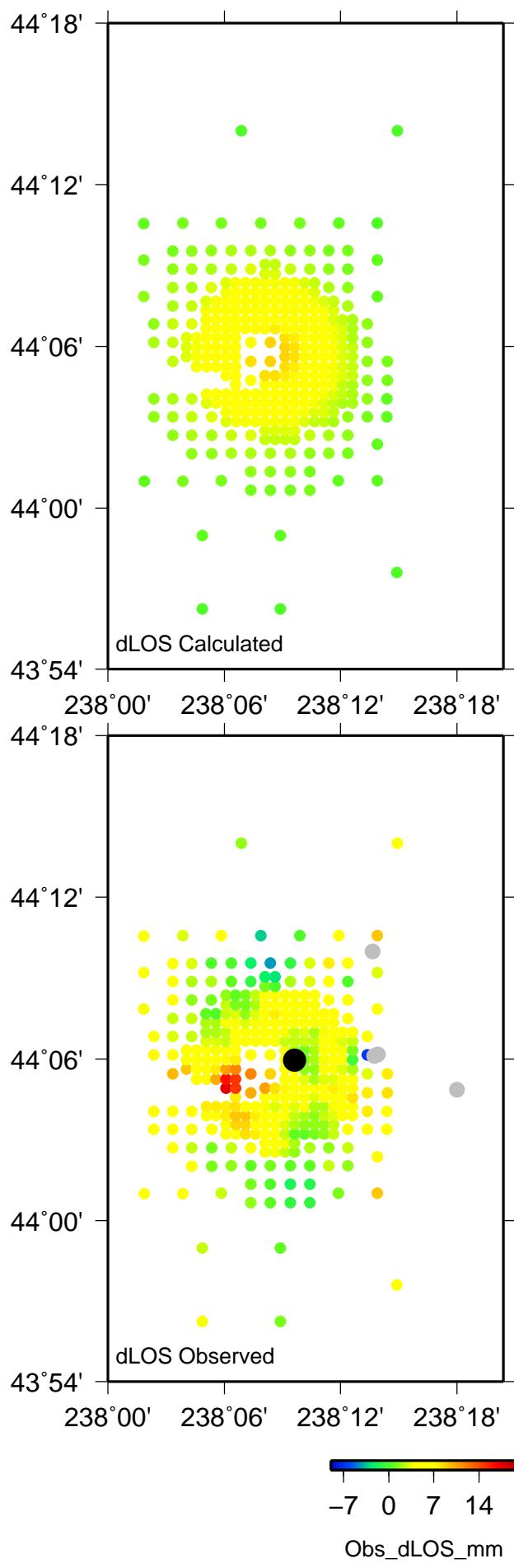




Name: VD38 : Time 2004.737 – 2006.750

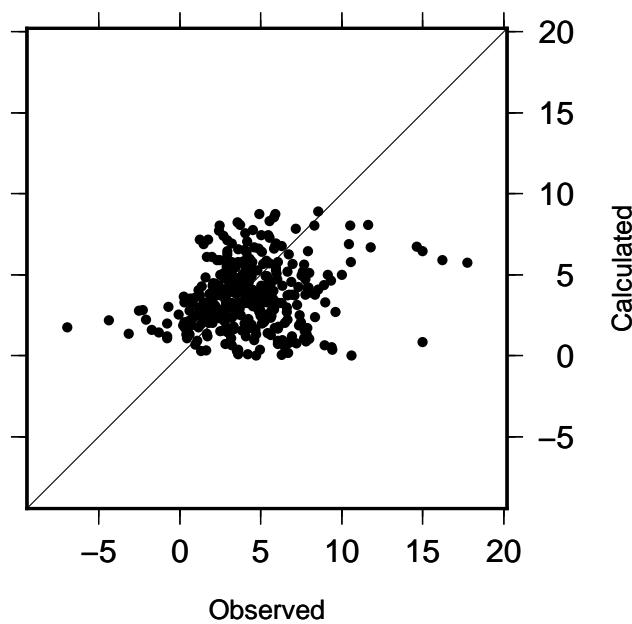
Model: sis1 N: 424 Nrms: 0.692 Wrms: 3.293  
H: -167.300 I: 20.500 Offset: -1.476

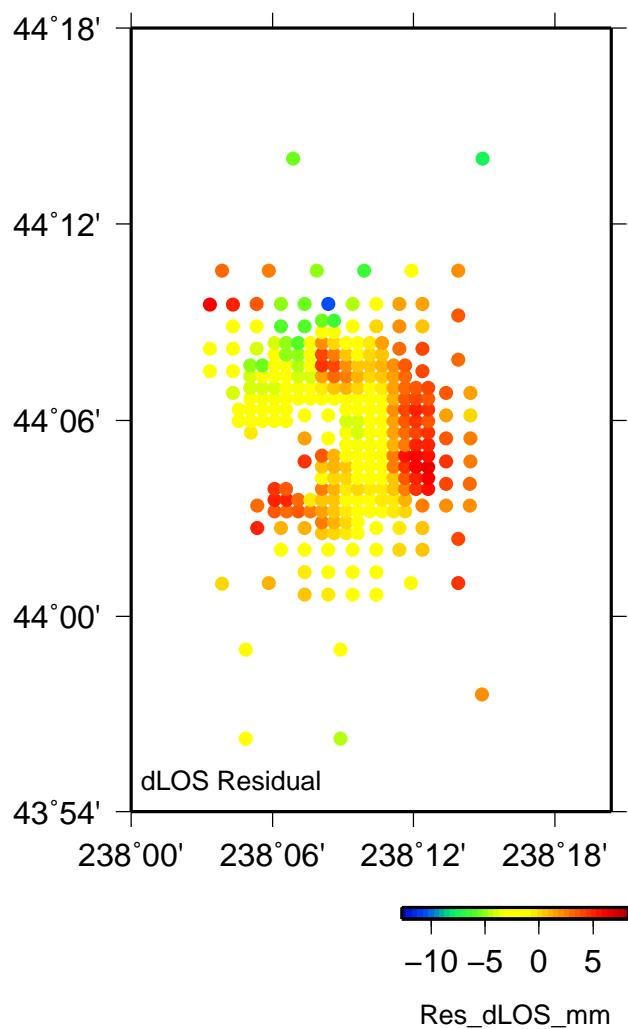
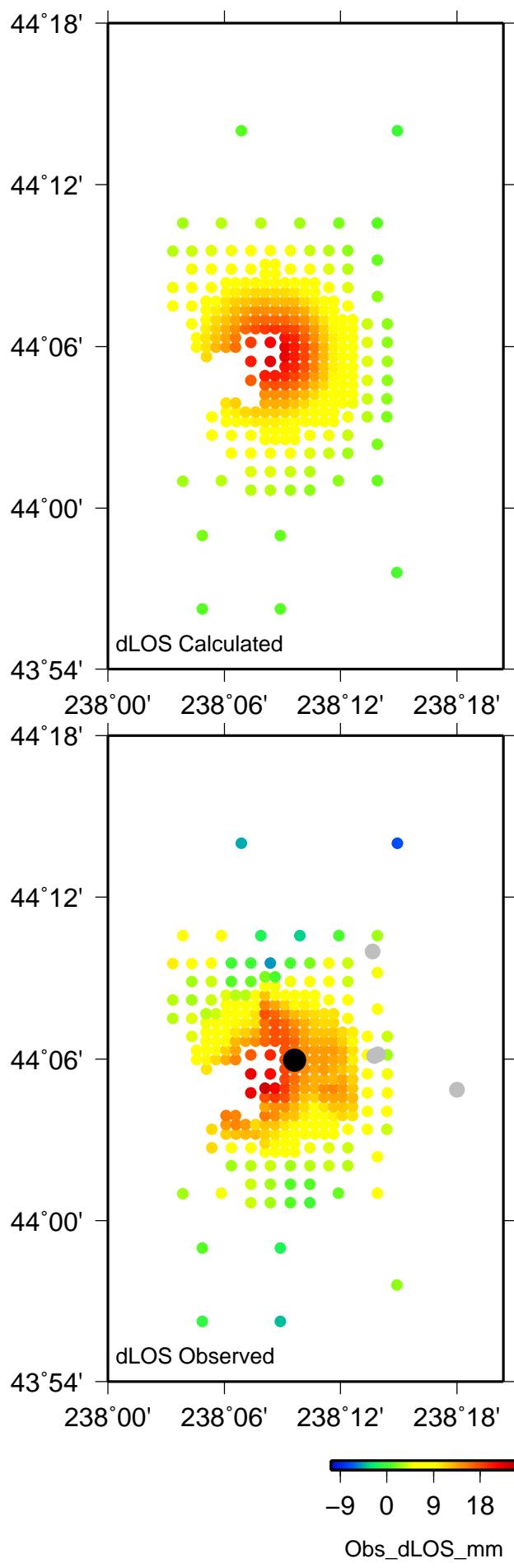




Name: VA39 : Time 2004.747 – 2005.513

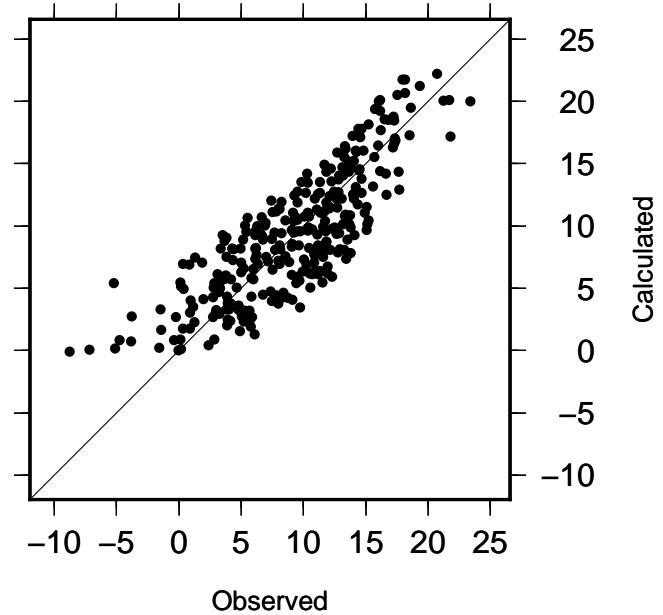
Model: sis1 N: 342 Nrms: 0.421 Wrms: 0.977  
H: -11.900 I: 26.700 Offset: 4.646

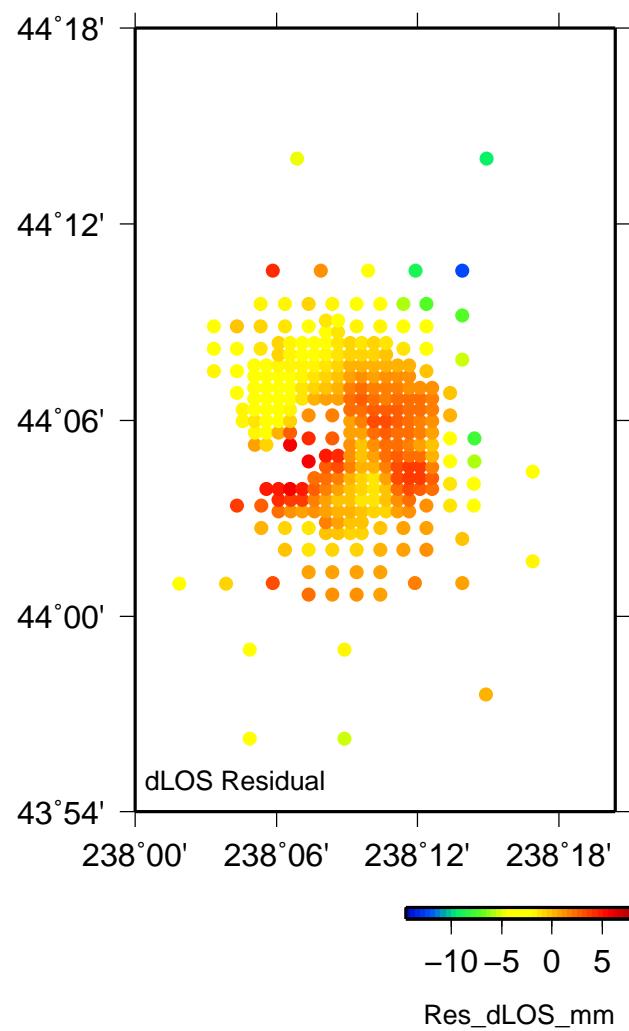
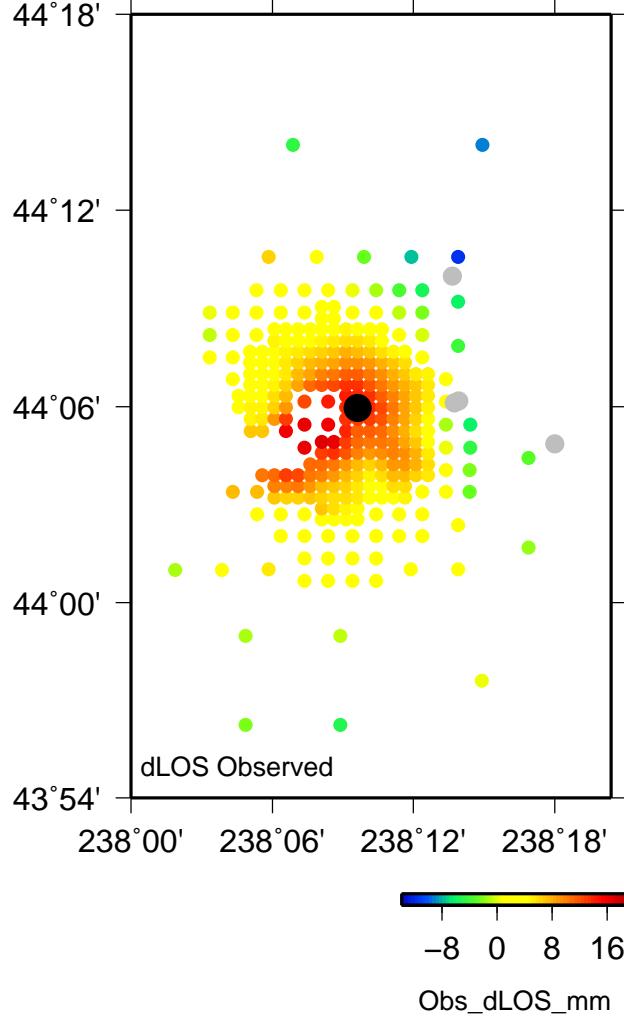
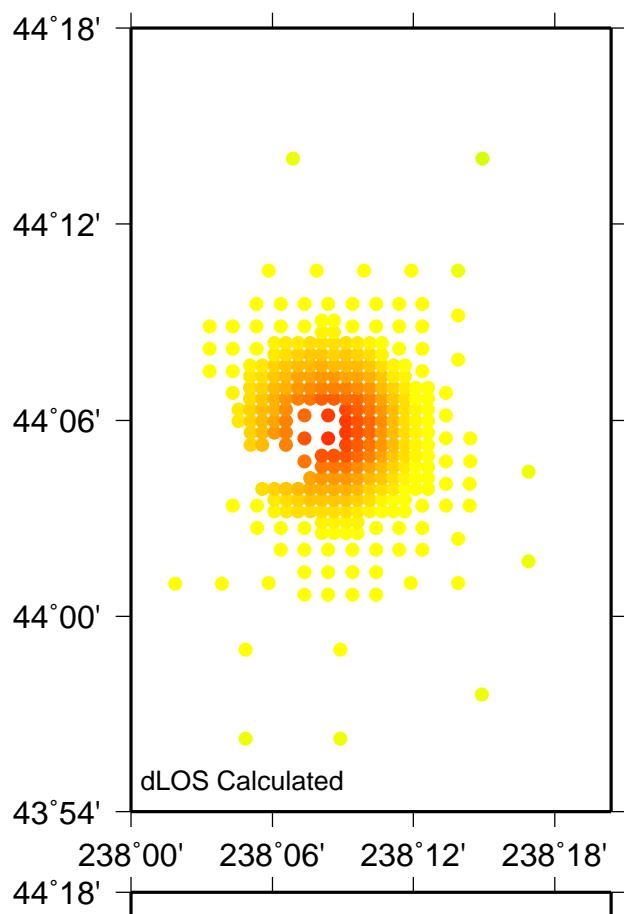




Name: VA40 : Time 2004.747 – 2006.760

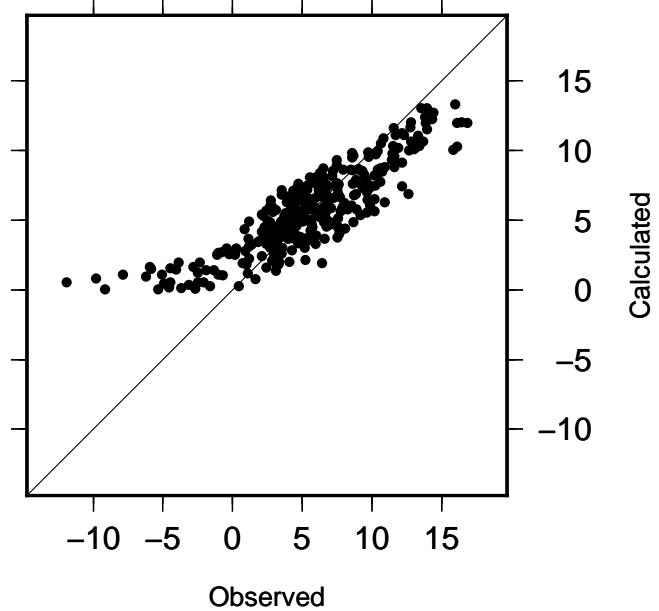
Model: sis1 N: 294 Nrms: 0.957 Wrms: 2.220  
H: -11.900 I: 26.700 Offset: -0.986

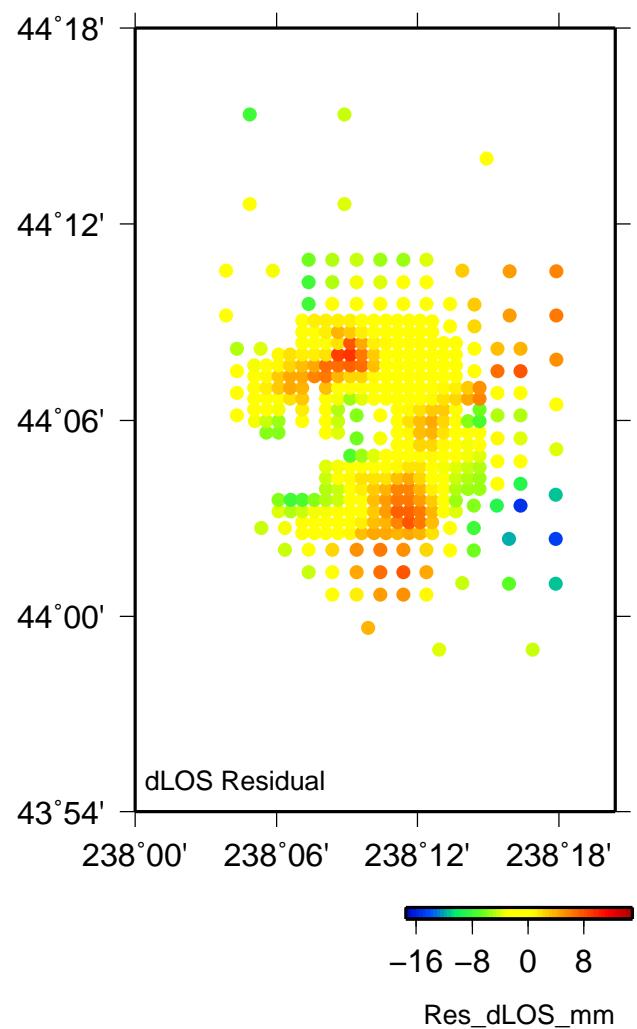
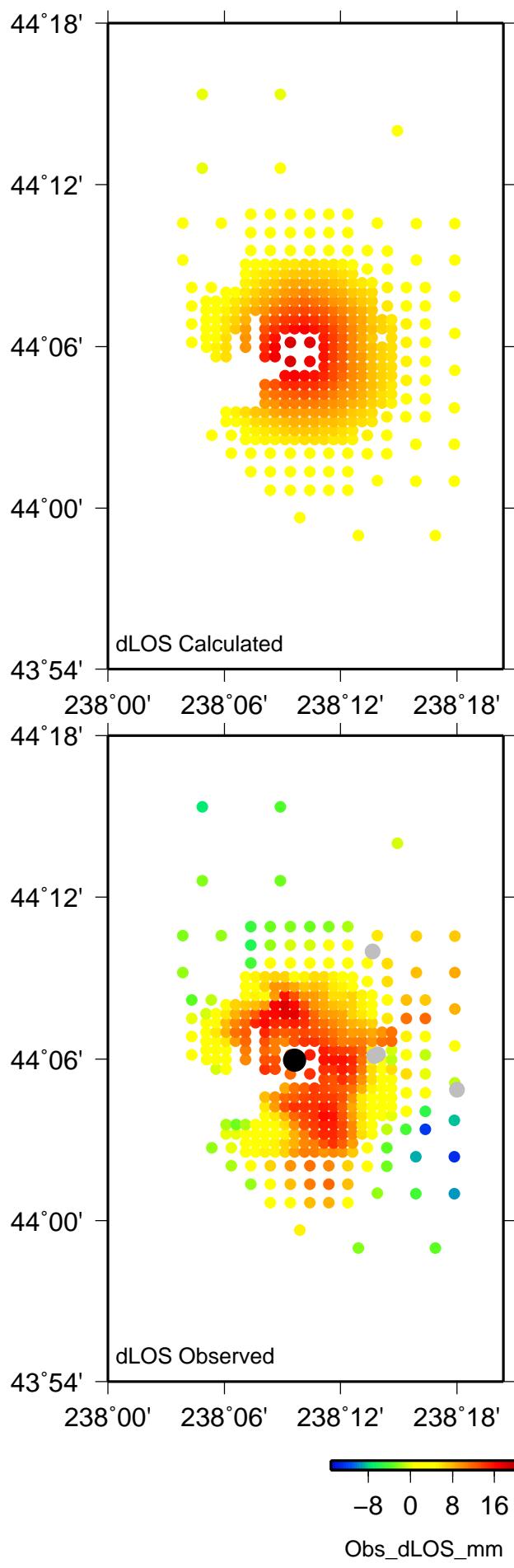




Name: VA41 : Time 2005.513 – 2006.760

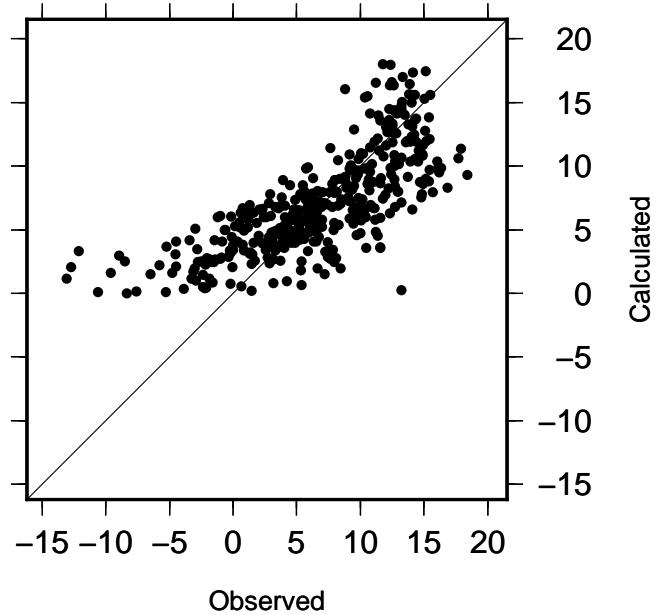
Model: sis1 N: 305 Nrms: 0.580 Wrms: 1.282  
H: -11.900 I: 26.700 Offset: -3.822

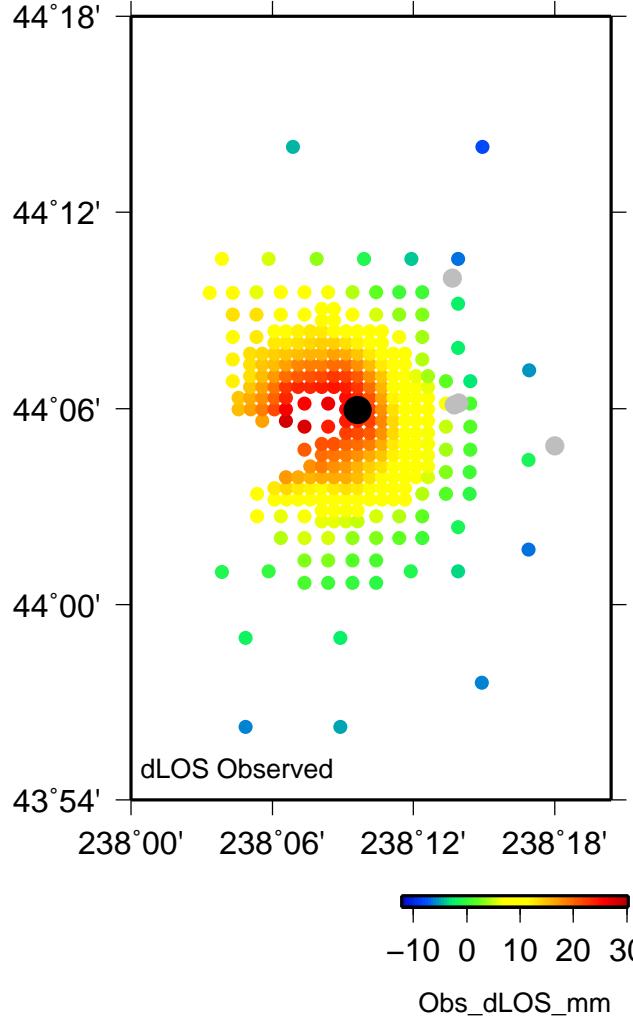
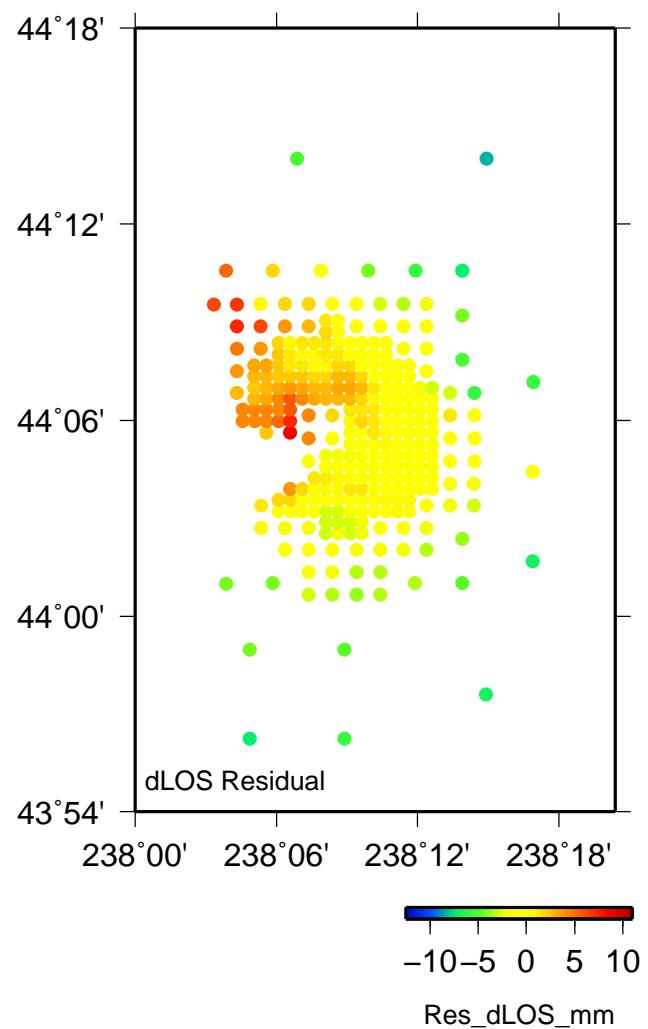
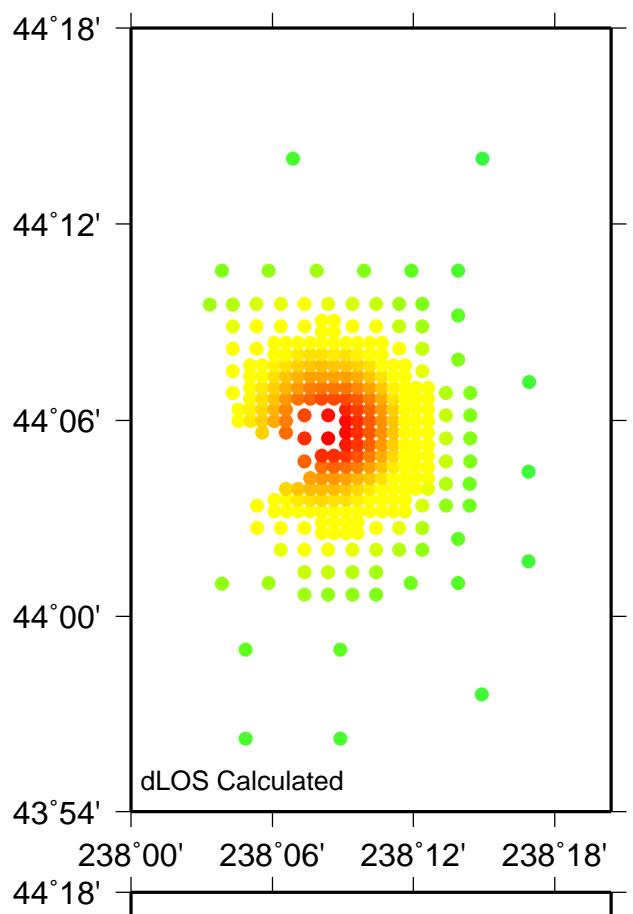




Name: VD42 : Time 2005.599 – 2007.517

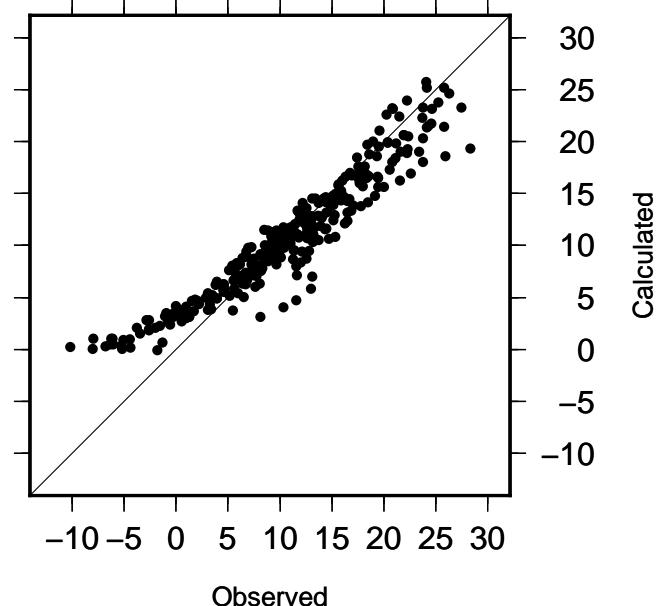
Model: sis1 N: 396 Nrms: 1.040 Wrms: 2.513  
H: -167.300 I: 20.500 Offset: -2.674

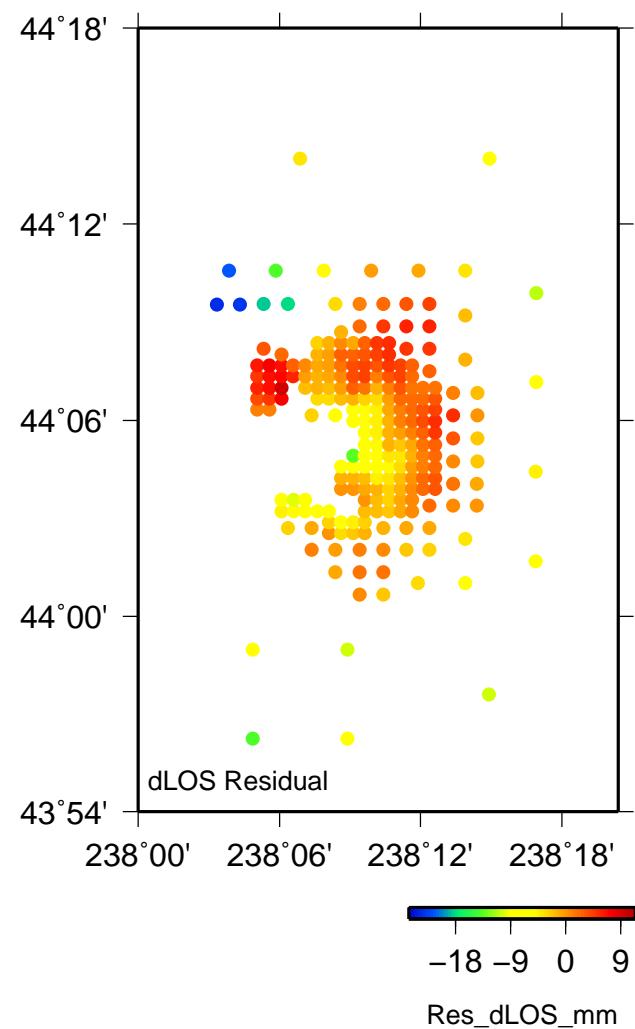
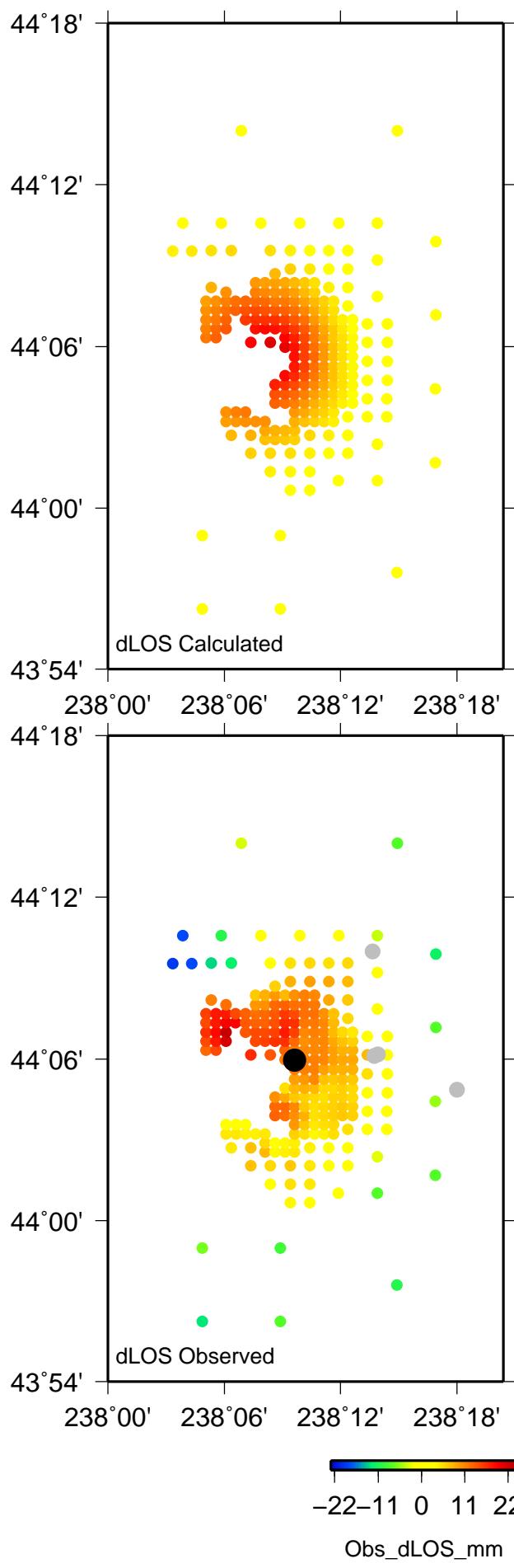




Name: VA43 : Time 2006.664 – 2009.634

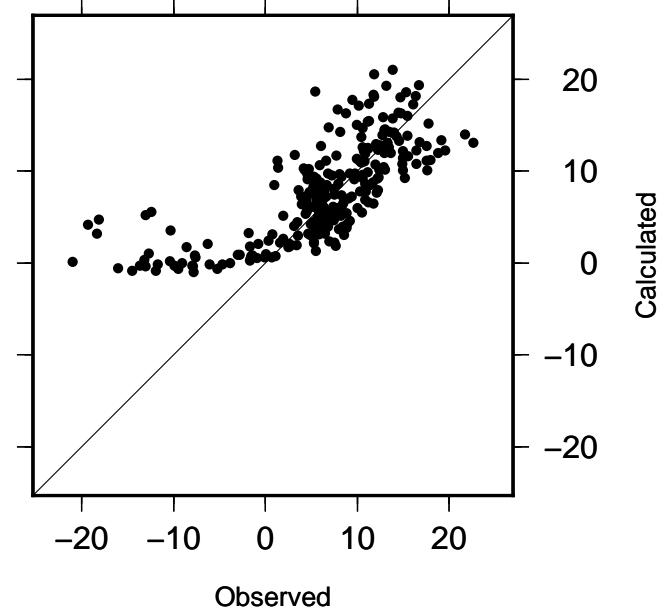
Model: sis1 N: 298 Nrms: 1.032 Wrms: 4.587  
H: -11.900 I: 26.700 Offset: -5.124

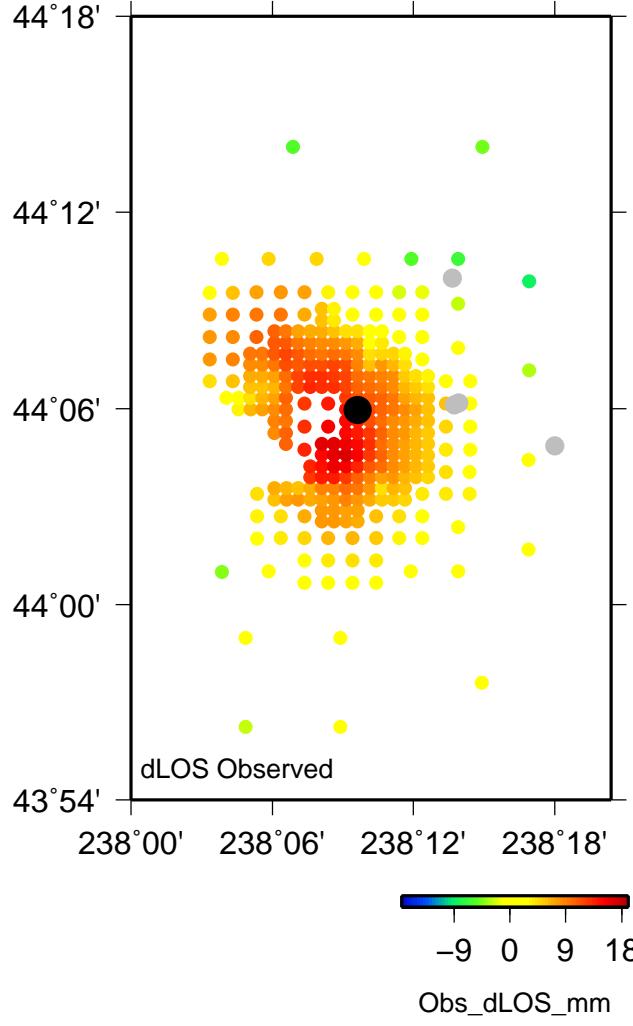
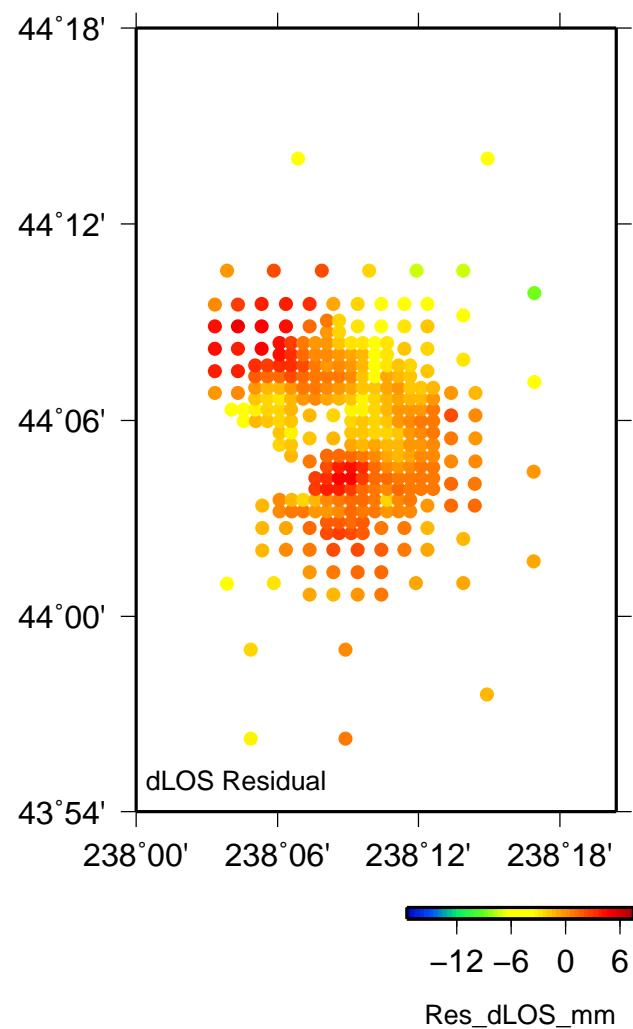
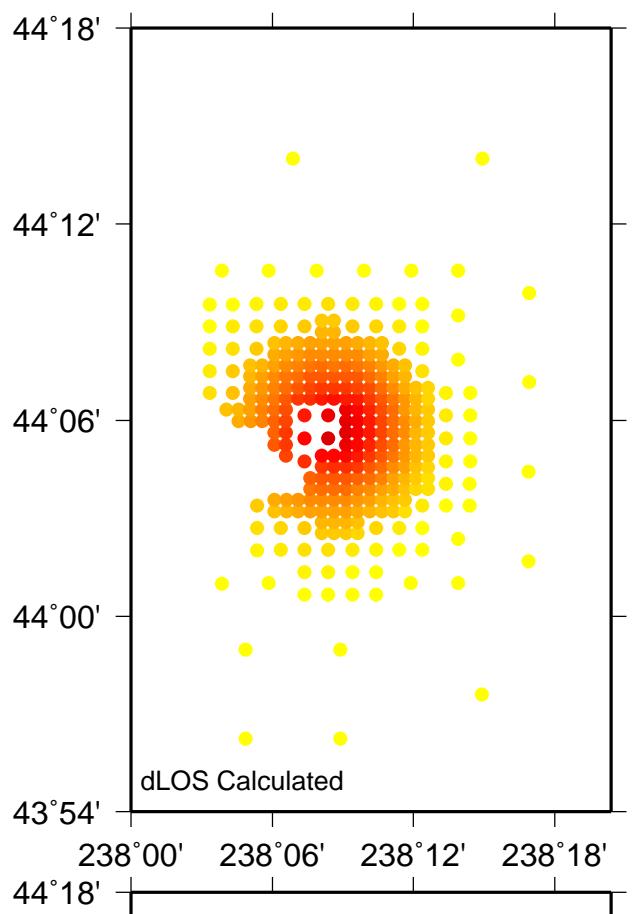




Name: VA44 : Time 2006.776 – 2009.554

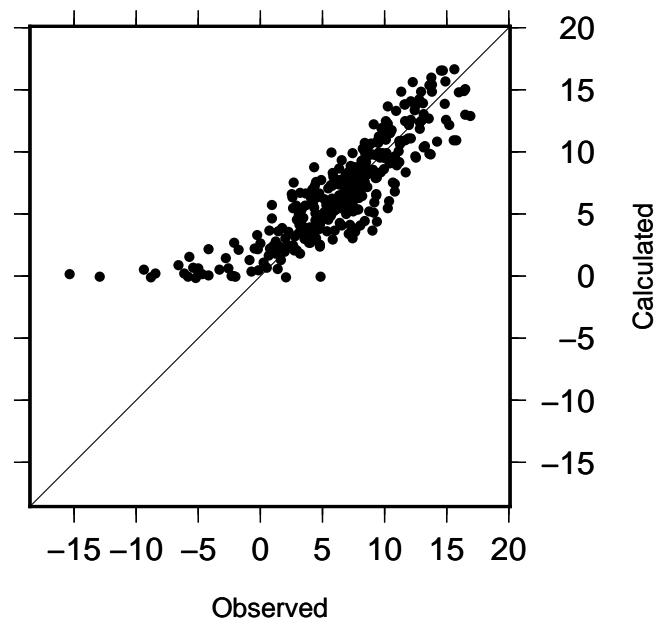
Model: sis1 N: 248 Nrms: 1.412 Wrms: 3.693  
H: -9.900 I: 40.400 Offset: -9.646

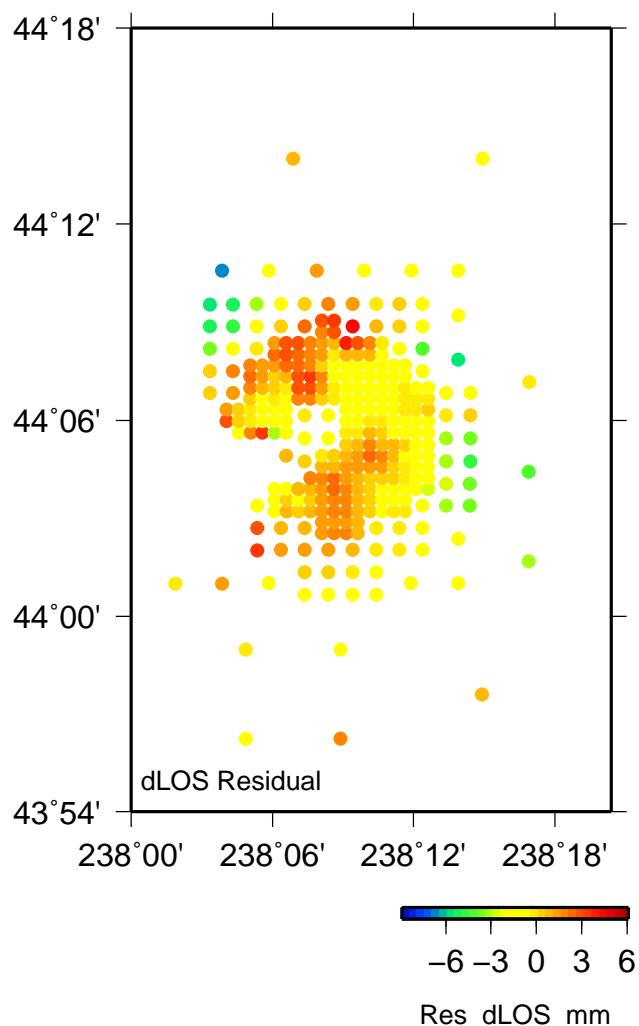
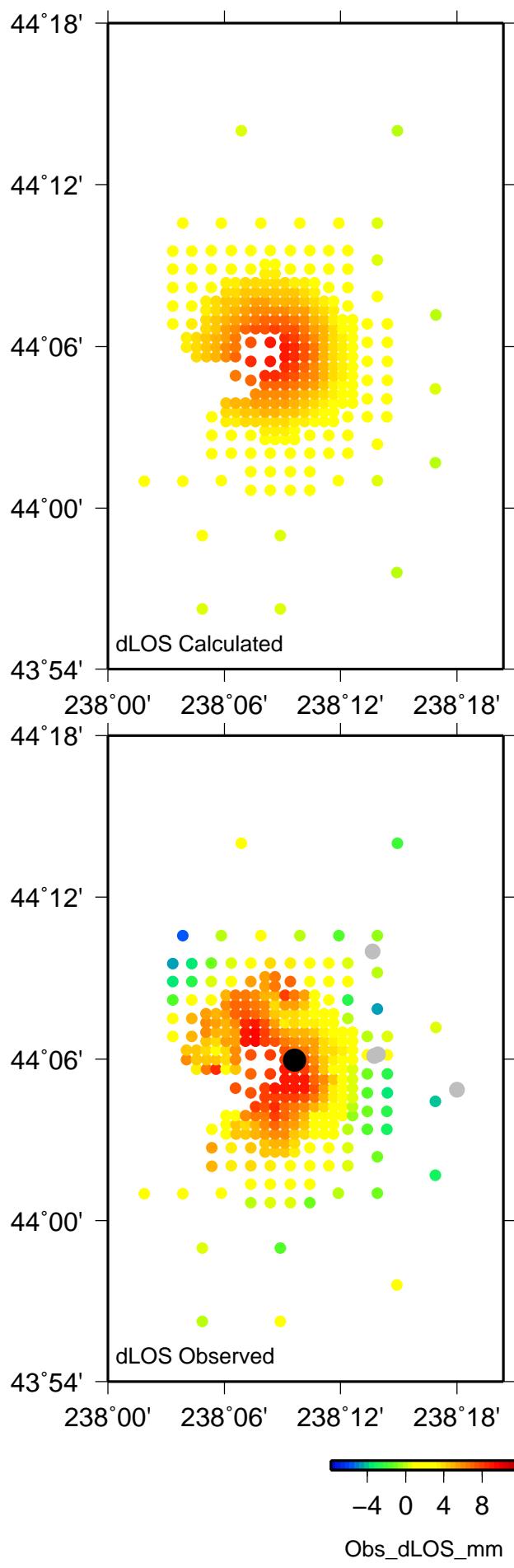




Name: VA45 : Time 2006.803 – 2008.719

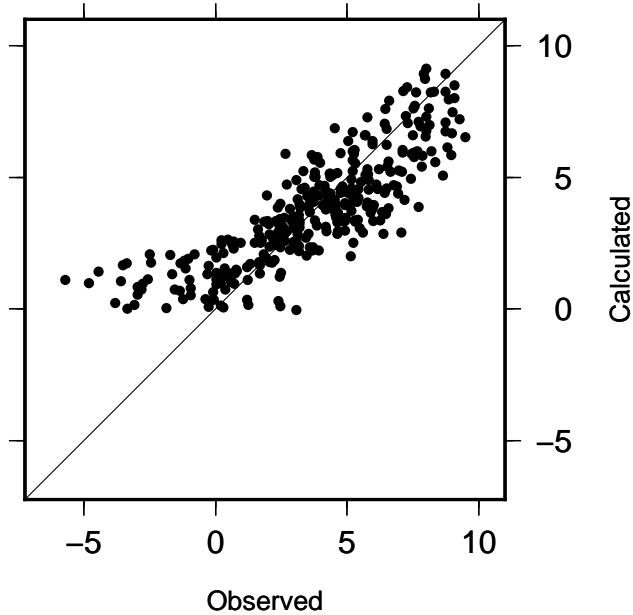
Model: sis1 N: 315 Nrms: 0.720 Wrms: 3.401  
H: -12.400 I: 22.800 Offset: -2.636

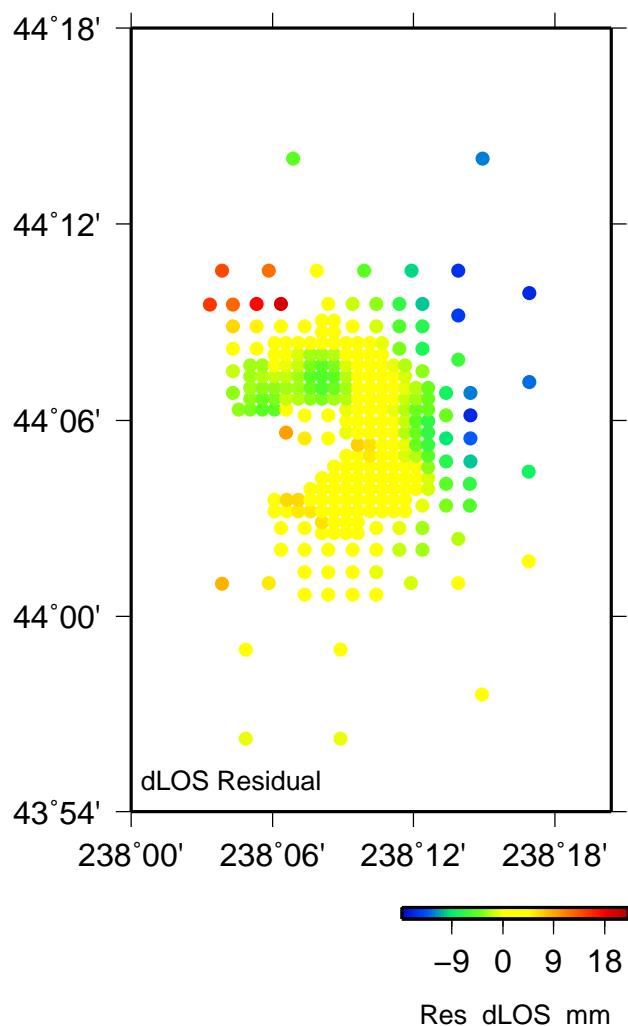
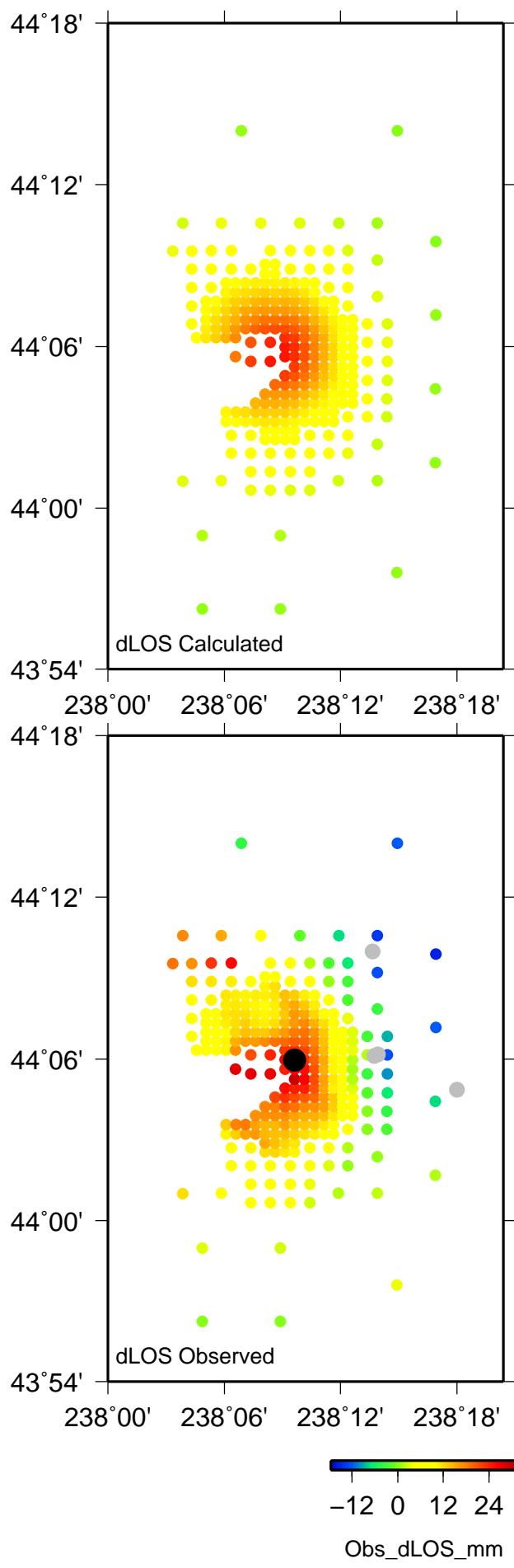




Name: VA46 : Time 2007.527 – 2008.580

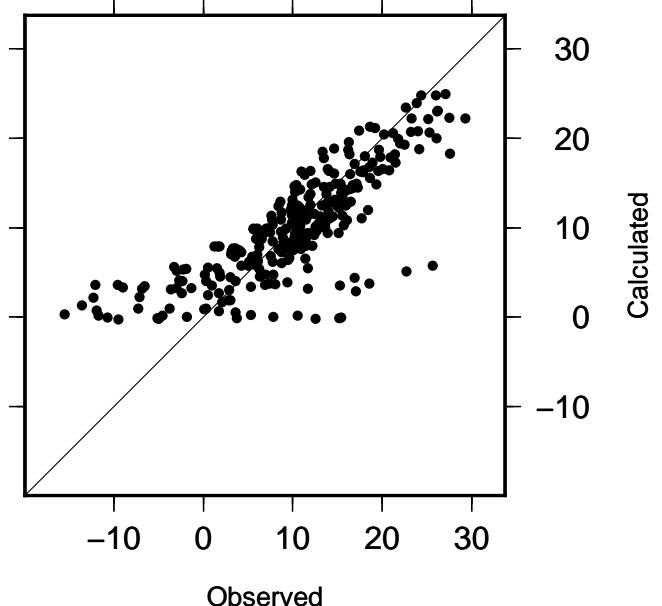
Model: sis1 N: 313 Nrms: 0.053 Wrms: 0.115  
H: -11.900 I: 26.700 Offset: 0.685

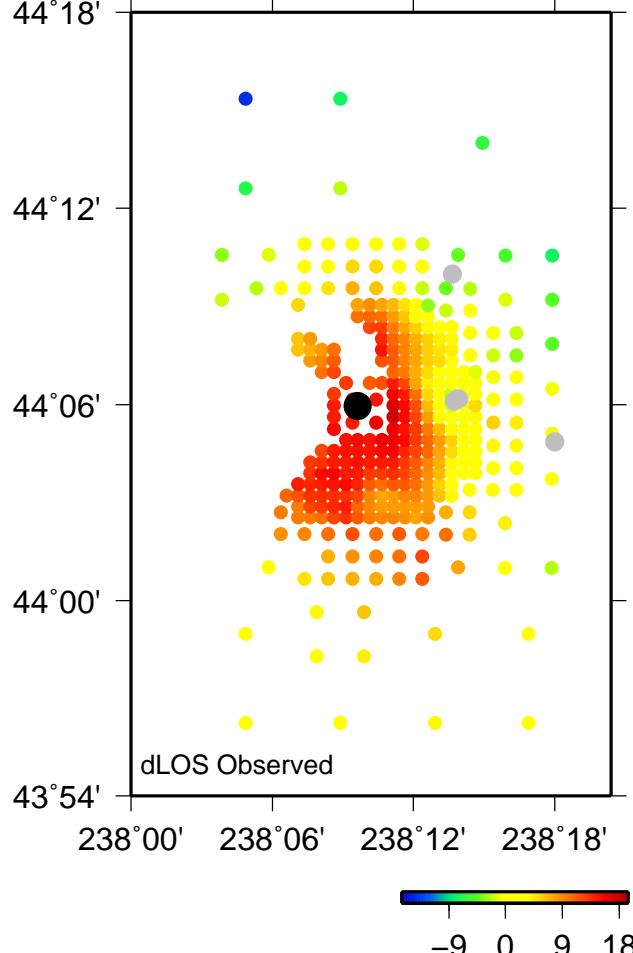
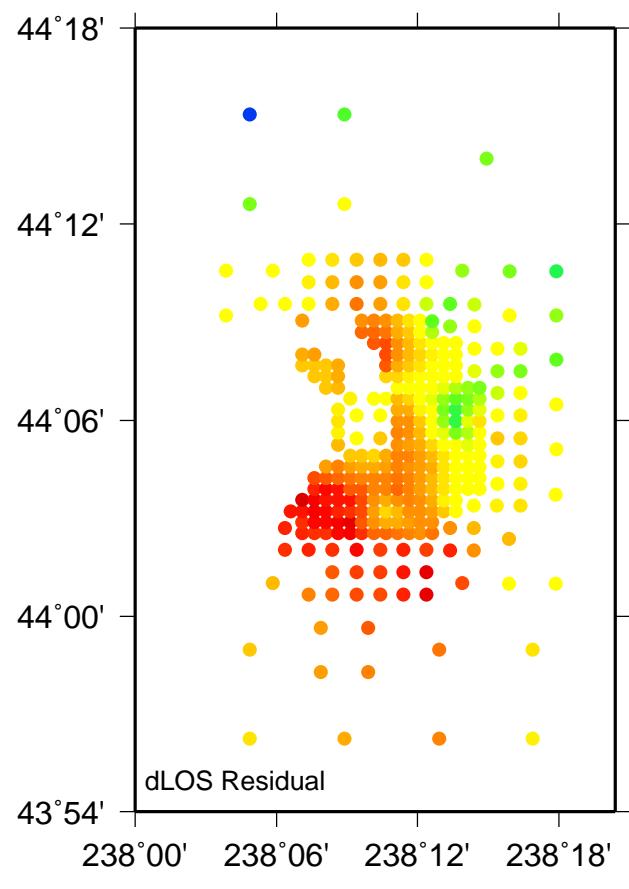
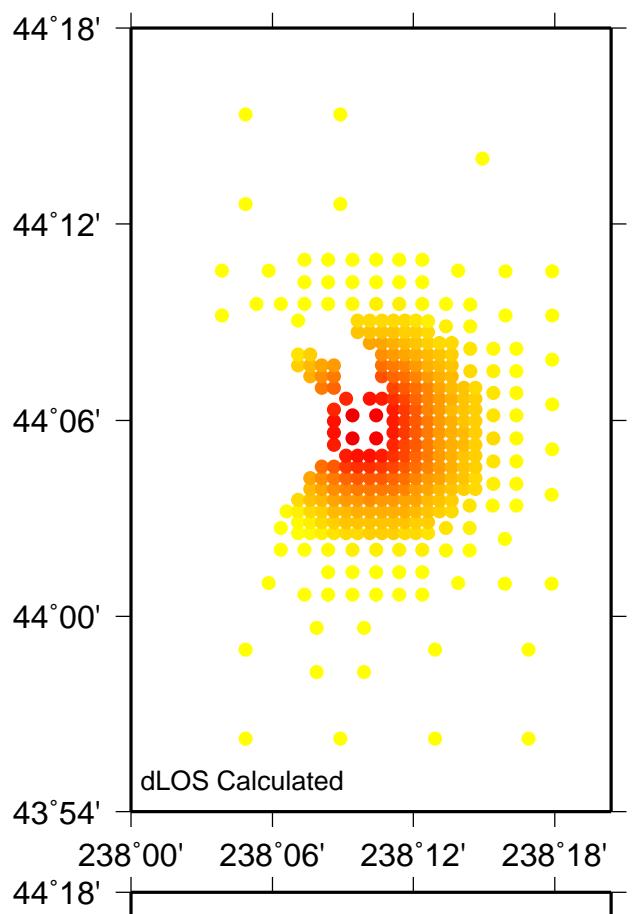




Name: VA47 : Time 2007.666 – 2010.732

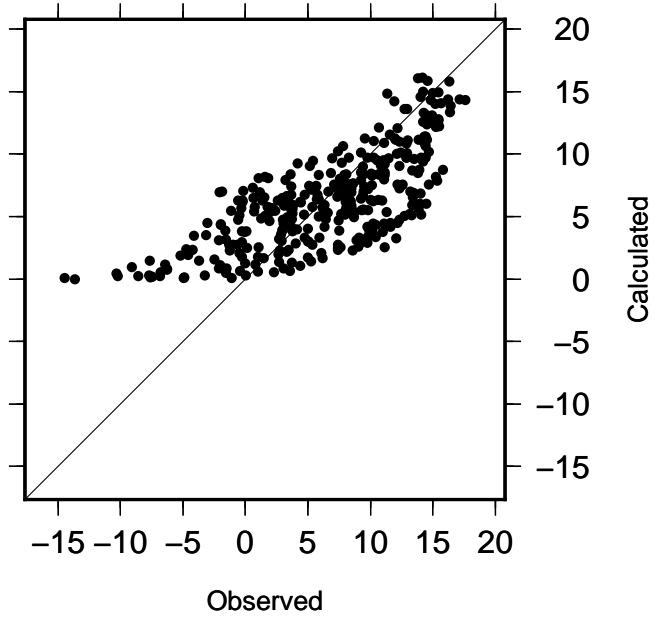
Model: sis1 N: 289 Nrms: 0.484 Wrms: 2.530  
H: -12.400 I: 22.800 Offset: 4.901

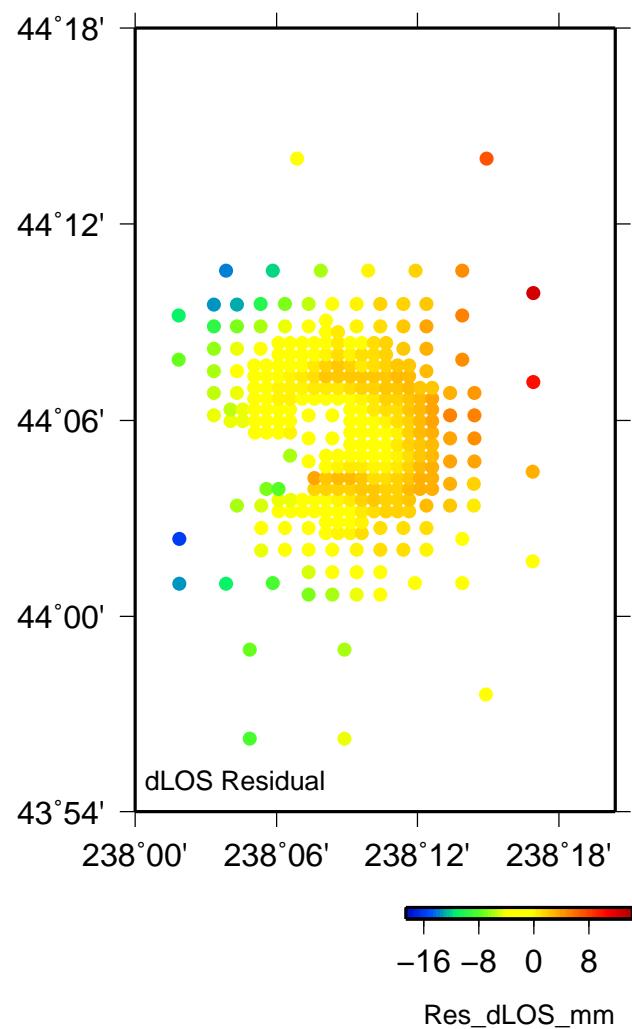
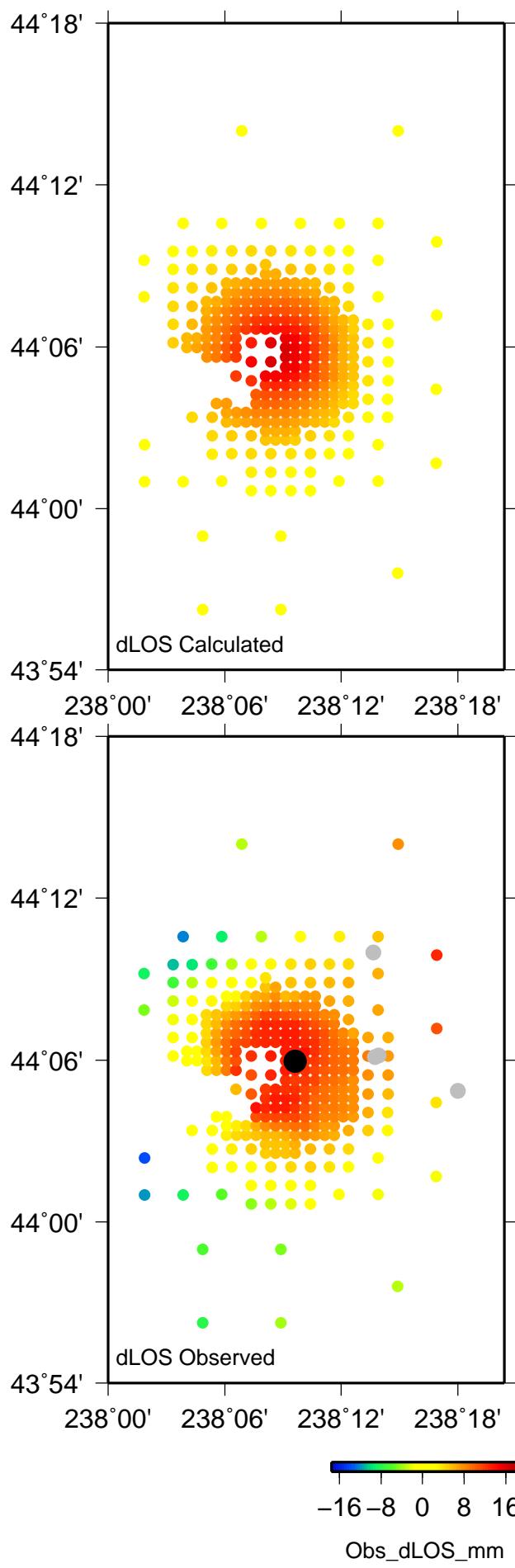




Name: VD48 : Time 2008.518 – 2010.723

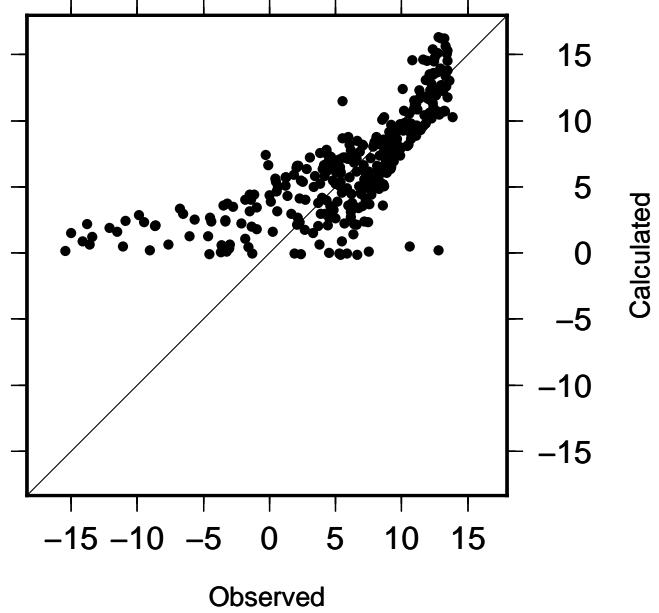
Model: sis1 N: 336 Nrms: 0.267 Wrms: 0.669  
H: -167.800 I: 24.500 Offset: -2.716

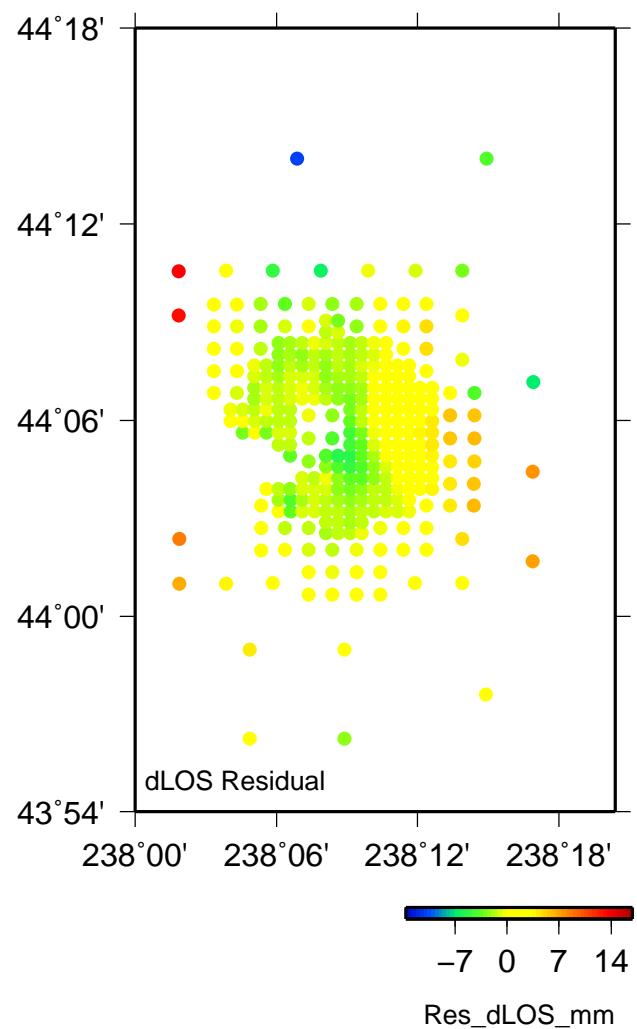
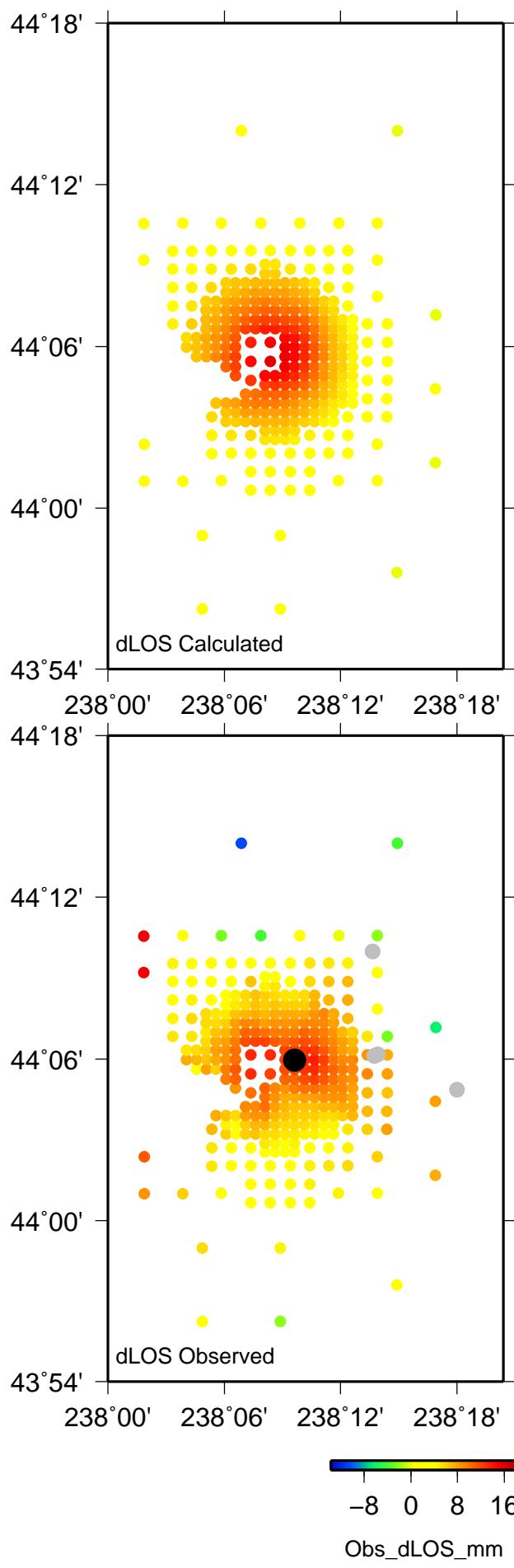




Name: VA49 : Time 2008.528 – 2010.540

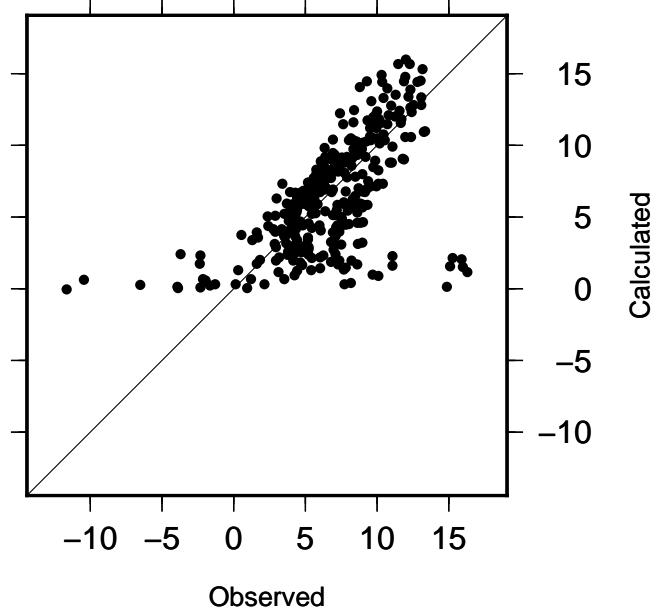
Model: sis1 N: 326 Nrms: 1.322 Wrms: 2.964  
H: -12.400 I: 22.800 Offset: -3.274

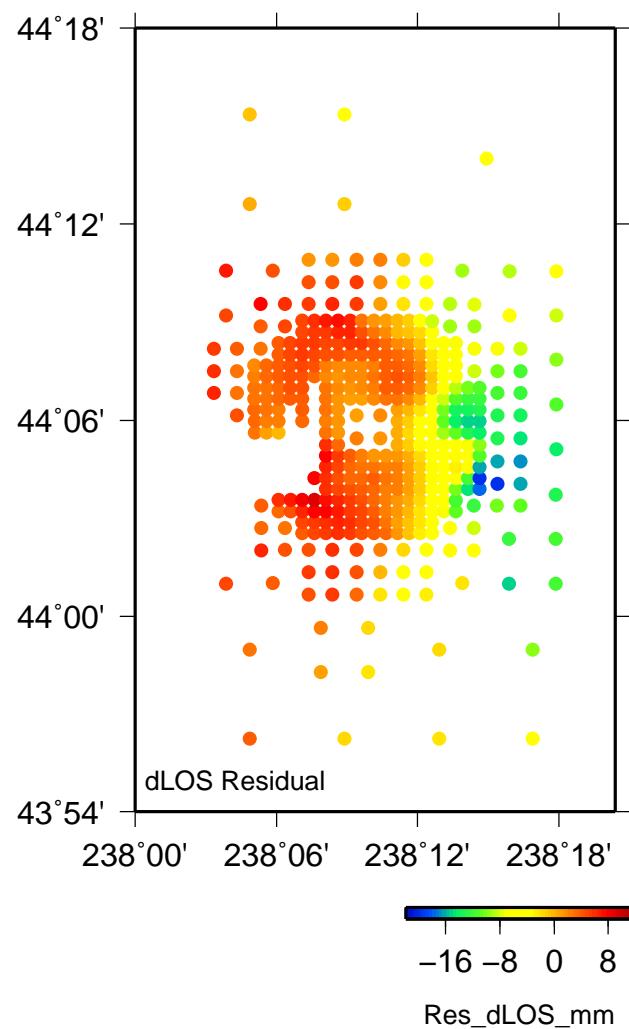
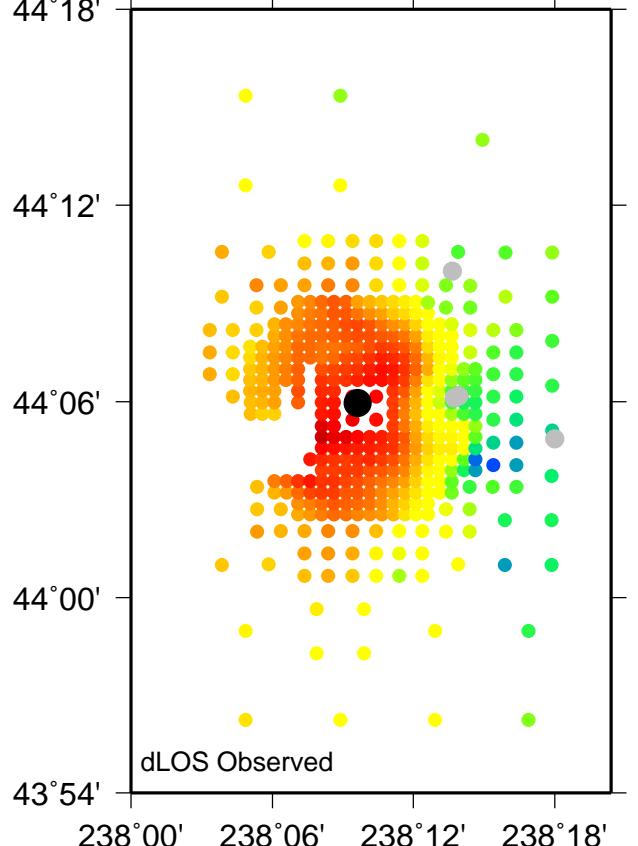
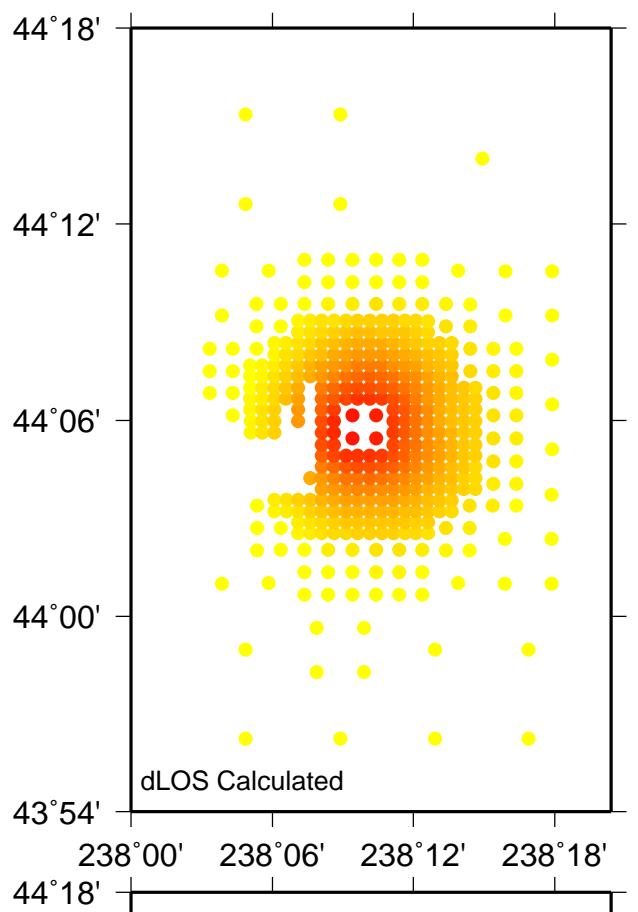




Name: VA50 : Time 2008.580 – 2010.592

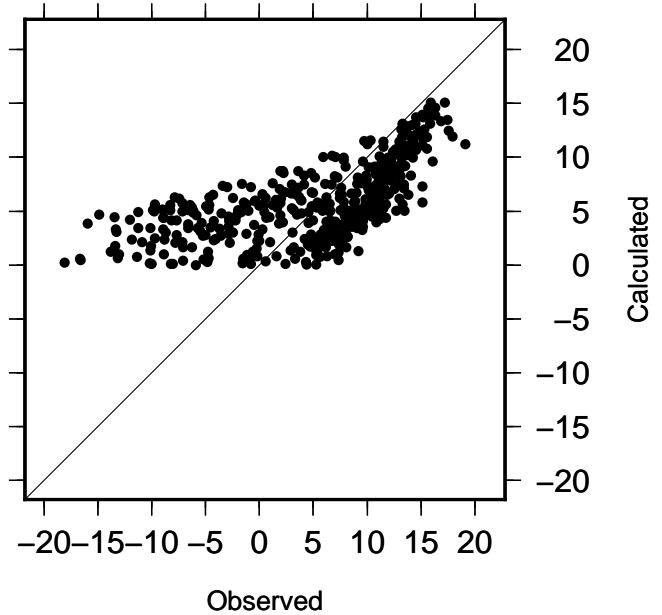
Model: sis1 N: 328 Nrms: 0.449 Wrms: 1.004  
H: -11.900 I: 26.700 Offset: -0.999

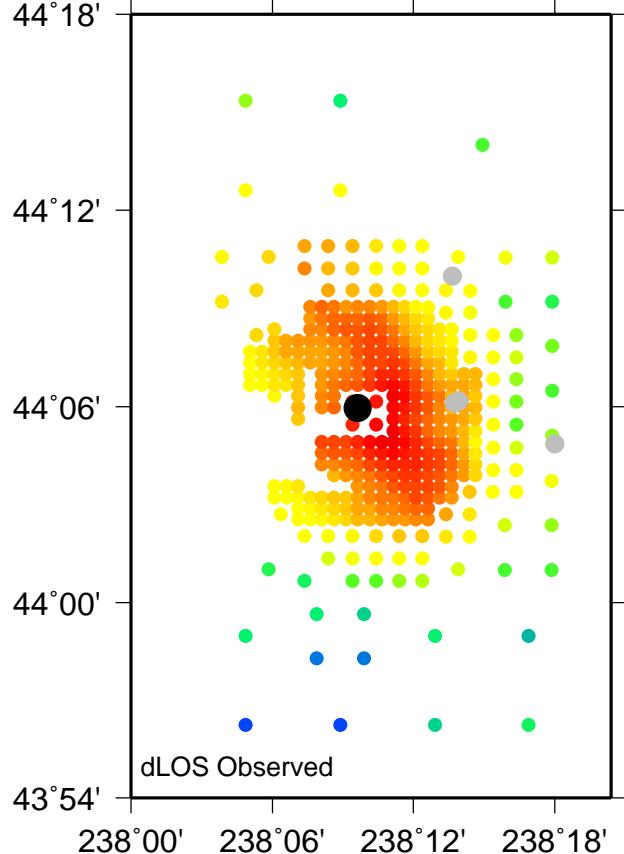
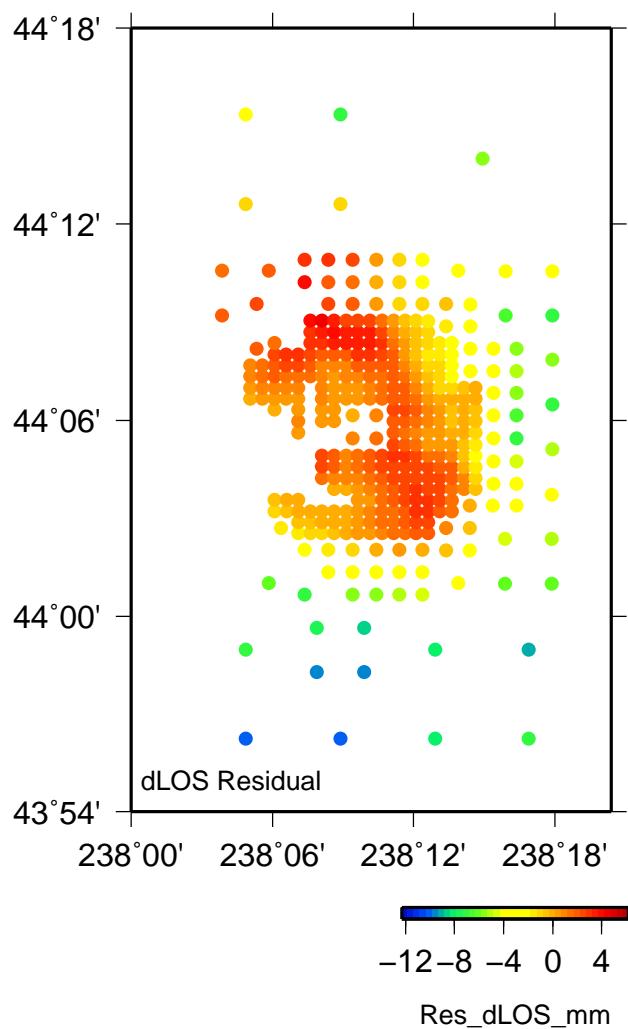
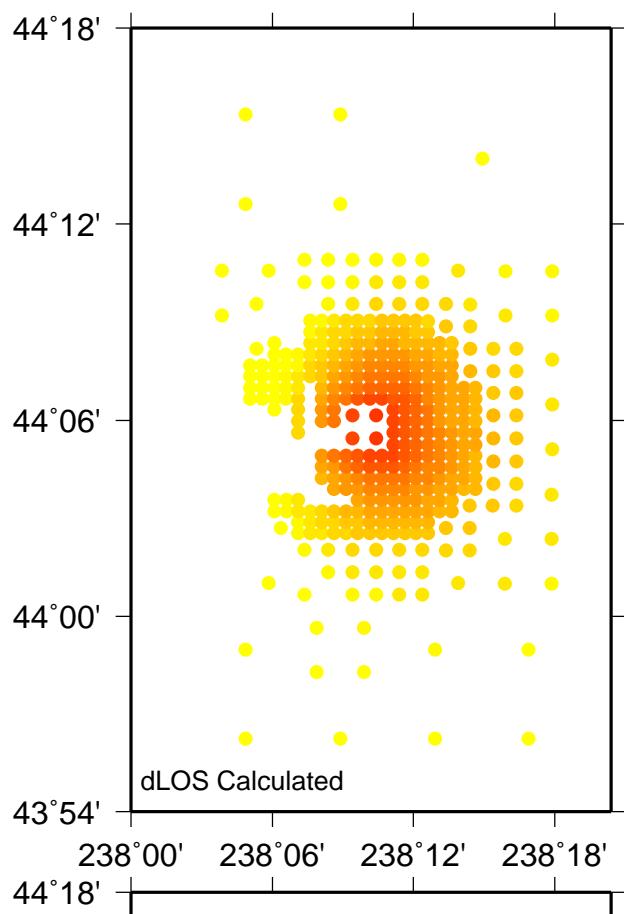




Name: VD51 : Time 2008.666 – 2010.679

Model: sis1 N: 430 Nrms: 0.391 Wrms: 0.881  
H: -167.300 I: 20.500 Offset: -5.767

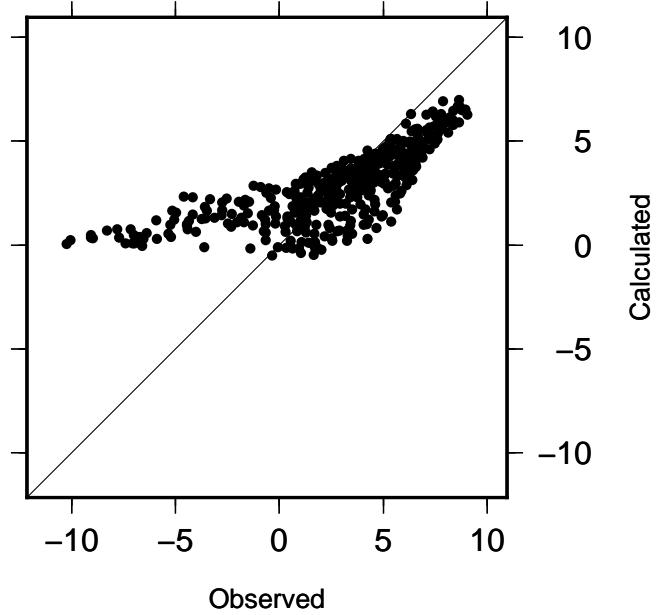


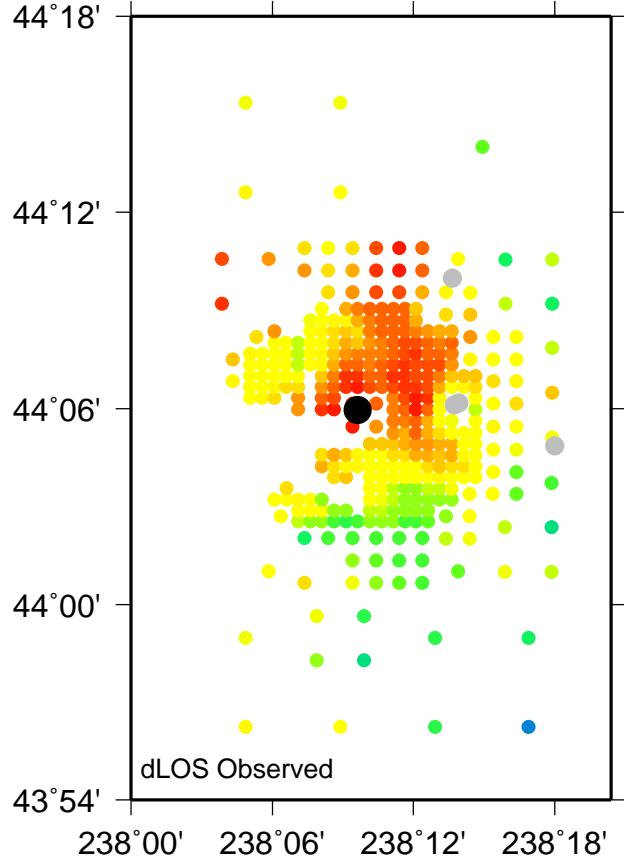
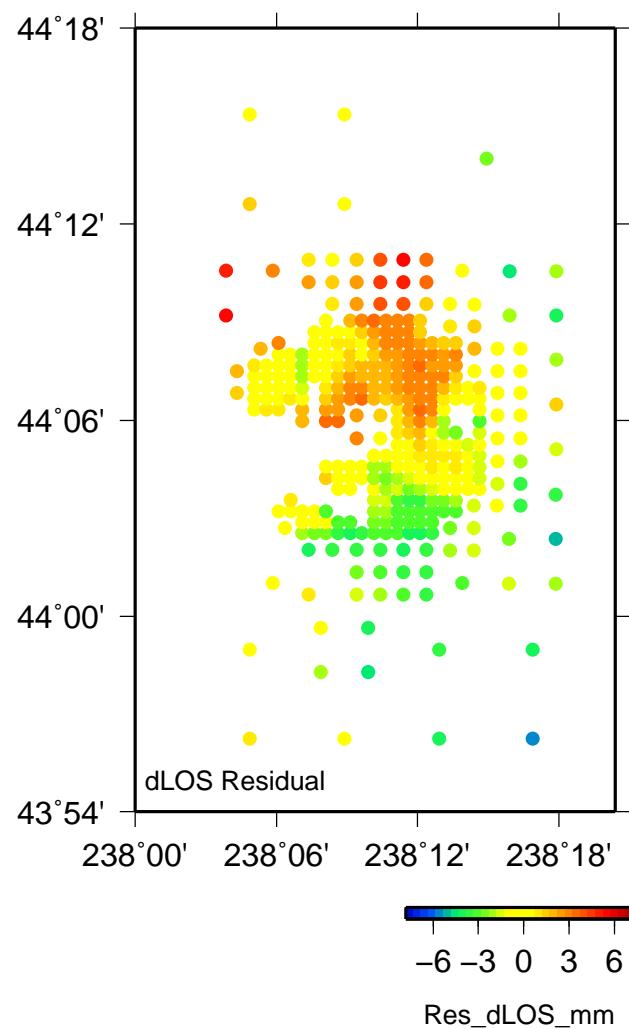
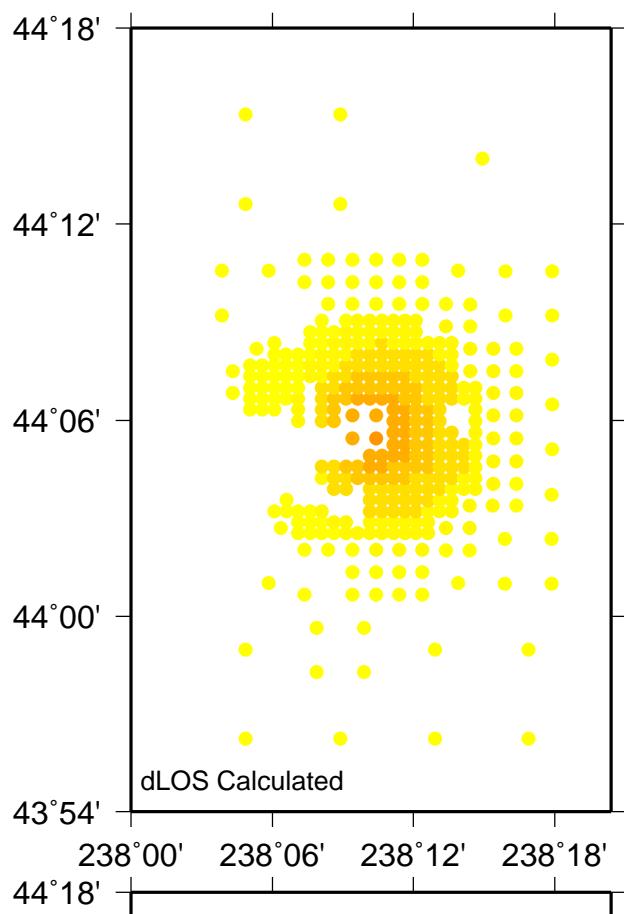


Obs\_dLOS\_mm  
-10 -5 0 5 10

Name: TD52 : Time 2012.643 – 2014.631

Model: sis1 N: 383 Nrms: 1.768 Wrms: 3.596  
H: 189.200 I: 44.500 Offset: -6.205

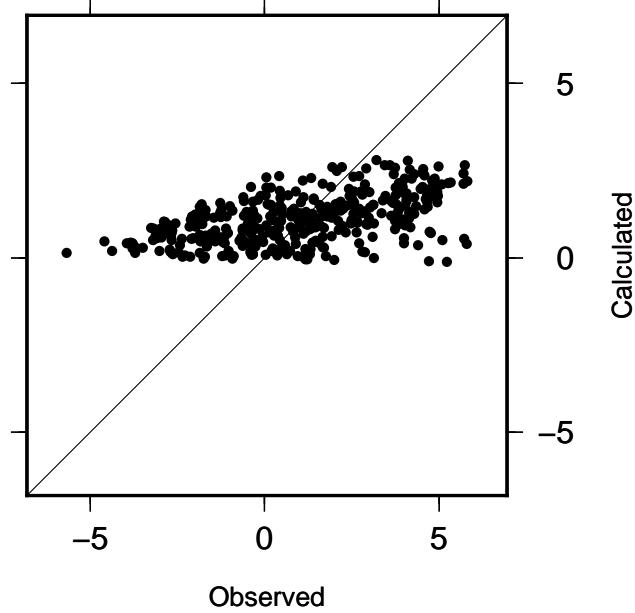


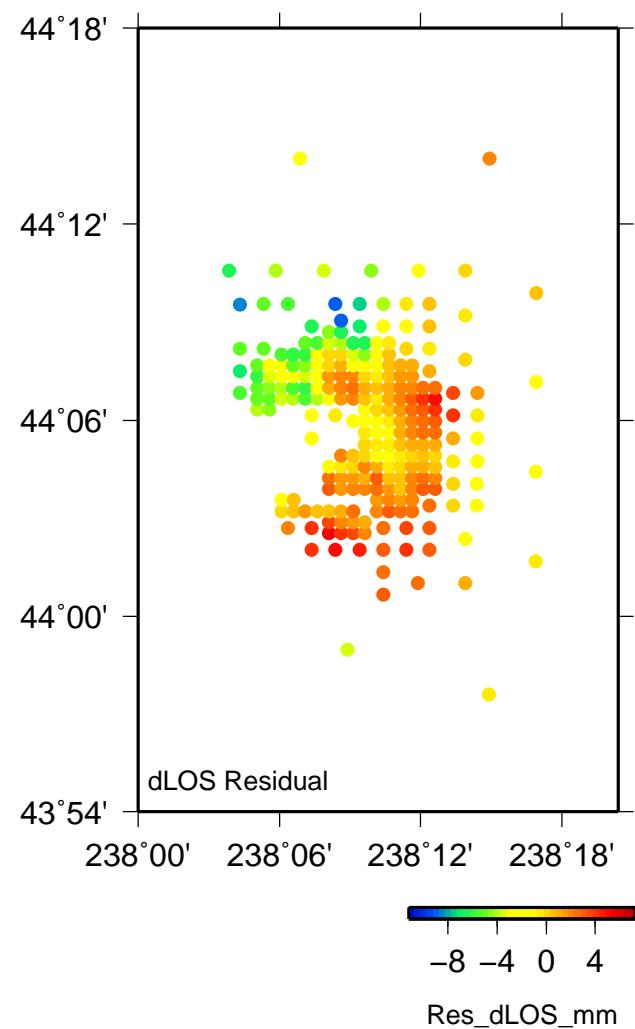
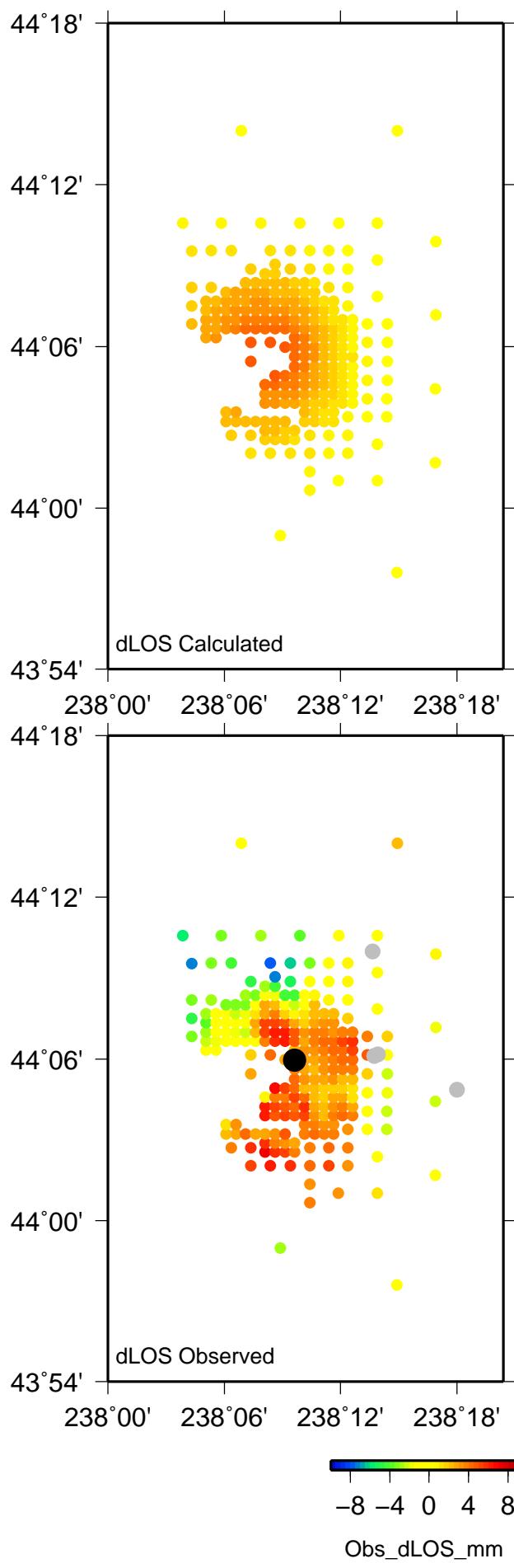


Obs\_dLOS\_mm

Name: SD53 : Time 2015.438 – 2016.817

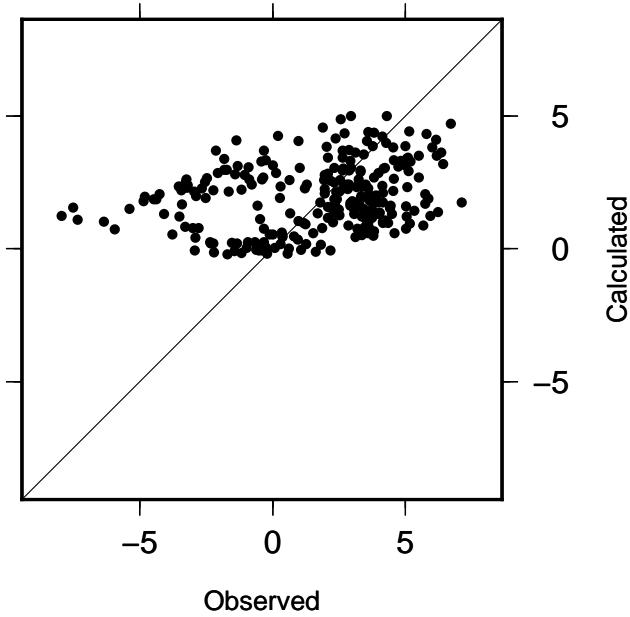
Model: sis1 N: 368 Nrms: 0.231 Wrms: 0.485  
H: -170.100 I: 39.700 Offset: -2.027

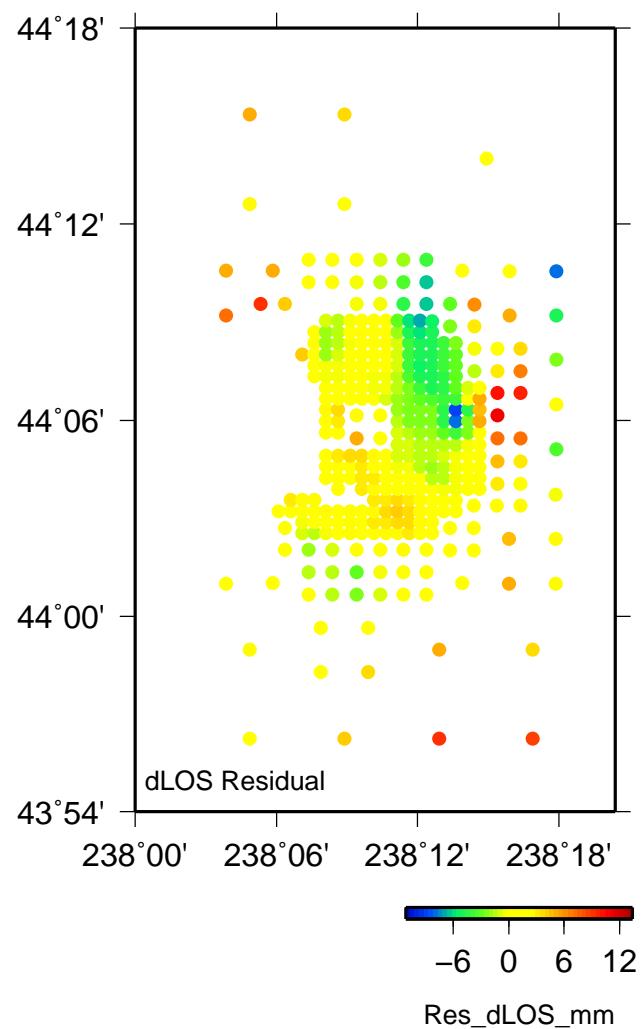
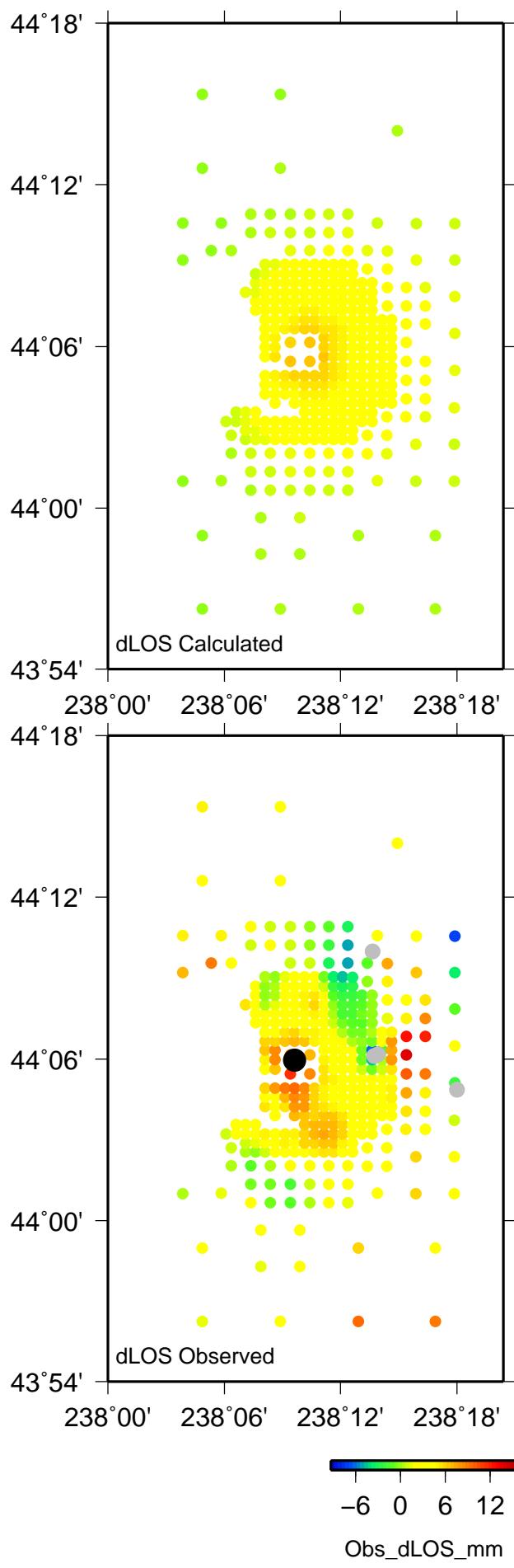




Name: SA54 : Time 2015.477 – 2017.825

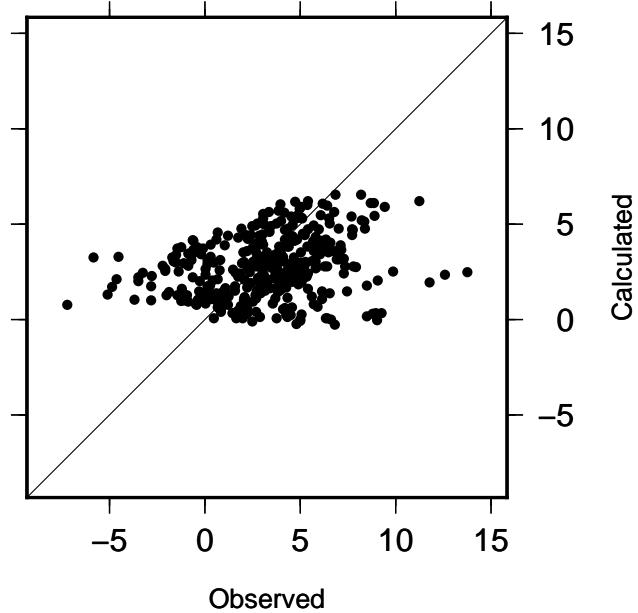
Model: sis1 N: 255 Nrms: 0.157 Wrms: 0.381  
H: -10.000 I: 38.900 Offset: -0.427

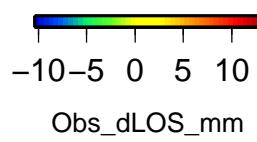
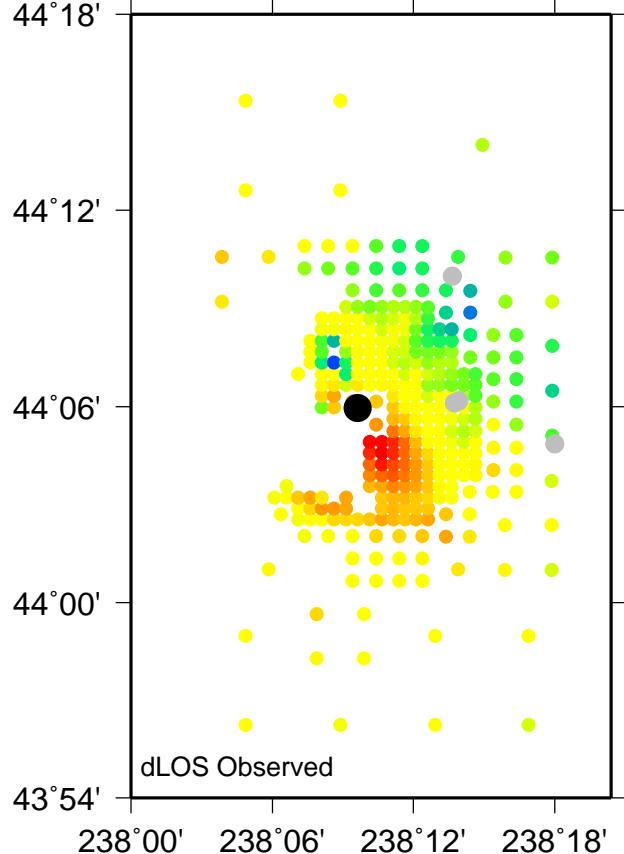
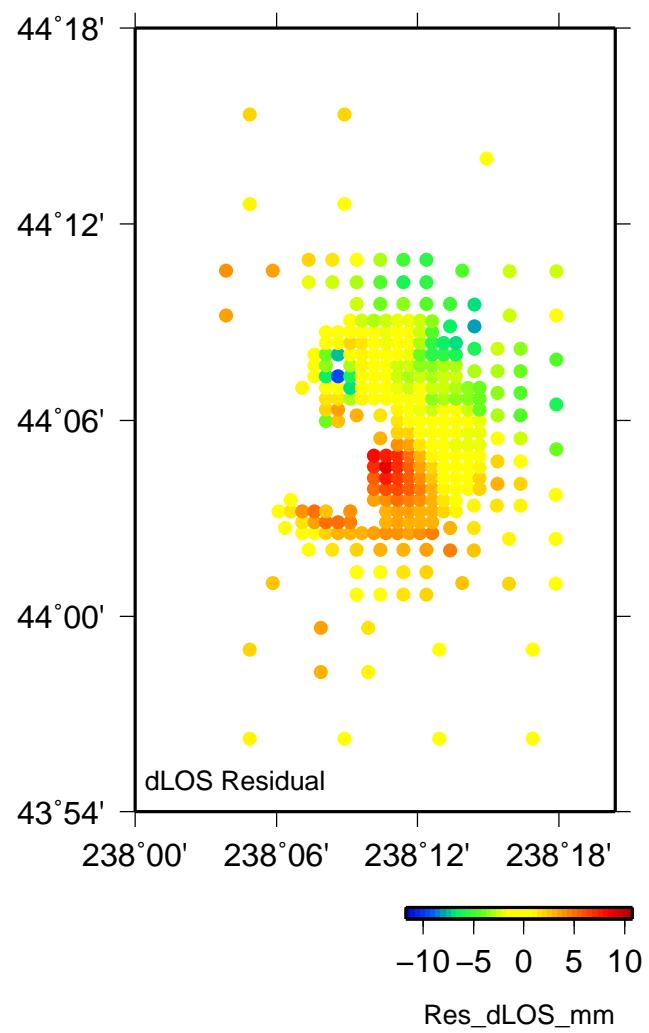
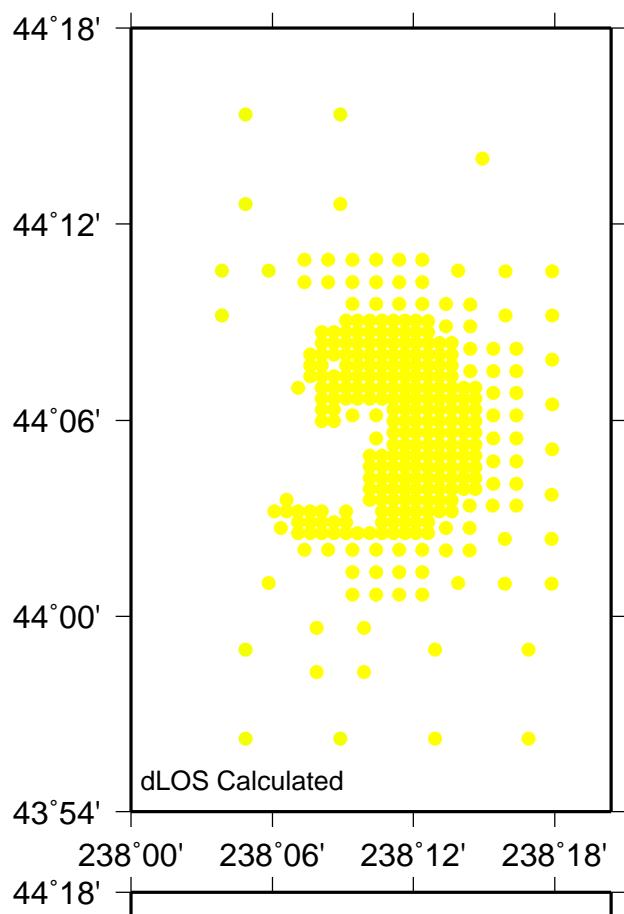




Name: SD55 : Time 2015.504 – 2018.690

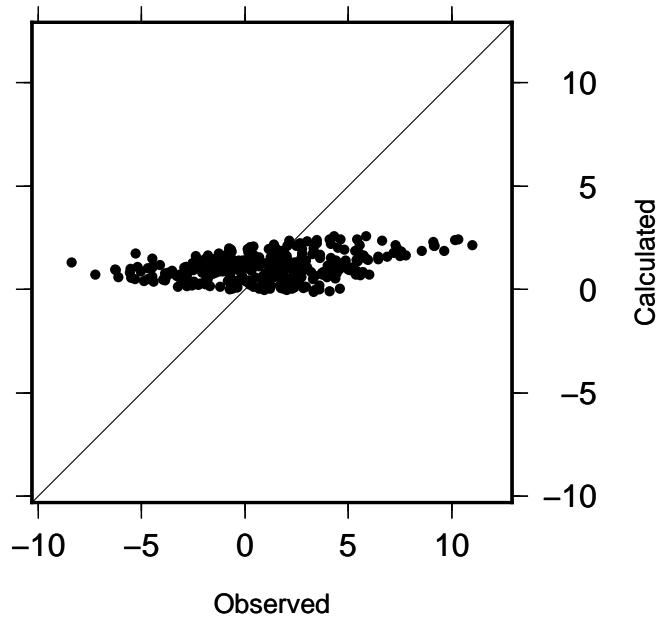
Model: sis1 N: 361 Nrms: 0.686 Wrms: 1.566  
H: -170.100 I: 39.700 Offset: 5.972

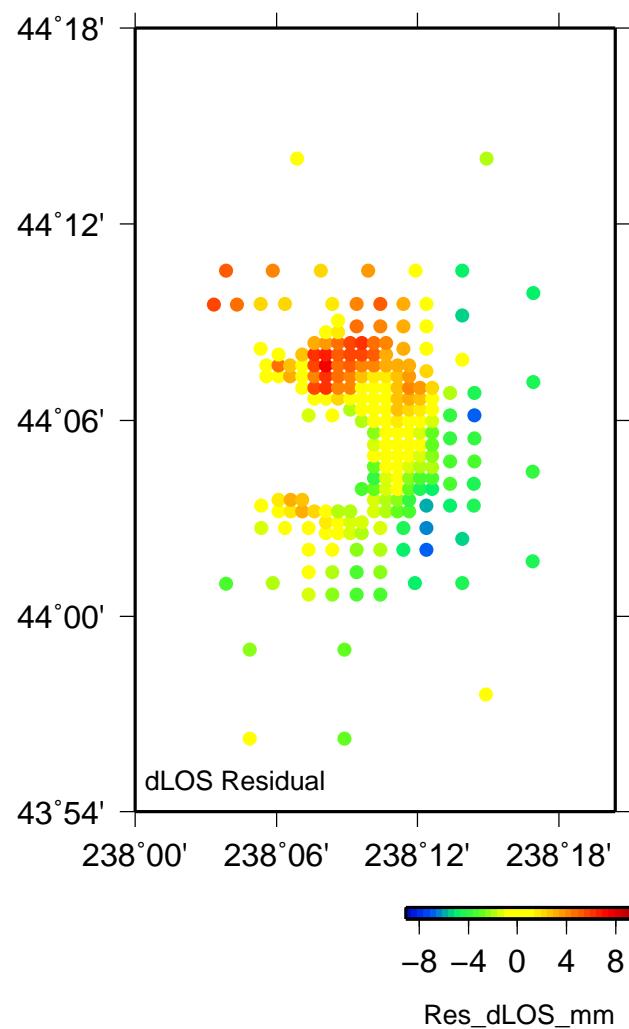
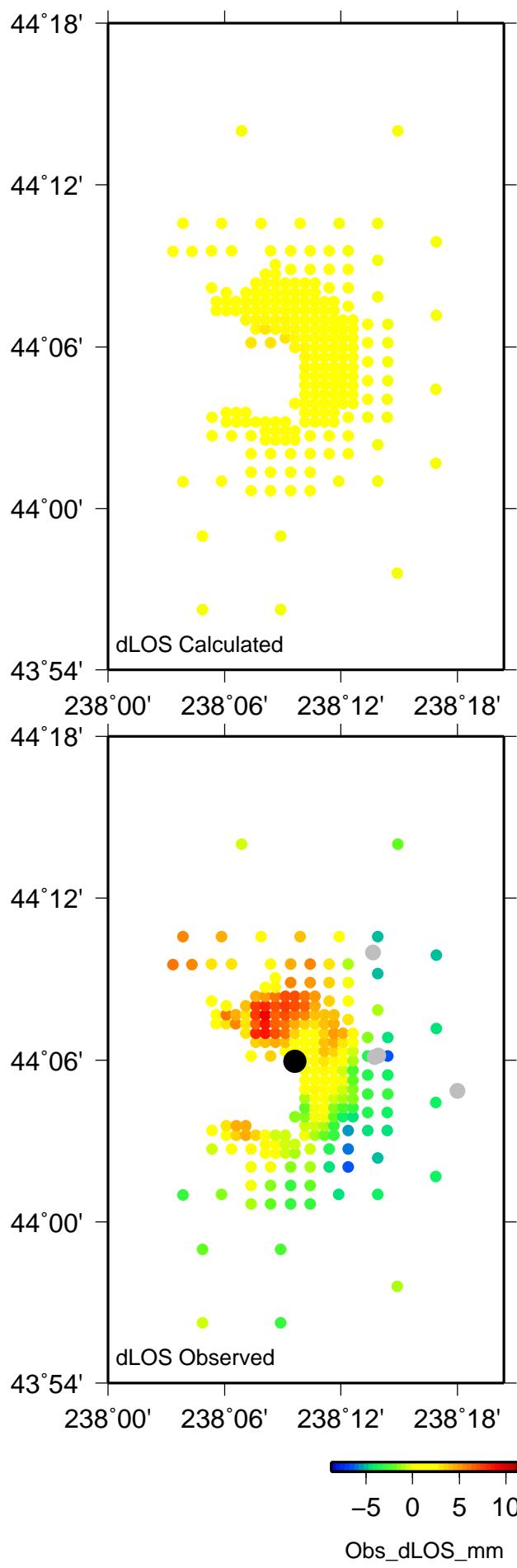




Name: SD56 : Time 2016.424 – 2017.770

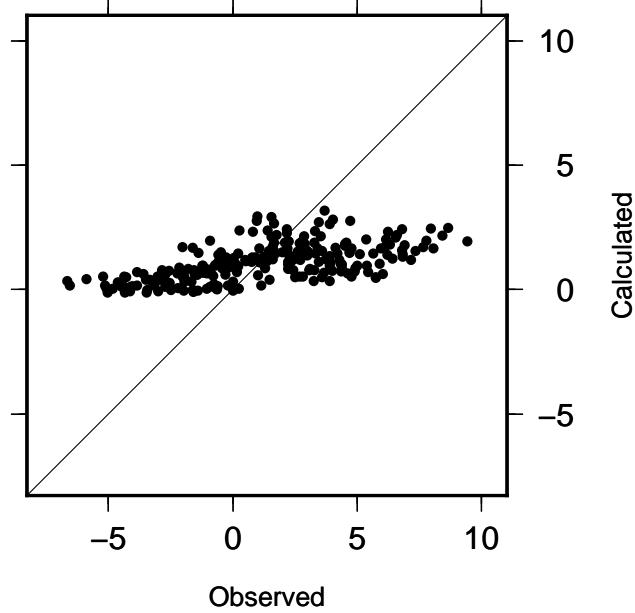
Model: sis1 N: 327 Nrms: 0.106 Wrms: 0.237  
H: -170.100 I: 39.700 Offset: -0.145

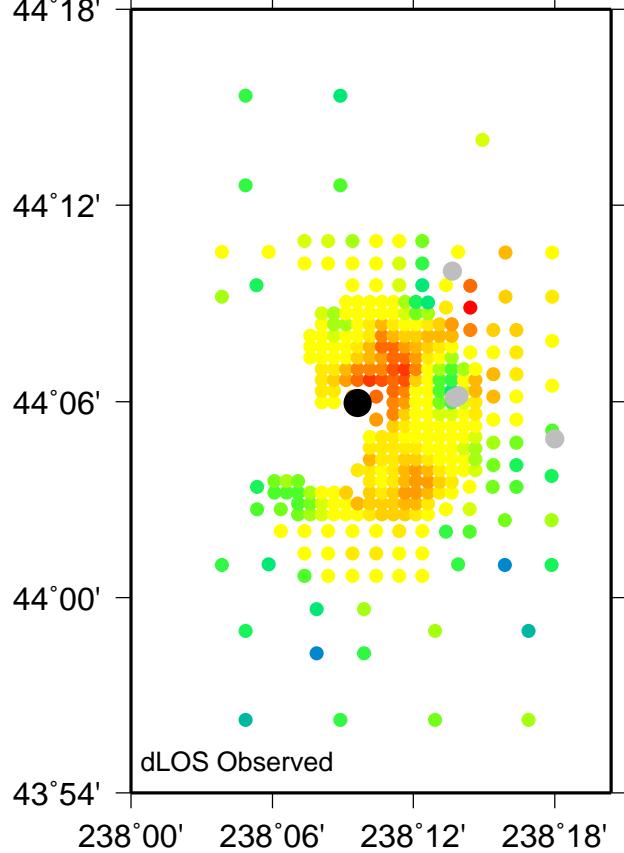
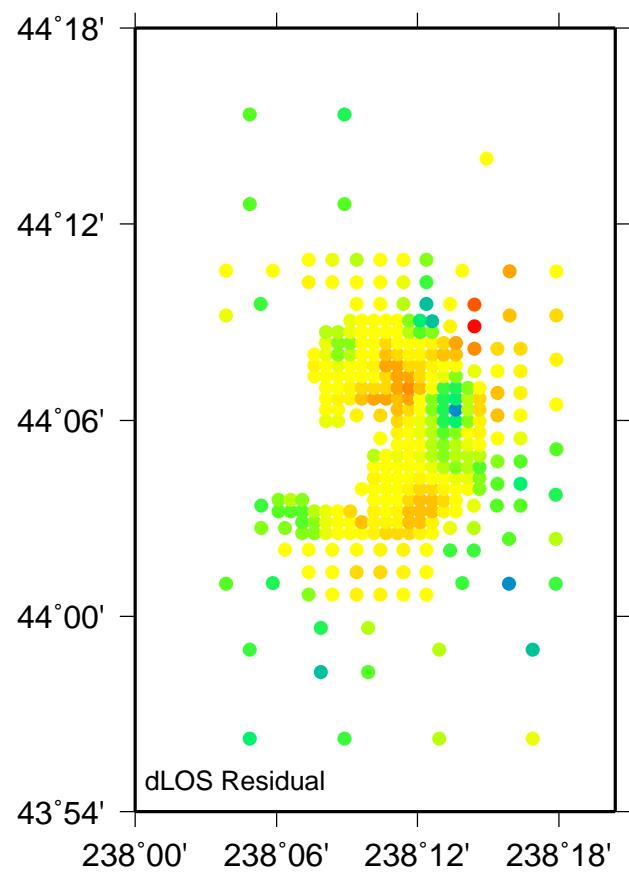
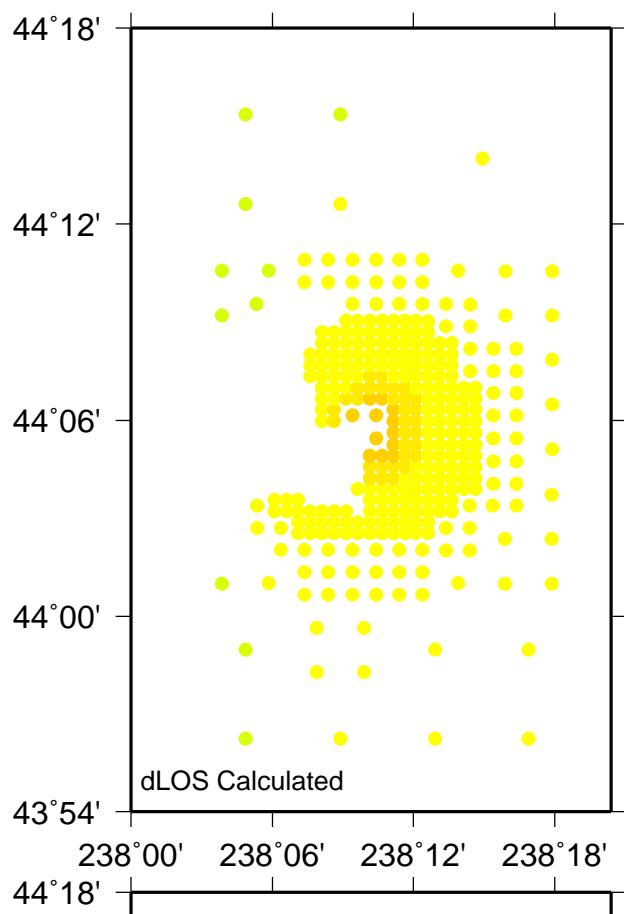




Name: SA57 : Time 2017.496 – 2018.877

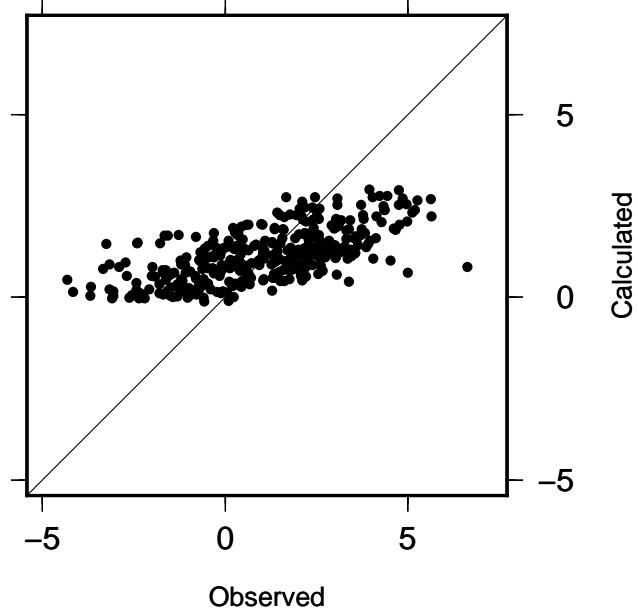
Model: sis1 N: 237 Nrms: 0.040 Wrms: 0.089  
H: -10.000 I: 38.900 Offset: -1.683

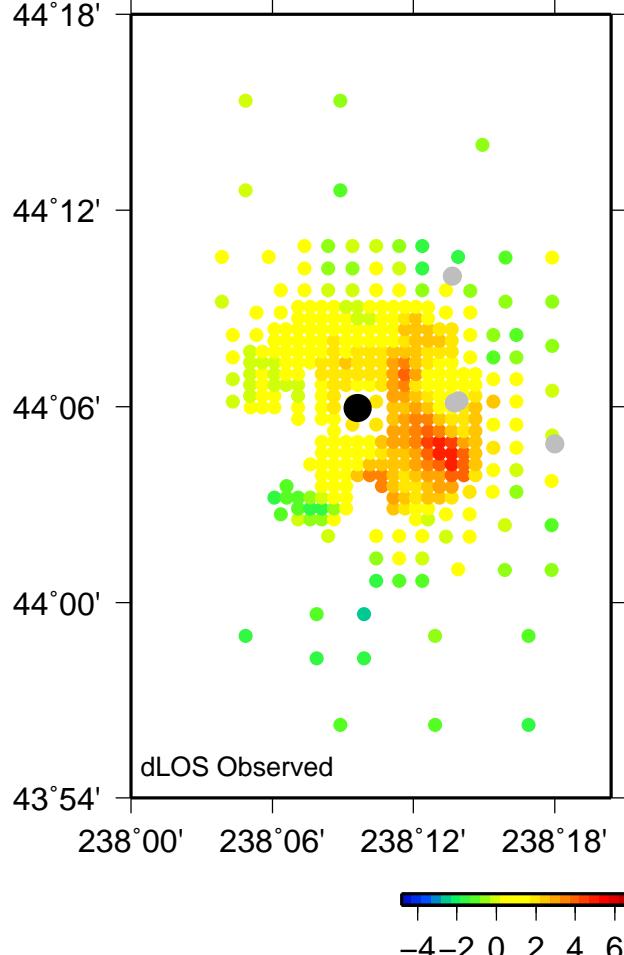
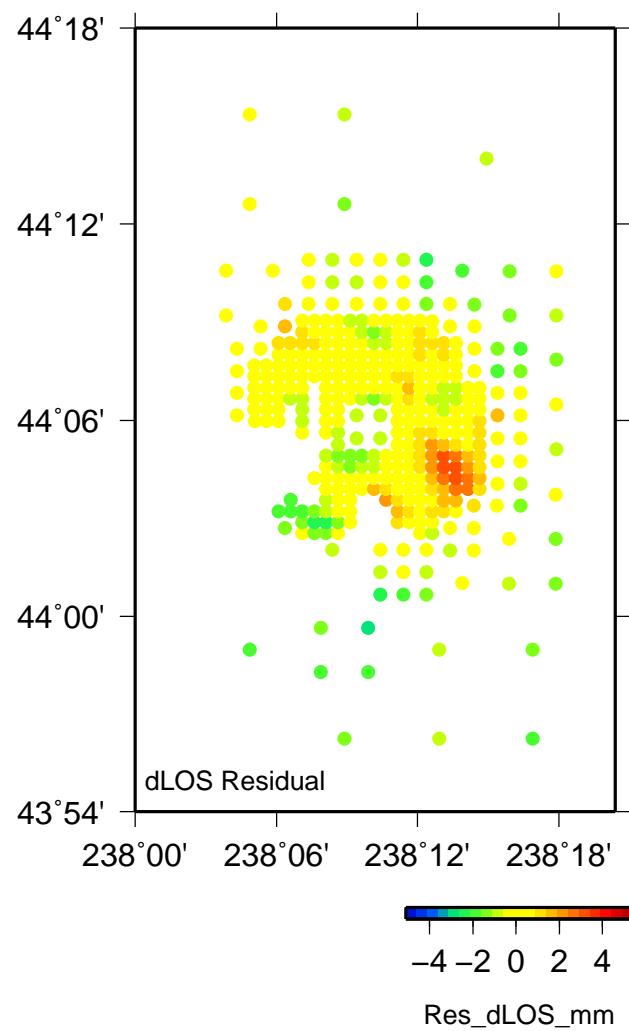
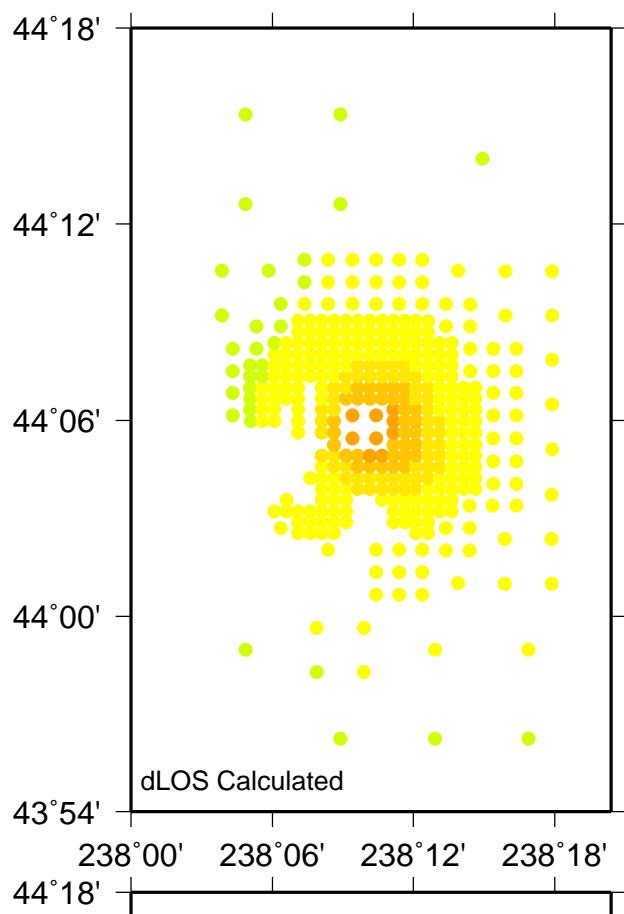




Name: SD58 : Time 2017.507 – 2018.855

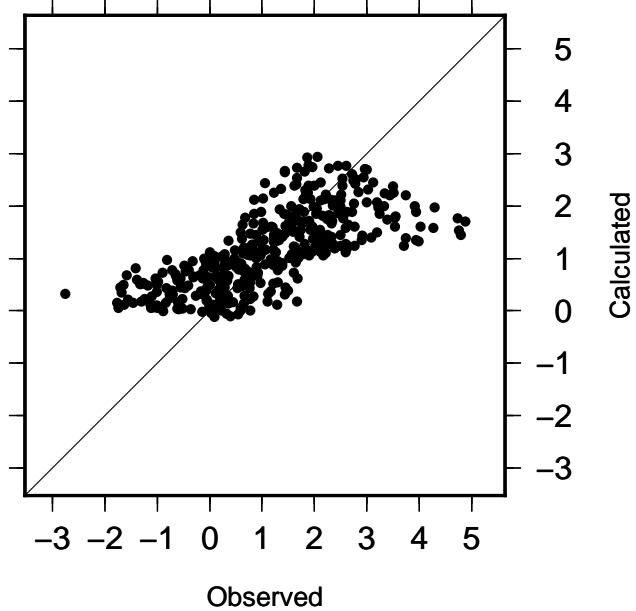
Model: sis1 N: 345 Nrms: 0.297 Wrms: 0.610  
H: -170.100 I: 39.700 Offset: -1.245

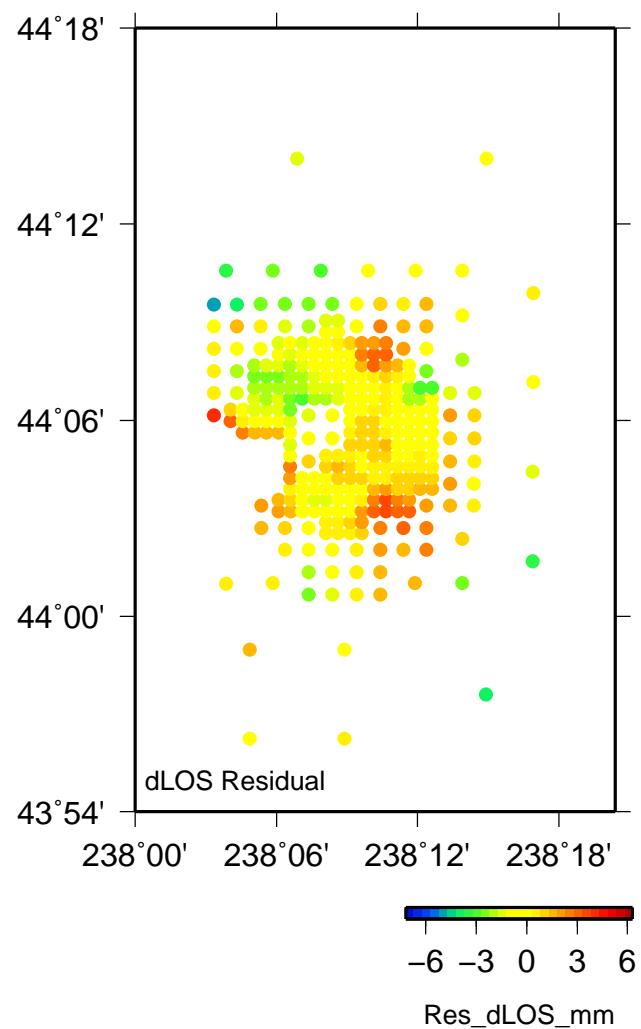
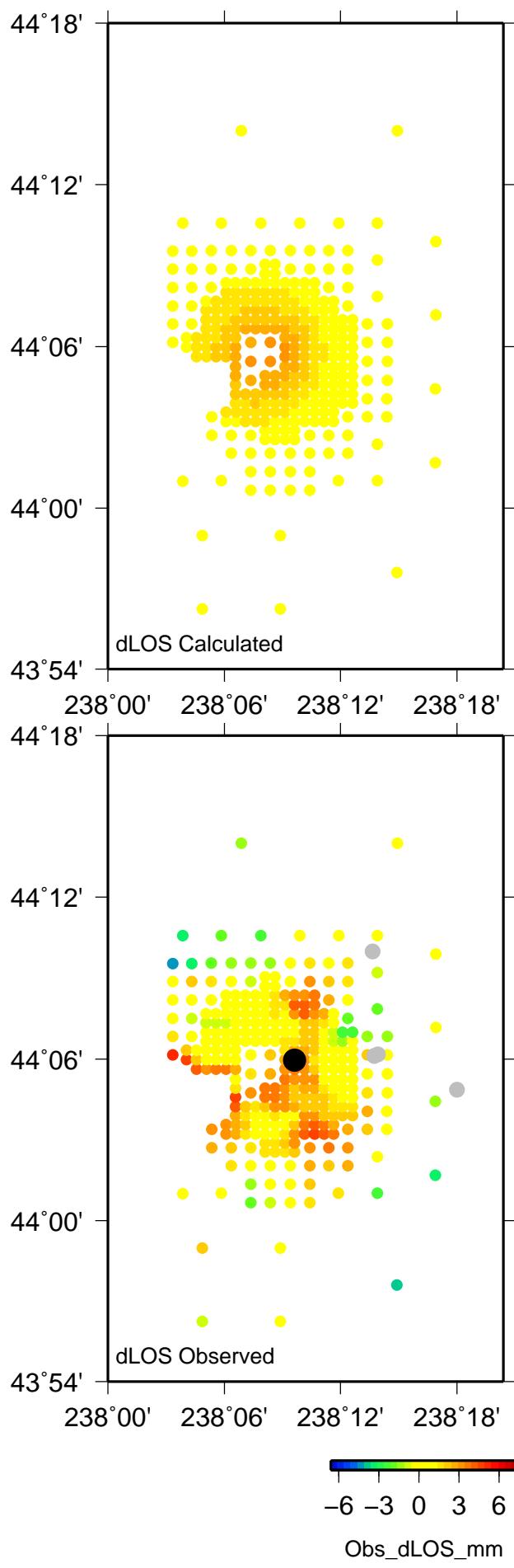




Name: SD59 : Time 2018.427 – 2019.874

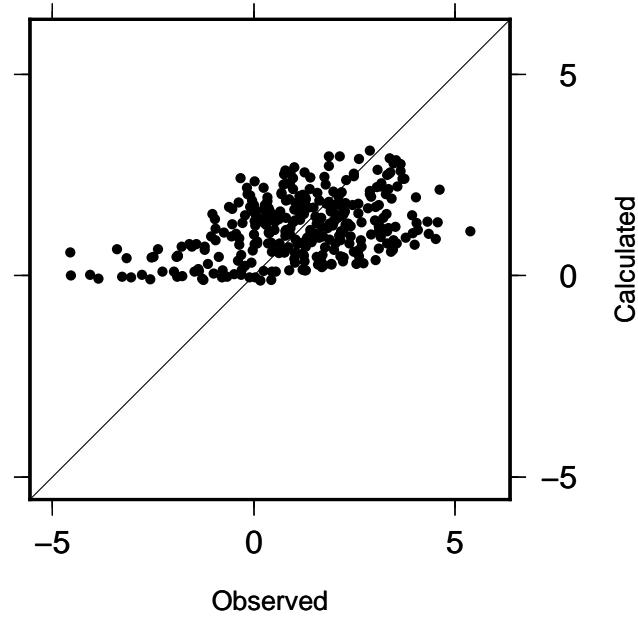
Model: sis1 N: 389 Nrms: 0.065 Wrms: 0.131  
H: -170.100 I: 39.700 Offset: -0.723

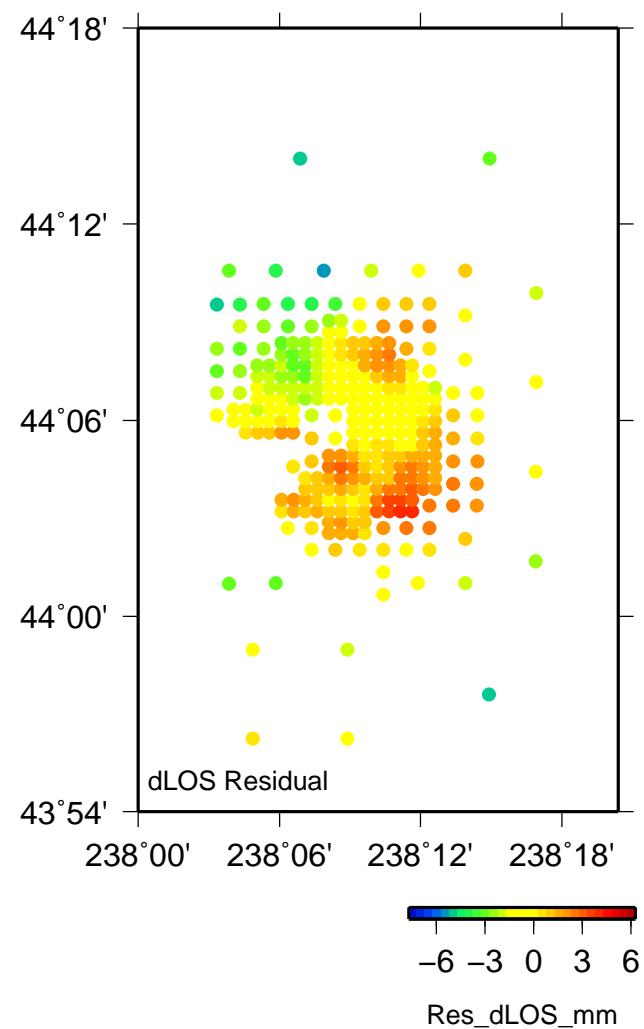
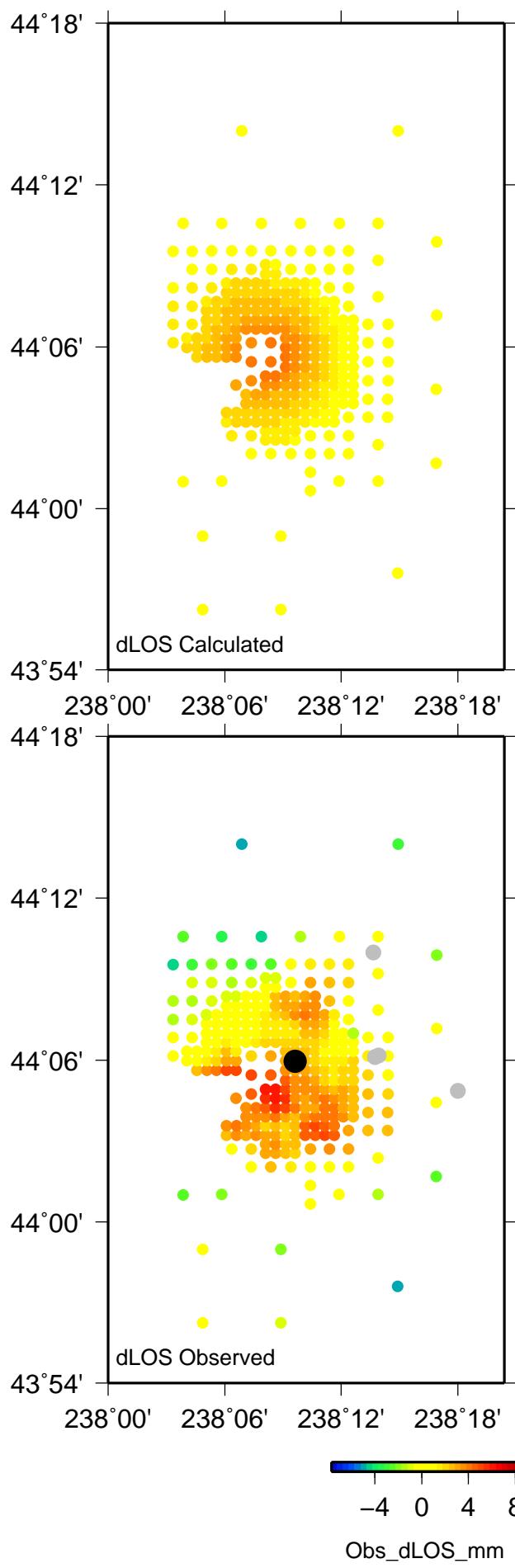




Name: SA60 : Time 2018.515 – 2019.896

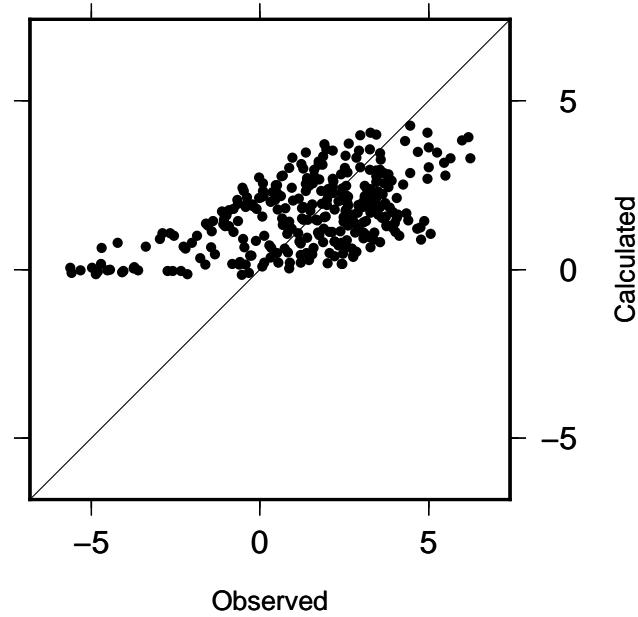
Model: sis1 N: 321 Nrms: 0.093 Wrms: 0.196  
H: -10.000 I: 38.900 Offset: -1.841

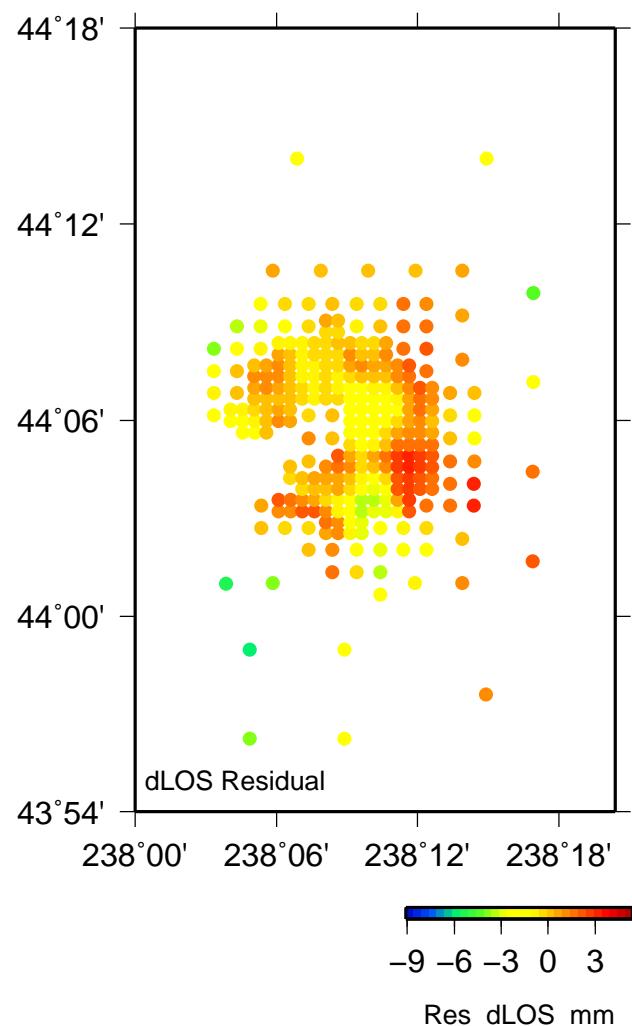
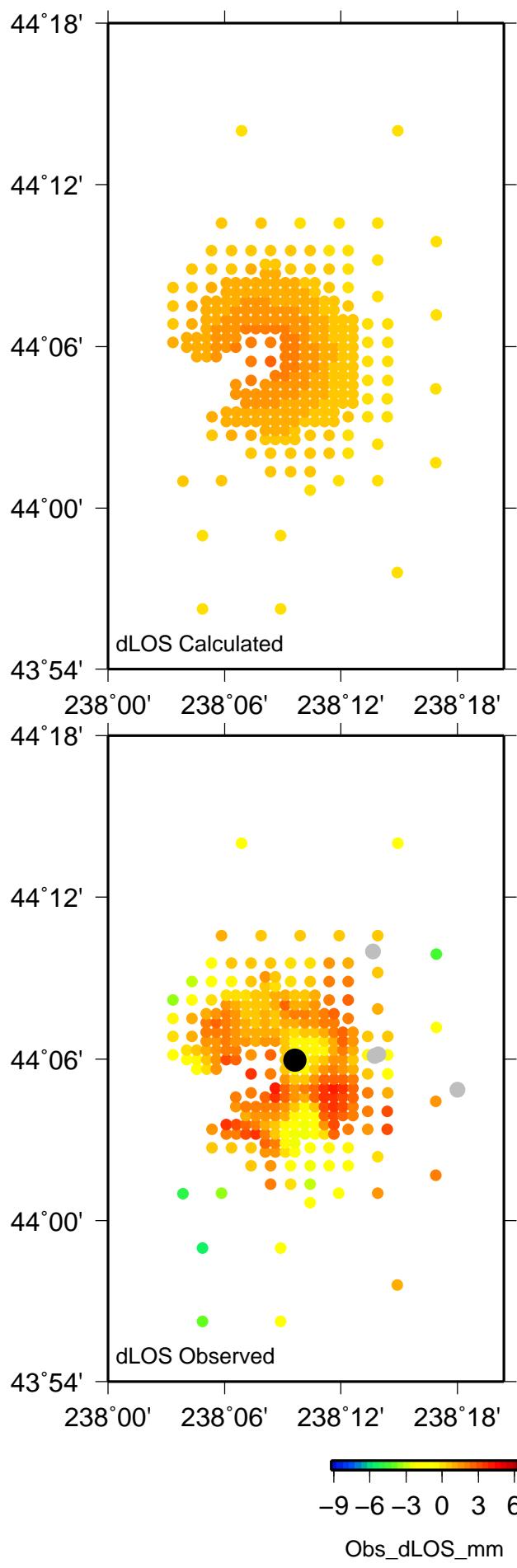




Name: SA61 : Time 2018.515 – 2020.749

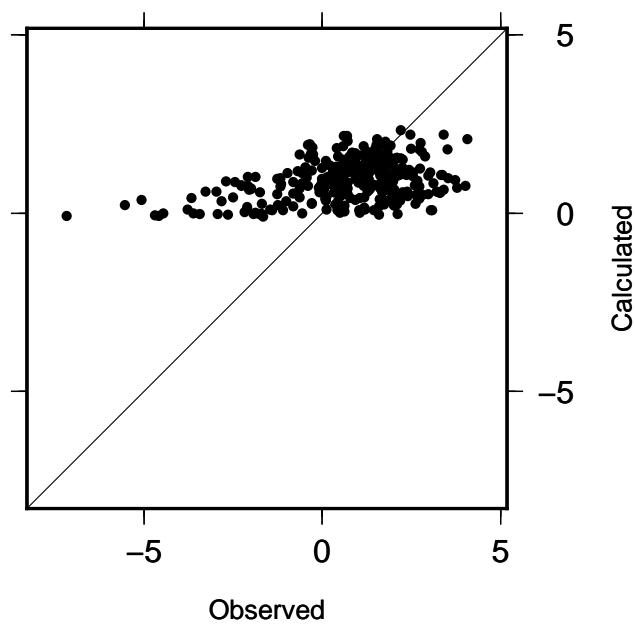
Model: sis1 N: 307 Nrms: 1.004 Wrms: 2.079  
H: -10.000 I: 38.900 Offset: -4.274

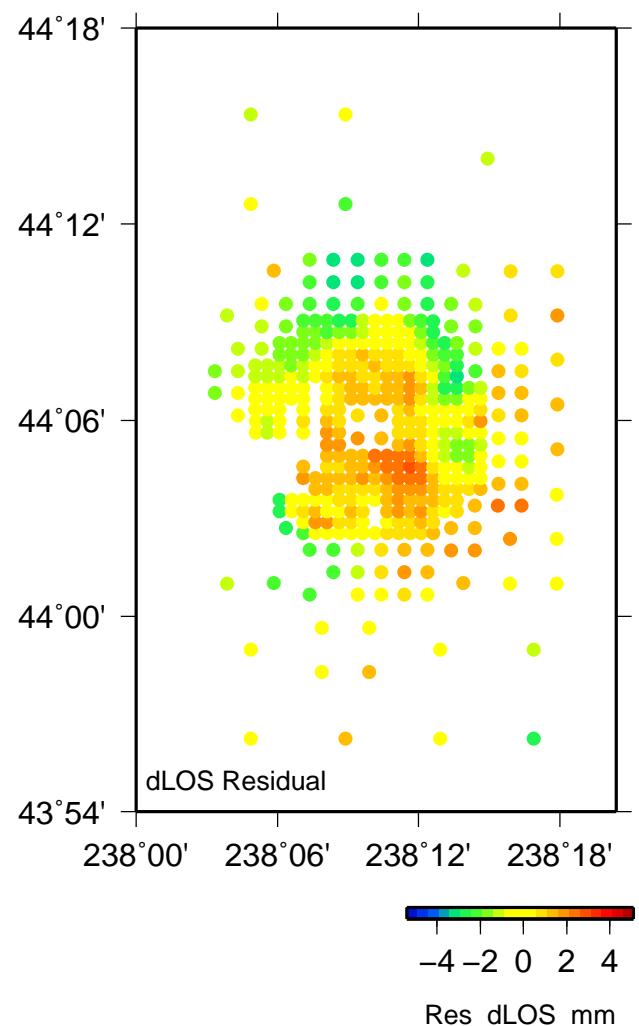
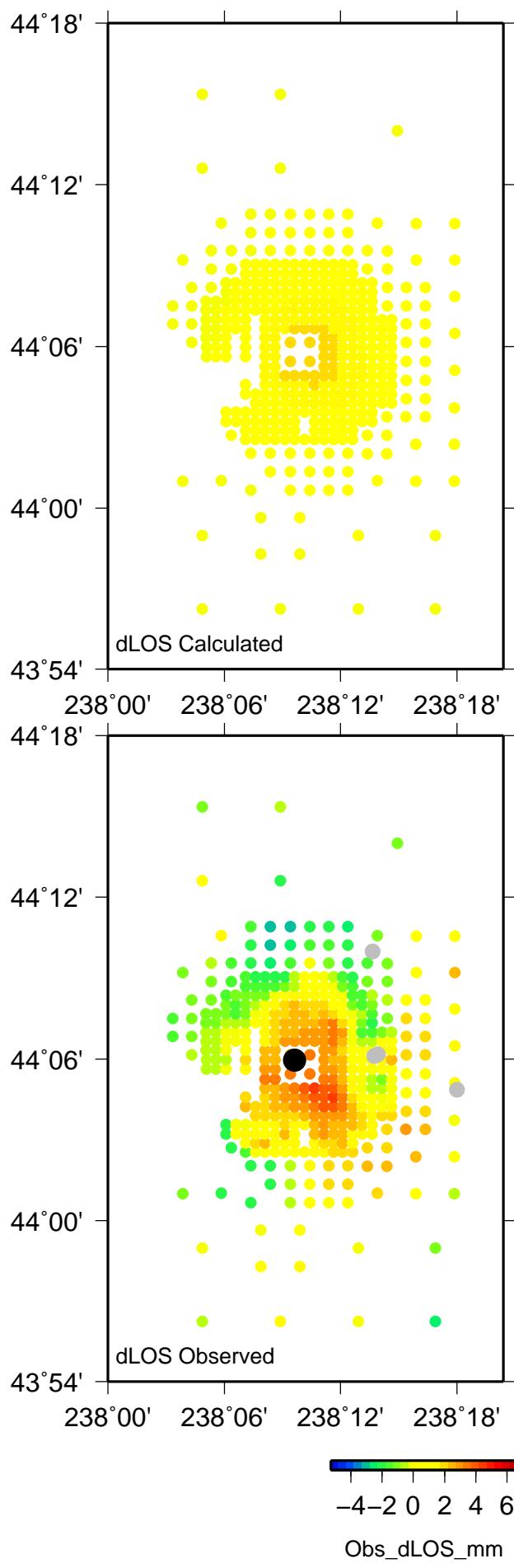




Name: SA62 : Time 2019.436 – 2020.749

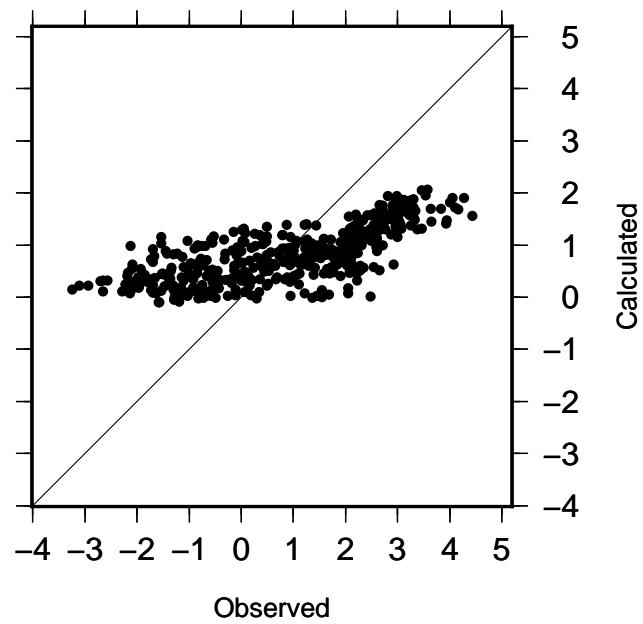
Model: sis1 N: 305 Nrms: 0.344 Wrms: 0.720  
H: -10.000 I: 38.900 Offset: -2.703





Name: SD63 : Time 2019.447 – 2020.760

Model: sis1 N: 422 Nrms: 0.386 Wrms: 0.782  
H: -170.100 I: 39.700 Offset: 0.857



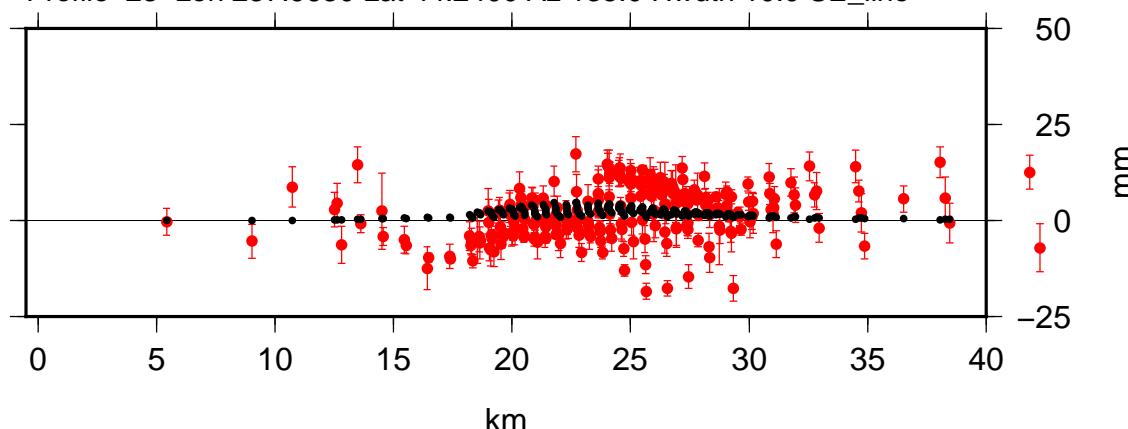
**Figure S-5.** Maps of observed and estimated InSAR interferogram line-of-sight changes (dLOS) and residuals. Observed and calculated dLOS share same color scale. Positive dLOS is toward the sensor (mostly up). Black dot is the estimated location of the bulge and gray dots are nearby volcanic centers. Plot in lower right corner shows observed versus calculated dLOS (in mm), diagonal line is where they are equal. Legend gives interferogram code (e.g., ED01) followed by the dates over which LOS changes were calculated and the heading (H) and incidence angle (I). N is the number of data points, Nrms is normalized RMS misfit and Wrms is weighted rms misfit. Offset is the static offset in mm between observed and calculated interferograms. The 63 interferograms are plotted in chronological order of the initial scene. First letter of name: E - ERS, V - ENVISAT, R - RADARSAT-1, T - TerraSAR-X, S - Sentinel-1. Second letter is A for ascending, D for descending. Note that the LOS scale changes from plot to plot for clarity.

Caption is below figure, which has several parts. Search for "Figure S" to locate caption.

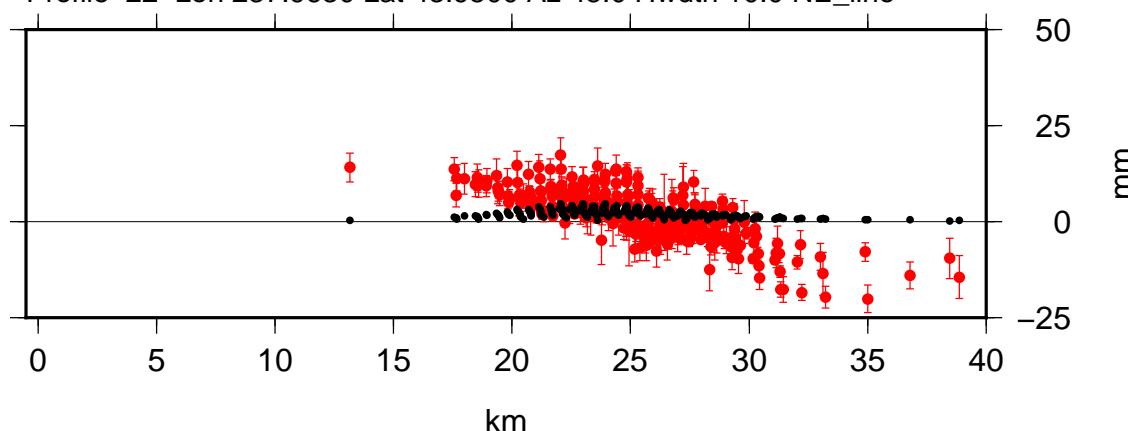
Code: ED01 Time: 1992.450 – 1995.580

Model: sis1 Nrms: 1.371 Wrms: 5.116

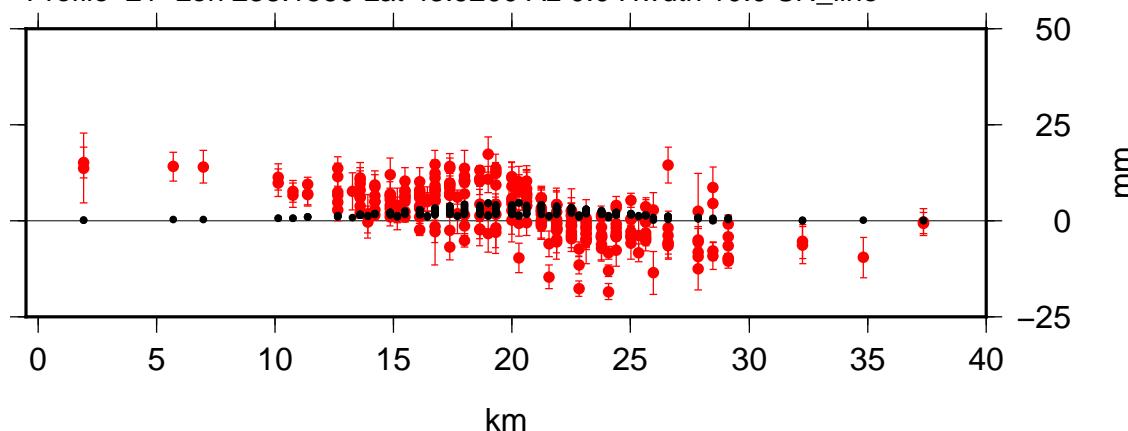
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



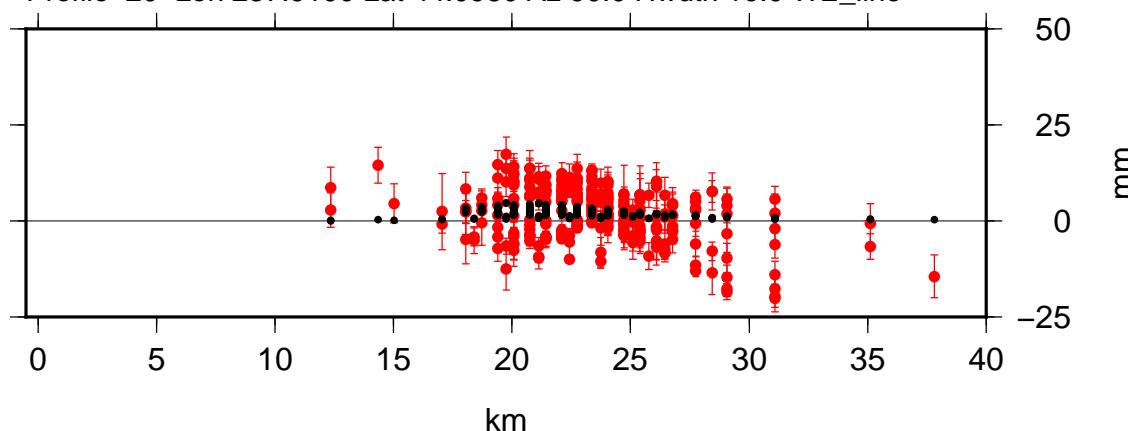
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



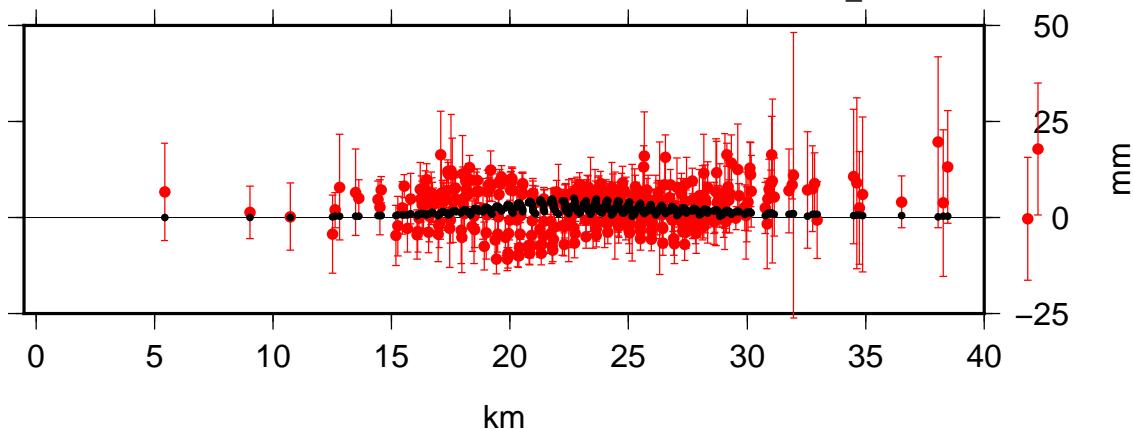
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



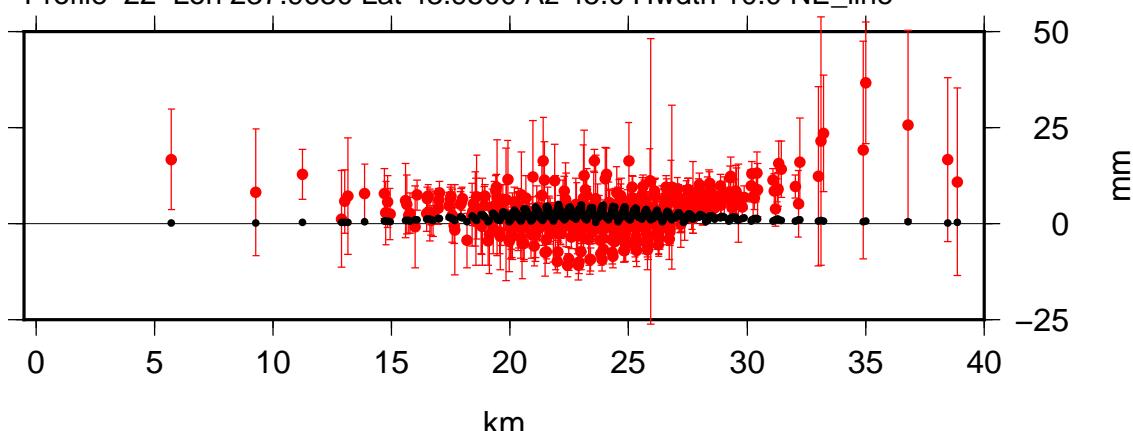
Code: ED02 Time: 1992.546 – 1995.676

Model: sis1 Nrms: 0.862 Wrms: 6.945

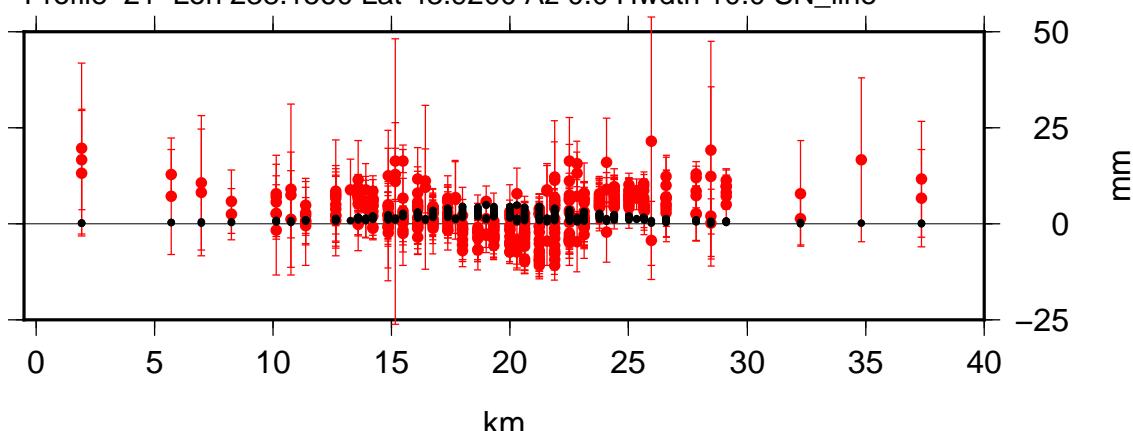
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



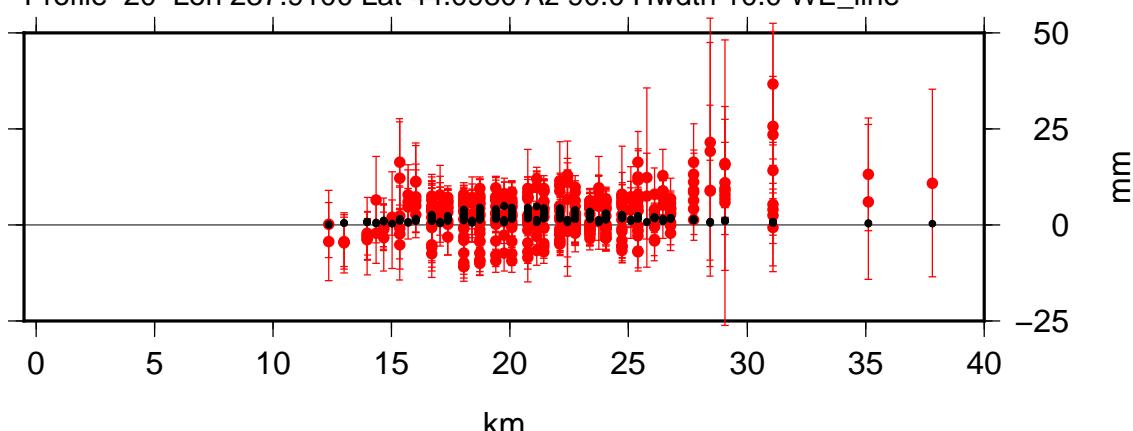
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



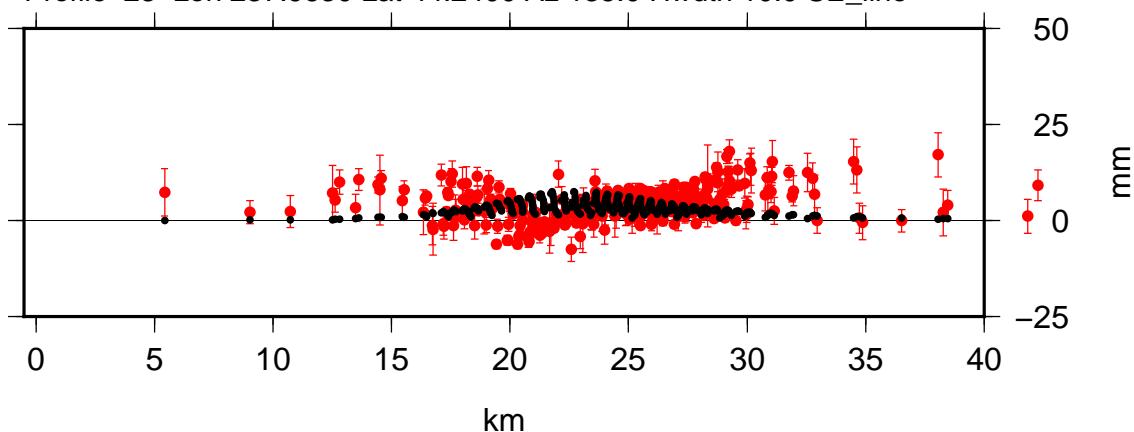
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



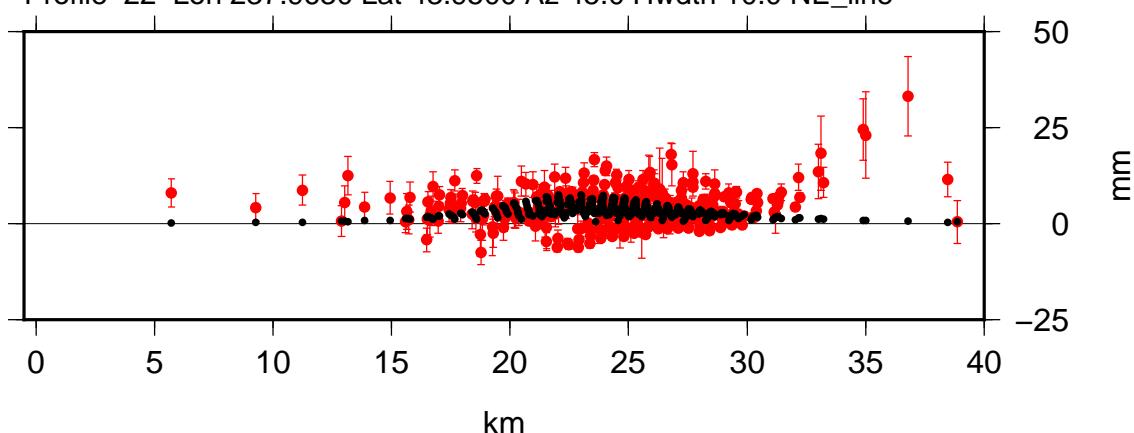
Code: ED03 Time: 1992.546 – 1996.636

Model: sis1 Nrms: 0.528 Wrms: 1.453

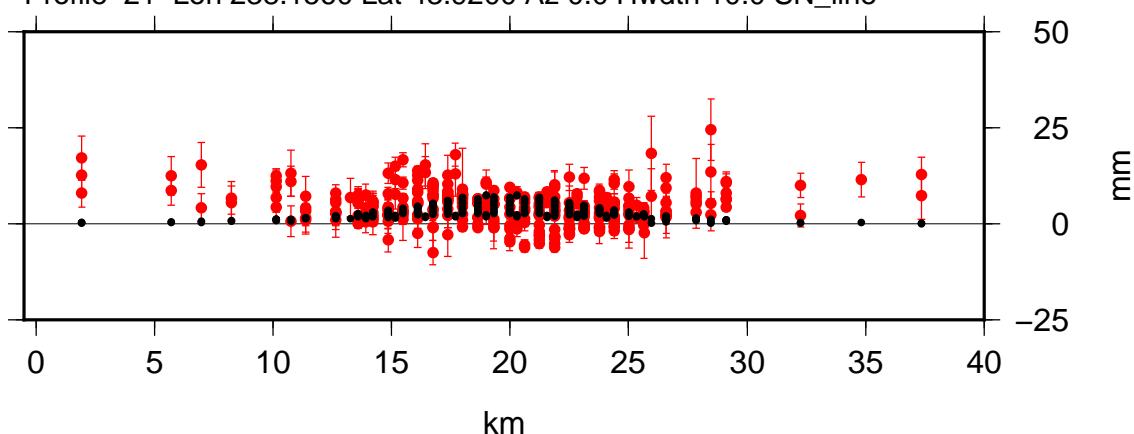
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



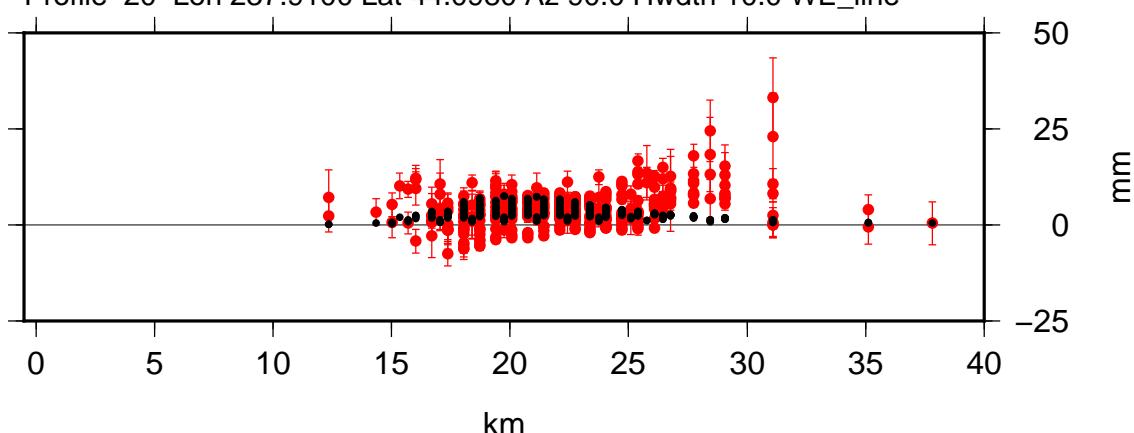
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



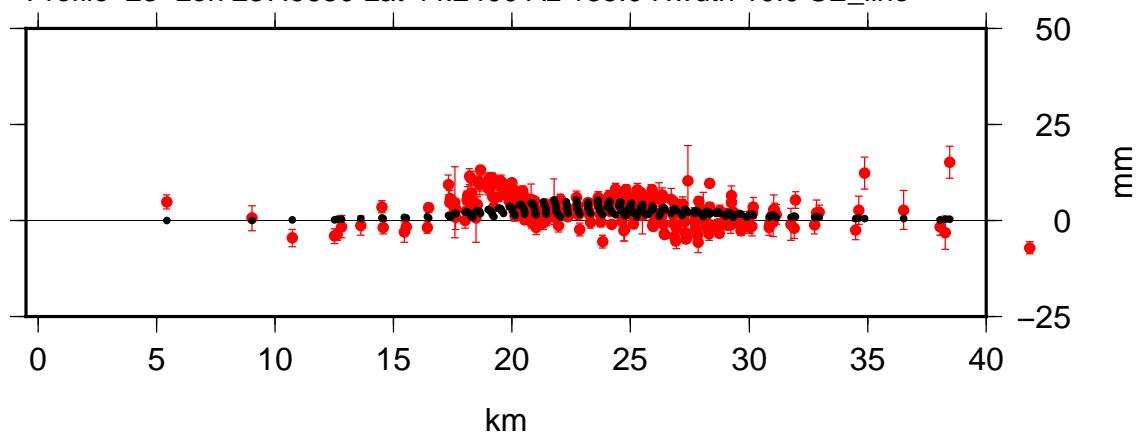
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



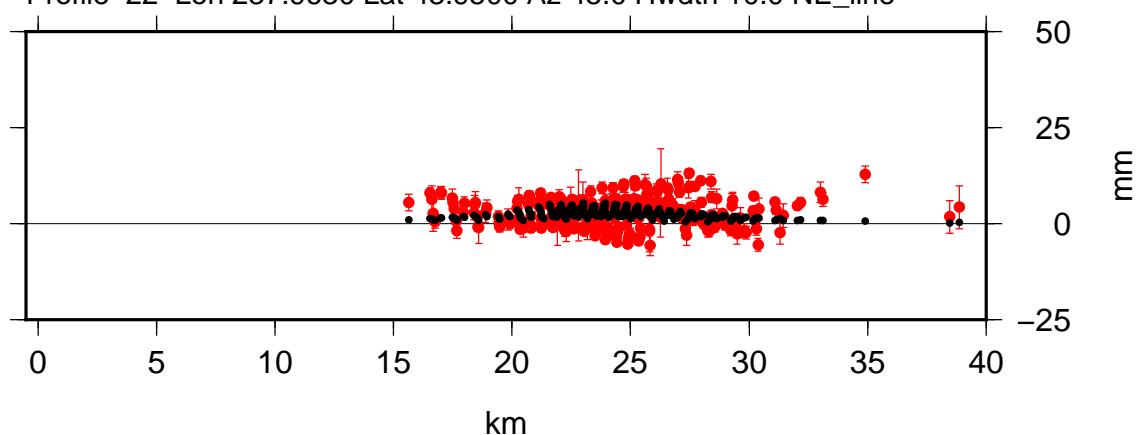
Code: ED04 Time: 1992.641 – 1995.868

Model: sis1 Nrms: 1.604 Wrms: 4.192

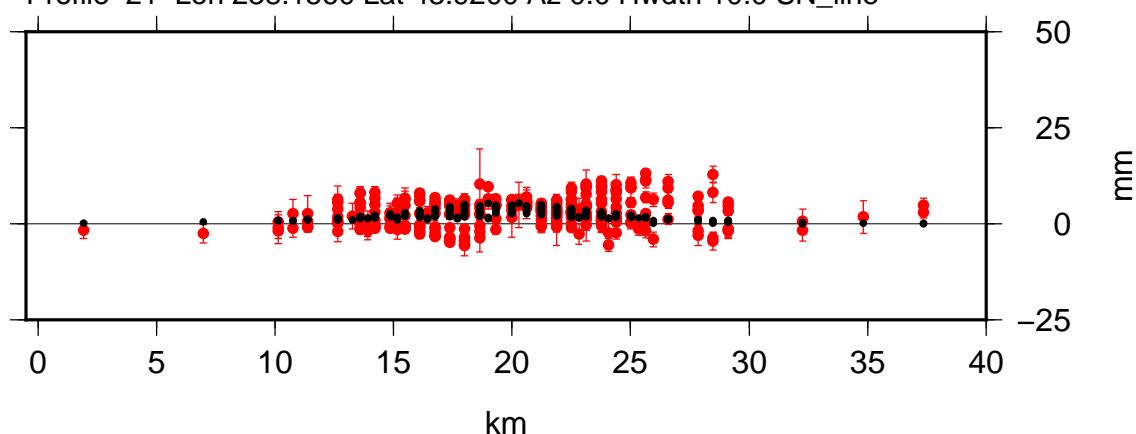
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



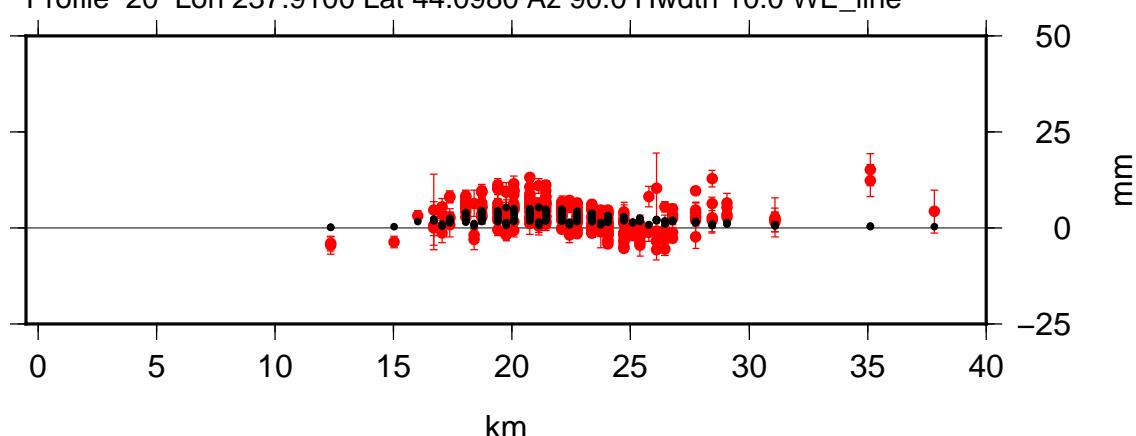
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



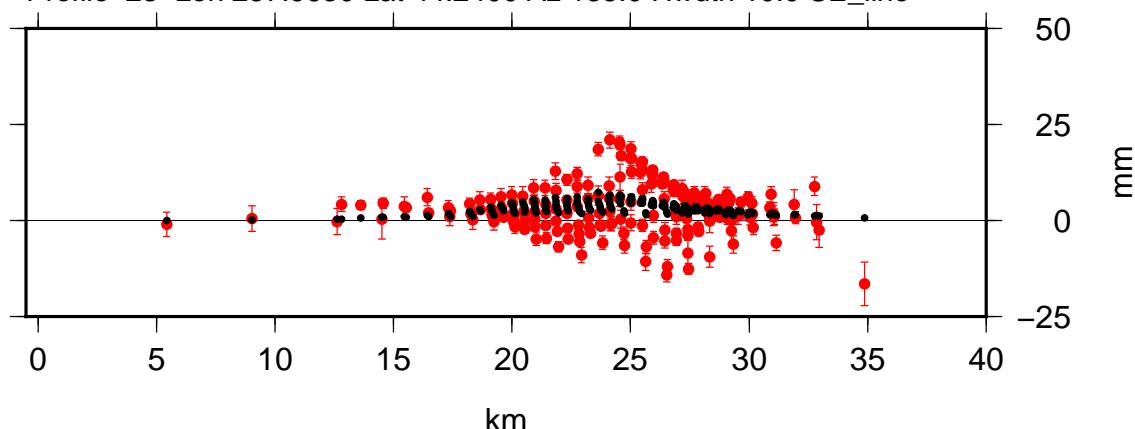
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



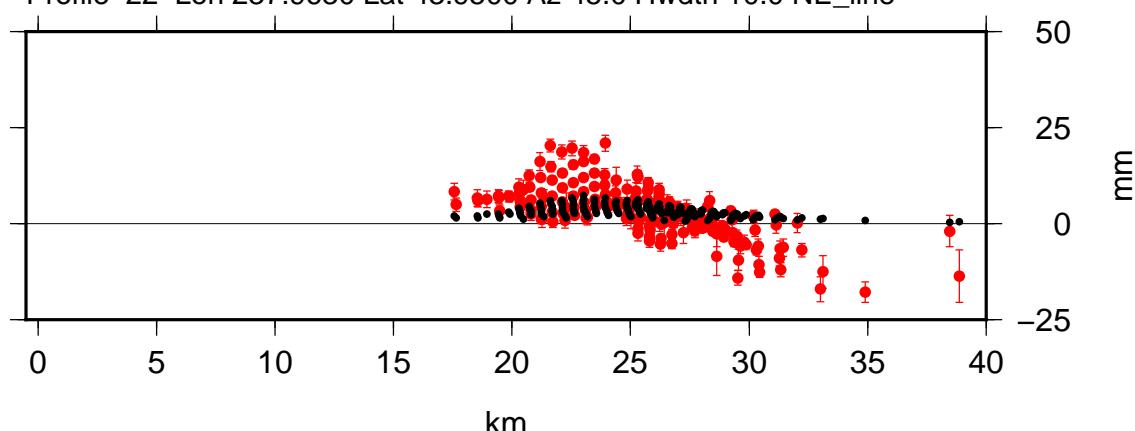
Code: ED05 Time: 1992.737 – 1996.636

Model: sis1 Nrms: 0.152 Wrms: 0.416

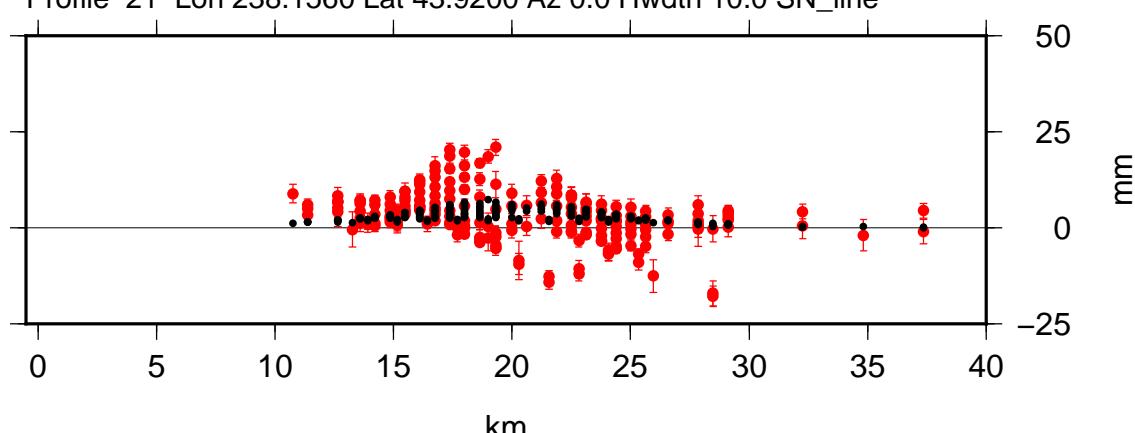
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



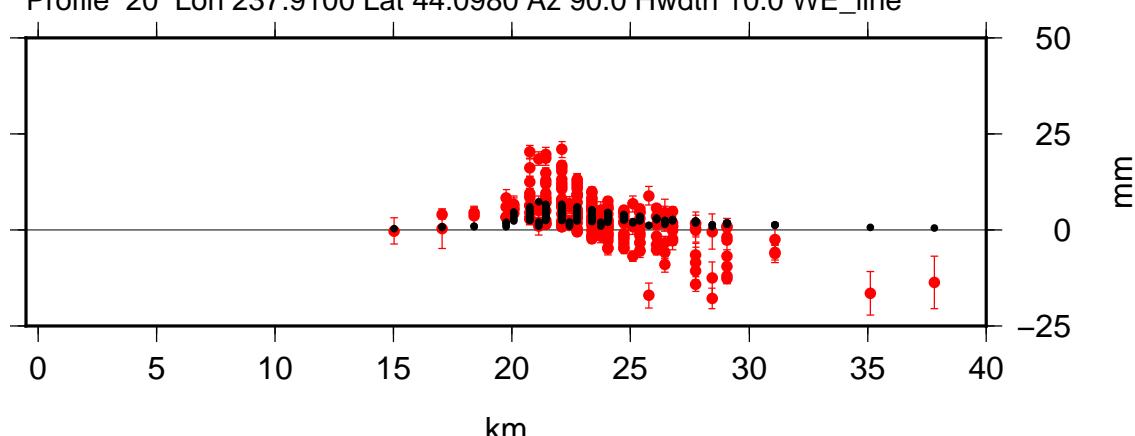
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



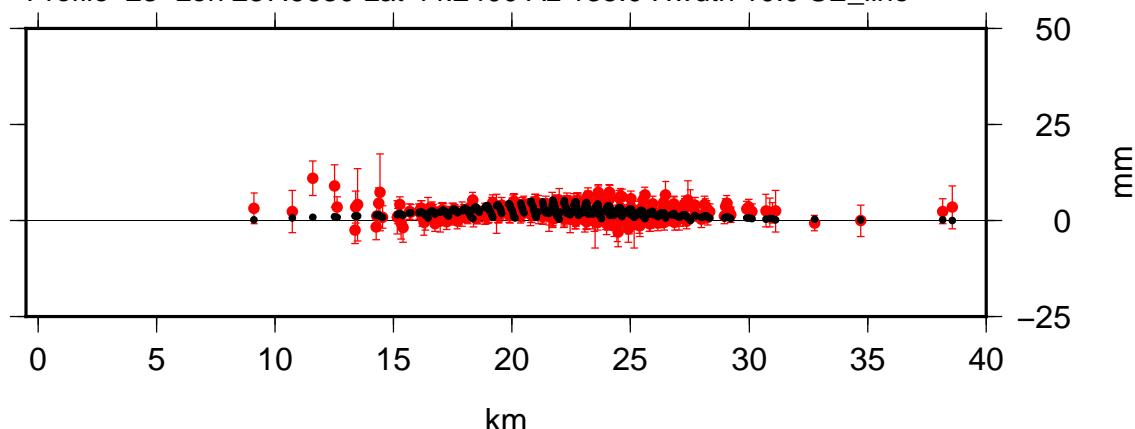
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



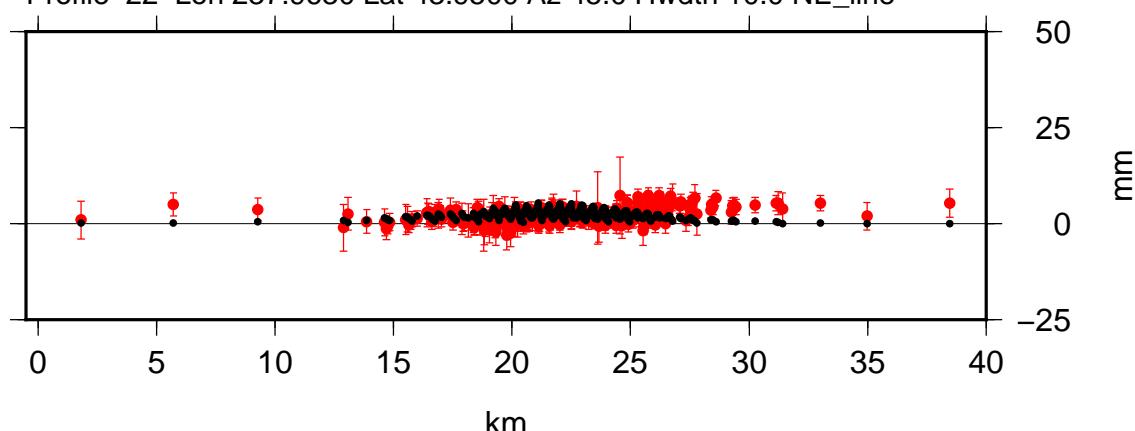
Code: EA06 Time: 1993.565 – 1995.740

Model: sis1 Nrms: 1.016 Wrms: 4.490

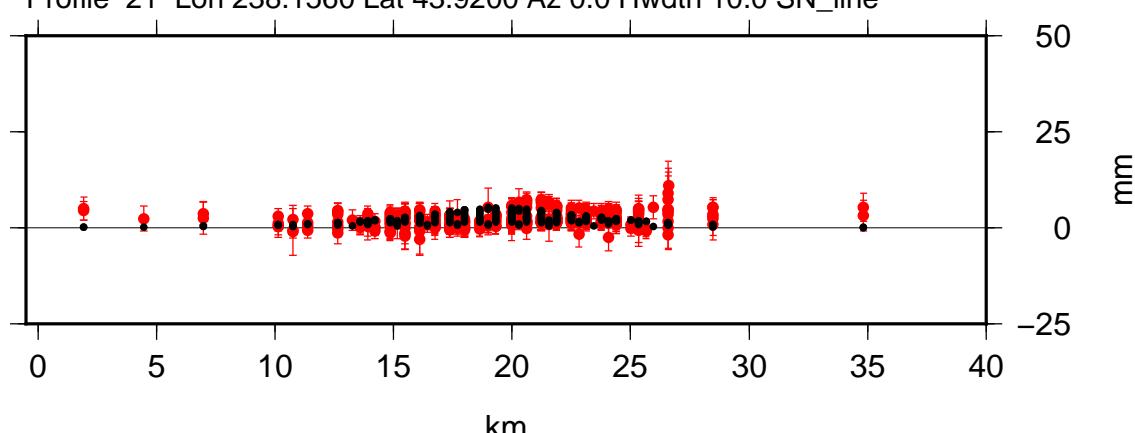
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



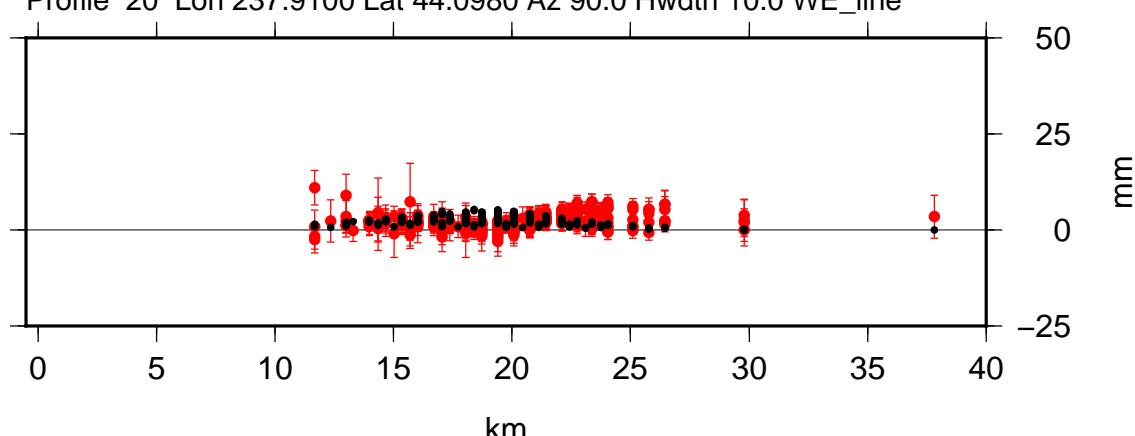
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



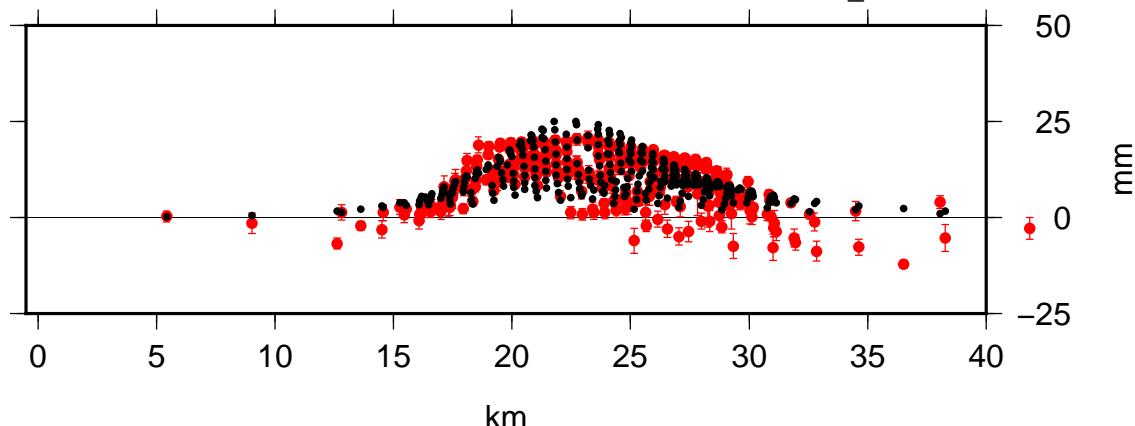
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



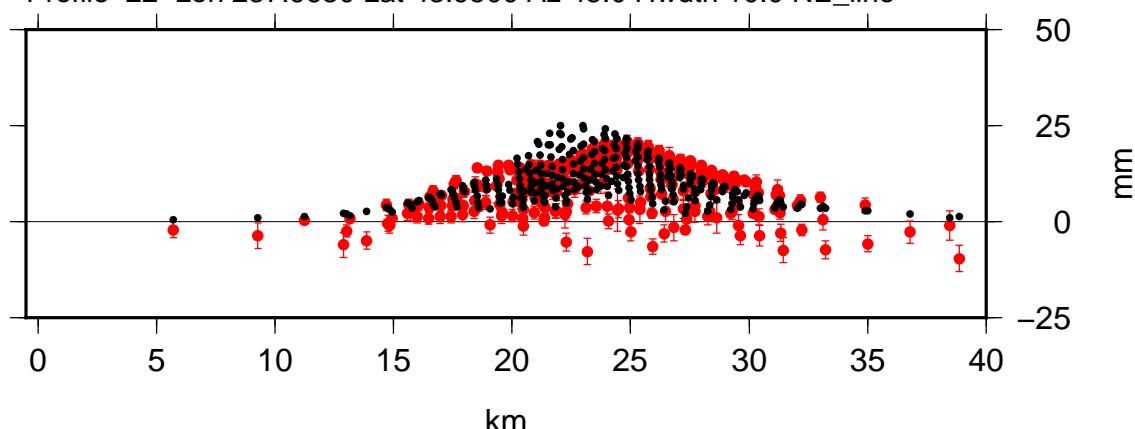
Code: ED07 Time: 1993.651 – 1998.509

Model: sis1 Nrms: 0.329 Wrms: 0.871

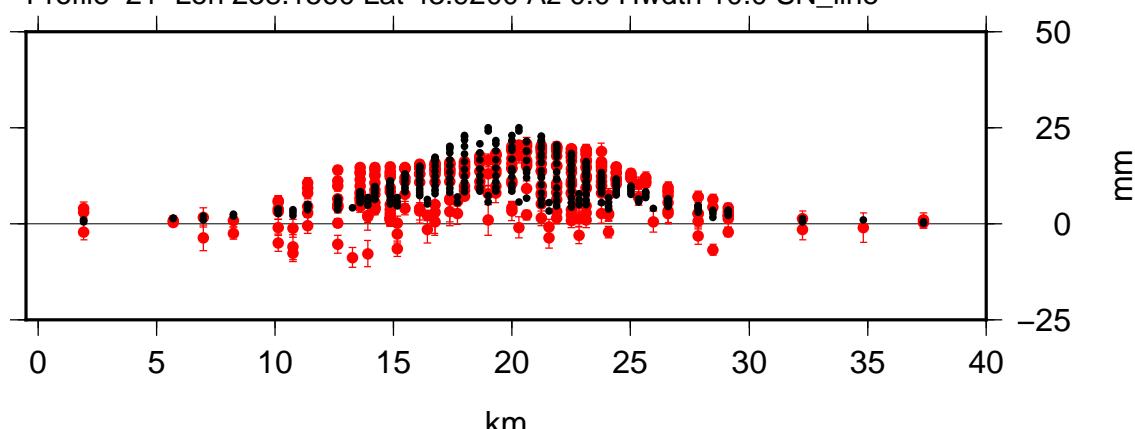
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



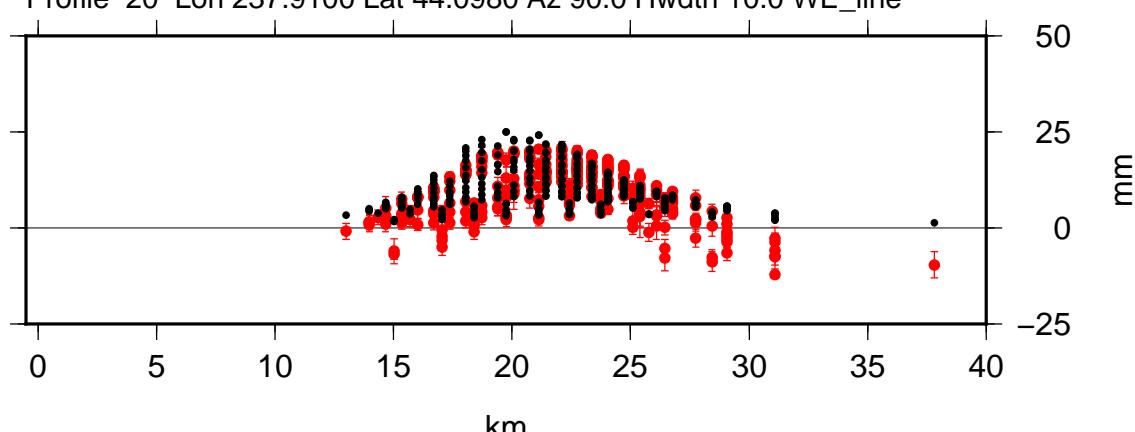
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



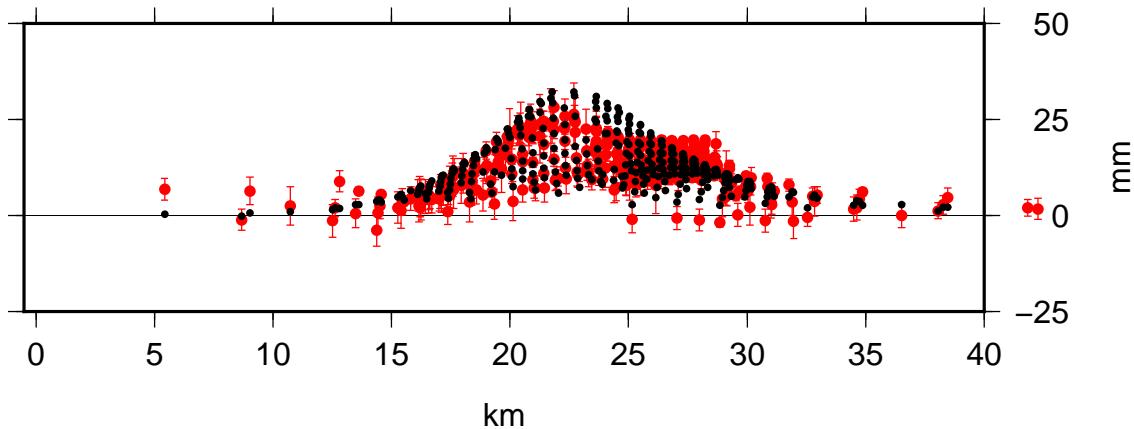
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



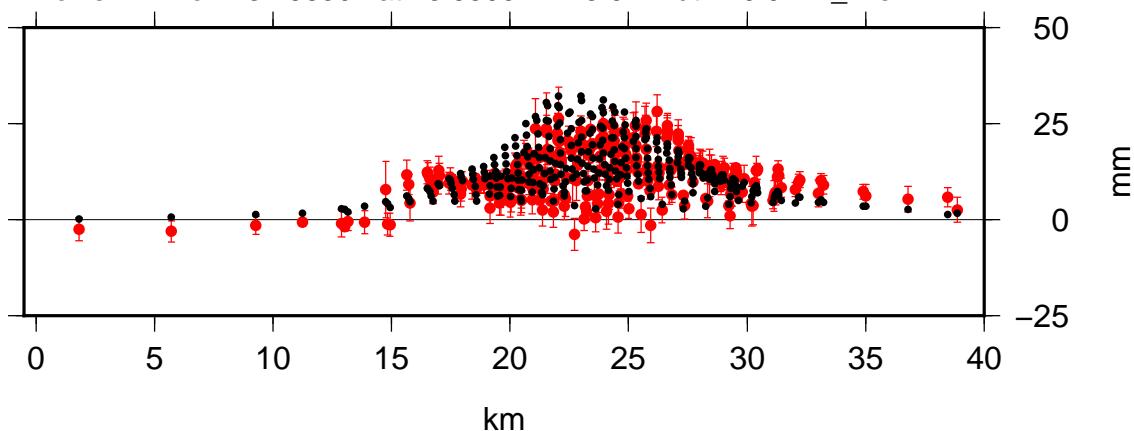
Code: ED08 Time: 1993.651 – 1998.797

Model: sis1 Nrms: 0.104 Wrms: 0.363

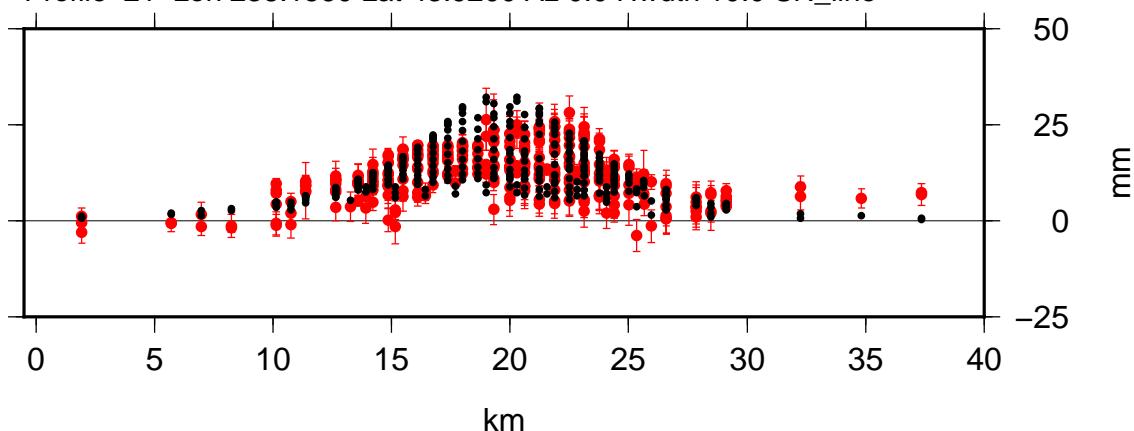
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



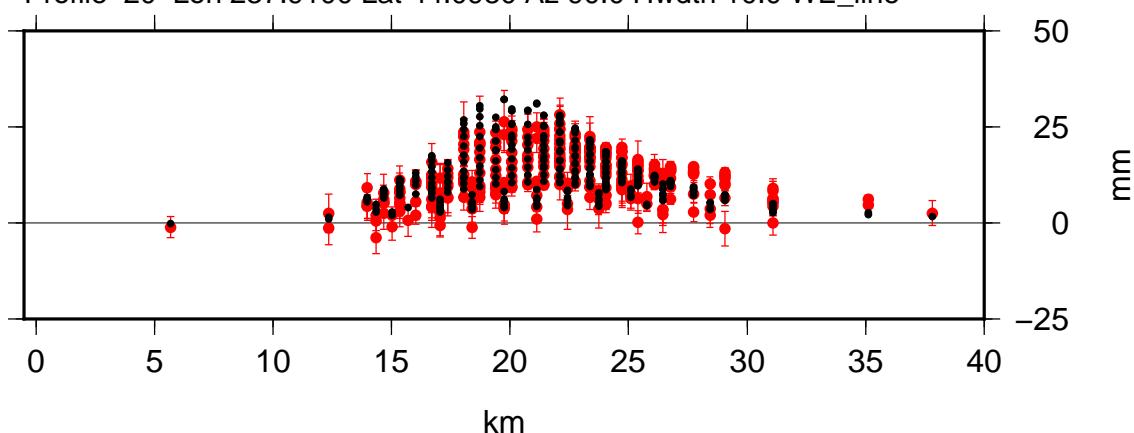
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



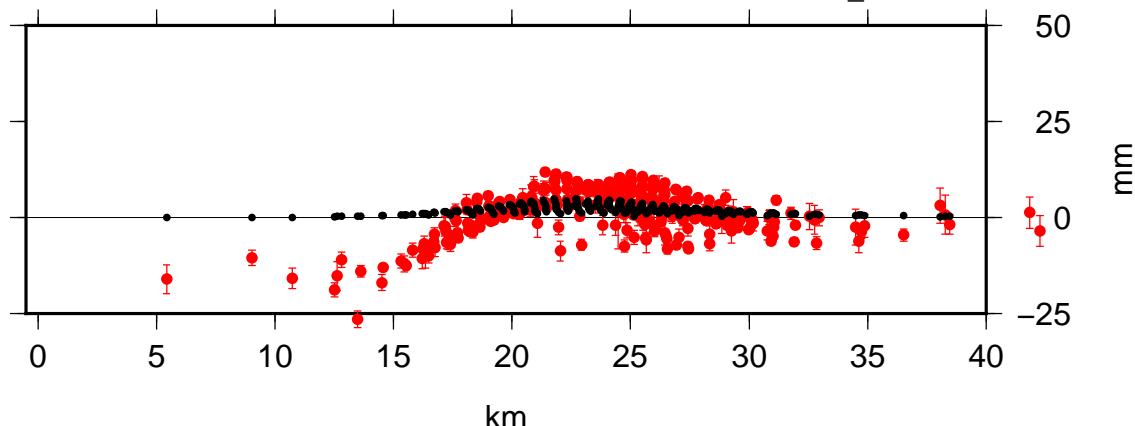
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



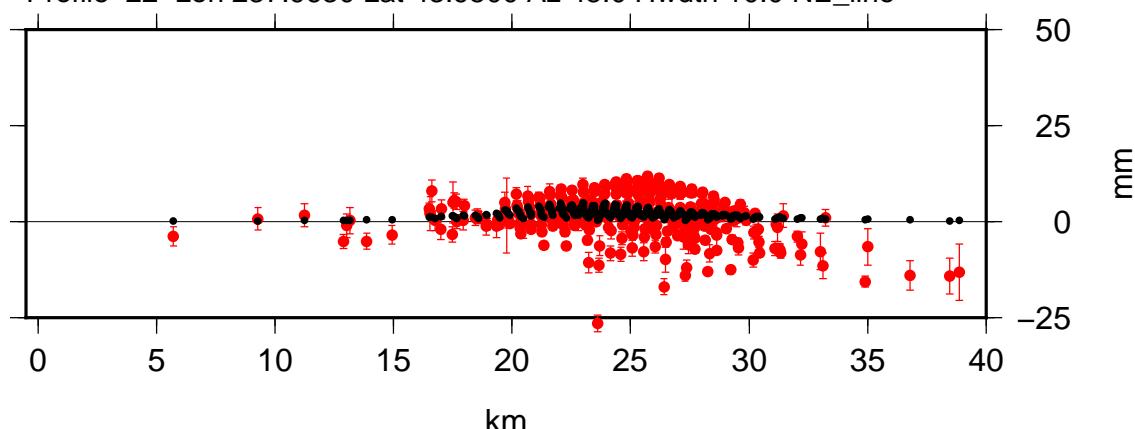
Code: ED09 Time: 1993.695 – 1995.772

Model: sis1 Nrms: 0.486 Wrms: 1.201

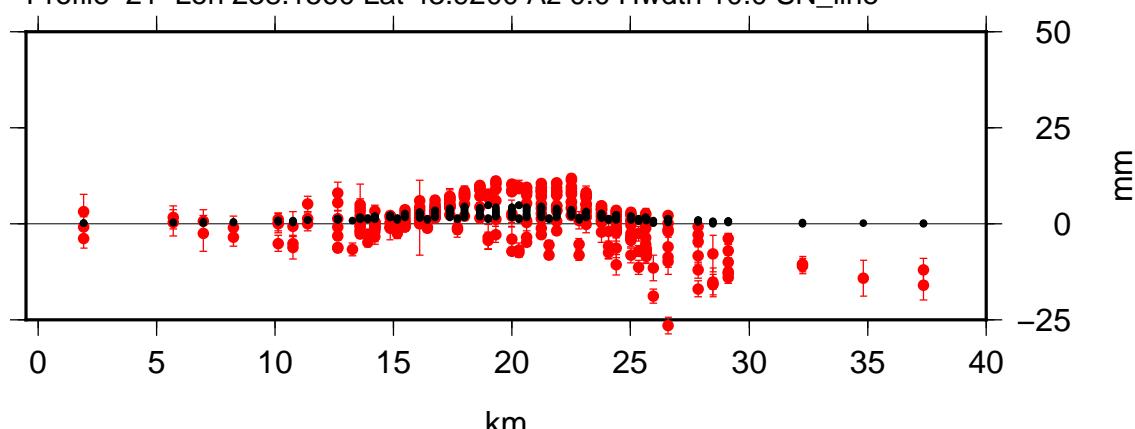
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



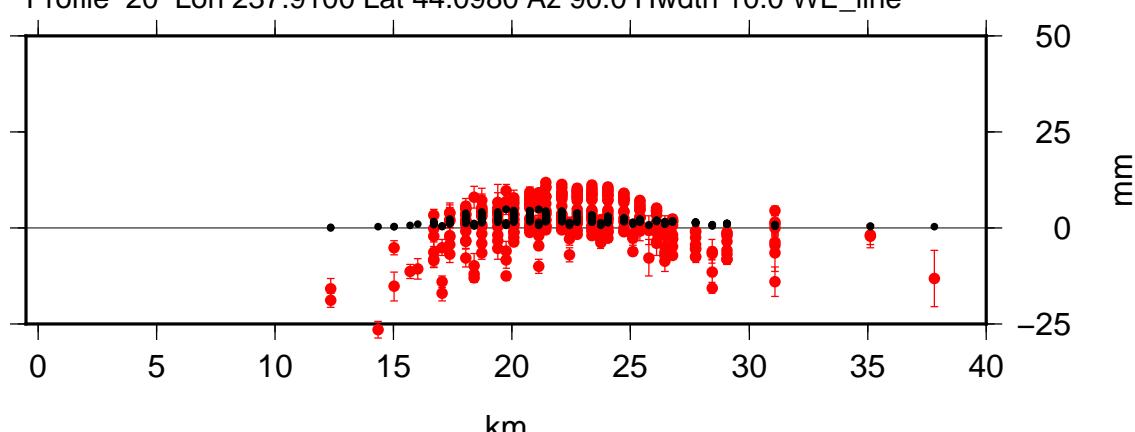
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



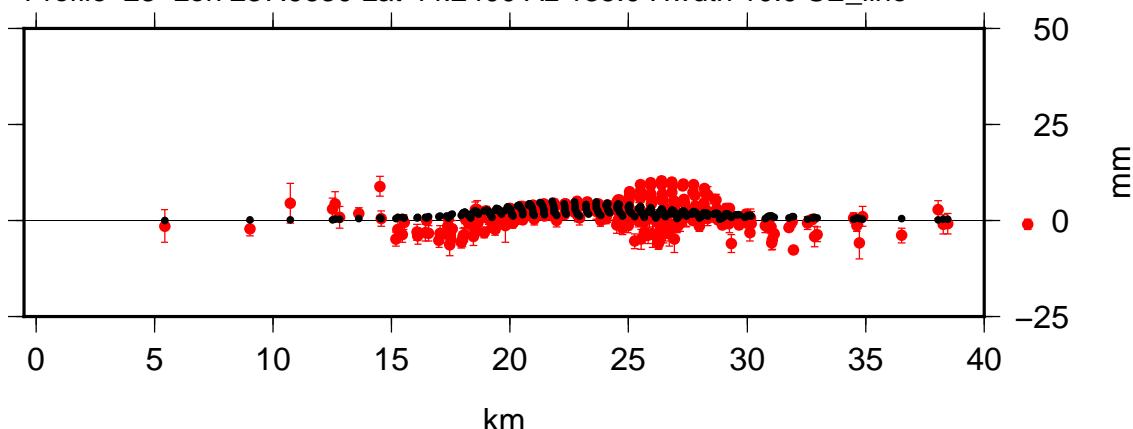
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



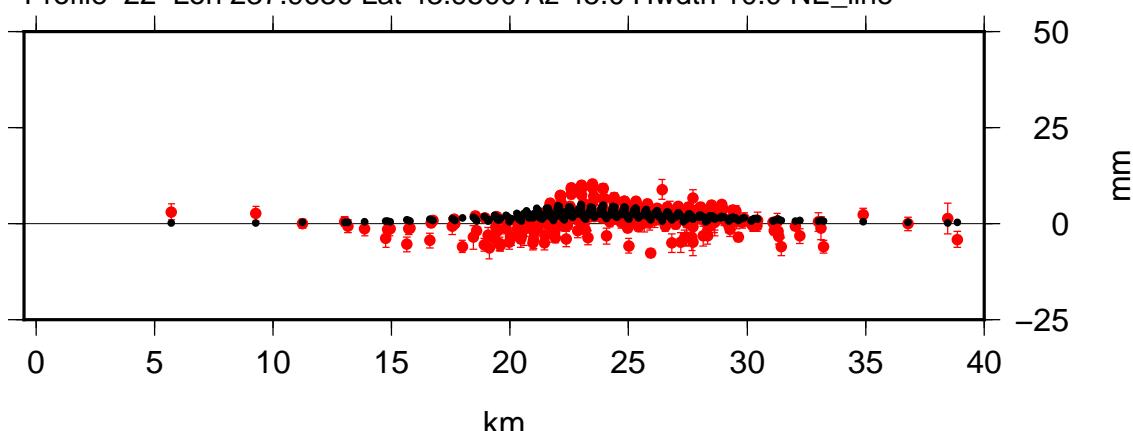
Code: ED10 Time: 1993.843 – 1995.824

Model: sis1 Nrms: 0.770 Wrms: 1.899

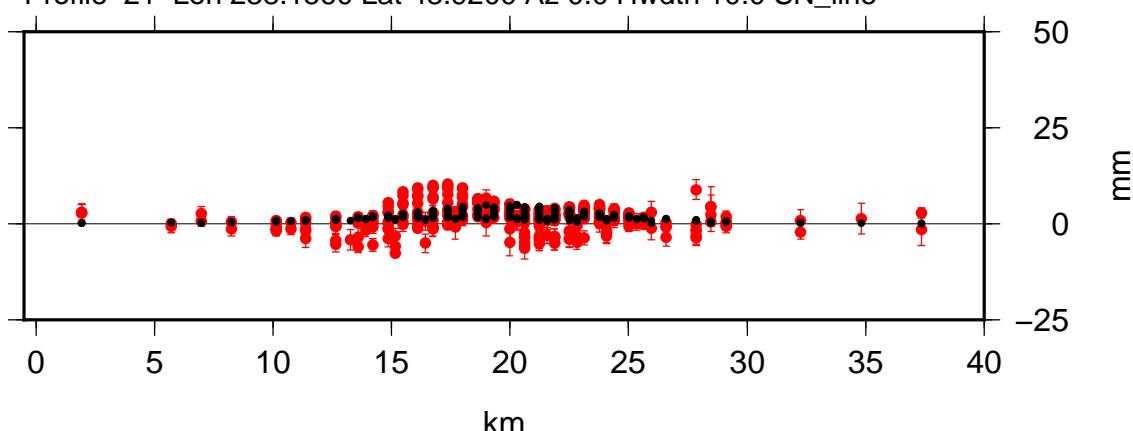
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



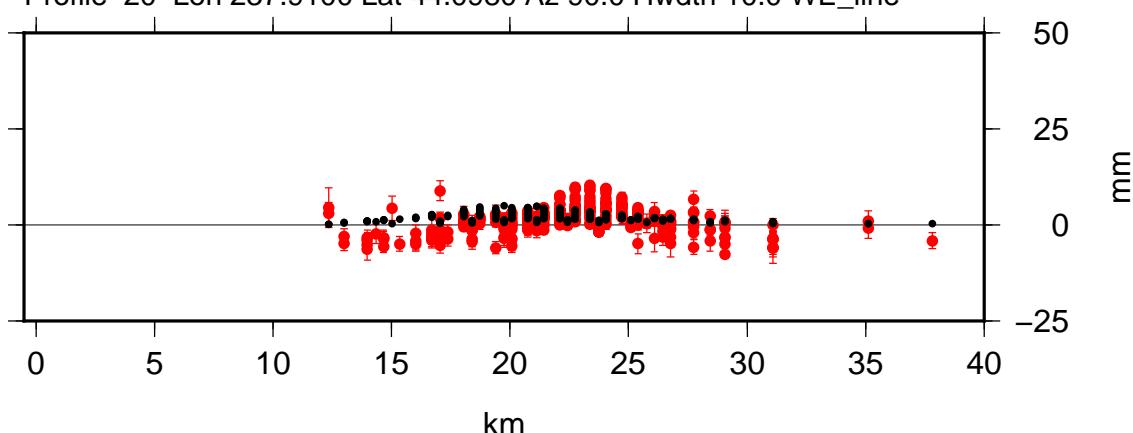
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



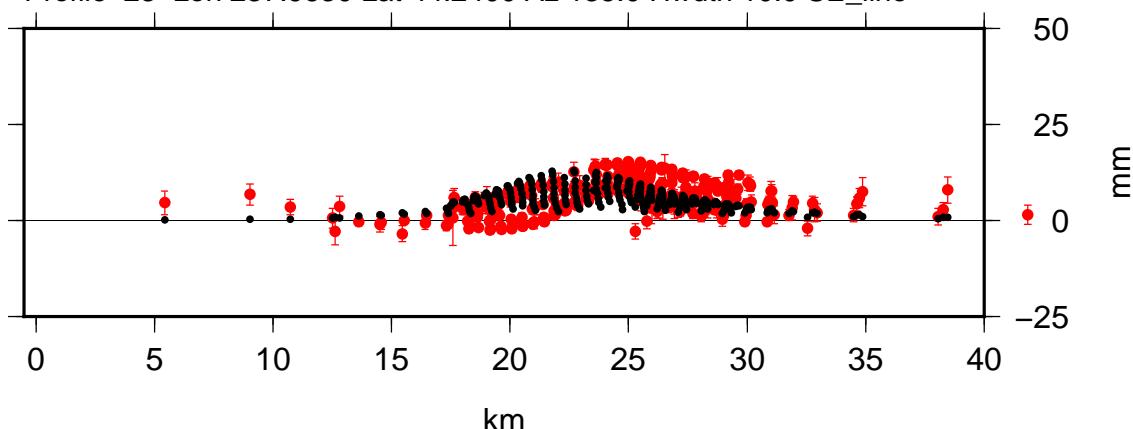
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



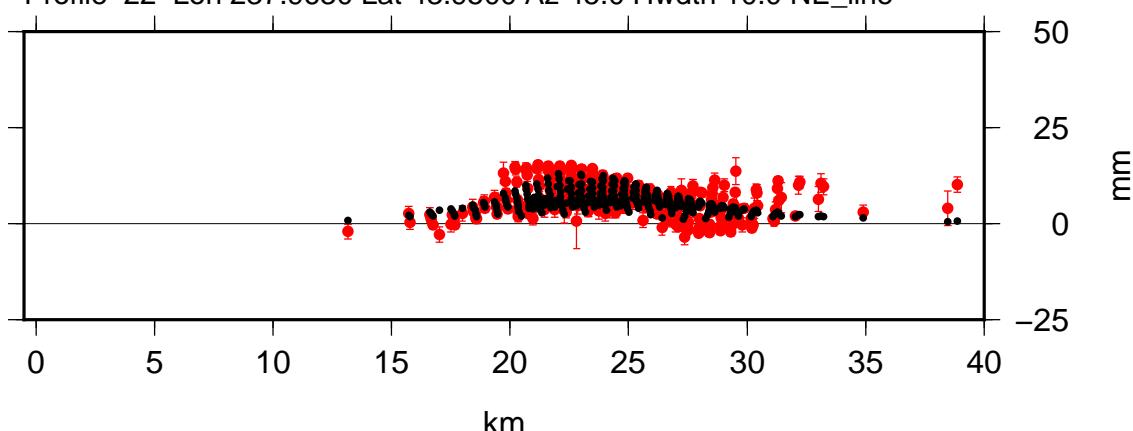
Code: ED11 Time: 1993.843 – 1997.646

Model: sis1 Nrms: 0.657 Wrms: 1.636

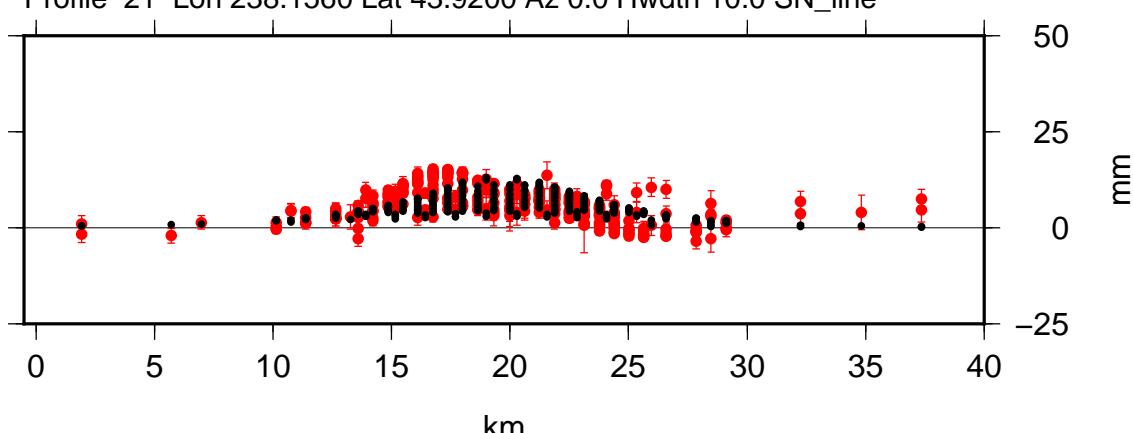
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



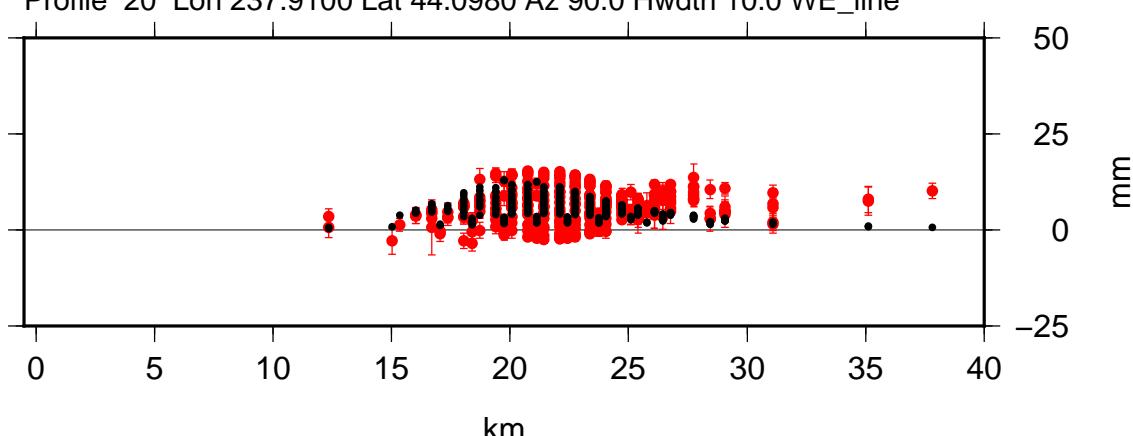
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



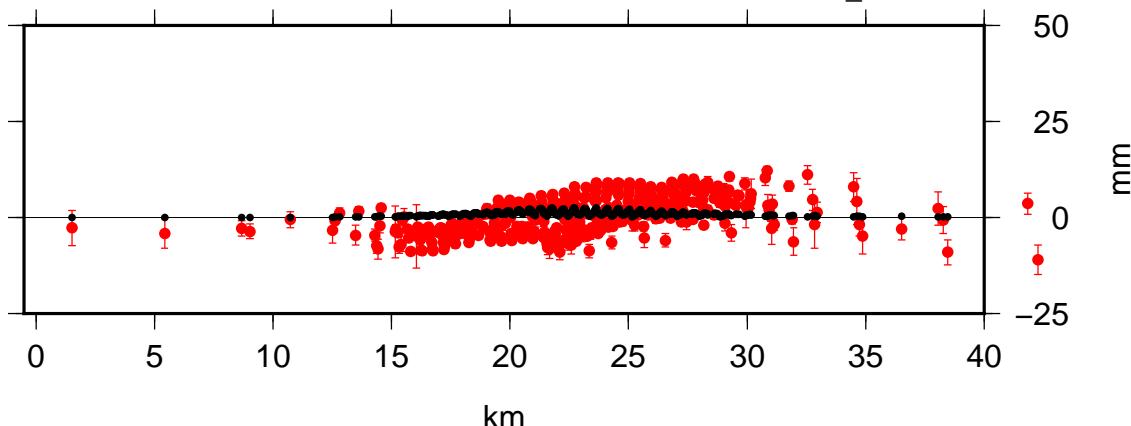
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



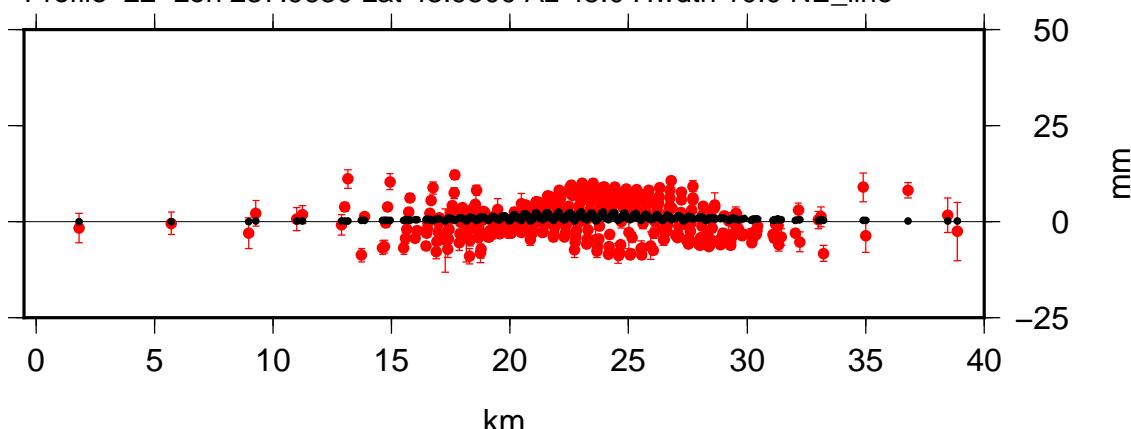
Code: ED12 Time: 1995.676 – 1996.636

Model: sis1 Nrms: 0.109 Wrms: 0.247

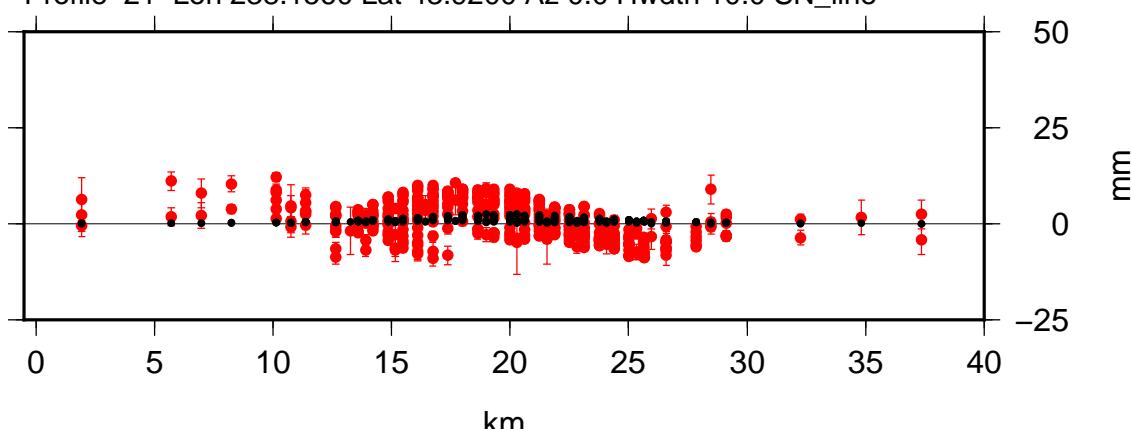
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



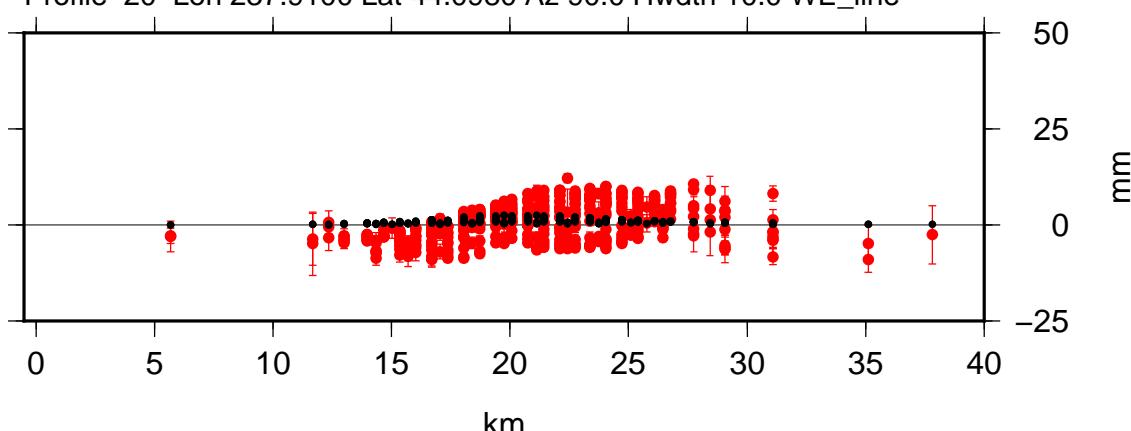
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



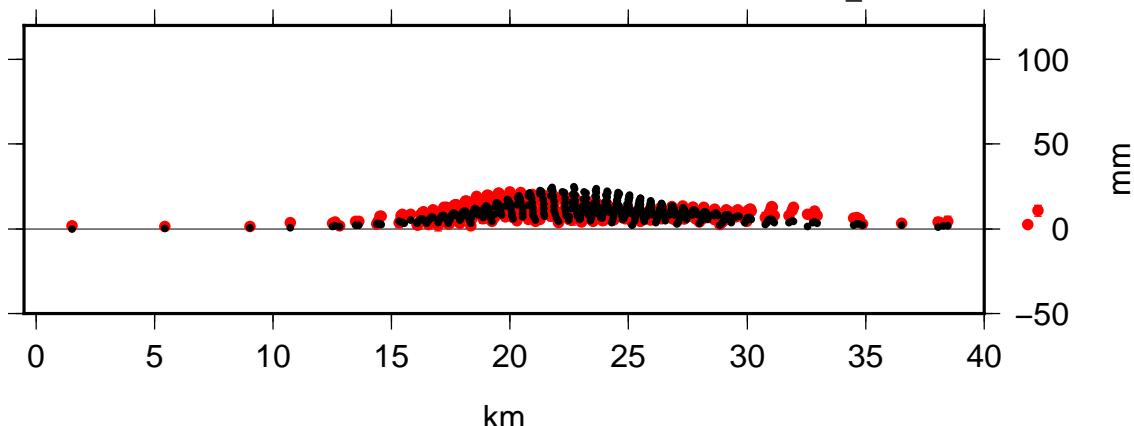
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



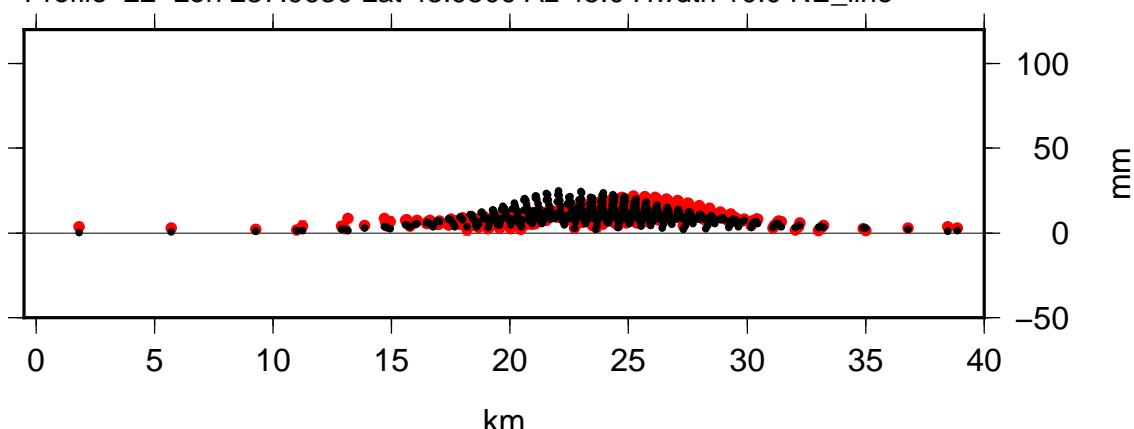
Code: ED13 Time: 1995.728 – 1998.701

Model: sis1 Nrms: 0.659 Wrms: 1.488

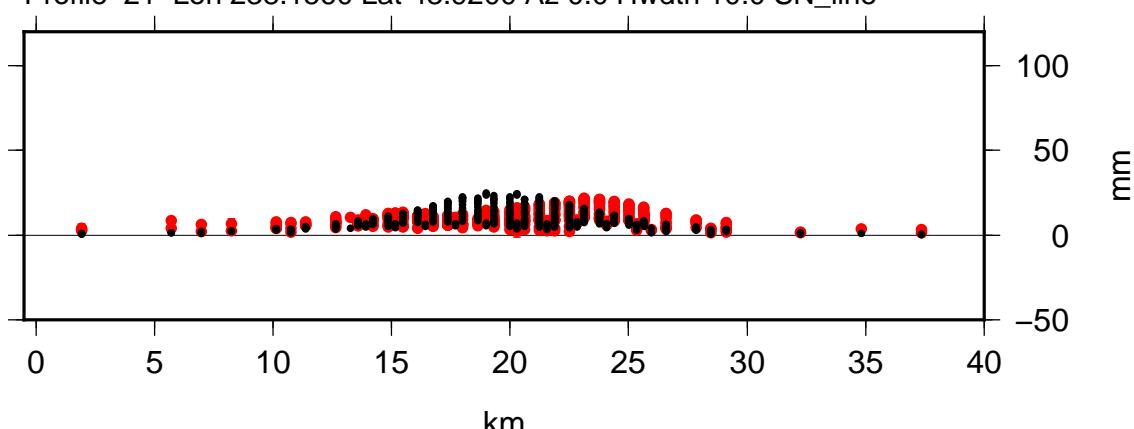
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



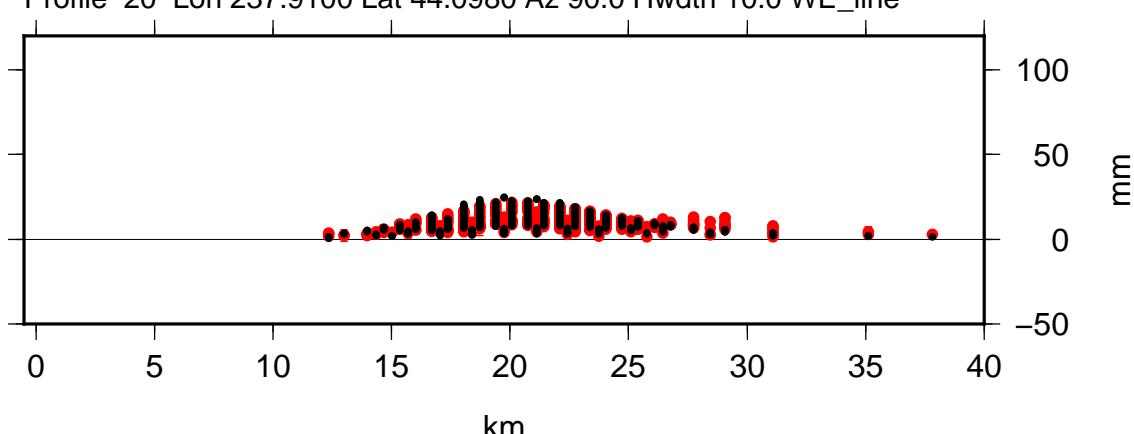
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



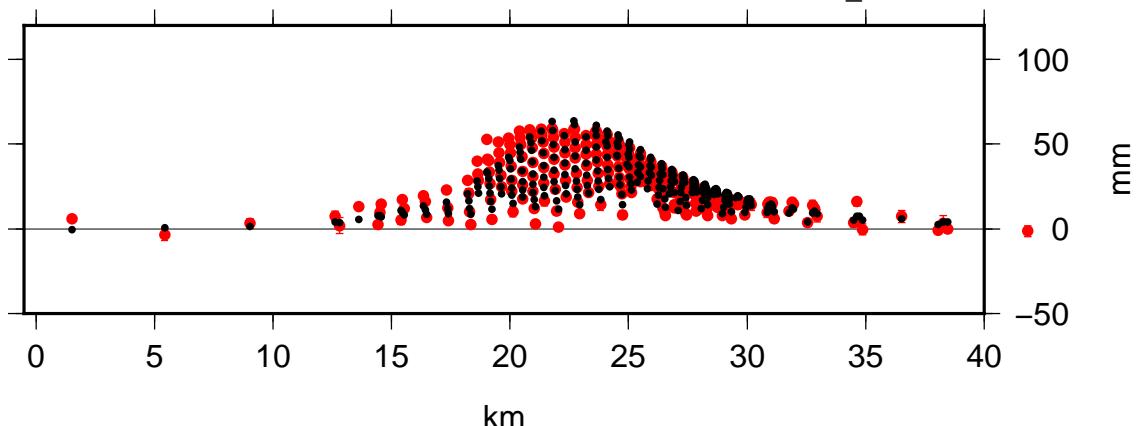
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



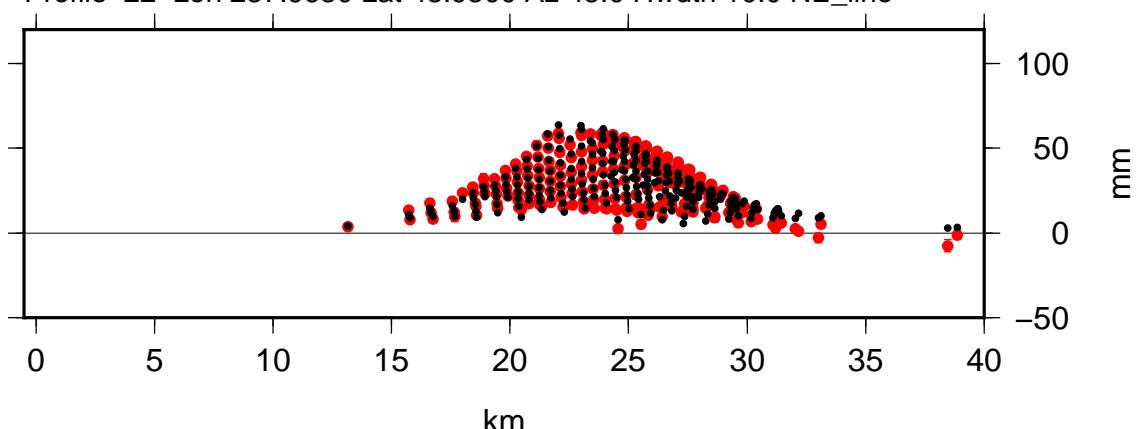
Code: ED14 Time: 1995.728 – 1999.756

Model: sis1 Nrms: 0.151 Wrms: 0.466

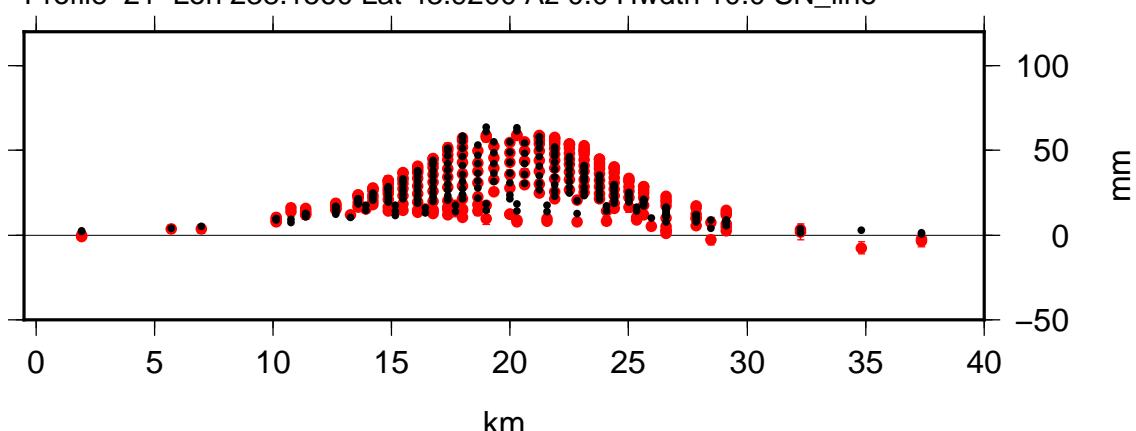
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



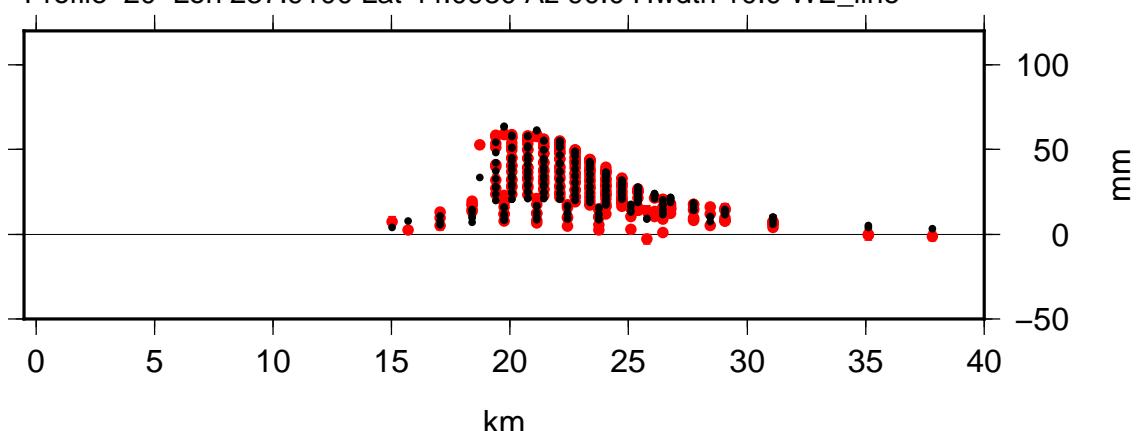
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



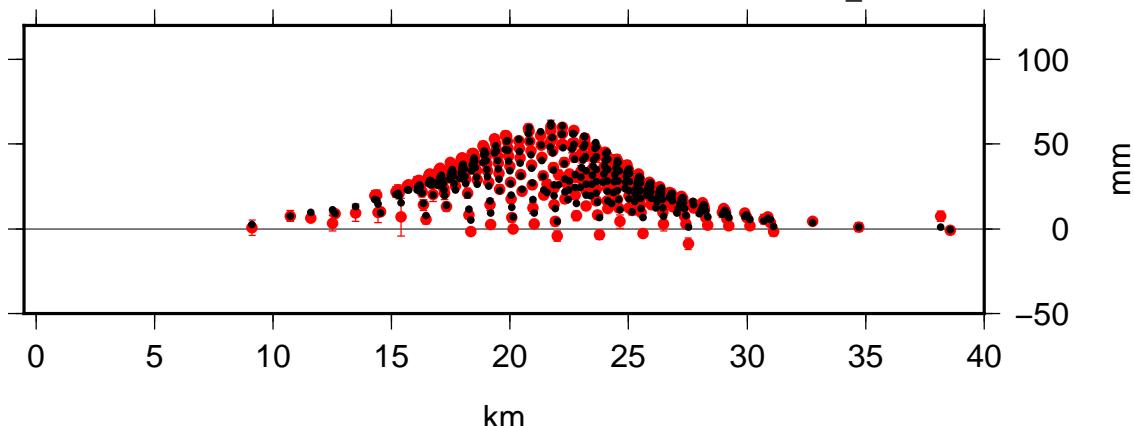
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



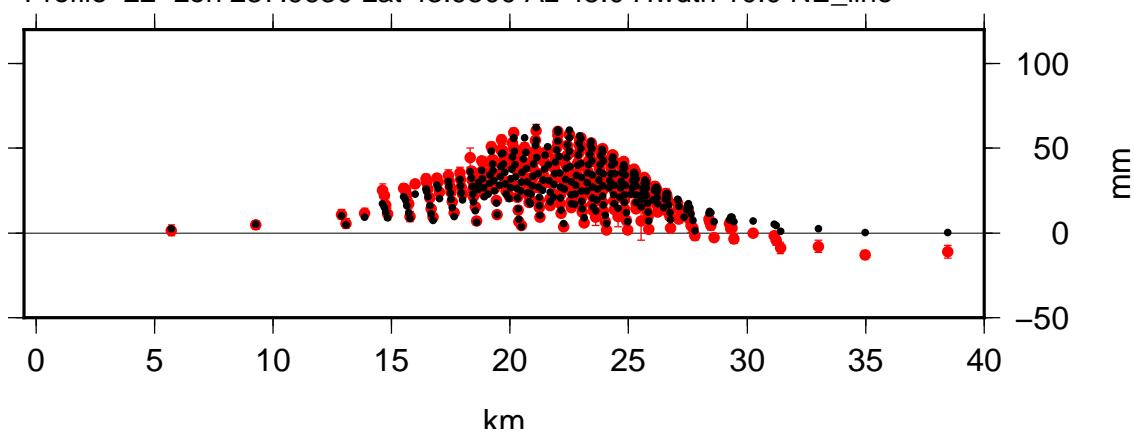
Code: EA15 Time: 1995.738 – 1999.669

Model: sis1 Nrms: 0.004 Wrms: 0.015

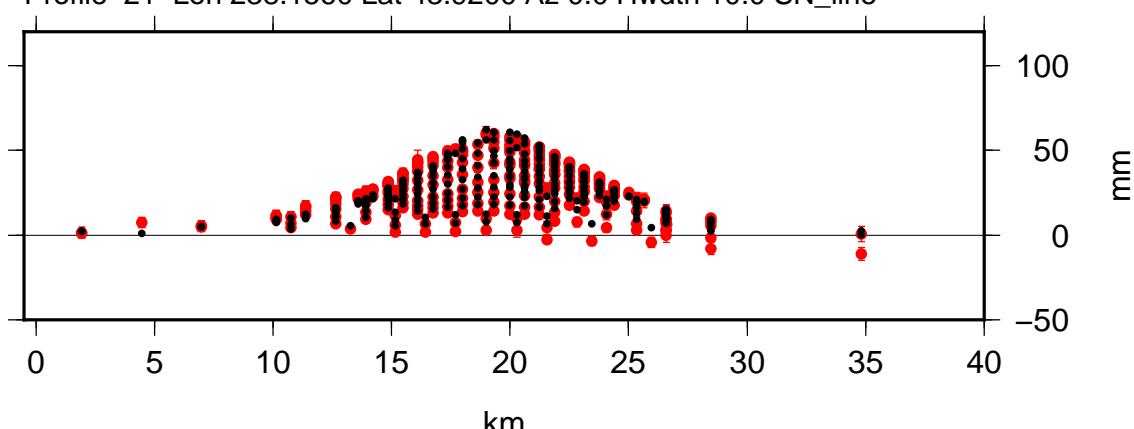
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



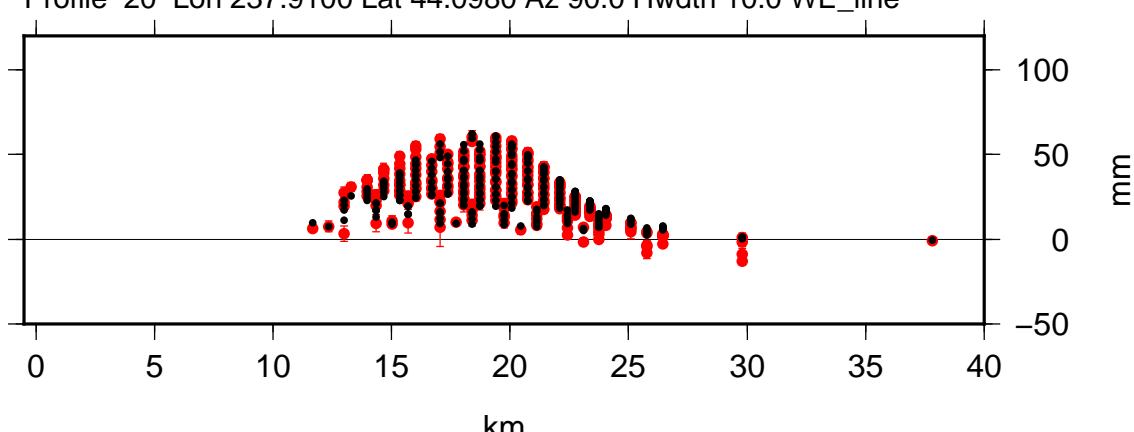
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



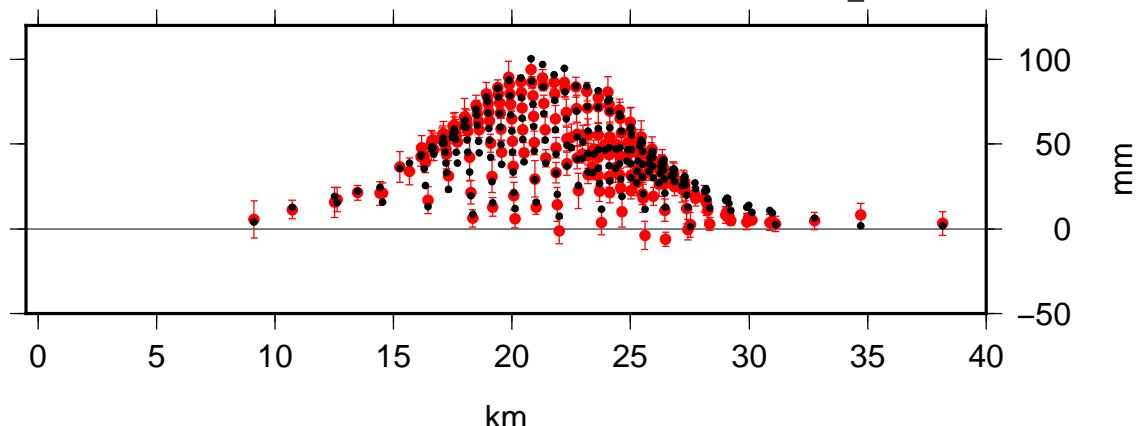
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



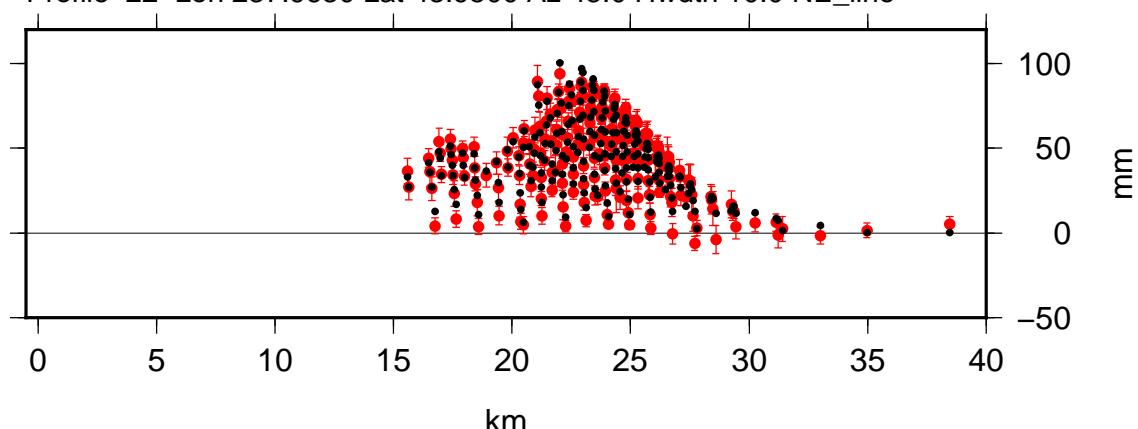
Code: EA16 Time: 1995.740 – 2000.626

Model: sis1 Nrms: 0.134 Wrms: 1.433

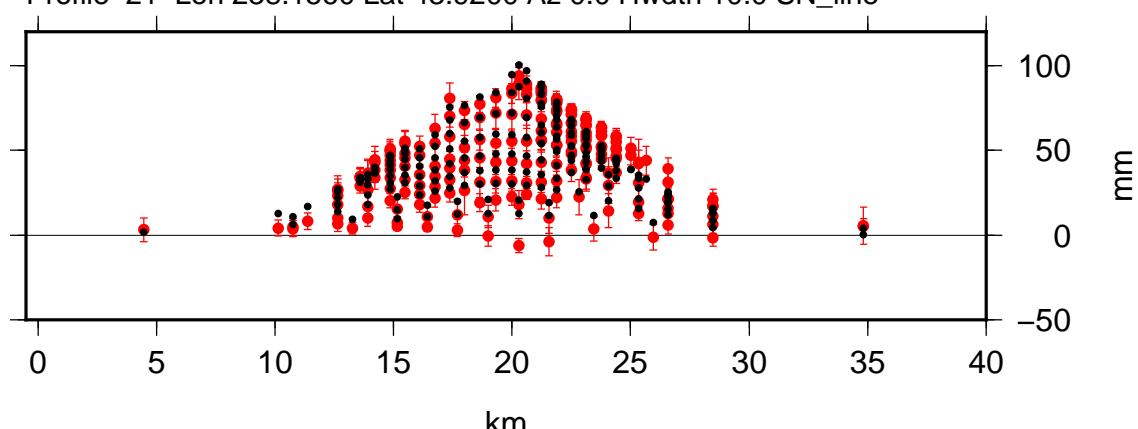
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



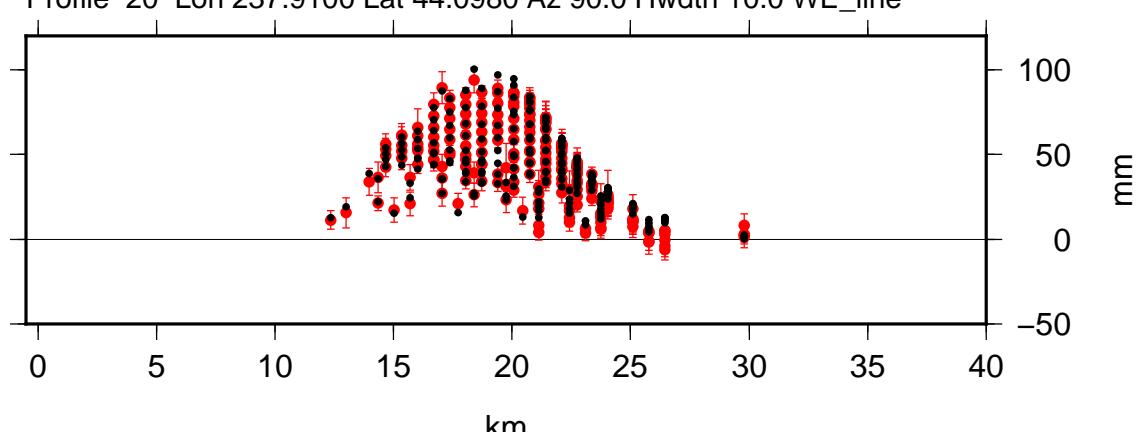
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



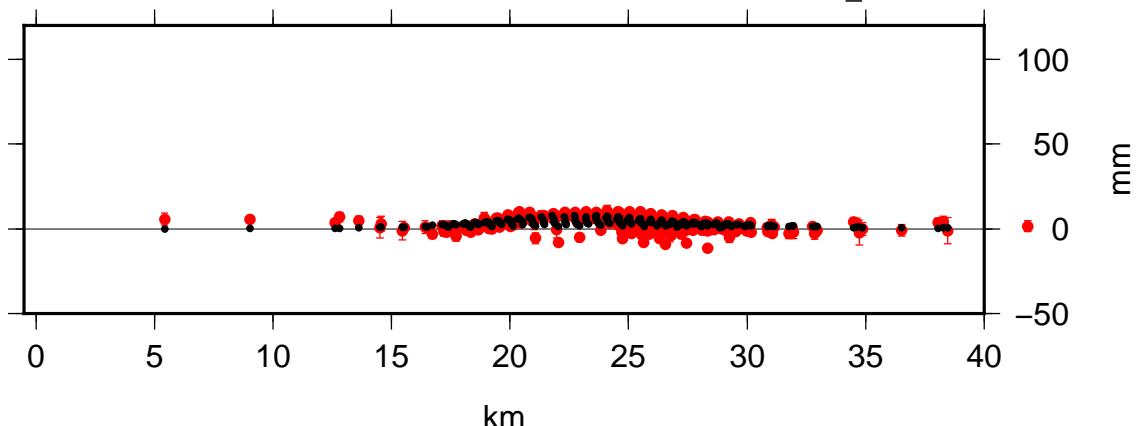
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



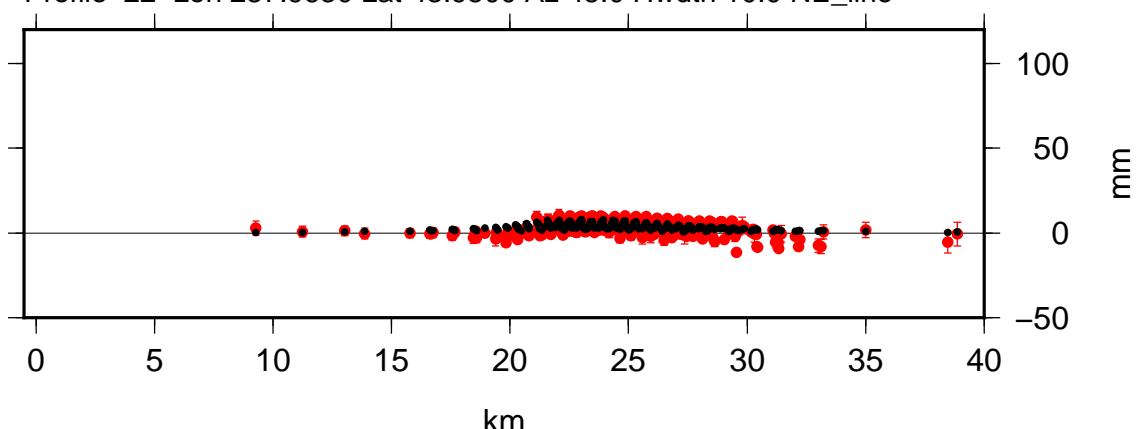
Code: ED17 Time: 1995.868 – 1997.690

Model: sis1 Nrms: 0.217 Wrms: 0.559

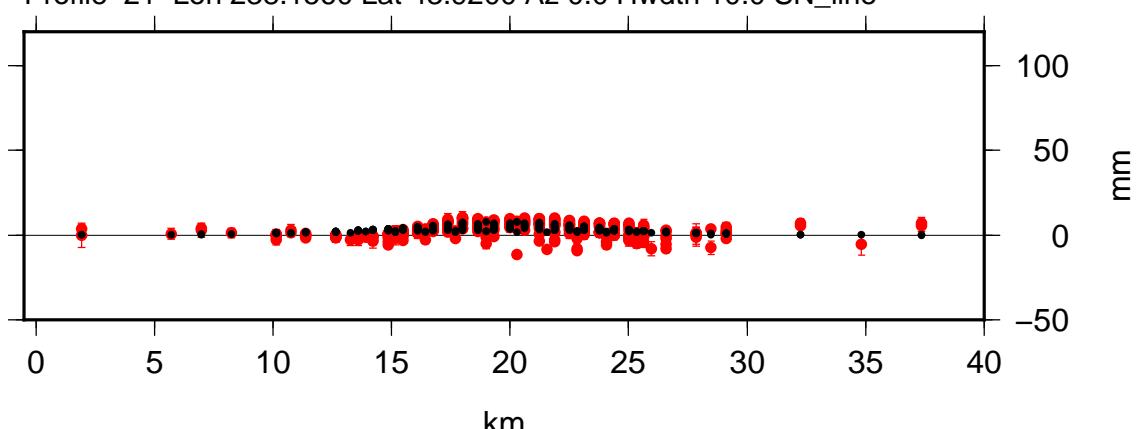
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



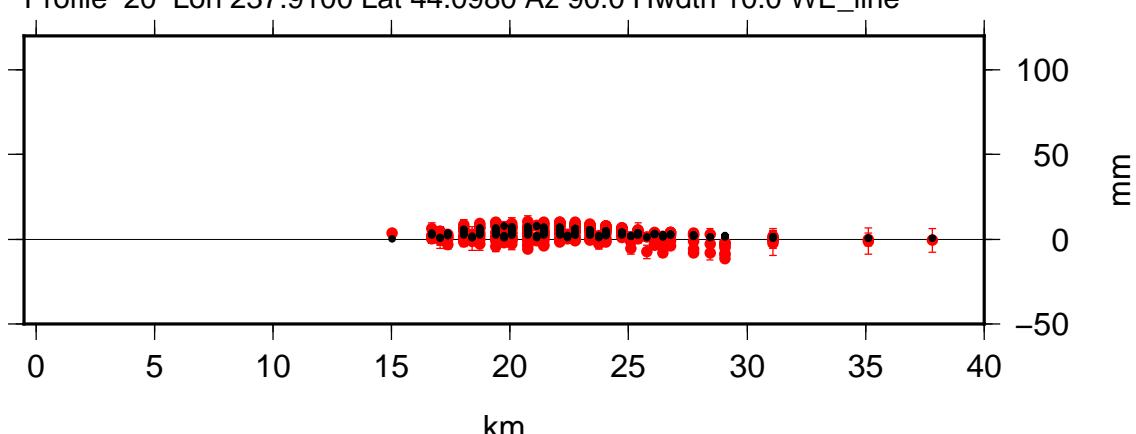
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



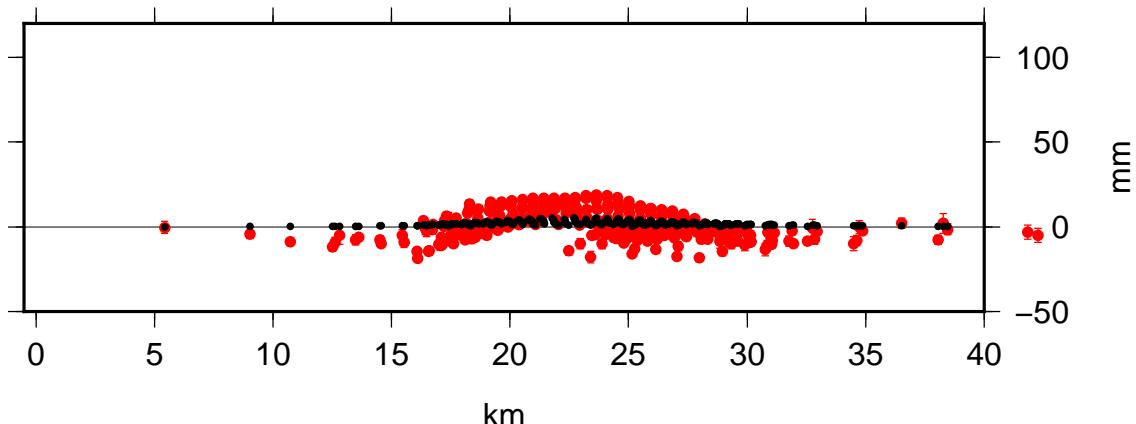
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



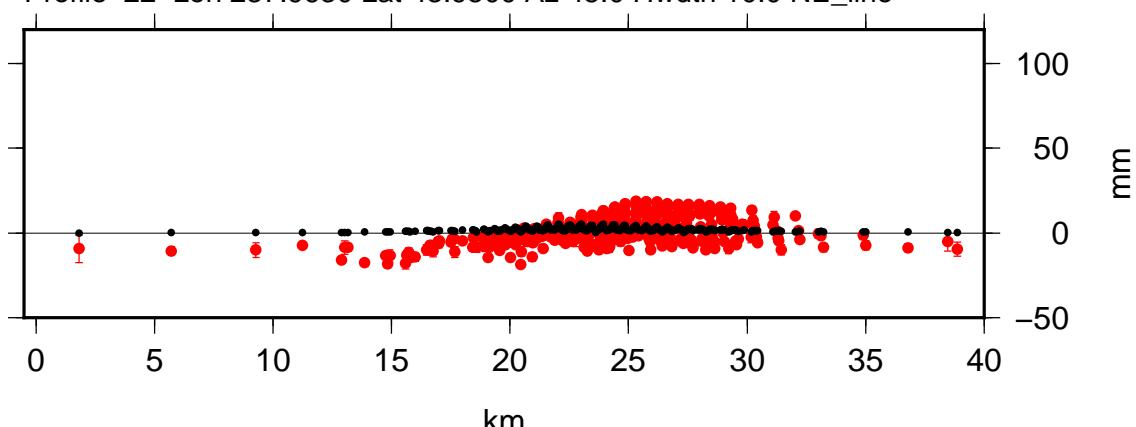
Code: ED18 Time: 1996.636 – 1997.594

Model: sis1 Nrms: 1.287 Wrms: 3.422

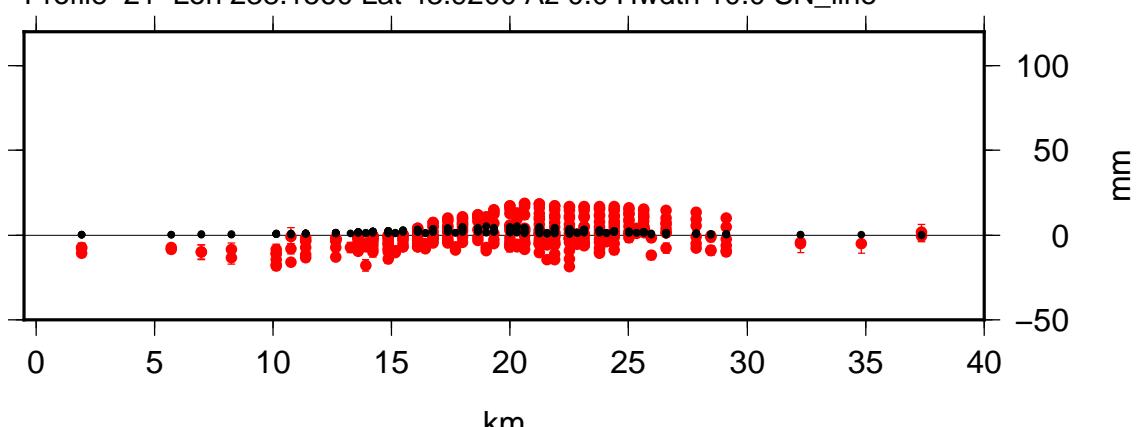
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



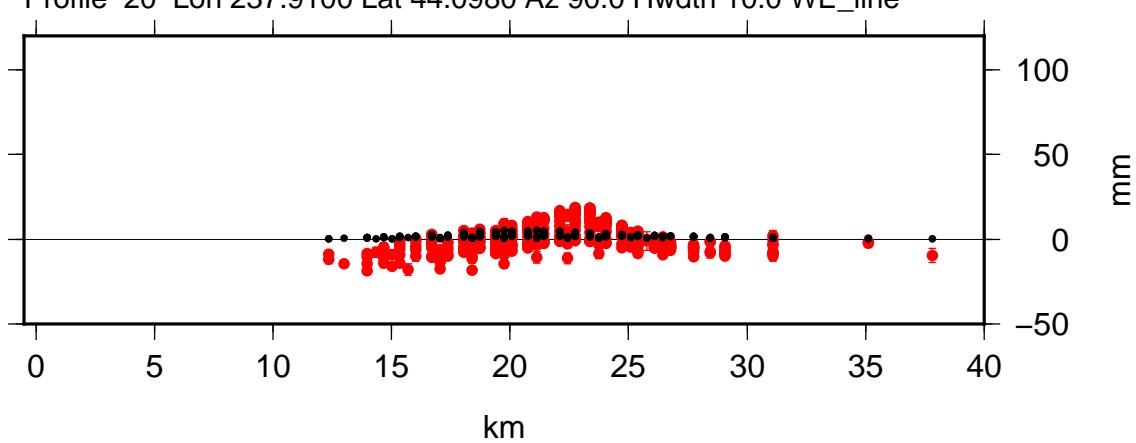
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



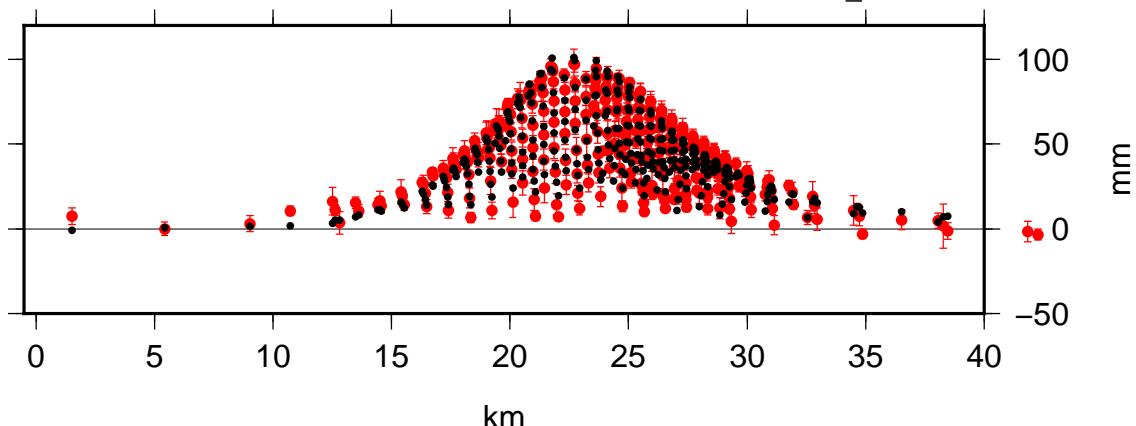
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



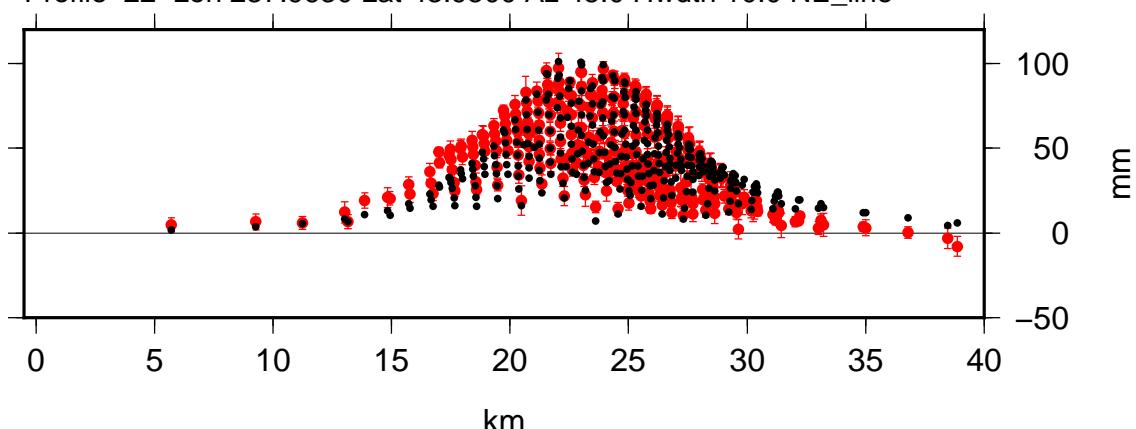
Code: ED19 Time: 1996.637 – 2000.757

Model: sis1 Nrms: 0.925 Wrms: 7.880

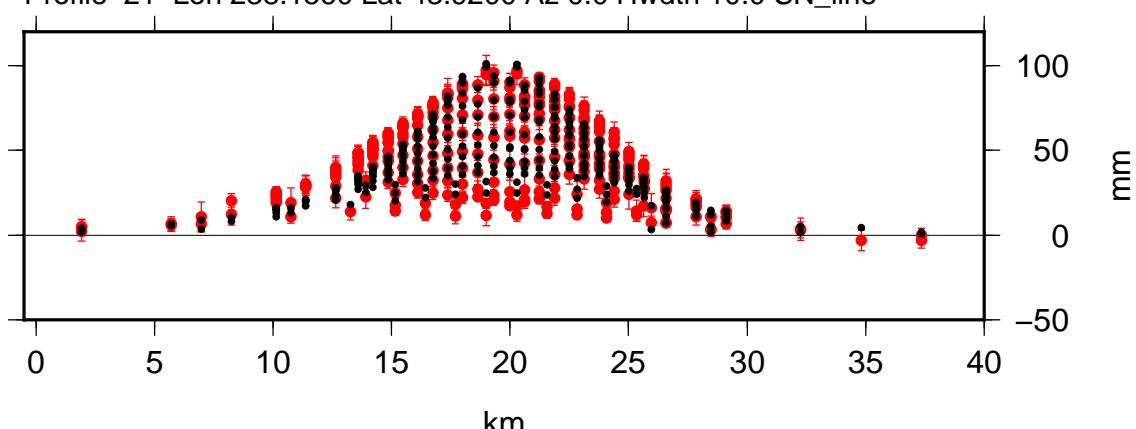
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



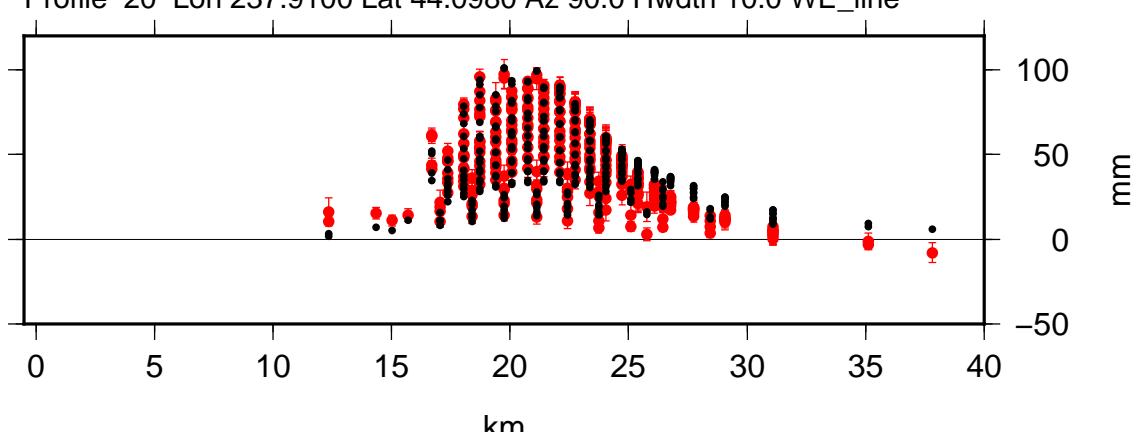
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



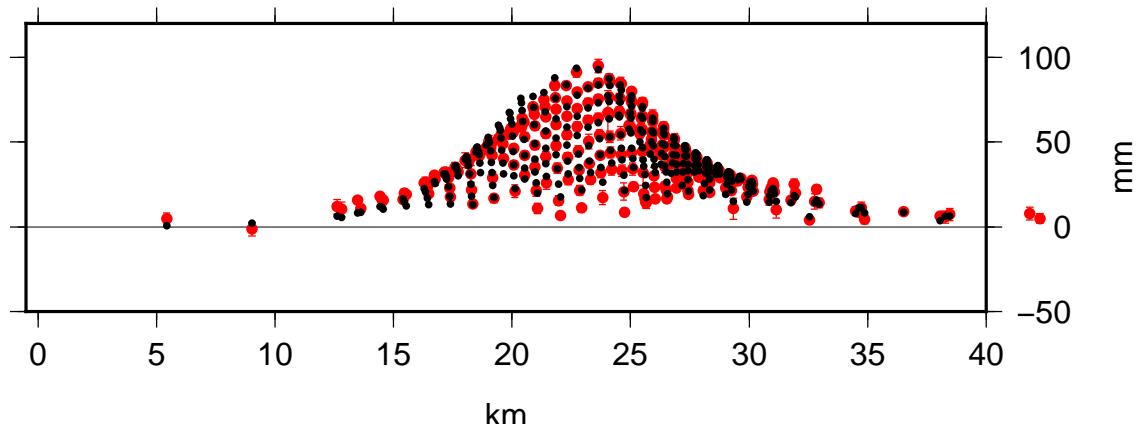
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



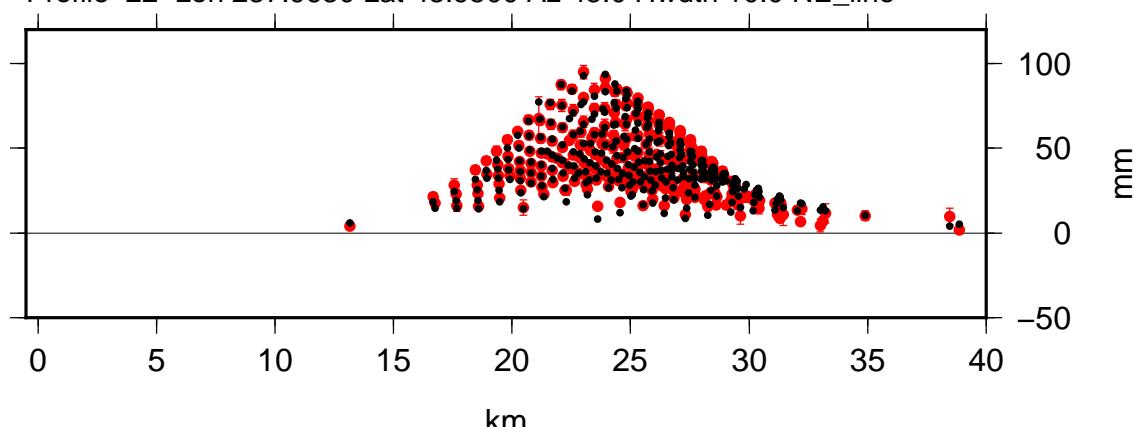
Code: ED20 Time: 1997.646 – 2000.713

Model: sis1 Nrms: 0.841 Wrms: 3.347

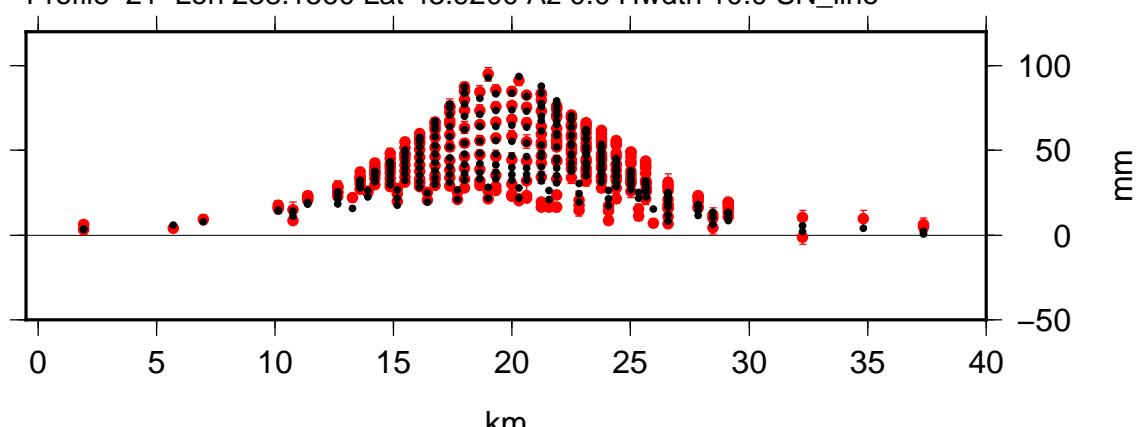
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



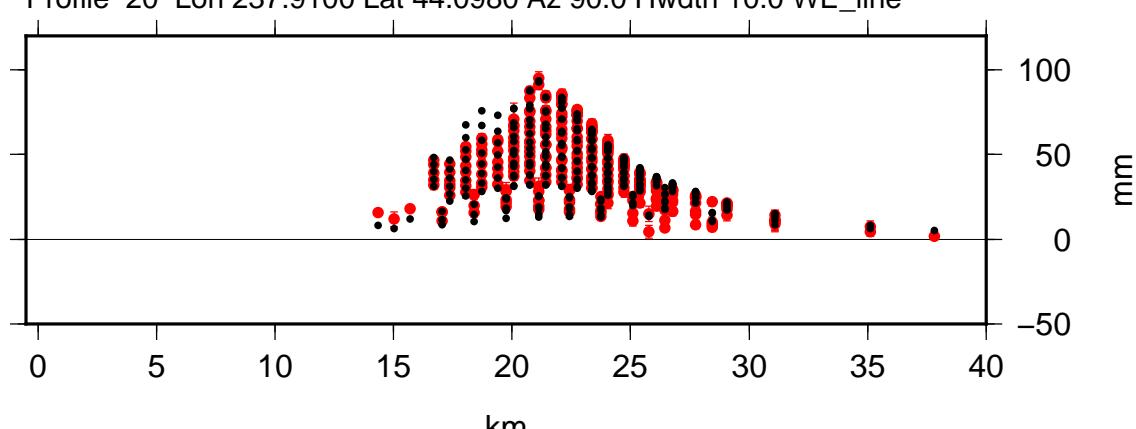
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



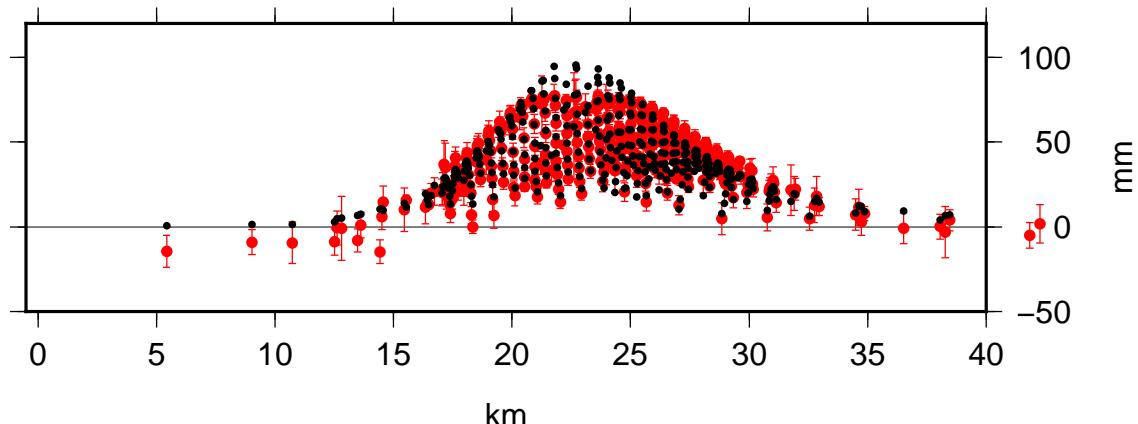
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



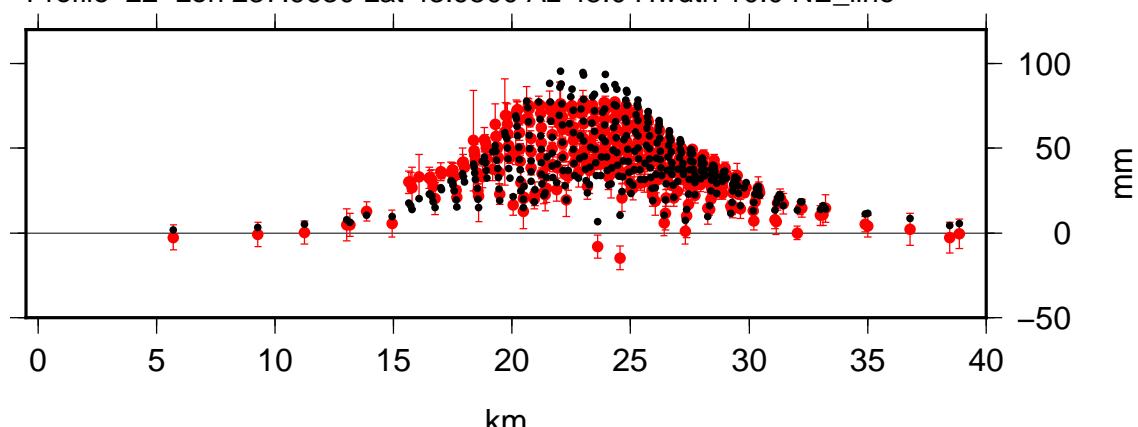
Code: ED21 Time: 1997.679 – 2000.756

Model: sis1 Nrms: 0.343 Wrms: 2.694

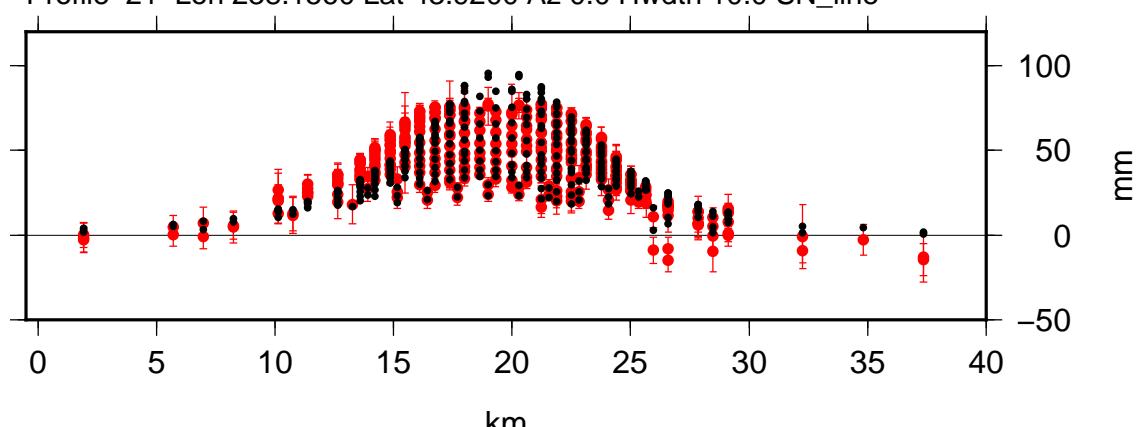
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



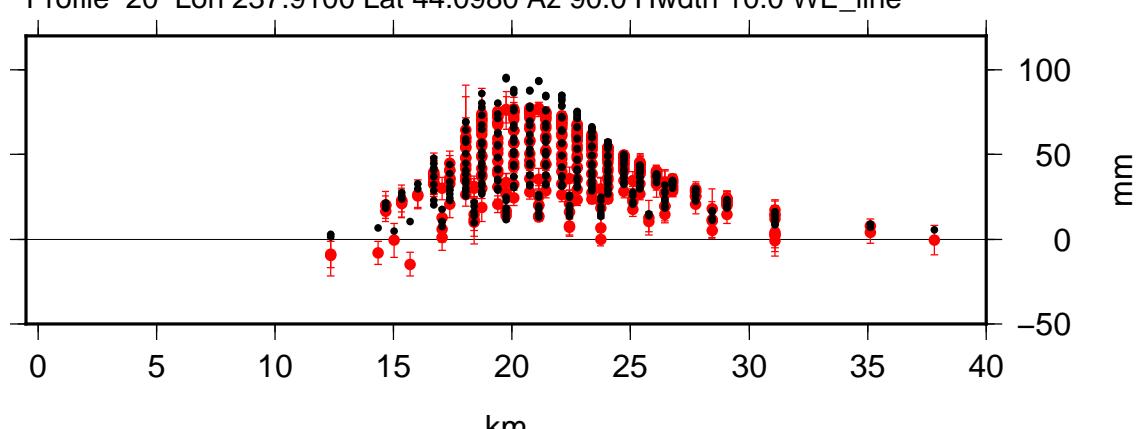
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



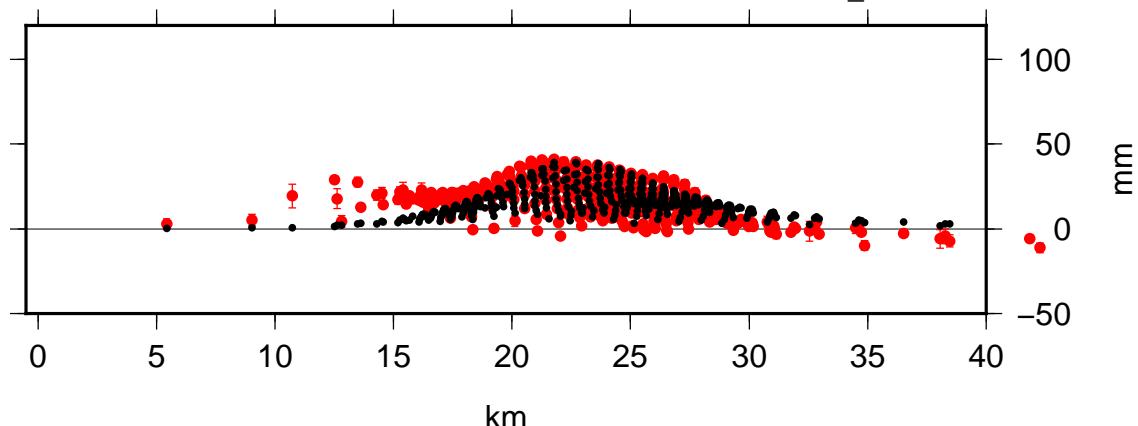
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



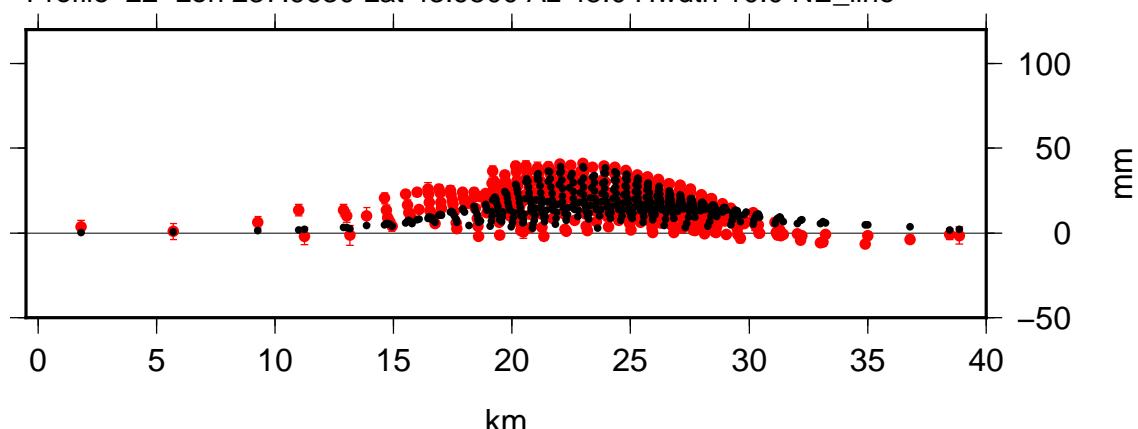
Code: ED22 Time: 1998.553 – 1999.704

Model: sis1 Nrms: 0.665 Wrms: 1.822

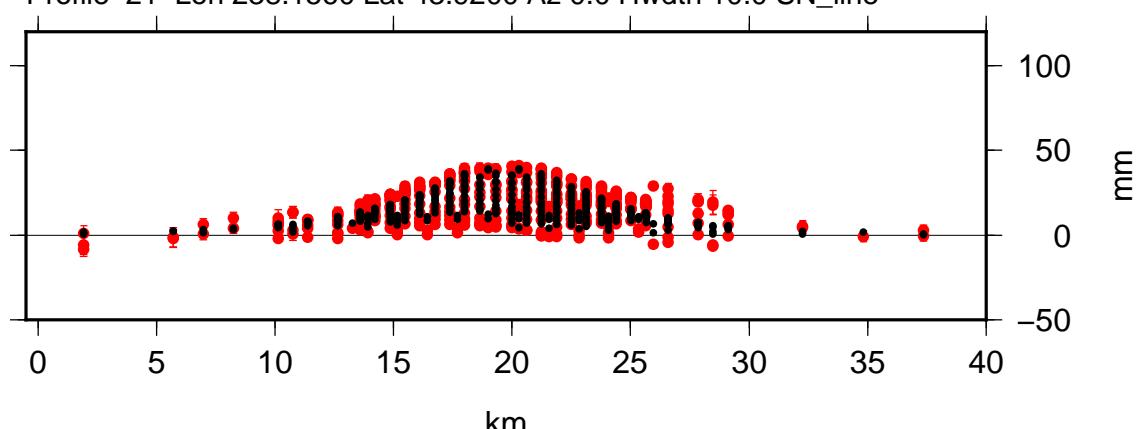
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



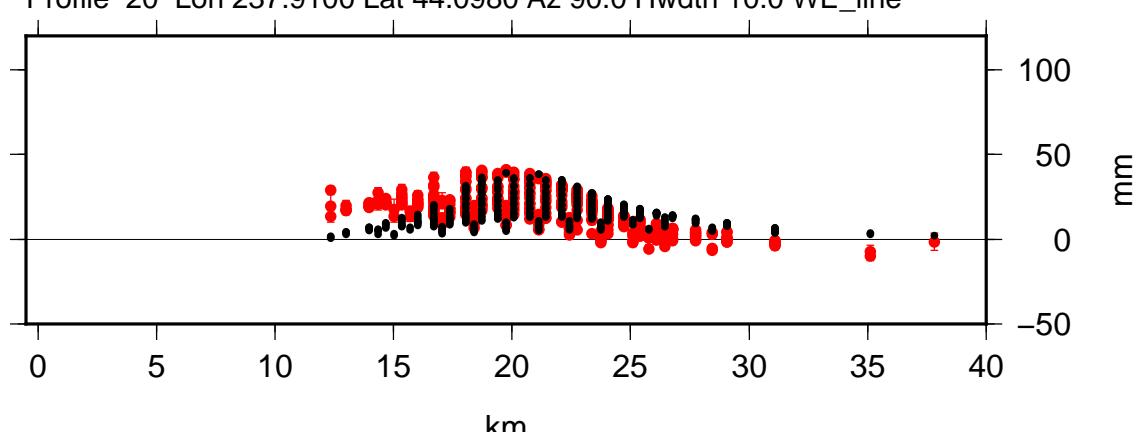
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



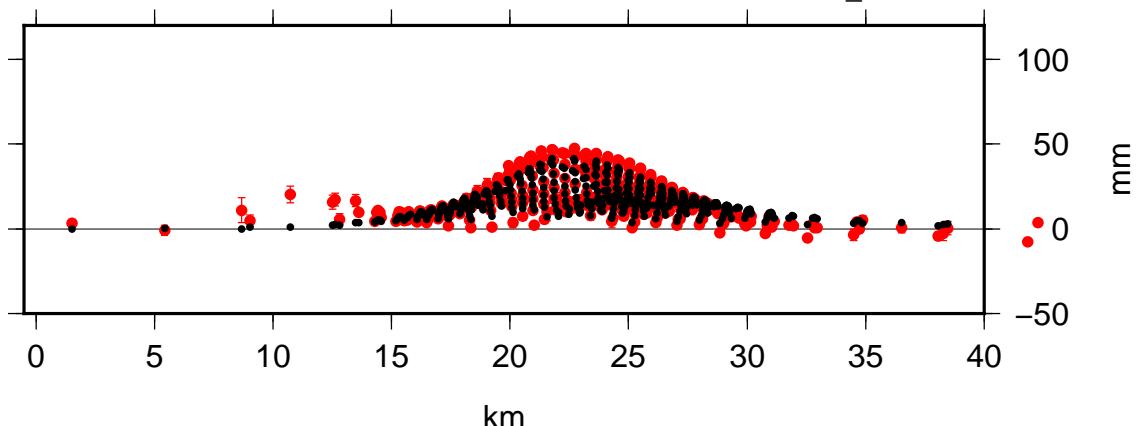
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



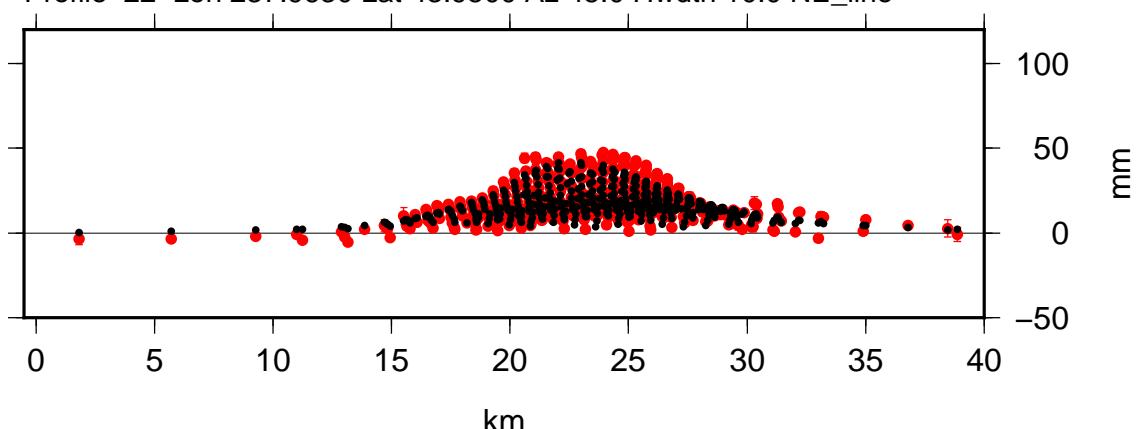
Code: ED23 Time: 1998.605 – 1999.756

Model: sis1 Nrms: 0.416 Wrms: 1.107

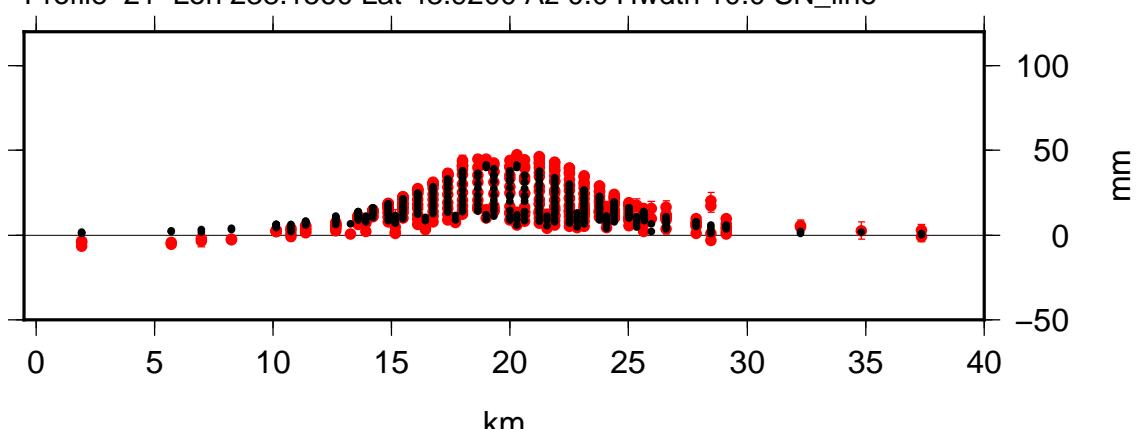
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



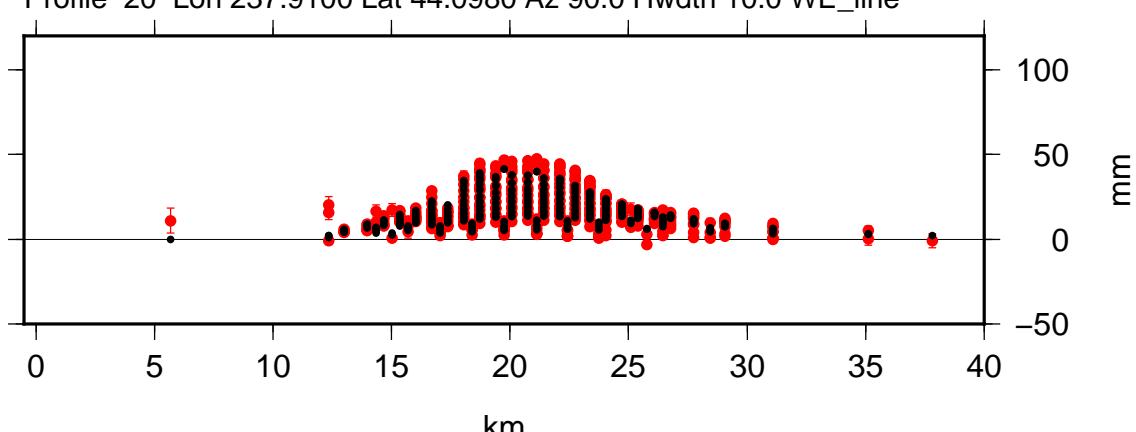
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



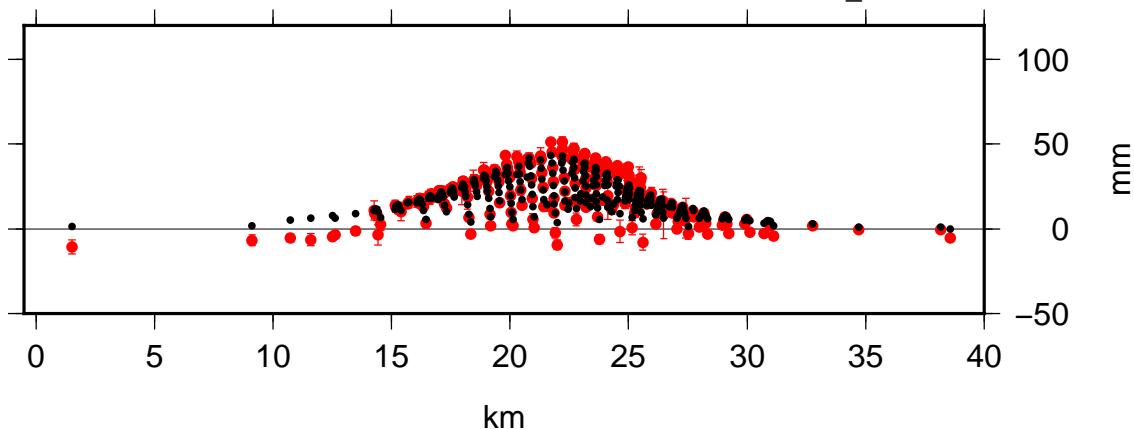
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



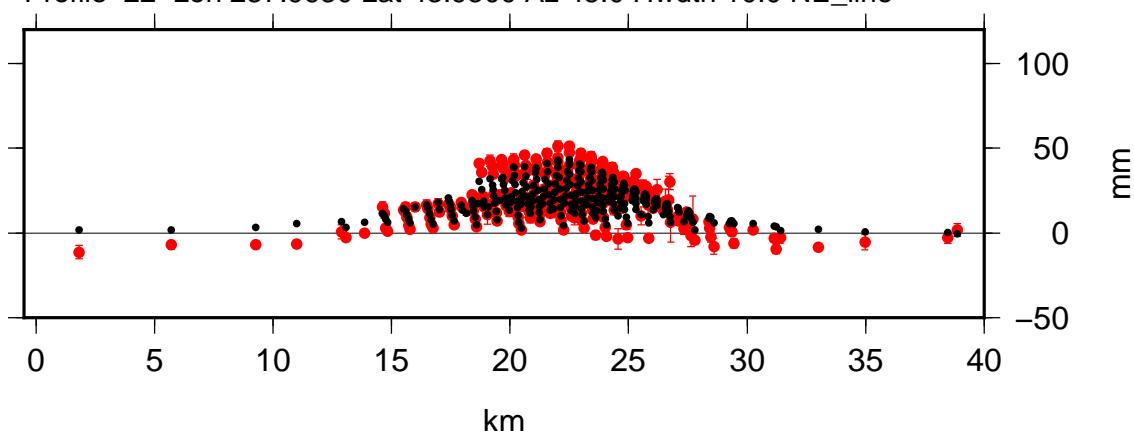
Code: EA24 Time: 1999.617 – 2000.574

Model: sis1 Nrms: 1.685 Wrms: 6.262

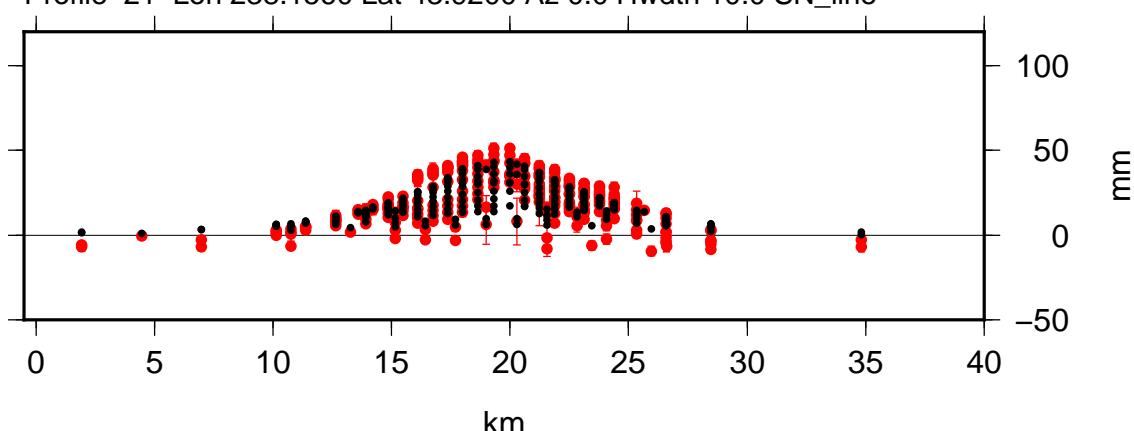
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



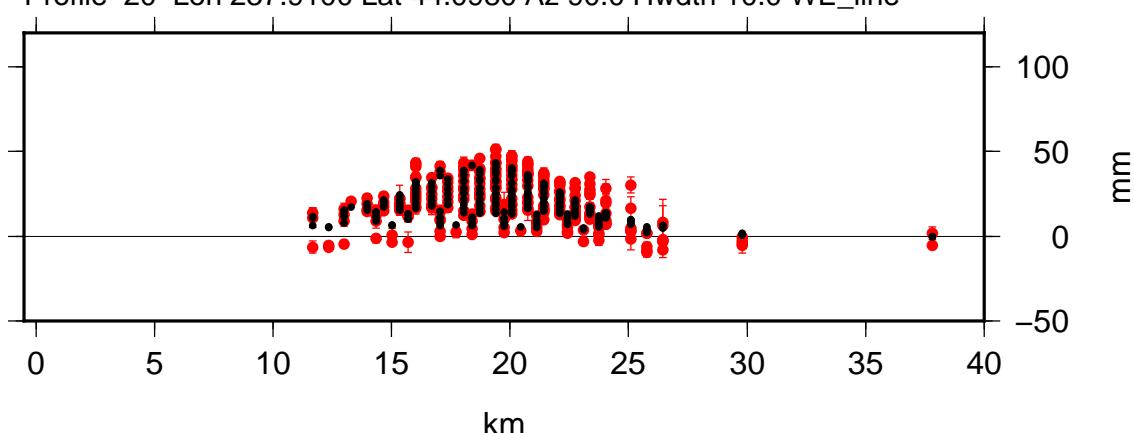
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



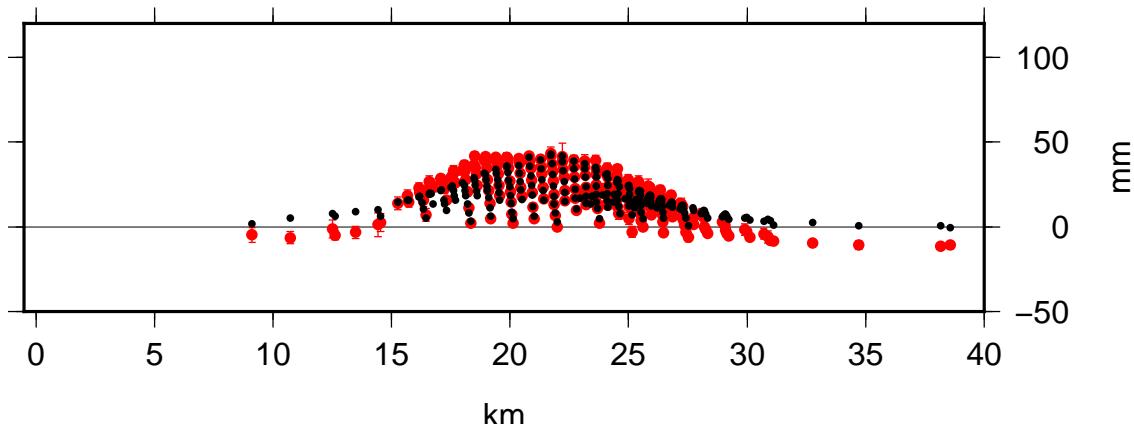
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



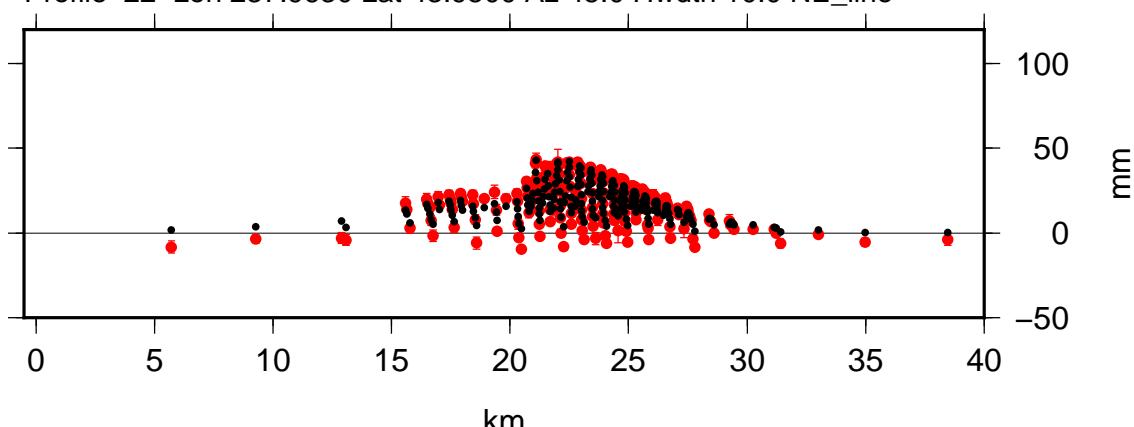
Code: EA25 Time: 1999.669 – 2000.626

Model: sis1 Nrms: 1.243 Wrms: 4.217

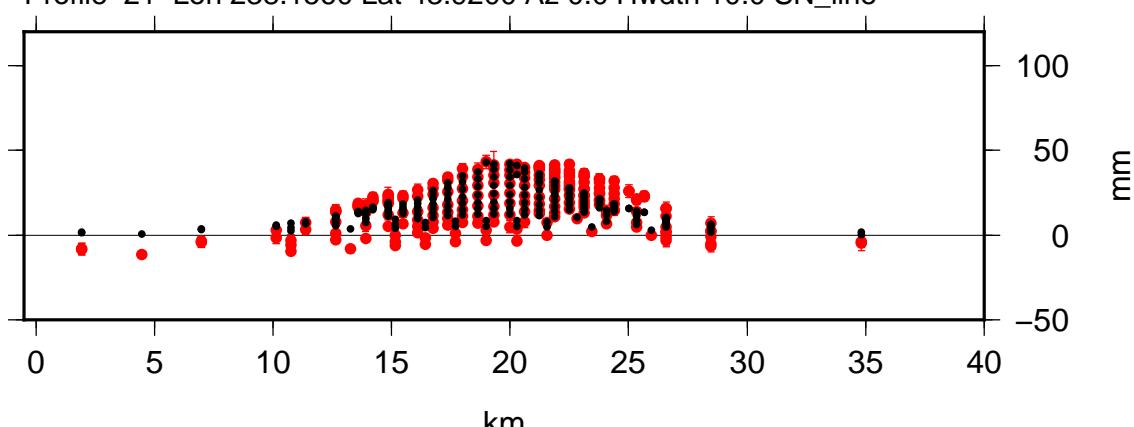
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



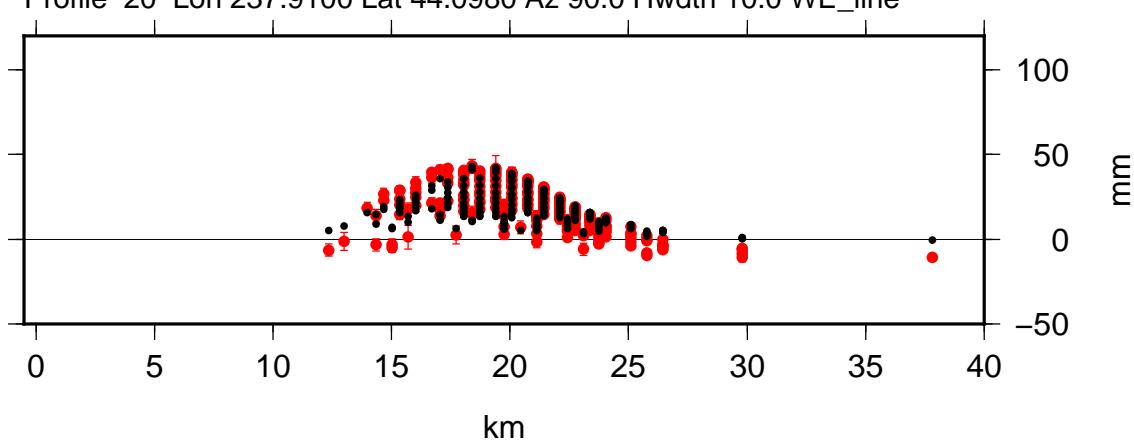
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



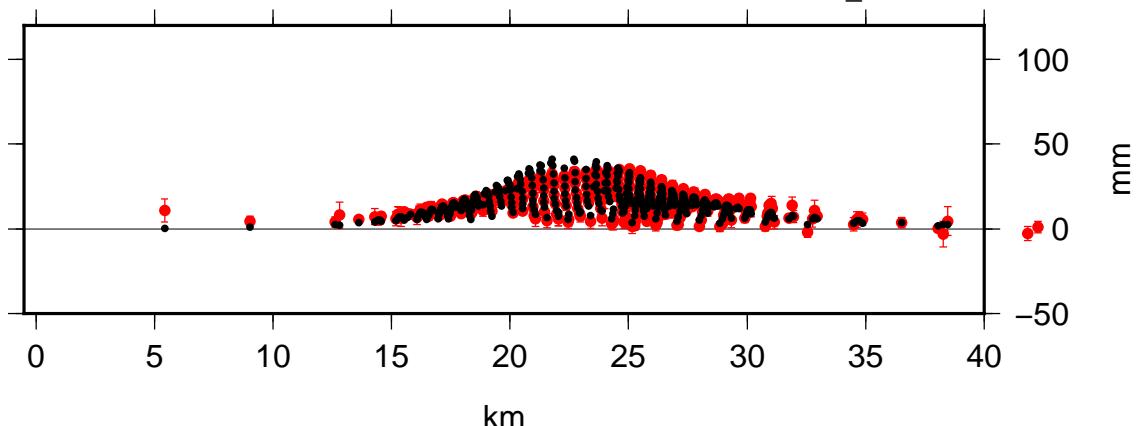
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



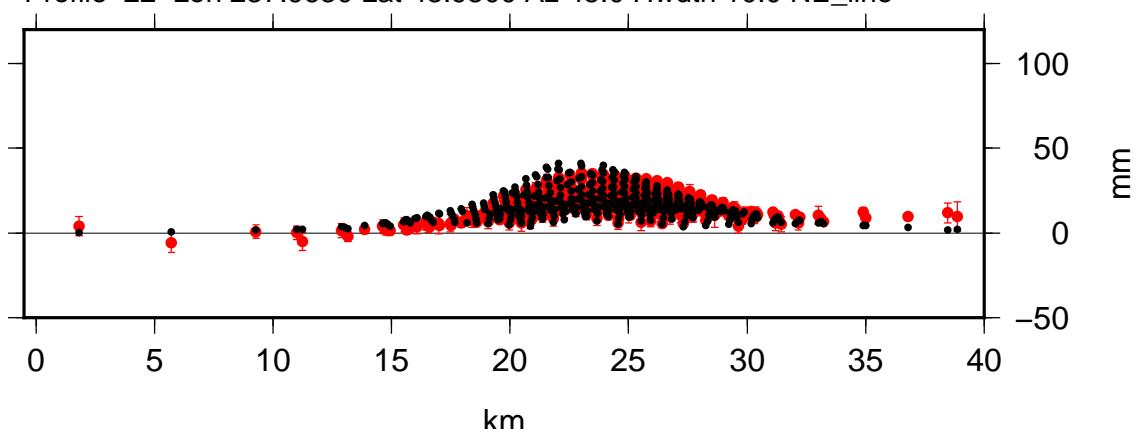
Code: ED26 Time: 1999.756 – 2000.713

Model: sis1 Nrms: 1.127 Wrms: 5.495

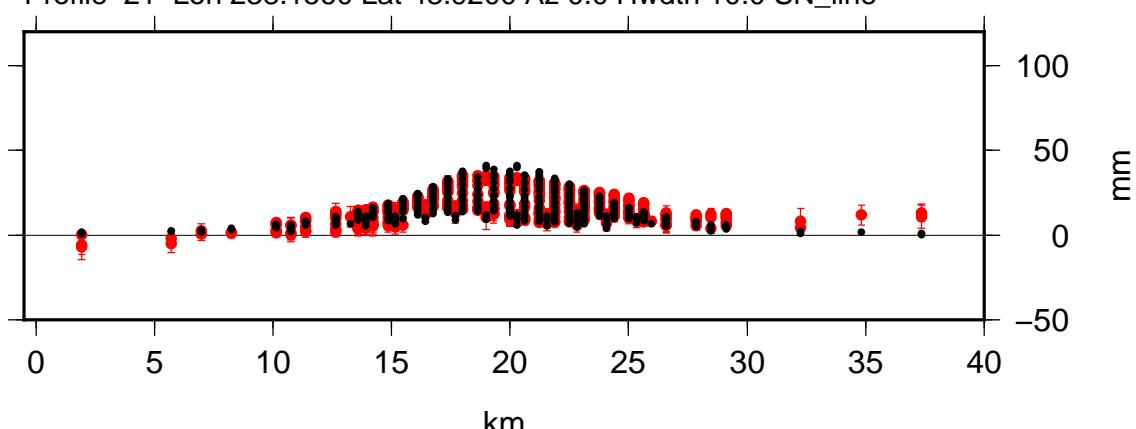
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



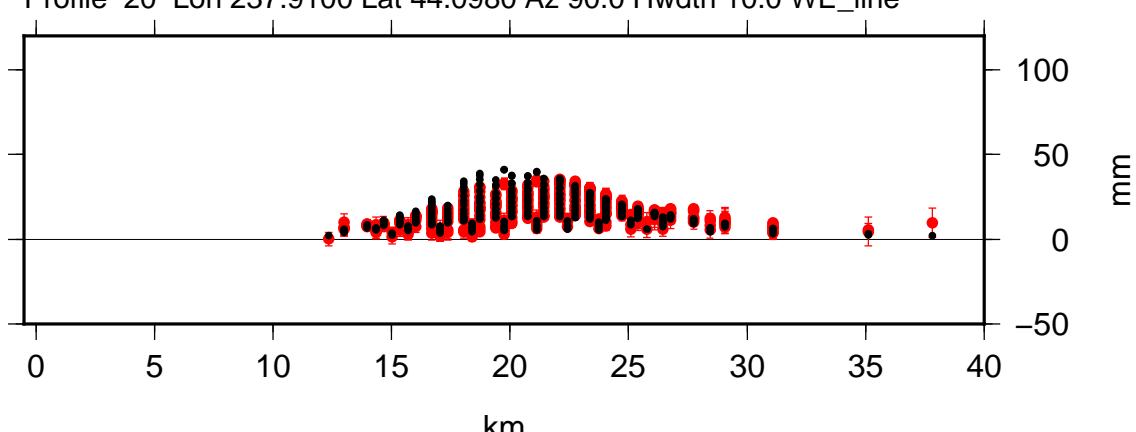
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



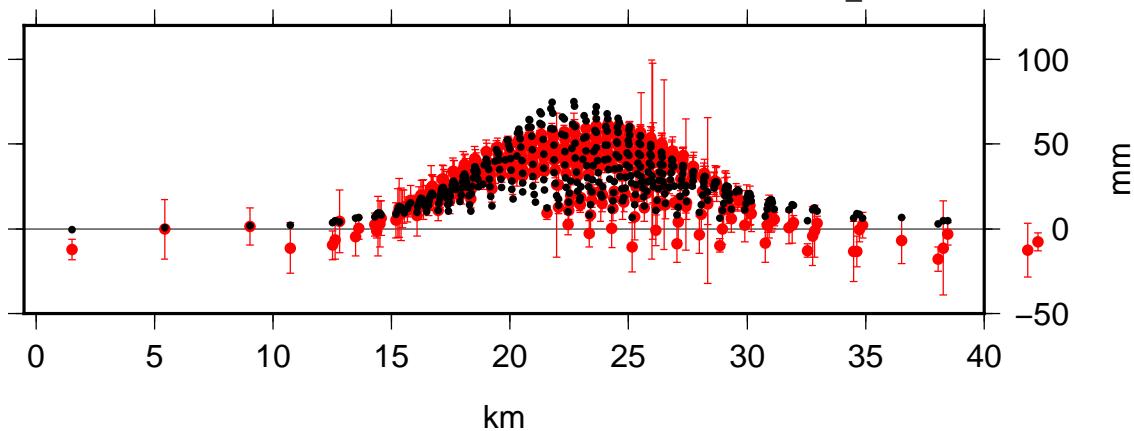
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



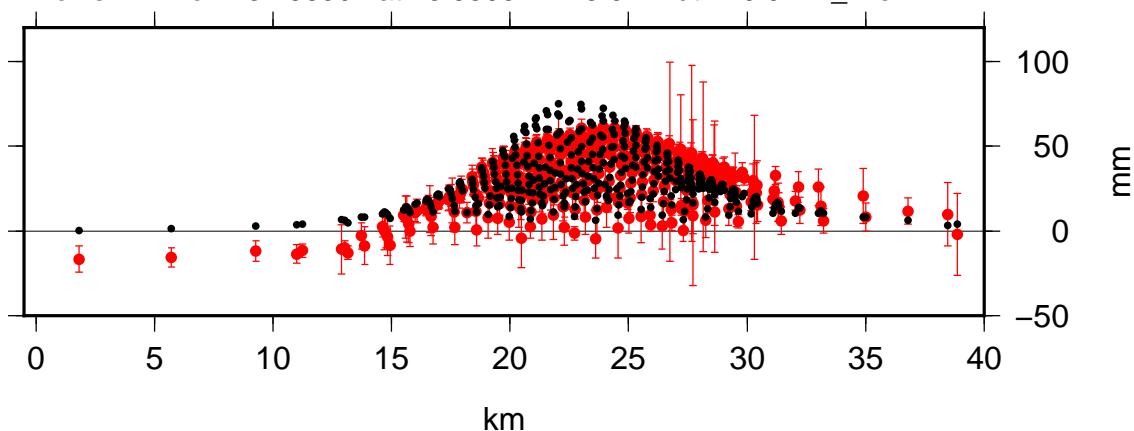
Code: ED27 Time: 1999.756 – 2001.671

Model: sis1 Nrms: 1.030 Wrms: 11.723

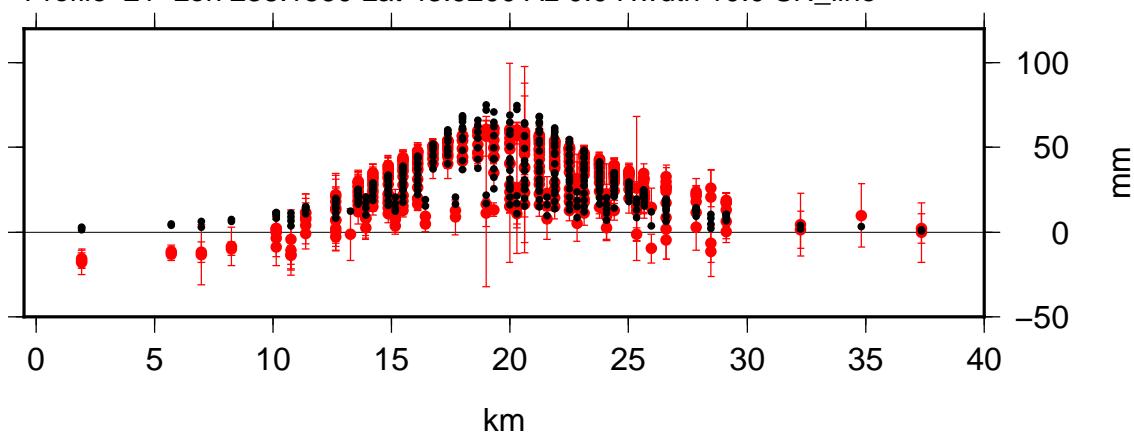
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



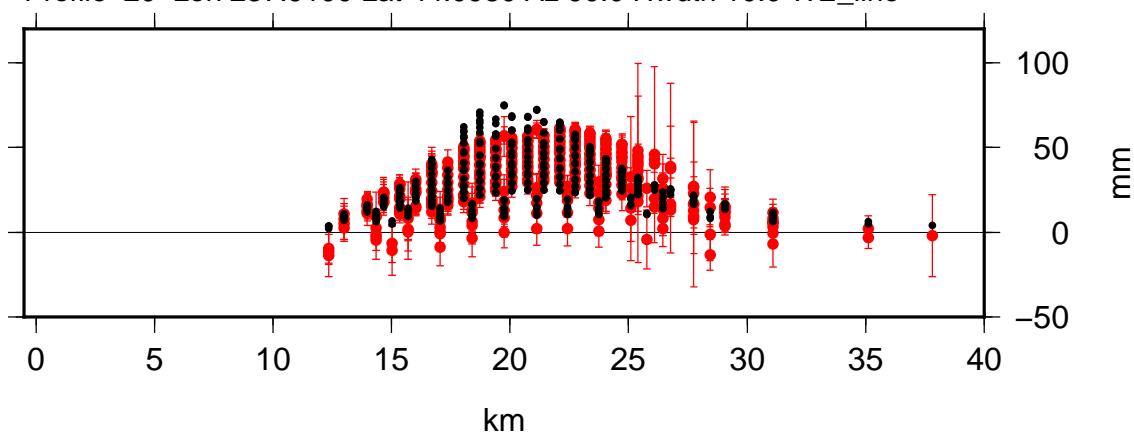
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



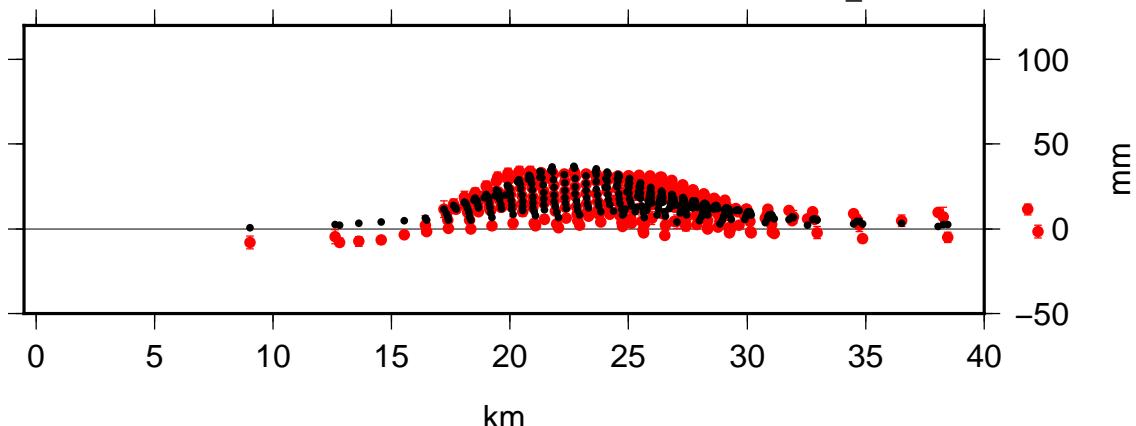
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



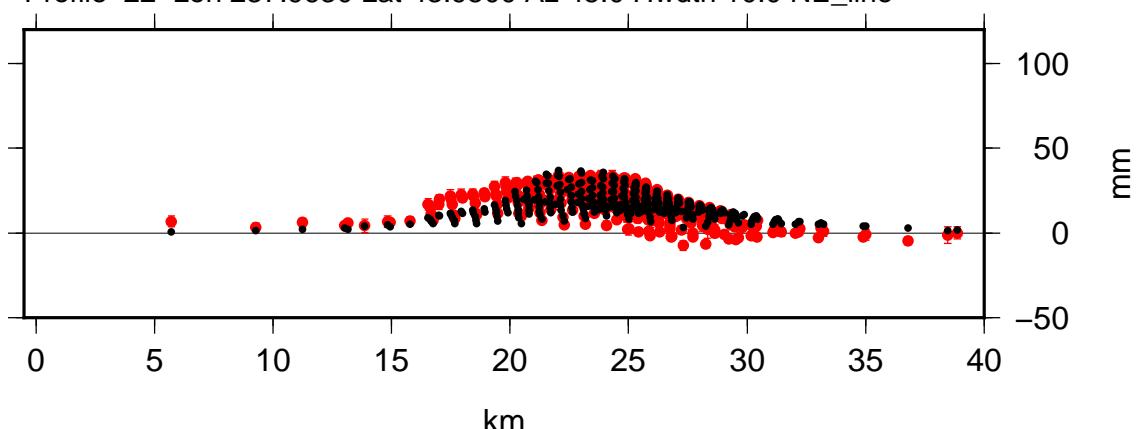
Code: ED28 Time: 2000.713 – 2001.767

Model: sis1 Nrms: 0.738 Wrms: 2.252

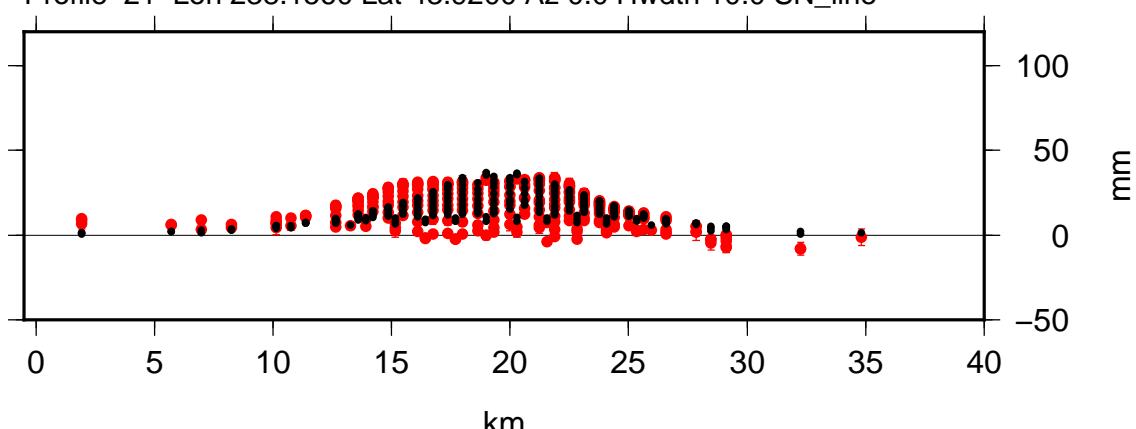
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



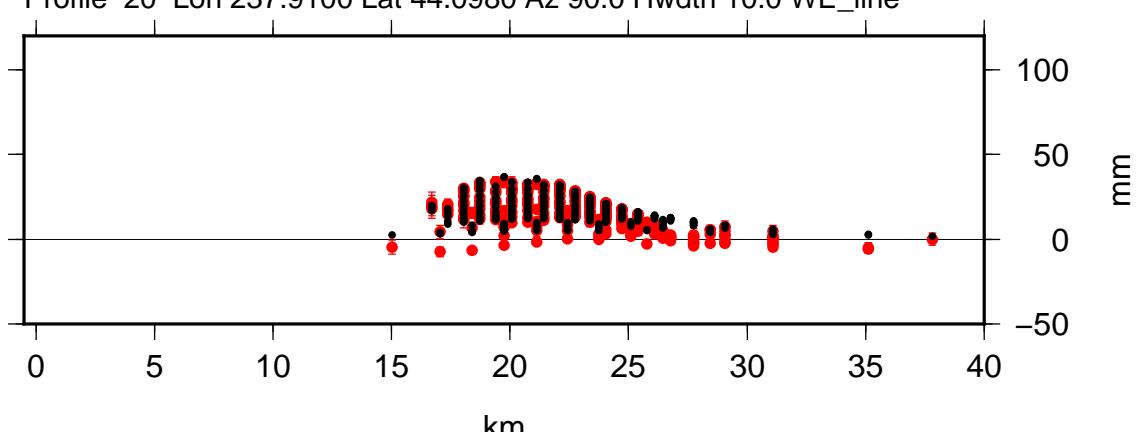
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



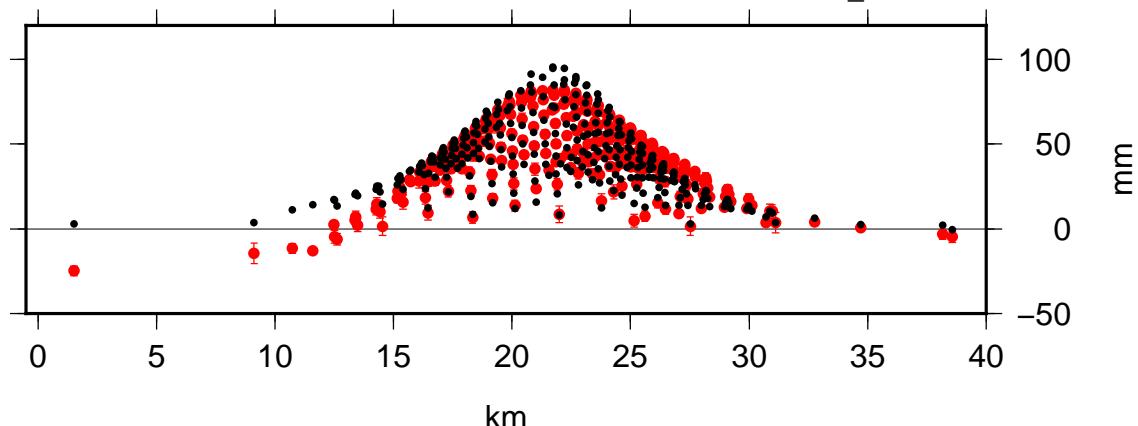
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



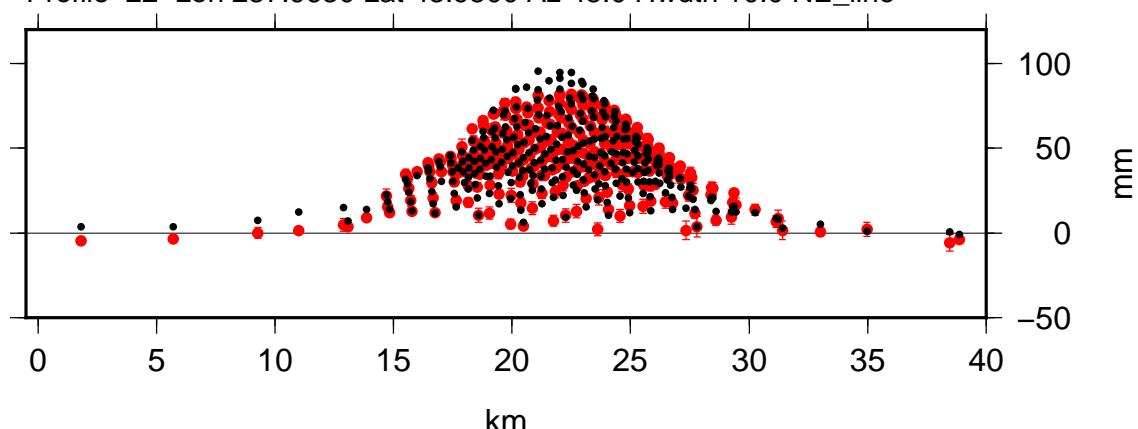
Code: EA29 Time: 2000.766 – 2004.790

Model: sis1 Nrms: 0.827 Wrms: 3.396

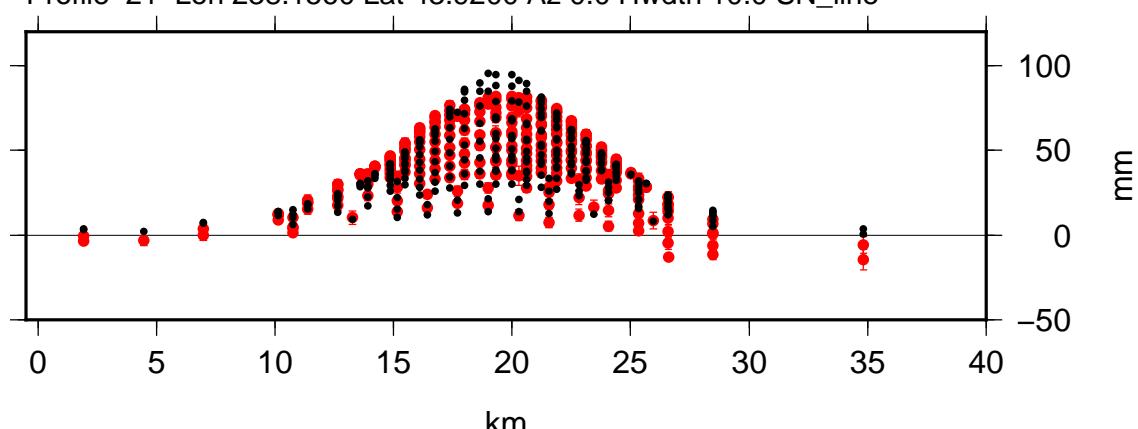
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



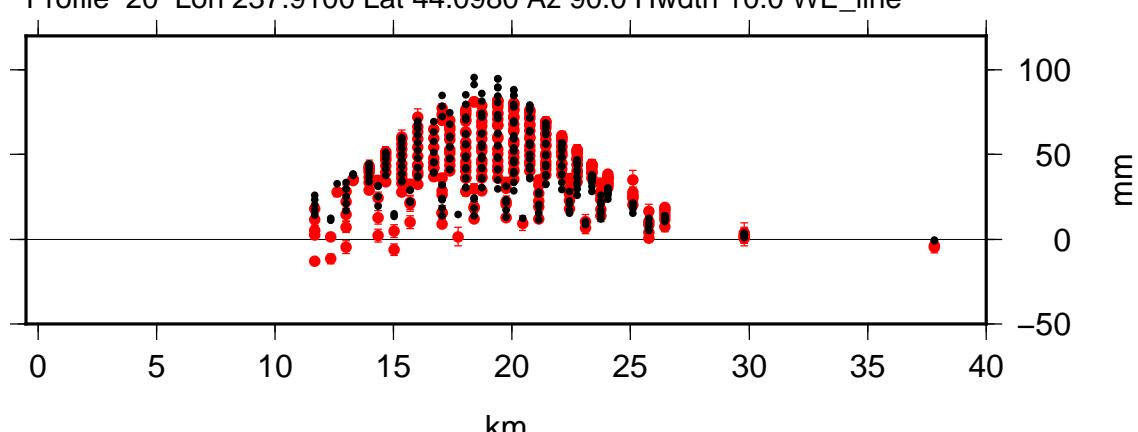
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



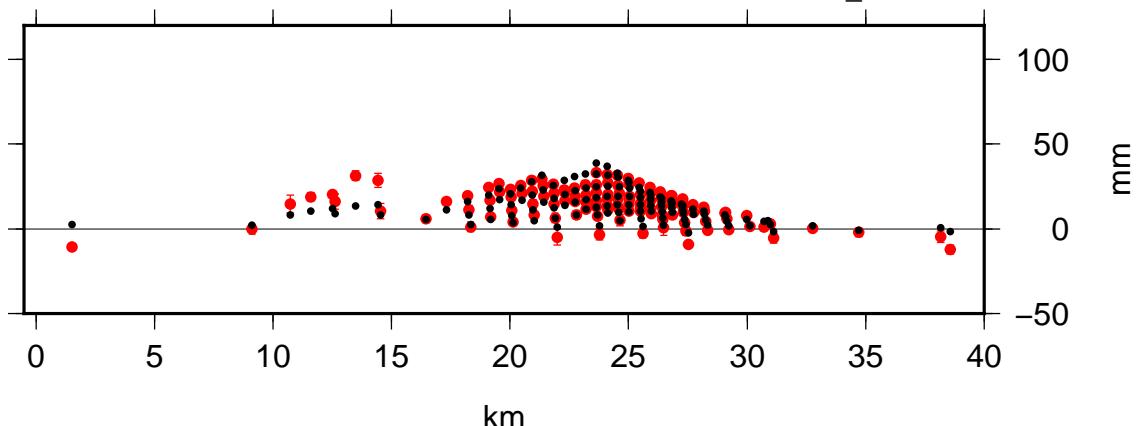
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



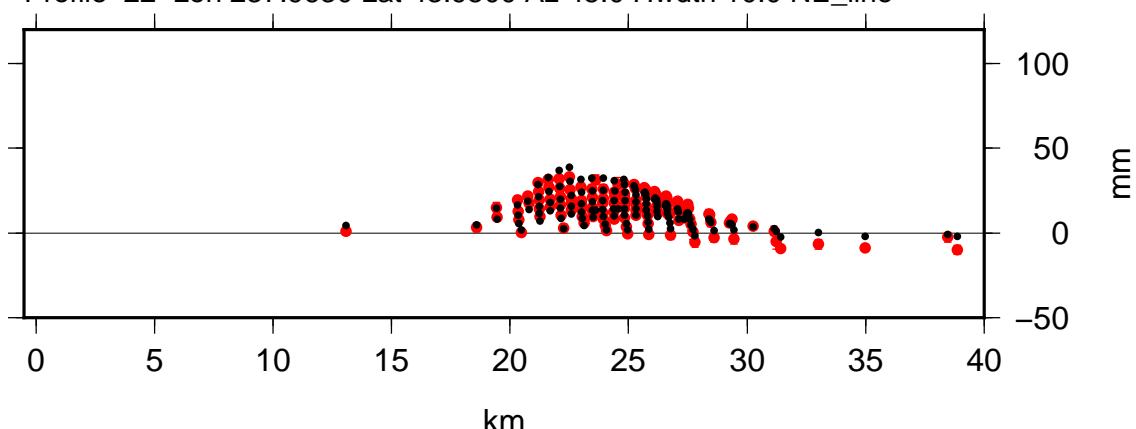
Code: RA30 Time: 2000.812 – 2002.784

Model: sis1 Nrms: 0.506 Wrms: 1.579

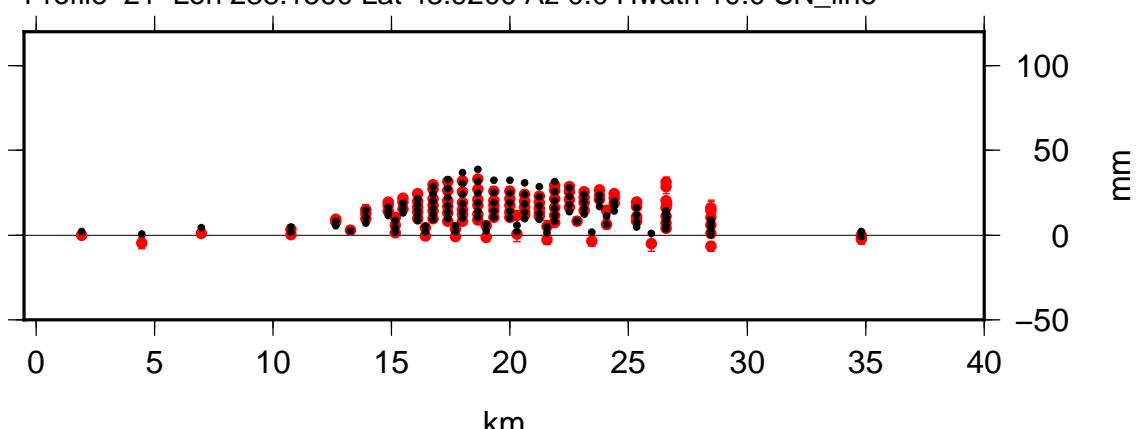
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



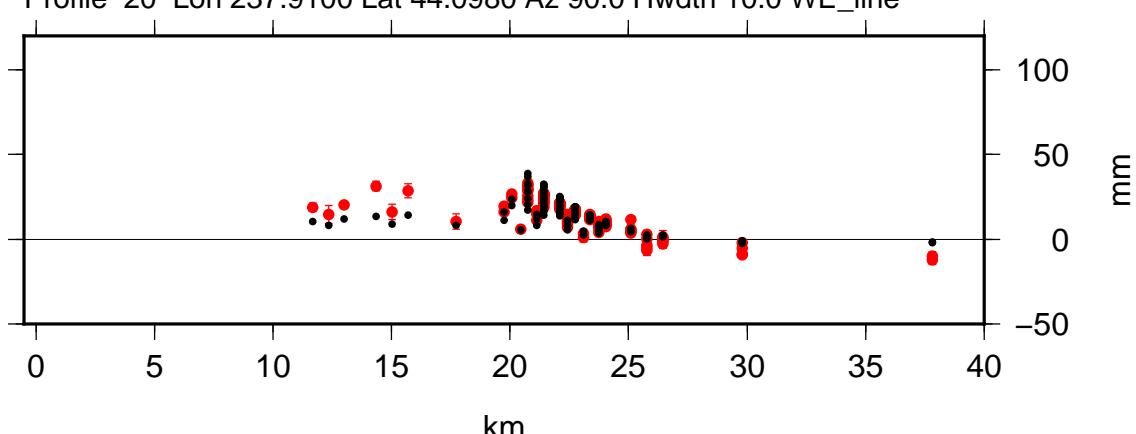
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



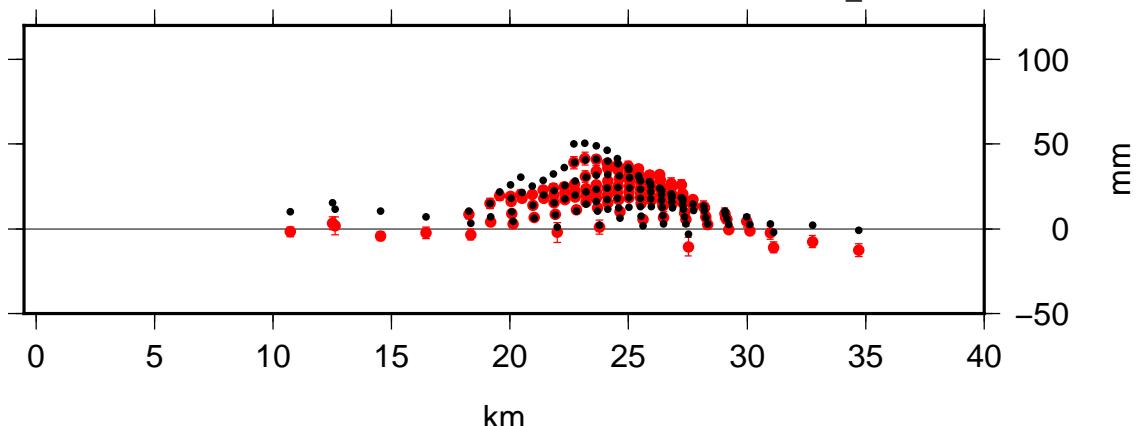
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



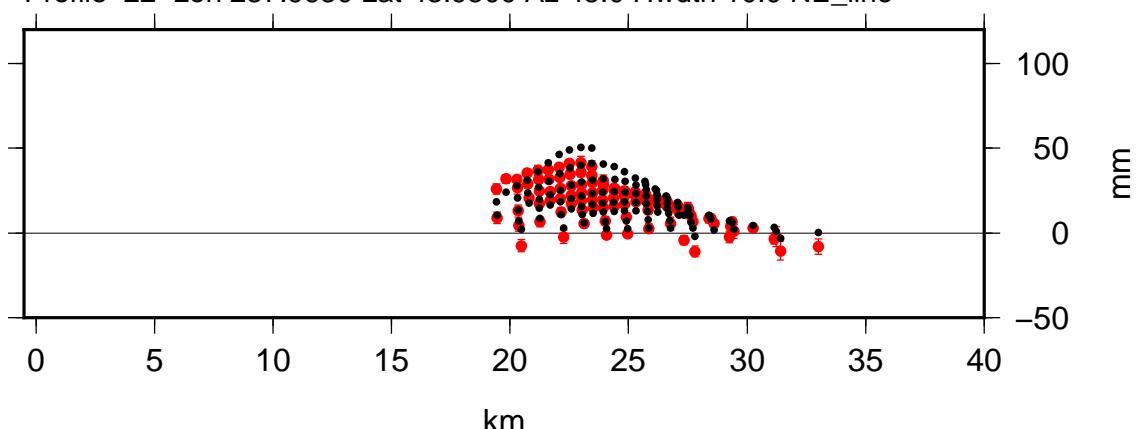
Code: RA31 Time: 2000.812 – 2003.639

Model: sis1 Nrms: 1.535 Wrms: 4.667

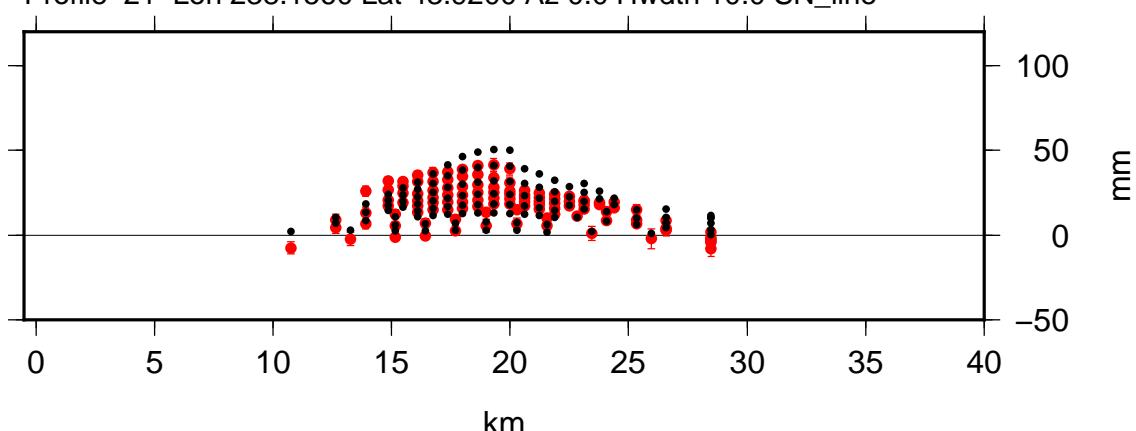
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



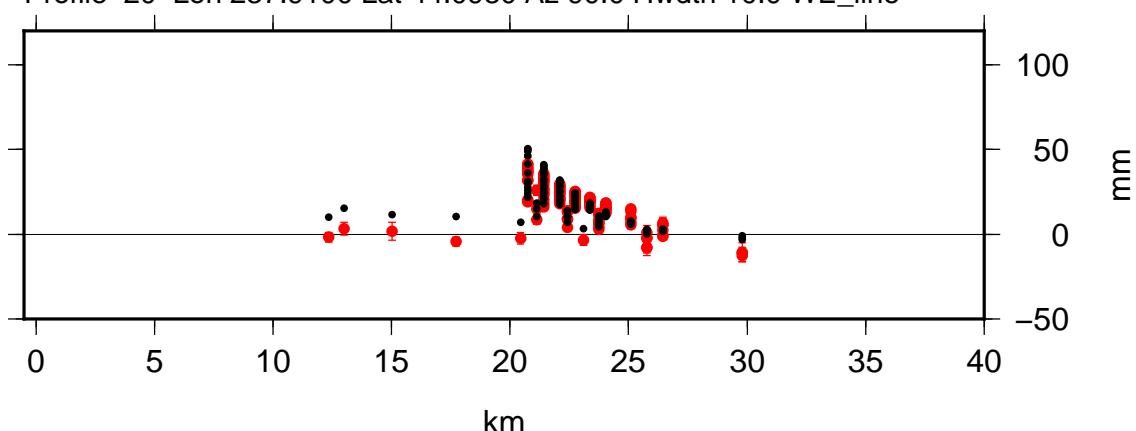
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



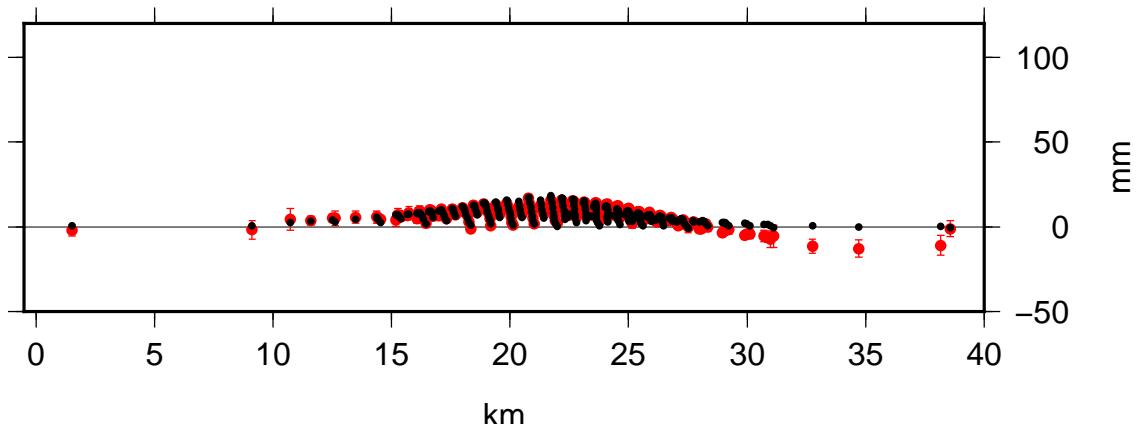
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



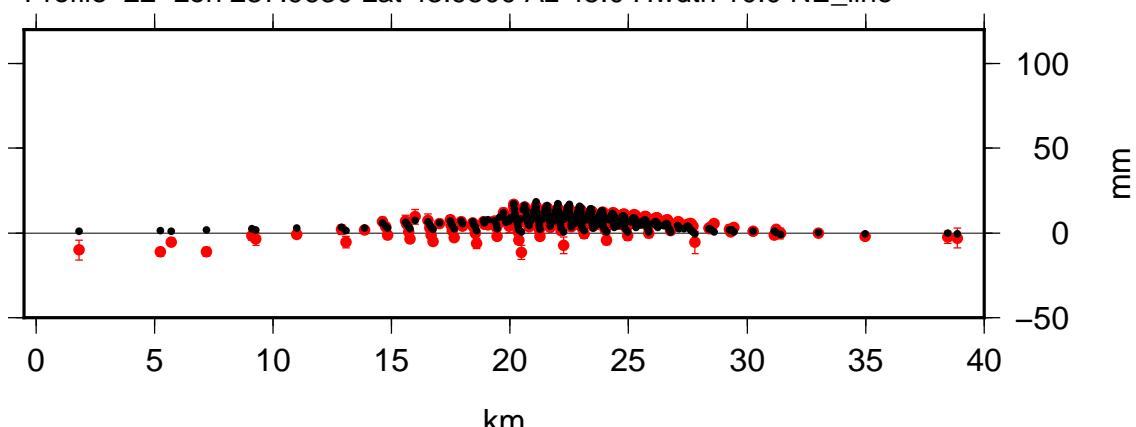
Code: RA32 Time: 2002.652 – 2003.671

Model: sis1 Nrms: 1.517 Wrms: 6.627

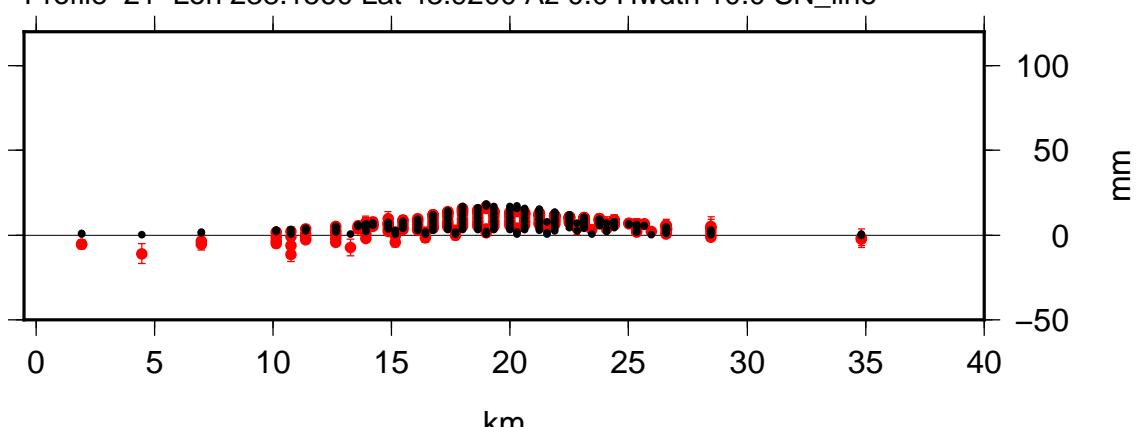
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



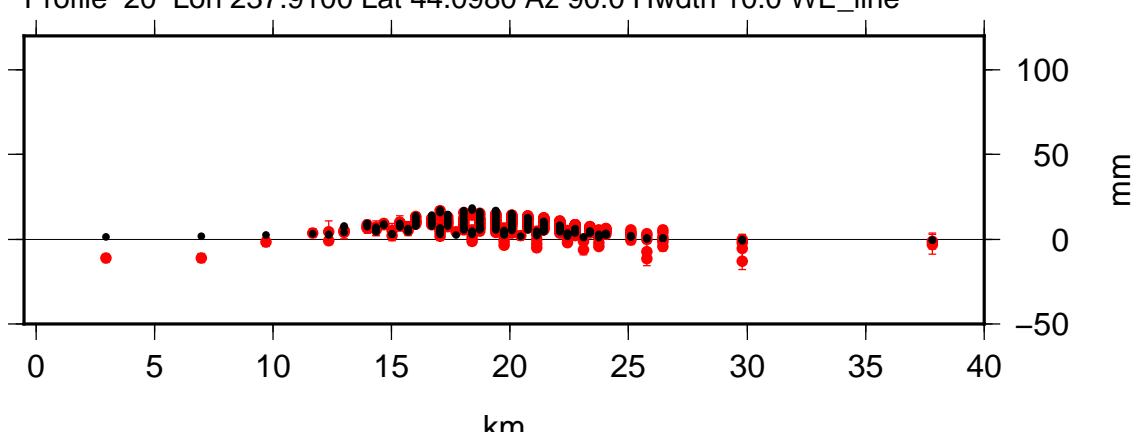
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



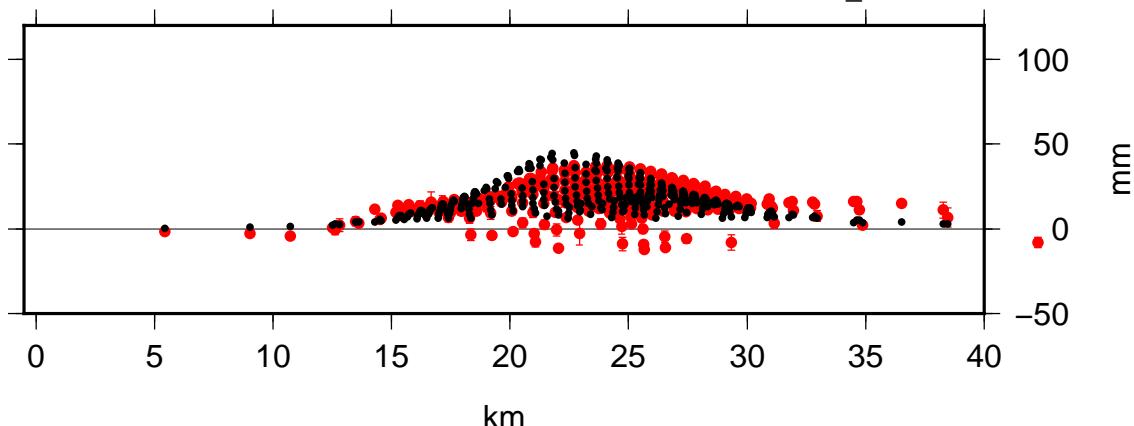
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



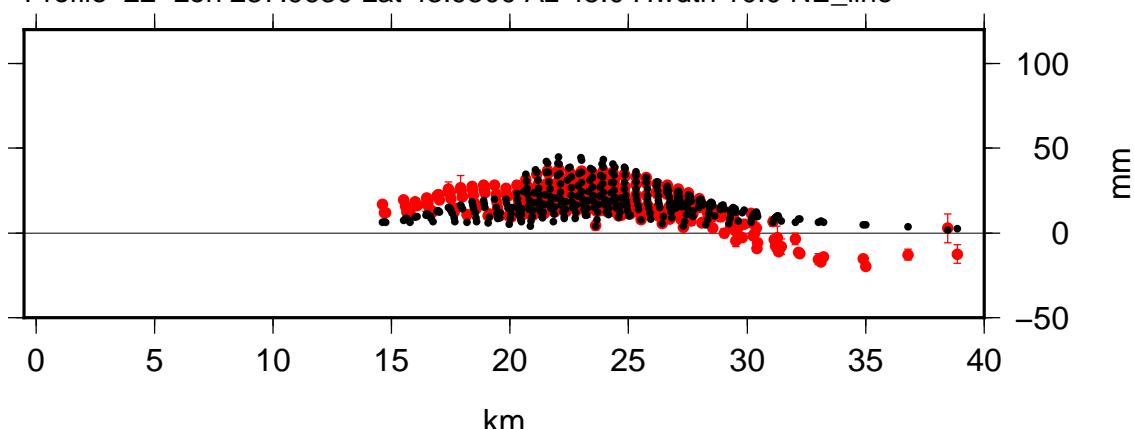
Code: VD33 Time: 2003.493 – 2007.599

Model: sis1 Nrms: 0.386 Wrms: 1.156

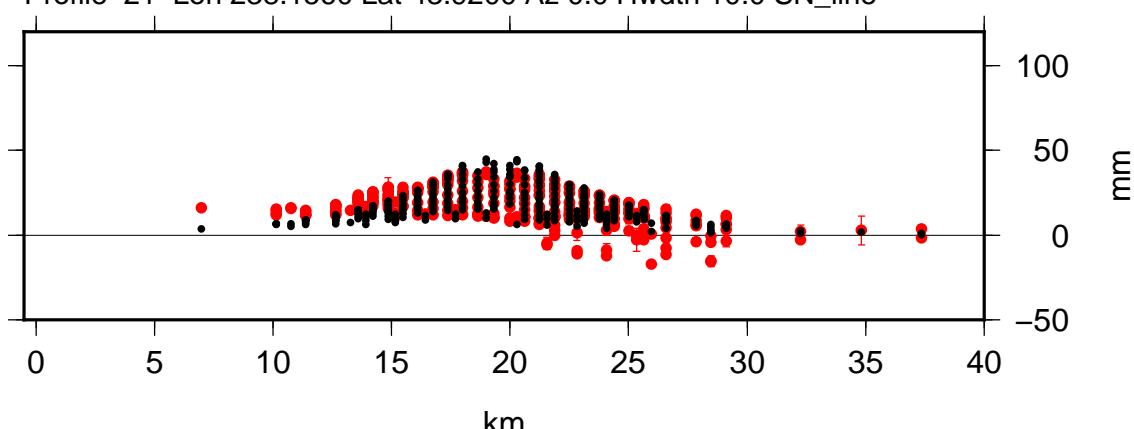
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



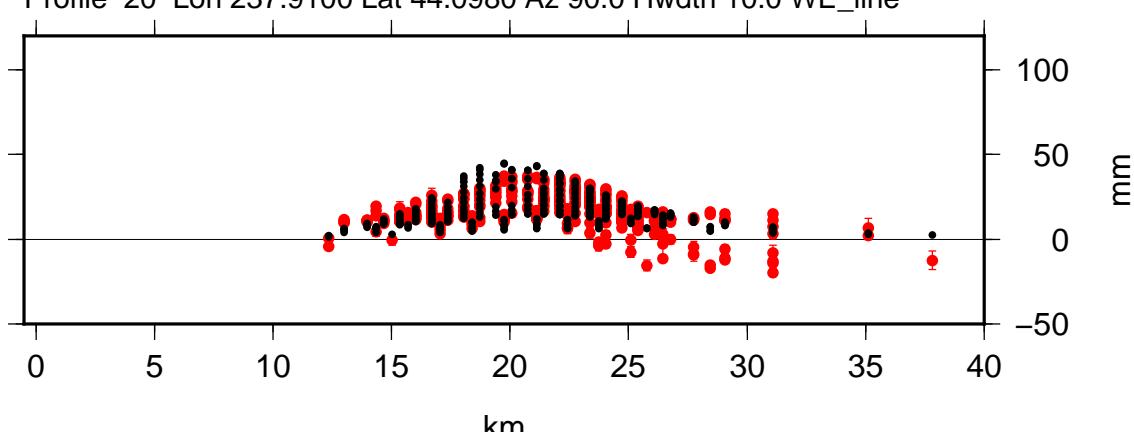
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



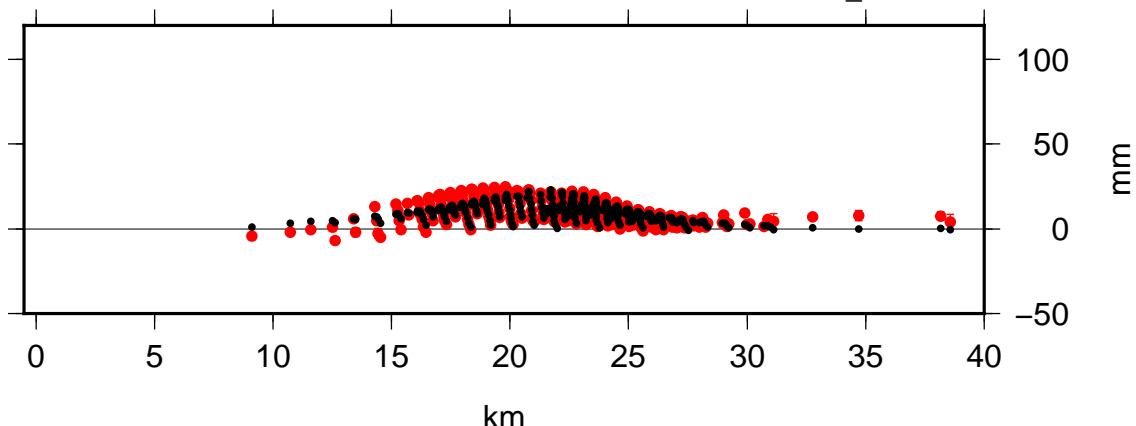
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



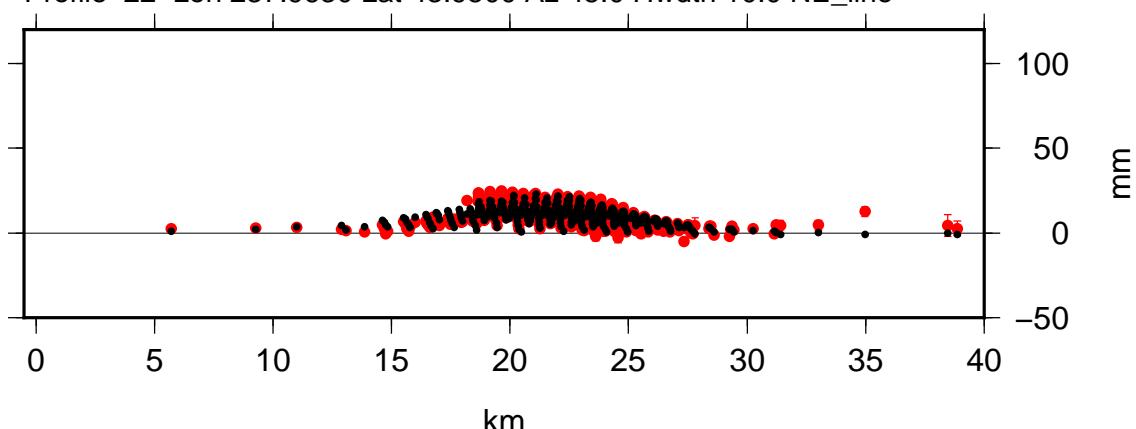
Code: RA34 Time: 2003.639 – 2005.608

Model: sis1 Nrms: 0.218 Wrms: 0.476

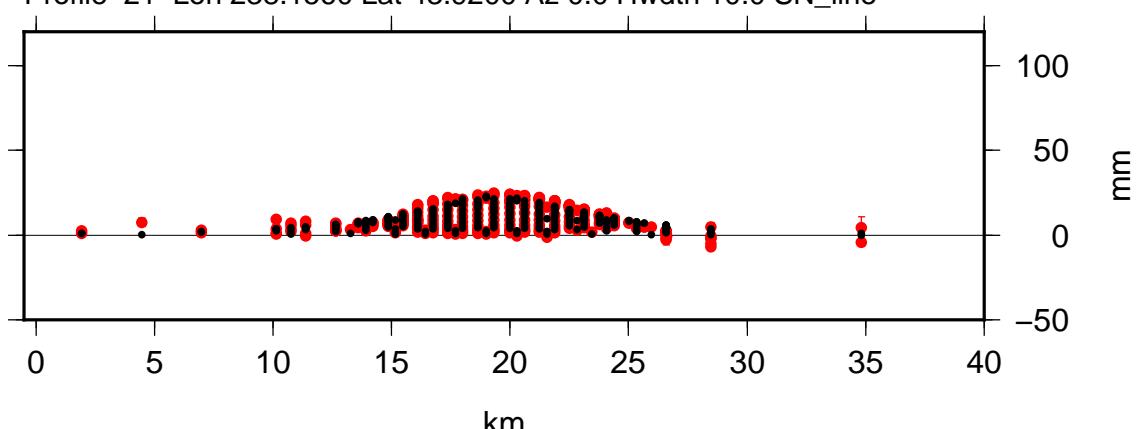
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



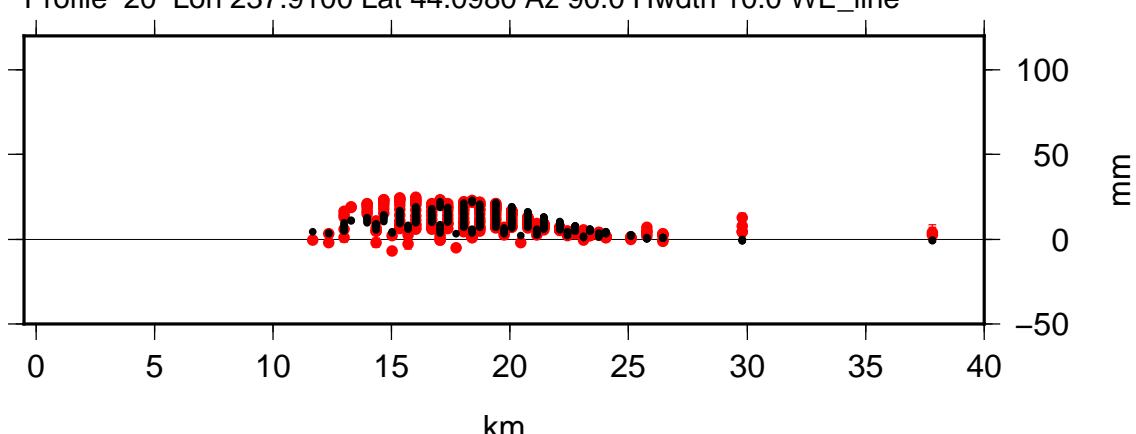
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



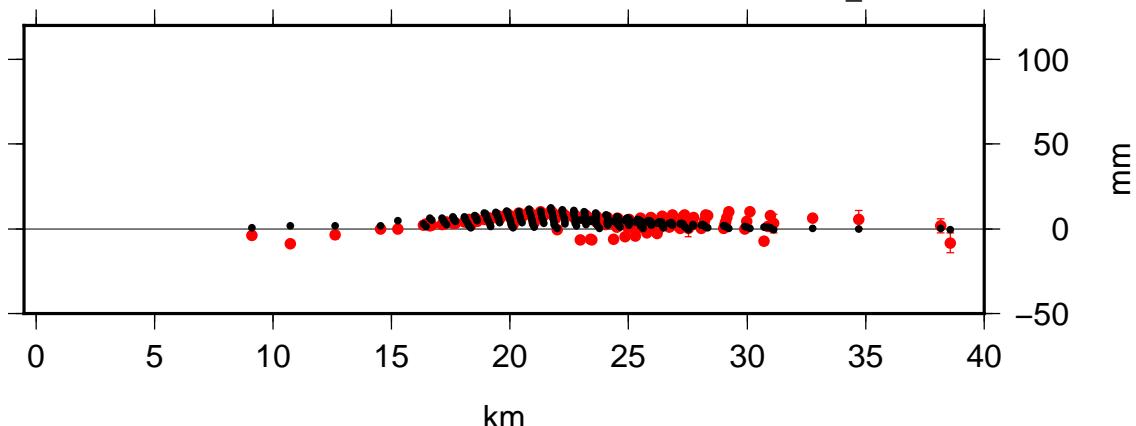
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



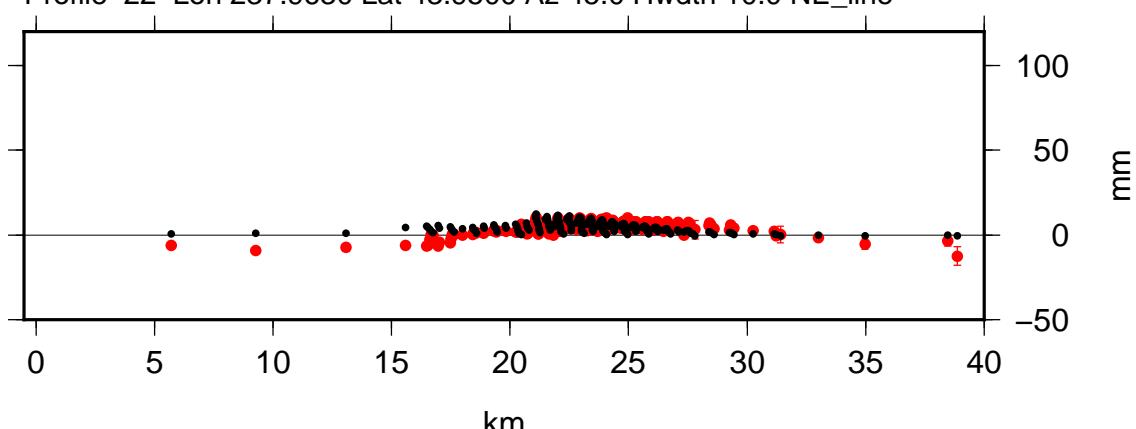
Code: RA35 Time: 2003.704 – 2004.689

Model: sis1 Nrms: 1.416 Wrms: 3.052

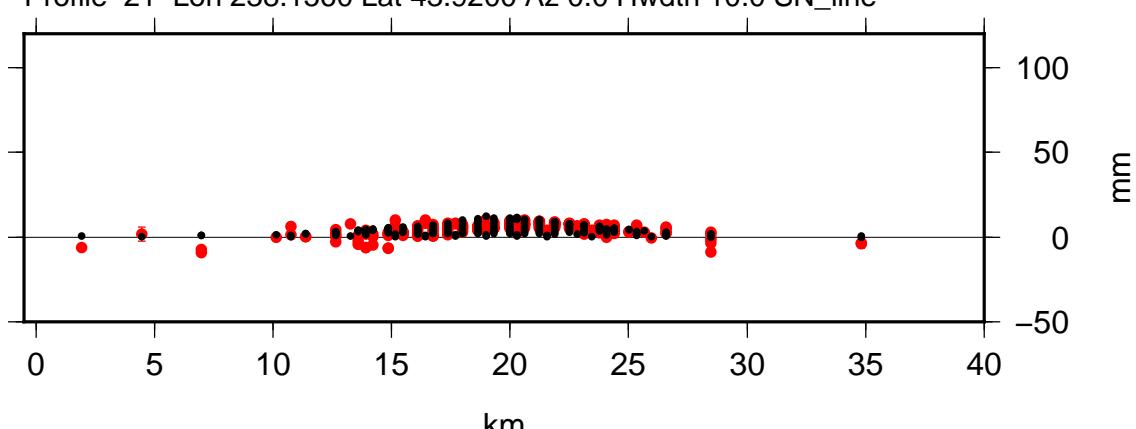
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



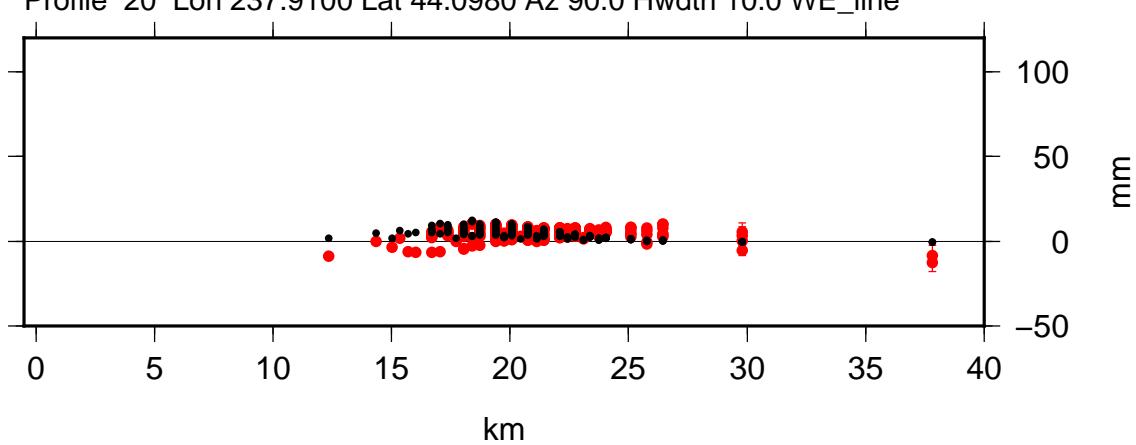
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



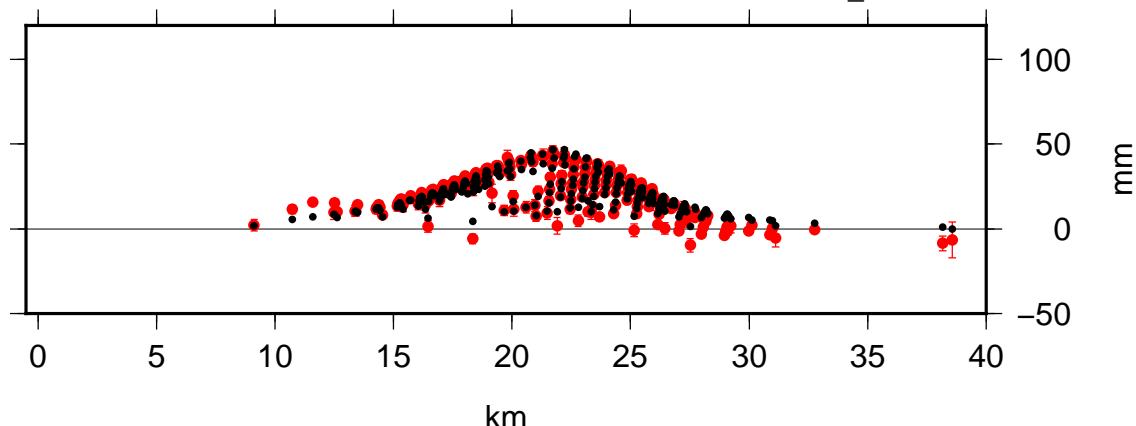
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



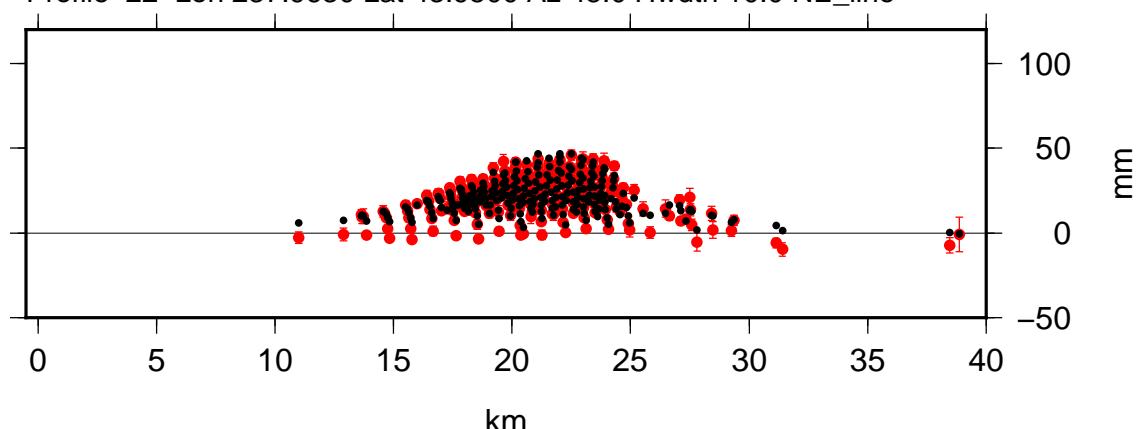
Code: VA36 Time: 2004.695 – 2009.486

Model: sis1 Nrms: 0.051 Wrms: 0.181

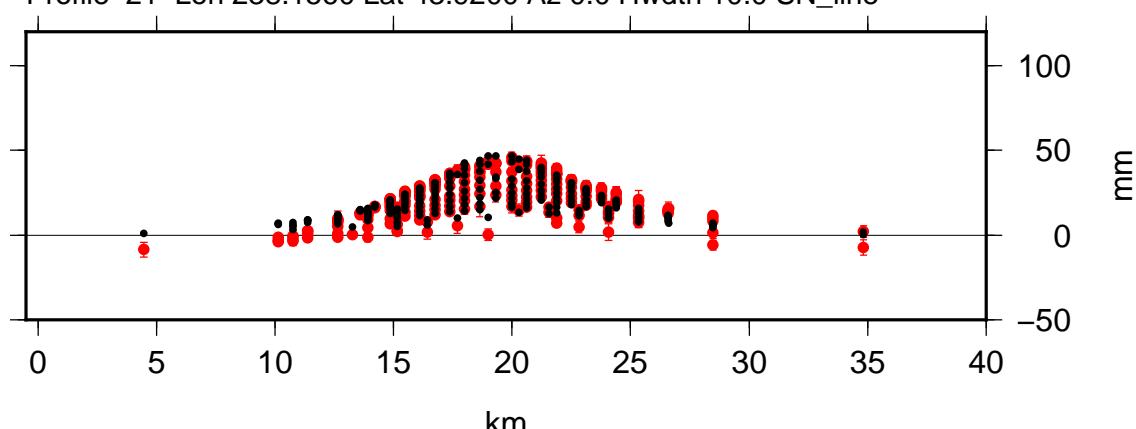
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



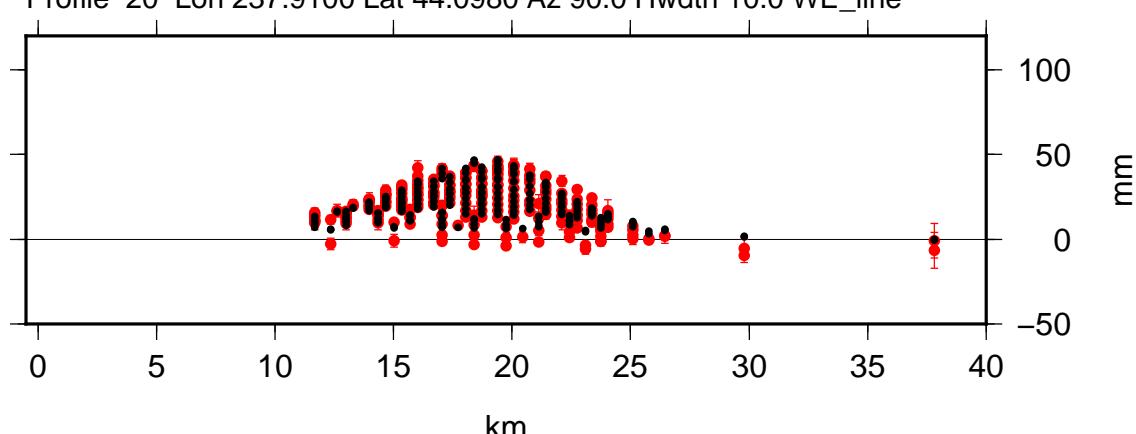
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



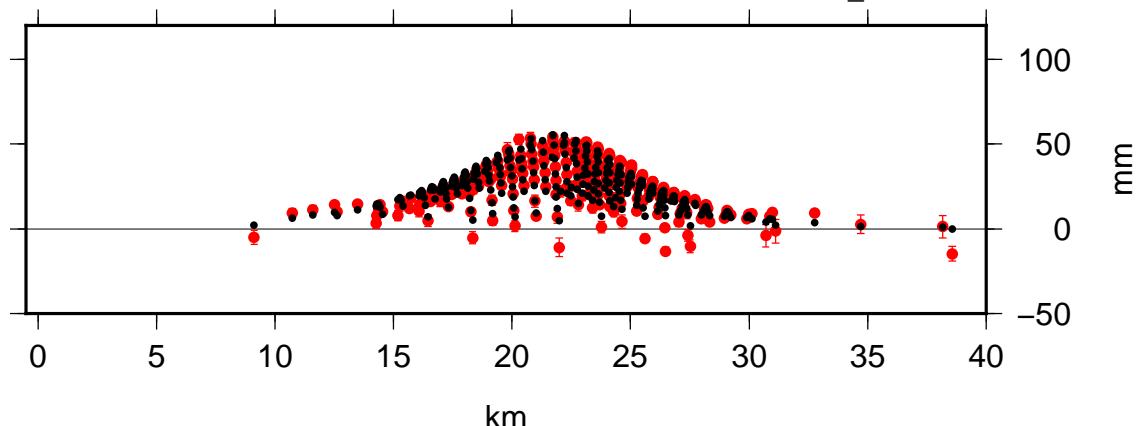
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



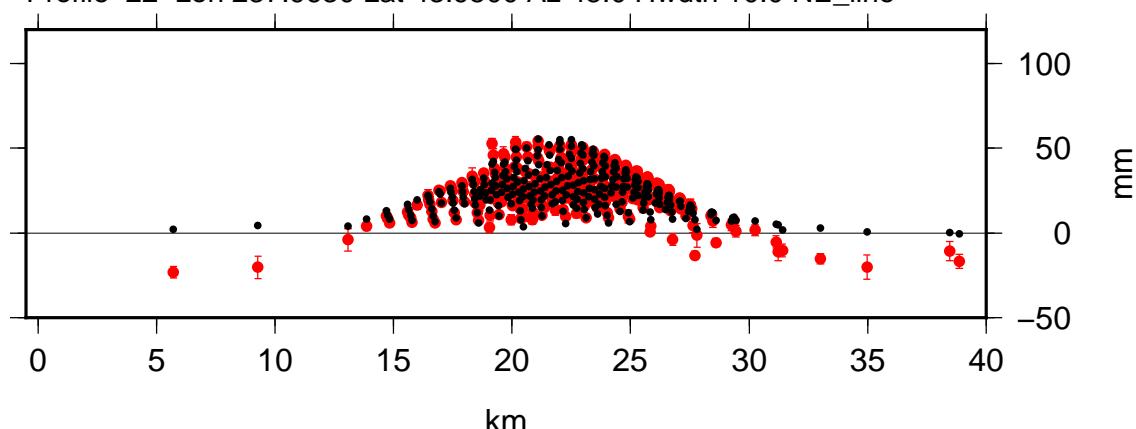
Code: VA37 Time: 2004.695 – 2010.636

Model: sis1 Nrms: 0.689 Wrms: 2.168

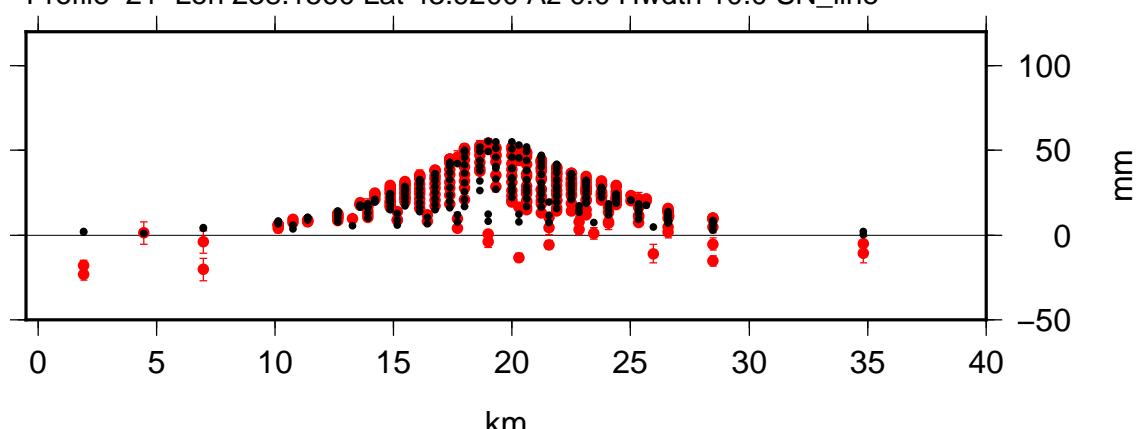
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



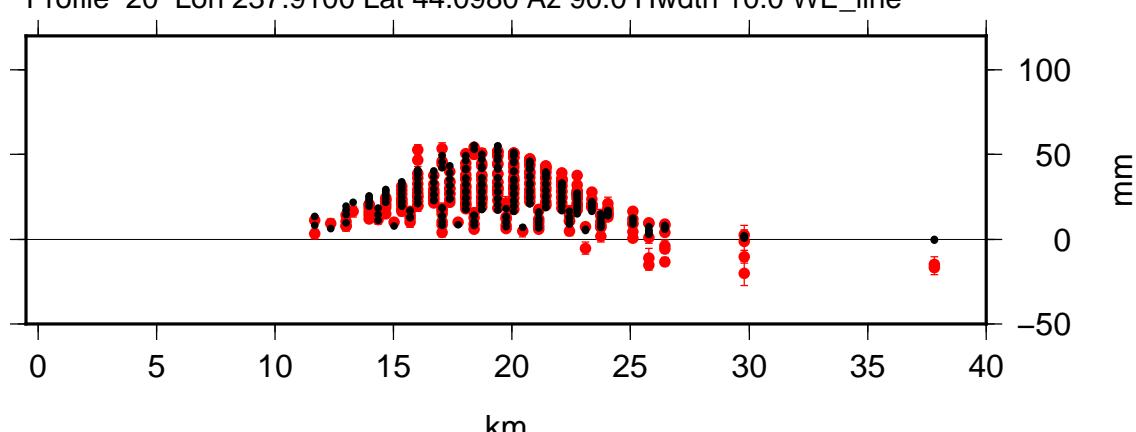
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



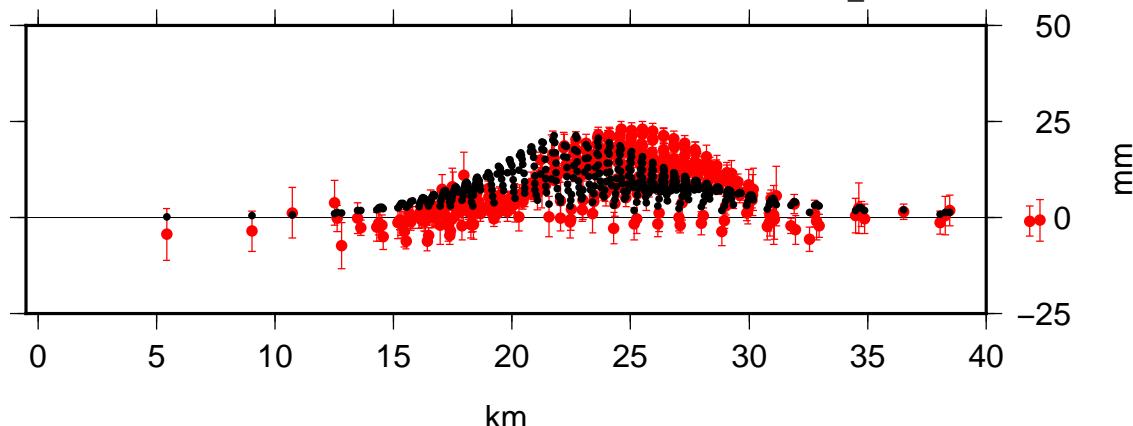
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



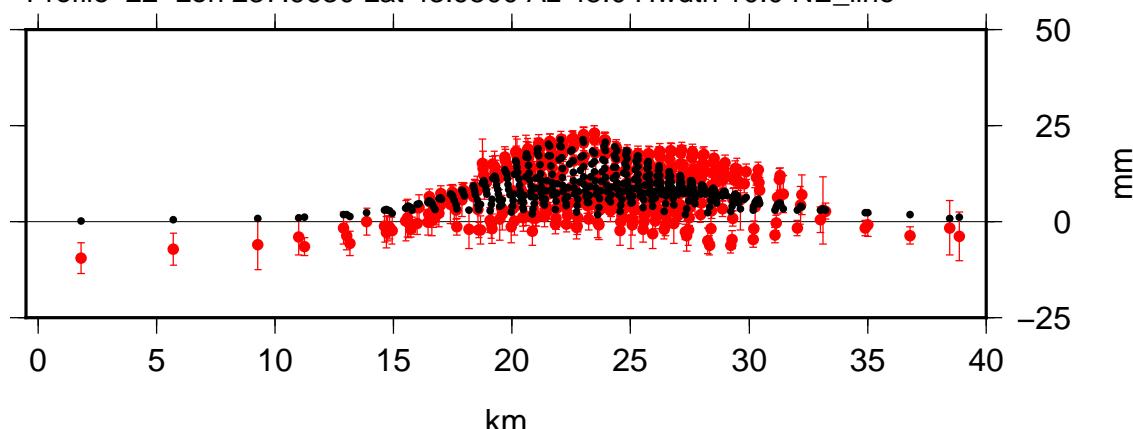
Code: VD38 Time: 2004.737 – 2006.750

Model: sis1 Nrms: 0.692 Wrms: 3.293

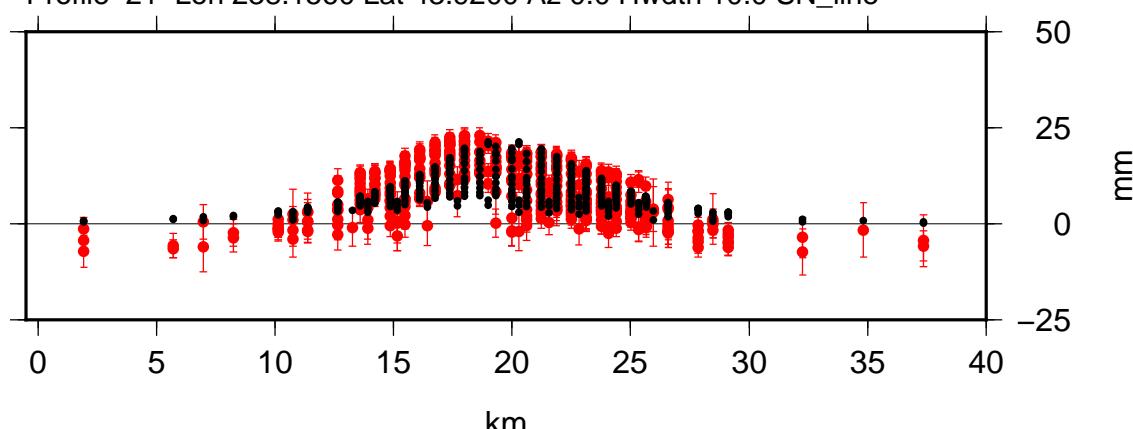
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



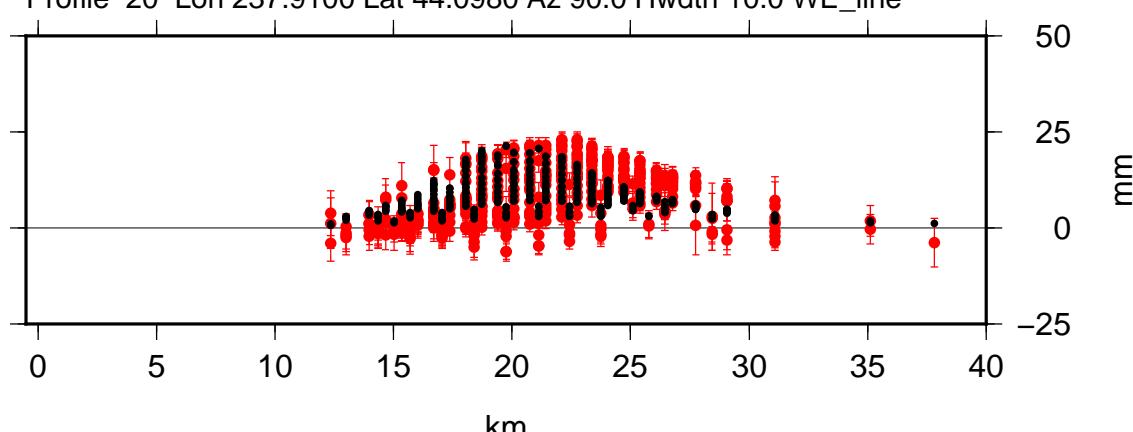
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



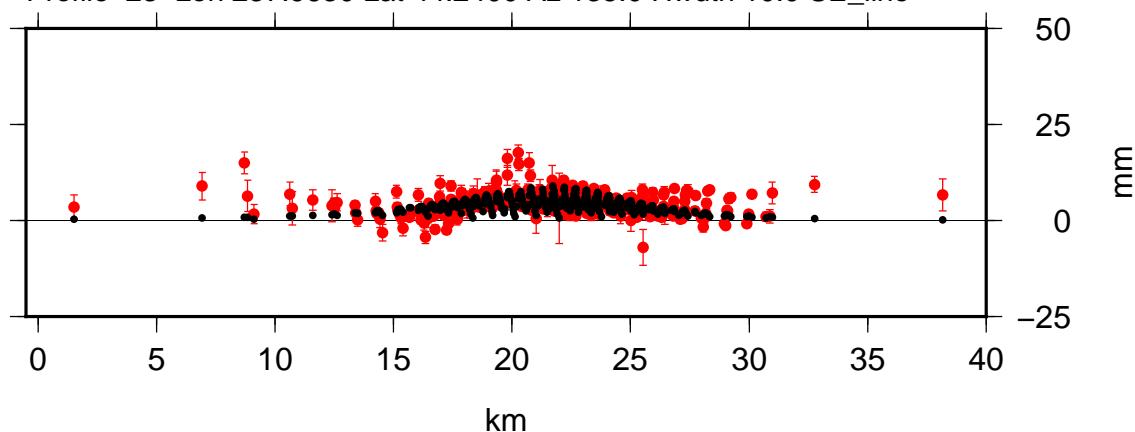
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



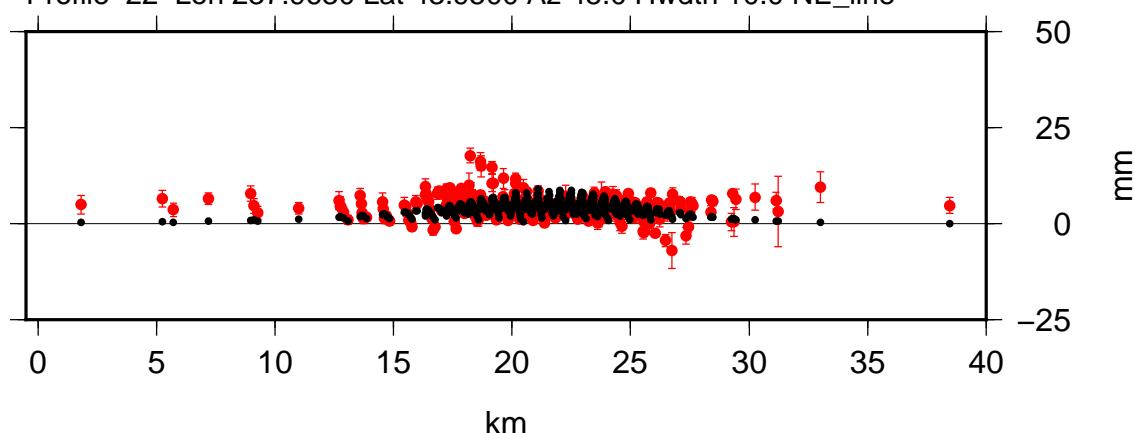
Code: VA39 Time: 2004.747 – 2005.513

Model: sis1 Nrms: 0.421 Wrms: 0.977

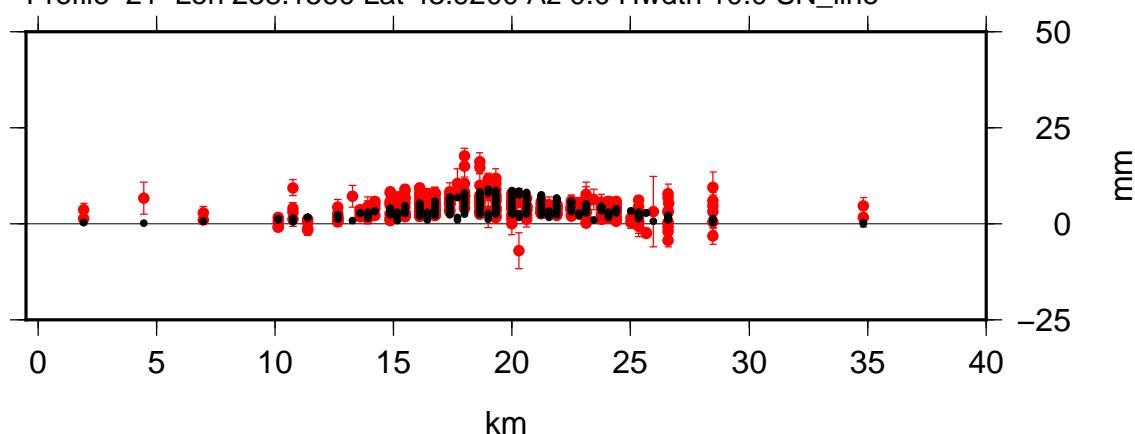
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



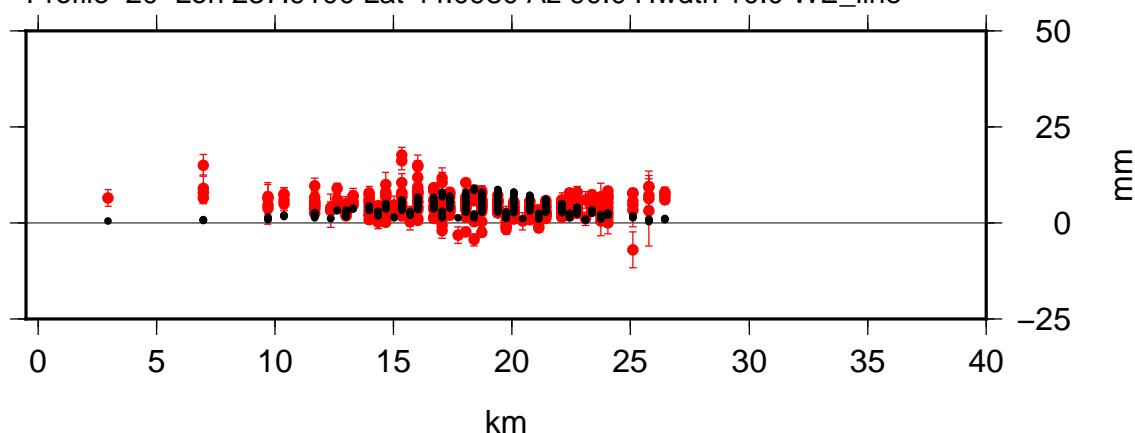
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



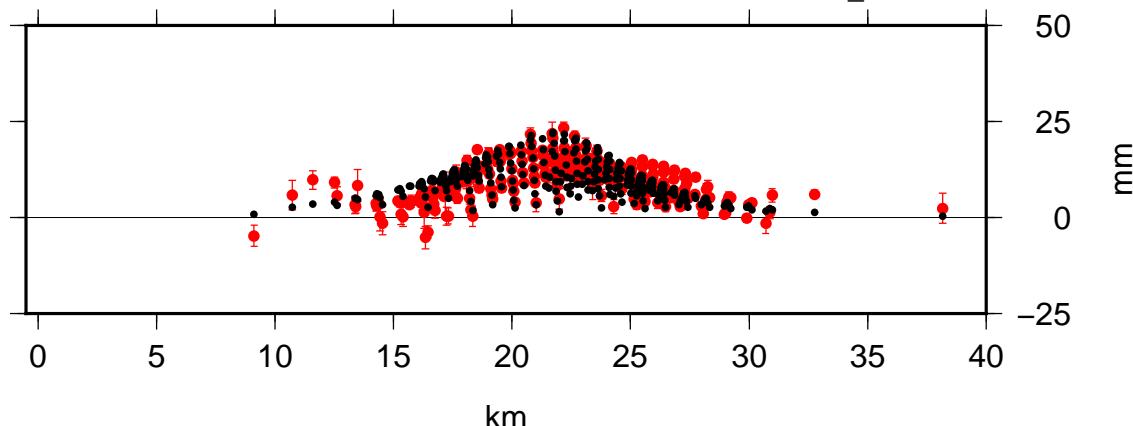
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



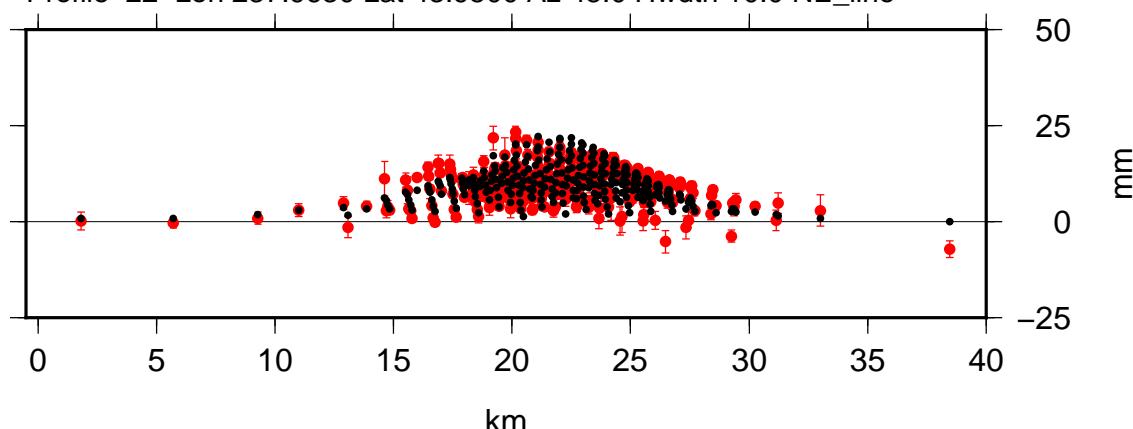
Code: VA40 Time: 2004.747 – 2006.760

Model: sis1 Nrms: 0.957 Wrms: 2.220

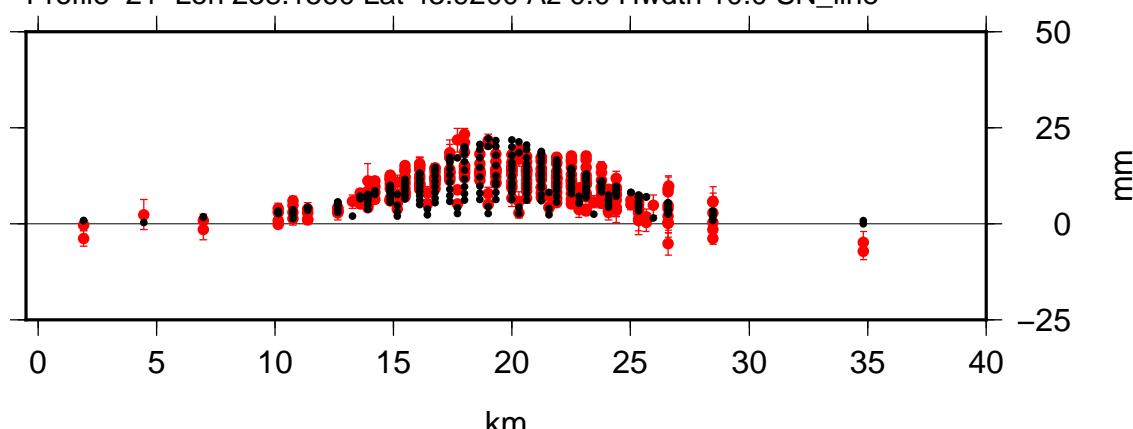
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



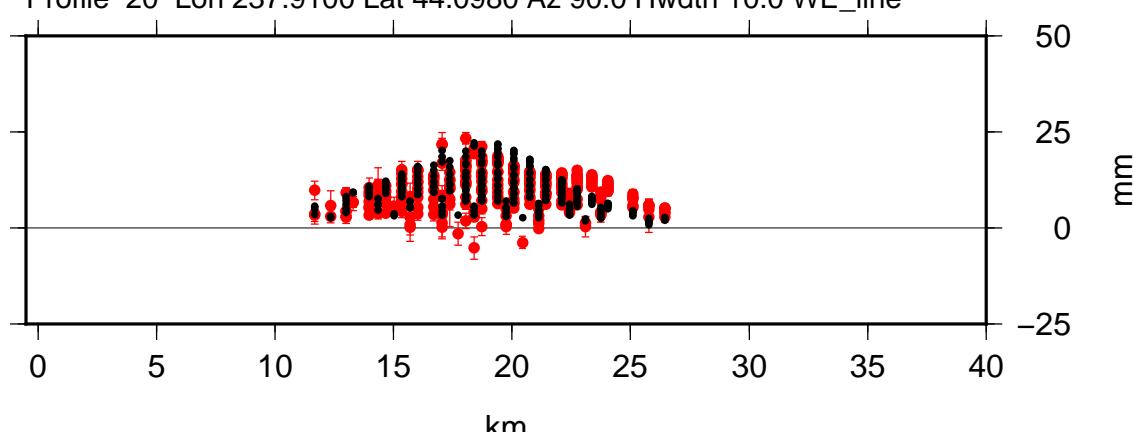
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



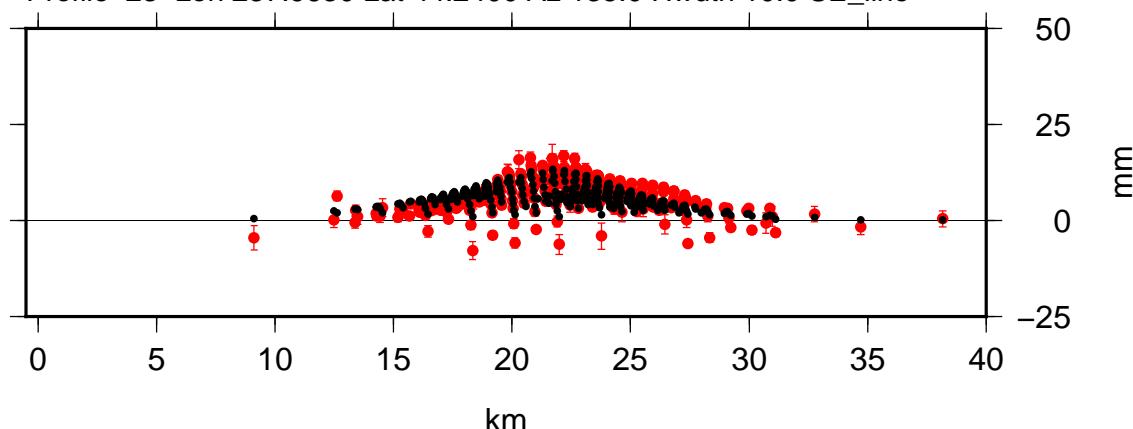
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



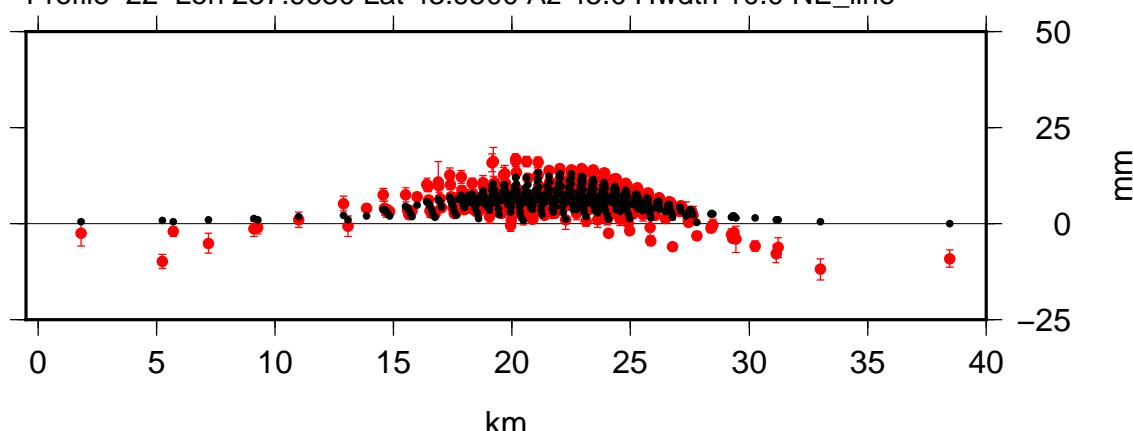
Code: VA41 Time: 2005.513 – 2006.760

Model: sis1 Nrms: 0.580 Wrms: 1.282

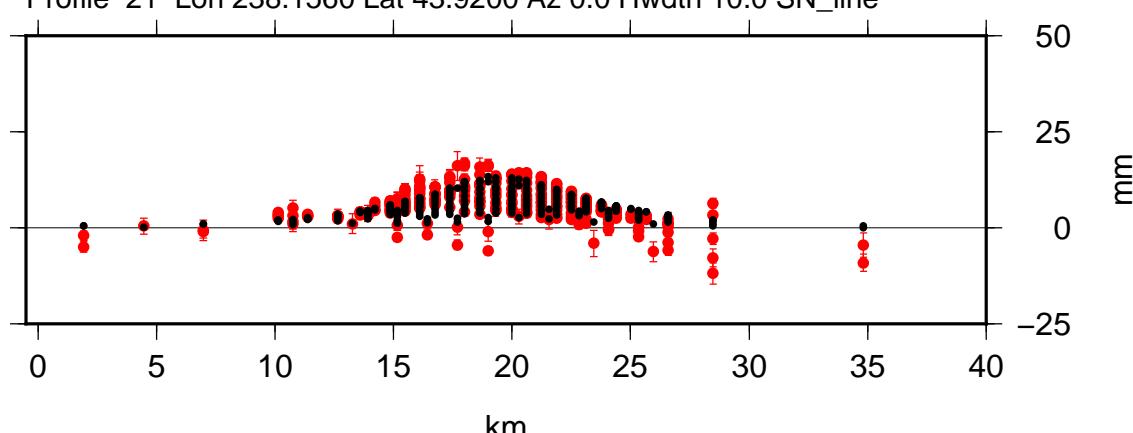
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



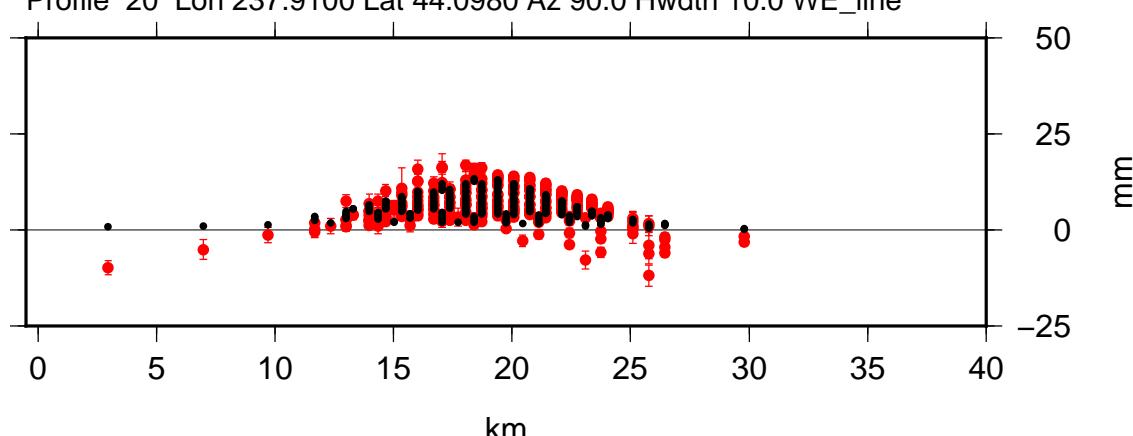
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



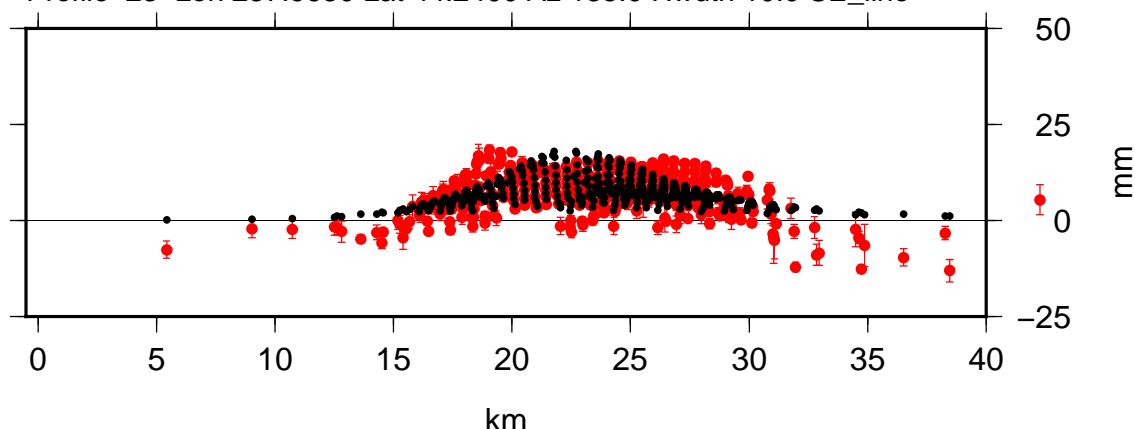
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



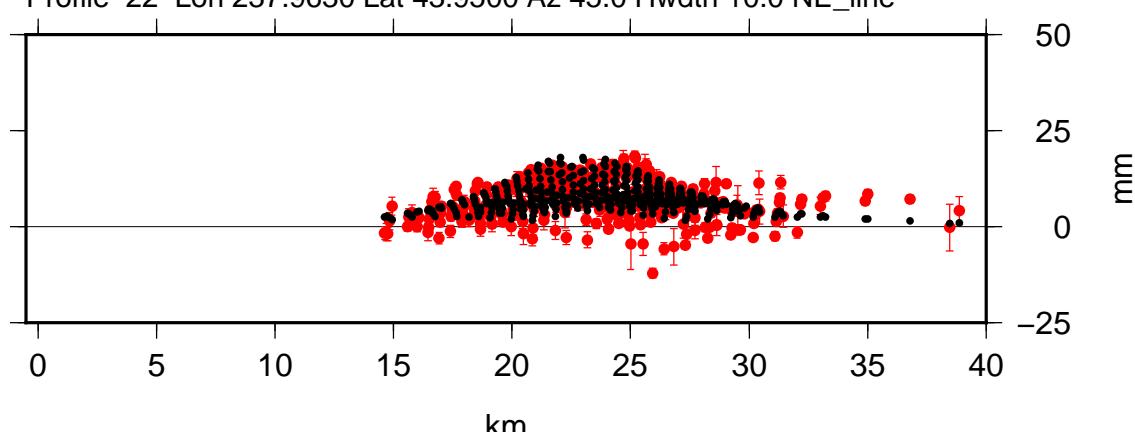
Code: VD42 Time: 2005.599 – 2007.517

Model: sis1 Nrms: 1.040 Wrms: 2.513

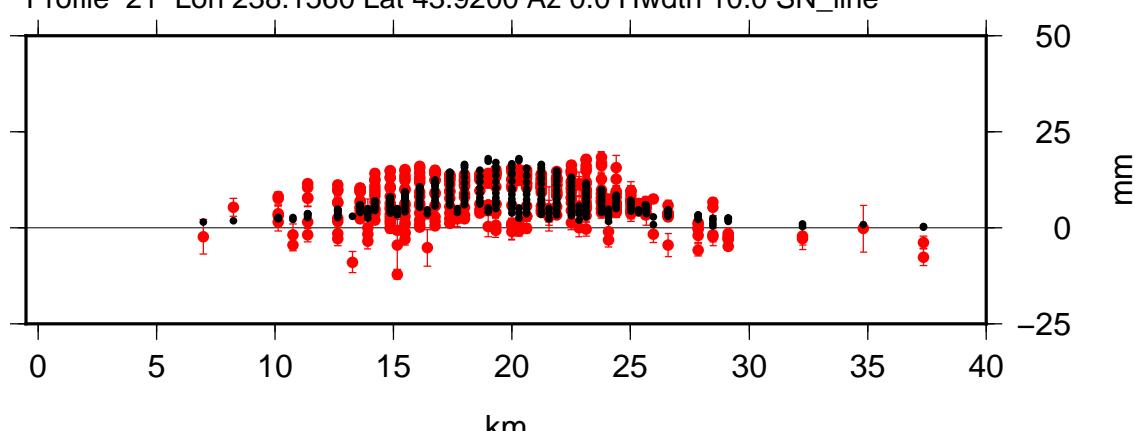
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



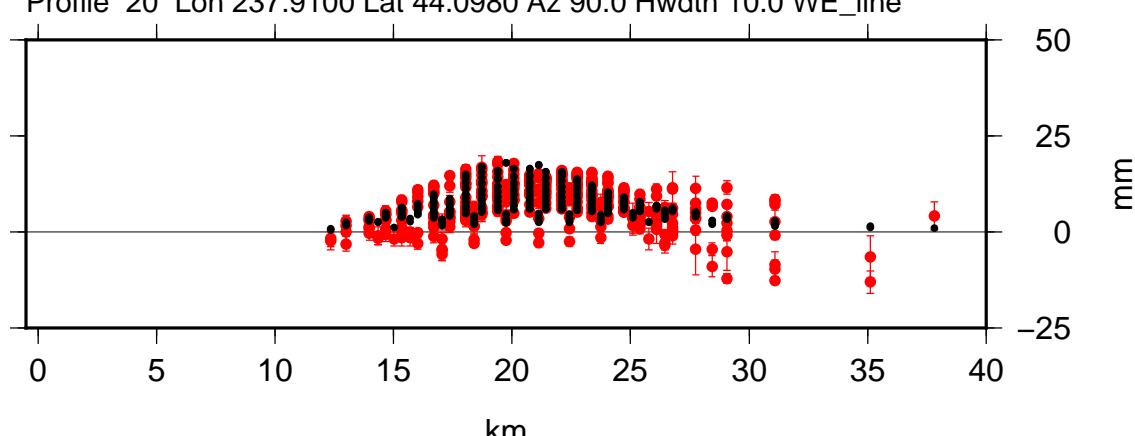
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



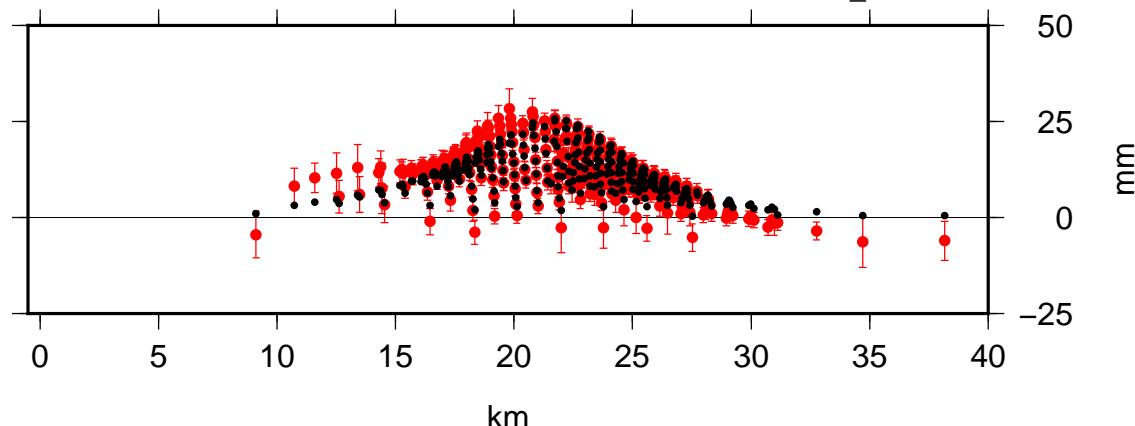
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



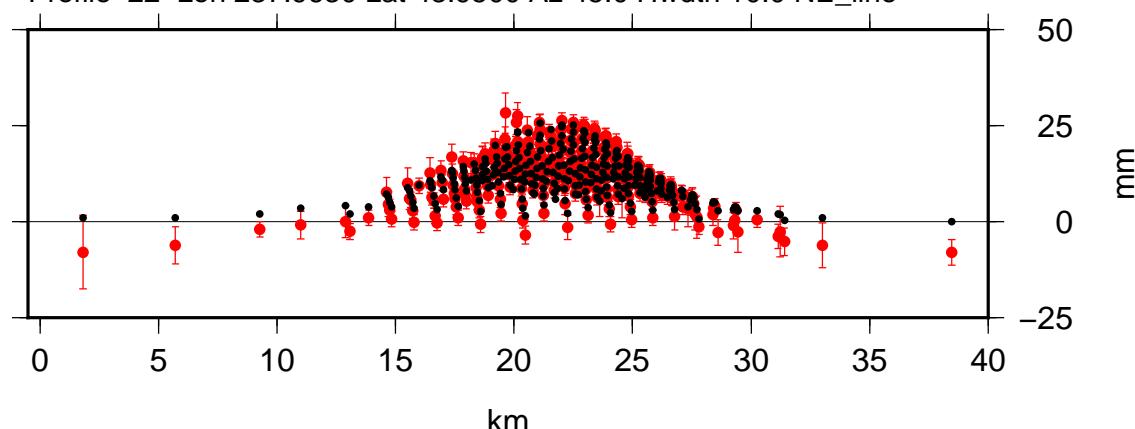
Code: VA43 Time: 2006.664 – 2009.634

Model: sis1 Nrms: 1.032 Wrms: 4.587

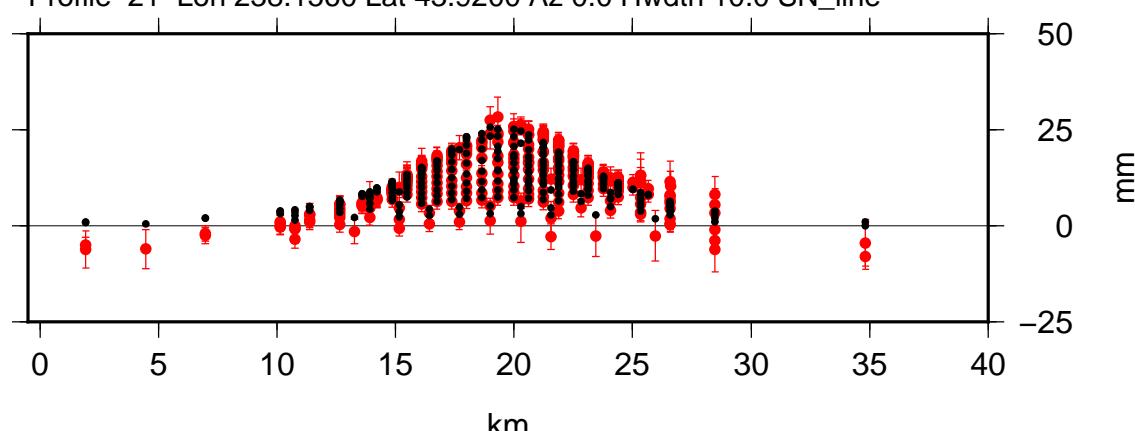
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



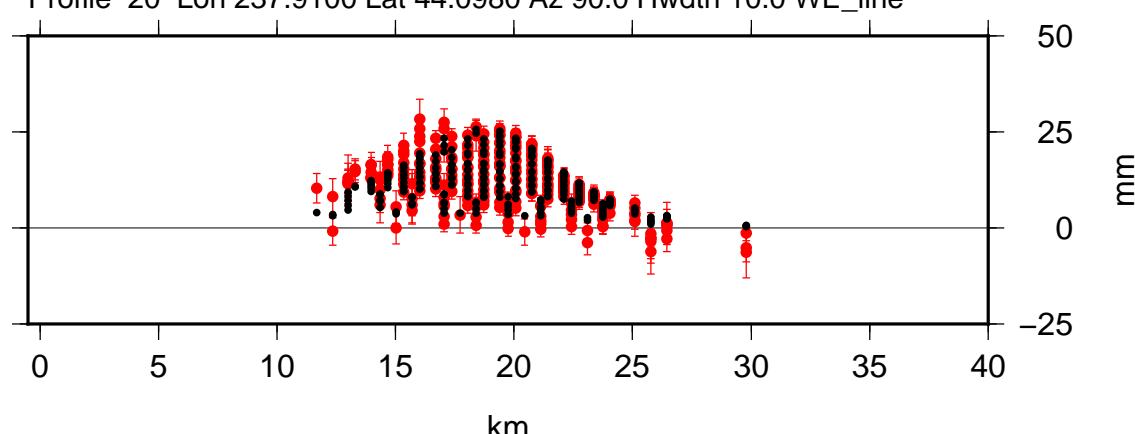
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



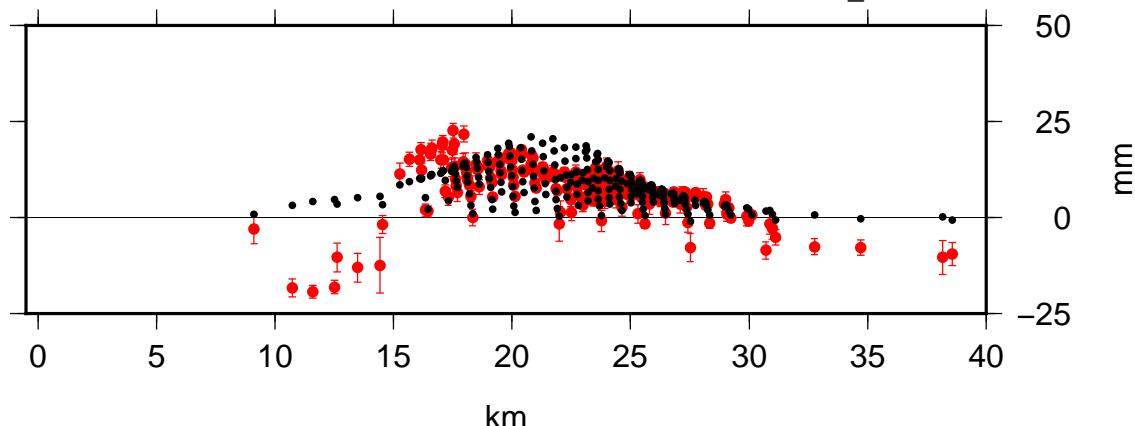
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



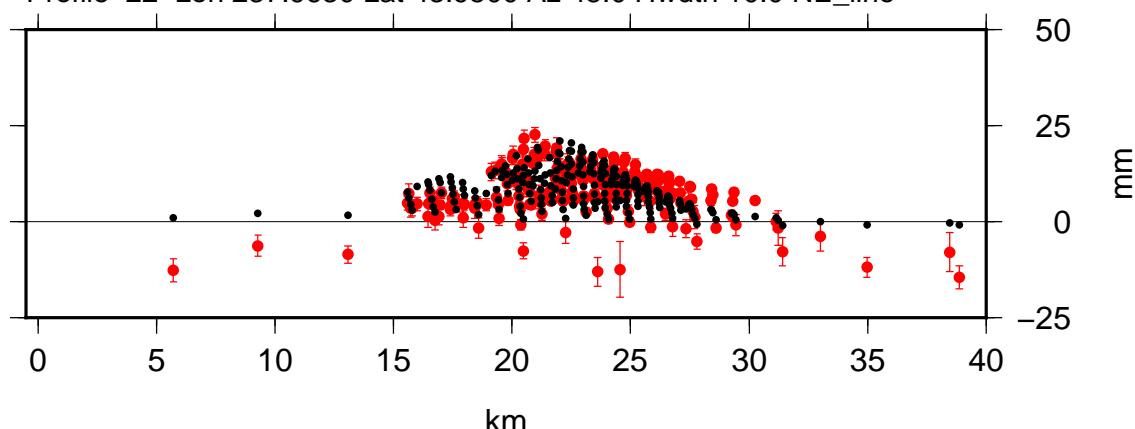
Code: VA44 Time: 2006.776 – 2009.554

Model: sis1 Nrms: 1.412 Wrms: 3.693

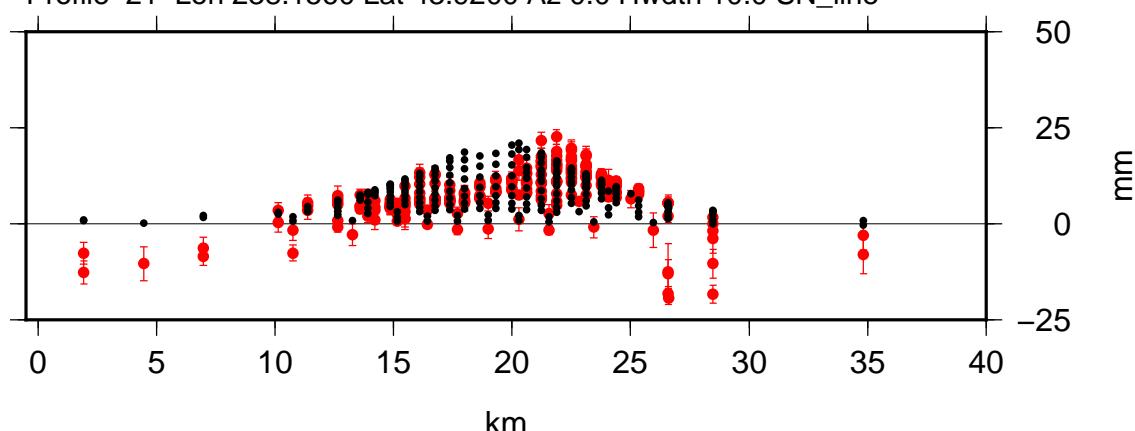
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



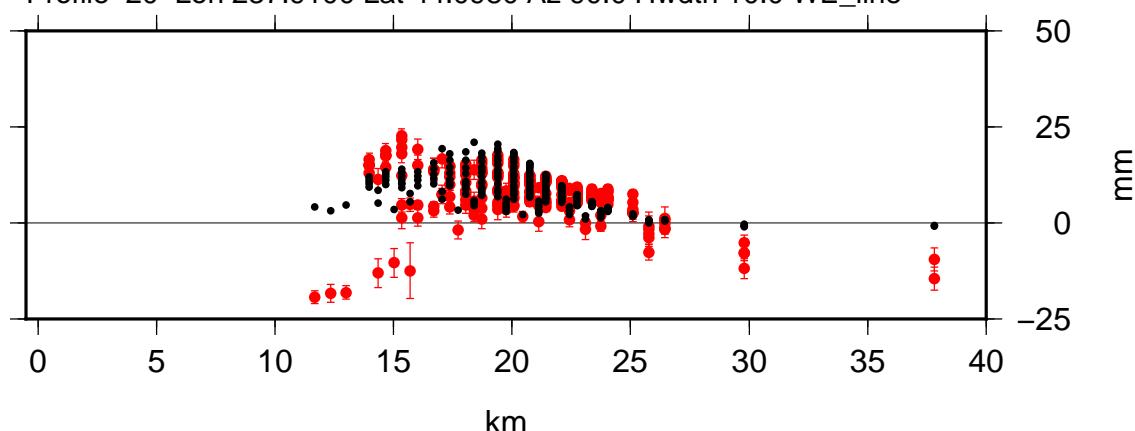
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



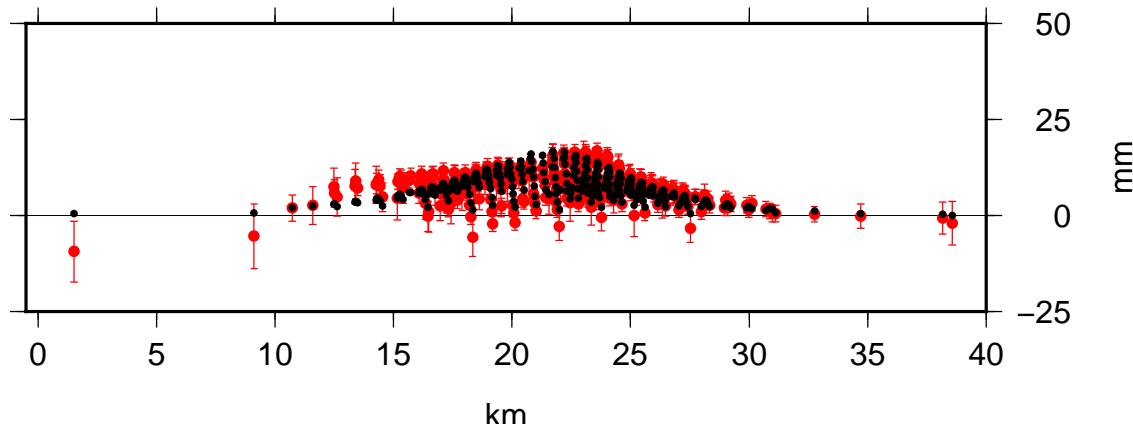
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



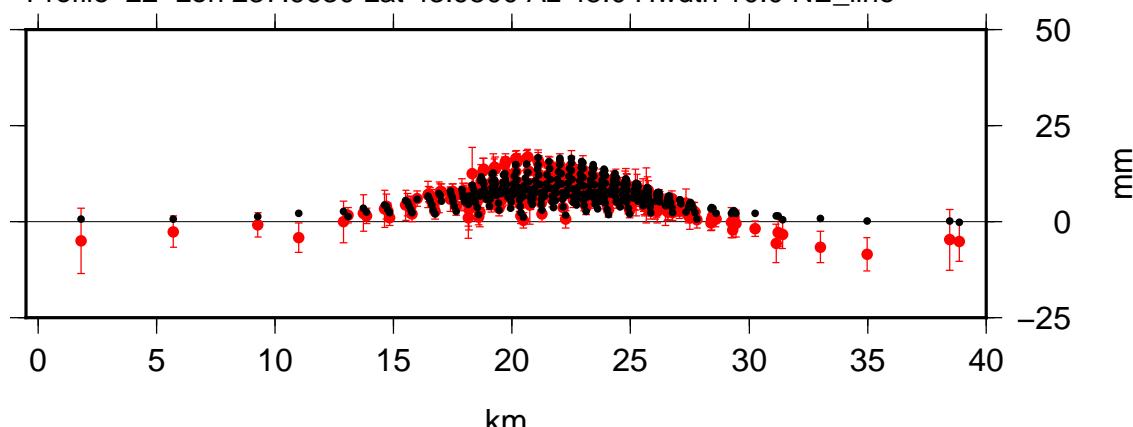
Code: VA45 Time: 2006.803 – 2008.719

Model: sis1 Nrms: 0.720 Wrms: 3.401

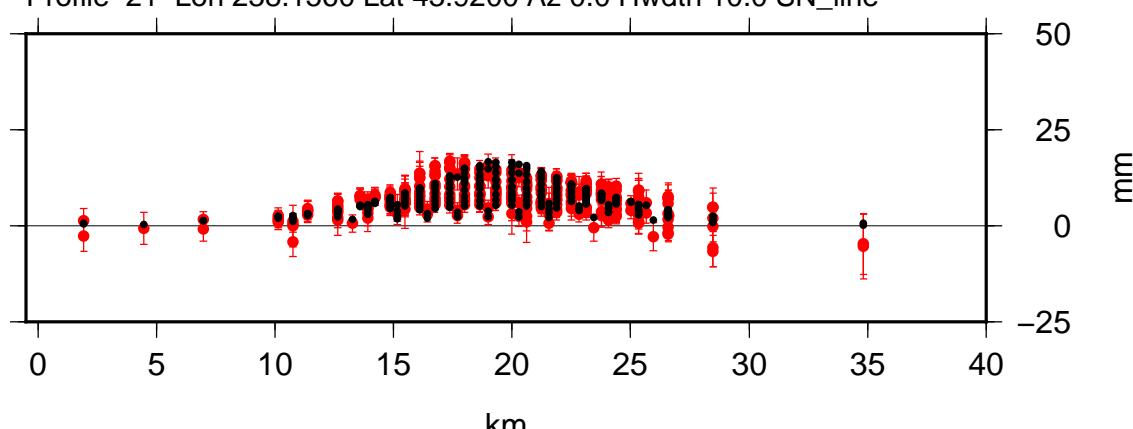
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



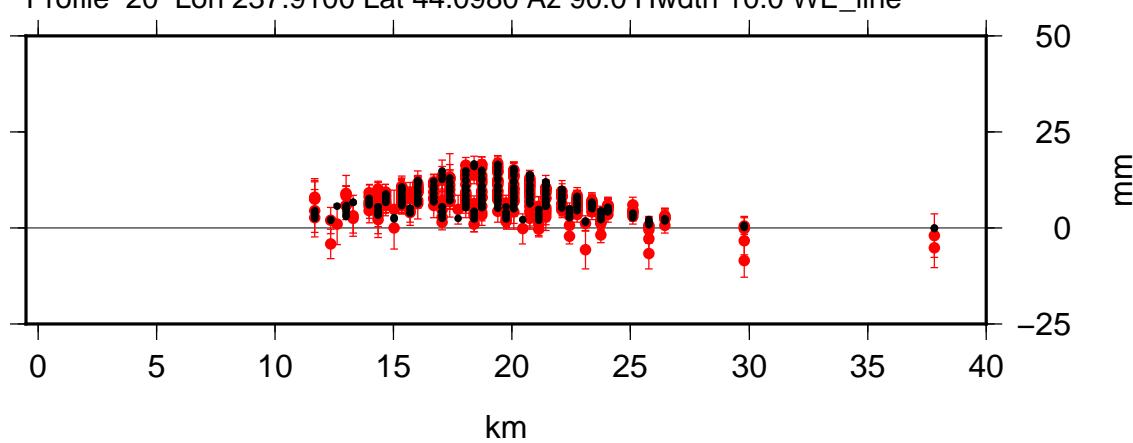
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



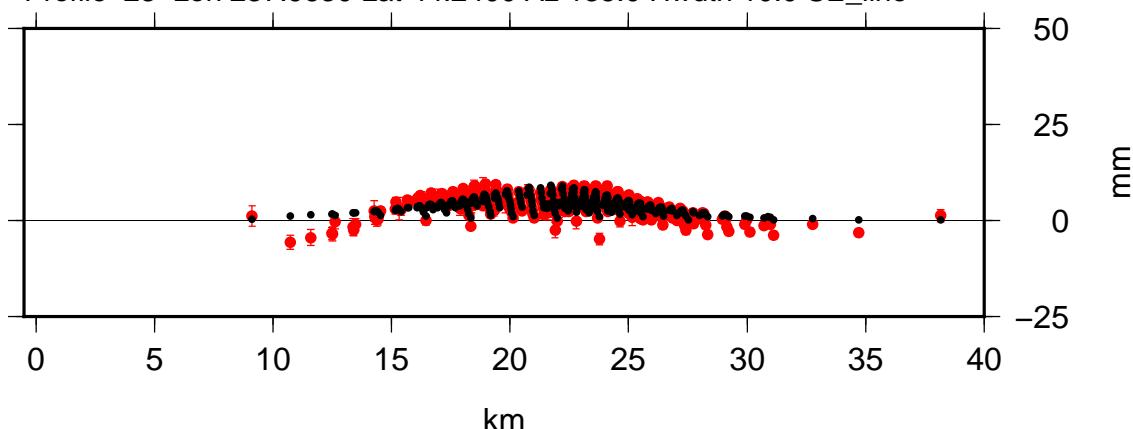
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



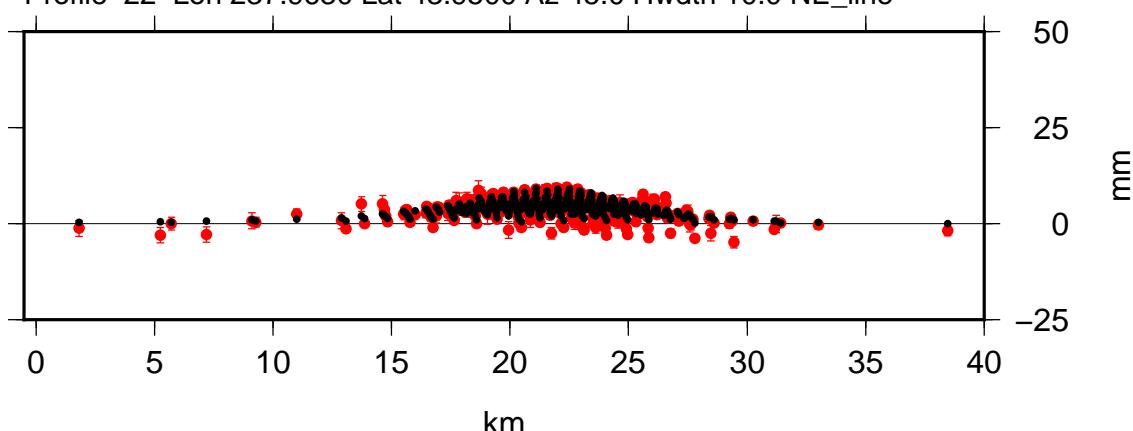
Code: VA46 Time: 2007.527 – 2008.580

Model: sis1 Nrms: 0.053 Wrms: 0.115

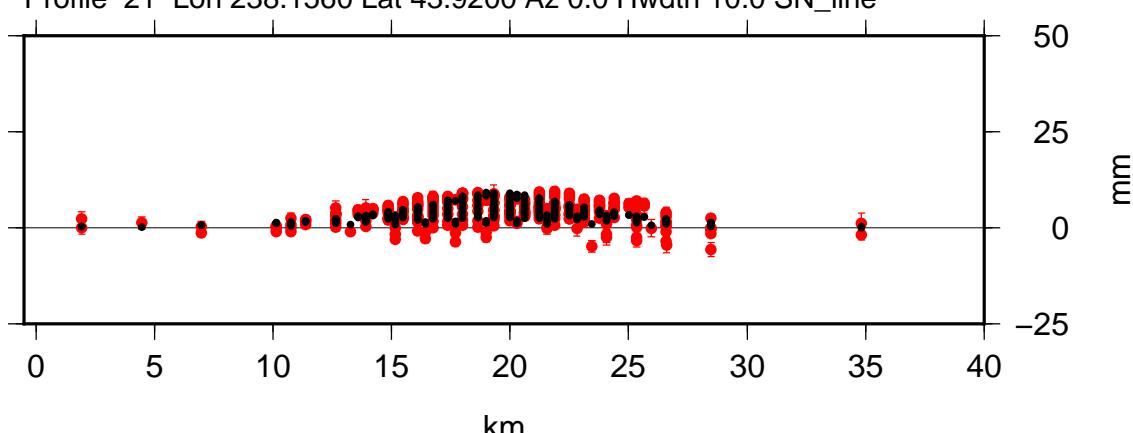
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



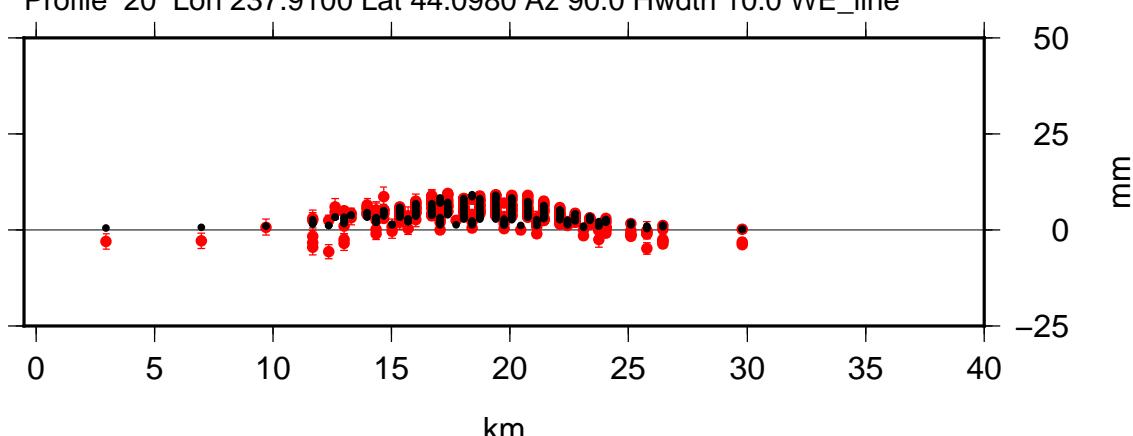
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



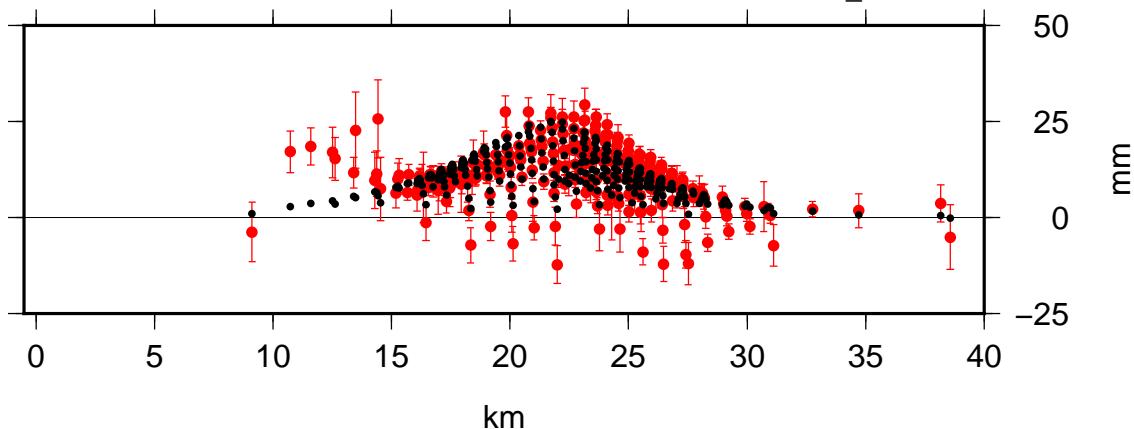
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



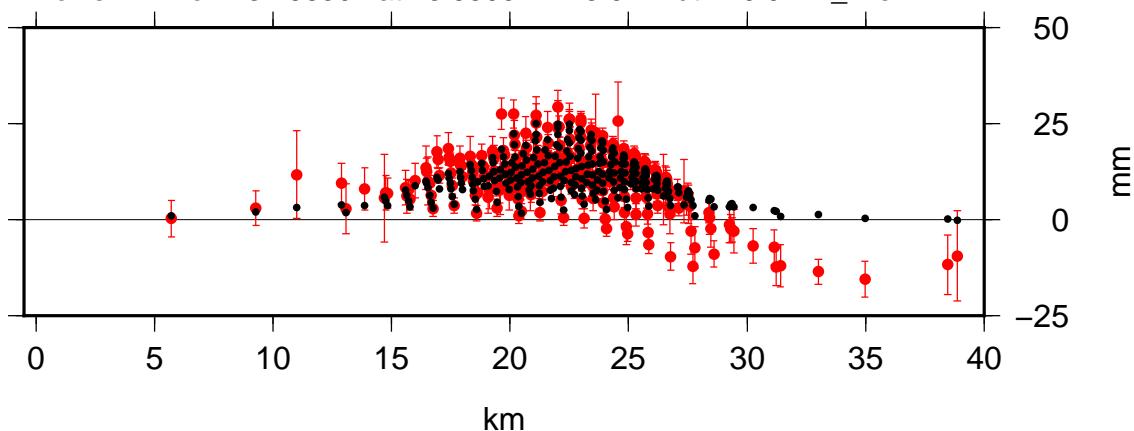
Code: VA47 Time: 2007.666 – 2010.732

Model: sis1 Nrms: 0.484 Wrms: 2.530

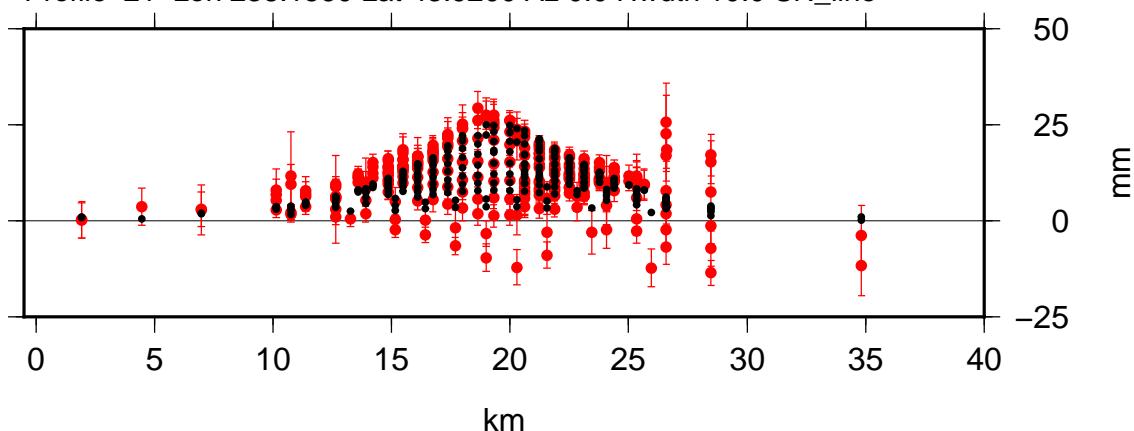
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



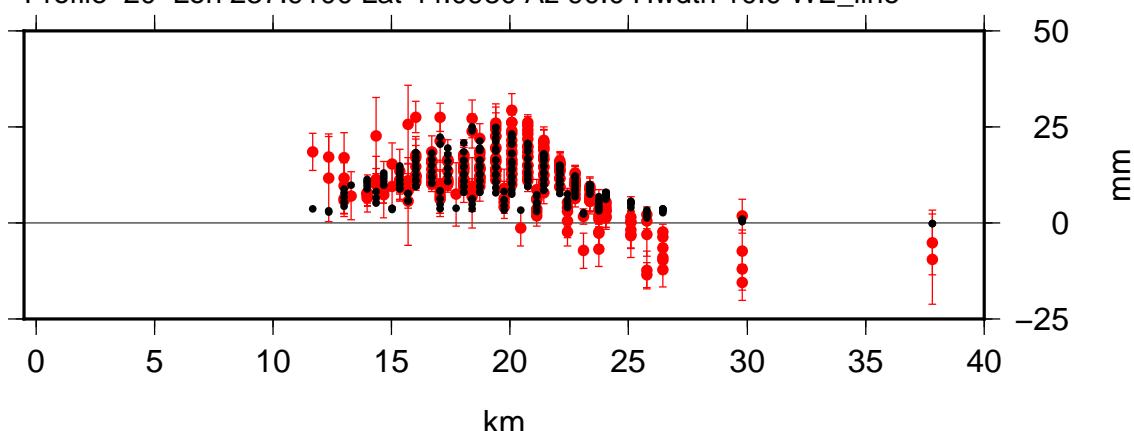
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



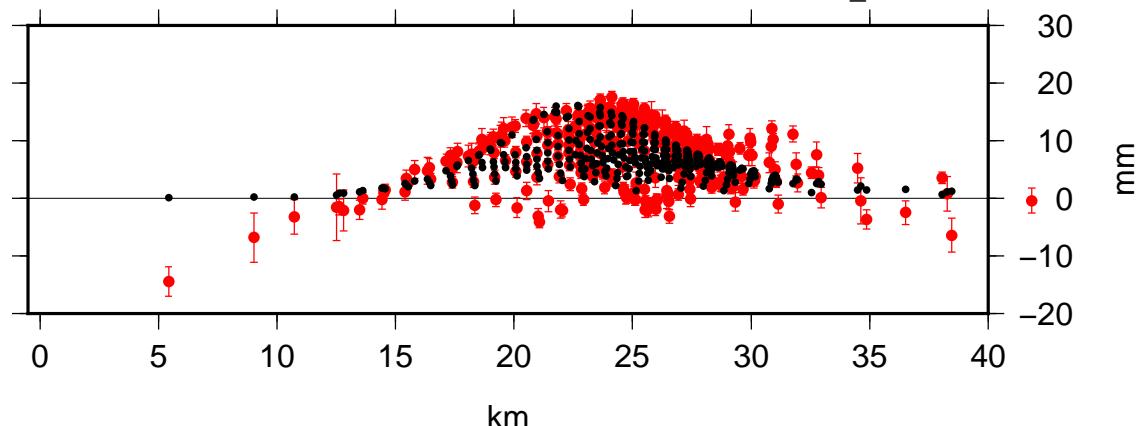
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



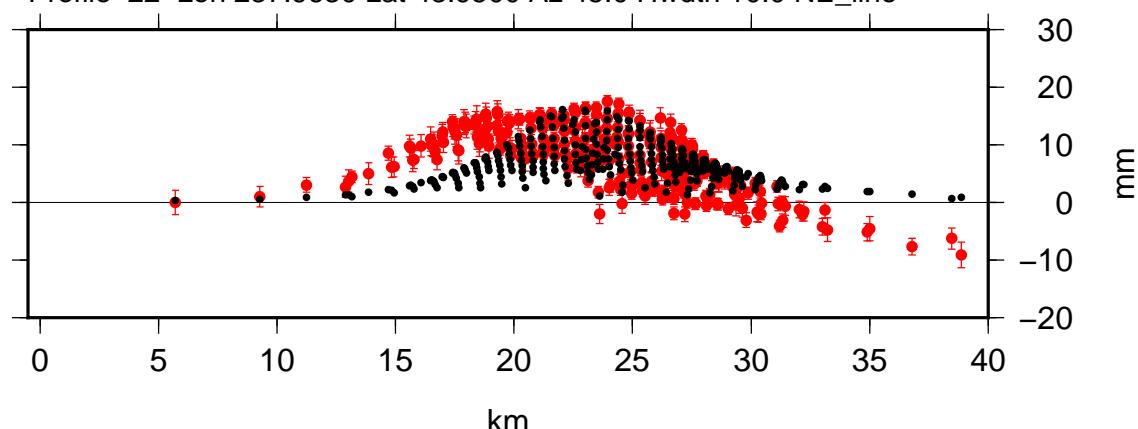
Code: VD48 Time: 2008.518 – 2010.723

Model: sis1 Nrms: 0.267 Wrms: 0.669

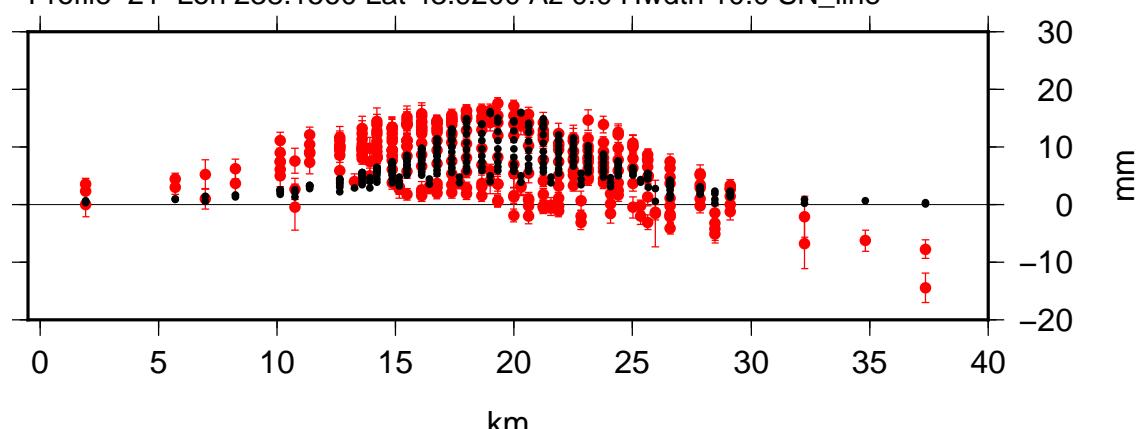
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



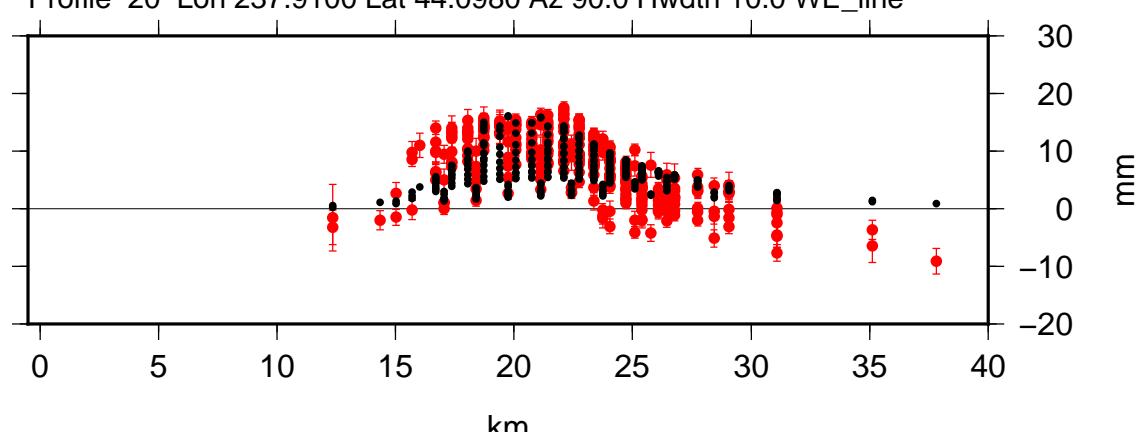
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



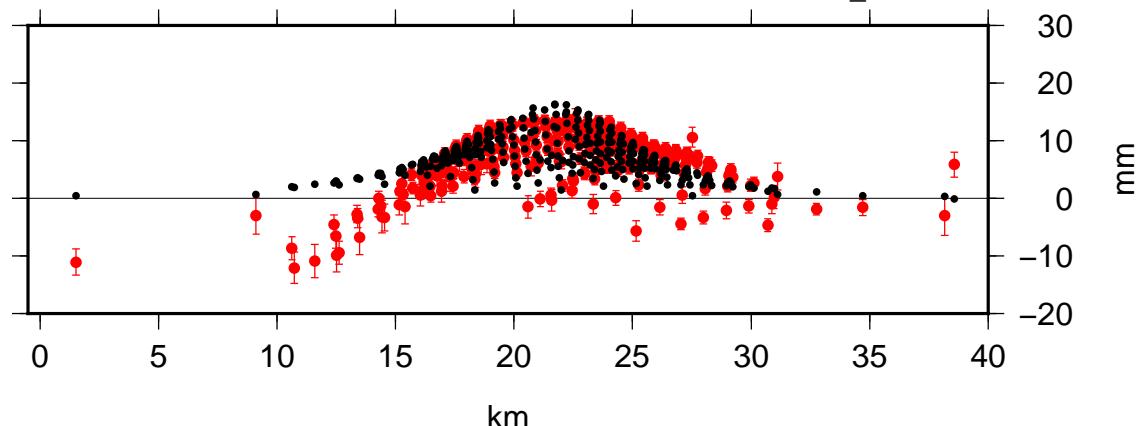
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



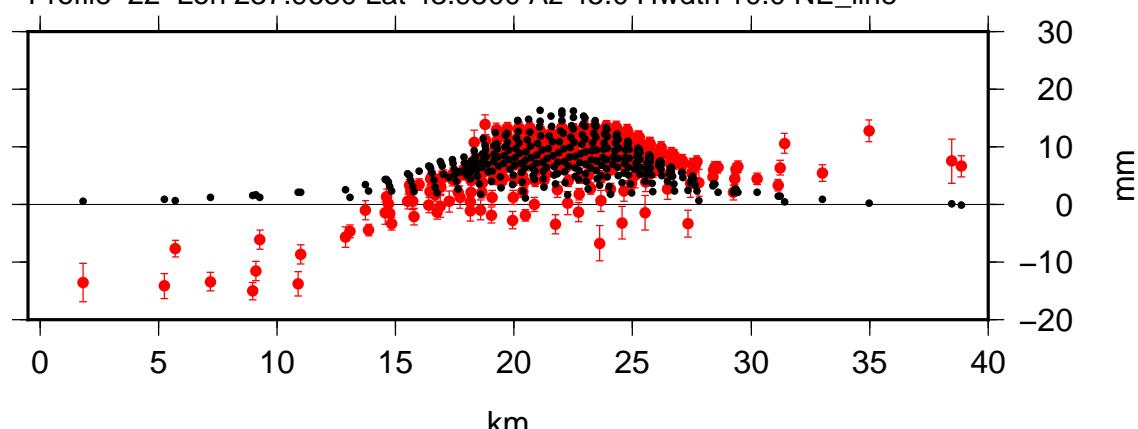
Code: VA49 Time: 2008.528 – 2010.540

Model: sis1 Nrms: 1.322 Wrms: 2.964

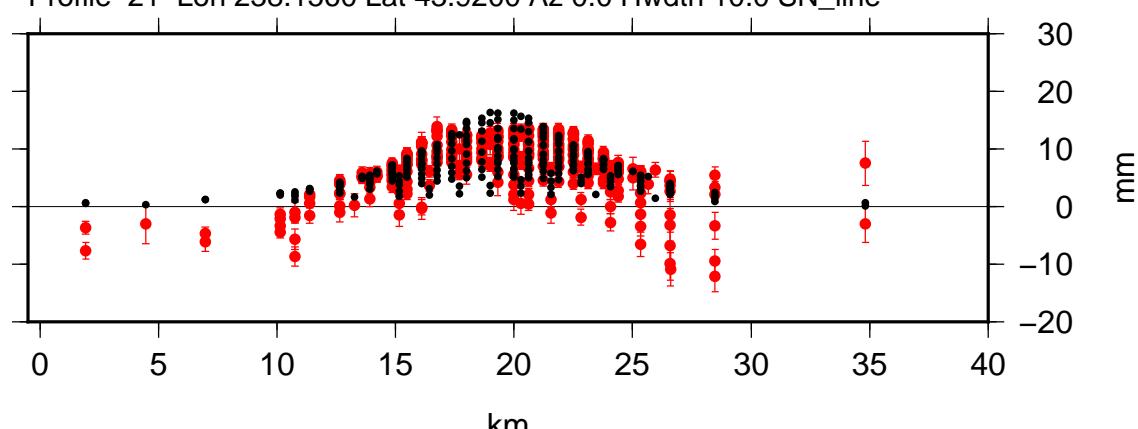
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



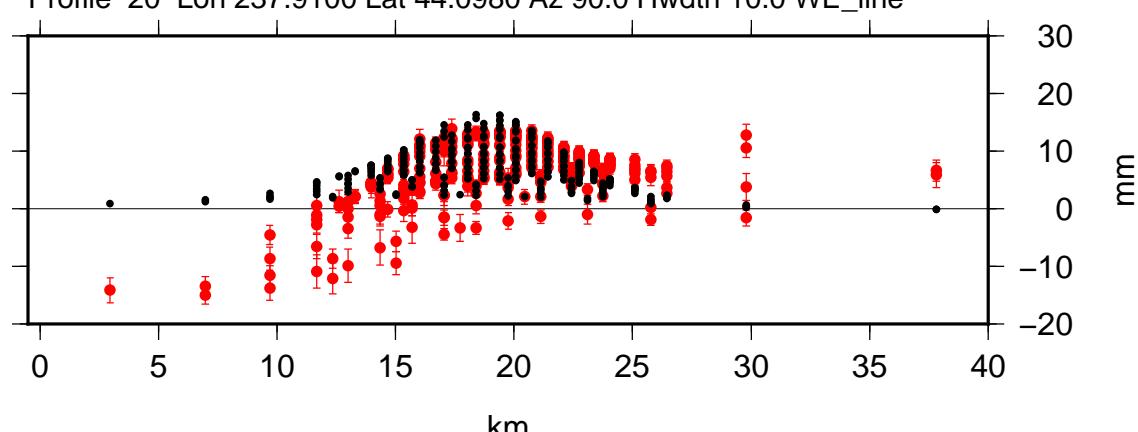
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



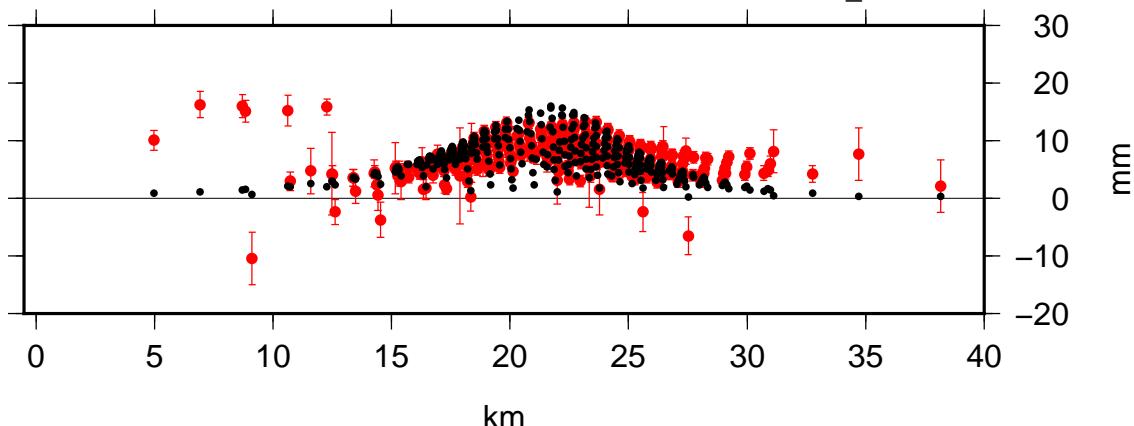
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



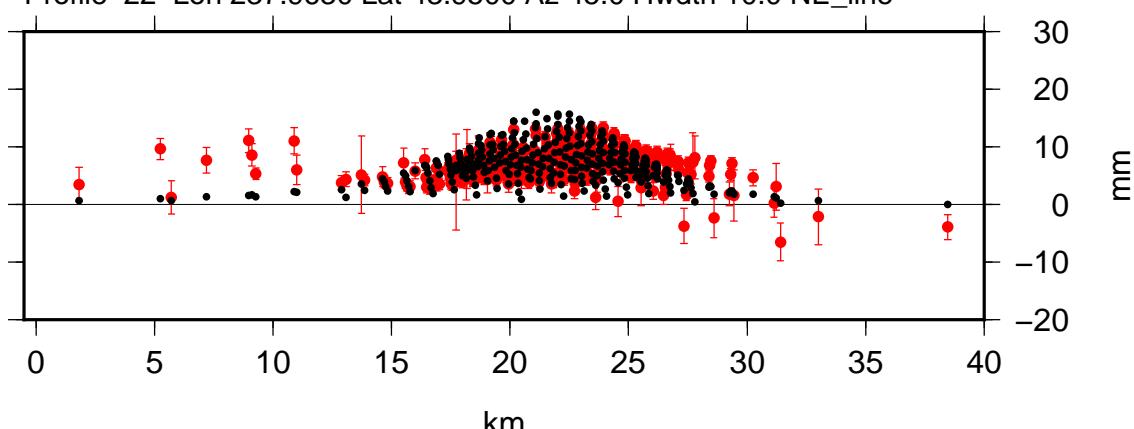
Code: VA50 Time: 2008.580 – 2010.592

Model: sis1 Nrms: 0.449 Wrms: 1.004

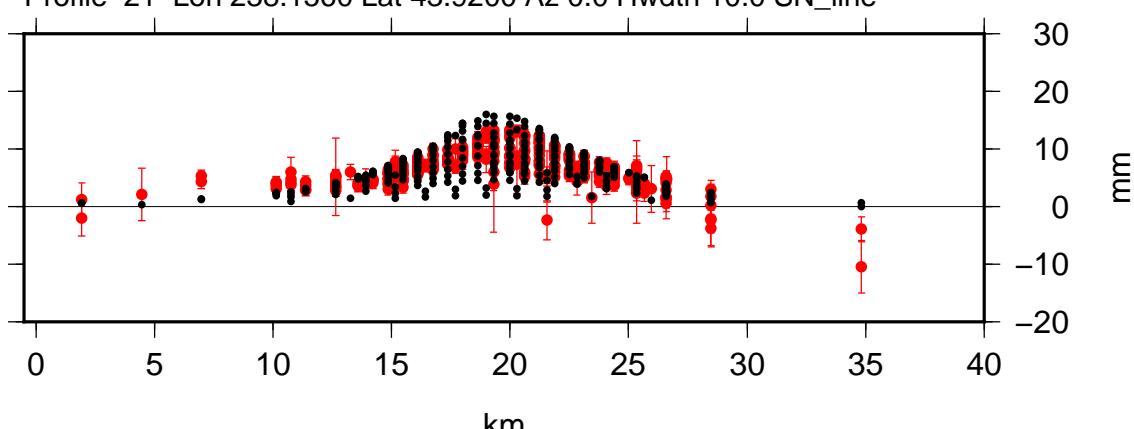
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



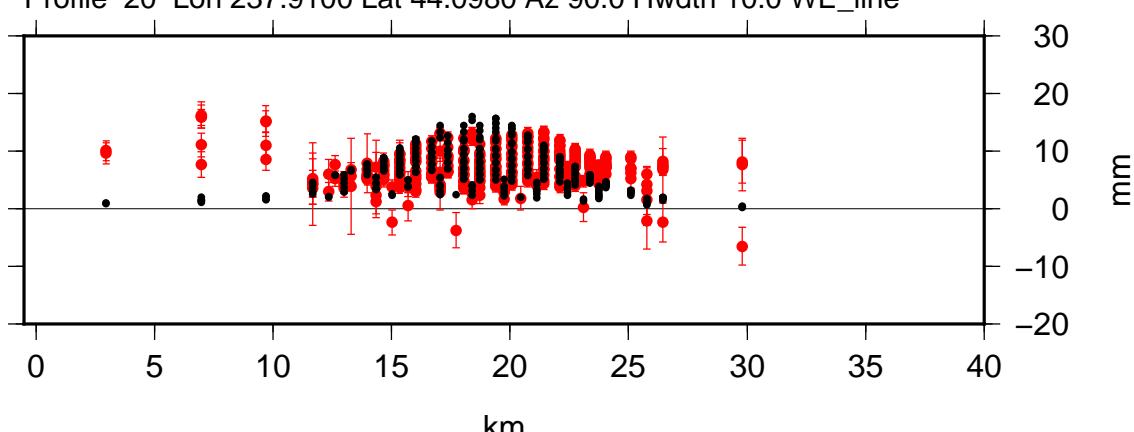
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



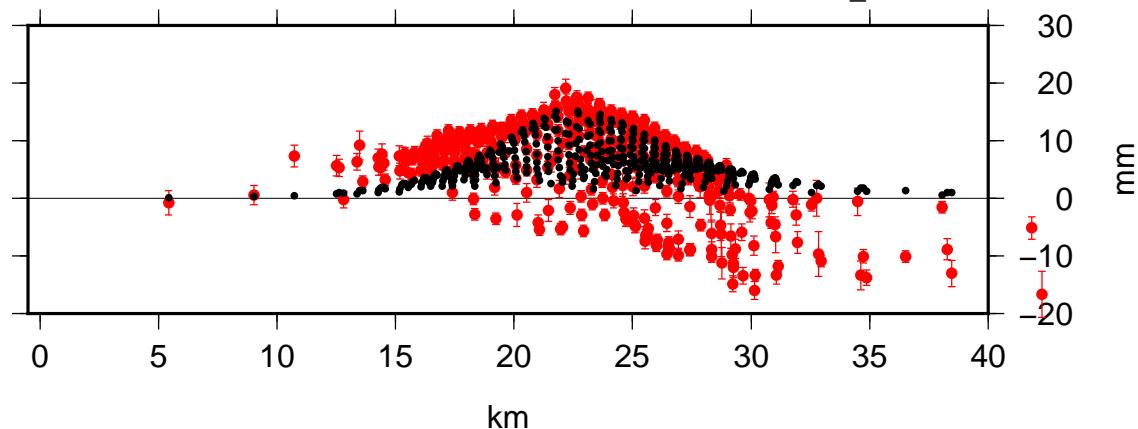
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



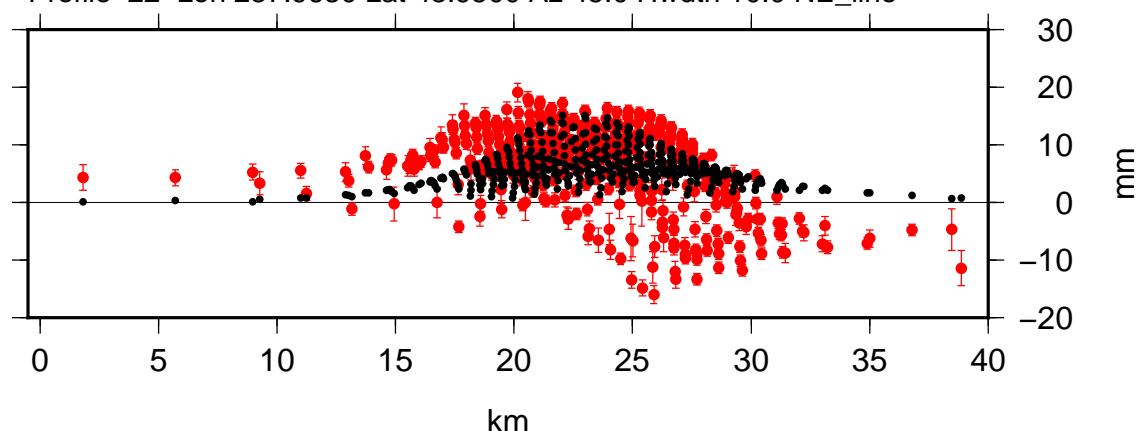
Code: VD51 Time: 2008.666 – 2010.679

Model: sis1 Nrms: 0.391 Wrms: 0.881

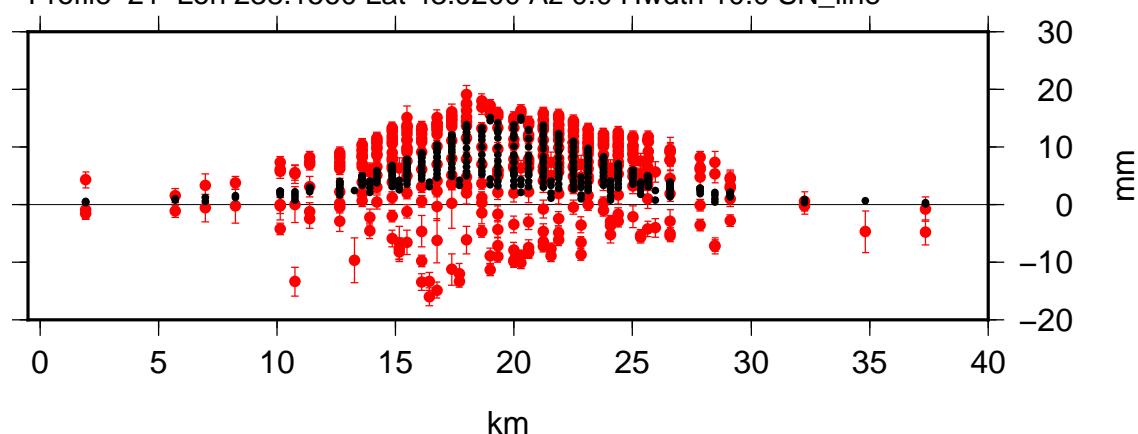
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



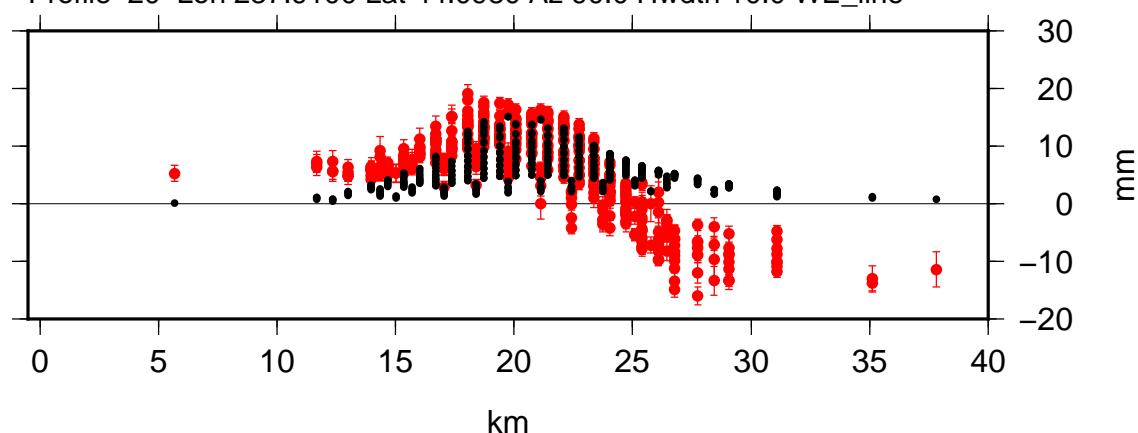
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



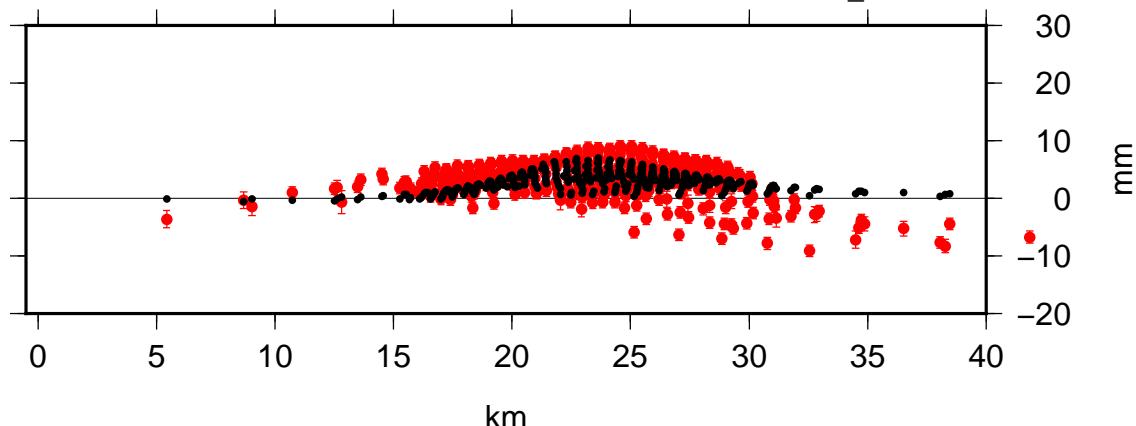
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



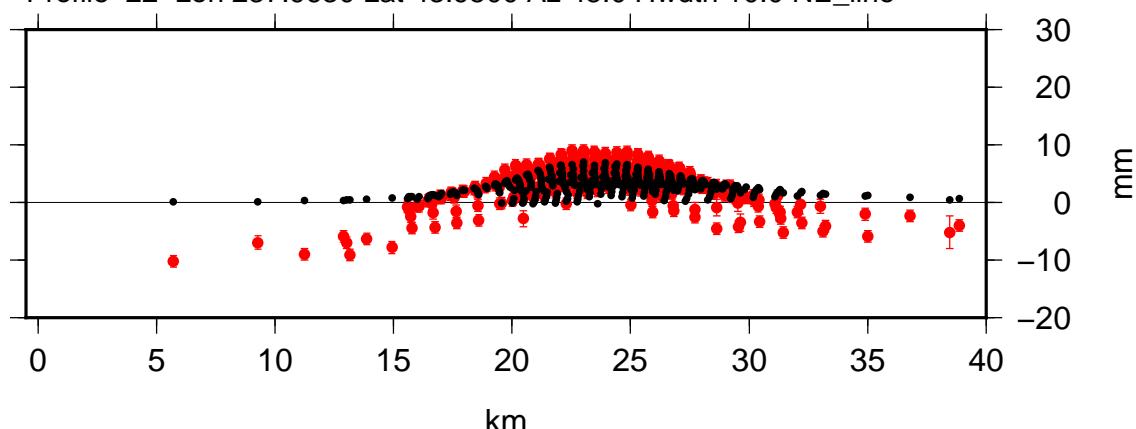
Code: TD52 Time: 2012.643 – 2014.631

Model: sis1 Nrms: 1.768 Wrms: 3.596

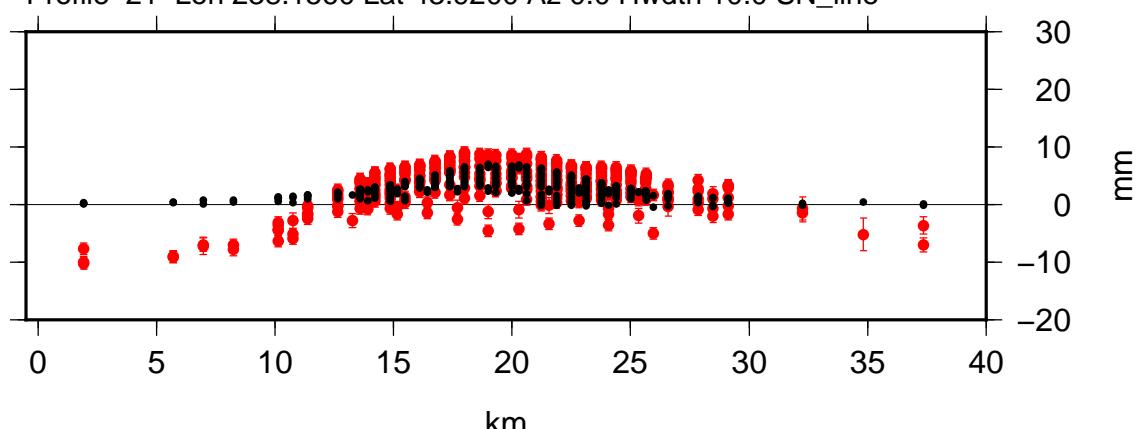
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



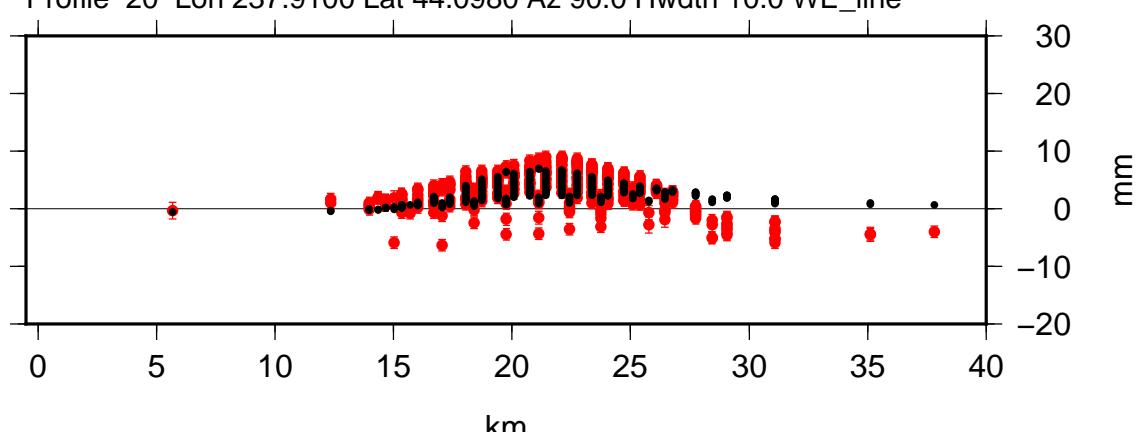
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



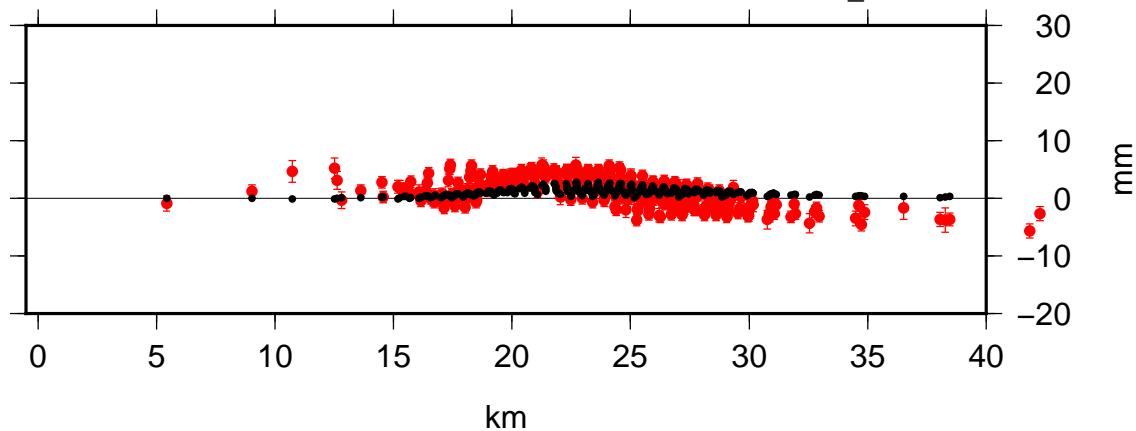
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



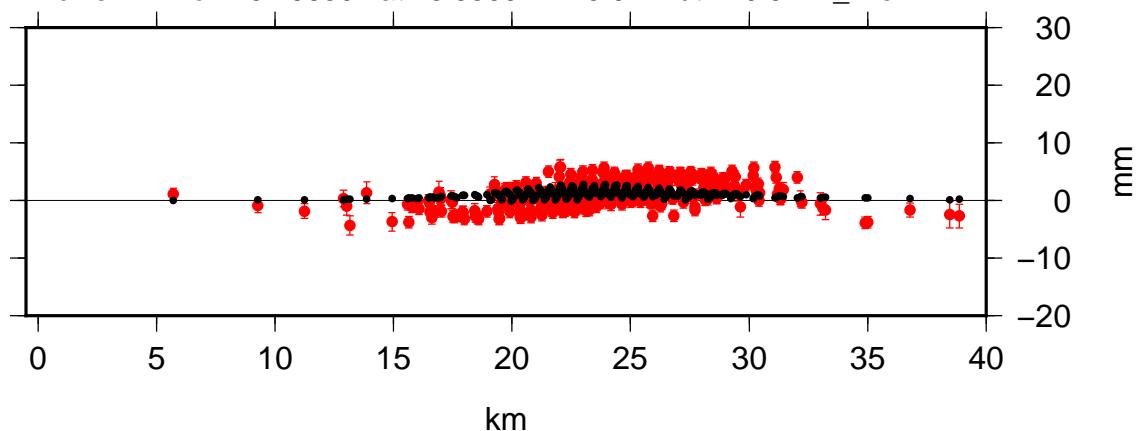
Code: SD53 Time: 2015.438 – 2016.817

Model: sis1 Nrms: 0.231 Wrms: 0.485

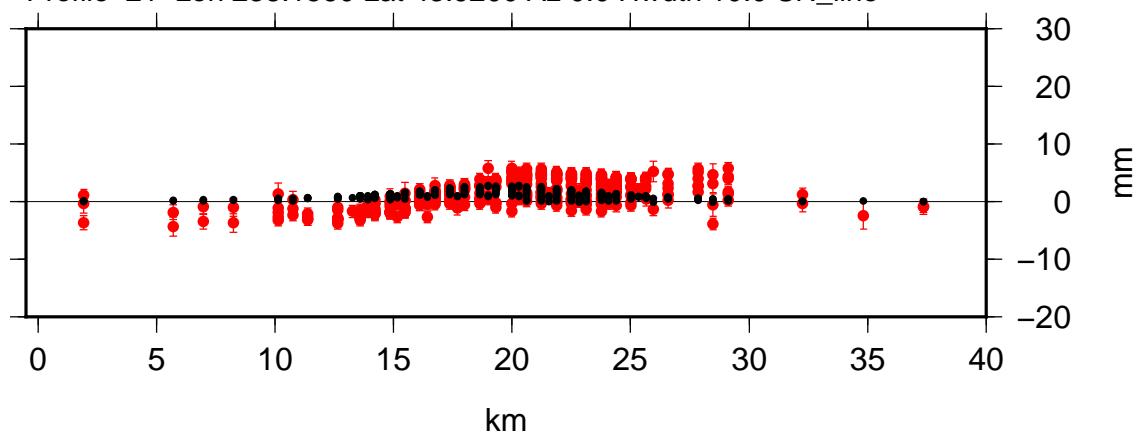
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



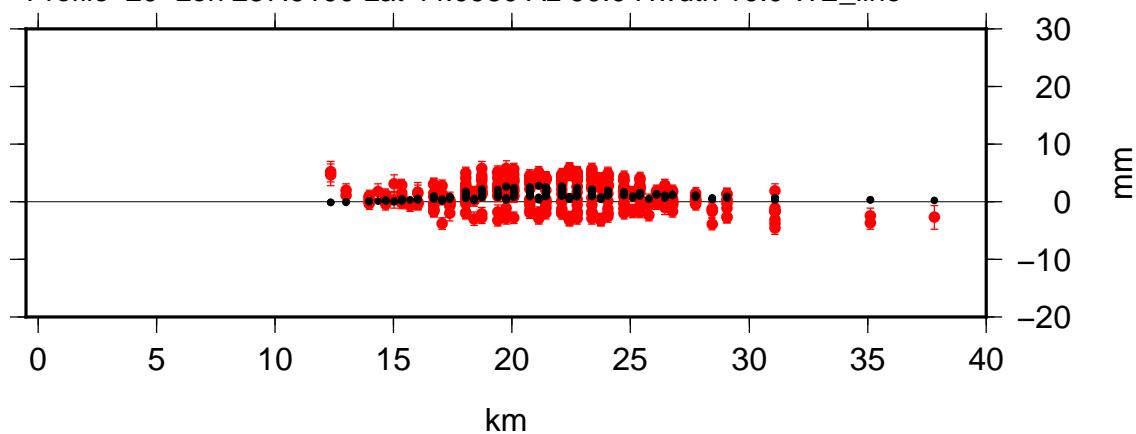
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



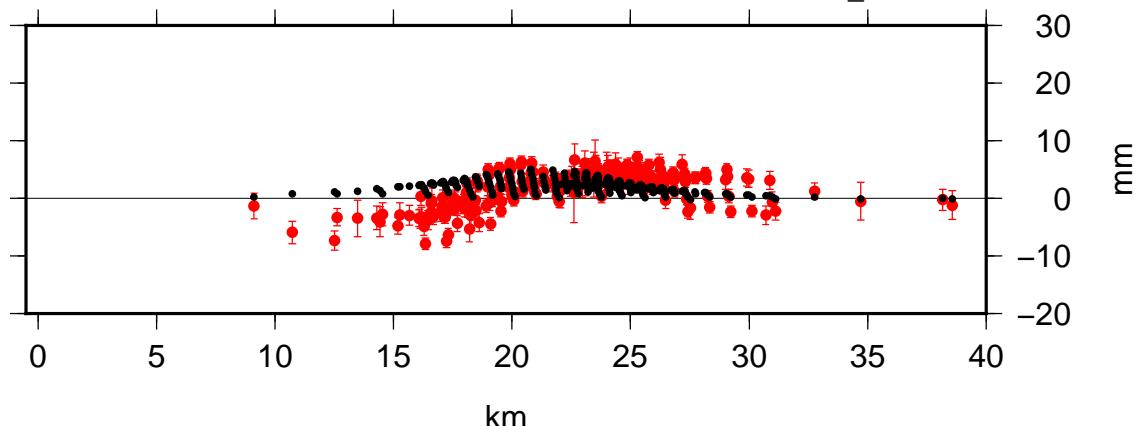
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



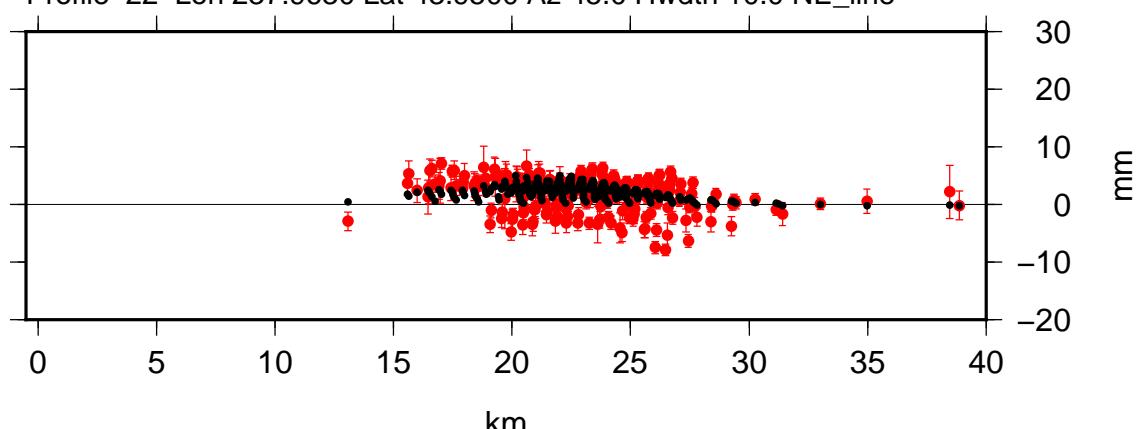
Code: SA54 Time: 2015.477 – 2017.825

Model: sis1 Nrms: 0.157 Wrms: 0.381

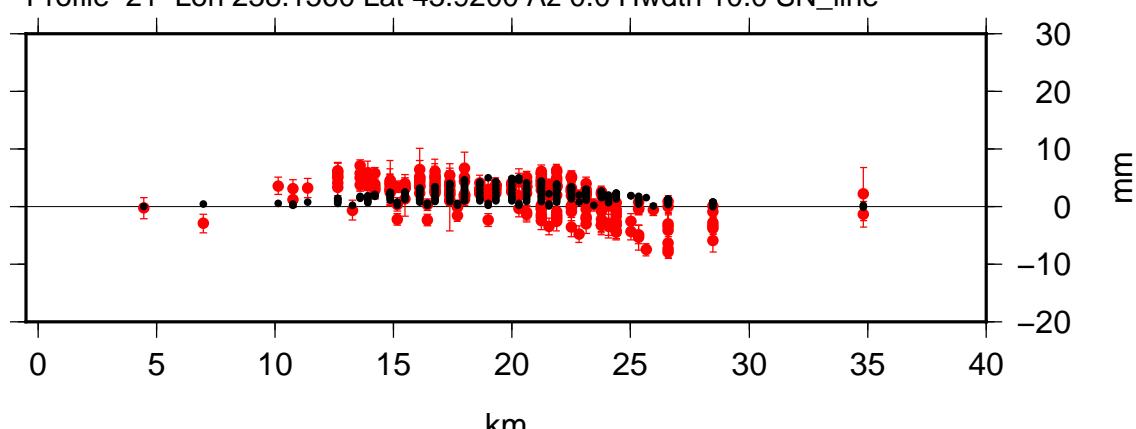
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



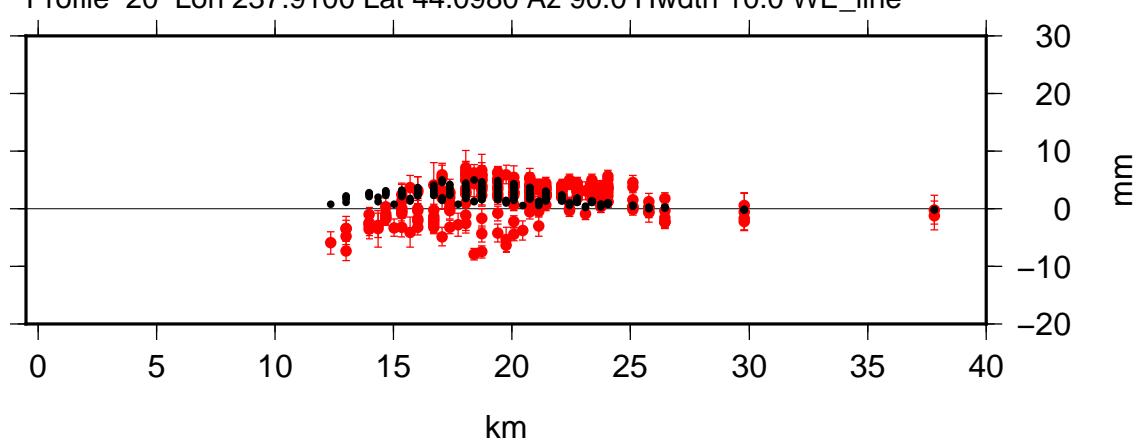
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



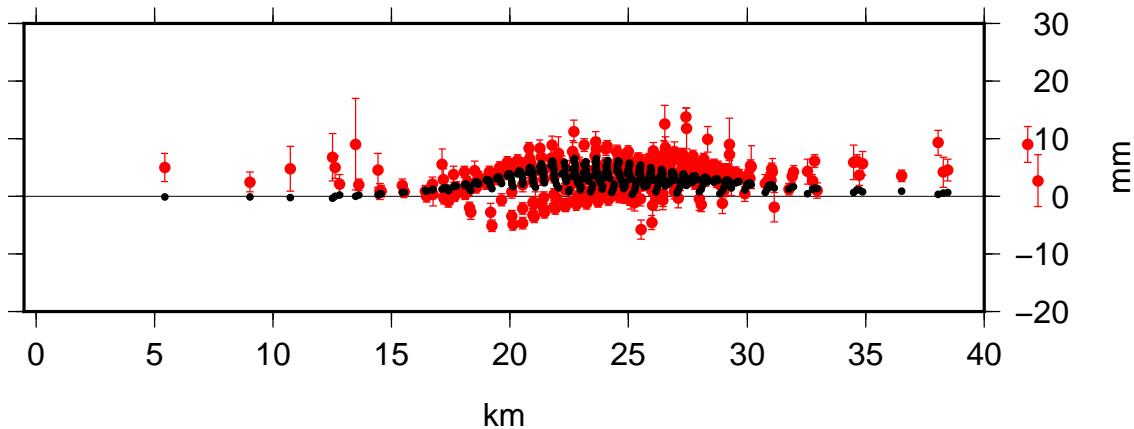
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



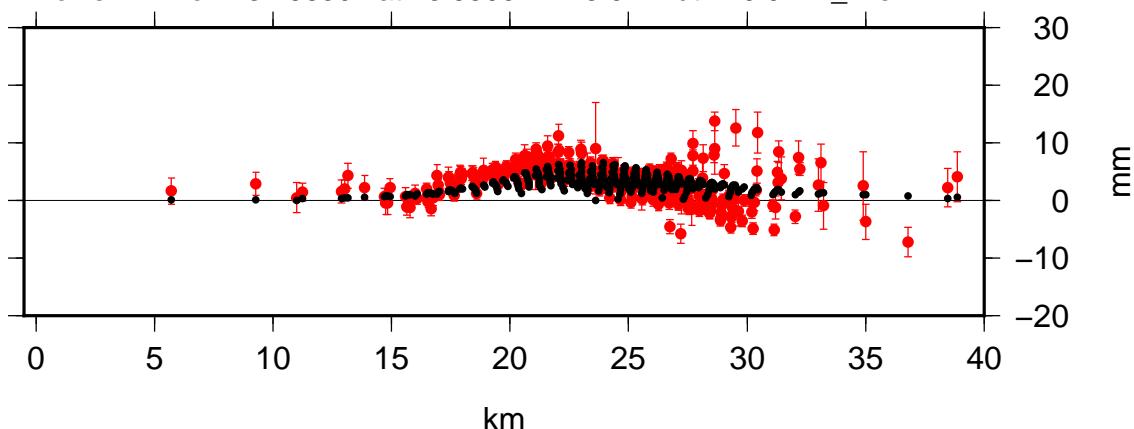
Code: SD55 Time: 2015.504 – 2018.690

Model: sis1 Nrms: 0.686 Wrms: 1.566

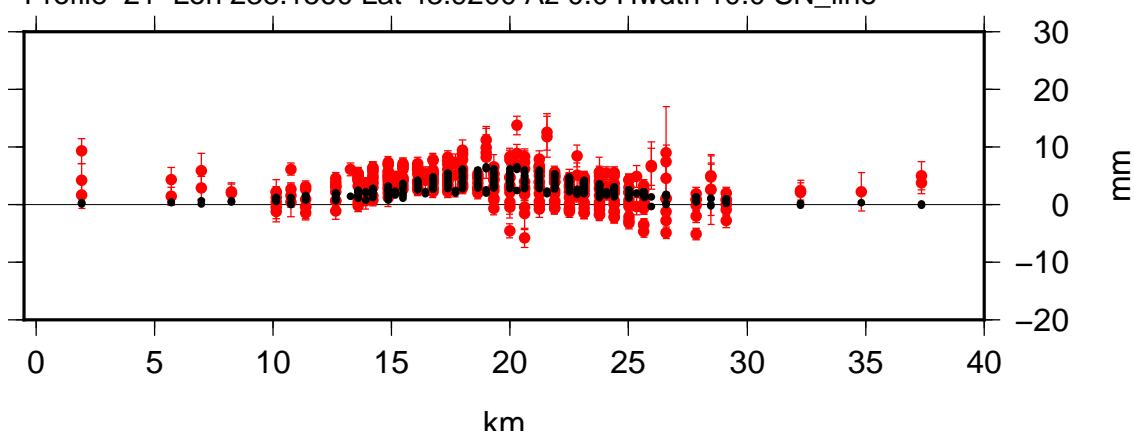
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



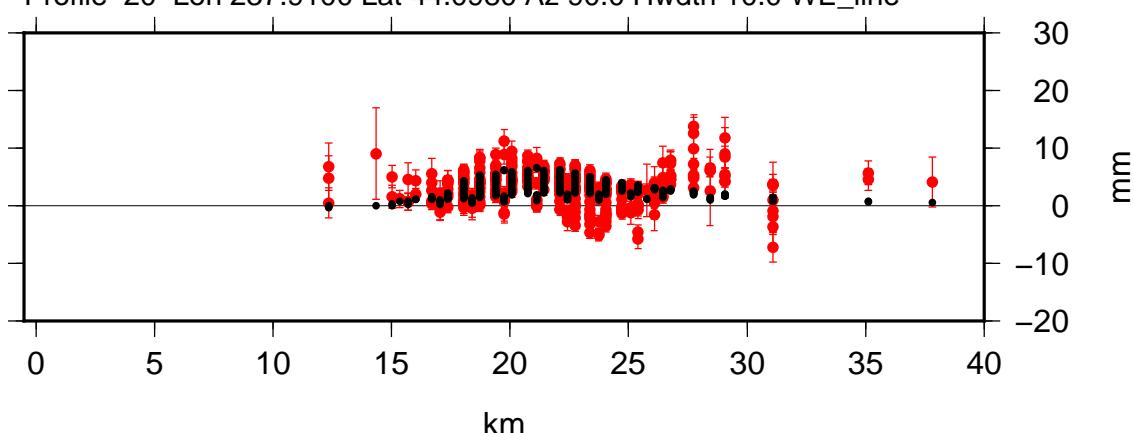
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



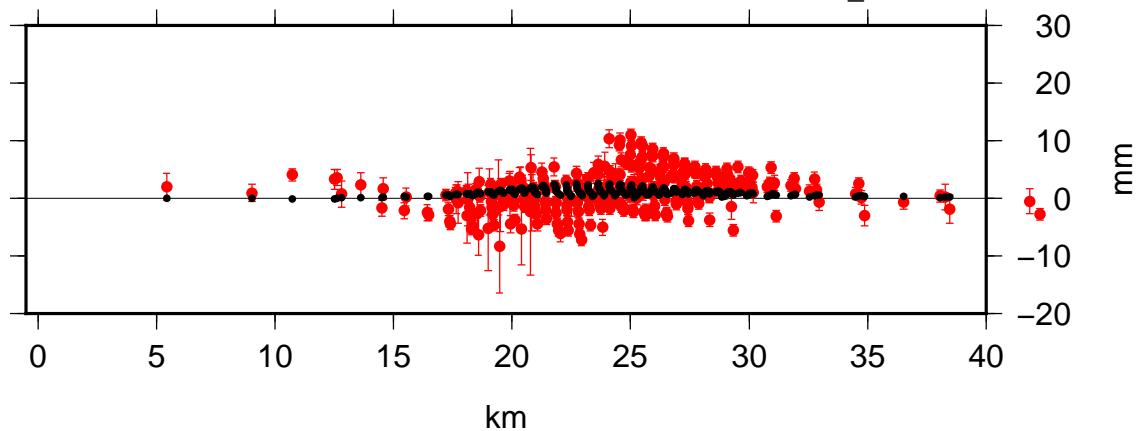
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



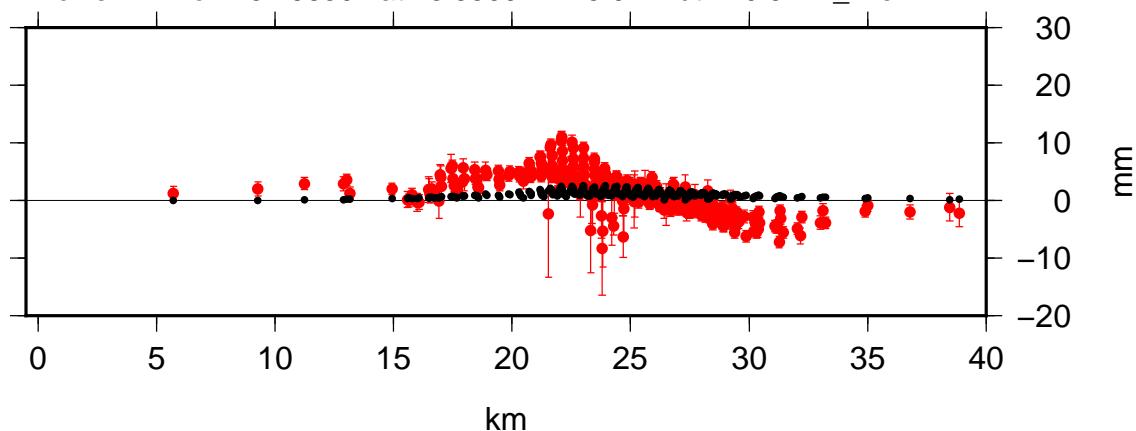
Code: SD56 Time: 2016.424 – 2017.770

Model: sis1 Nrms: 0.106 Wrms: 0.237

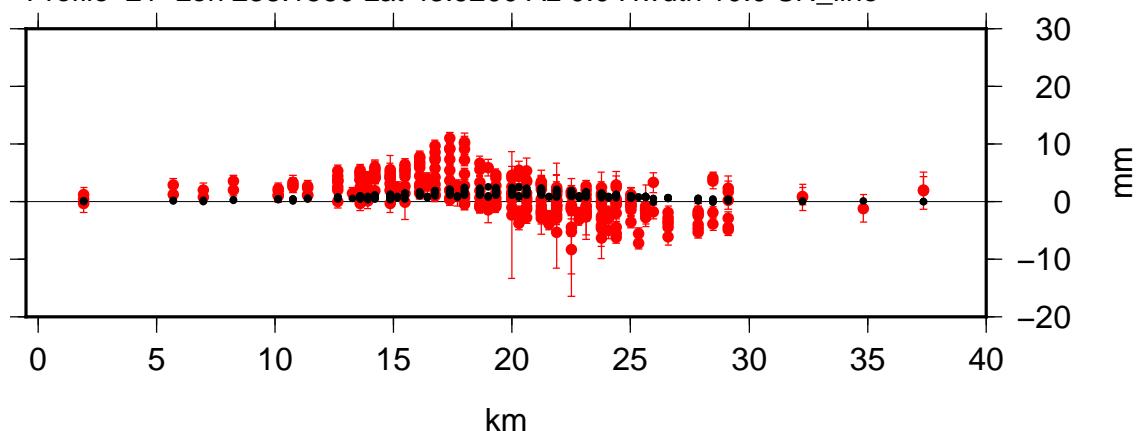
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



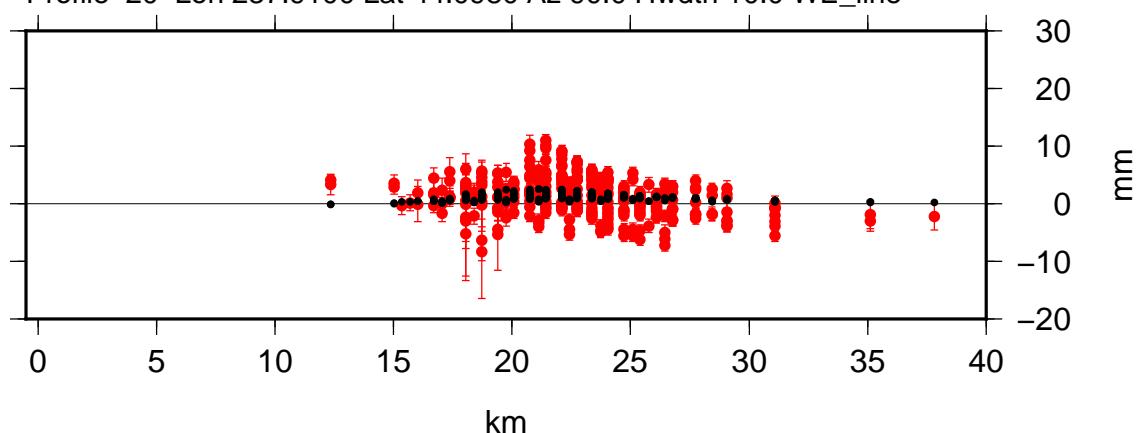
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



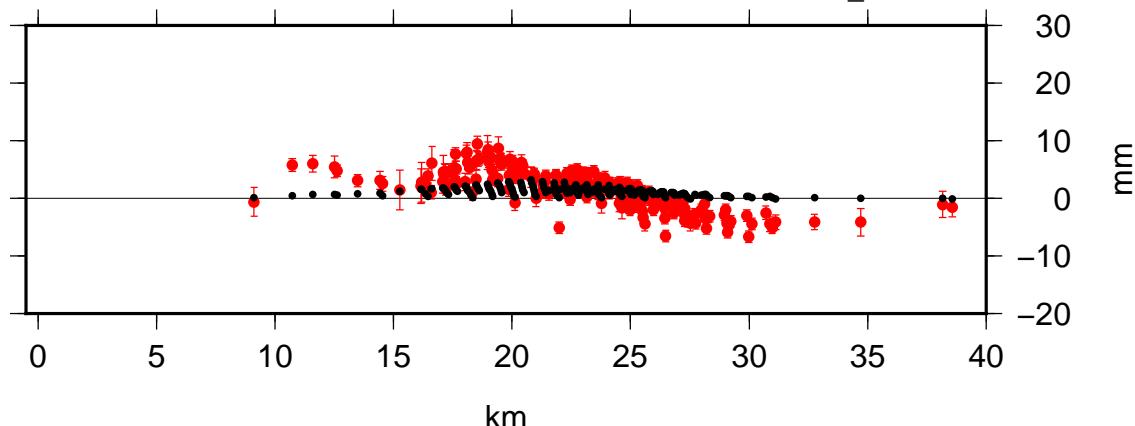
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



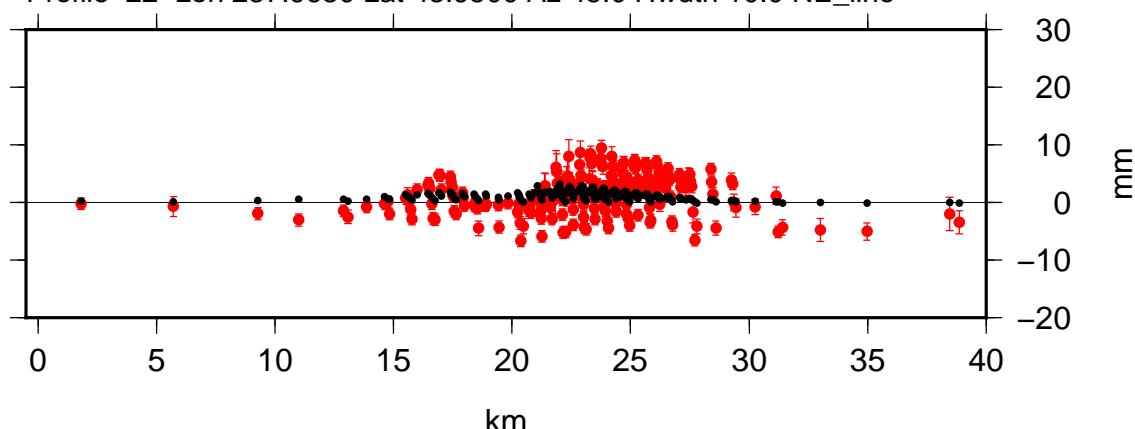
Code: SA57 Time: 2017.496 – 2018.877

Model: sis1 Nrms: 0.040 Wrms: 0.089

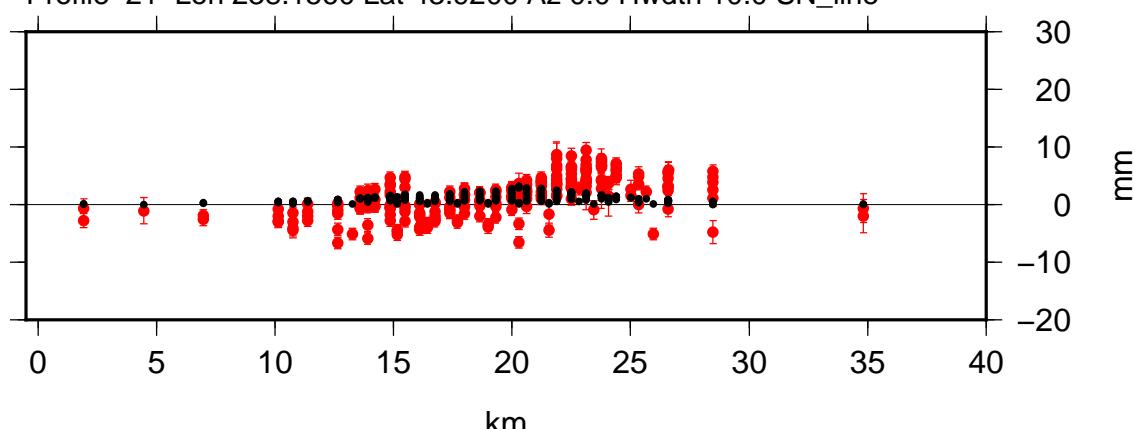
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



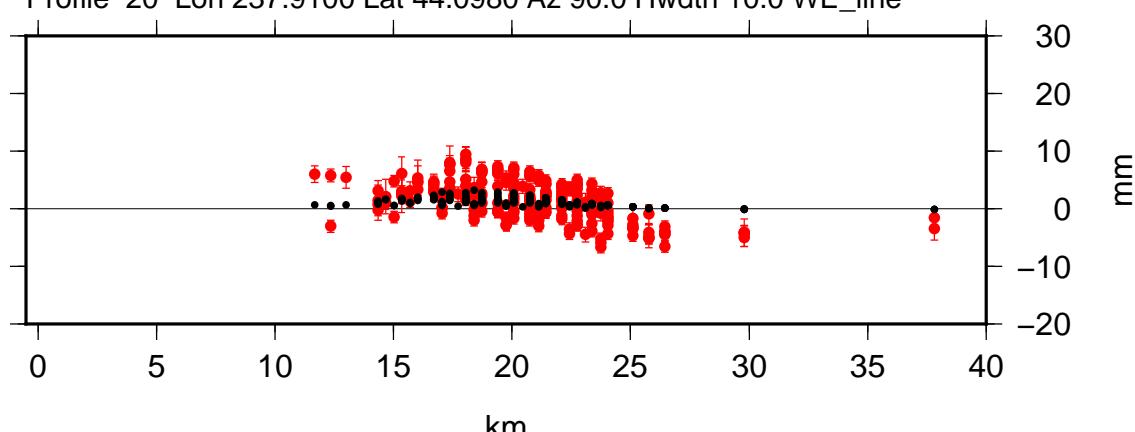
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



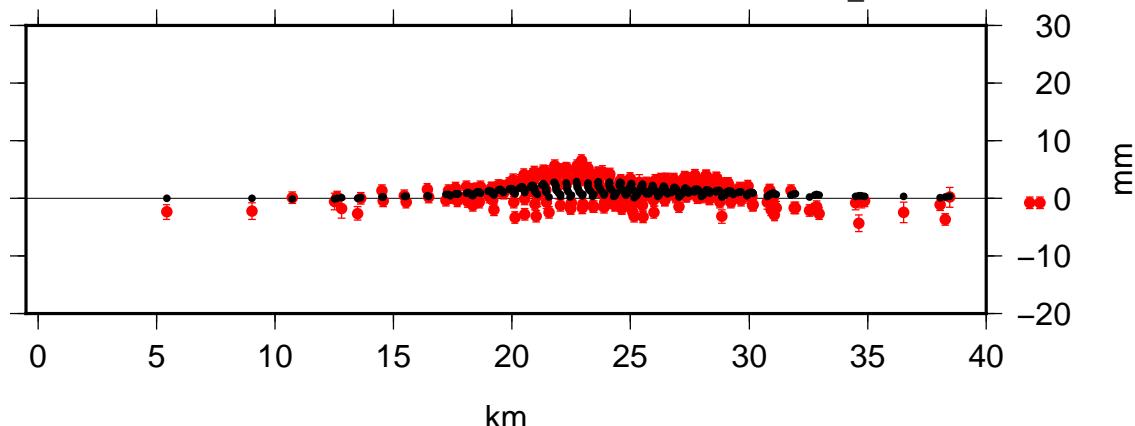
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



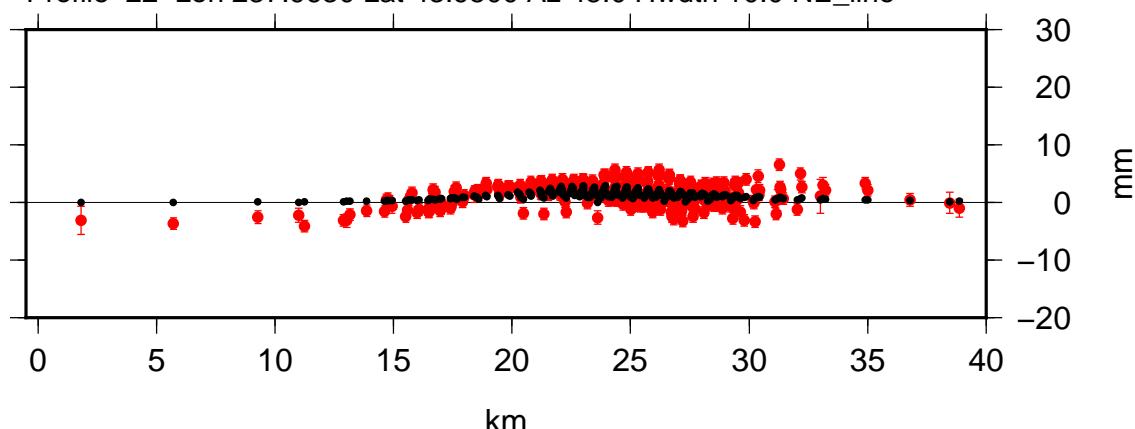
Code: SD58 Time: 2017.507 – 2018.855

Model: sis1 Nrms: 0.297 Wrms: 0.610

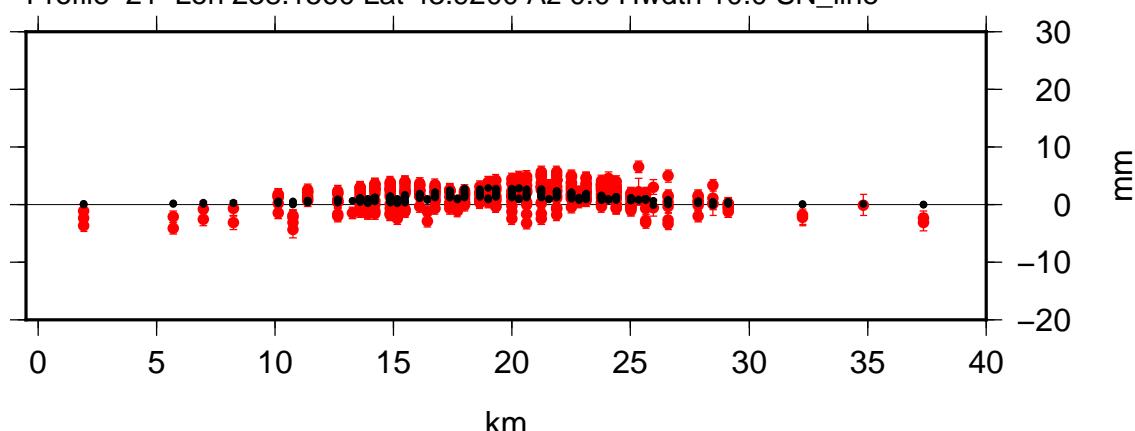
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



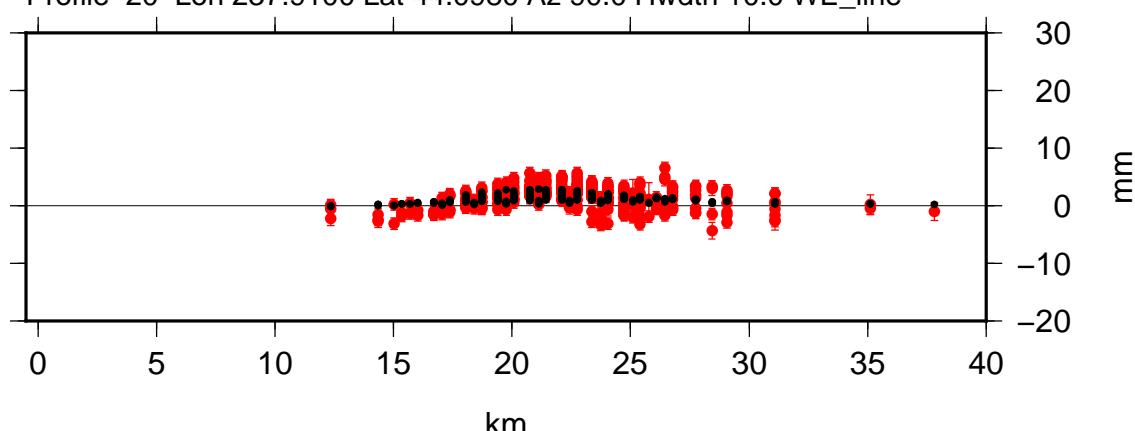
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



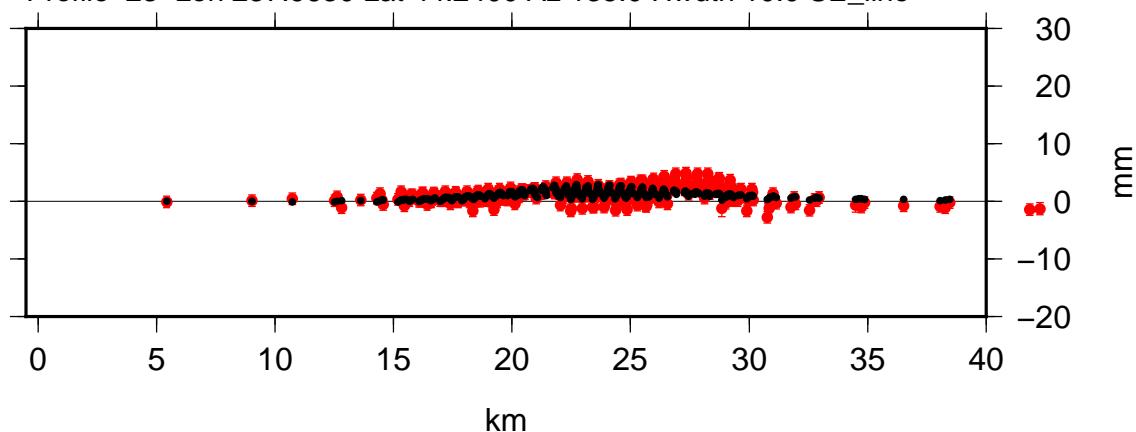
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



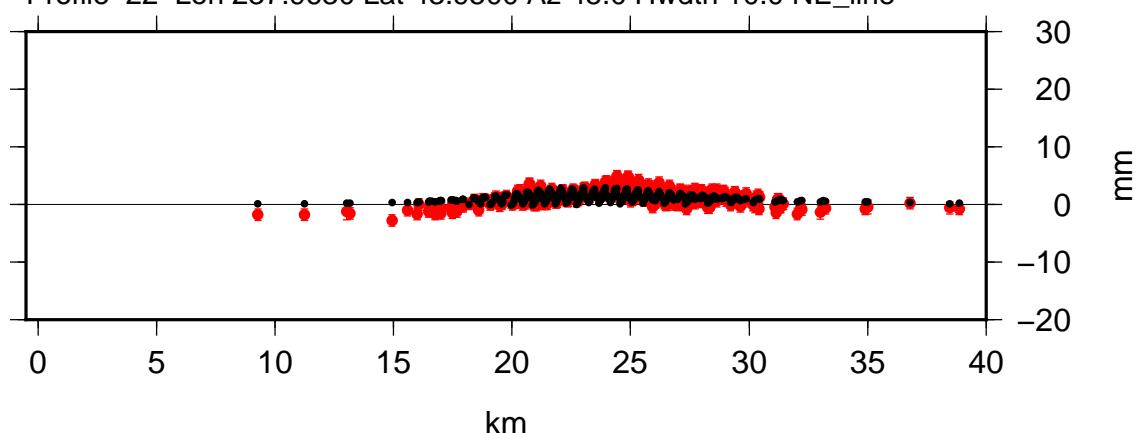
Code: SD59 Time: 2018.427 – 2019.874

Model: sis1 Nrms: 0.065 Wrms: 0.131

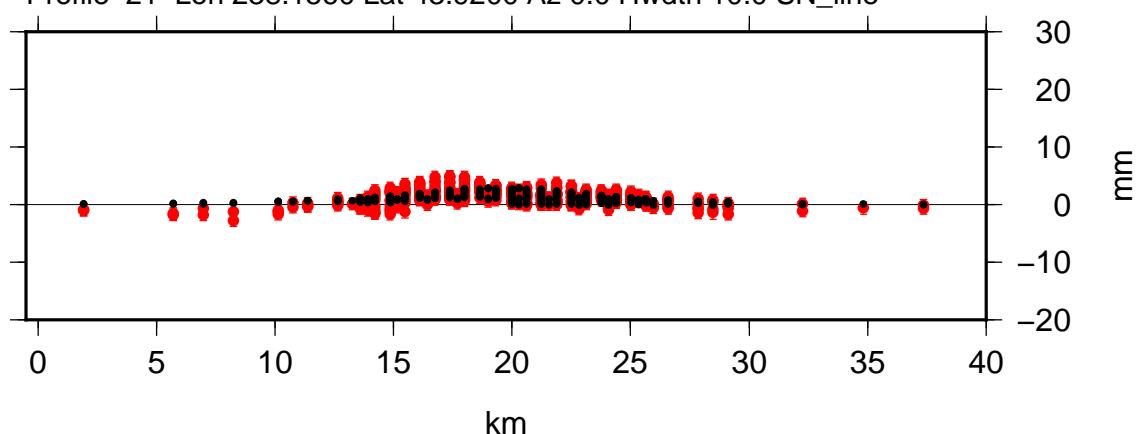
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



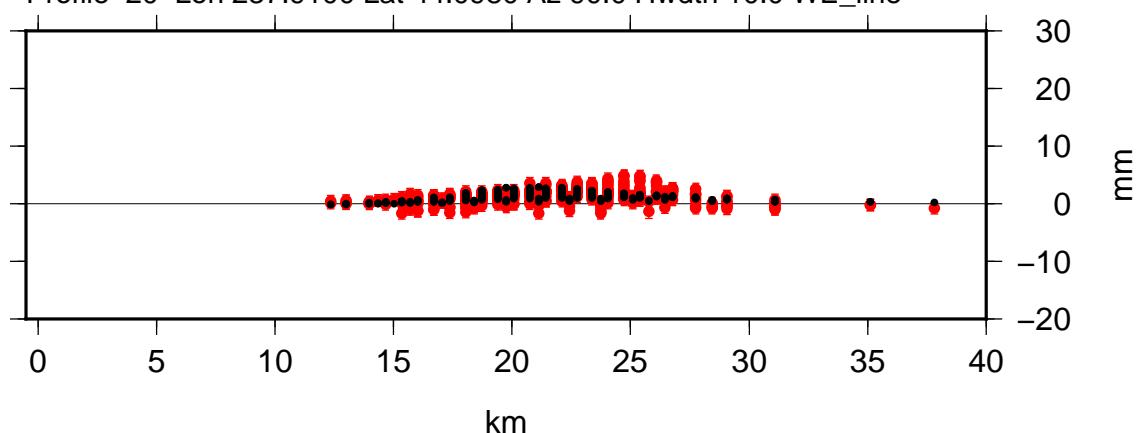
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



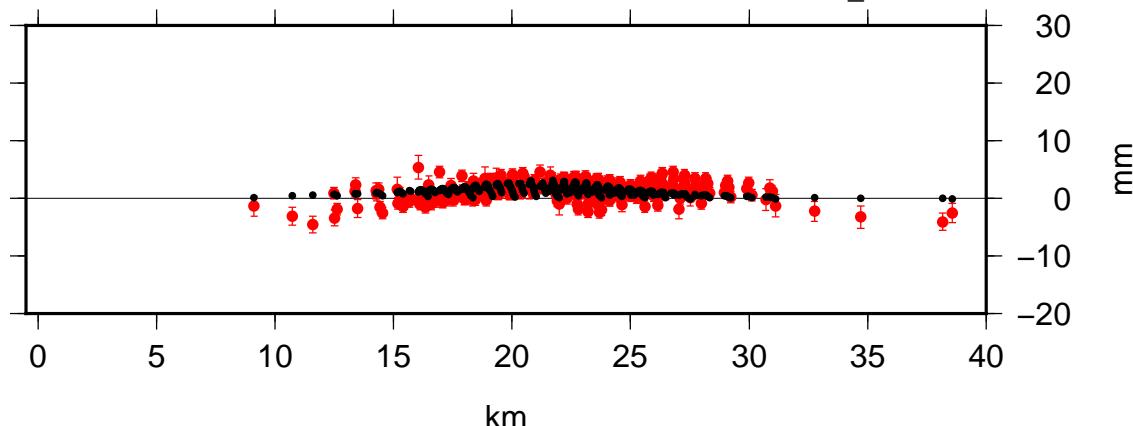
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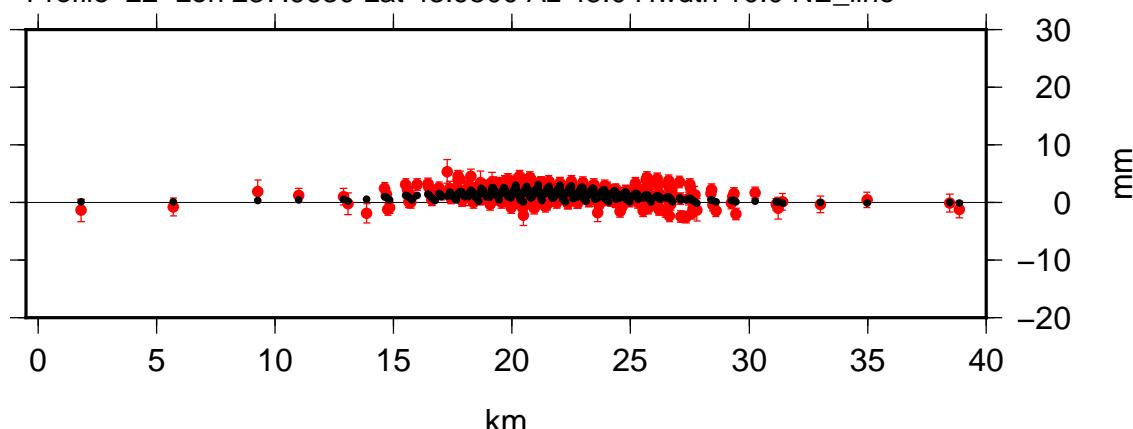
Code: SA60 Time: 2018.515 – 2019.896

Model: sis1 Nrms: 0.093 Wrms: 0.196

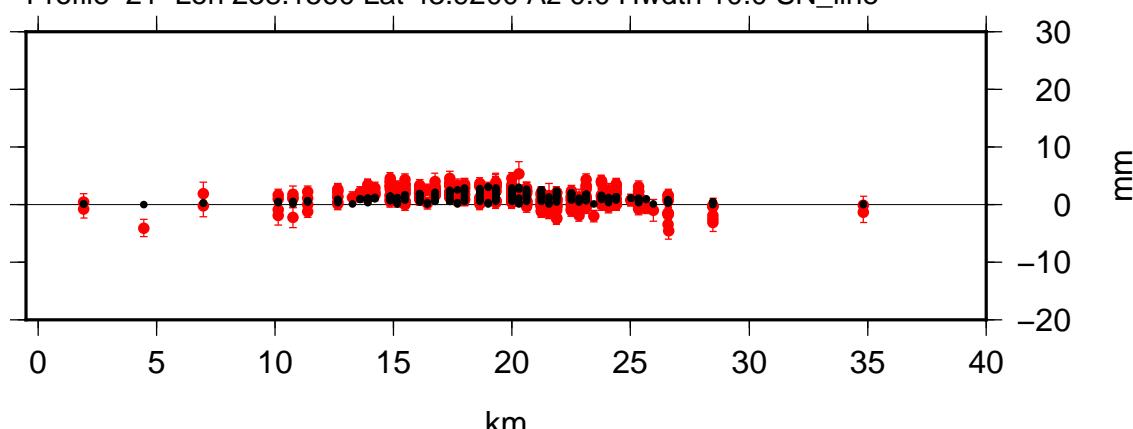
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



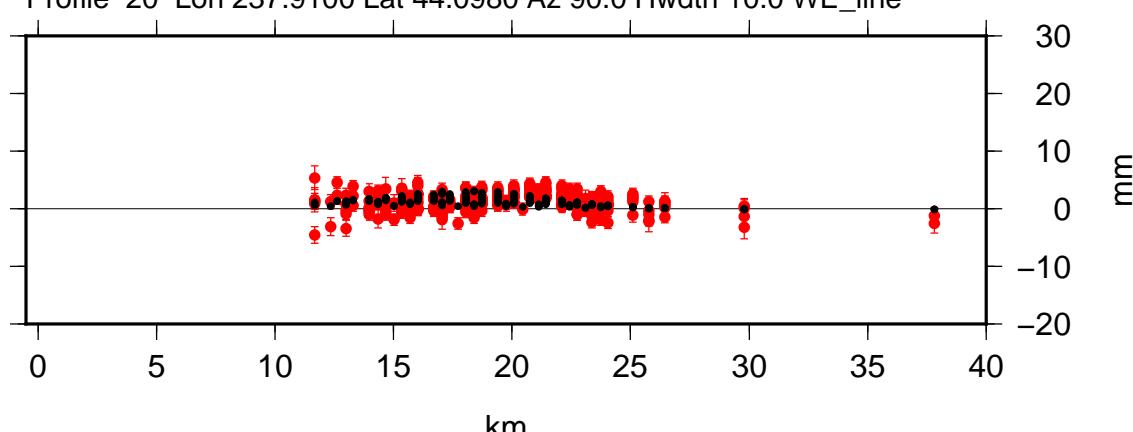
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



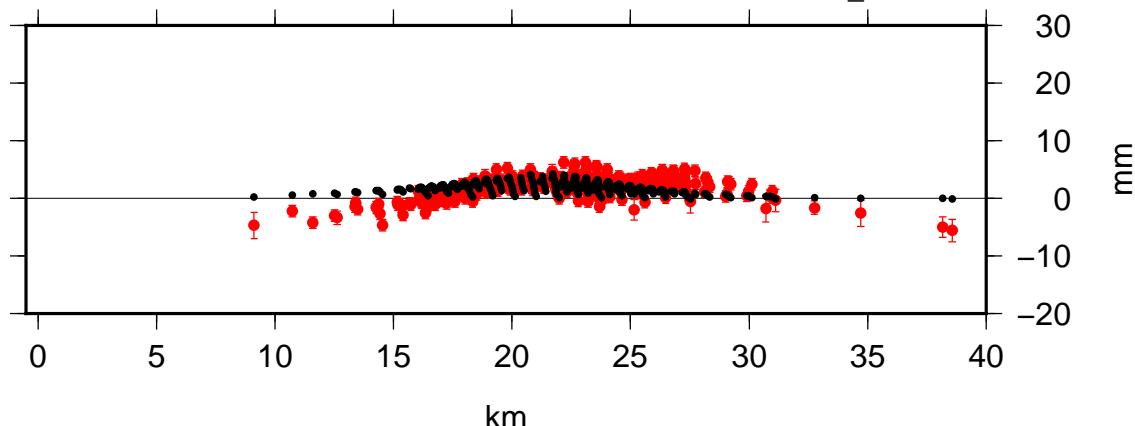
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



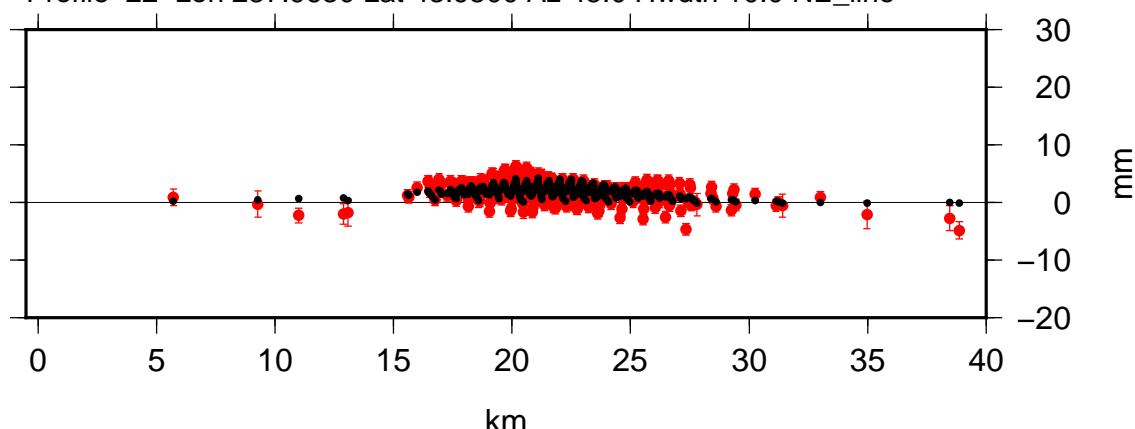
Code: SA61 Time: 2018.515 – 2020.749

Model: sis1 Nrms: 1.004 Wrms: 2.079

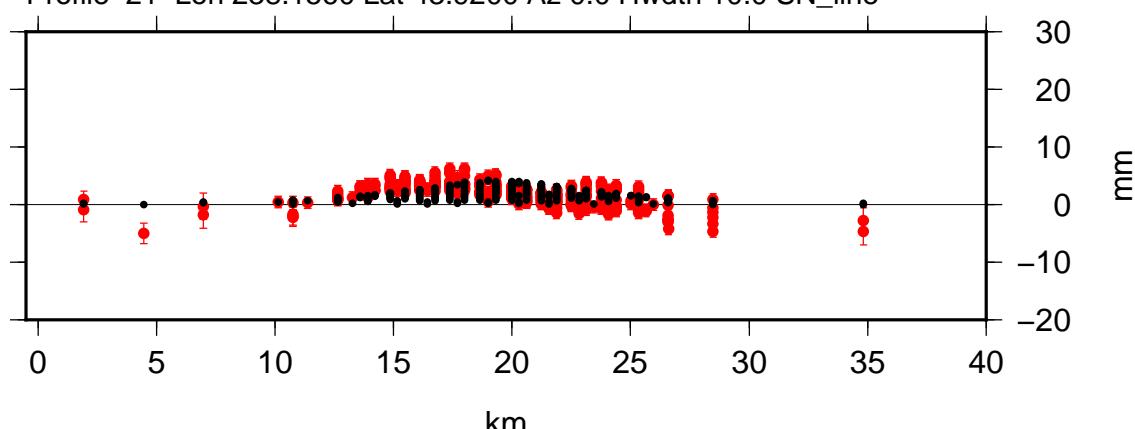
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



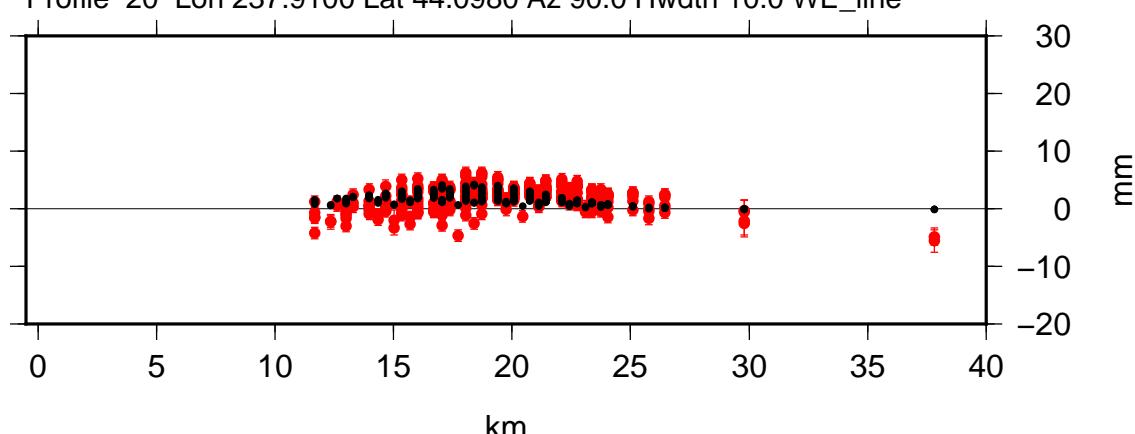
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



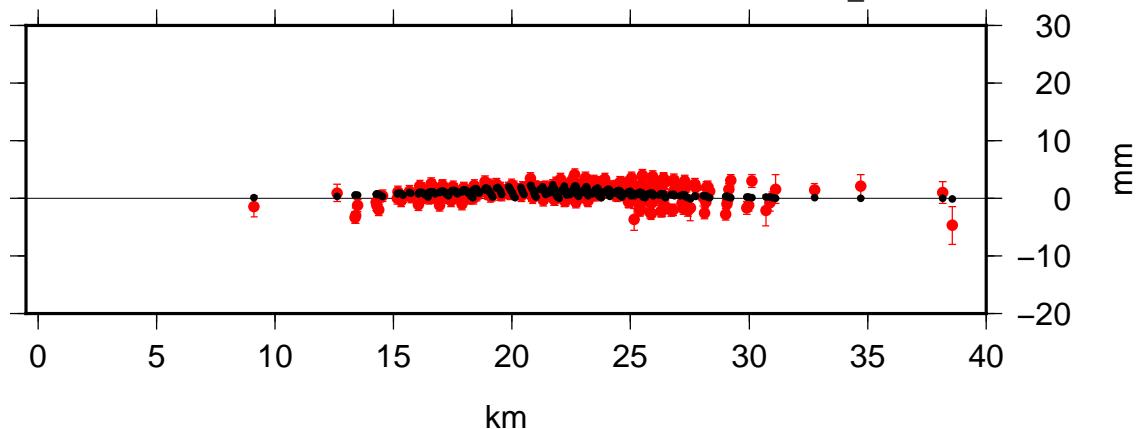
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



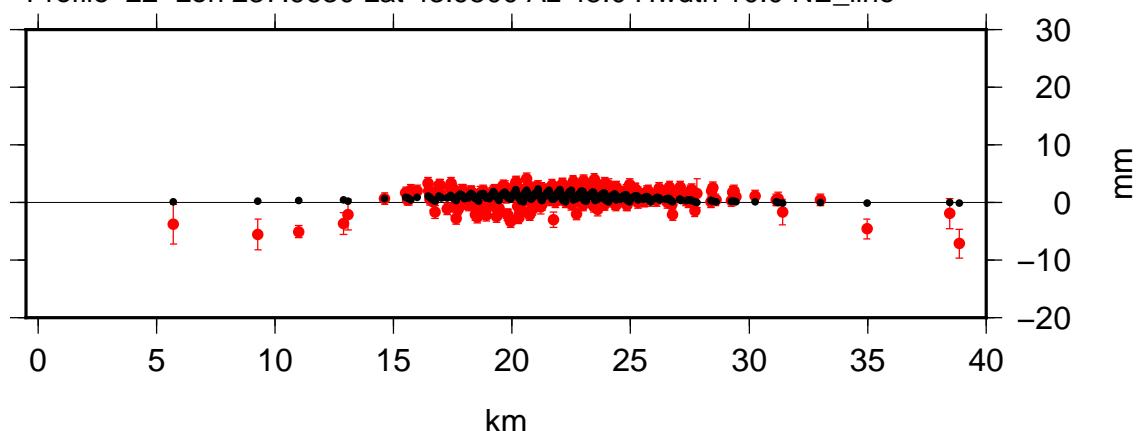
Code: SA62 Time: 2019.436 – 2020.749

Model: sis1 Nrms: 0.344 Wrms: 0.720

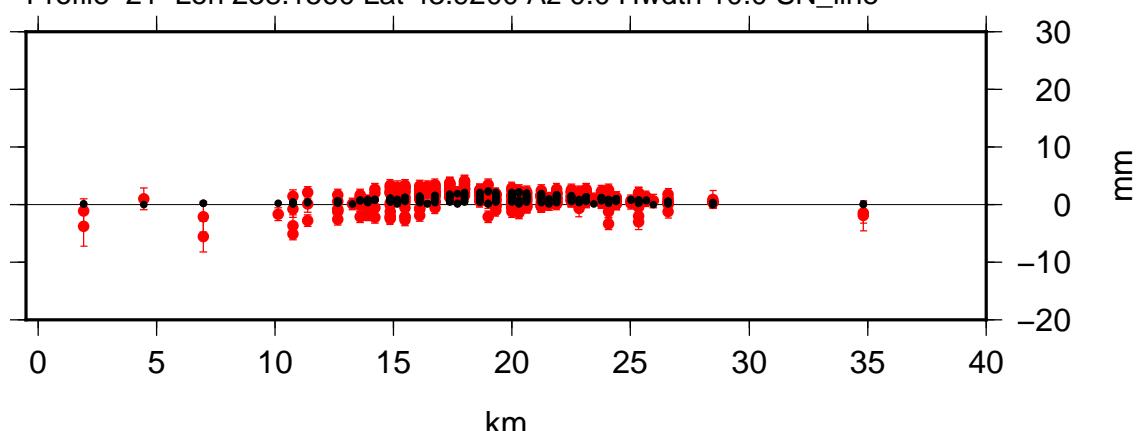
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



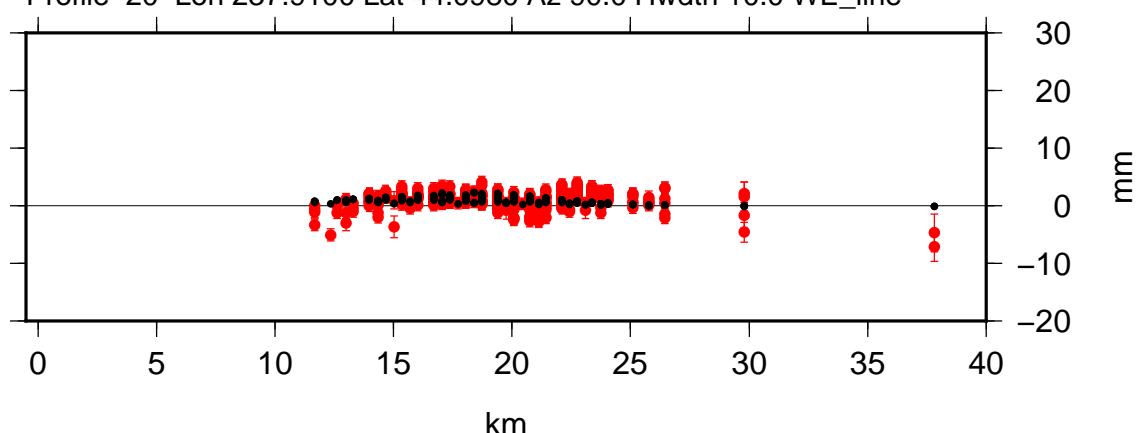
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



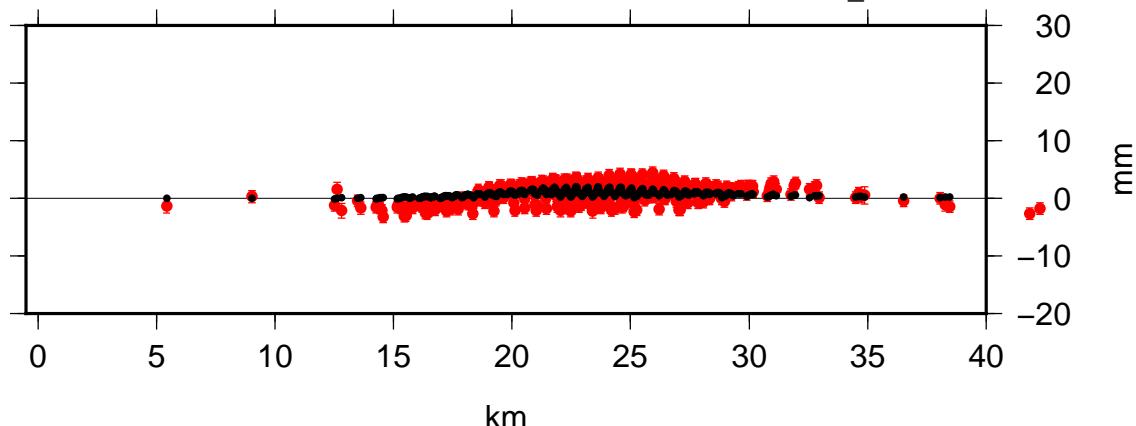
Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



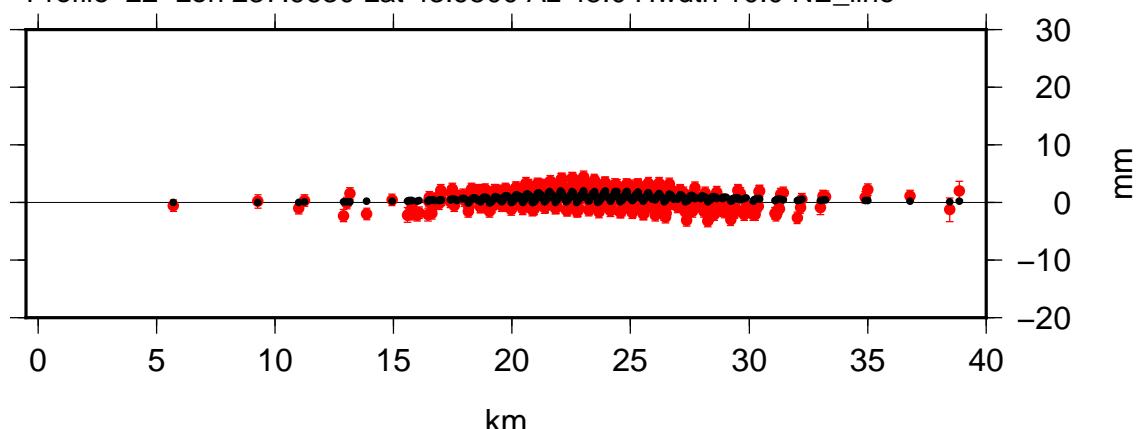
Code: SD63 Time: 2019.447 – 2020.760

Model: sis1 Nrms: 0.386 Wrms: 0.782

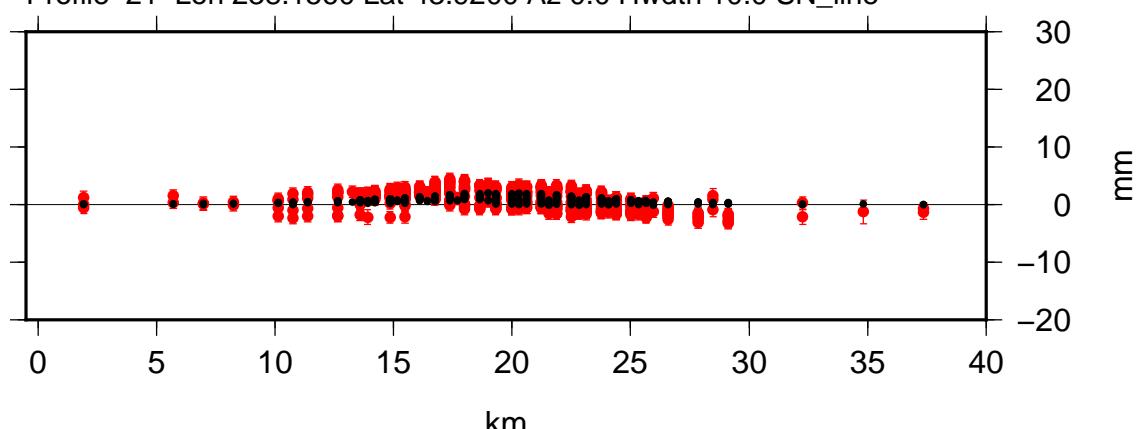
Profile 23 Lon 237.9630 Lat 44.2400 Az 135.0 Hwdth 10.0 SE\_line



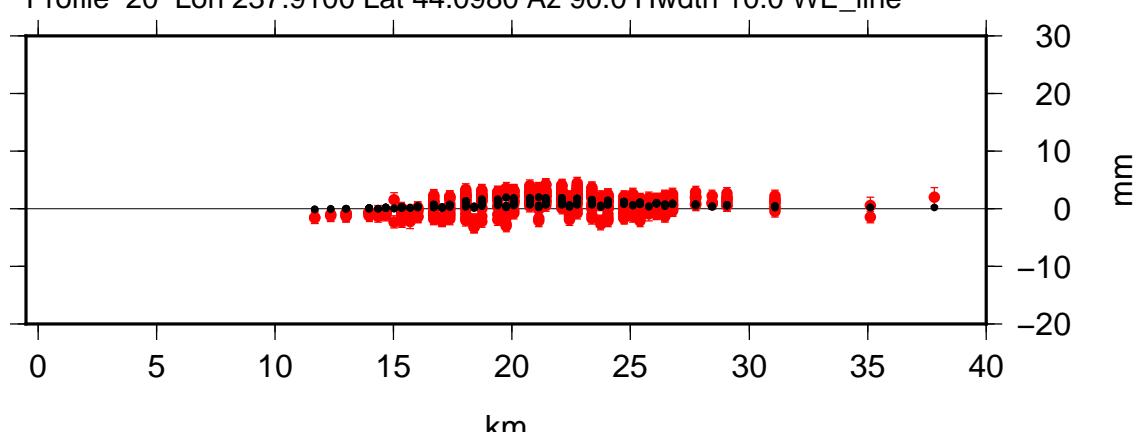
Profile 22 Lon 237.9630 Lat 43.9500 Az 45.0 Hwdth 10.0 NE\_line



Profile 21 Lon 238.1560 Lat 43.9200 Az 0.0 Hwdth 10.0 SN\_line



Profile 20 Lon 237.9100 Lat 44.0980 Az 90.0 Hwdth 10.0 WE\_line



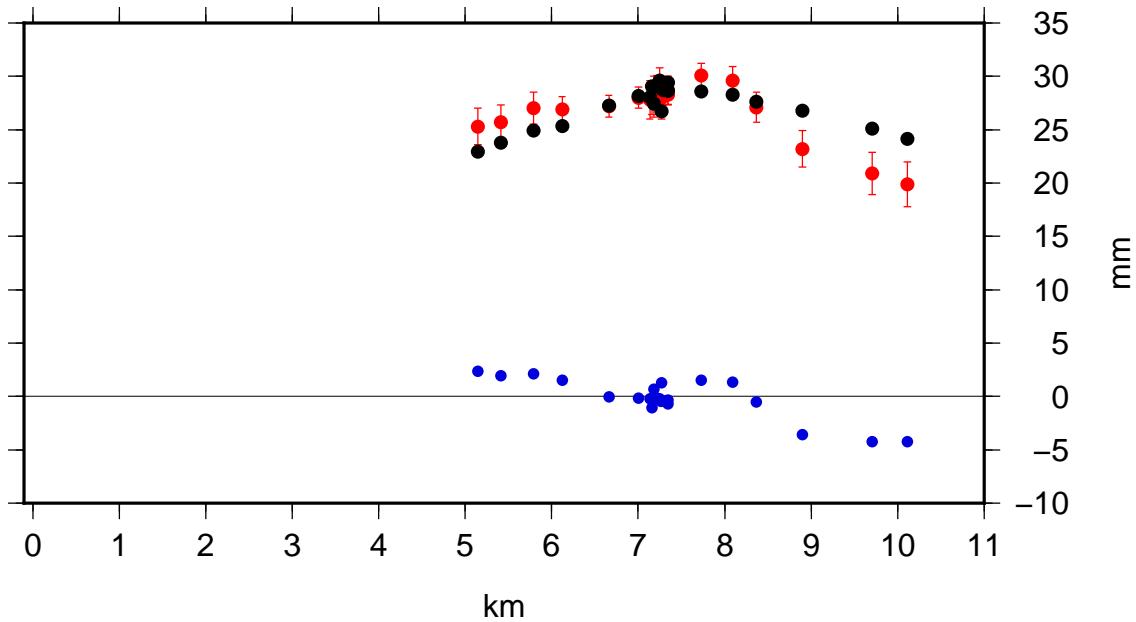
**Figure S-6.** Plots of InSAR profiles passing through the Three Sisters Bulge for model sis1. Top panel is NW-to-SE profile, second from top is SW-to-NE trending, second from bottom is S-to-N and bottom is W-to-E. Red dots are observed dLOS with 1-sigma error bars and black dots are calculated dLOS. Legend gives interferogram code (e.g., ED01), Time gives the dates of the two scenes, Nrms is normalized RMS misfit and Wrms is weighted rms misfit. Next line gives the starting Longitude and Latitude of the profile, its azimuth relative to north and half-width in km. The 63 interferograms are plotted in chronological order of the initial scene. Note that the LOS scale changes from plot to plot for clarity.

Caption is below figure, which has several parts. Search for "Figure S" to locate caption.

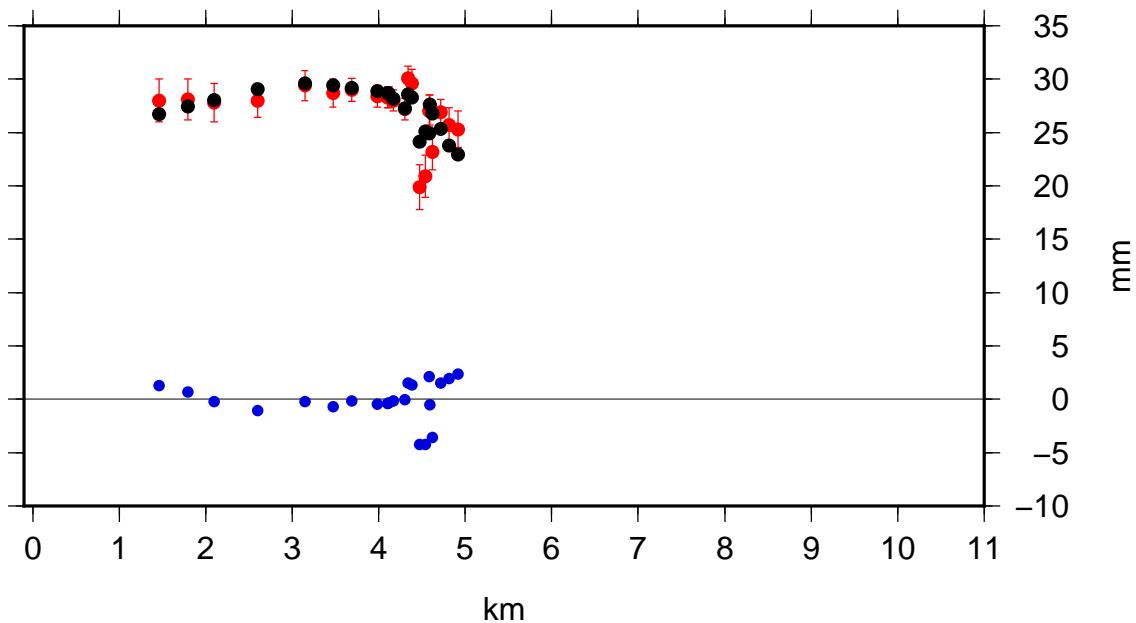
Code: Lv23 Time: 2002.622 – 2003.693

Model: sis1 Nrms: 1.405 Wrms: 1.843

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



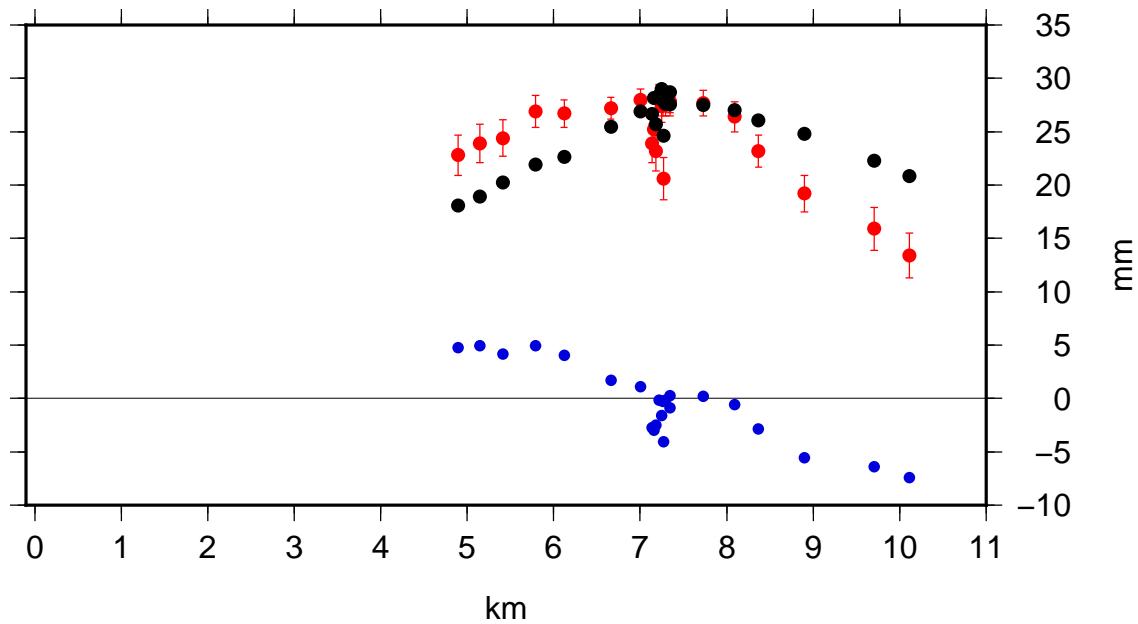
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



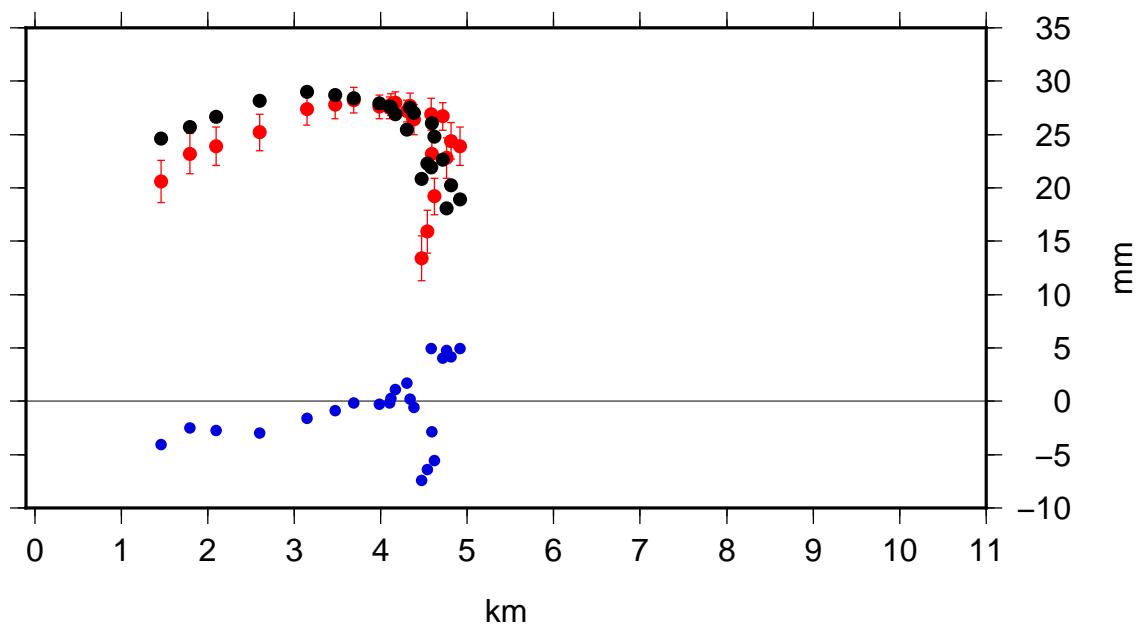
Code: Lv24 Time: 2002.622 – 2004.455

Model: sis1 Nrms: 2.495 Wrms: 3.428

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



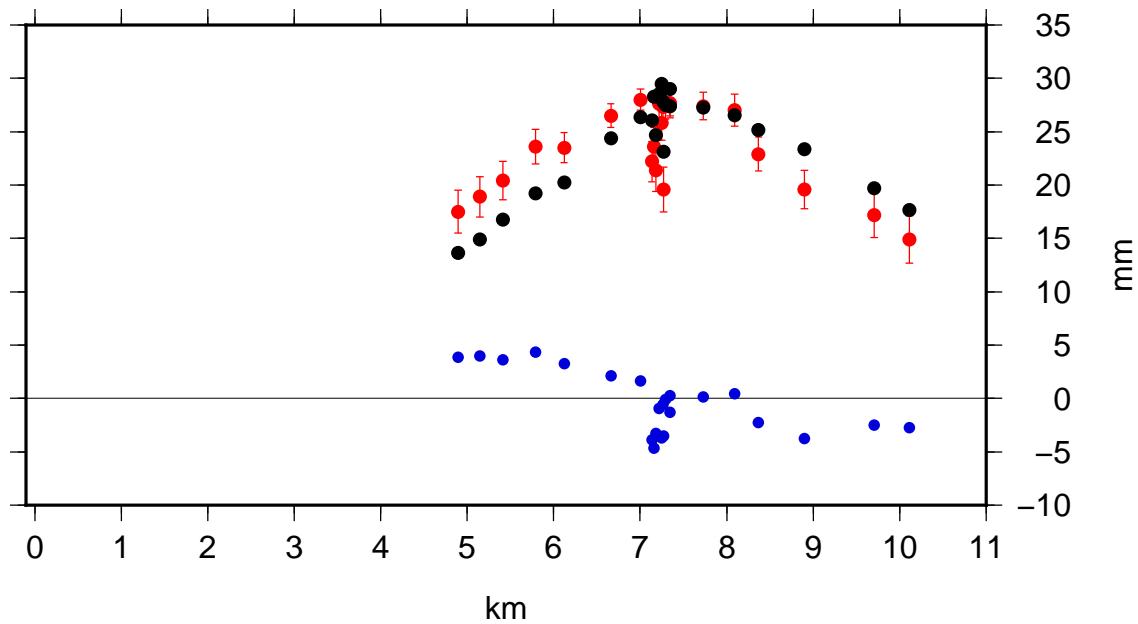
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



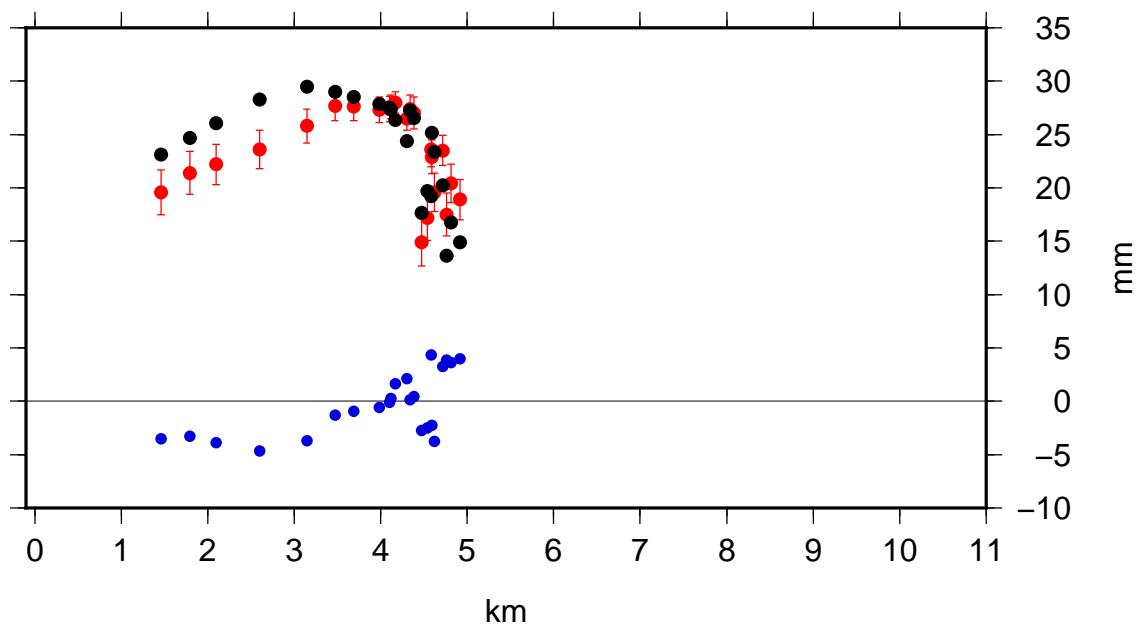
Code: Lv25 Time: 2002.622 – 2005.630

Model: sis1 Nrms: 1.932 Wrms: 2.860

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



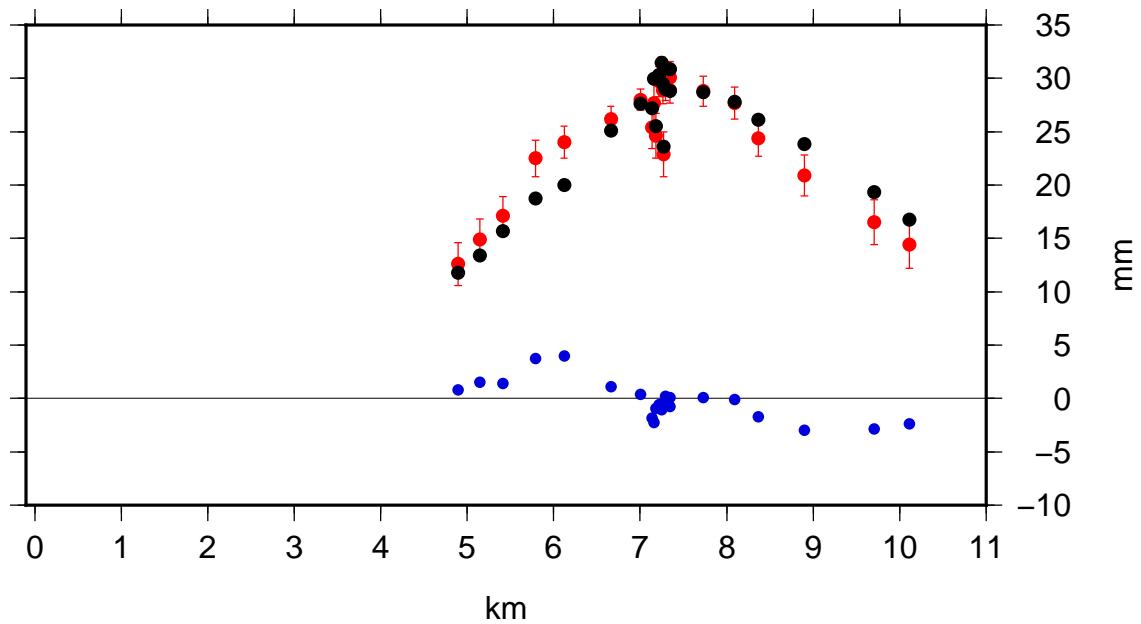
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



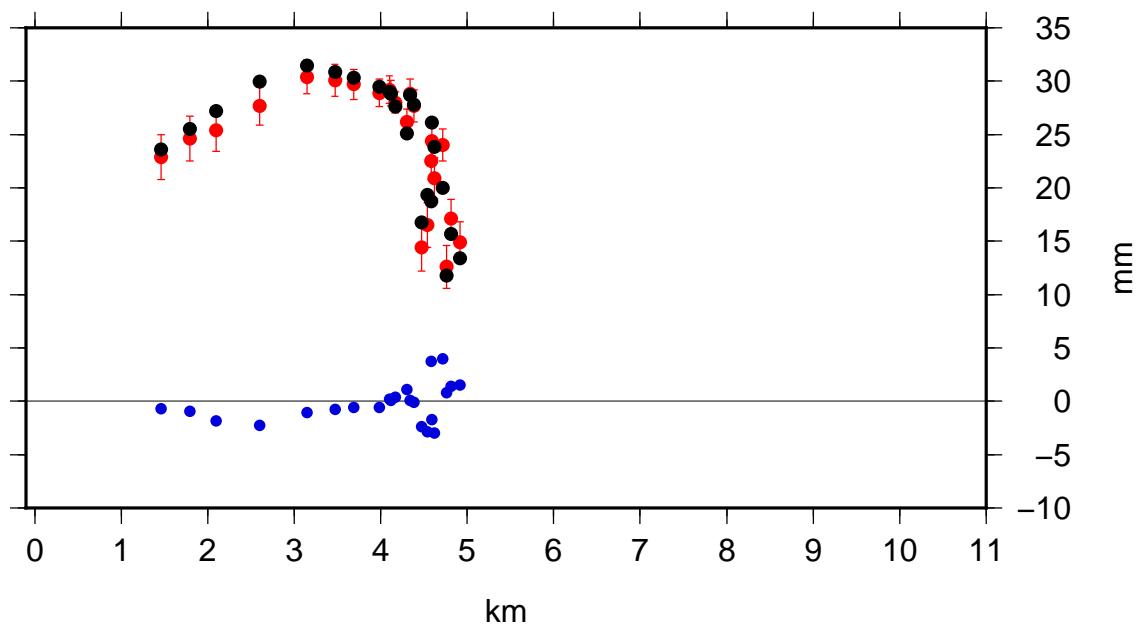
Code: Lv26 Time: 2002.622 – 2006.641

Model: sis1 Nrms: 0.403 Wrms: 0.625

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



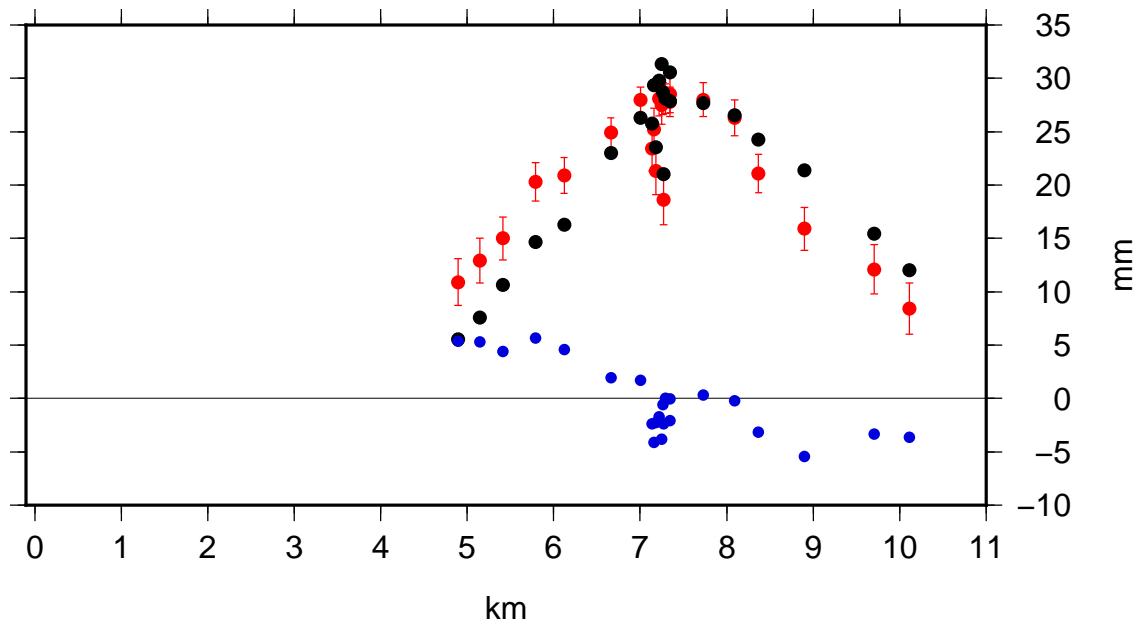
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



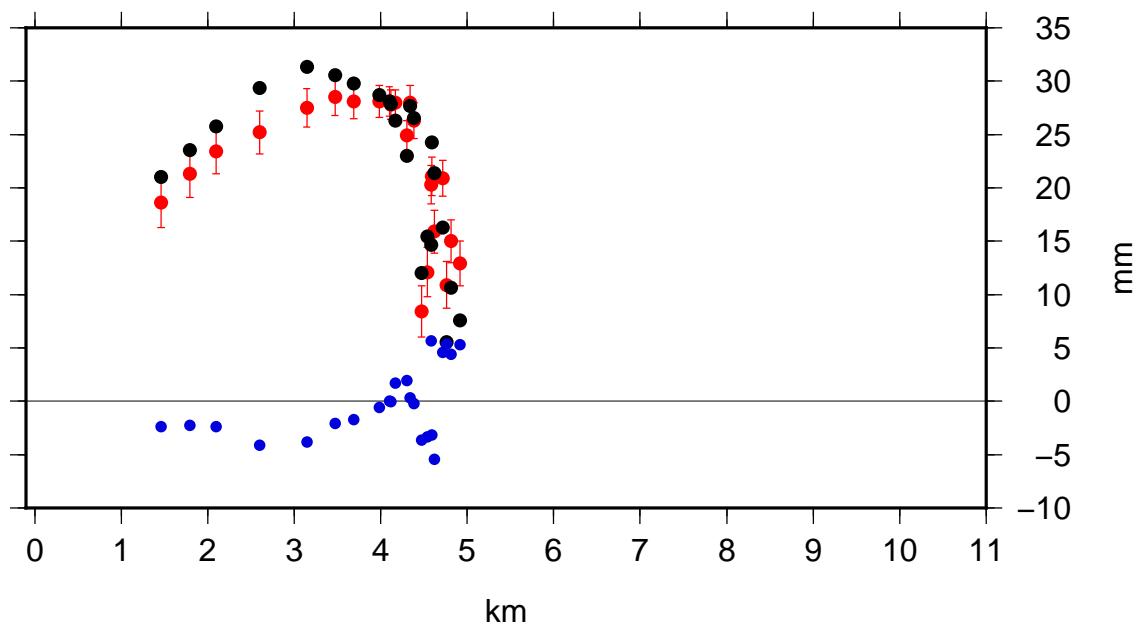
Code: Lv28 Time: 2002.622 – 2008.652

Model: sis1 Nrms: 2.446 Wrms: 4.259

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



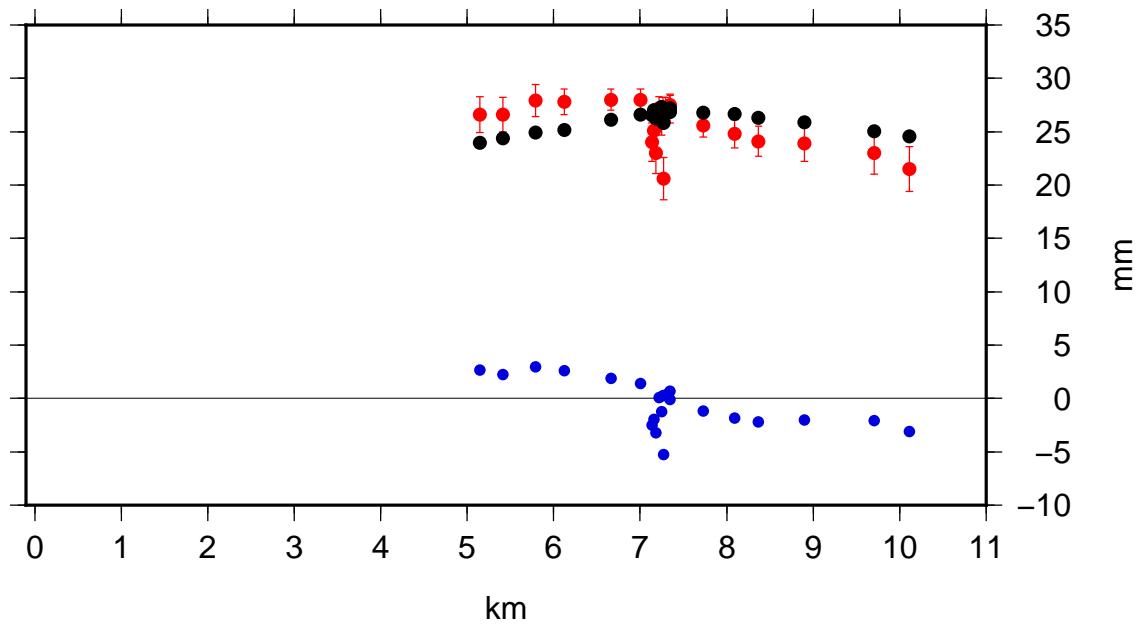
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



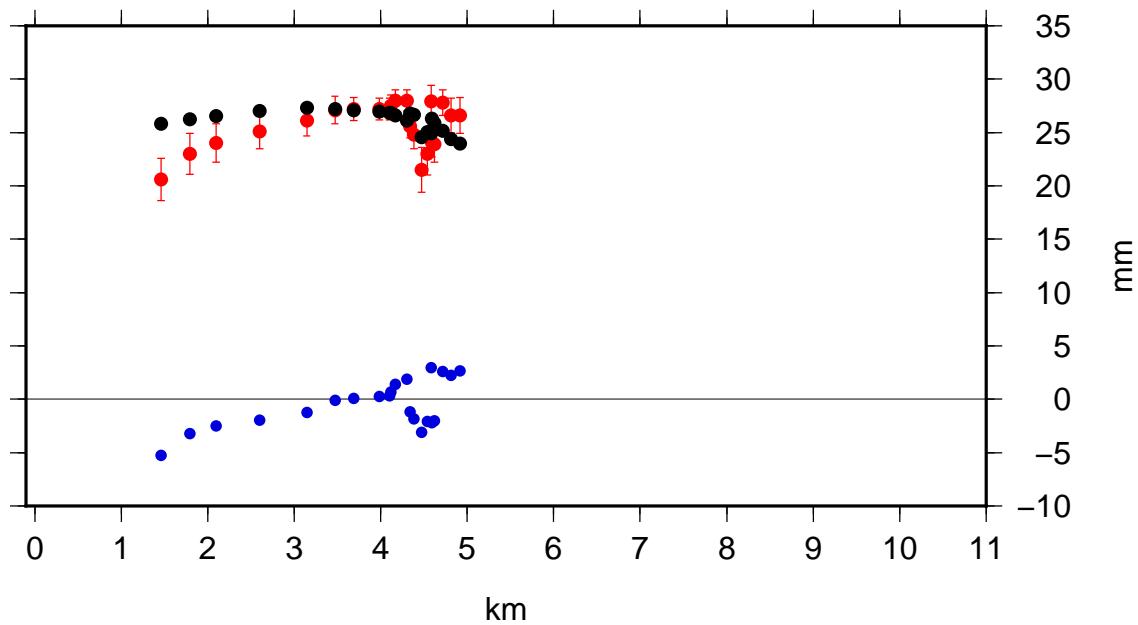
Code: Lv34 Time: 2003.693 – 2004.455

Model: sis1 Nrms: 1.565 Wrms: 2.053

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



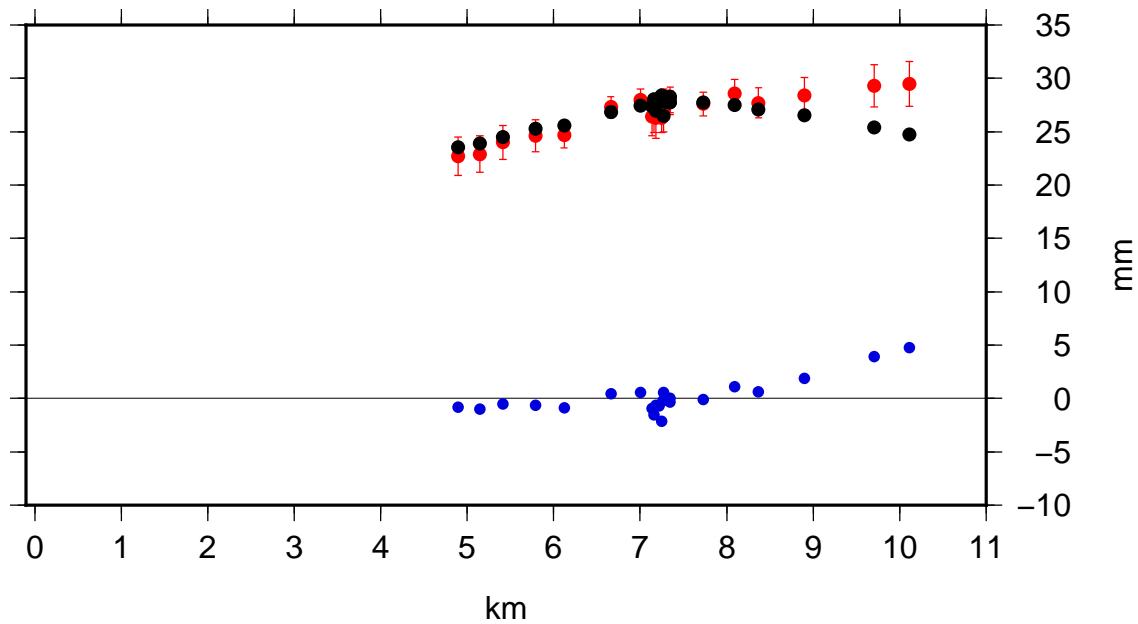
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



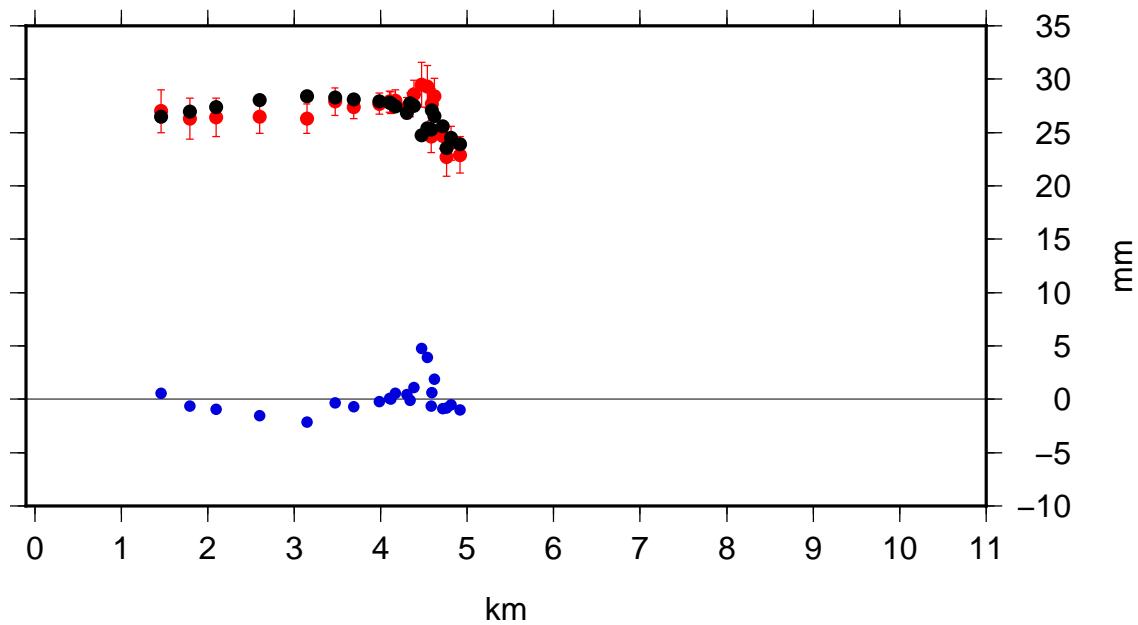
Code: Lv45 Time: 2004.455 – 2005.630

Model: sis1 Nrms: 0.460 Wrms: 0.610

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



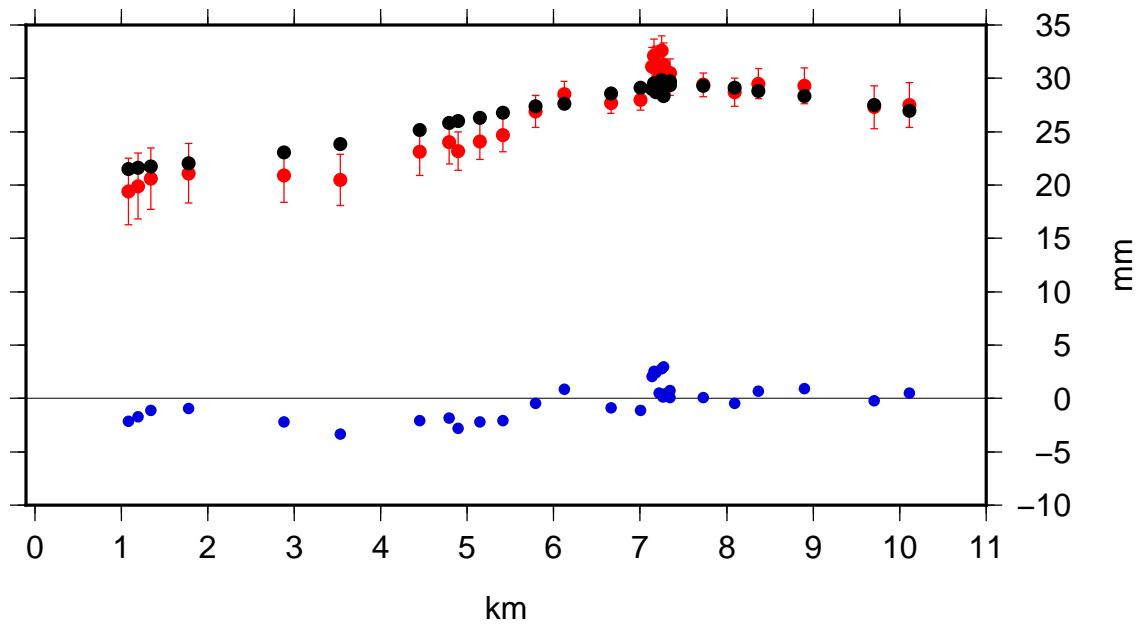
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



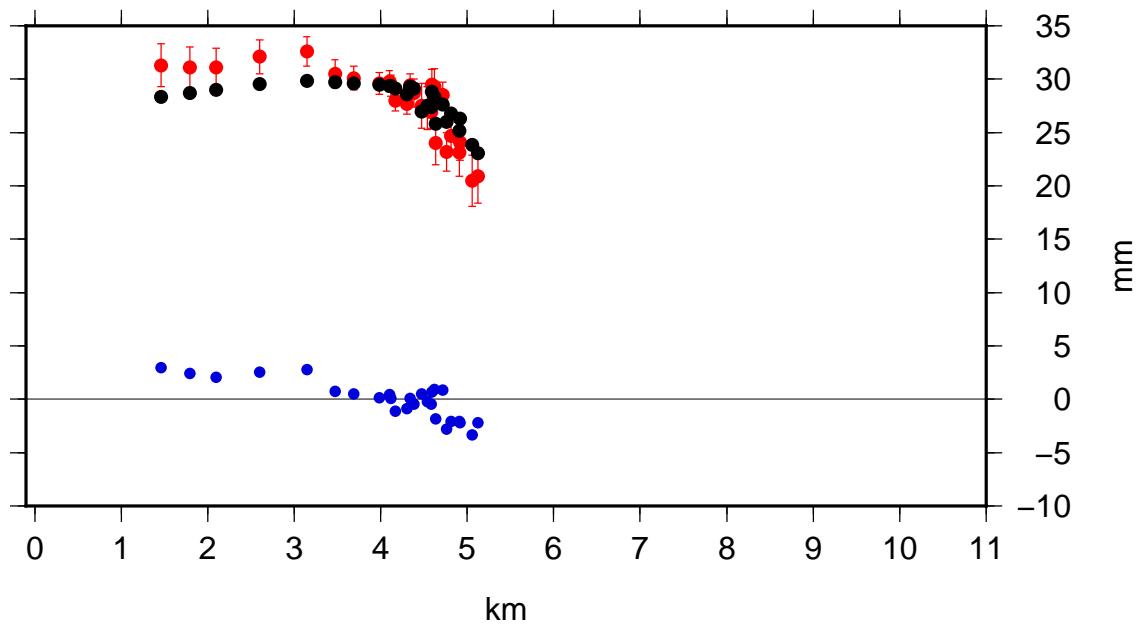
Code: Lv56 Time: 2005.630 – 2006.641

Model: sis1 Nrms: 0.682 Wrms: 1.002

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



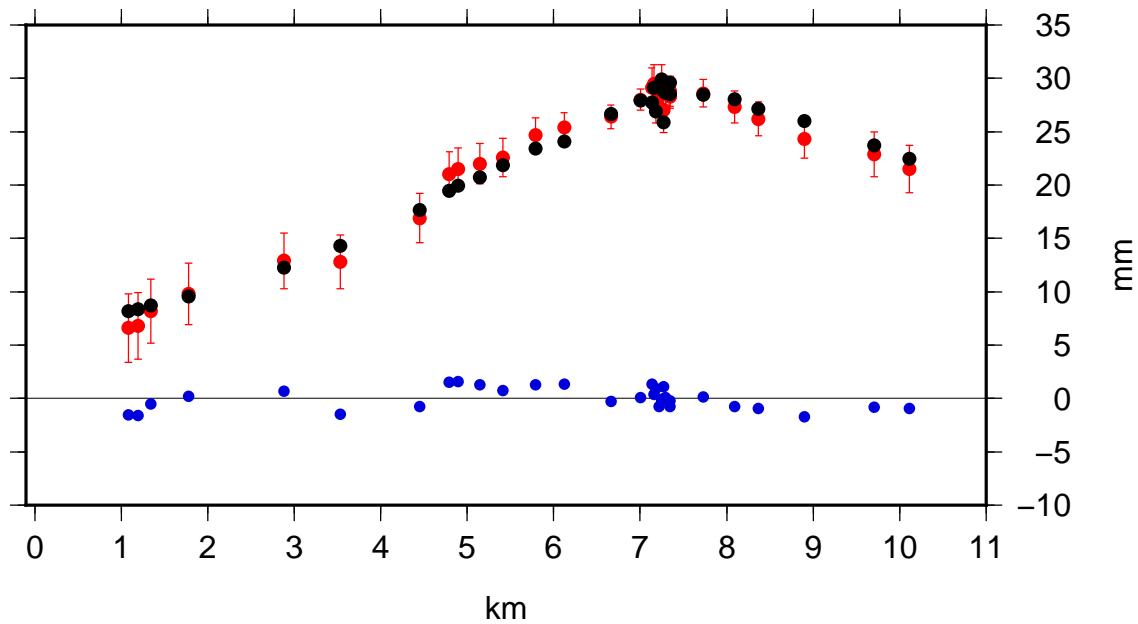
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



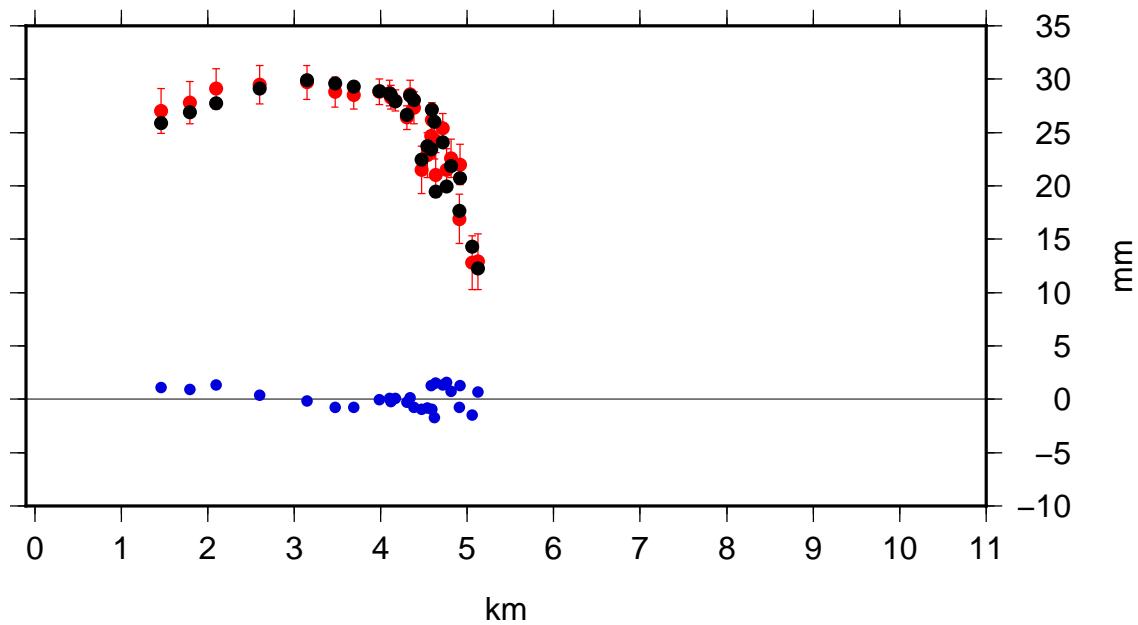
Code: Lv58 Time: 2005.630 – 2008.652

Model: sis1 Nrms: 0.489 Wrms: 0.798

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



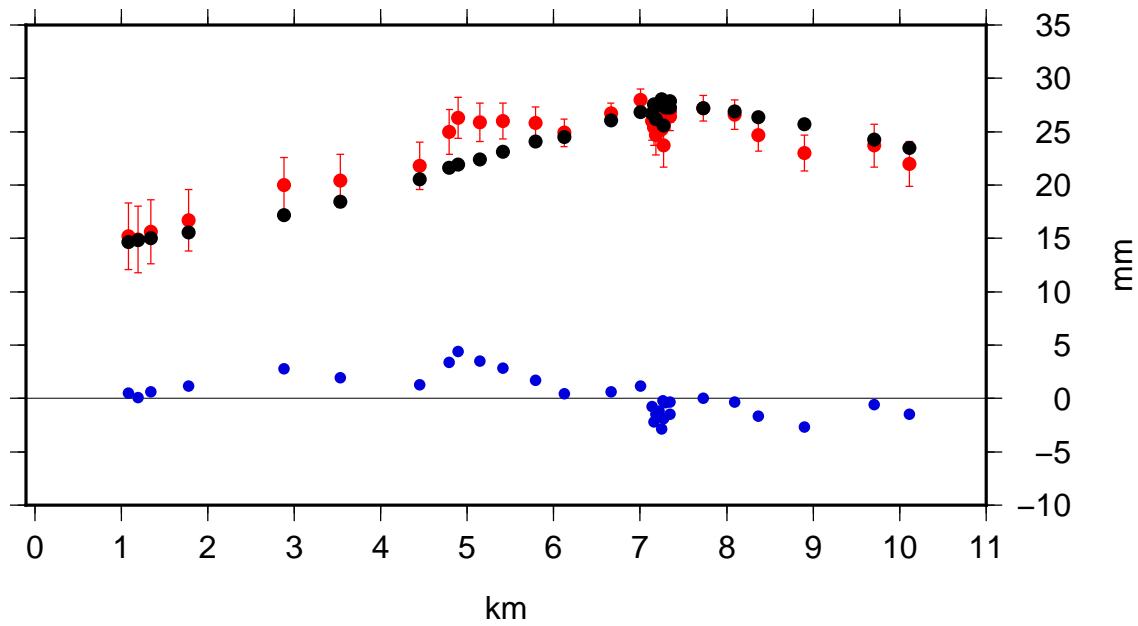
Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



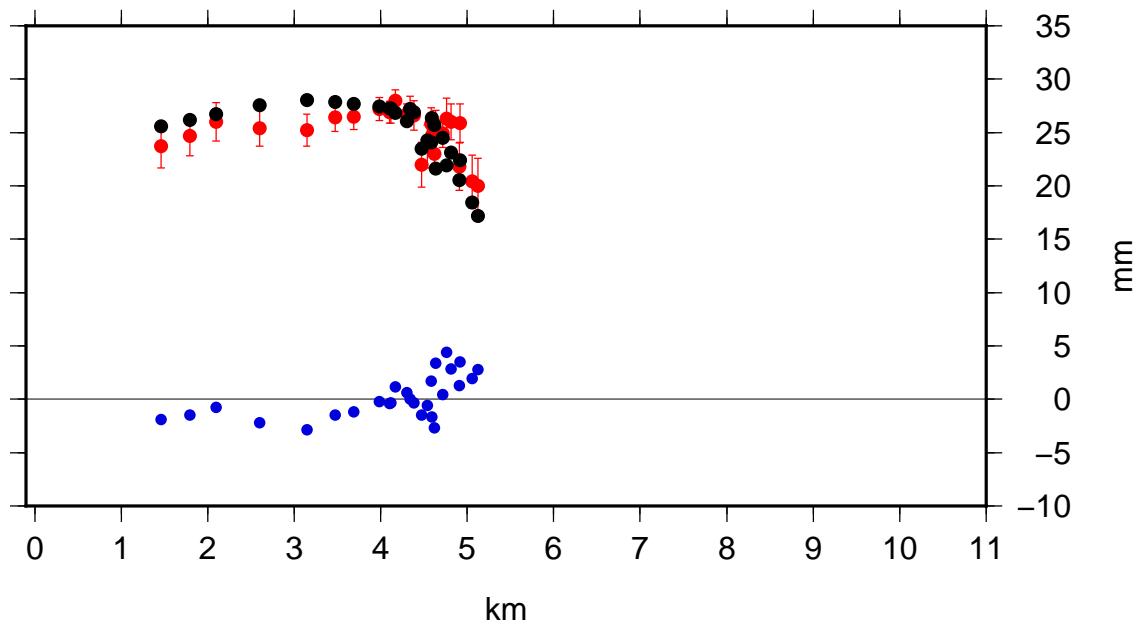
Code: Lv68 Time: 2006.641 – 2008.652

Model: sis1 Nrms: 0.169 Wrms: 0.258

Profile 2 Lon 238.1850 Lat 44.0300 Az 340.0 Hwdth 4.0 SN\_line



Profile 1 Lon 238.1200 Lat 44.0800 Az 78.0 Hwdth 4.0 WE\_line



**Figure S-7.** Leveling profiles for the line trending N20W (top panel) and N78E (bottom panel). Red dots are observations with 1-sigma error bars, black dots are calculated values and blue dots are residuals. Note that the vertical axis is arbitrarily shifted for clarity and only the relative uplift values matter. Legend gives the data file code (e.g., Lv23) and the times of the two occupations compared. Nrms is normalized RMS misfit and Wrms is weighted rms misfit. Site names are given in Figure 9 of the text.

**Table S-1.** List of interferograms used for this study. First letter of name: E - ERS, V - ENVISAT, R - RADARSAT-1, T - TerraSAR-X, S - Sentinel-1. Second letter is A for ascending, D for descending. *Ndata* is the number of samples taken from the interferogram by quadtree sampling and *Nrms* is the normalized RMS misfit for model sis1.

<b>Code</b>	<b>Time 1</b>	<b>Time2</b>	<b>Ndata</b>	<b>Nrms</b>
ED01	1992.450	1995.580	293	1.370
ED02	1992.546	1995.676	401	0.861
ED03	1992.546	1996.636	359	0.528
ED04	1992.641	1995.868	287	1.603
ED05	1992.737	1996.636	219	0.153
EA06	1993.565	1995.740	298	1.015
ED07	1993.651	1998.509	328	0.330
ED08	1993.651	1998.797	351	0.102
ED09	1993.695	1995.772	344	0.486
ED10	1993.843	1995.824	318	0.769
ED11	1993.843	1997.646	308	0.656
ED12	1995.676	1996.636	444	0.108
ED13	1995.728	1998.701	414	0.660
ED14	1995.728	1999.756	274	0.152
EA15	1995.738	1999.669	292	0.005
EA16	1995.740	2000.626	219	0.133
ED17	1995.868	1997.690	301	0.217
ED18	1996.636	1997.594	371	1.288
ED19	1996.637	2000.757	353	0.923
ED20	1997.646	2000.713	305	0.841
ED21	1997.679	2000.756	366	0.343
ED22	1998.553	1999.704	416	0.666
ED23	1998.605	1999.756	413	0.415
EA24	1999.617	2000.574	284	1.685
EA25	1999.669	2000.626	228	1.244
ED26	1999.756	2000.713	395	1.129
ED27	1999.756	2001.671	407	1.031
ED28	2000.713	2001.767	320	0.745
EA29	2000.766	2004.790	313	0.828
RA30	2000.812	2002.784	140	0.519
RA31	2000.812	2003.639	117	1.546
RA32	2002.652	2003.671	269	1.516
VD33	2003.493	2007.599	350	0.387

RA34	2003.639	2005.608	305	0.217
RA35	2003.704	2004.689	219	1.419
VA36	2004.695	2009.486	241	0.052
VA37	2004.695	2010.636	285	0.687
VD38	2004.737	2006.750	424	0.692
VA39	2004.747	2005.513	342	0.424
VA40	2004.747	2006.760	294	0.959
VA41	2005.513	2006.760	305	0.586
VD42	2005.599	2007.517	396	1.041
VA43	2006.664	2009.634	298	1.035
VA44	2006.776	2009.554	248	1.416
VA45	2006.803	2008.719	315	0.720
VA46	2007.527	2008.580	313	0.054
VA47	2007.666	2010.732	289	0.484
VD48	2008.518	2010.723	336	0.267
VA49	2008.528	2010.540	326	1.322
VA50	2008.580	2010.592	328	0.449
VD51	2008.666	2010.679	430	0.394
TD52	2012.643	2014.631	383	1.764
SD53	2015.438	2016.817	368	0.228
SA54	2015.477	2017.825	255	0.161
SD55	2015.504	2018.690	361	0.686
SD56	2016.424	2017.770	327	0.113
SA57	2017.496	2018.877	237	0.042
SD58	2017.507	2018.855	345	0.292
SD59	2018.427	2019.874	389	0.079
SA60	2018.515	2019.896	321	0.085
SA61	2018.515	2020.749	307	0.996
SA62	2019.436	2020.749	305	0.344
SD63	2019.447	2020.760	422	0.387

**Table S-2.** GPS station HUSB equipment changes

<b><i>Equipment</i></b>	<b><i>Serial Number</i></b>	<b><i>Start</i></b>	<b><i>End</i></b>
Receiver			
Trimble 4700	220213986	2001-05-24	2003-05-20
Trimble 4700	220290947	2003-05-20	2004-03-28
Trimble 5700	220316024	2004-03-28	2010-08-08
Trimble NetRS	4850161902	2010-08-08	2018-08-08
Javad Sigma	623	2018-08-08	present
Antenna			
Trimble Choke Ring	220227651	2001-05-24	2018-08-08
Javad RINGANT_DM	553	2018-08-08	present

**Table S-3.** List of semipermanent GPS (SPGPS) stations used in this study. *Year* is the first year of observation. For additional information, including time series data, see:  
<https://earthquake.usgs.gov/monitoring/gps/Sisters>.

<b>Station ID</b>	<b>Year</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Elevation (m)</b>
BLNP	2013	44.24579	238.15020	1521.78
CUT2	2009	44.08525	238.17483	1812.69
GBN1	2009	44.56458	238.56071	0864.90
GBN2	2009	44.55924	238.43472	1270.66
GBN3	2009	44.54840	238.28742	1143.55
GBN4	2009	44.56805	237.89786	1342.49
GBN5	2009	44.60215	237.76398	1329.37
GBN6	2009	44.42487	238.57713	0823.65
LINL	2013	44.17859	238.09734	1213.45
POTH	2009	44.09688	237.96019	1408.70
SQAW	2009	44.19244	238.34951	1406.96
SYNC	2009	44.02386	238.22332	1649.43
TAMR	2009	44.08980	238.38043	2166.56
WHBR	2009	44.16317	238.02140	0688.33

**Table S-4.** Default noise amplitudes in USGS time series (from Murray and Svare, 2017)

<b>cGPS data</b>	<b>East</b>	<b>North</b>	<b>Vertical</b>
White noise (mm)	0.84	0.85	3.2
Flicker noise (mm/yr <sup>0.25</sup> )	1.4	1.7	6.4
Random walk noise (mm/yr <sup>0.5</sup> )	0.6	0.5	0.5
<b>sGPS data</b>			
White noise (mm)	2.0	2.0	6.0
Flicker noise (mm/yr <sup>0.25</sup> )	1.0	1.0	3.0
Random walk noise (mm/yr <sup>0.5</sup> )	2.0	2.0	6.0

**Table S-5.** Noise amplitudes from cGPS station HUSB time series analysis

	<b>East</b>	<b>North</b>	<b>Vertical</b>
White noise (mm)	0.68	0.63	2.8
Flicker noise (mm/yr <sup>0.25</sup> )	2.0	2.2	8.0
Random walk noise (mm/yr <sup>0.5</sup> )	0.6	0.5	0.5

**Table S-6.** Leveling data list. *Ndata* is the number of samples and *Nrms* is the normalized RMS misfit for model sis1.

<b>Code</b>	<b>Time 1</b>	<b>Time 2</b>	<b>Ndata</b>	<b>Nrms</b>
Lv23	2002.622	2003.693	22	1.423
Lv24	2002.622	2004.455	23	2.510
Lv25	2002.622	2005.630	23	1.960
Lv26	2002.622	2006.641	23	0.425
Lv28	2002.622	2008.652	23	2.473
Lv34	2003.693	2004.455	22	1.566
Lv45	2004.455	2005.630	23	0.446
Lv56	2005.630	2006.641	31	0.697
Lv58	2005.630	2008.652	31	0.502
Lv68	2006.641	2008.652	31	0.171