```
% Homework 08     Javier Colton & Curtis Crandall
```

Part 1

```
clc
clear all

allGPS

% Do the histograms make sense?
% The histograms do make sense. They have a degree of fit trends with
 the
% different movement directions. North has the best fit and Vertical
 has
% the least best fit. The stacked bar representation makes this easy
 to
% see.

% Is there anthing strage in the histograms?
% The only strange thing is how poorley fit the vertical moevement is
% compared to North and East

% Would it be usefull to change the histogram bin size?
% The bin size is almost reflective of the error size within the fit.
 Yes,
% the bins can visually represent the residual data.

% What kind of model represents the residual data?
% The residual data follos gausian distribution.


h =

  Figure (19) with properties:

      Number: 19
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [488 342 560 420]
       Units: 'pixels'

  Use GET to show all properties


h =

  Figure (21) with properties:

      Number: 21
        Name: ''
       Color: [0.9400 0.9400 0.9400]
```

```
    Position: [488 342 560 420]
       Units: 'pixels'

  Use GET to show all properties


h =

  Figure (23) with properties:

      Number: 23
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [488 342 560 420]
       Units: 'pixels'

  Use GET to show all properties


h =

  Figure (25) with properties:

      Number: 25
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [488 342 560 420]
       Units: 'pixels'

  Use GET to show all properties


h =

  Figure (27) with properties:

      Number: 27
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [488 342 560 420]
       Units: 'pixels'

  Use GET to show all properties


h =

  Figure (29) with properties:

      Number: 29
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [488 342 560 420]
       Units: 'pixels'
```

```
  Use GET to show all properties
```

```
h =

  Figure (31) with properties:

      Number: 31
        Name: ''
       Color: [0.9400 0.9400 0.9400]
    Position: [488 342 560 420]
       Units: 'pixels'

  Use GET to show all properties
```

```
Etable =
```

Station	East_poly_cm_yr_	East_HW7_cm_yr_	Diff__cm_yr_
'ana1'	-4.08	-4.07	0.01
'bbdm'	-4.1	-4.09	0.01
'cirx'	-3.97	-3.96	0.01
'cmp9'	-3.64	-3.67	-0.03
'dam2'	-3.64	-3.63	0.01
'kbrc'	-3.87	-3.87	0
'p729'	-4.1	-4.18	-0.08

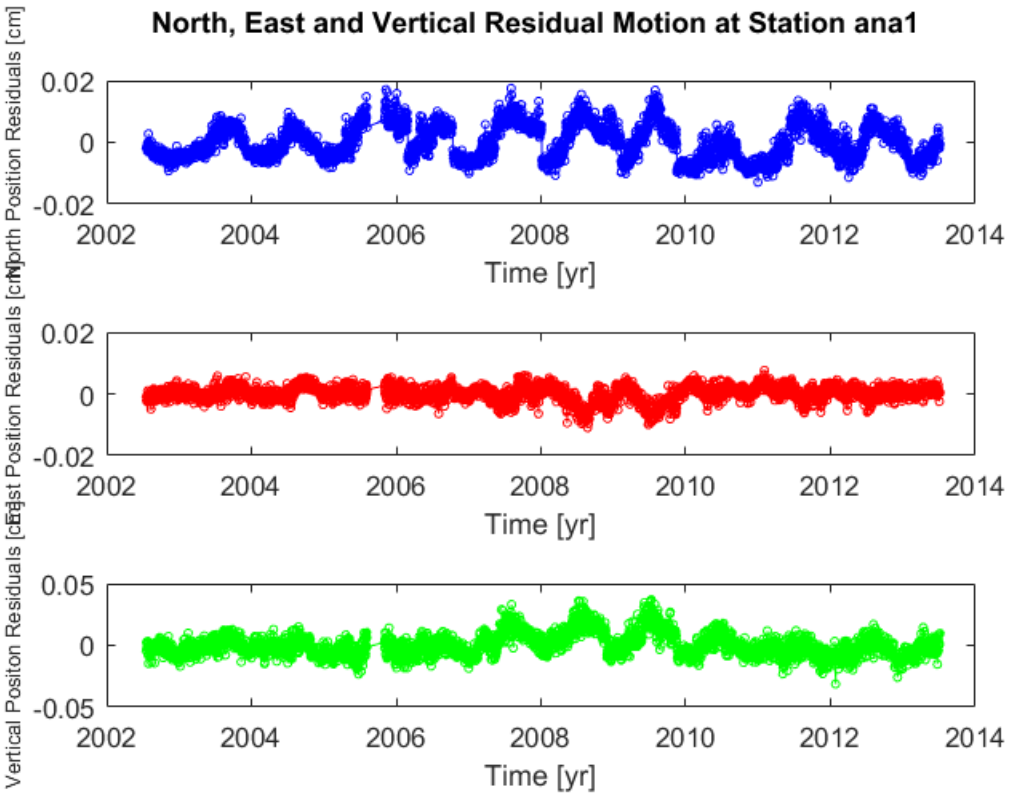
```
Ntable =
```

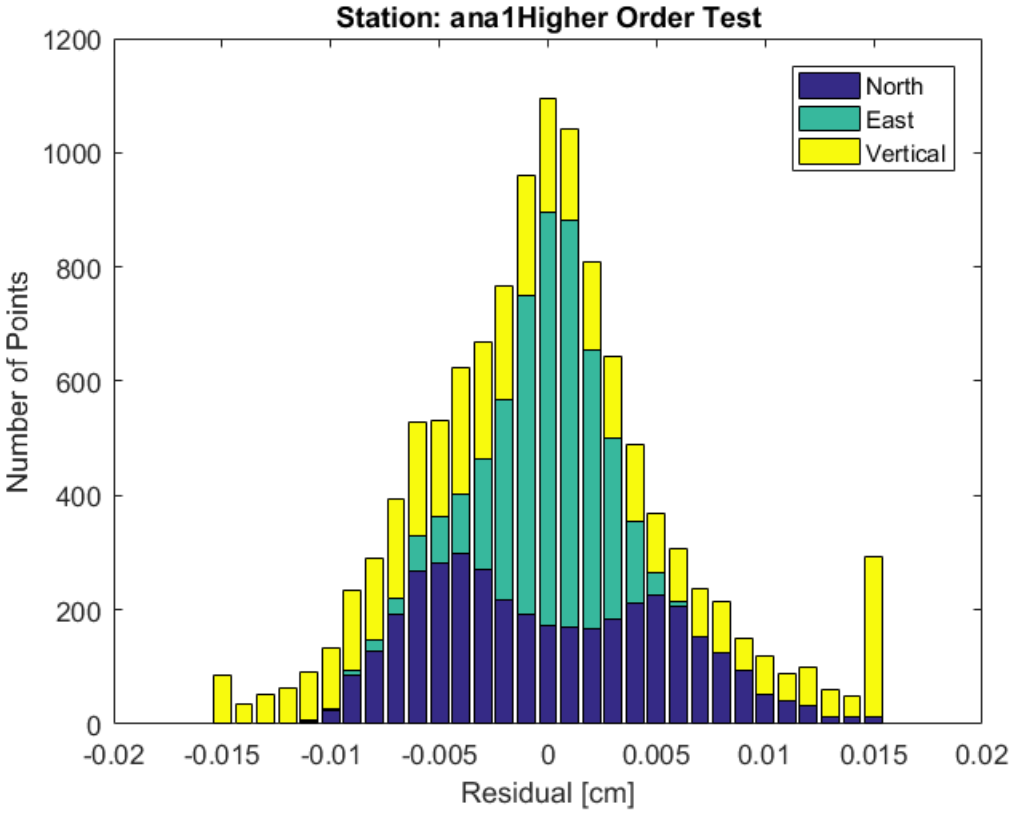
Station	North_poly_cm_yr_	North_HW7_cm_yr_	Diff__cm_yr_
'ana1'	2.2148	2.22	0.0052
'bbdm'	2.0346	2.02	-0.0146
'cirx'	1.9719	2	0.0281
'cmp9'	1.3429	1.38	0.0371
'dam2'	1.3365	1.34	0.0035
'kbrc'	1.2675	1.28	0.0125
'p729'	1.93	1.87	-0.06

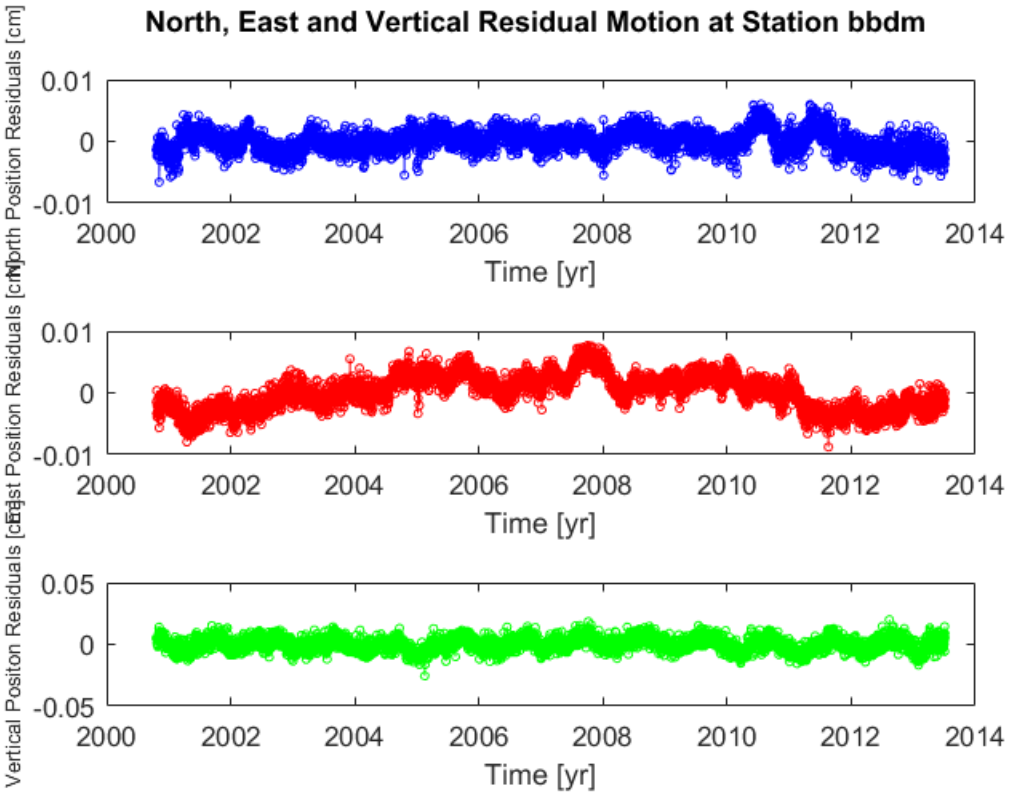
```
Vtable =
```

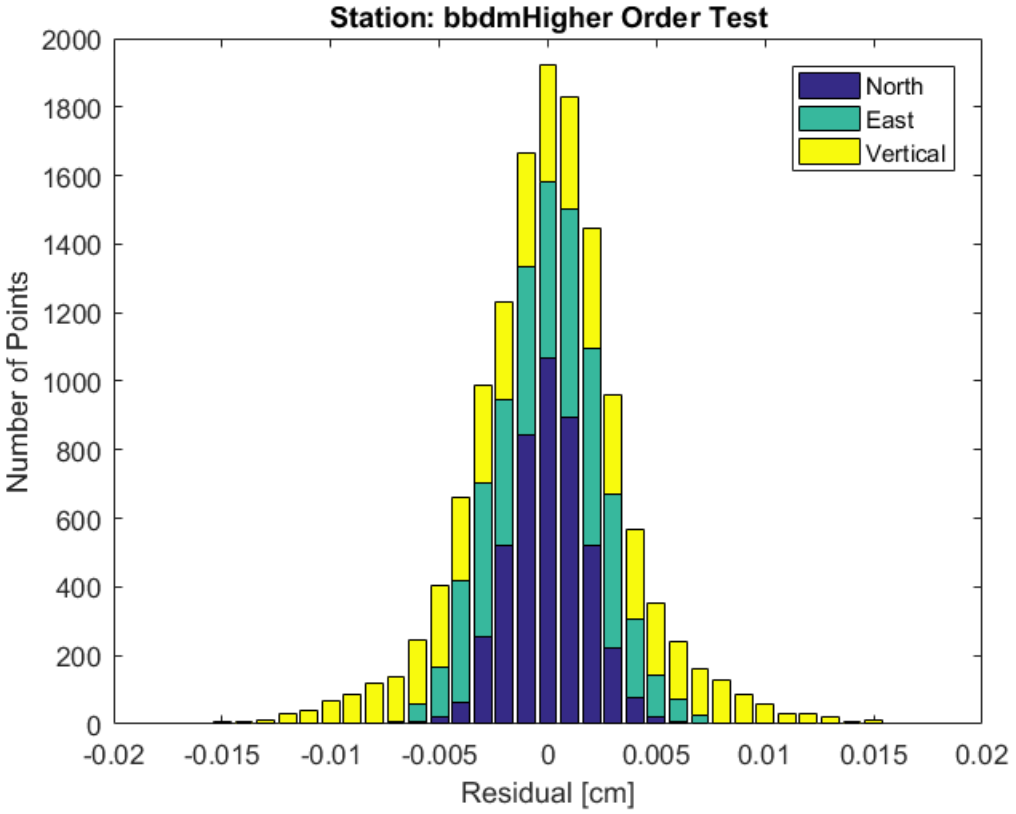
Station	Vert_poly_cm_yr_	Vert_HW7_cm_yr_	Diff__cm_yr_
'ana1'	0.0006	0.127	0.1264
'bbdm'	0.066	0.068	0.002
'cirx'	-0.0272	0.0245	0.0517
'cmp9'	-0.0281	0.0908	0.1189

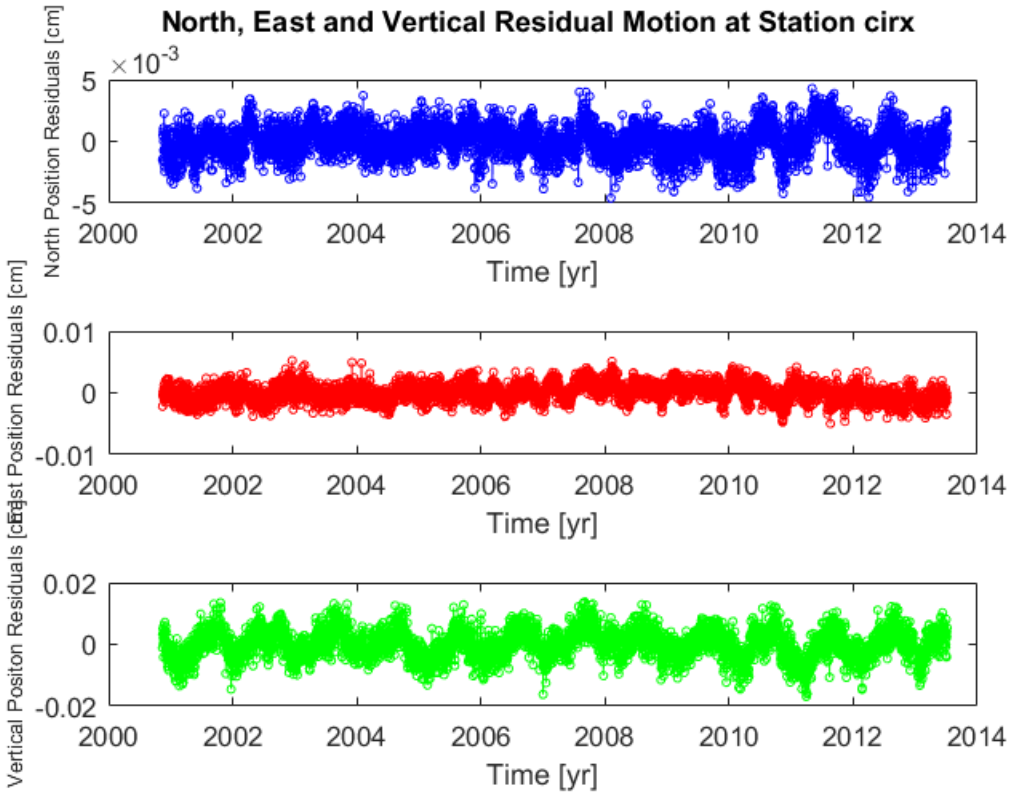
```
'dam2'      0.0557          0.05          -0.0057
'kbrc'     -0.0401         0.015           0.0551
'p729'     -0.3295         -0.45          -0.1205
```

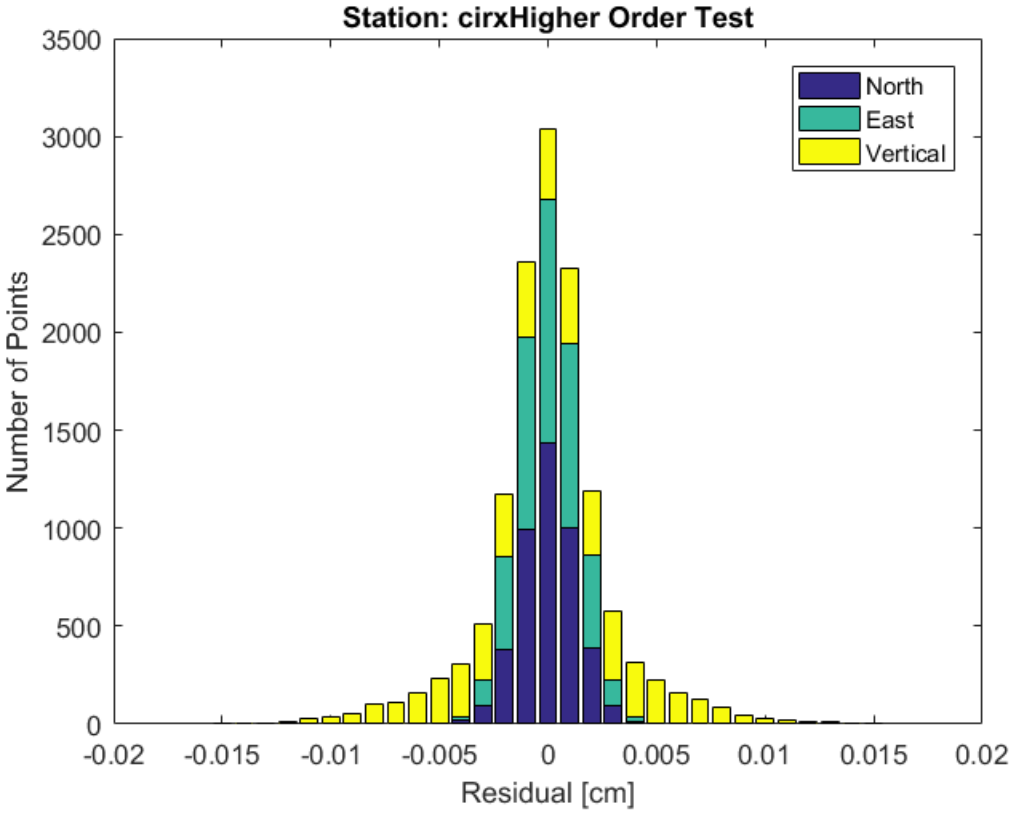


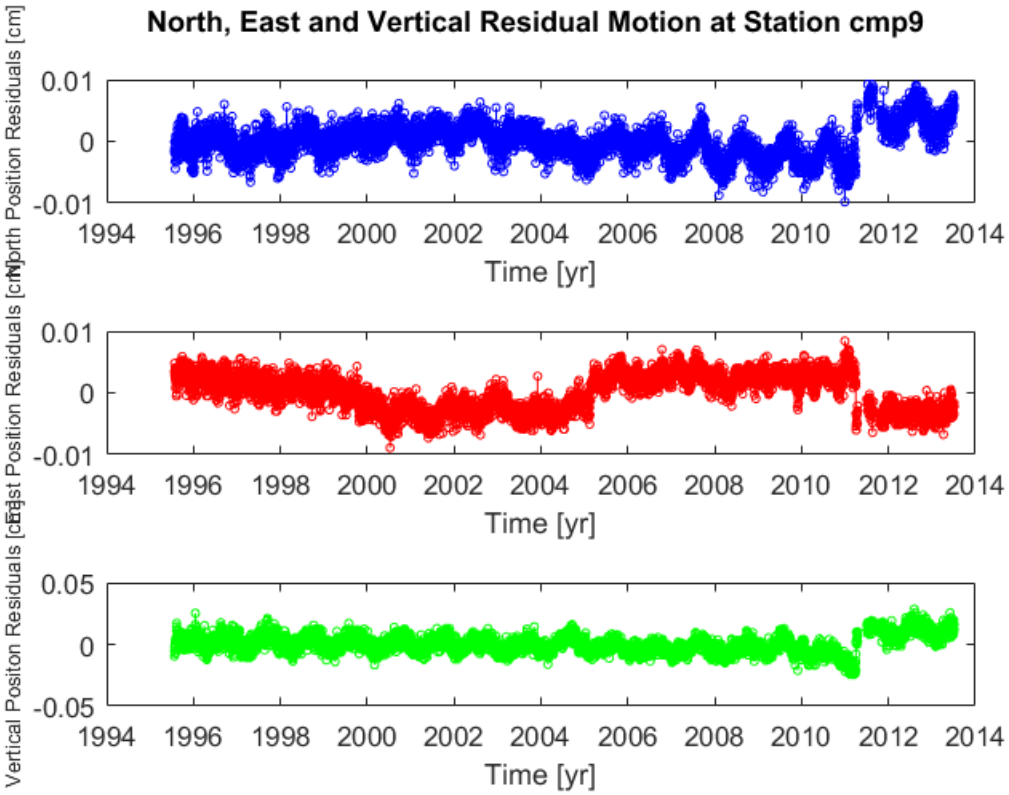

Station: ana1Higher Order Test
North
East
Vertical
Number of Points
Residual [cm]

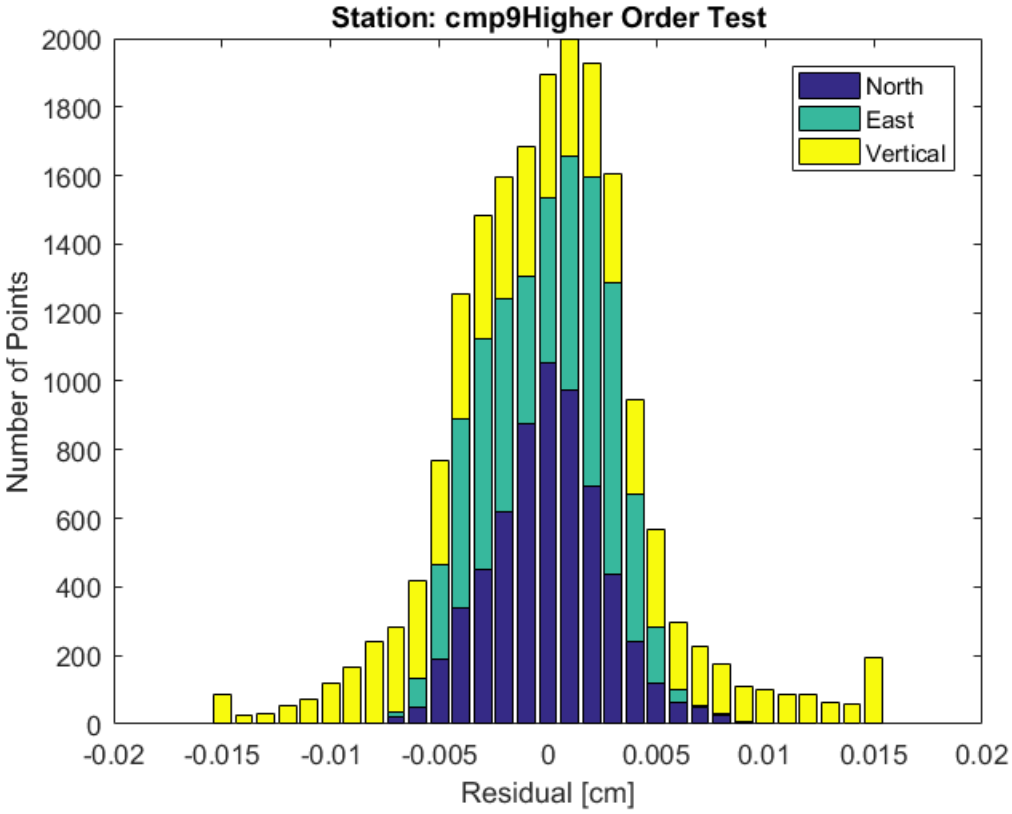

North, East and Vertical Residual Motion at Station bbdm
North Position Residuals [cm]
East Position Residuals [cm]
Vertical Positon Residuals [cm]
Time [yr]

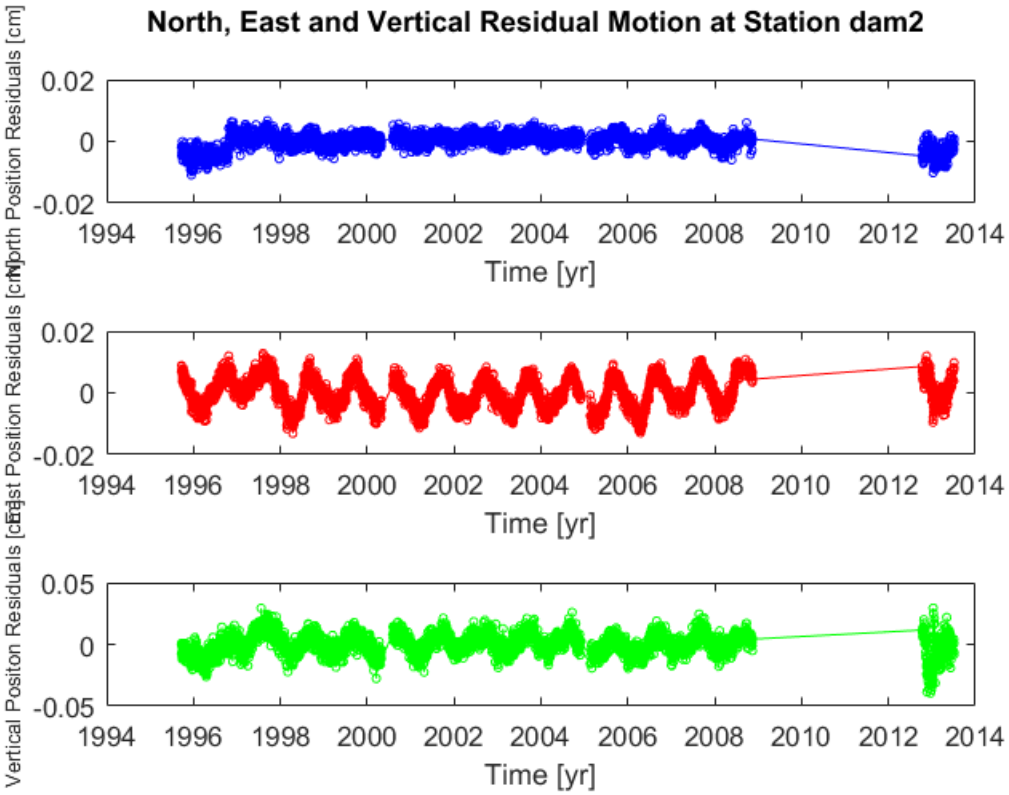

Station: bbdmHigher Order Test
North
East
Vertical
Number of Points
Residual [cm]

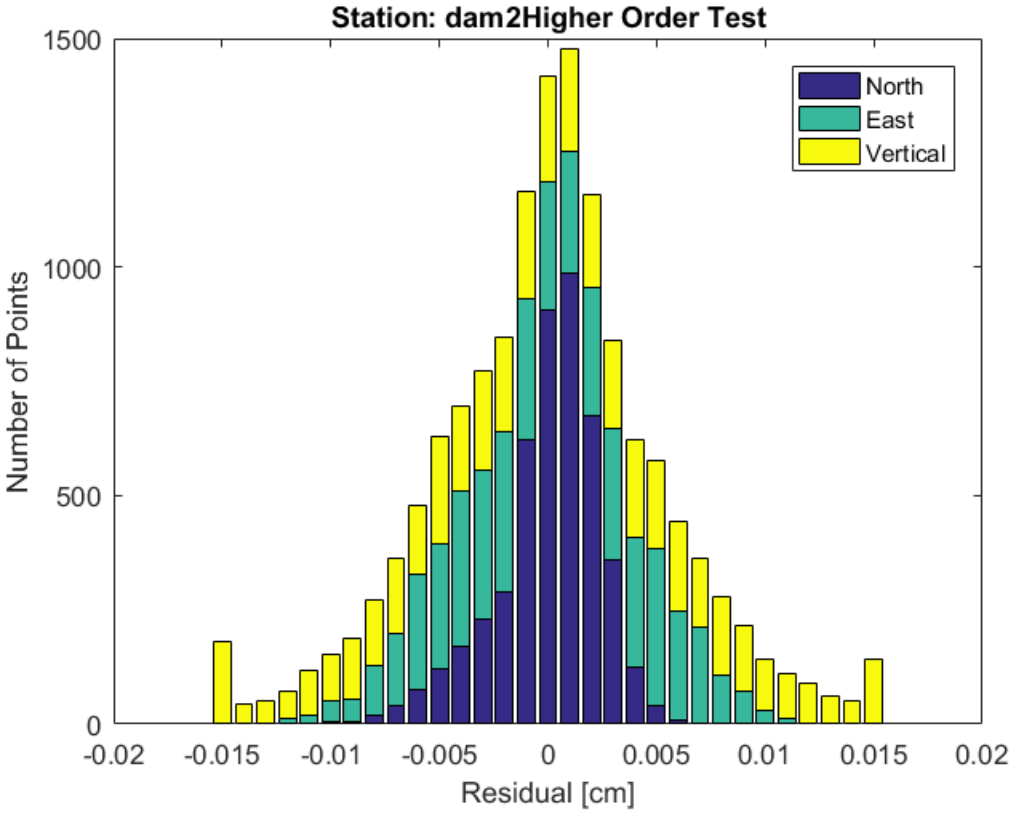

North, East and Vertical Residual Motion at Station cirx
North Position Residuals [cm]
East Position Residuals [cm]
Vertical Positon Residuals [cm]
Time [yr]

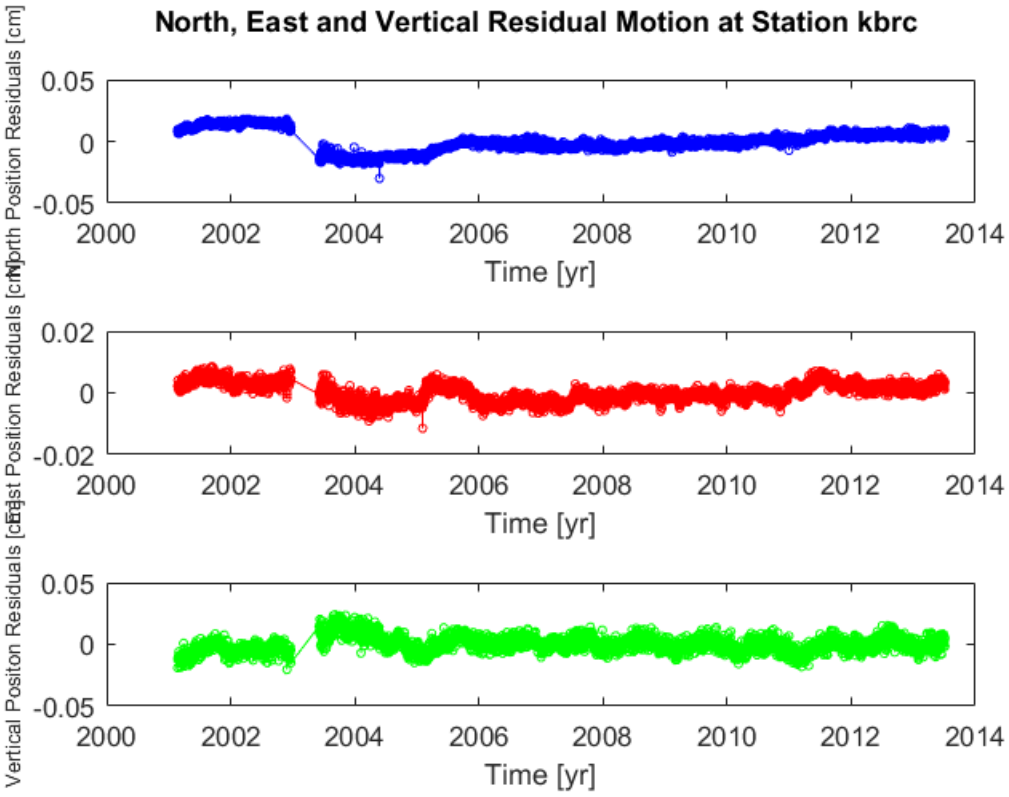

Station: cirxHigher Order Test
North
East
Vertical
Number of Points
Residual [cm]

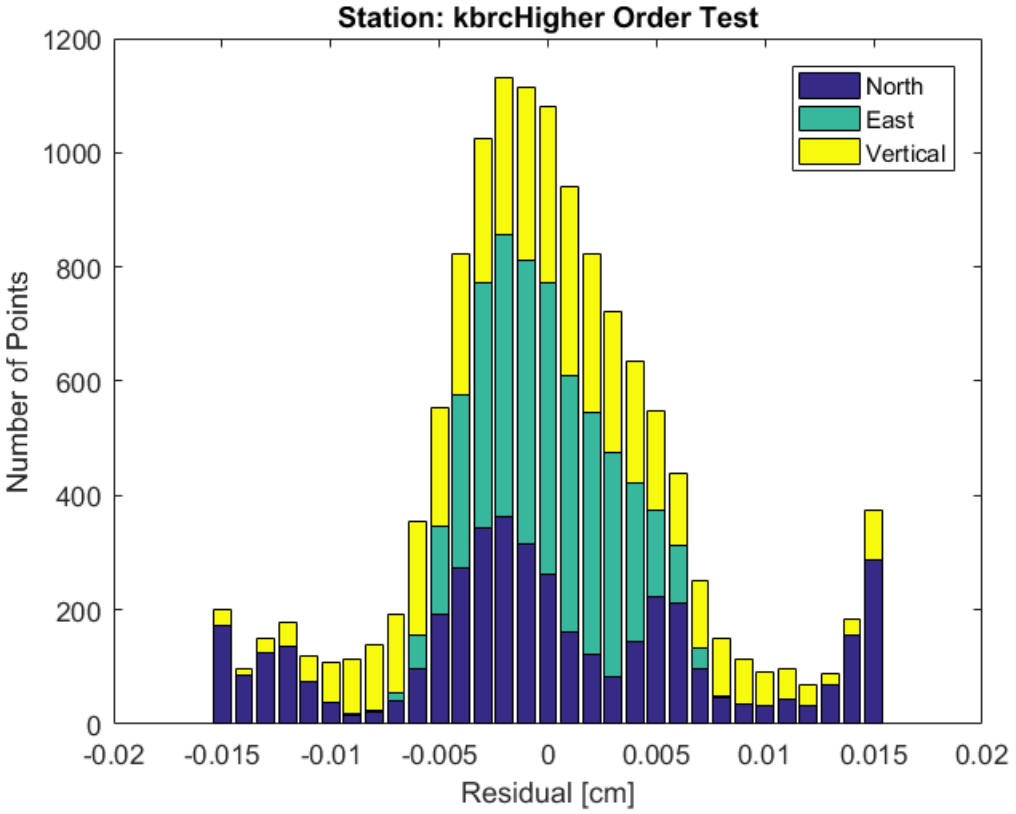

North, East and Vertical Residual Motion at Station cmp9
North Position Residuals [cm]
East Position Residuals [cm]
Vertical Positon Residuals [cm]
Time [yr]

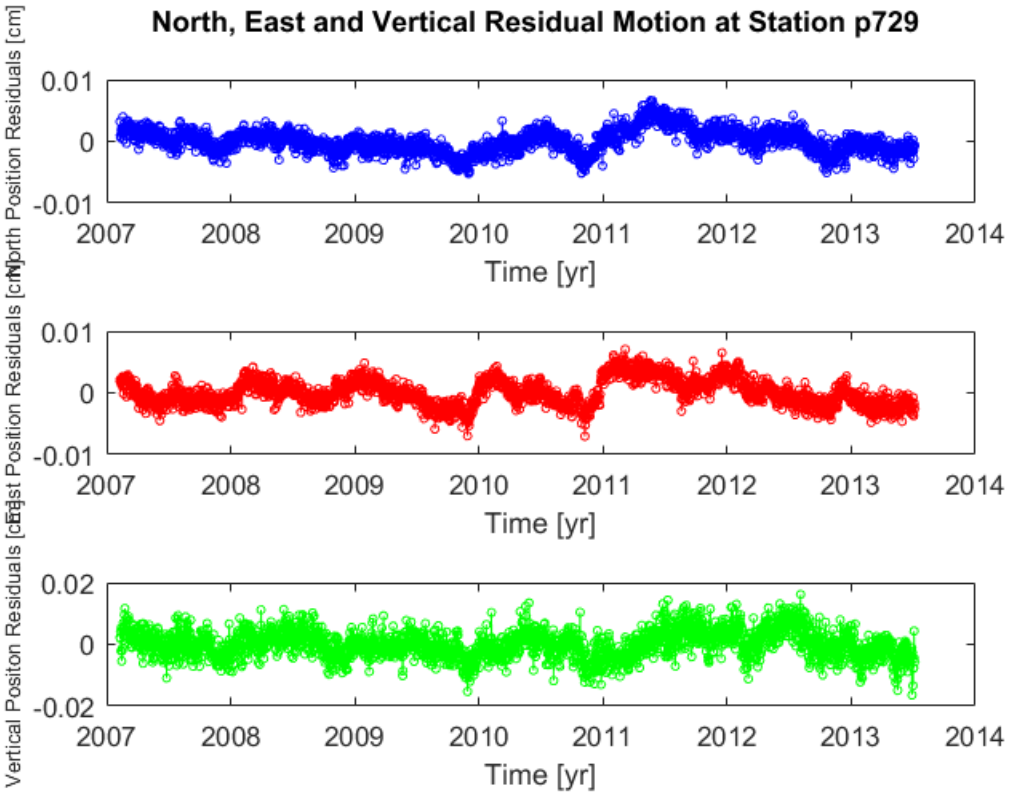

Station: cmp9Higher Order Test
North
East
Vertical
Number of Points
Residual [cm]

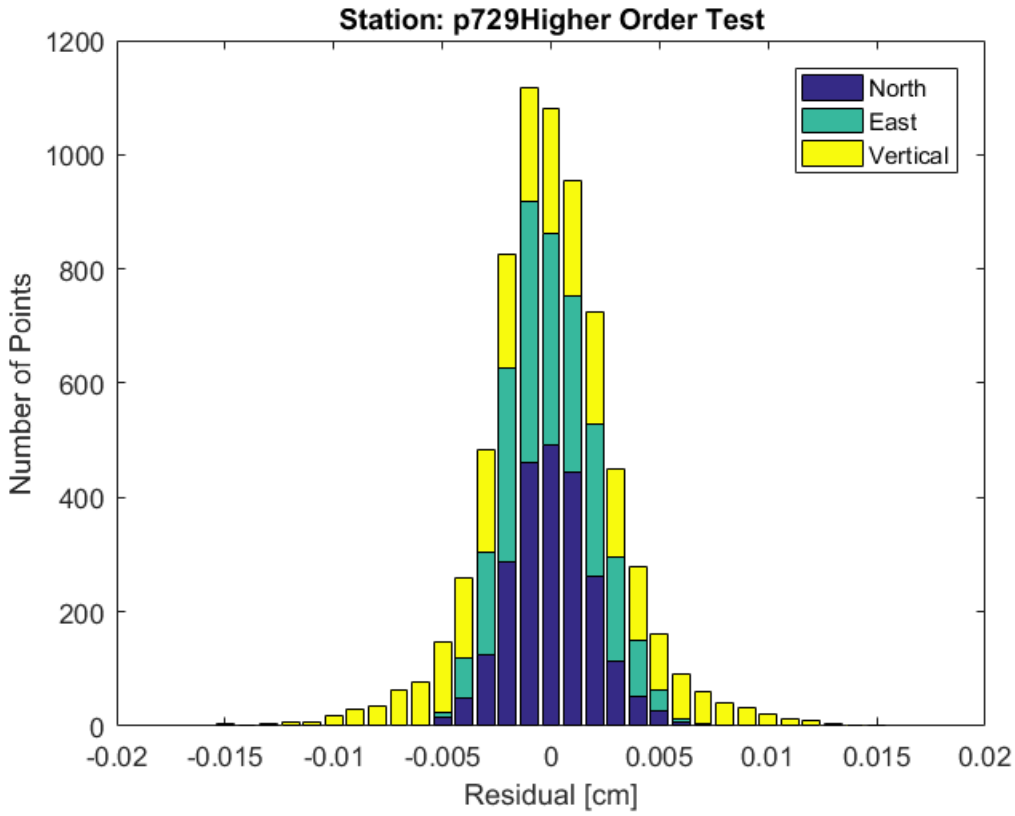

North, East and Vertical Residual Motion at Station dam2
North Position Residuals [cm]
East Position Residuals [cm]
Vertical Positon Residuals [cm]
Time [yr]


Station: dam2Higher Order Test
North
East
Vertical
Number of Points
1500
1000
500
0
-0.02
-0.015
-0.01
-0.005
0
0.005
0.01
0.015
0.02
Residual [cm]


North, East and Vertical Residual Motion at Station kbrc
North Position Residuals [cm]
East Position Residuals [cm]
Vertical Positon Residuals [cm]
0.05
0
-0.05
0.02
-0.02
2000
2002
2004
2006
2008
2010
2012
2014
Time [yr]


Station: kbrcHigher Order Test
North
East
Vertical
Number of Points
Residual [cm]


North, East and Vertical Residual Motion at Station p729
North Position Residuals [cm]
East Position Residuals [cm]
Vertical Positon Residuals [cm]
Time [yr]

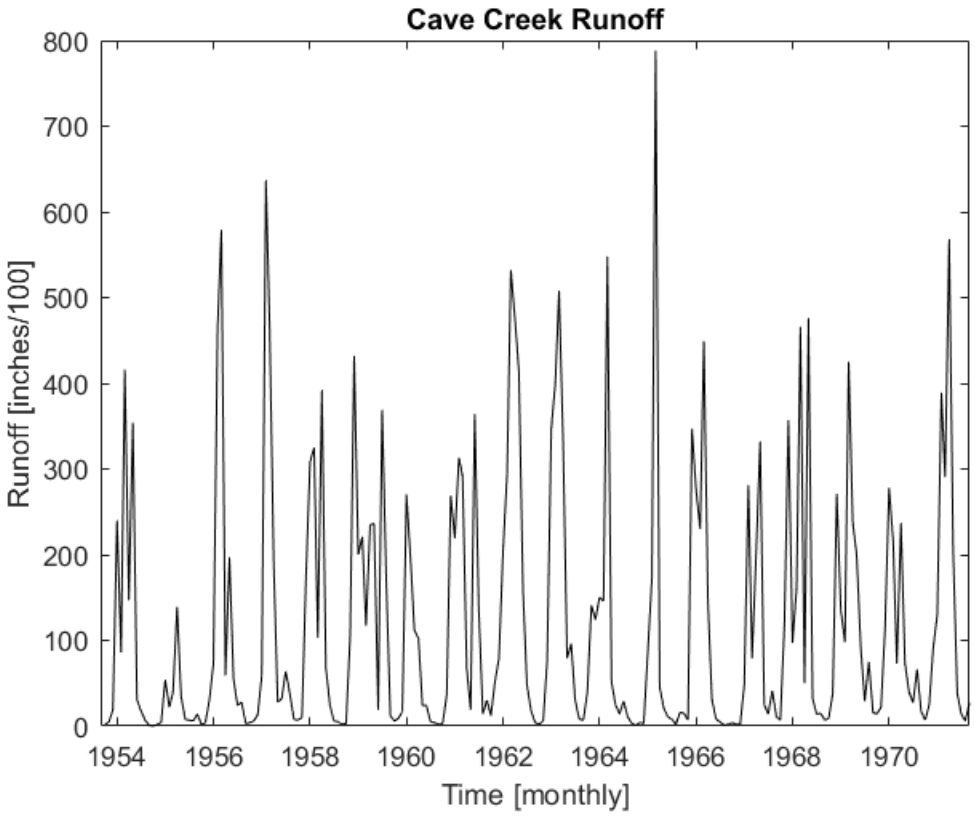


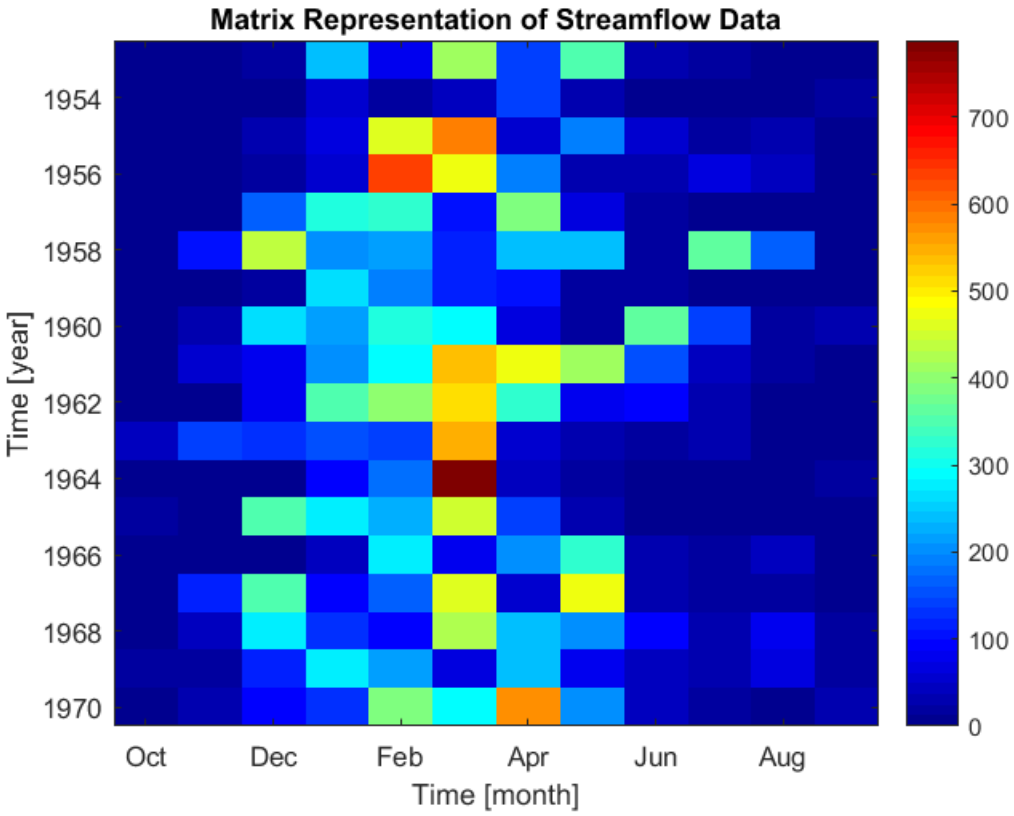
Part 2

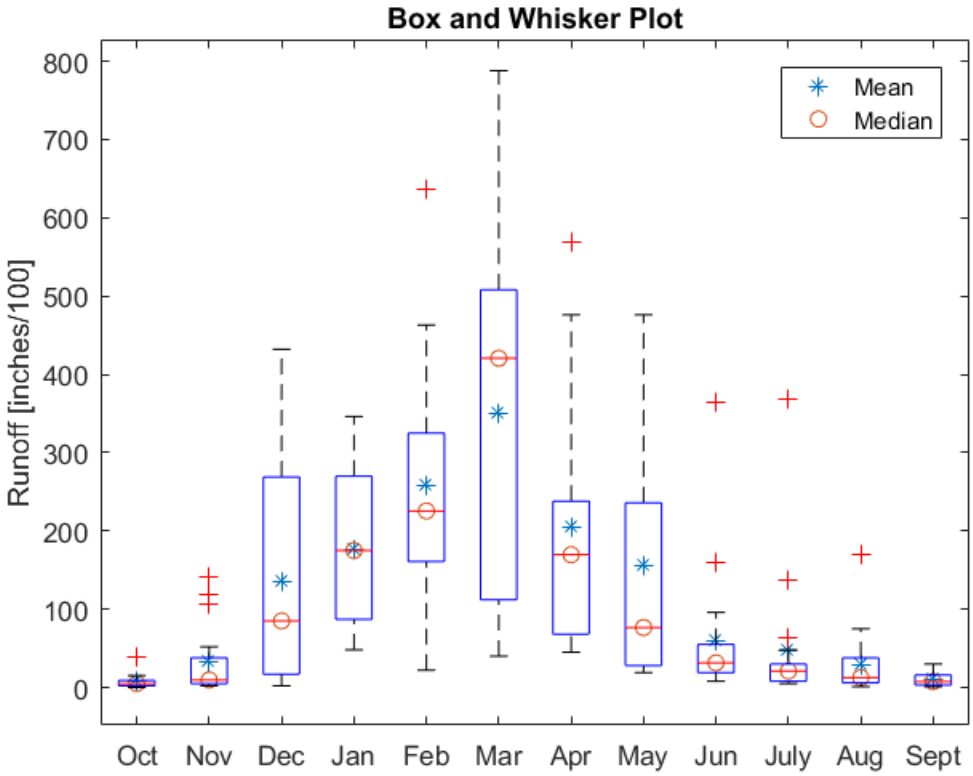
```
load('cavecreek.txt')
%caveCreekArray=importdata('cavecreek.txt');
timeArray=datetime(1953,10,01):calmonths(1):datetime(1971,09,30);

figure;
plot(timeArray,cavecreek,'k')
xlabel('Time [monthly]');
ylabel('Runoff [inches/100]');
title('Cave Creek Runoff');

% Why do we need t sort the data?
% This is becuase it is water year format. So, in order to plot in
 annual
% or chronological order, the data has to be in annual or
 chronological
% order.

timeArrayCol= transpose(cavecreek);
T = reshape(cavecreek,[12,18]);
Tnew = transpose(T);

h2=figure;
imagesc(Tnew)
```

```
c=colorbar;
colormap('jet')
xlabel('Time [month]');
ylabel('Time [year]');
title('Matrix Representation of Streamflow Data');
xticks = 1:2:12;
xticksLabels = {'Oct','Dec','Feb','Apr','Jun','Aug'};
set(gca,'xtick',xticks,'xticklabels',xticksLabels);
yticks = 2:2:18;
yticksLabels =
 {'1954','1956','1958','1960','1962','1964','1966','1968','1970'};
set(gca,'ytick',yticks,'yticklabels',yticksLabels);



meanArray = mean(Tnew,1);

medianArray = median(Tnew);

h3 = figure;

x = 1:12;
plot(x,meanArray,'*');
axis([0,13,0,500]);
hold on;
plot(x,medianArray,'o');
title('Median and Mean');
ylabel('Runoff [inches/100]')
xticks = 1:12;
xticksLabels =
 {'Oct','Nov','Dec','Jan','Feb','Mar','Apr','May','Jun','July','Aug','Sept'};
set(gca,'xtick',xticks,'xticklabels',xticksLabels);
legend('Mean','Median')

% Why do the mean and median not match?
% The mean is the average and the median is the middle sample value.
 They
% are completely different. They would only be the same if data was
% distributed the perfectly.

hold on
h4 = boxplot(Tnew);
set(gca,'xtick',xticks,'xticklabels',xticksLabels);
ylabel('Runoff [inches/100]');
title('Box and Whisker Plot');

% Explain information in boxplot.
% The box and whisker plot is just a visual representation of
 frequency or
% concentration, with the whiskers representing the extremes. The red
% indicators show outliers (abnormal values). In this data set,
 outliers
% could refer to a higher than normal water storage year, resulting in
% higher or lower streamflow numbers. The data representing streamflow
```

```
% numbers coresponds to what you would expect to see in a given water
 year;
% higher runoff numbers located in the Spring, when water is melting,
 when
% alternately water is frozen in the winter months, showing little to
 no
% streamflow.
```




Matrix Representation of Streamflow Data
Time [year]
1954
1956
1958
1960
1962
1964
1966
1968
1970
Oct
Dec
Feb
Apr
Jun
Aug
Time [month]
700
600
500
400
300
200
100
0


Box and Whisker Plot
Runoff [inches/100]
800
700
600
500
400
300
200
100
0
Mean
Median
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sept

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