
Table of Contents

.....	1
.....	1
INITIALIZATION	1
.....	2
CALCULATIONS	2
.....	3
FORMATTED FIGURES	3
.....	7
ANALYSIS	7
-- Q1	7
.....	7
ACADEMIC INTEGRITY STATEMENT	7

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
%This problem continues off where PS02 left off with the volcanos,I
% was asked to analyze the volcanos under the all
% the different conditions and answering all the questions such as
% how many volcanoes are visible in the PoLAR Viewer images. Then
% create a
% graph for each of the cases and then answer the questions based on
% the
% graphs.
%
% Assignment Information
% Assignment:      PS 03, Problem 3
% Author:         Ranjan Behl, rbehl@purdue.edu
% Team ID:        008-14
% Contributor:    Name, login@purdue [repeat for each]
% My contributor(s) helped me:
%   [ ] understand the assignment expectations without
%       telling me how they will approach it.
%   [ ] understand different ways to think about a solution
%       without helping me plan my solution.
%   [ ] think through the meaning of a specific error or
%       bug present in my code without looking at my code.
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

INITIALIZATION

```
data = csvread('Data_volcano_list.csv',1,3);% importing the given
% volcano data into a matrix called data
latitude = data(:,1);% importing the latitude volcano data into a
% column vector
```

```
longitude = data(:,2);% importing the longitude volcano data into a
column vector
elevation = data(:,3);% importing the elevation volcano data into a
column vector
```

CALCULATIONS

```
%Part 3
%a
latitudeACP1 = latitude(latitude <= 39.5 & latitude >= -39.5);%
creating a vector of latitude that are visible in the ACP-1 images
longitudeACP1 = longitude(latitude <= 39.5 & latitude >= -39.5);%
creating a vector of longitude that are visible in the ACP-1 images
%b
latitudeV11 = latitude(elevation > 2500 & latitude <=0.0);% creating
a vector of latitude that are visible in the V11 images
longitudeV11 = longitude(elevation > 2500 & latitude <=0.0);% creating
a vector of longitude that are visible in the V11 images
%c
latitudeMASC_find = find((longitude >=100.0 & longitude < 145.0)|
(longitude > -140.0 & longitude <=-120.0)); % finds the index of the
MASC values
latitudeMASC = latitude(latitudeMASC_find);% creating a vector of
latitude that are visible in the MASC images
longitudeMASC = longitude(latitudeMASC_find);% creating a vector of
longitude that are visible in the MASC images
%d
latitudePolar = latitude(latitude >= 50.0);% creating a vector of
latitude that are visible in the Polar viewer
longitudePolar = longitude(latitude >= 50.0);% creating a vector of
longitude that are visible in the Polar viewer
%e
latitudeany = latitude((latitude <= 39.5 & latitude >= -39.5)
| (longitude >=100.0 & longitude < 145.0 & longitude > -140.0 &
longitude <=-120.0) | (elevation > 2500) | (latitude <=0.0 & latitude
>= 50.0));% creating a vector of latitude that are visible for all of
the instruments
longitudeany = longitude((latitude <= 39.5 & latitude >= -39.5)
| (longitude >=100.0 & longitude < 145.0 & longitude > -140.0 &
longitude <=-120.0) | (elevation > 2500) | (latitude <=0.0 & latitude
>= 50.0));% creating a vector of longitude that are visible for all
of the instruments
%f
latitudenone = latitude(not(latitude <= 39.5 & latitude >= -39.5)
| not(longitude >=100.0 & longitude < 145.0 & longitude > -140.0
& longitude <=-120.0) | not(elevation > 2500) | not(latitude <=0.0
& latitude >= 50.0));% creating a vector of latitude that are not
visible for any of the instruments
longitudenone = longitude(not(latitude <= 39.5 & latitude >= -39.5)
| not(longitude >=100.0 & longitude < 145.0 & longitude > -140.0 &
```

```
longitude <=-120.0) | not(elevation > 2500) | not(latitude <=0.0
 & latitude >= 50.0));% creating a vector of longitude that are not
 visible for any of the instruments
```

FORMATTED FIGURES

```
%Part 4
%a
figure(1)
plot(latitude,longitude,'og');% creates a plot that showcases all of
 the volcano locations
xlabel('latitude(dd)'); % labeling the x axis
ylabel('longitude(dd)');% labeling the y axis
title('All Volcano Locations');% labeling the title
%Part 5
%a
figure(2)
subplotA = subplot(2,2,1),
 plot(latitudeACP1,longitudeACP1,'vr'); %creating subplot A
grid on
xlabel('latitude(dd)'); % labeling the x axis
ylabel('longitude(dd)');% labeling the y axis
title('All Volcano Locations Visible to ACP-1');% labeling the title
%b
subplotB = subplot(2,2,2),
 plot(latitudeVll,longitudeVll,'^b'); %creating subplot B
grid on
xlabel('latitude(dd)'); % labeling the x axis
ylabel('longitude(dd)');% labeling the y axis
title('All Volcano Locations Visible to Vll');% labeling the title
%c
subplotC = subplot(2,2,3),
 plot(latitudeMASC,longitudeMASC,'xc');%creating subplot c
grid on
xlabel('latitude(dd)');% labeling the x axis
ylabel('longitude(dd)');% labeling the y axis
title('All Volcano Locations Visible to MASC');% labeling the title
%d
subplotD = subplot(2,2,4),
 plot(latitudePolar,longitudePolar,'.k');%creating subplot d
grid on
xlabel('latitude(dd)');%c
ylabel('longitude(dd)');% labeling the y axis
title('All Volcano Locations Visible to Polar');% labeling the title
%Part 6
figure(3)
Visiblevolcanos = plot(latitudeany,longitudeany,'sk');% creating a
 plot that showcases the location of all of the volcanos that are
 visible
hold on
```

```

NonVisiblevolcanos = plot(latitudenone, longitudenone, 'dm');% creating
    a plot that showcases the location of all of the volcanos that are
    not visible
legend("All Visible Volcanos", "All Non Visible Volcanos");% creating a
    legend
legend('location', 'southoutside');% changing the legend location so it
    doesnt cover up the graph
title('Volcanos Images Visible to any Instrument vs Volcanos that are
    not in Range');% creating a title
xlabel('latitude(dd)');% labeling the x axis
ylabel('longitude(dd)');% labeling the y axis

```

```
subplotA =
```

Axes (All Volcano Locations Visible to ACP-1) with properties:

```

        XLim: [-40 40]
        YLim: [-200 200]
        XScale: 'linear'
        YScale: 'linear'
    GridLineStyle: '-'
        Position: [0.1300 0.5876 0.3347 0.3365]
        Units: 'normalized'

```

Use GET to show all properties

```
subplotB =
```

Axes (All Volcano Locations Visible to Vll) with properties:

```

        XLim: [-80 0]
        YLim: [-100 200]
        XScale: 'linear'
        YScale: 'linear'
    GridLineStyle: '-'
        Position: [0.5703 0.5876 0.3347 0.3365]
        Units: 'normalized'

```

Use GET to show all properties

```
subplotC =
```

Axes (All Volcano Locations Visible to MASC) with properties:

```

        XLim: [-50 50]
        YLim: [-130 200]
        XScale: 'linear'
        YScale: 'linear'
    GridLineStyle: '-'
        Position: [0.1300 0.1138 0.3347 0.3365]
        Units: 'normalized'

```

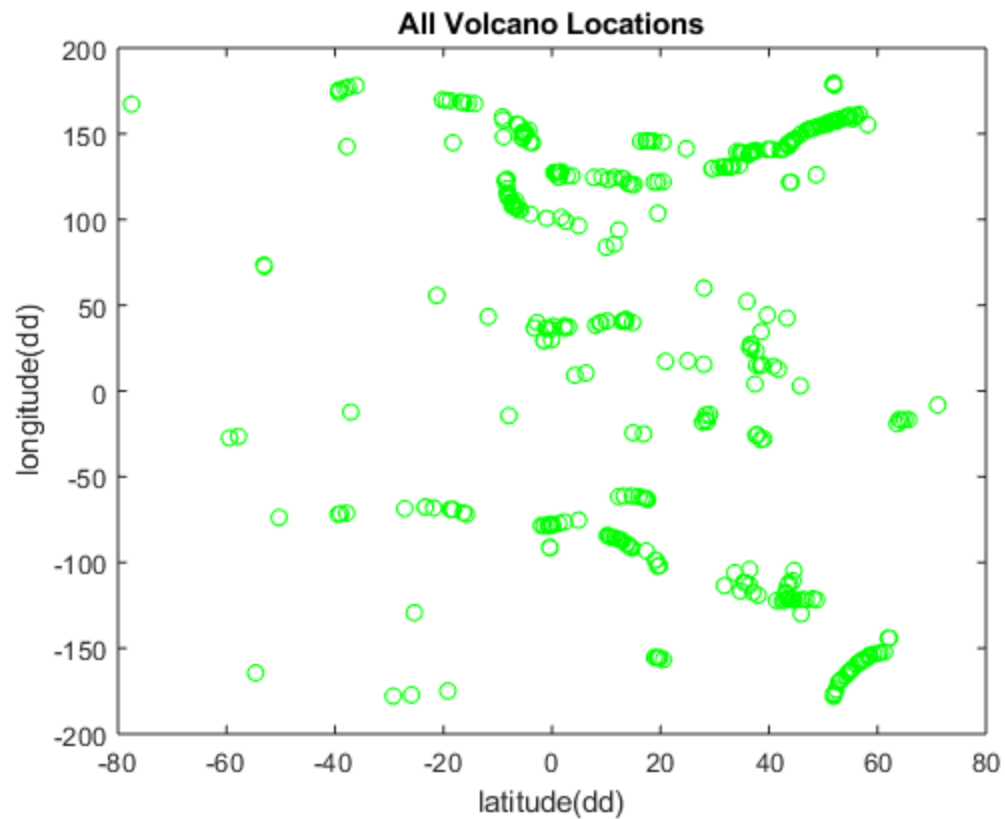
Use GET to show all properties

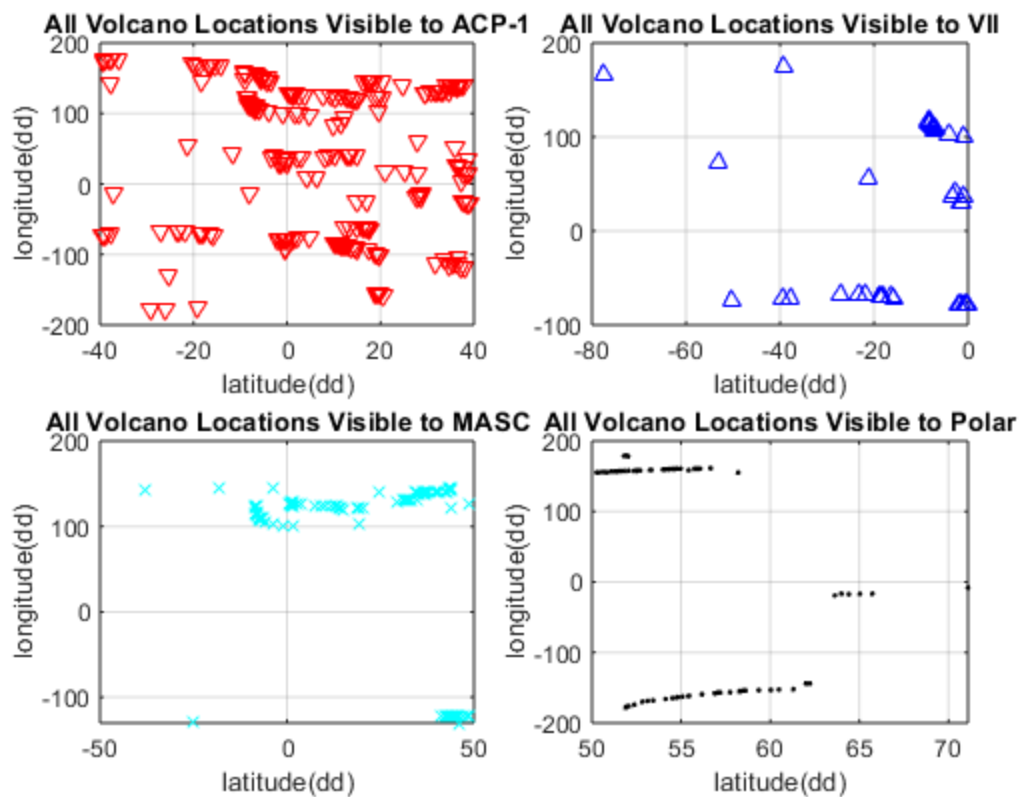
subplotD =

Axes (All Volcano Locations Visible to Polar) with properties:

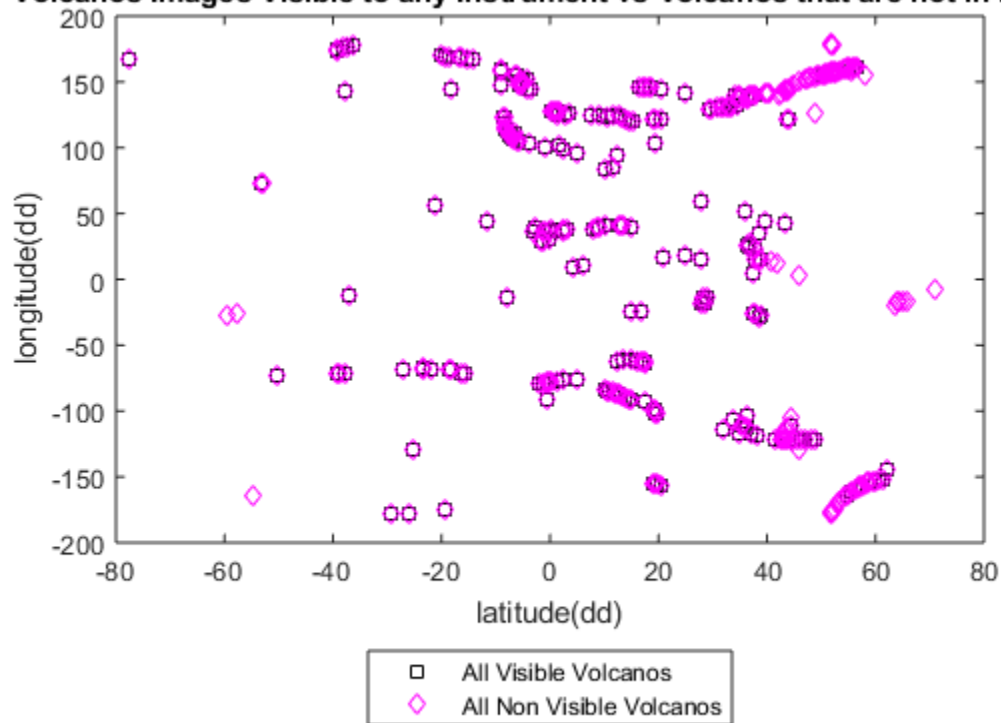
```
    XLim: [50 71.1000]  
    YLim: [-200 200]  
    XScale: 'linear'  
    YScale: 'linear'  
    GridLineStyle: '-'  
    Position: [0.5703 0.1138 0.3347 0.3365]  
    Units: 'normalized'
```

Use GET to show all properties





Volcanos Images Visible to any Instrument vs Volcanos that are not in Range



ANALYSIS

-- Q1

Based on figure 3 it can be said that there were more volcanos that the four instruments weren't able to capture images of.

ACADEMIC INTEGRITY STATEMENT

I have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I provided access to my code to another. The script I am submitting is my own original work.

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