Final Project First Course

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Harvey became a hurricane August 24th, made landfall on the 25th, and was downgraded to a tropical storm on August 26th.

The impact of Harvey was felt over much more than just 3 days. In the 2017 storm events data set, Harvey related events are reported beginning August 17th and end September 3rd as the system moved north and east across the United States. Flooding, thunderstorms, hail, and tornadoes are just a few of the weather events related to Harvey.

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Background and Scope

Import the Data

Use only the first time to generate the function

```
%uiimport("StormEvents_2017_finalProject.csv")
%pause
```

Use in anytime later of using uiimport command

```
clc
clear
ev=importfile1("StormEvents_2017_finalProject.csv");
ev.Property_Cost(ismissing(ev.Property_Cost))=0;
head(ev,10)
```

```
ans = 10×24 table
```

...

	EpisodeID	Event_ID	State	Year	Month	Event_Type	CZ_Name
1	113355	678791	NEW JER...	2017	April	Thunderstorm Wind	GLOUCESTER
2	113459	679228	FLORIDA	2017	April	Tornado	LEE
3	113448	679268	OHIO	2017	April	Thunderstorm Wind	GREENE
4	113697	682042	OHIO	2017	April	Flood	CLERMONT
5	113683	682062	NEBRASKA	2017	April	Hail	CASS
6	114718	688082	INDIANA	2017	April	Flash Flood	SWITZERLAND
7	114834	688895	VIRGINIA	2017	April	Thunderstorm Wind	WESTMOREL...
8	121068	724772	GULF OF...	2017	October	Marine Thunders...	ATCHAFALA...
9	114489	686560	OHIO	2017	April	Flash Flood	CLERMONT
10	113683	682156	NEBRASKA	2017	April	Thunderstorm Wind	BURT

Two States Most Impacted by Harvey

Clearly state the two states in order

```
hb=datetime("2017-08-17 00:00:00");
he=datetime("2017-09-03 11:59:59");
hb1=day(hb,"dayofyear");
he1=day(he,"dayofyear");
ev1=ev;
ev1=ev1(day(ev1.Begin_Date_Time,"dayofyear")>= hb1 & day(ev1.End_Date_Time,"dayofyear") <= he1,
ev2=groupsummary(ev1,"State","Sum","Property_Cost");
ev2 = sortrows(ev2,'sum_Property_Cost','descend')
```

ev2 = 57×3 table

	State	GroupCount	sum_Property_Cost
1	TEXAS	272	7.7427e+10
2	LOUISIANA	85	75277000
3	NORTH C...	59	12338500
4	WASHING...	2	4000000
5	FLORIDA	68	2237000
6	MINNESOTA	24	1375000
7	NEBRASKA	62	1054000
8	MISSISS...	39	915000
9	NEW YORK	109	641000
10	TENNESSEE	46	504000
11	PENNSYL...	203	491630
12	KENTUCKY	20	435000
13	CALIFOR...	74	329000

	State	GroupCount	sum_Property_Cost
14	IOWA	54	321000

⋮

```
heatmap(ev2,"State","sum_Property_Cost")
```

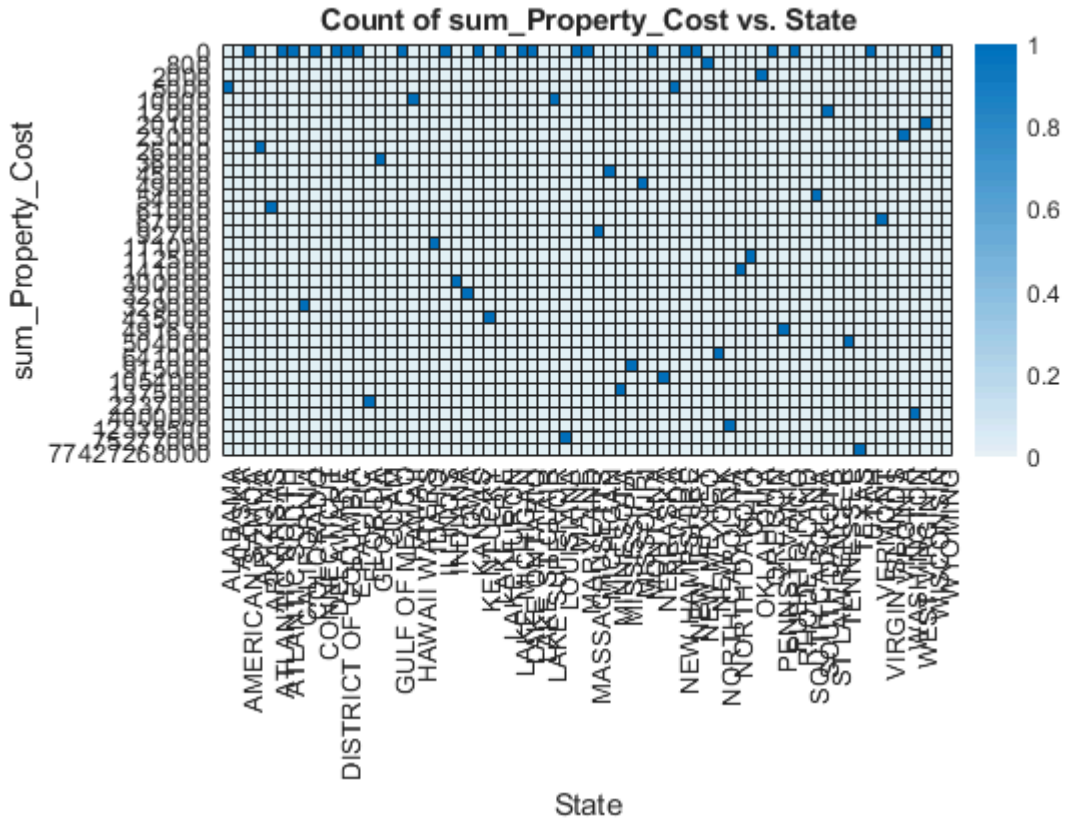


Table of Events for Two Most Impacted States

Create and display a few rows of events that include only the two most affected states

```
ev3=ev1;
ev4=ev1;
ev3=ev3(ev3.State=="TEXAS",:);
ev31=groupsummary(ev3,"Event_Type");
ev31 = sortrows(ev31,'GroupCount','descend')
```

ev31 = 11×2 table

	Event_Type	GroupCount
1	Flash Flood	126
2	Tropical Storm	41
3	Thunderstorm Wind	27
4	Tornado	26
5	Flood	16

	Event_Type	GroupCount
6	Heat	13
7	Hurricane	9
8	Storm Surge/Tide	6
9	Funnel Cloud	3
10	Hail	3
11	Heavy Rain	2

```
ev4=ev4(ev4.State=="LOUISIANA",:);
ev41=groupsummary(ev4,"Event_Type");
ev41 = sortrows(ev41,'GroupCount','descend')
```

ev41 = 6×2 table

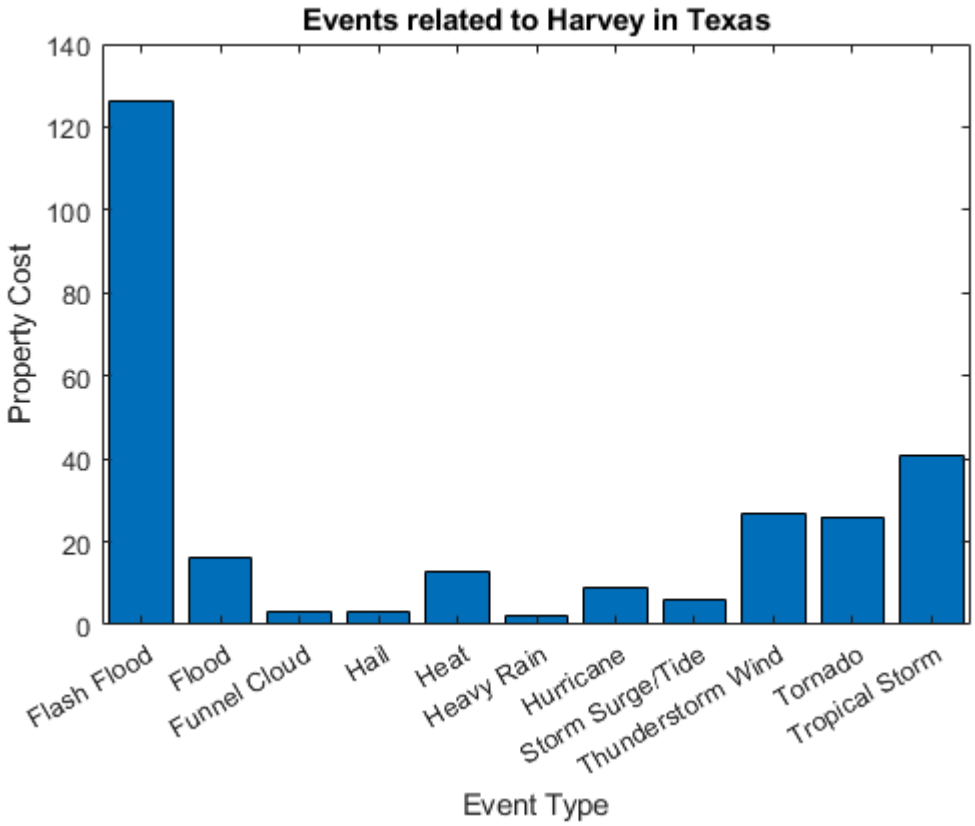
	Event_Type	GroupCount
1	Flash Flood	53
2	Heat	17
3	Tornado	7
4	Storm Surge/Tide	4
5	Tropical Storm	3
6	Flood	1

Visualizations

Figure of Event Types

Create a figure showing the type and number of occurances for events related to Harvey in the two states

```
ev31.Event_Type=removecats(ev31.Event_Type);
bar(ev31.Event_Type,ev31.GroupCount)
title("Events related to Harvey in Texas")
xlabel("Event Type")
ylabel("Property Cost")
```




```
ev41.Event_Type=removecats(ev41.Event_Type);
bar(ev41.Event_Type,ev41.GroupCount)
title("Events related to Harvey in Louisiana")
xlabel("Event Type")
ylabel("Property Cost")
```

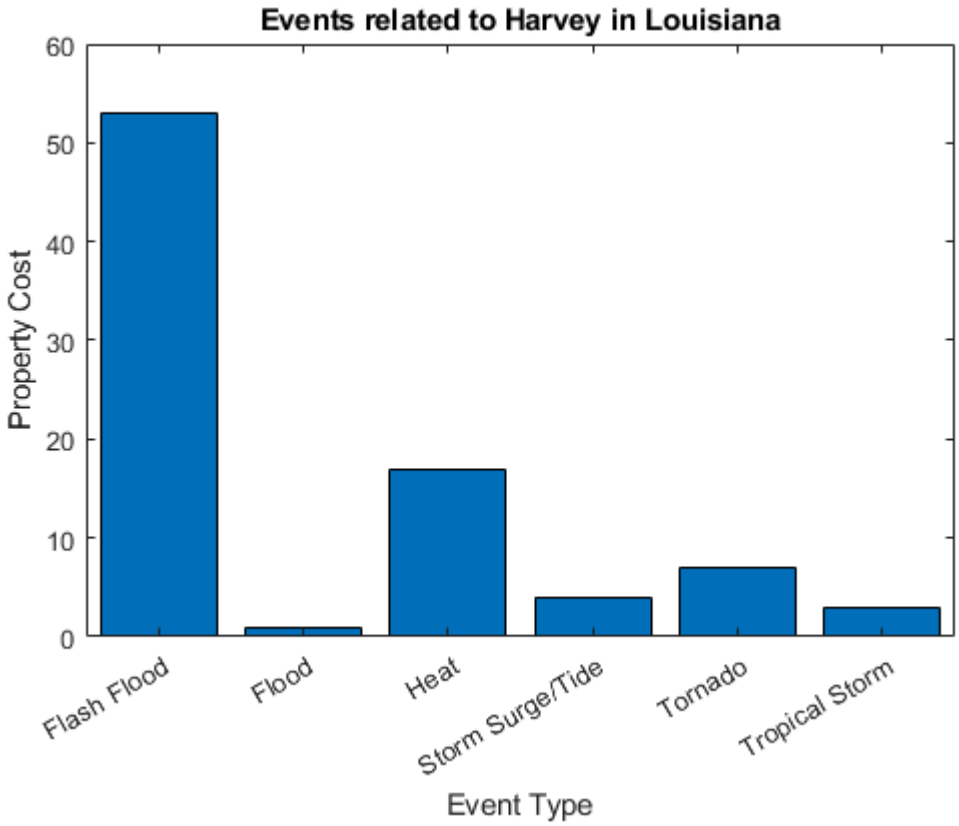
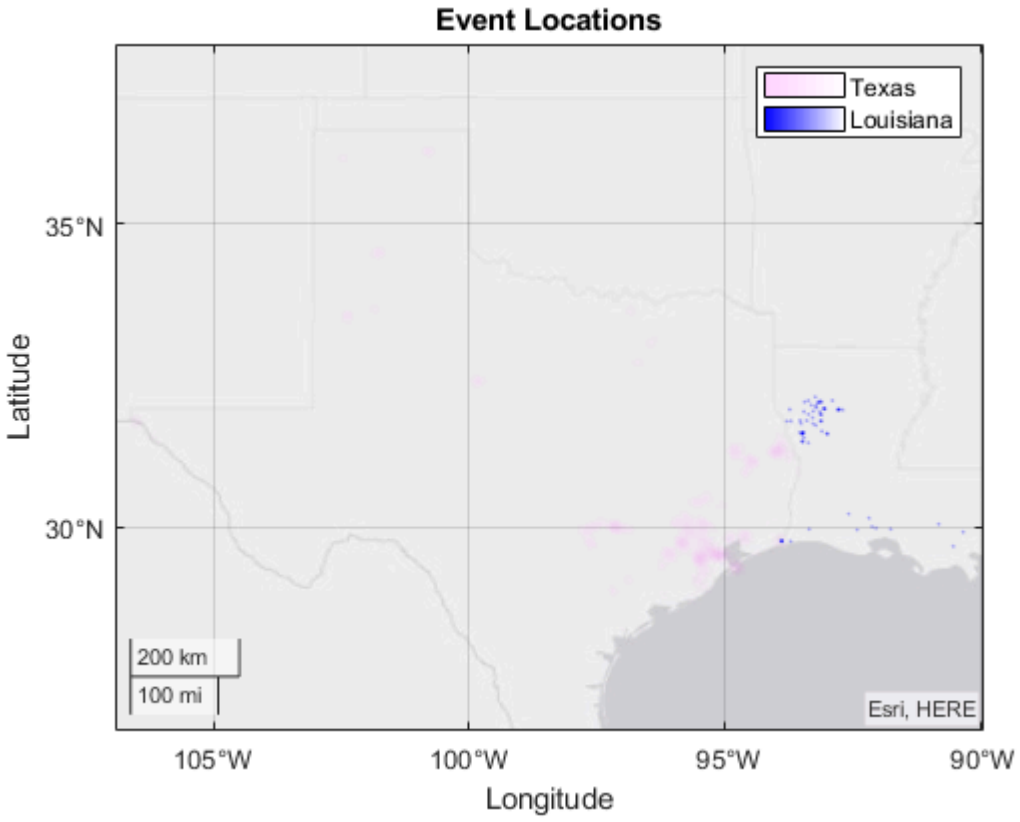


Figure of Event Locations

Show the location of events in the two states. Be sure to use different markers for the two states

```
geodensityplot(ev3.Begin_Lat,ev3.Begin_Lon,'FaceColor','m');
hold on
geodensityplot(ev4.Begin_Lat,ev4.Begin_Lon,'FaceColor','b');
title("Event Locations")
legend("Texas","Louisiana")
geolimits("auto")
hold off
```



Analysis

Three Counties with Most Events in State 1

Either type out, show in a table, or show in a clear visualization the three counties with the most events in state 1.

```
ev32=groupsummary(ev3,"CZ_Name");
ev32 = sortrows(ev32,'GroupCount','descend');
head(ev32,3)
```

ans = 3×2 table

	CZ_Name	GroupCount
1	HARRIS	21
2	GALVESTON	17
3	FORT BEND	13

Three Counties with Most Events in State 2

Either type out, show in a table, or show in a clear visualization the three counties with the most events in state 2.

```
ev42=groupsummary(ev4,"CZ_Name");
ev42 = sortrows(ev42,'GroupCount','descend');
```

```
head(ev42,3)
```

ans = 3×2 table

	CZ_Name	GroupCount
1	NATCHITOCHES	21
2	SABINE	15
3	RED RIVER	9

Three Counties with Highest Property Cost in State 1

Either type out, show in a table, or show in a clear visualization the three counties with the highest property damage in state 1. *Be sure to include the dollar amount*.

```
ev33=groupsummary(ev3,"CZ_Name","Sum","Property_Cost");
ev33 = sortrows(ev33,'sum_Property_Cost','descend');
head(ev33,3)
```

ans = 3×3 table

	CZ_Name	GroupCount	sum_Property_Cost
1	GALVESTON	17	2.0000e+10
2	FORT BEND	13	1.6004e+10
3	MONTGOMERY	6	1.4000e+10

Three Counties with Highest Property Cost in State 2

Either type out, show in a table, or show in a clear visualization the three counties with the highest property damage in state 2. *Be sure to include the dollar amount*.

```
ev43=groupsummary(ev4,"CZ_Name","Sum","Property_Cost");
ev43 = sortrows(ev43,'sum_Property_Cost','descend');
head(ev43,3)
```

ans = 3×3 table

	CZ_Name	GroupCount	sum_Property_Cost
1	CALCASIEU	1	60000000
2	BEAUREGARD	1	15000000
3	ACADIA	1	200000

Conclusions and Recommendations

According to the results the two most impacted states are Texas and Louisiana, different type events presents like flash flood, tornados, tropical storm, heat etc.

In Texas the three most impacted counties are dfferent to the three counties with the most property damage, in fact we have Galvestone, Fort Bend and Montgomery respectively

In Lousiana something similar occurs, the three counties with the most property damage are Calcasieu, Beauregard and Acadia respectively

This couinties mentioned before require the most possible atention