WEATHERAUS

In [ ]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [ ]:
```
df5=pd.read_csv('weatherAUS.csv')
```

In [ ]:
```
df5
```

Out[ ]:

	Date	Location	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshir
0	2008-12-01	Albury	13.4	22.9	0.6	NaN	Na
1	2008-12-02	Albury	7.4	25.1	0.0	NaN	Na
2	2008-12-03	Albury	12.9	25.7	0.0	NaN	Na
3	2008-12-04	Albury	9.2	28.0	0.0	NaN	Na
4	2008-12-05	Albury	17.5	32.3	1.0	NaN	Na
...	...	...	...	...	...	...	
94768	2011-01-26	Adelaide	16.7	29.6	0.4	NaN	12
94769	2011-01-27	Adelaide	19.5	32.0	0.0	12.4	9
94770	2011-01-28	Adelaide	15.8	31.8	0.0	8.0	12
94771	2011-01-29	Adelaide	18.5	37.7	0.0	NaN	12
94772	2011-01-30	Adelaide	25.8	42.5	0.0	NaN	12

94773 rows × 24 columns

In [ ]:
```
df5.shape
```

Out[ ]:
```
(94773, 24)
```

In [ ]:
```
df5.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 94773 entries, 0 to 94772
Data columns (total 24 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Date           94773 non-null  object 
 1   Location       94773 non-null  object 
 2   MinTemp        94313 non-null  float64
 3   MaxTemp        94554 non-null  float64
 4   Rainfall       93718 non-null  float64
 5   Evaporation    52579 non-null  float64
 6   Sunshine       45783 non-null  float64
 7   WindGustDir    89081 non-null  object 
 8   WindGustSpeed  89089 non-null  float64
 9   WindDir9am     87119 non-null  object 
 10  WindDir3pm     92116 non-null  object 
 11  WindSpeed9am   93615 non-null  float64
 12  WindSpeed3pm   93014 non-null  float64
 13  Humidity9am    93482 non-null  float64
 14  Humidity3pm    93067 non-null  float64
 15  Pressure9am    85072 non-null  float64
 16  Pressure3pm    85119 non-null  float64
 17  Cloud9am       58619 non-null  float64
 18  Cloud3pm       57476 non-null  float64
 19  Temp9am        93982 non-null  float64
 20  Temp3pm        93514 non-null  float64
 21  RainToday      93717 non-null  object 
 22  RISK_MM        94772 non-null  float64
 23  RainTomorrow   94772 non-null  object 
dtypes: float64(17), object(7)
memory usage: 17.4+ MB
```

In [ ]:
```
df5.isnull().sum()
```

Out[ ]:

	0
Date	0
Location	0
MinTemp	460
MaxTemp	219
Rainfall	1055
Evaporation	42194
Sunshine	48990
WindGustDir	5692
WindGustSpeed	5684
WindDir9am	7654
WindDir3pm	2657
WindSpeed9am	1158
WindSpeed3pm	1759
Humidity9am	1291
Humidity3pm	1706
Pressure9am	9701
Pressure3pm	9654
Cloud9am	36154
Cloud3pm	37297
Temp9am	791
Temp3pm	1259
RainToday	1056
RISK_MM	1
RainTomorrow	1

dtype: int64

In [ ]:
```
df5['MinTemp']=df5['MinTemp'].fillna(df5['MinTemp'].mean())
```

In [ ]:
```
df5['MaxTemp']=df5['MaxTemp'].fillna(df5['MaxTemp'].mean())
```

In [ ]:
```
df5['MinTemp'].isnull().sum()
```

Out[ ]:
```
np.int64(0)
```

In [ ]:
```
df5['MaxTemp'].isnull().sum()
```

Out[ ]:
```
np.int64(0)
```

In [ ]:
```
df5['Rainfall']=df5['Rainfall'].fillna(df5['Rainfall'].mean())
```

In [ ]:
```
df5['Evaporation']=df5['Evaporation'].fillna(df5['Evaporation'].mean())
```

In [ ]:
```
df5['Sunshine']=df5['Sunshine'].fillna(df5['Sunshine'].mean())
```

In [ ]:
```
df5['WindGustDir'].unique()
```

Out[ ]:
```
array(['W', 'WNW', 'WSW', 'NE', 'NNW', 'N', 'NNE', 'SW', 'ENE', 'SSE',
       'S', 'NW', 'SE', 'ESE', nan, 'E', 'SSW'], dtype=object)
```

In [ ]:
```
df5['WindGustDir']=df5['WindGustDir'].fillna(np.random.choice(['W', 'WNW', 'WS
       'S', 'NW', 'SE', 'ESE',  'E', 'SSW']))
```

In [ ]:
```
df5['WindGustSpeed']=df5['WindGustSpeed'].fillna(df5['WindGustSpeed'].mean())
```

In [ ]:
```
df5['WindDir9am'].unique()
```

Out[ ]:
```
array(['W', 'NNW', 'SE', 'ENE', 'SW', 'SSE', 'S', 'NE', nan, 'SSW', 'N',
       'WSW', 'ESE', 'E', 'NW', 'WNW', 'NNE'], dtype=object)
```

In [ ]:
```
df5['WindDir9am']=df5['WindDir9am'].fillna(np.random.choice(['W', 'NNW', 'SE',
       'WSW', 'ESE', 'E', 'NW', 'WNW', 'NNE']))
```

In [ ]:
```
df5['WindDir3pm'].unique()
```

Out[ ]:
```
array(['WNW', 'WSW', 'E', 'NW', 'W', 'SSE', 'ESE', 'ENE', 'NNW', 'SSW',
       'SW', 'SE', 'N', 'S', 'NNE', nan, 'NE'], dtype=object)
```

In [ ]:
```
df5['WindDir3pm']=df5['WindDir3pm'].fillna(np.random.choice(['W', 'NNW', 'SE',
       'WSW', 'ESE', 'E', 'NW', 'WNW', 'NNE']))
```

In [ ]:
```
df5['WindDir3pm'].isnull().sum()
```

Out[ ]:
```
np.int64(0)
```

In [ ]:
```
df5['WindSpeed9am']=df5['WindSpeed9am'].fillna(df5['WindSpeed9am'].mean())
```

In [ ]:
```
df5['WindSpeed3pm']=df5['WindSpeed3pm'].fillna(df5['WindSpeed3pm'].mean())
```

In [ ]:
```
df5['Humidity9am']=df5['Humidity9am'].fillna(df5['Humidity9am'].mean())
```

In [ ]:
```
df5['Humidity3pm']=df5['Humidity3pm'].fillna(df5['Humidity3pm'].mean())
```

In [ ]:
```
df5['Pressure9am']=df5['Pressure9am'].fillna(df5['Pressure9am'].mean())
```

In [ ]:
```
df5['Pressure3pm']=df5['Pressure3pm'].fillna(df5['Pressure3pm'].mean())
```

In [ ]:
```
df5['Cloud9am']=df5['Cloud9am'].fillna(df5['Cloud9am'].mean())
```

In [ ]:
```
df5['Cloud3pm']=df5['Cloud3pm'].fillna(df5['Cloud3pm'].mean())
```

In [ ]:
```
df5['Temp9am']=df5['Temp9am'].fillna(df5['Temp9am'].mean())
```

In [ ]:
```
df5['Temp3pm']=df5['Temp3pm'].fillna(df5['Temp3pm'].mean())
```

In [ ]:
```
df5['Temp3pm']=df5['Temp3pm'].fillna(df5['Temp3pm'].mean())
```

In [ ]:
```
df5['RainToday'].unique()
```

Out[ ]:
```
array(['No', 'Yes', nan], dtype=object)
```

In [ ]:
```
df5['RainToday']=df5['RainToday'].fillna(np.random.choice(['No', 'Yes']))
```

In [ ]:
```
df5.isnull().sum()
```

Out[ ]:

	0
Date	0
Location	0
MinTemp	0
MaxTemp	0
Rainfall	0
Evaporation	0
Sunshine	0
WindGustDir	0
WindGustSpeed	0
WindDir9am	0
WindDir3pm	0
WindSpeed9am	0
WindSpeed3pm	0
Humidity9am	0
Humidity3pm	0
Pressure9am	0
Pressure3pm	0
Cloud9am	0
Cloud3pm	0
Temp9am	0
Temp3pm	0
RainToday	0
RISK_MM	1
RainTomorrow	1

dtype: int64

In [ ]:
```
df5.duplicated().sum()
```

Out[ ]:
```
np.int64(0)
```

In [ ]:
```
df5.describe()
```

Out[ ]:

	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshine	W
count	94773.000000	94773.000000	94773.000000	94773.000000	94773.000000	
mean	12.086363	22.760775	2.535371	5.228030	7.343673	
std	6.437633	6.852767	9.110664	2.903462	2.653386	
min	-8.500000	-4.800000	0.000000	0.000000	0.000000	
25%	7.500000	17.800000	0.000000	4.000000	7.343673	
50%	12.100000	22.600000	0.000000	5.228030	7.343673	
75%	17.000000	27.600000	1.000000	5.228030	8.000000	
max	33.900000	47.300000	371.000000	145.000000	14.500000	

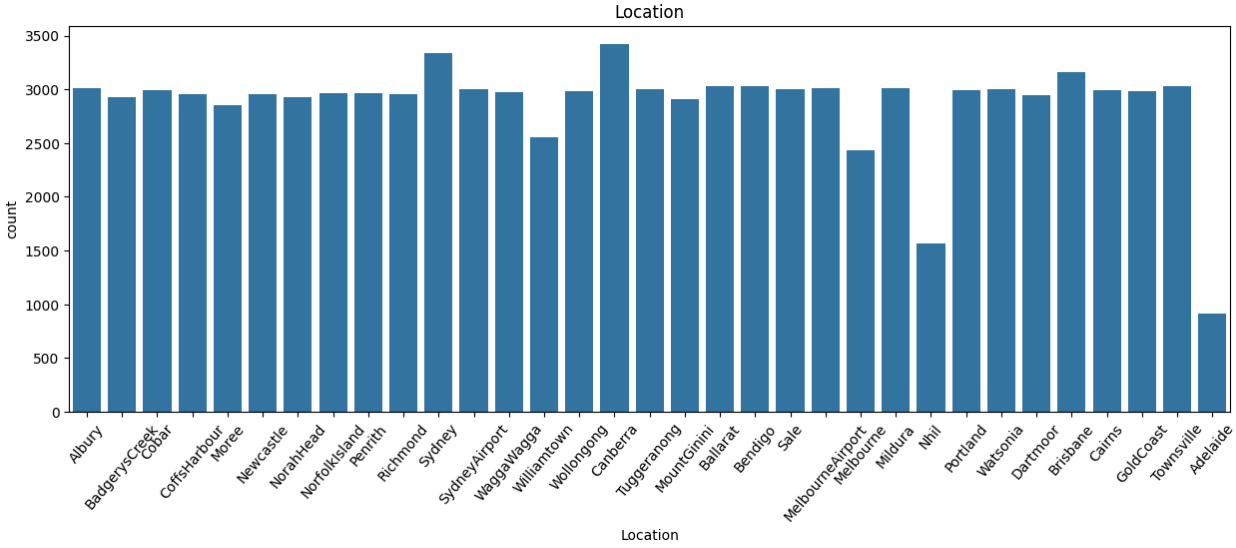
In [ ]:
```
categorical5=df5.select_dtypes(include='object')
```

In [ ]:
```
for i in categorical5.columns:
  print(df5[i].describe())
  print('**********************************')
```

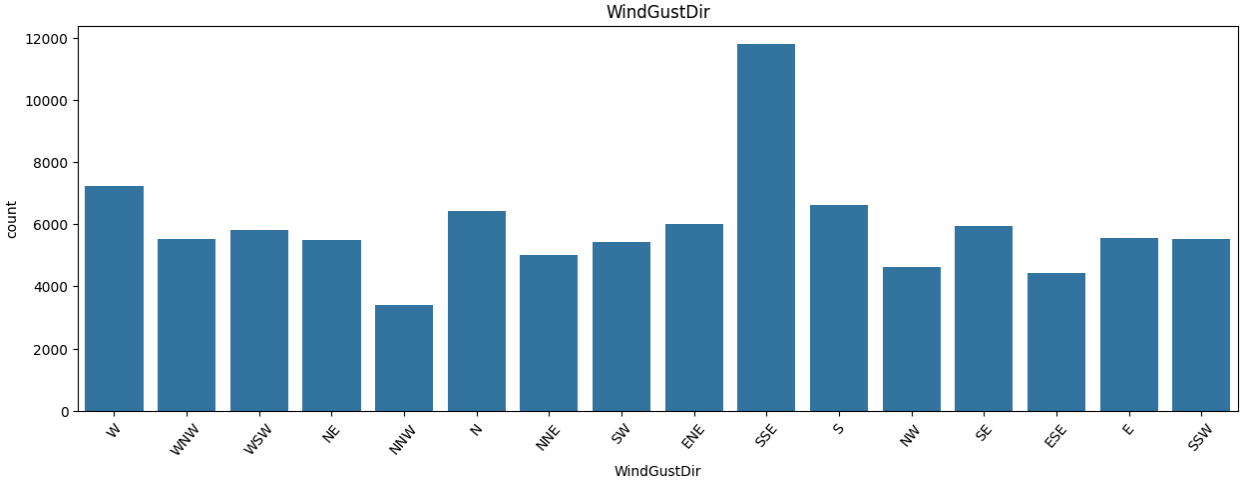
```
count          94773
unique          3436
top       2010-12-05
freq              32
Name: Date, dtype: object
**********
count        94773
unique          33
top       Canberra
freq          3418
Name: Location, dtype: object
**********
count     94773
unique       16
top         SSE
freq      11791
Name: WindGustDir, dtype: object
**********
count     94773
unique       16
top         NNE
freq      12703
Name: WindDir9am, dtype: object
**********
count     94773
unique       16
top          NE
freq       9527
Name: WindDir3pm, dtype: object
**********
count     94773
unique        2
top          No
freq      73278
Name: RainToday, dtype: object
**********
count     94772
unique        2
top          No
freq      72957
Name: RainTomorrow, dtype: object
**********
```

In [ ]:

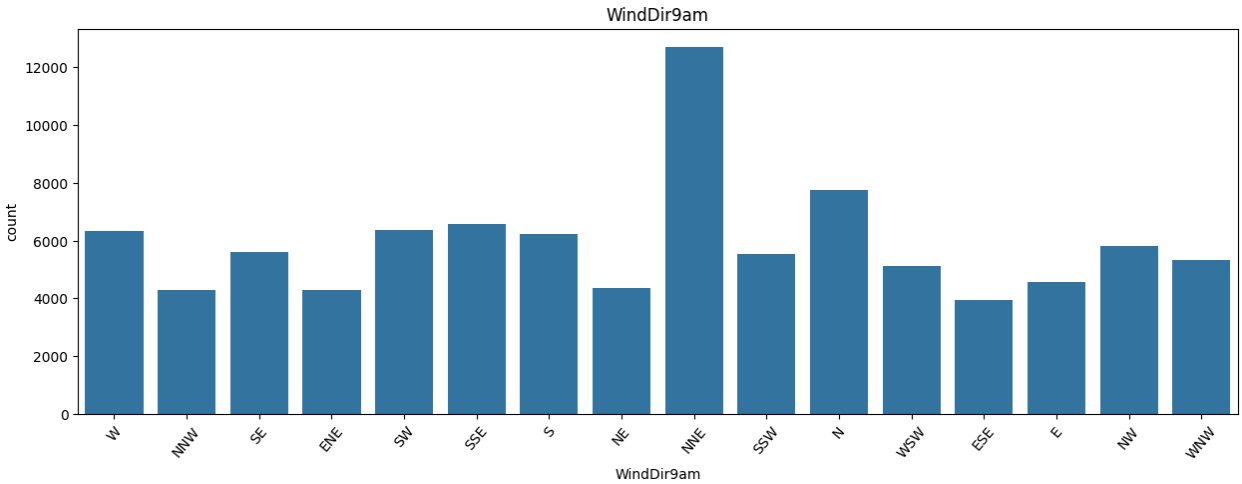
```
for i in categorical5:
 if i!='Date':
  plt.figure(figsize=(15,5))
  sns.countplot(x=df5[i])
  plt.title(i)
  plt.xticks(rotation=50)
  plt.show()
  print('**********')
```


Location
count
Location
Albury
BadgerysCreek
Cobar
CoffsHarbour
Moree
Newcastle
NorahHead
NorfolkIsland
Penrith
Richmond
Sydney
SydneyAirport
WaggaWagga
Williamtown
Wollongong
Canberra
Tuggeranong
MountGinini
Ballarat
Bendigo
Sale
MelbourneAirport
Melbourne
Mildura
Nhil
Portland
Watsonia
Dartmoor
Brisbane
Cairns
GoldCoast
Townsville
Adelaide

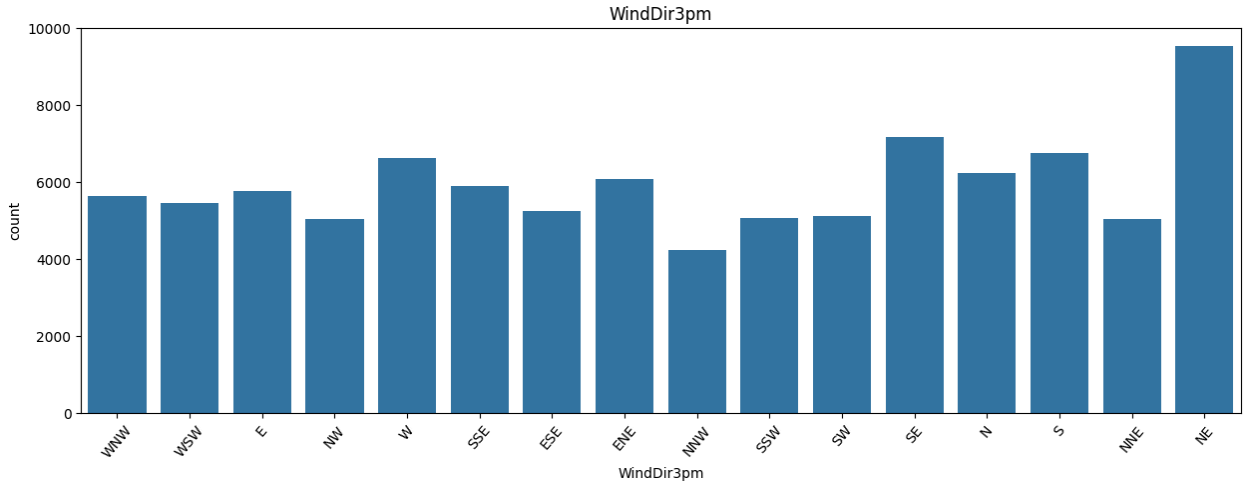
****


WindGustDir
count
WindGustDir
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW

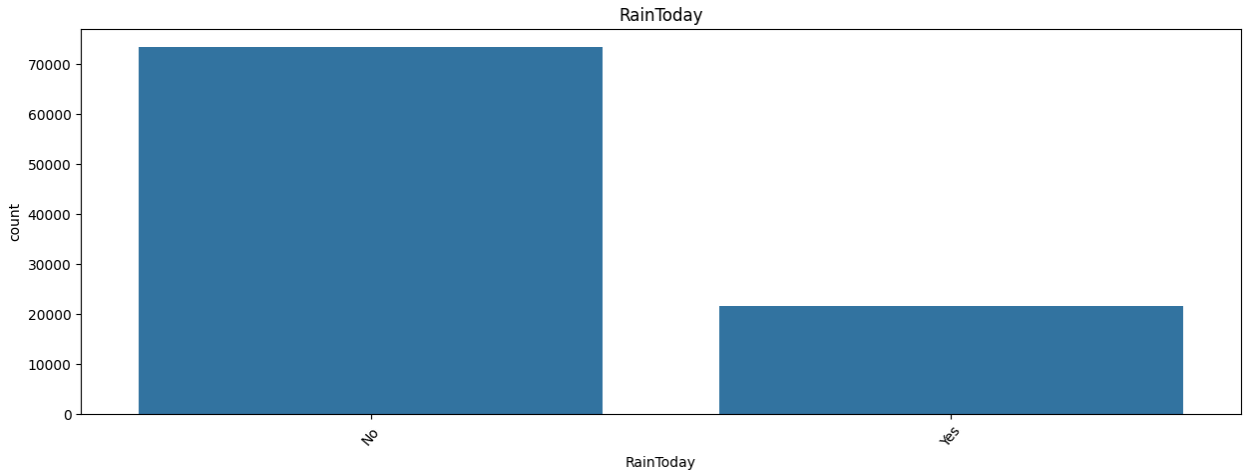
****


WindDir9am
count
WindDir9am
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW

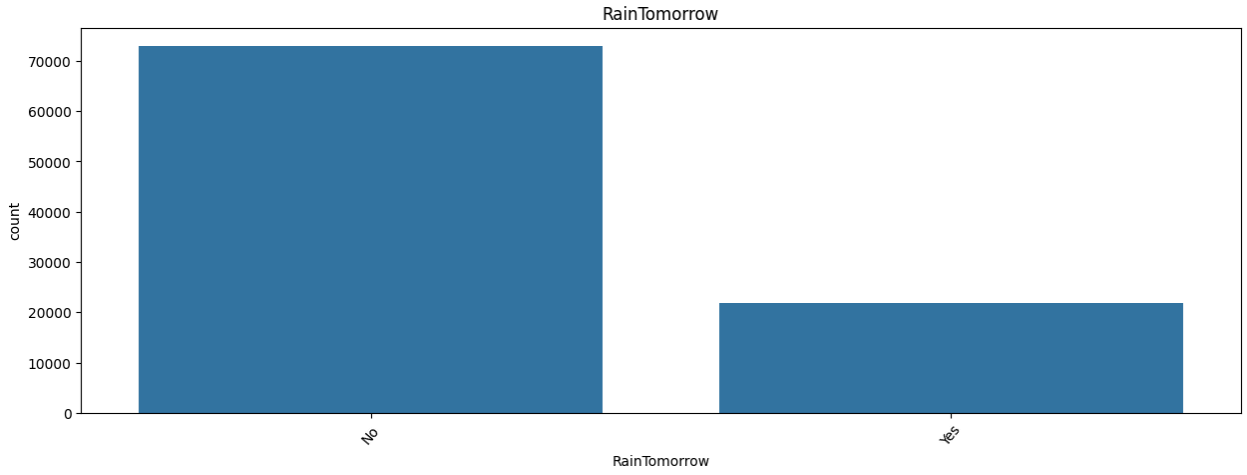
****



****



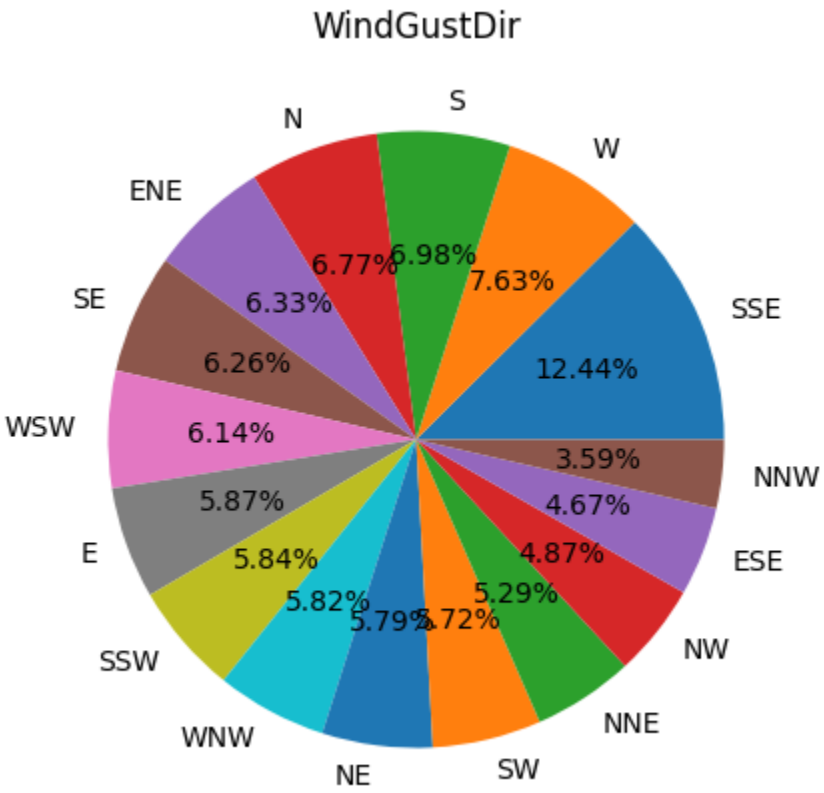
****



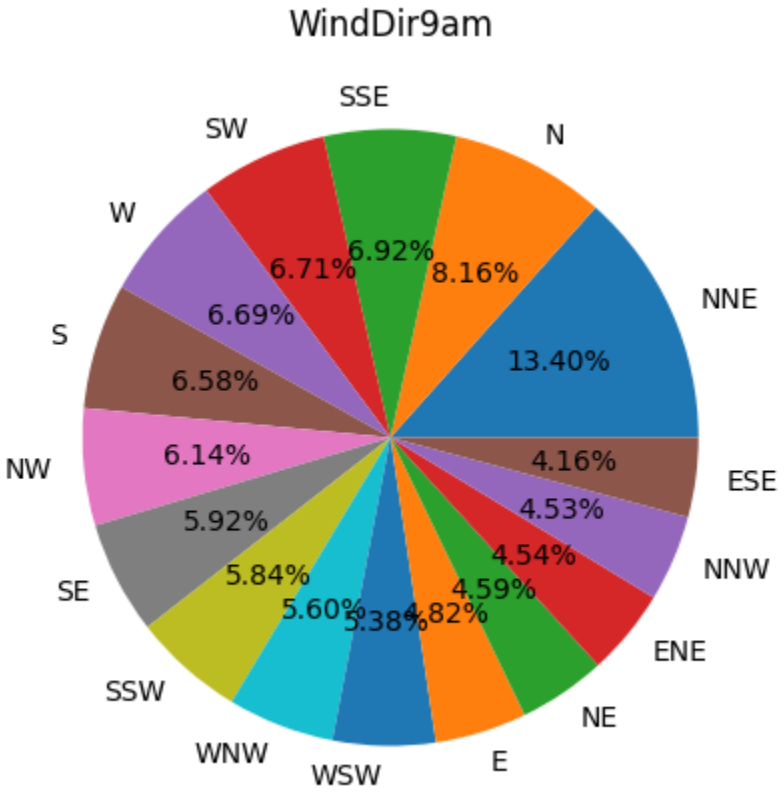
****

In [ ]:
```
for i in categorical5:
 if i!='Date' and i!='Location':
  plt.figure(figsize=(15,5))
  plt.pie(df5[i].value_counts(),labels=df5[i].value_counts().index,autopct='%1
  plt.title(i)
  plt.xticks(rotation=50)
```

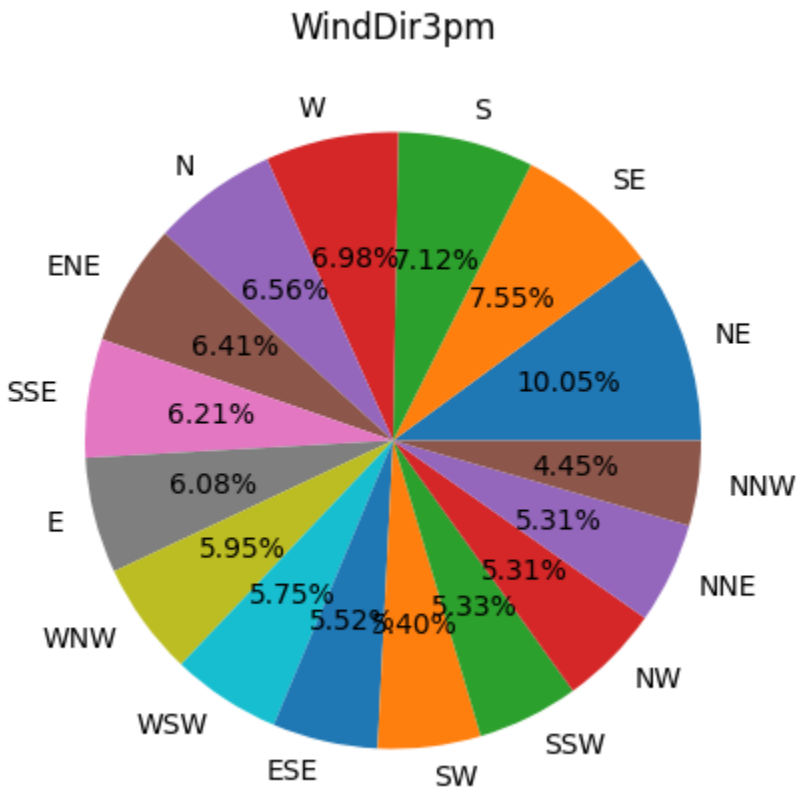
```
plt.show()
print('**********************************')
```



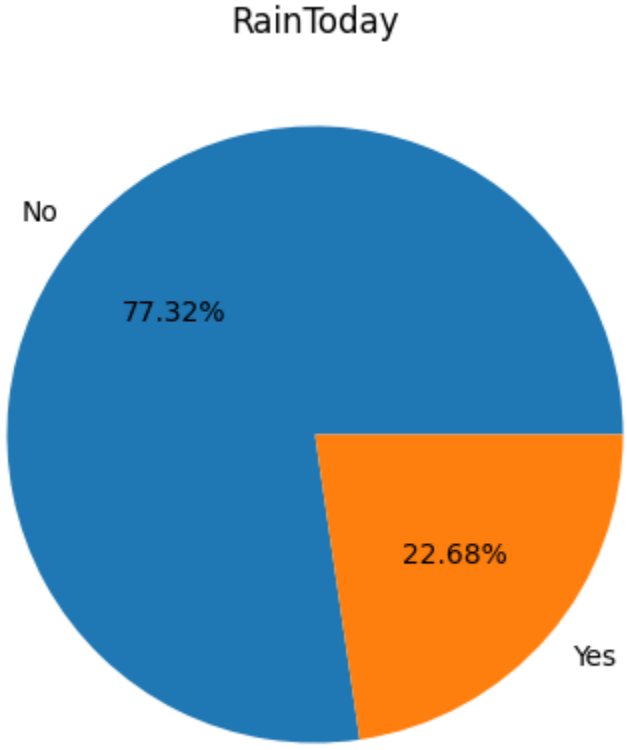
****



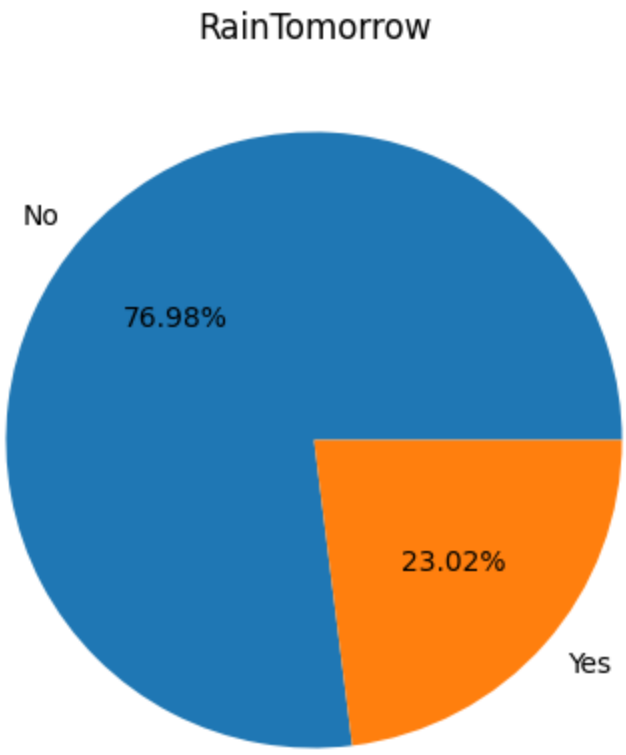
****


WindDir3pm
W
S
N
SE
ENE
NE
SSE
NNW
E
NNE
WNW
NW
WSW
SSW
ESE
SW
6.98%
7.12%
6.56%
7.55%
6.41%
10.05%
6.21%
4.45%
6.08%
5.31%
5.95%
5.31%
5.75%
5.33%
5.52%
5.40%

****


RainToday
No
77.32%
22.68%
Yes

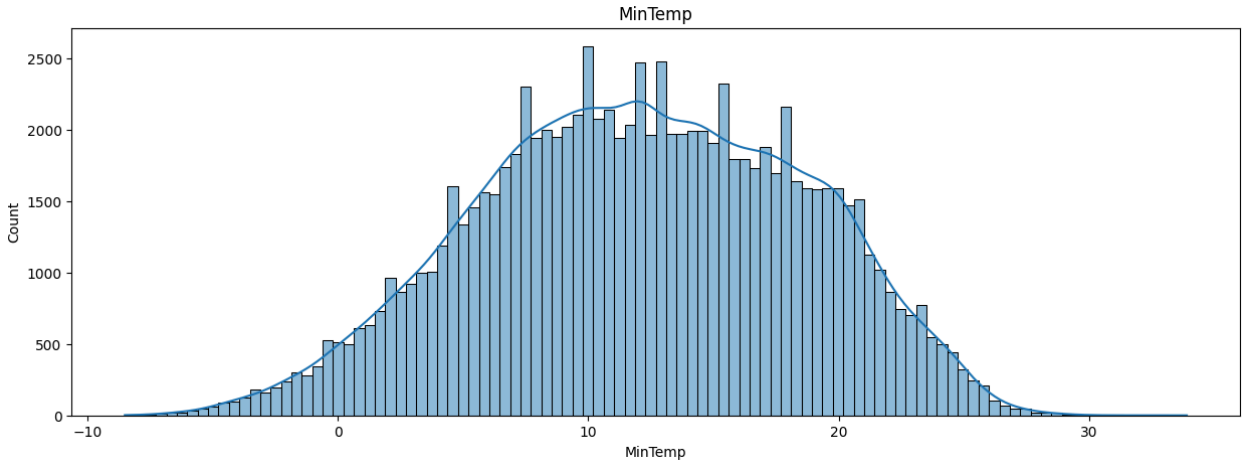
****

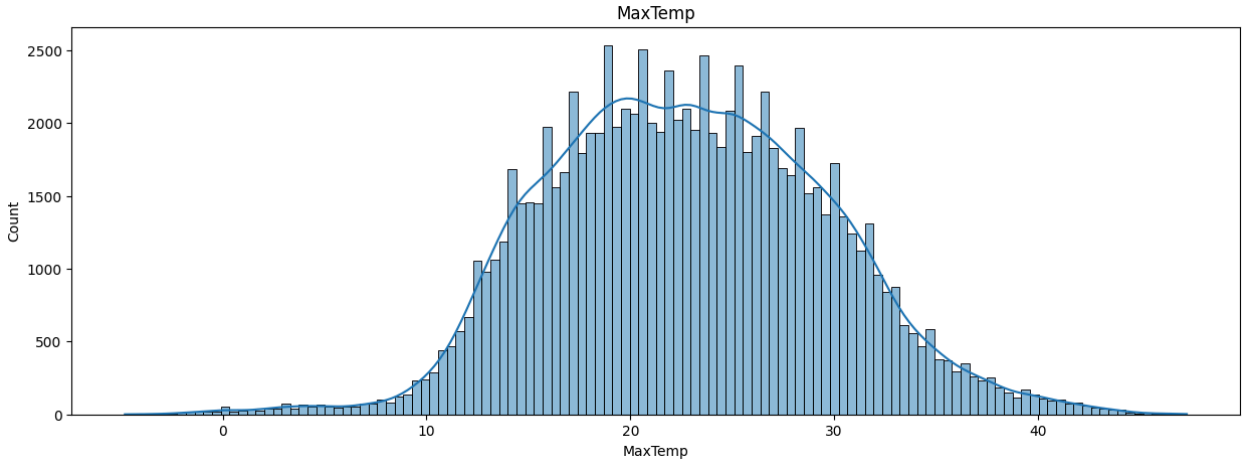


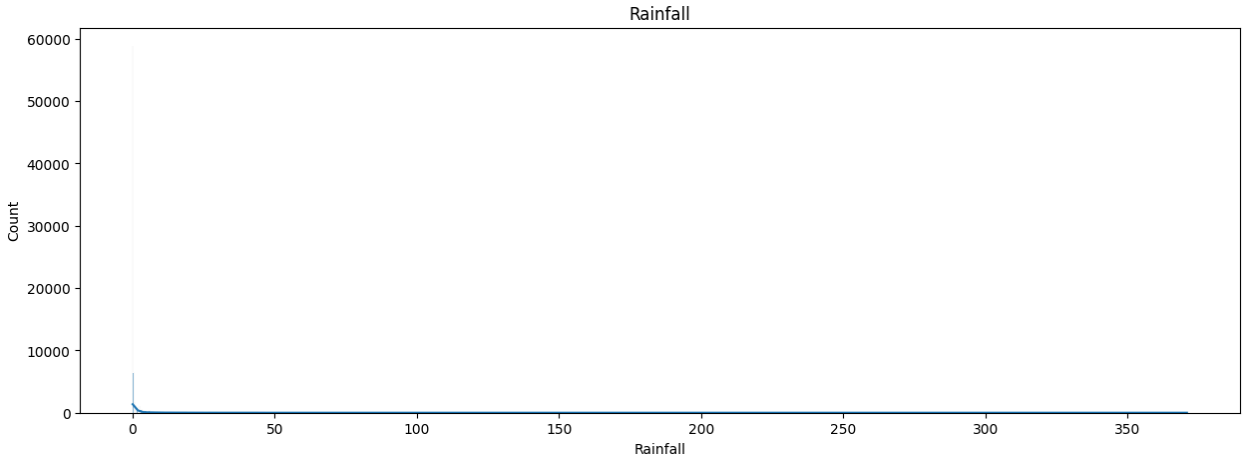
****

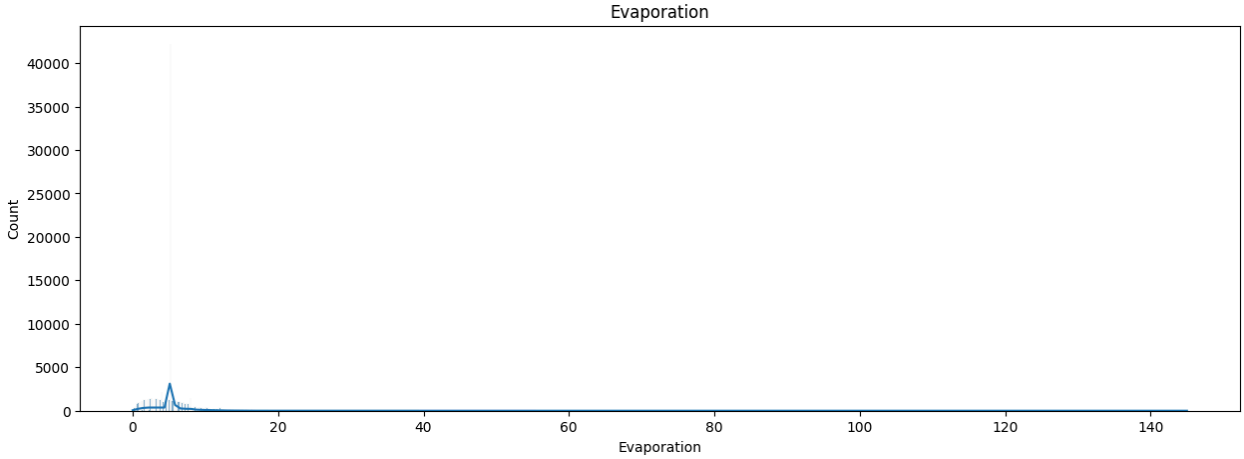
In [ ]:
```
Numerical5=df5.select_dtypes(exclude='object')
```

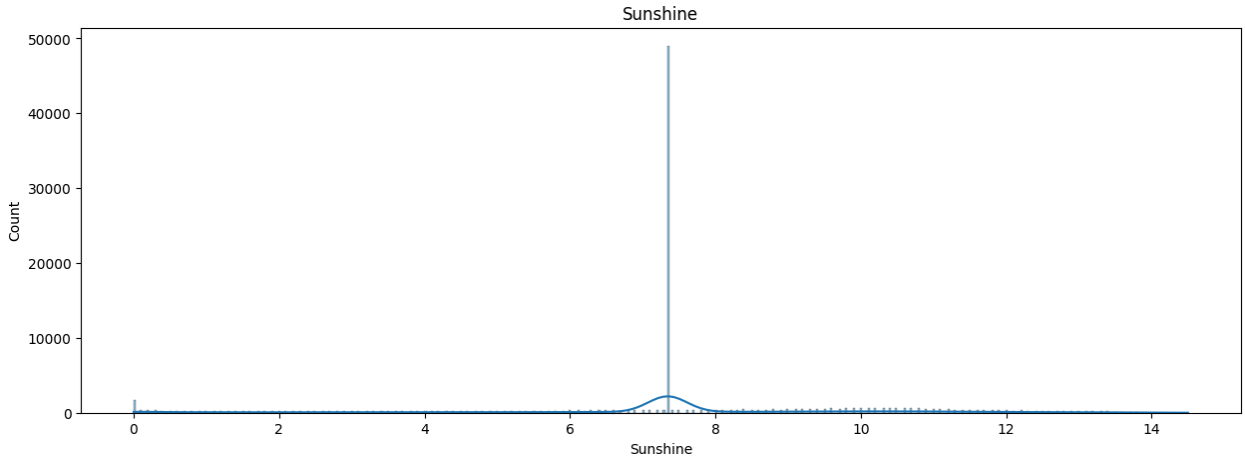
In [ ]:
```
for i in Numerical5:
  plt.figure(figsize=(15,5))
  sns.histplot(x=df5[i],kde=True)
  plt.title(i)
  plt.show()
```

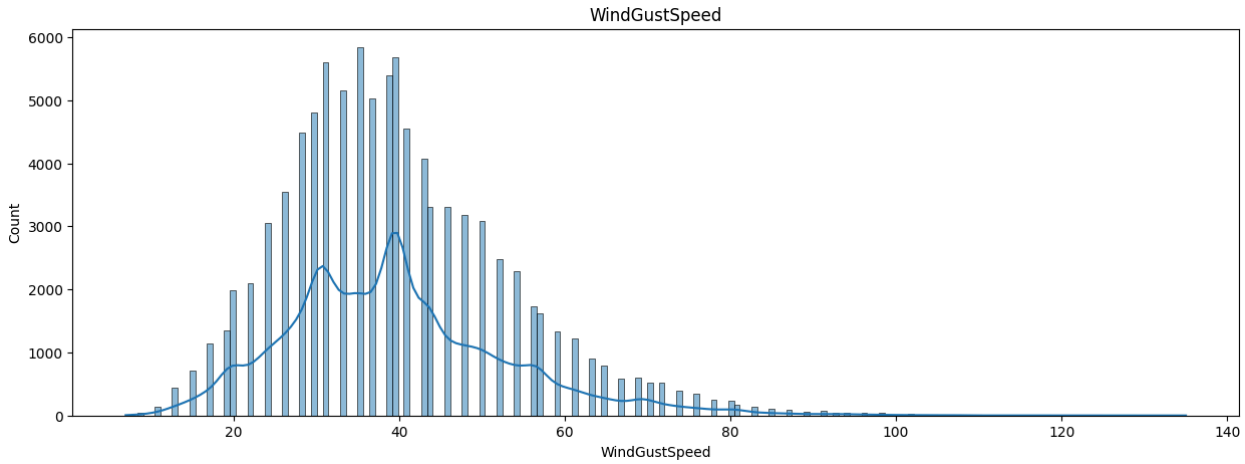


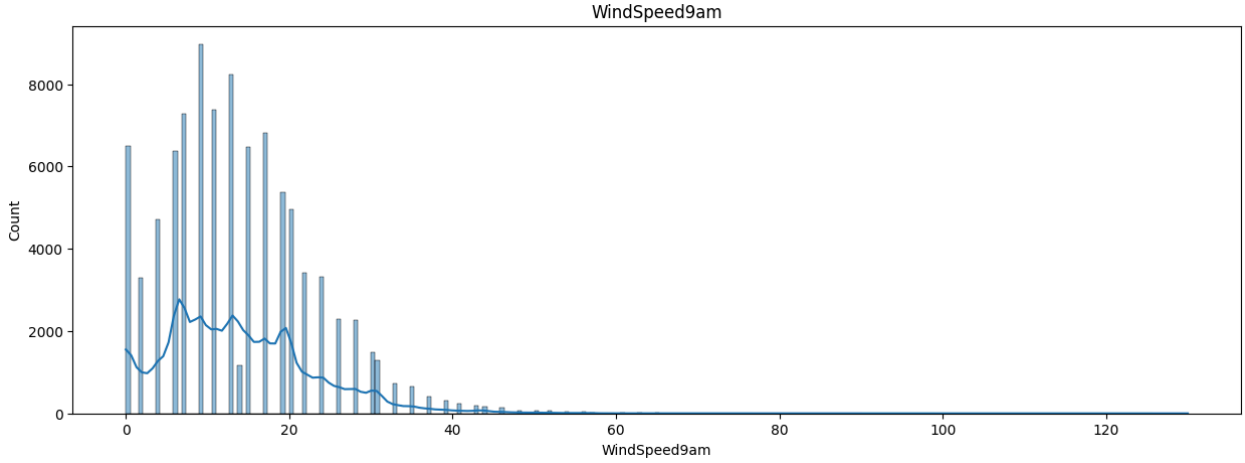

MaxTemp
Count
MaxTemp
0
500
1000
1500
2000
2500
0
10
20
30
40

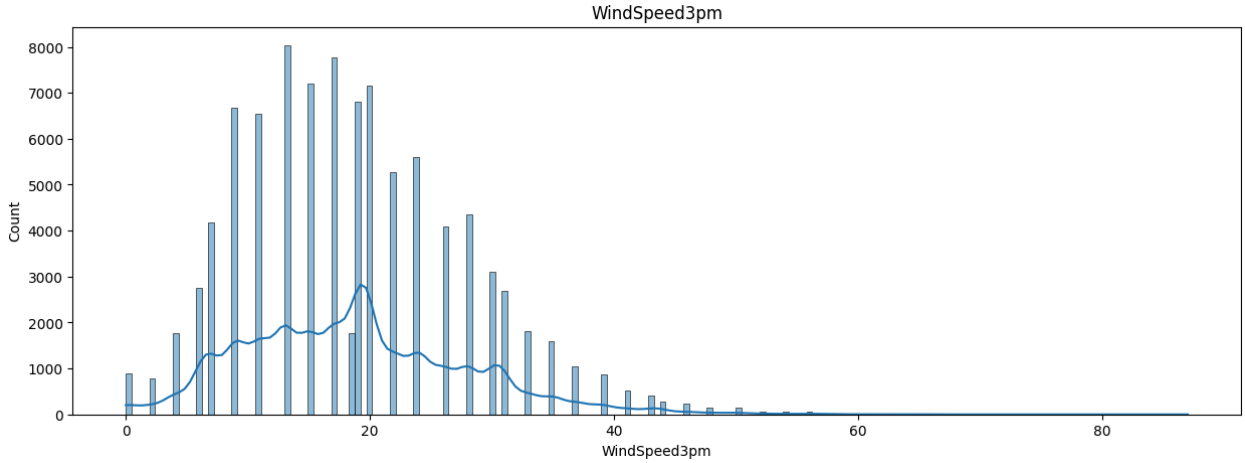

Rainfall
Count
Rainfall
0
10000
20000
30000
40000
50000
60000
0
50
100
150
200
250
300
350

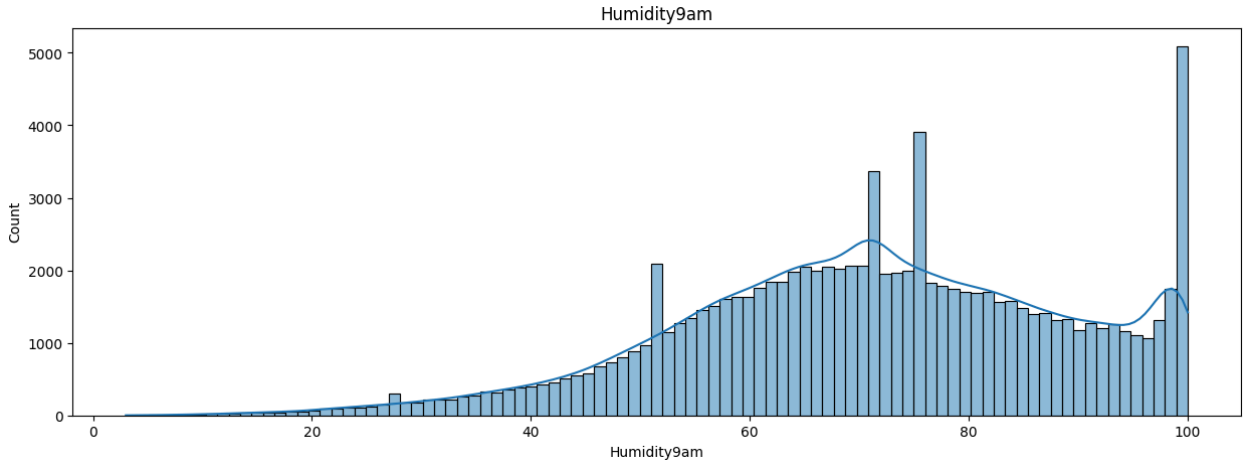

Evaporation
Count
Evaporation
0
5000
10000
15000
20000
25000
30000
35000
40000
0
20
40
60
80
100
120
140

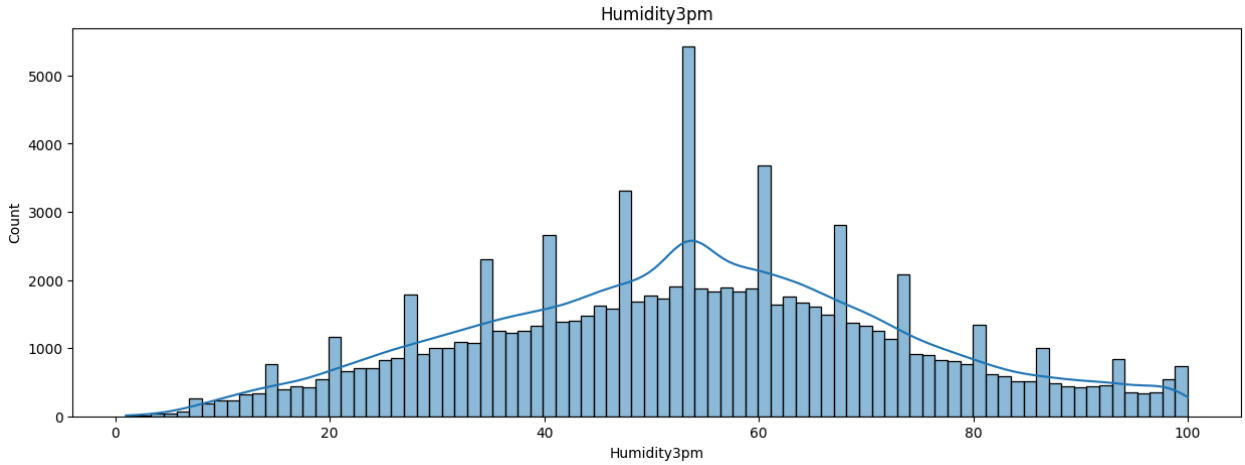

Sunshine
Count
Sunshine
0
10000
20000
30000
40000
50000
0
2
4
6
8
10
12
14

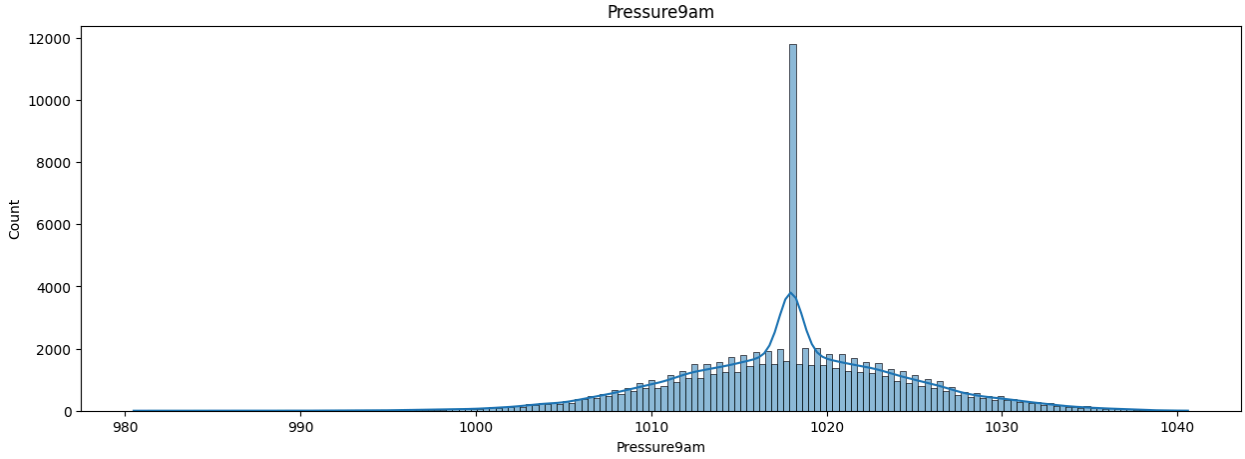

WindGustSpeed
Count
WindGustSpeed
0
1000
2000
3000
4000
5000
6000
20
40
60
80
100
120
140

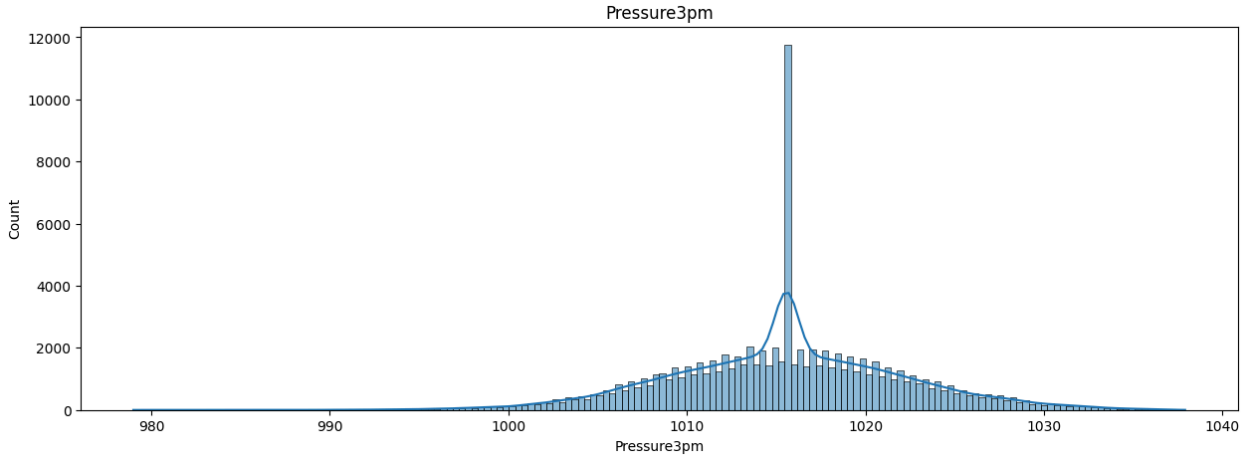

WindSpeed9am
Count
WindSpeed9am
0
2000
4000
6000
8000
0
20
40
60
80
100
120

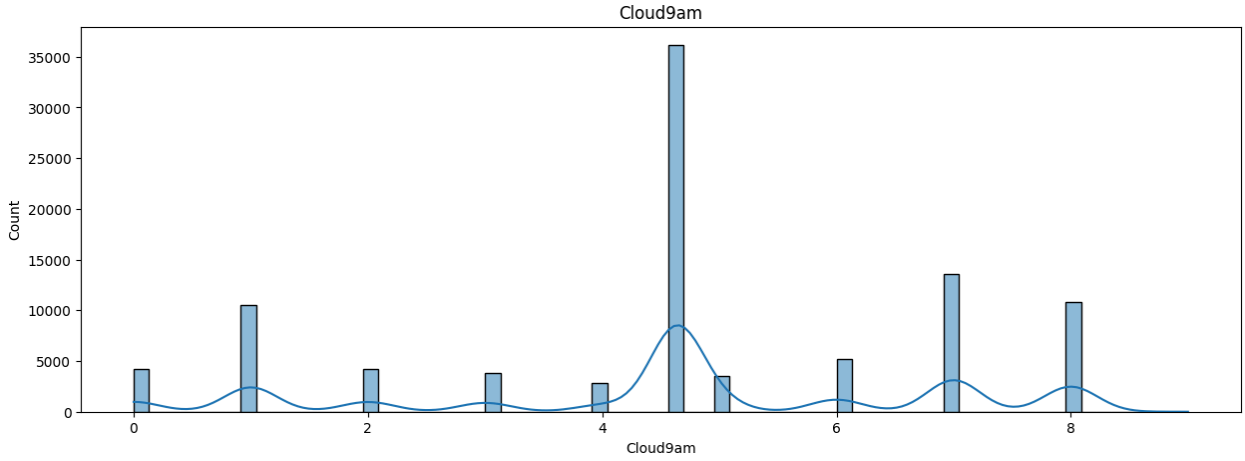

WindSpeed3pm
Count
WindSpeed3pm
0
1000
2000
3000
4000
5000
6000
7000
8000
0
20
40
60
80

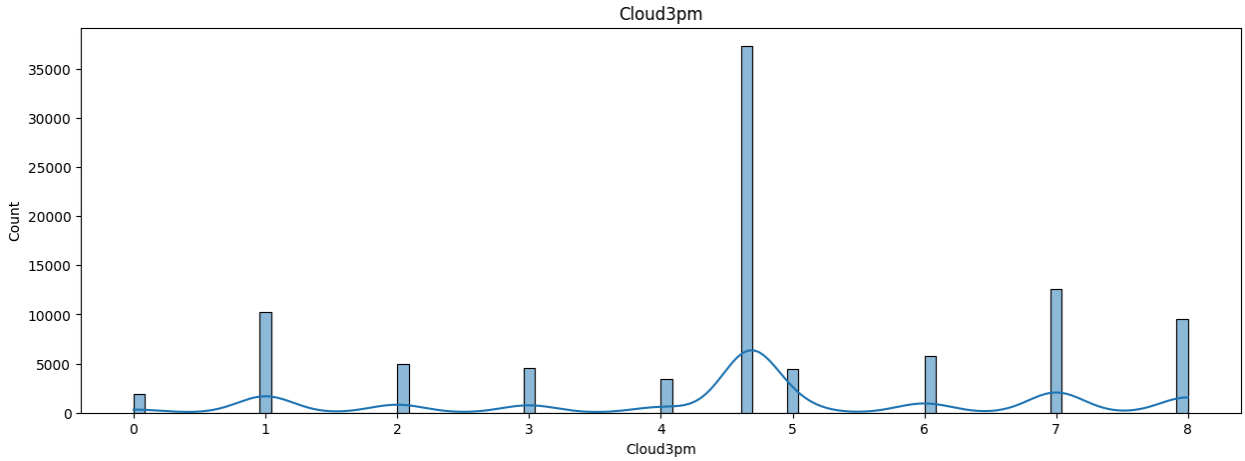

Humidity9am
Count
Humidity9am
0
1000
2000
3000
4000
5000
0
20
40
60
80
100

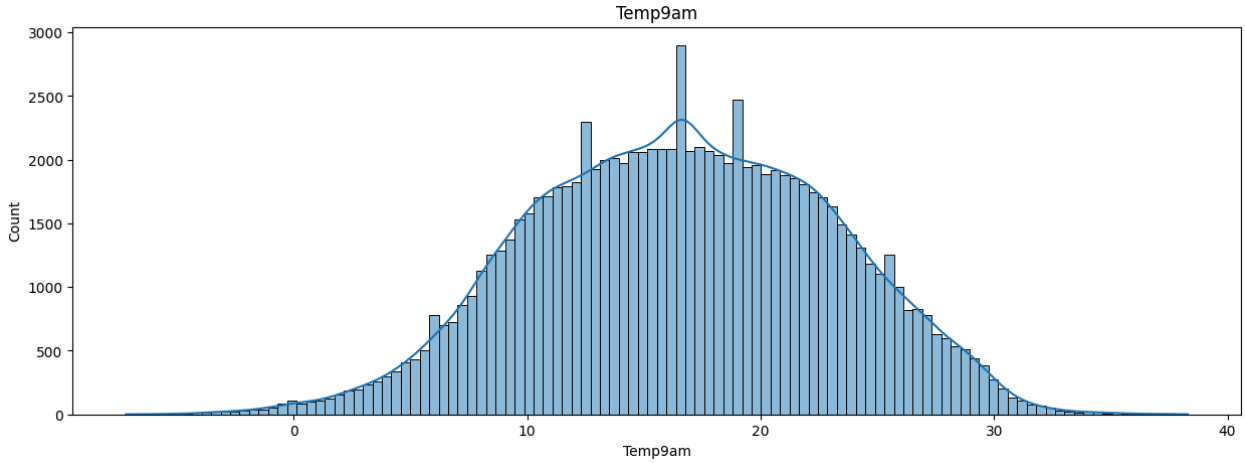

Humidity3pm
Count
Humidity3pm
0
1000
2000
3000
4000
5000
0
20
40
60
80
100

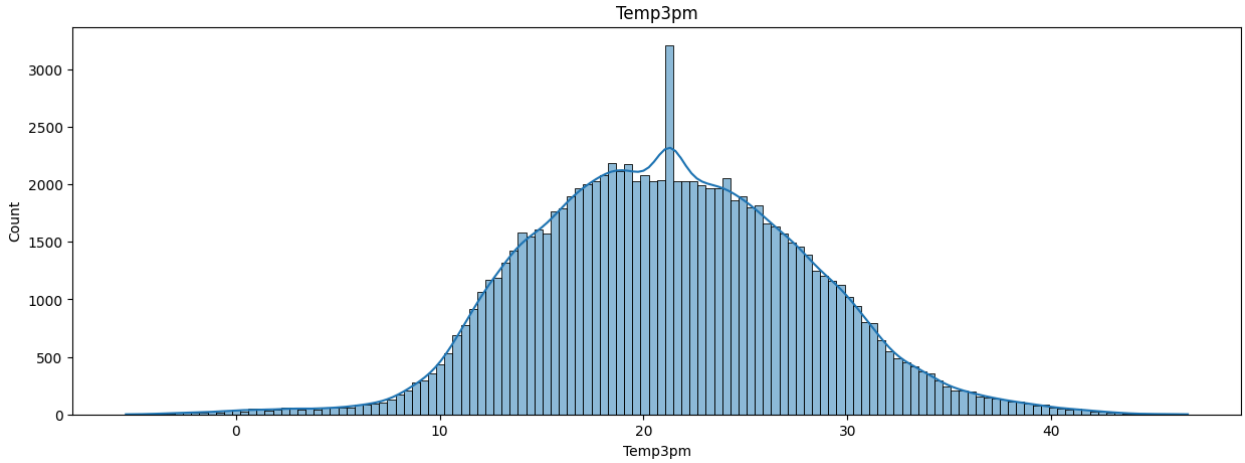

Pressure9am
Count
Pressure9am
0
2000
4000
6000
8000
10000
12000
980
990
1000
1010
1020
1030
1040

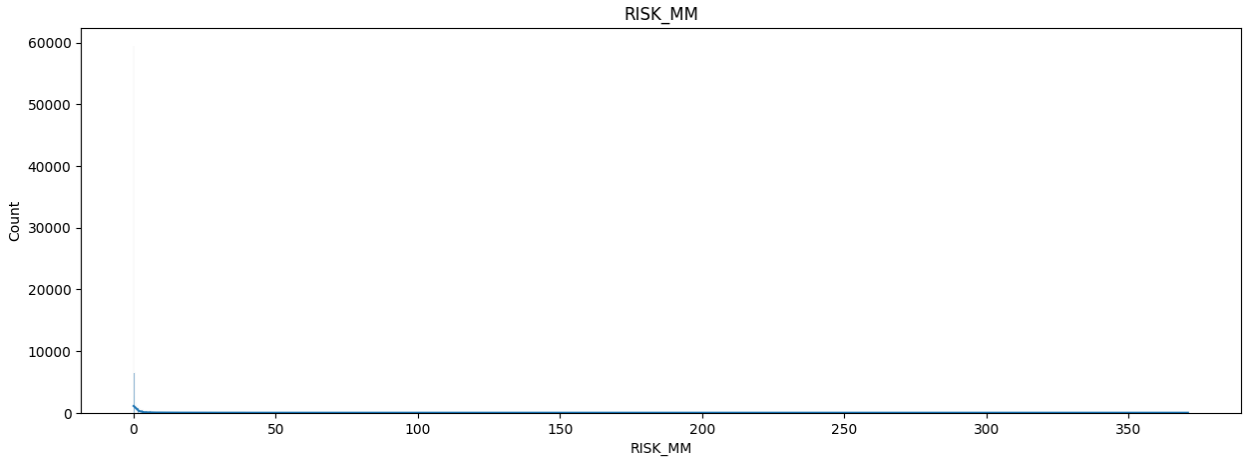

Pressure3pm
Count
Pressure3pm
0
2000
4000
6000
8000
10000
12000
980
990
1000
1010
1020
1030
1040


Cloud9am
Count
Cloud9am
0
5000
10000
15000
20000
25000
30000
35000
0
2
4
6
8

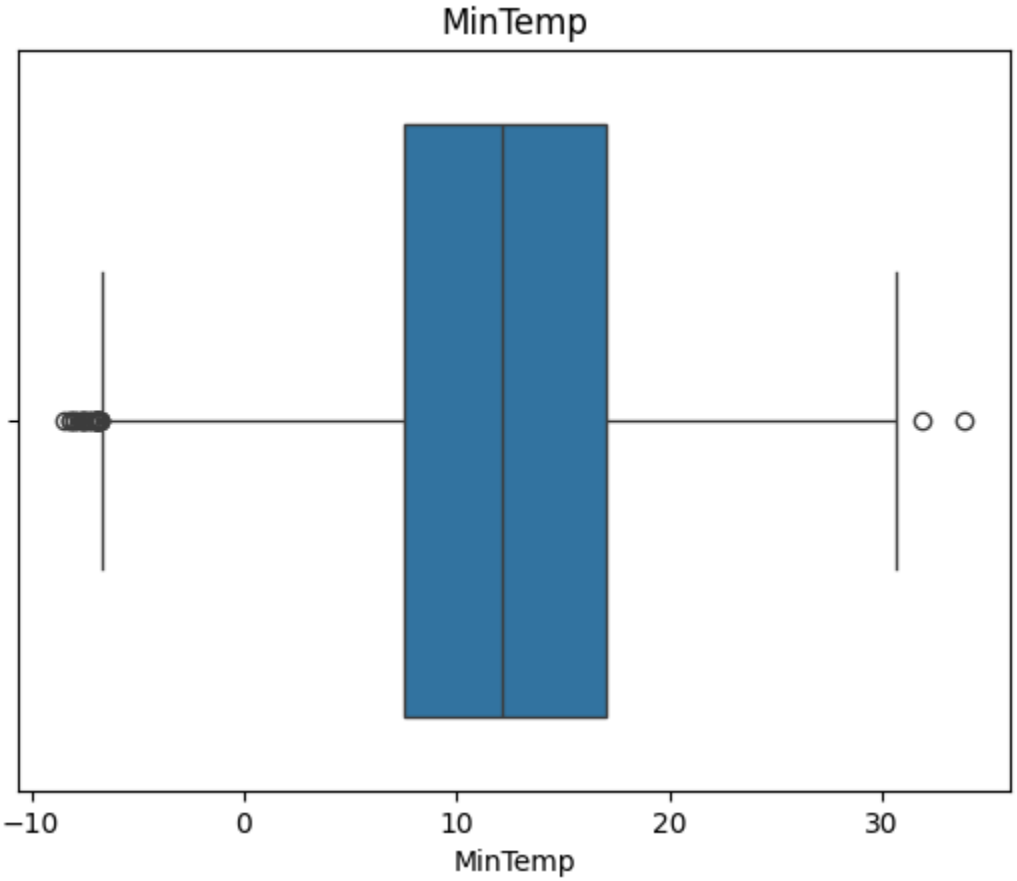

Cloud3pm
Count
Cloud3pm

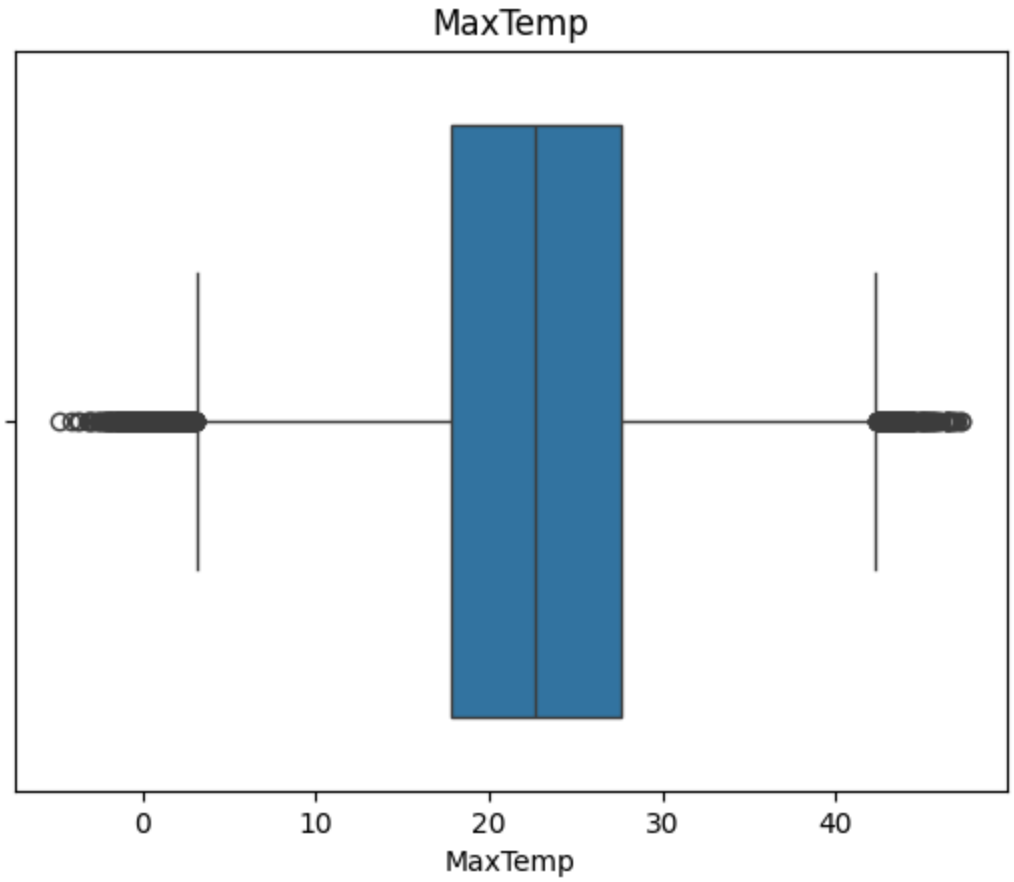

Temp9am
Count
Temp9am

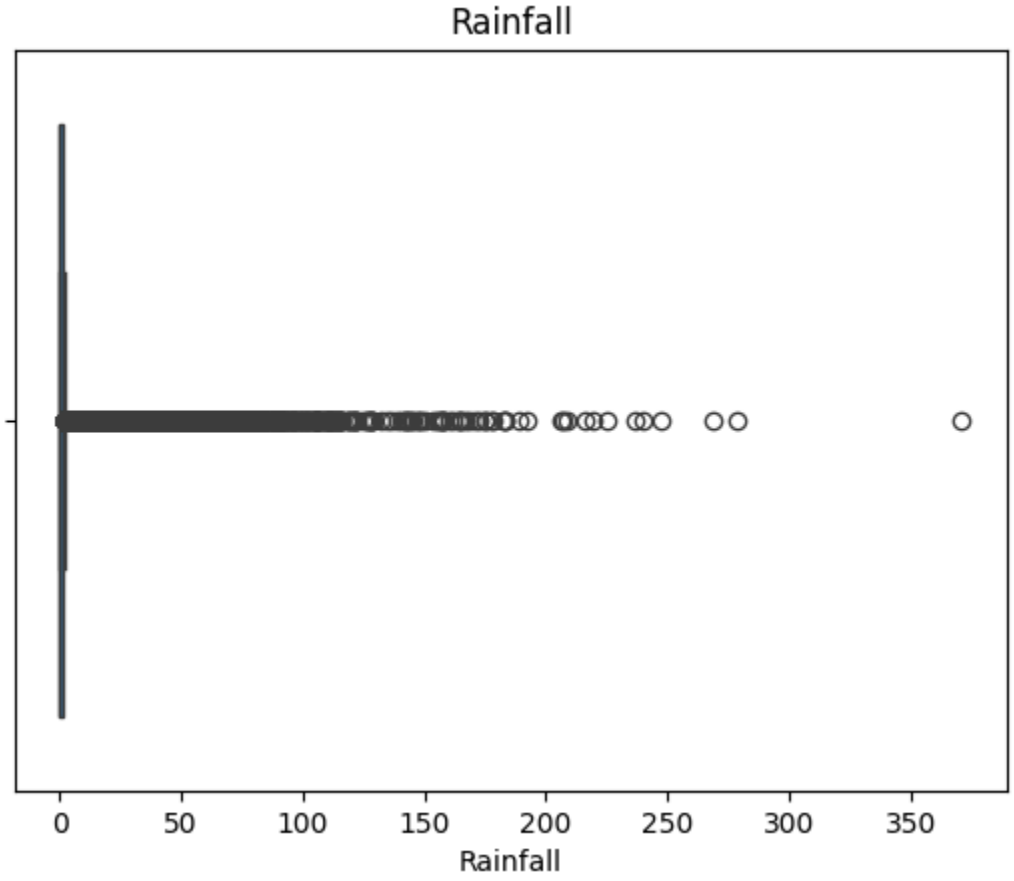

Temp3pm
Count
Temp3pm

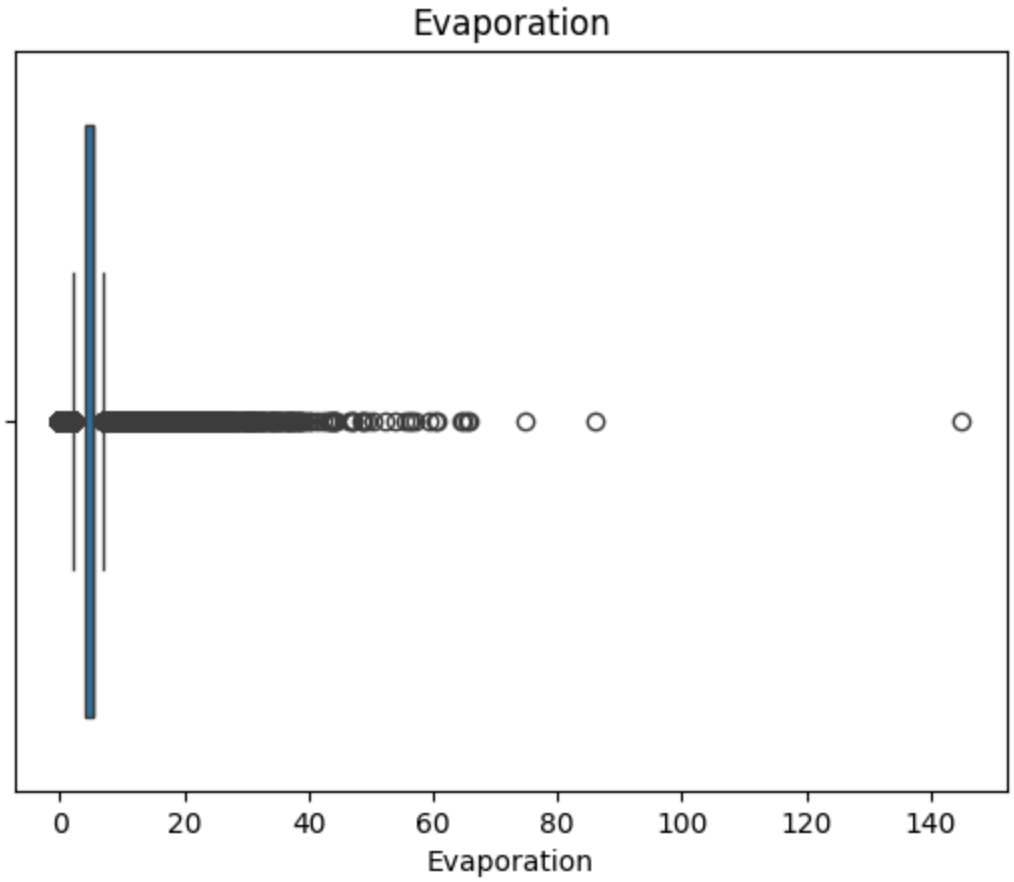


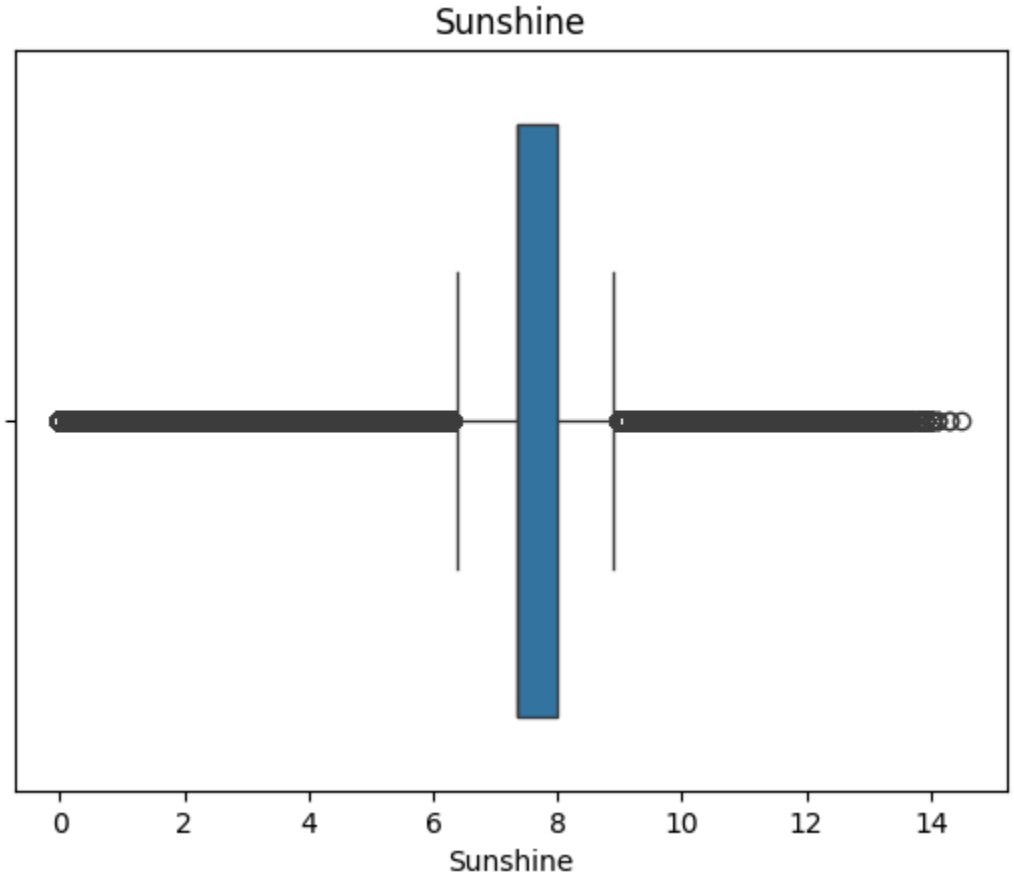
In [ ]:
```
for i in Numerical5:
  sns.boxplot(x=df5[i])
  plt.title(i)
  plt.show()
```

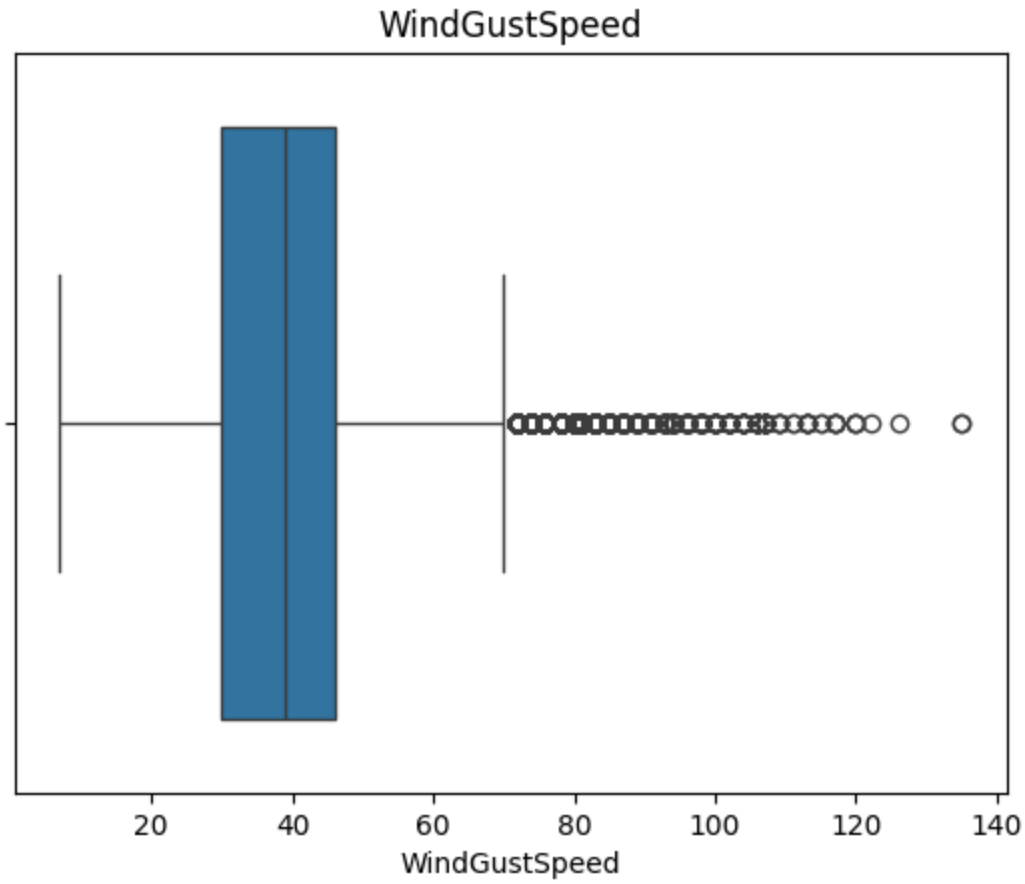


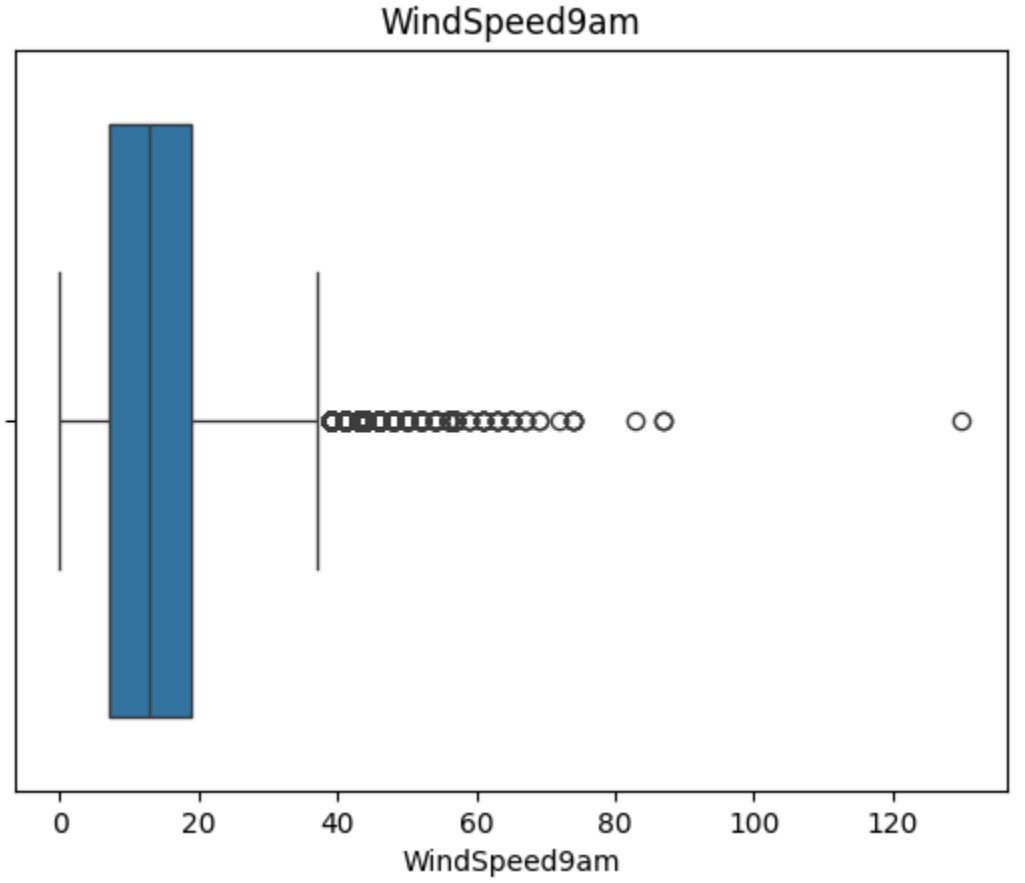

MaxTemp
0
10
20
30
40
MaxTemp

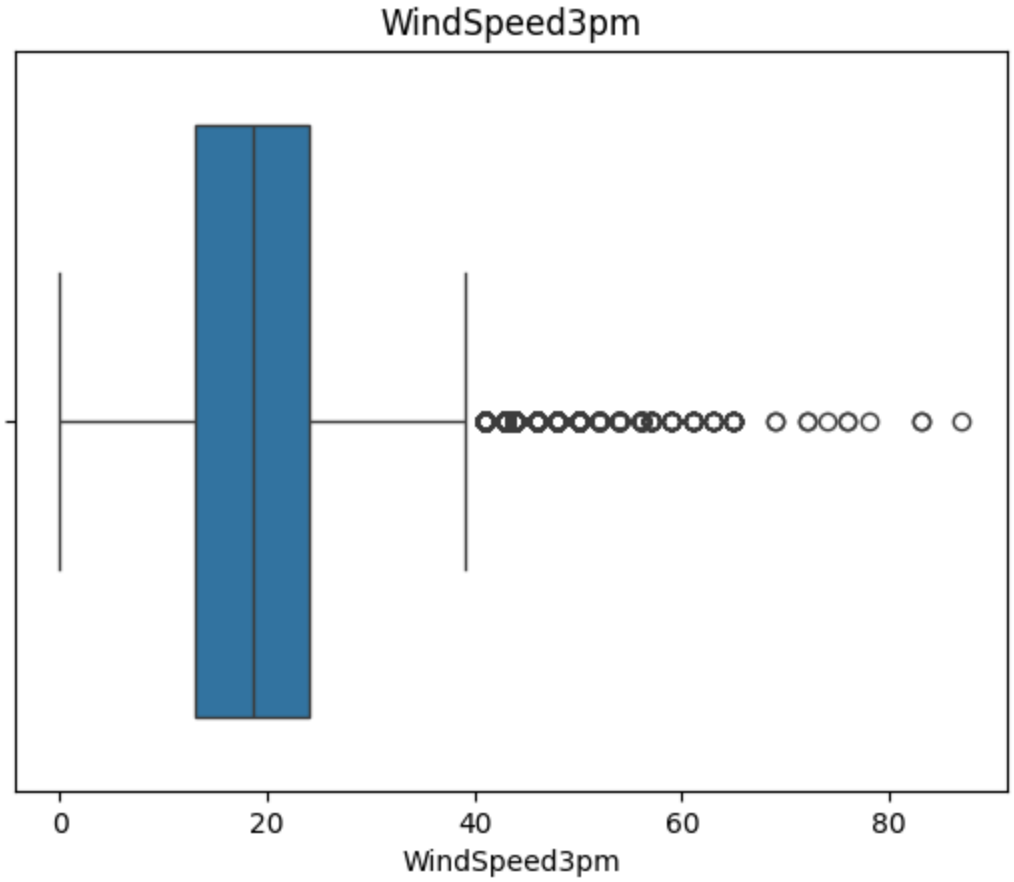

Rainfall
0
50
100
150
200
250
300
350
Rainfall

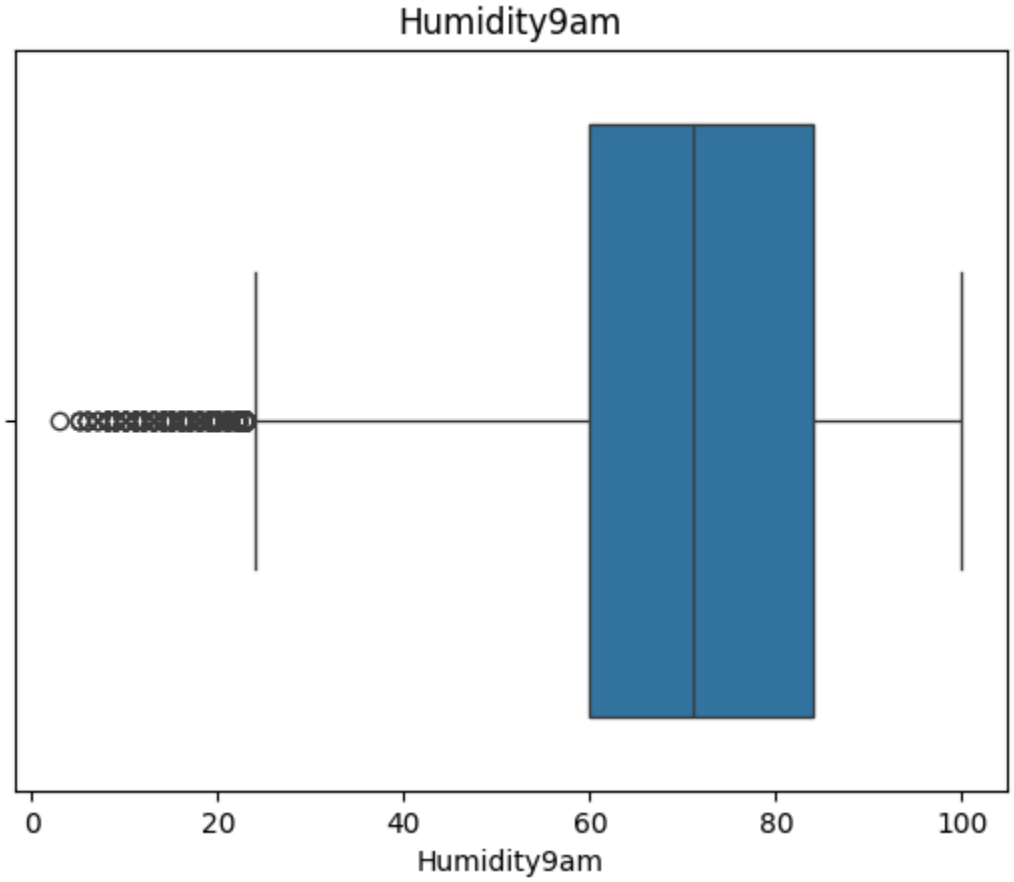

Evaporation
0
20
40
60
80
100
120
140
Evaporation

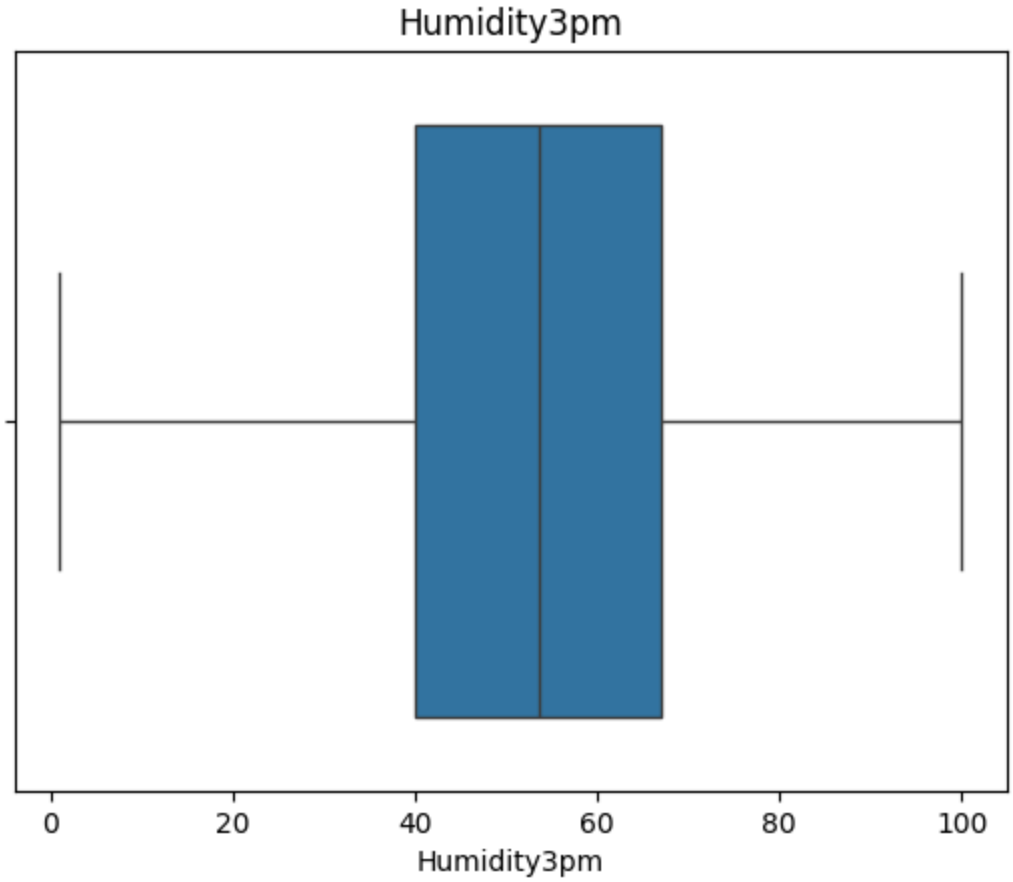

Sunshine
0
2
4
6
8
10
12
14
Sunshine

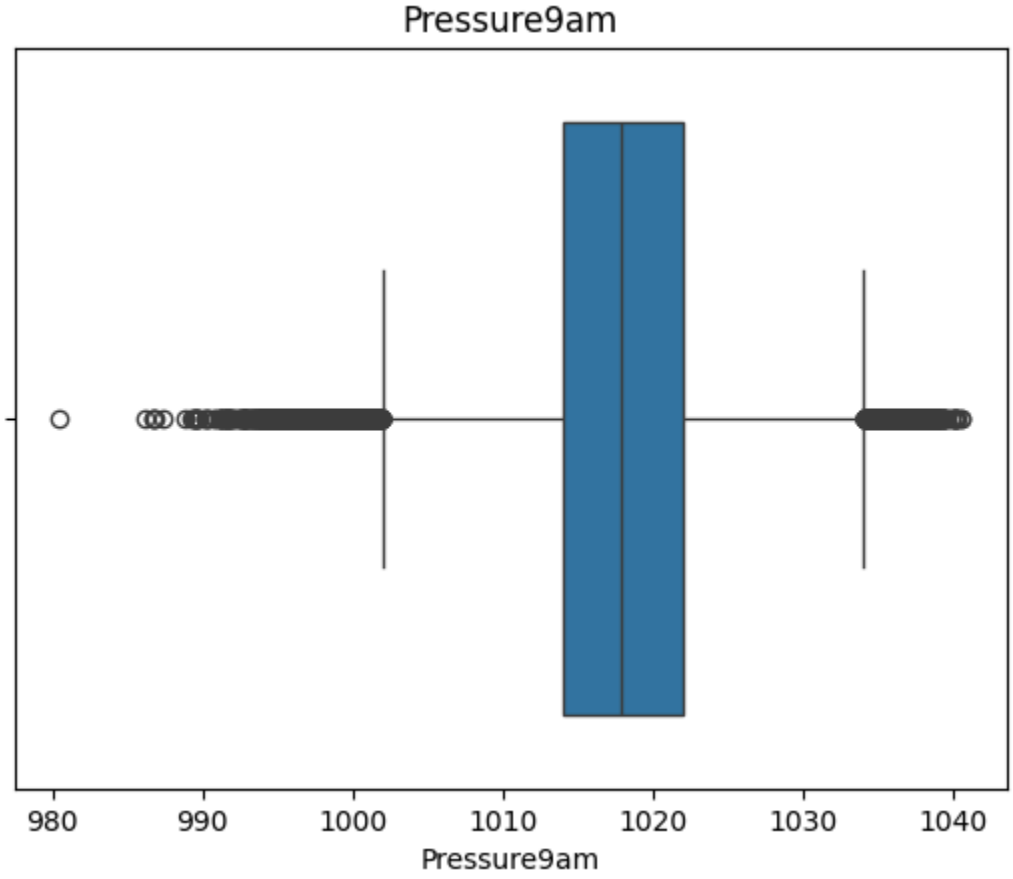

WindGustSpeed
20
40
60
80
100
120
140
WindGustSpeed

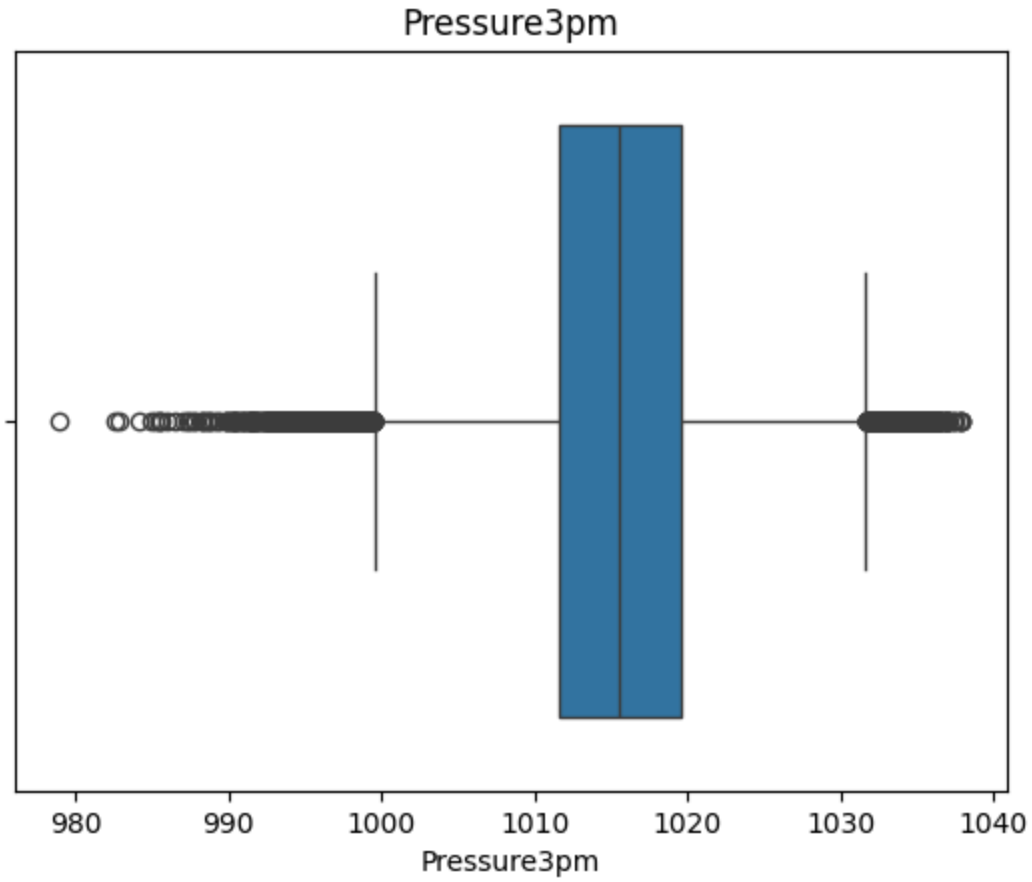

WindSpeed9am
0
20
40
60
80
100
120
WindSpeed9am

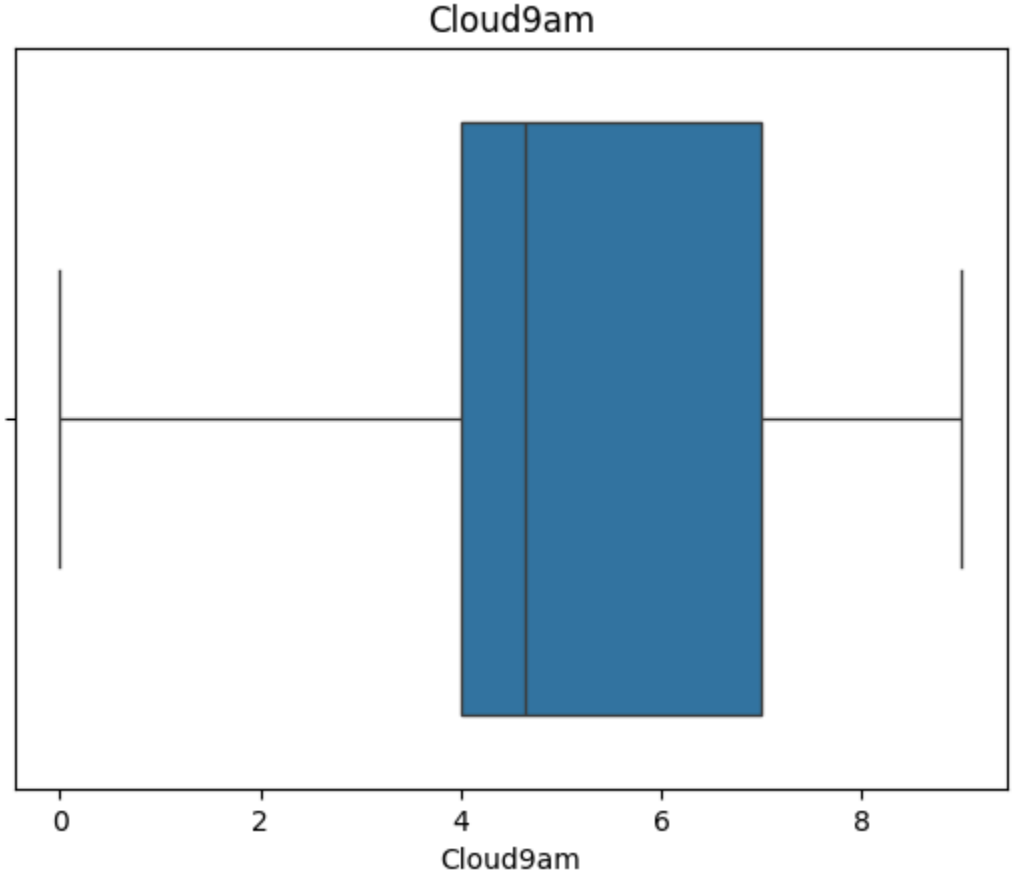

WindSpeed3pm
0
20
40
60
80
WindSpeed3pm

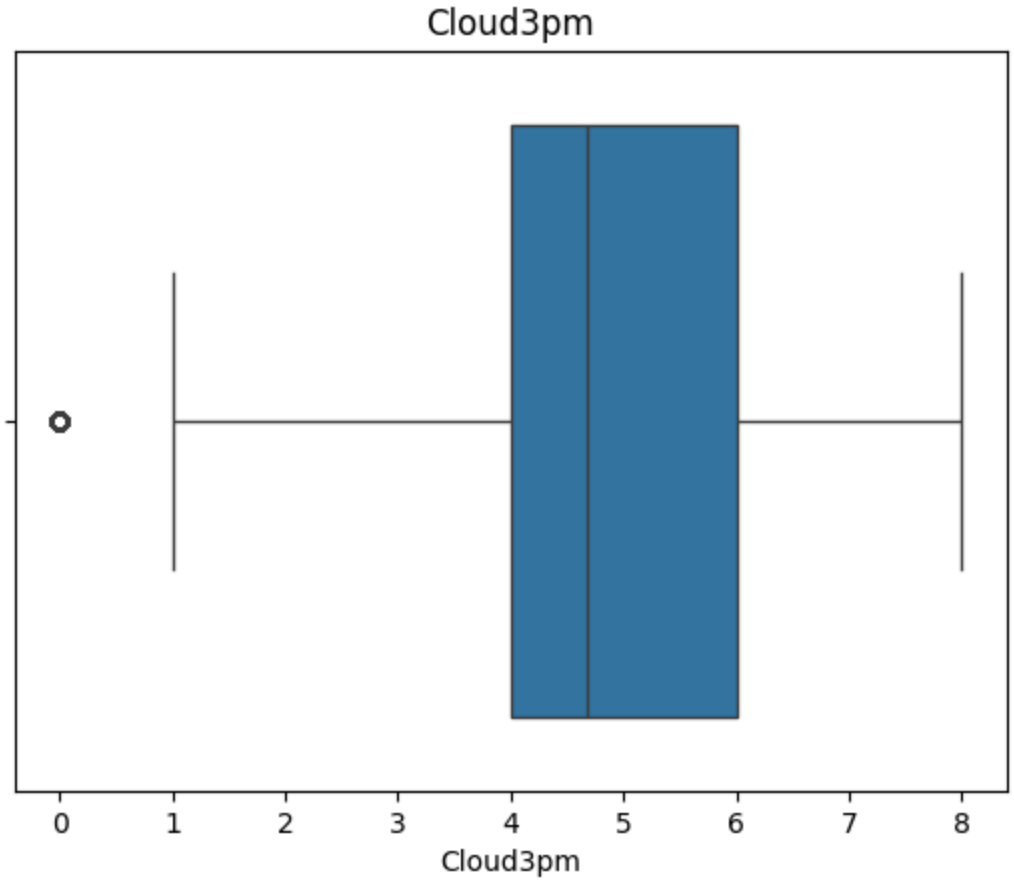

Humidity9am
0
20
40
60
80
100
Humidity9am

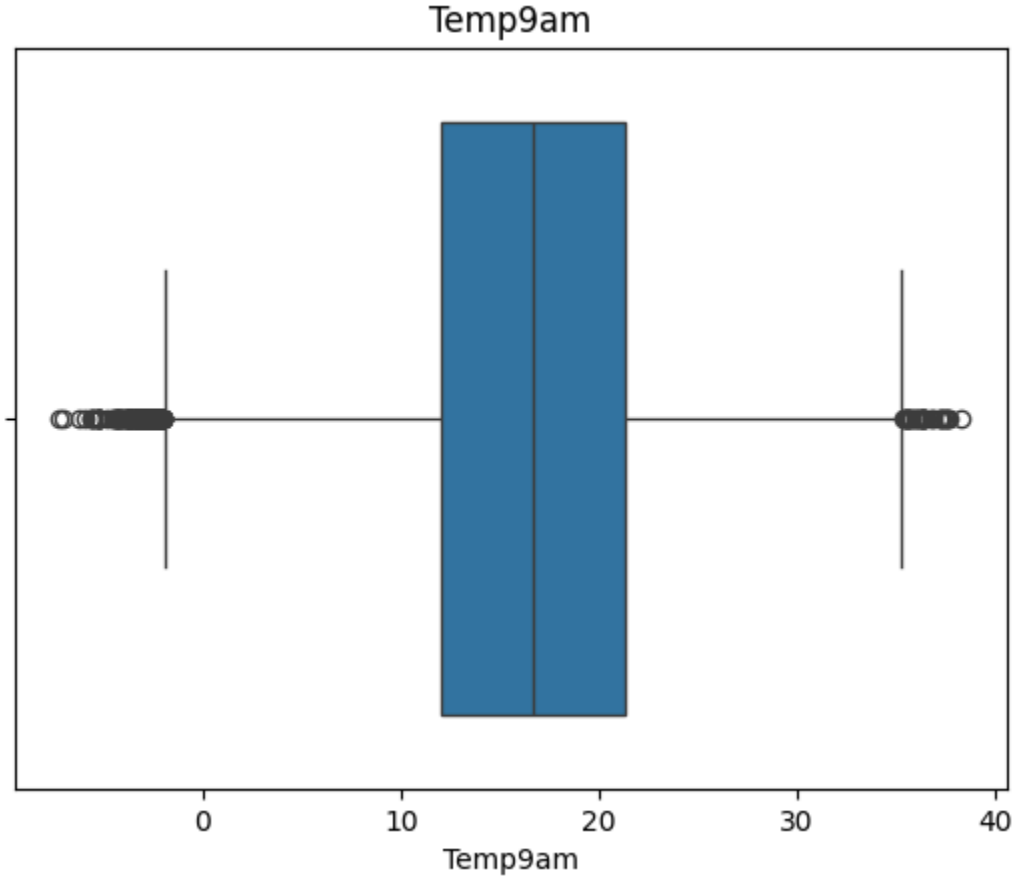

Humidity3pm
0
20
40
60
80
100
Humidity3pm

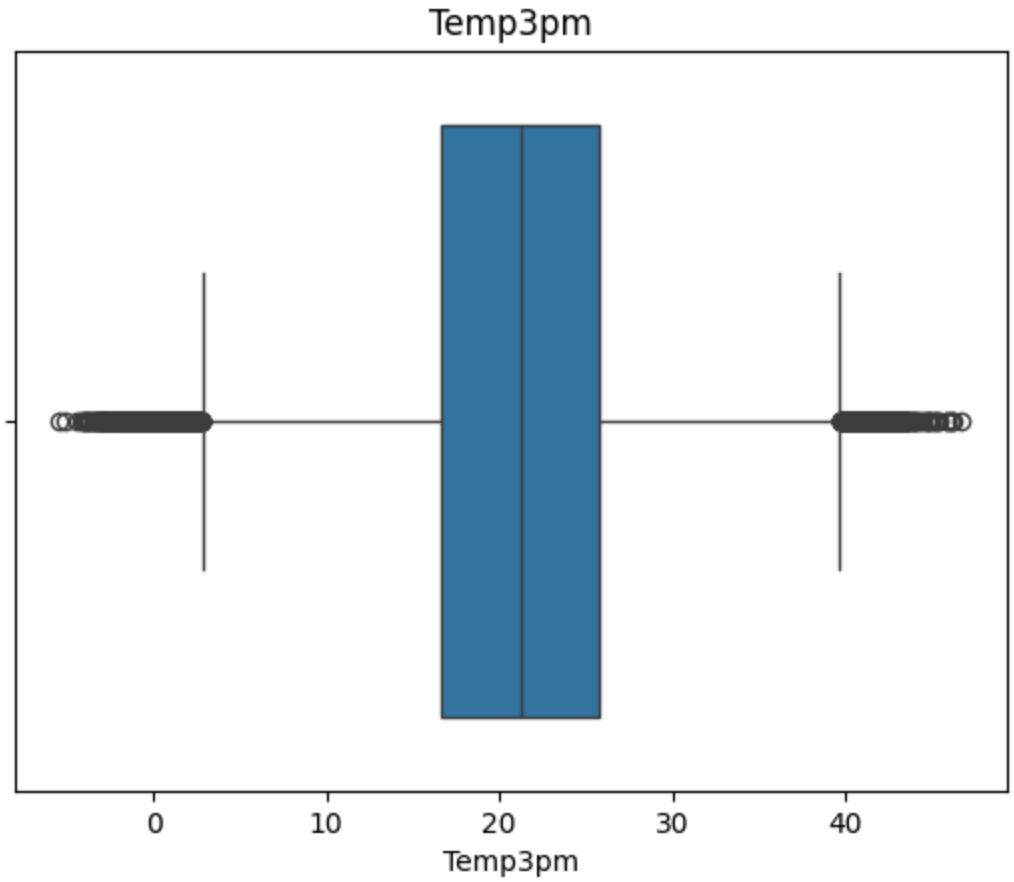

Pressure9am
980
990
1000
1010
1020
1030
1040
Pressure9am

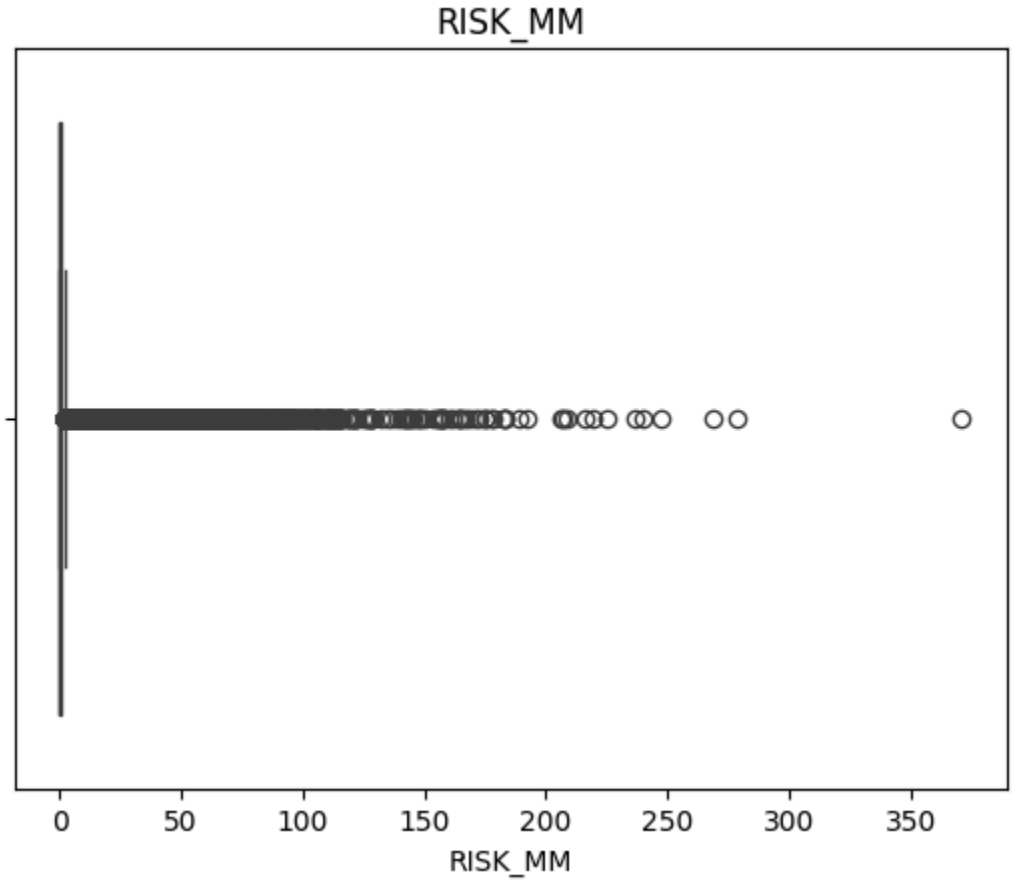

Pressure3pm
980
990
1000
1010
1020
1030
1040
Pressure3pm


Cloud9am
0
2
4
6
8
Cloud9am

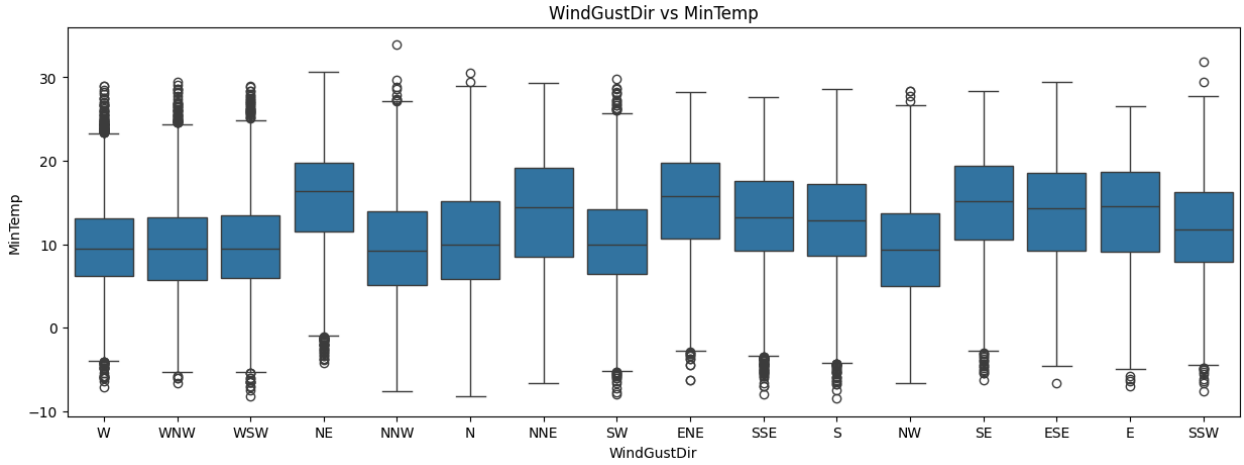

Cloud3pm
0
1
2
3
4
5
6
7
8
Cloud3pm

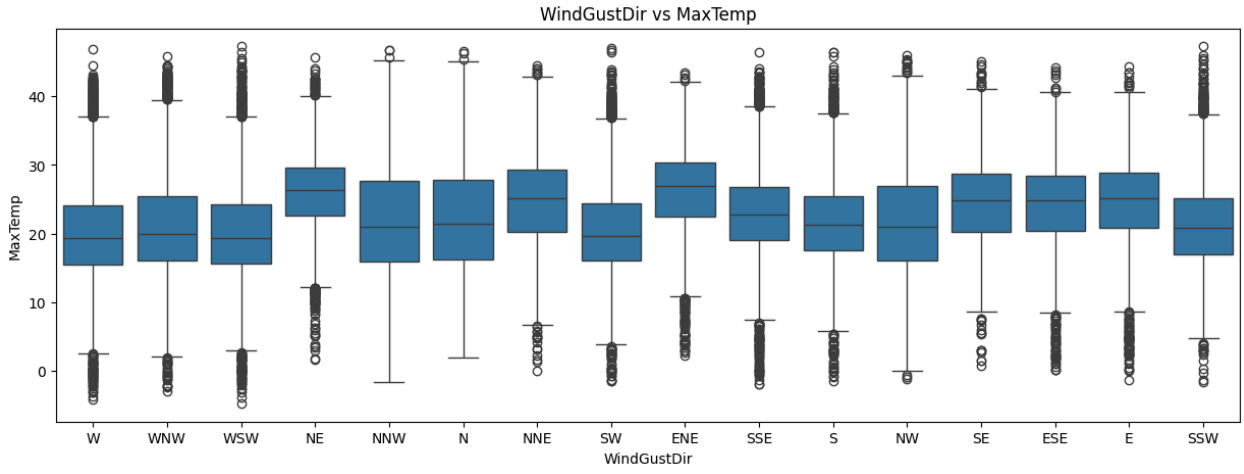

Temp9am
0
10
20
30
40
Temp9am

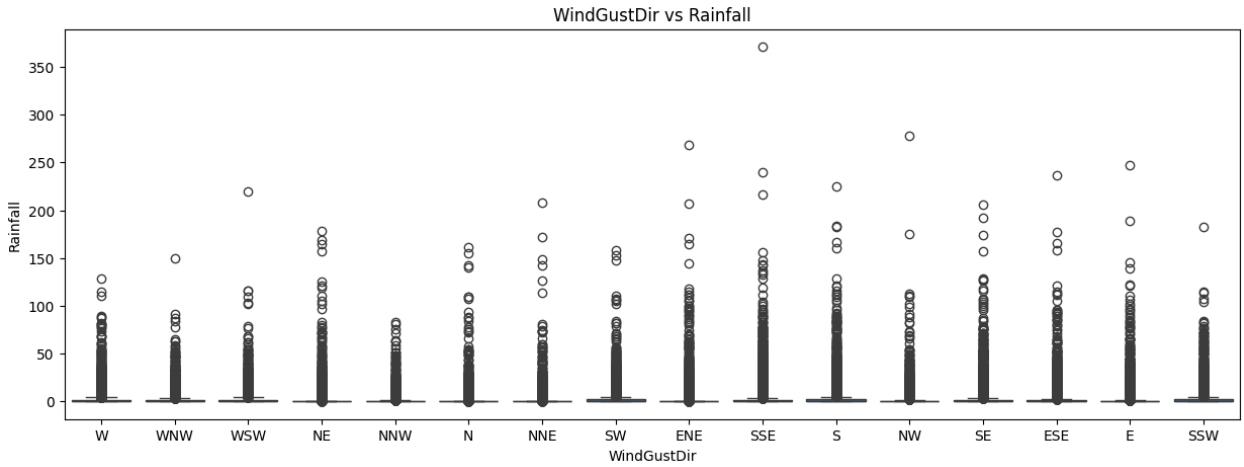

Temp3pm
0
10
20
30
40
Temp3pm

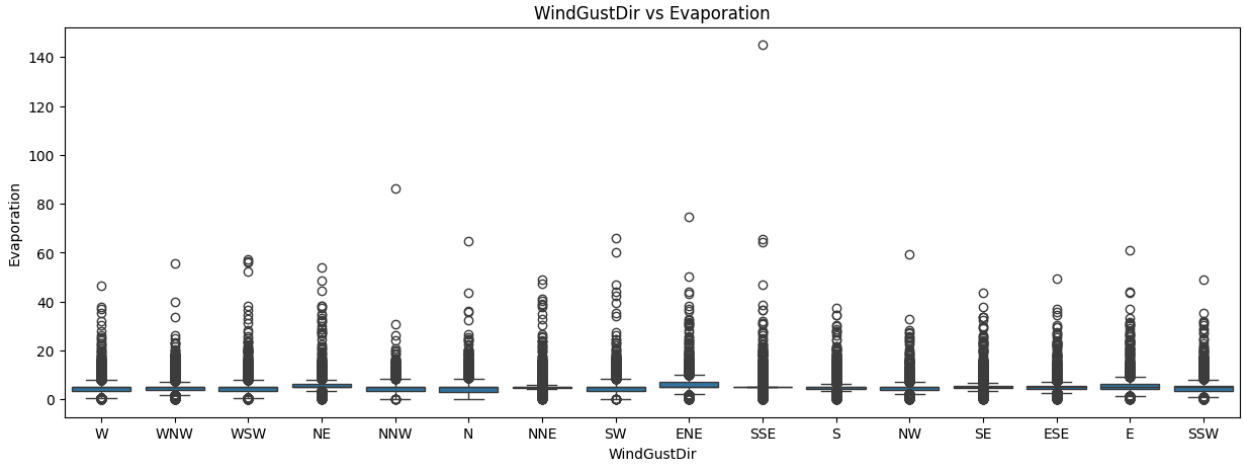

RISK_MM
0
50
100
150
200
250
300
350
RISK_MM

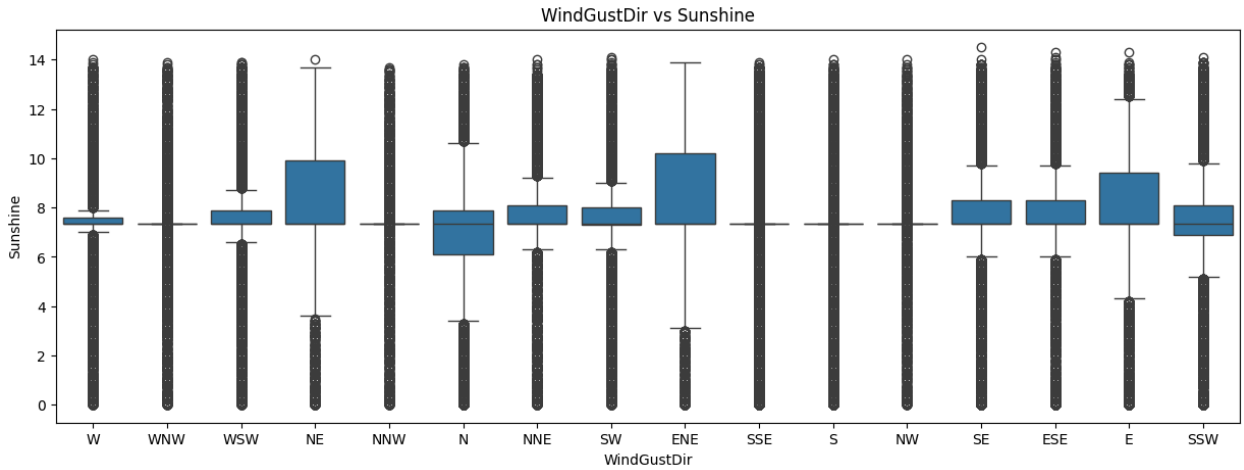
In [ ]:
```
for i in categorical5:
  if i!='Date' and i!='Location':
    for j in Numerical5:
      plt.figure(figsize=(15,5))
      sns.boxplot(x=df5[i],y=df5[j])
      plt.title(i+' vs '+j)
      plt.show()
```

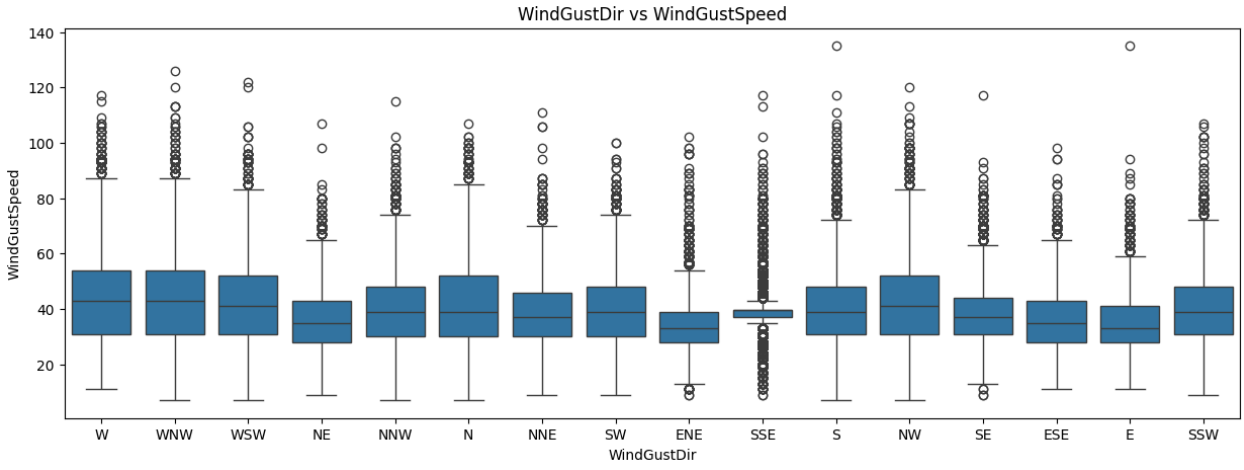


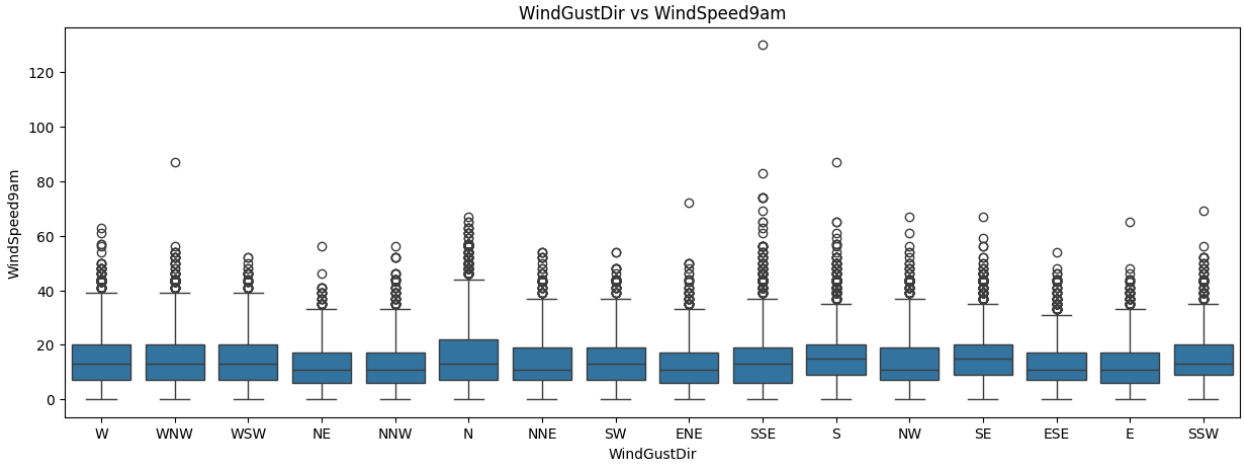


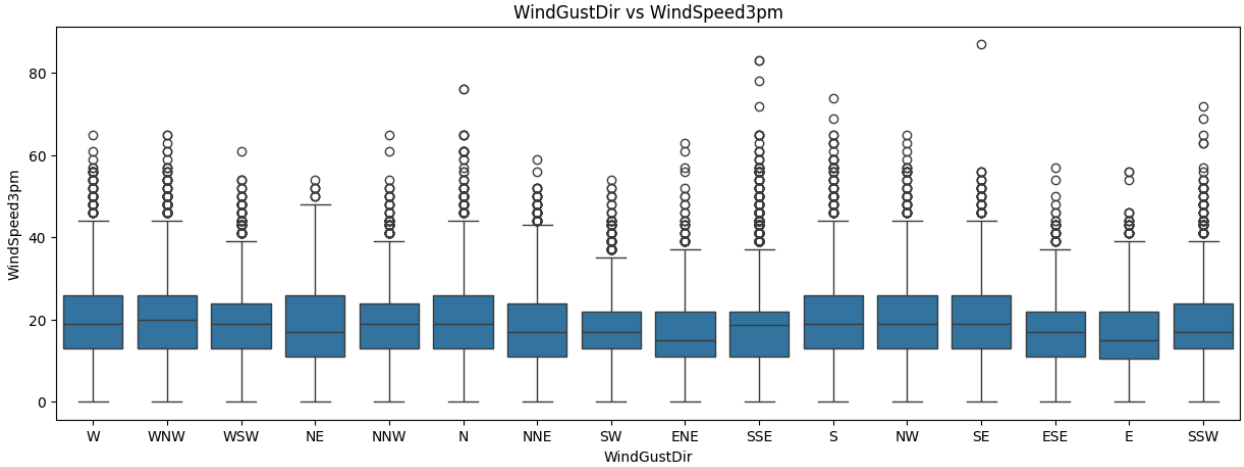


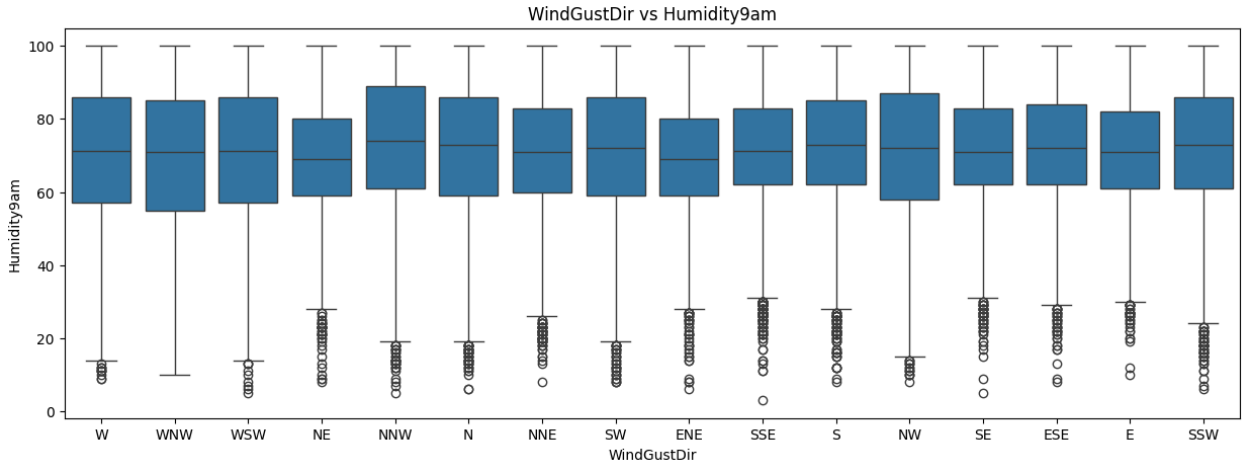

WindGustDir vs Evaporation
Evaporation
WindGustDir
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW

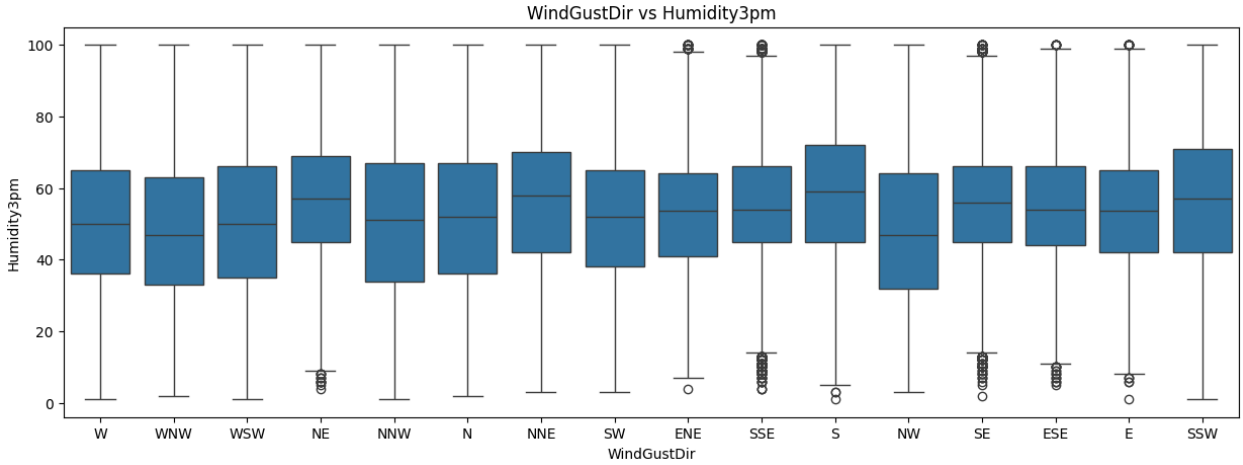

WindGustDir vs Sunshine
Sunshine
WindGustDir
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW

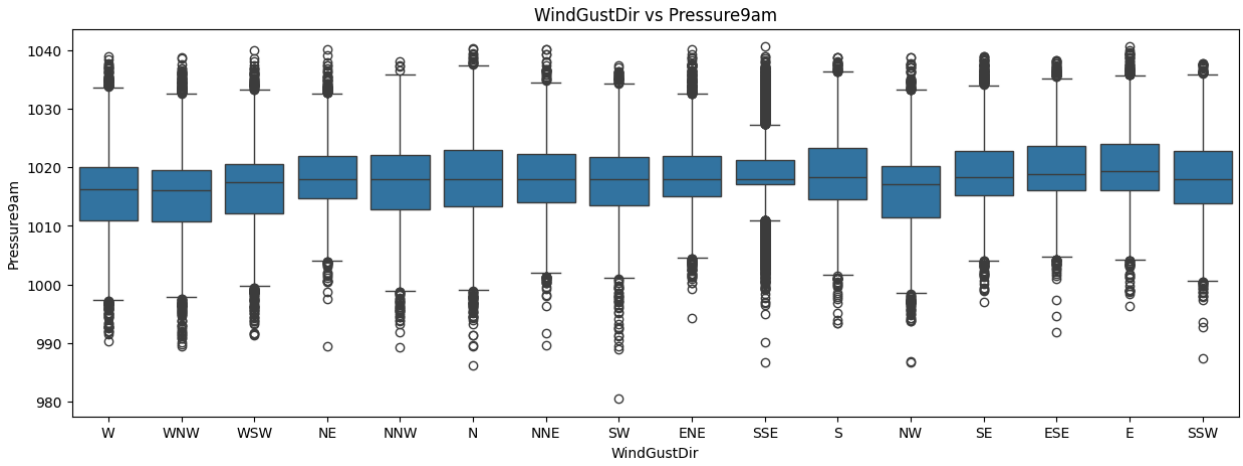

WindGustDir vs WindGustSpeed
WindGustSpeed
WindGustDir
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW

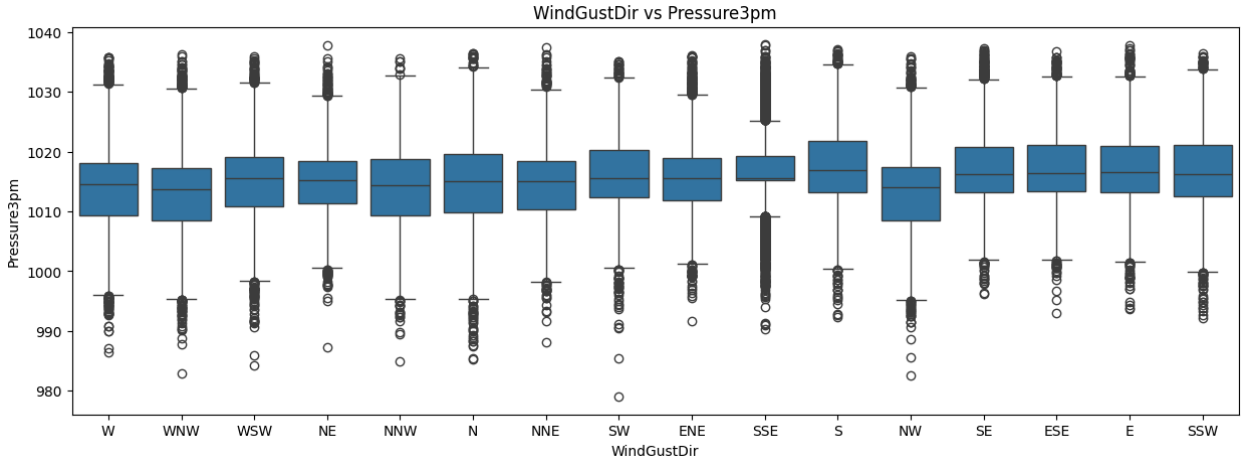

WindGustDir vs WindSpeed9am
WindSpeed9am
0
20
40
60
80
100
120
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

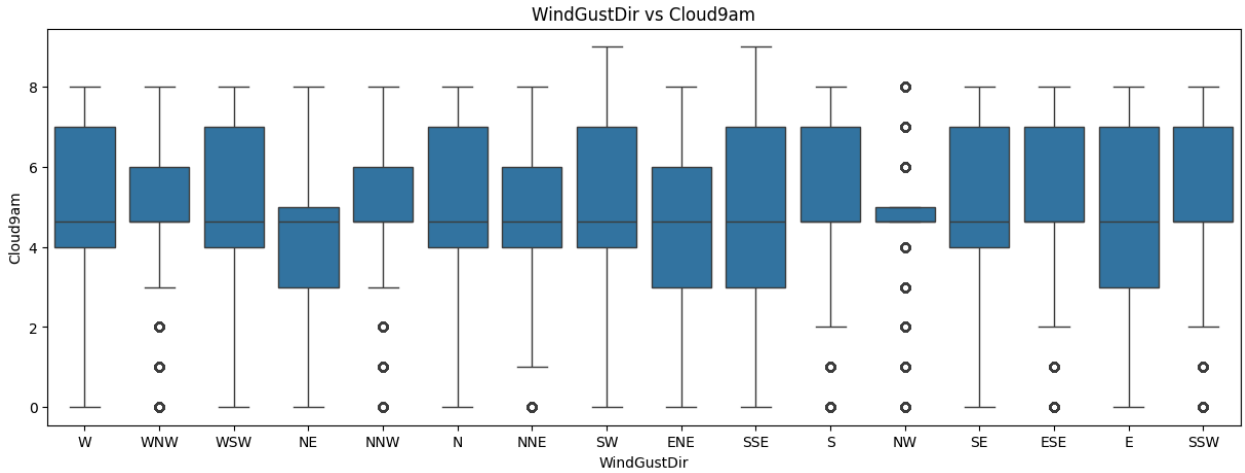

WindGustDir vs WindSpeed3pm
WindSpeed3pm
0
20
40
60
80
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

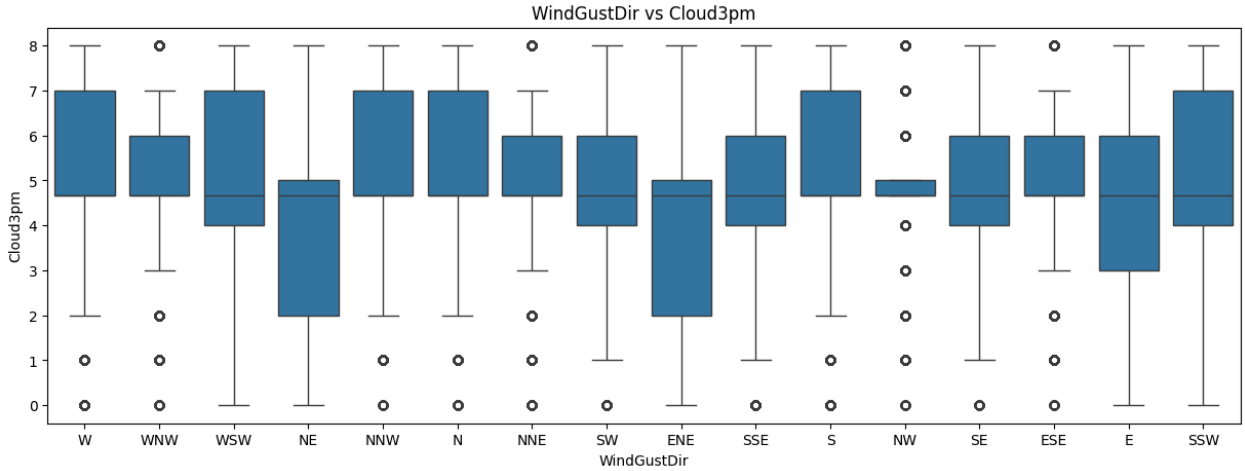

WindGustDir vs Humidity9am
Humidity9am
0
20
40
60
80
100
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

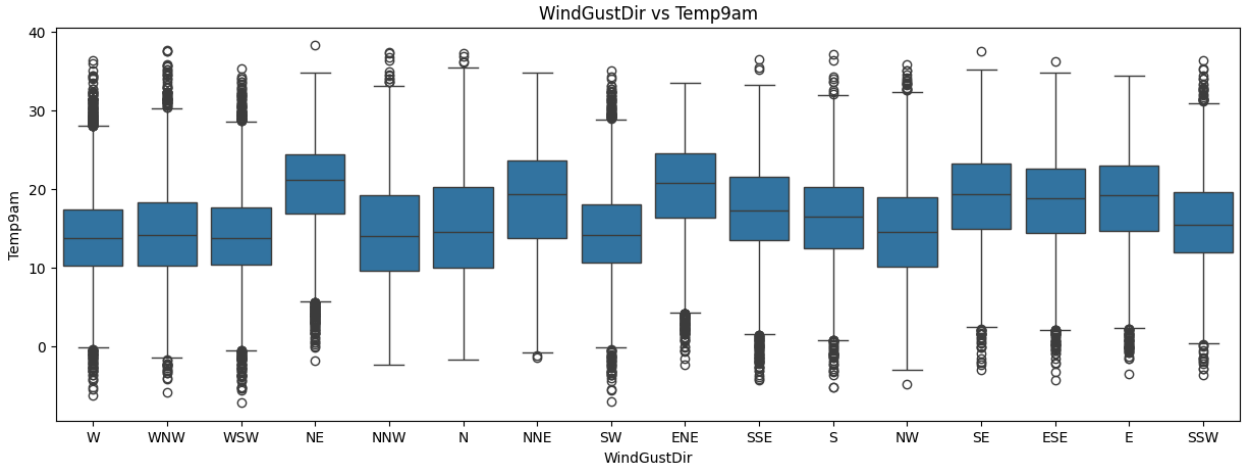

WindGustDir vs Humidity3pm
Humidity3pm
0
20
40
60
80
100
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

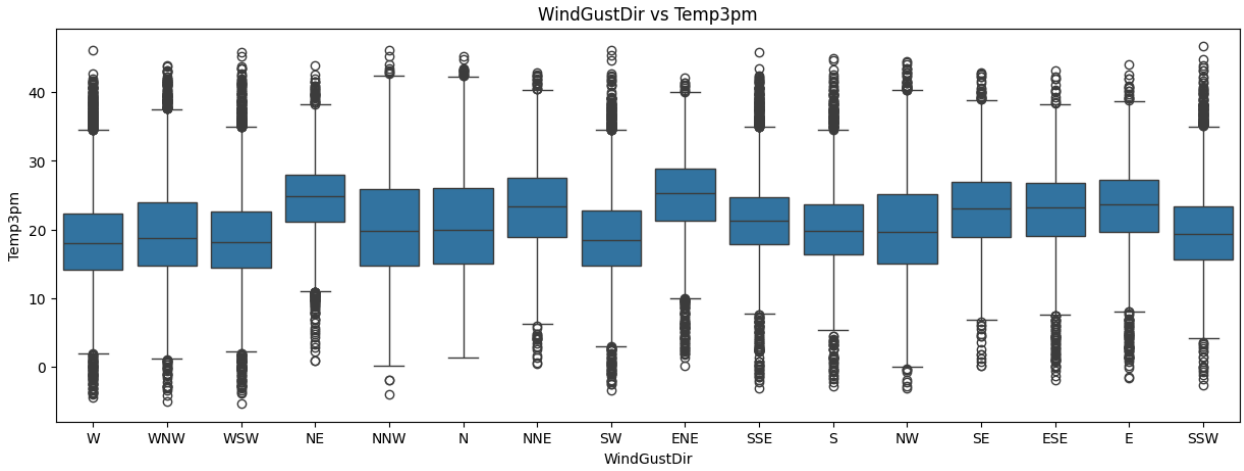

WindGustDir vs Pressure9am
Pressure9am
980
990
1000
1010
1020
1030
1040
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

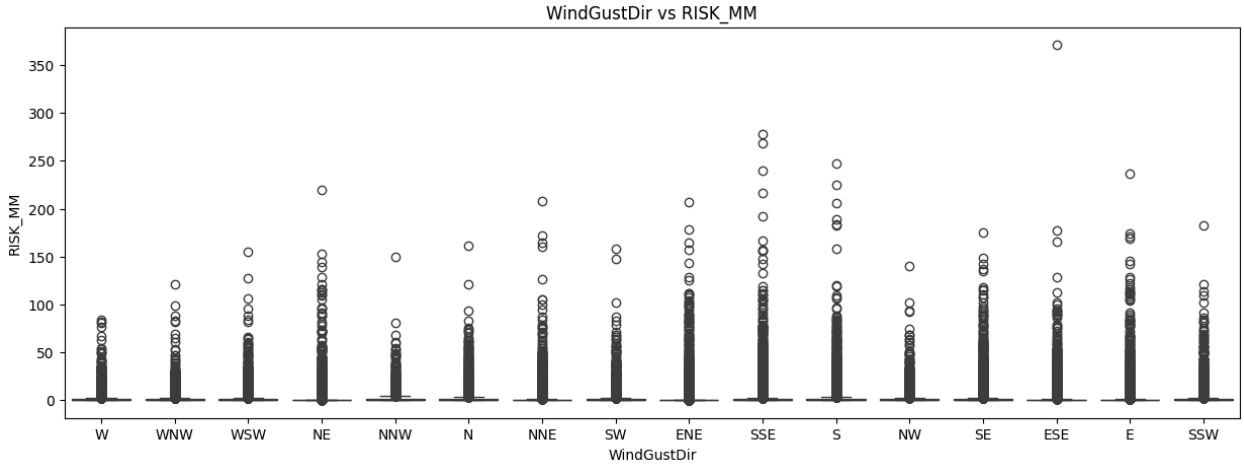

WindGustDir vs Pressure3pm
Pressure3pm
980
990
1000
1010
1020
1030
1040
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

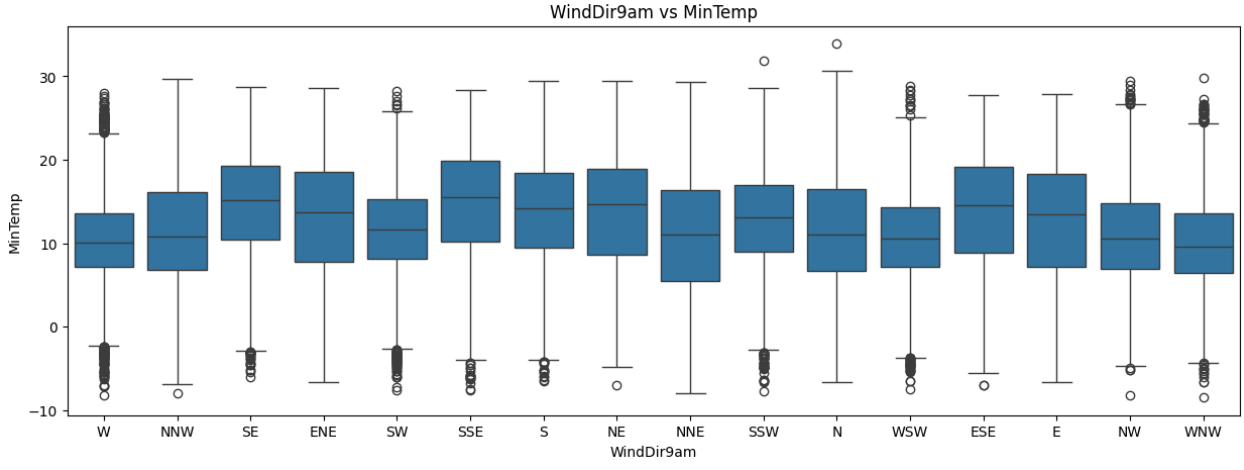

WindGustDir vs Cloud9am
Cloud9am
0
2
4
6
8
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

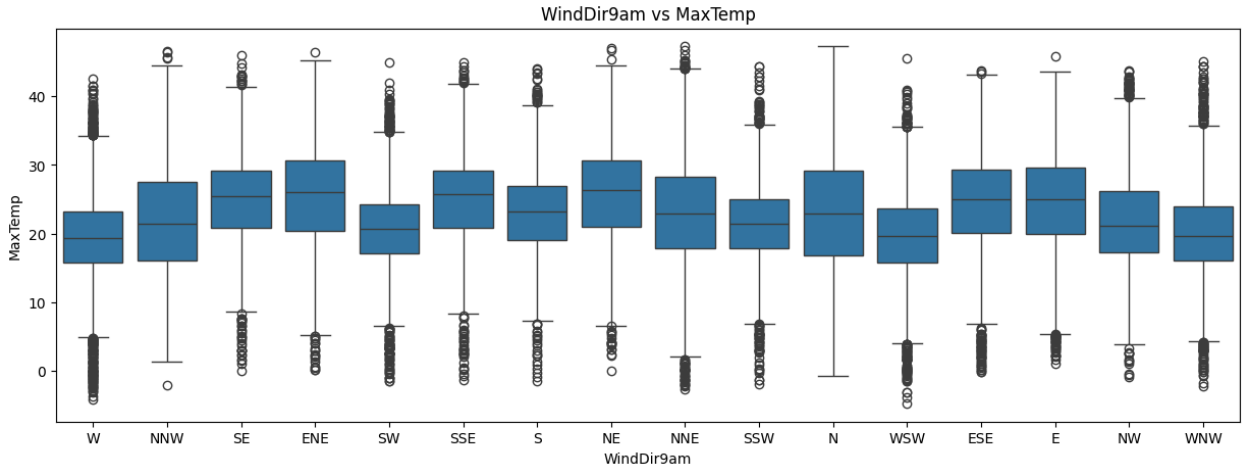

WindGustDir vs Cloud3pm
Cloud3pm
0
1
2
3
4
5
6
7
8
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

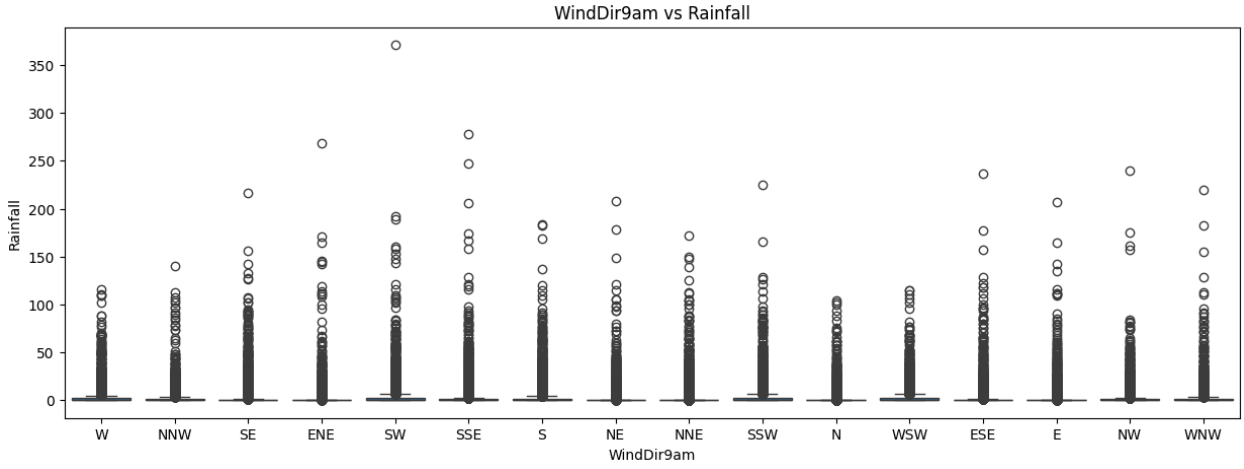

WindGustDir vs Temp9am
Temp9am
0
10
20
30
40
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir

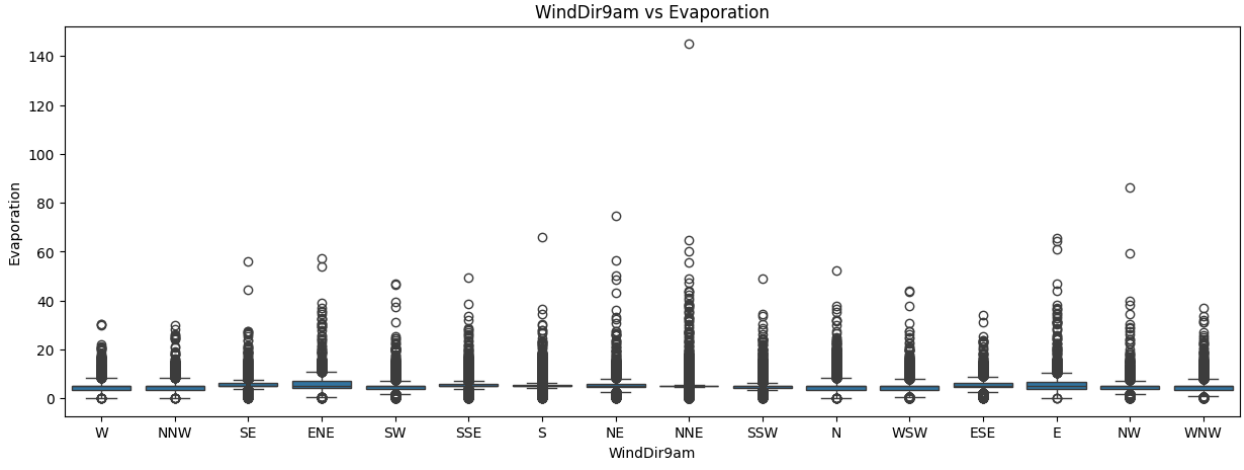

WindGustDir vs Temp3pm
Temp3pm
WindGustDir
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW

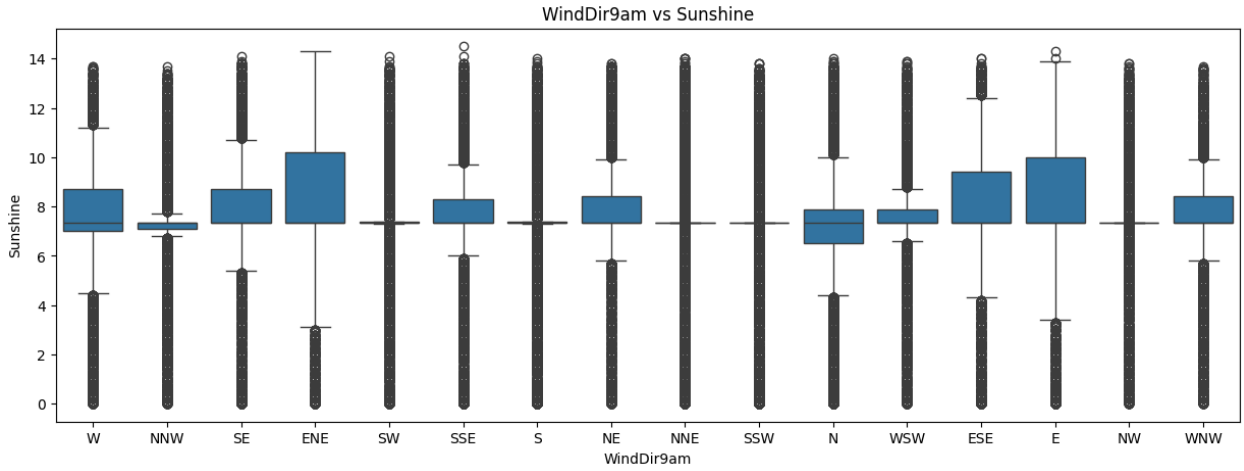

WindGustDir vs RISK_MM
RISK_MM
WindGustDir
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW

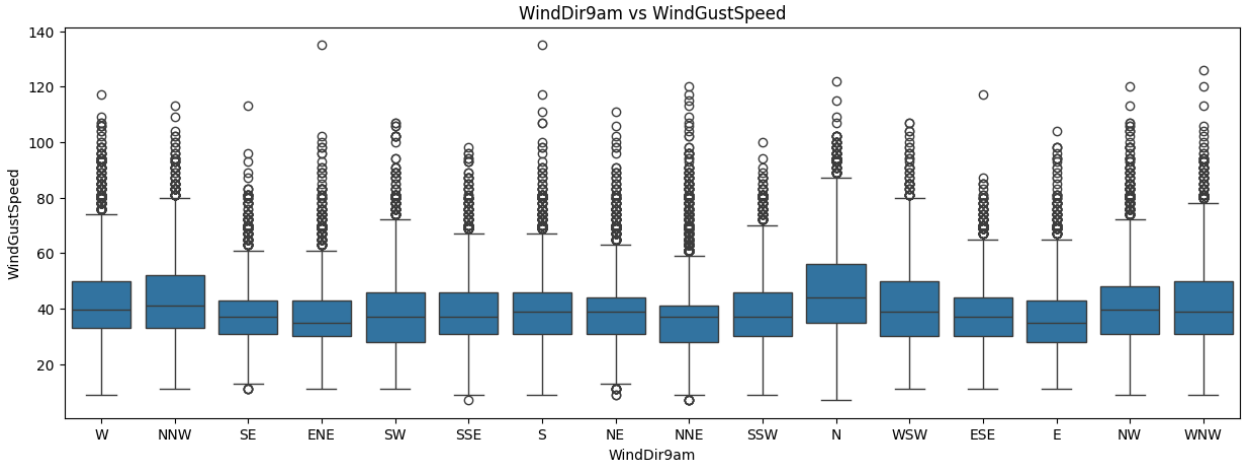

WindDir9am vs MinTemp
MinTemp
WindDir9am
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW

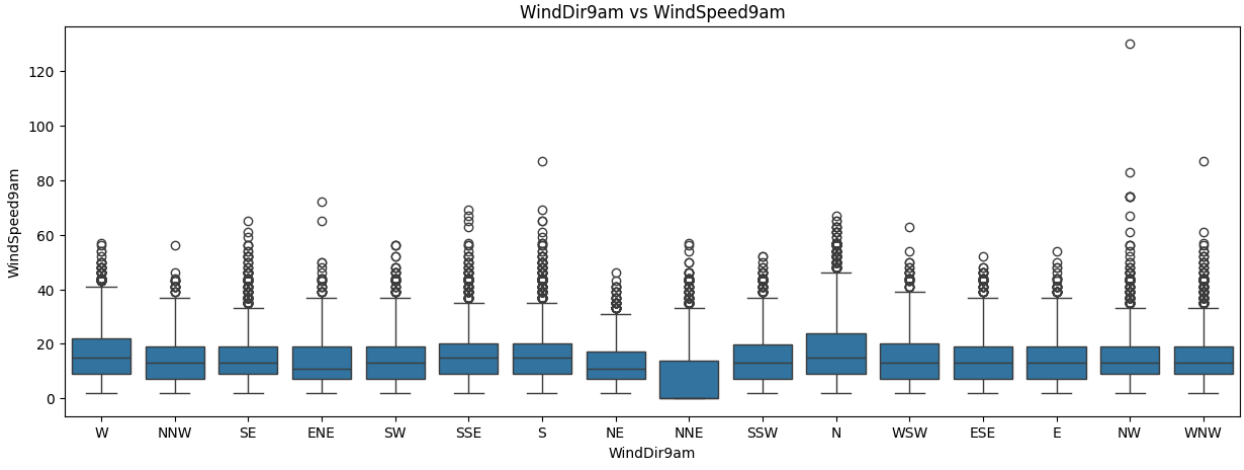

WindDir9am vs MaxTemp
MaxTemp
WindDir9am
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW

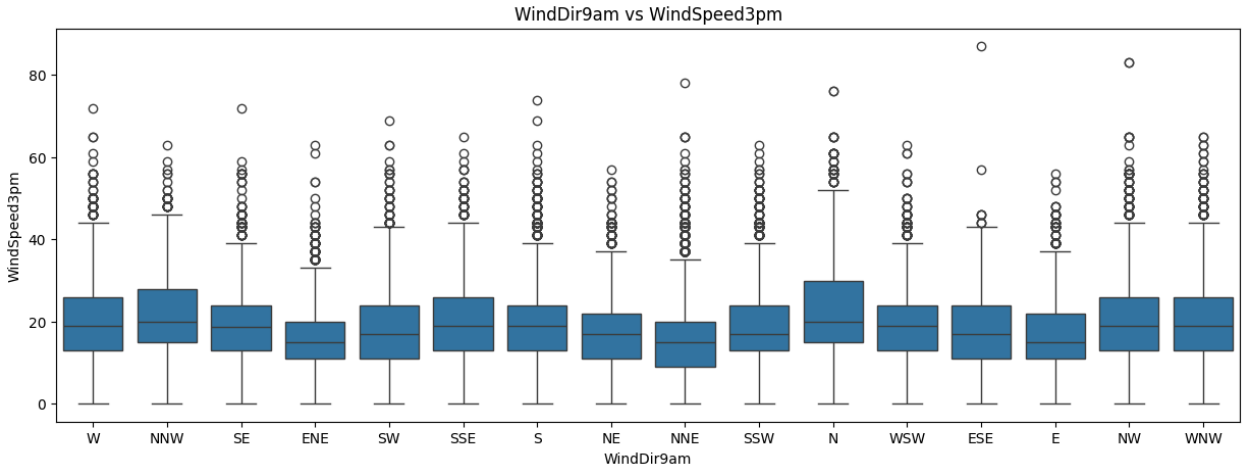

WindDir9am vs Rainfall
Rainfall
WindDir9am
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW

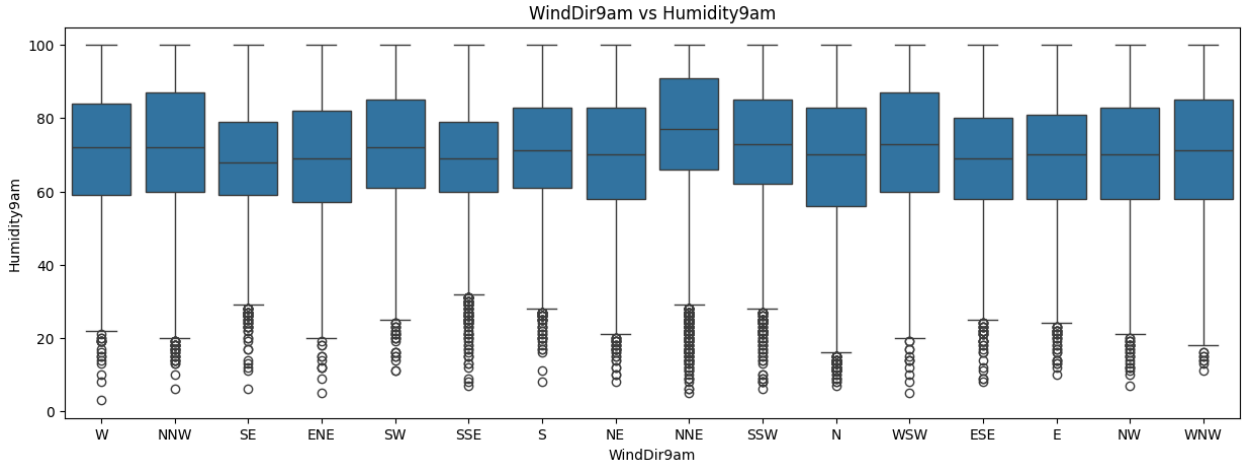

WindDir9am vs Evaporation
Evaporation
WindDir9am
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW

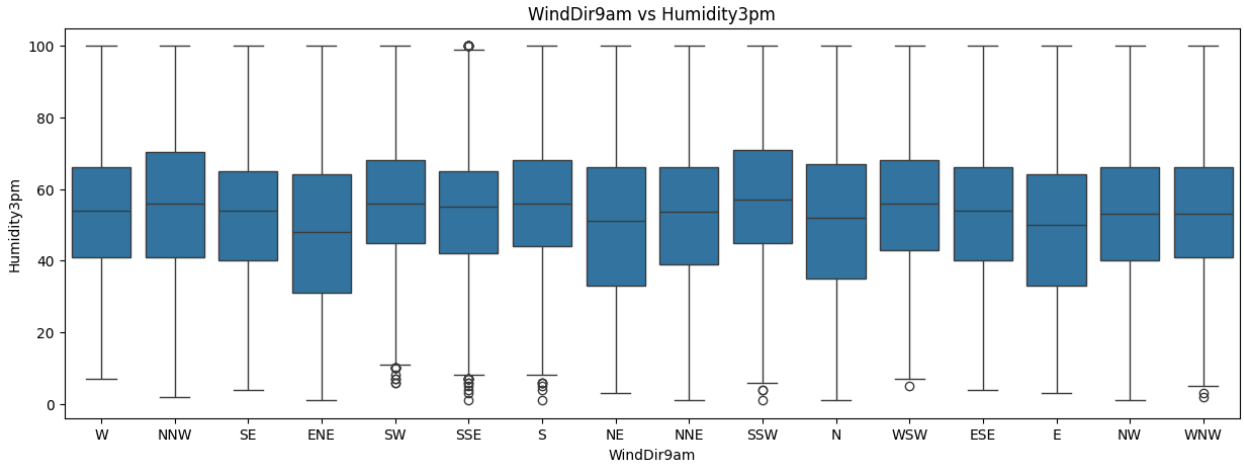

WindDir9am vs Sunshine
Sunshine
0
2
4
6
8
10
12
14
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

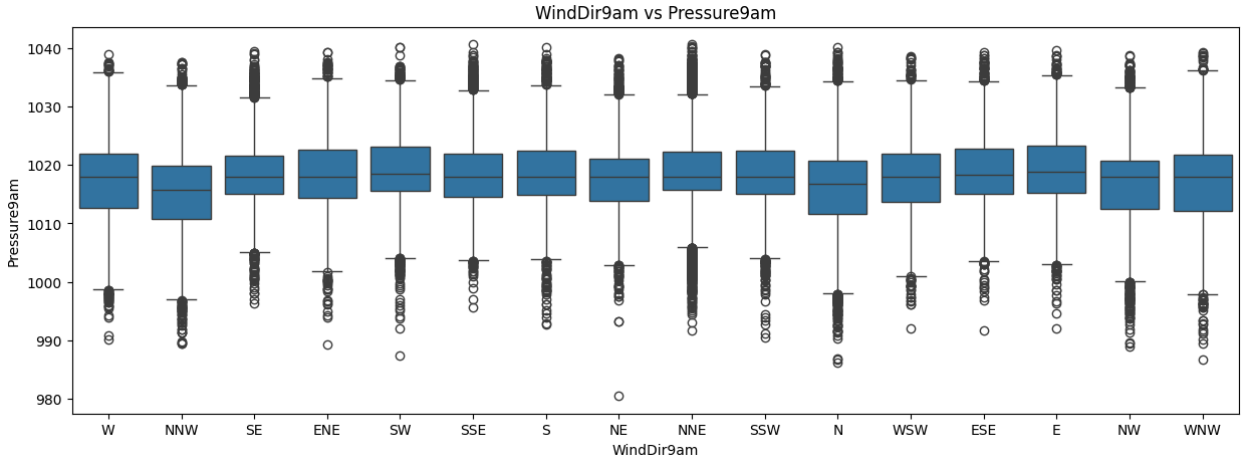

WindDir9am vs WindGustSpeed
WindGustSpeed
20
40
60
80
100
120
140
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

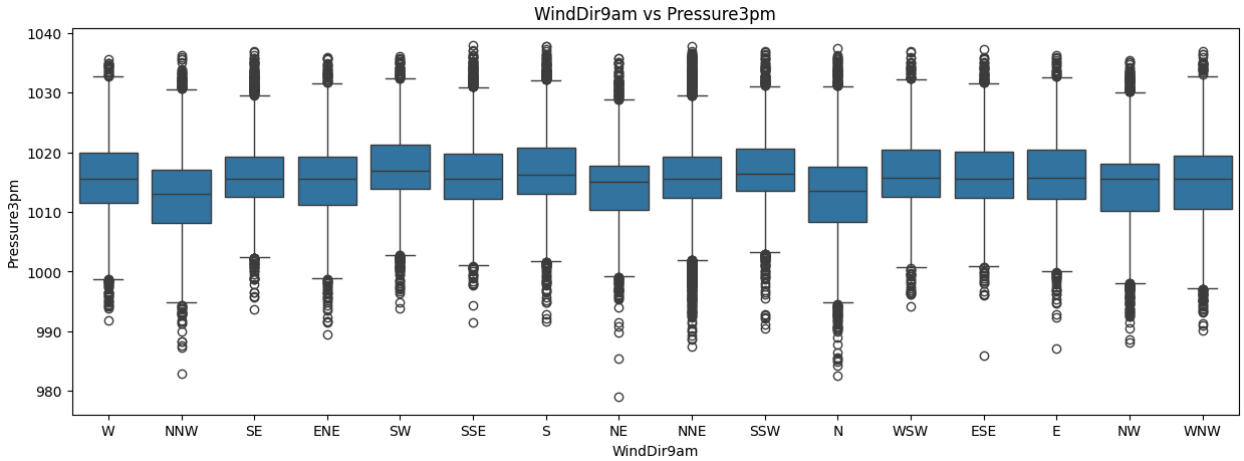

WindDir9am vs WindSpeed9am
WindSpeed9am
0
20
40
60
80
100
120
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

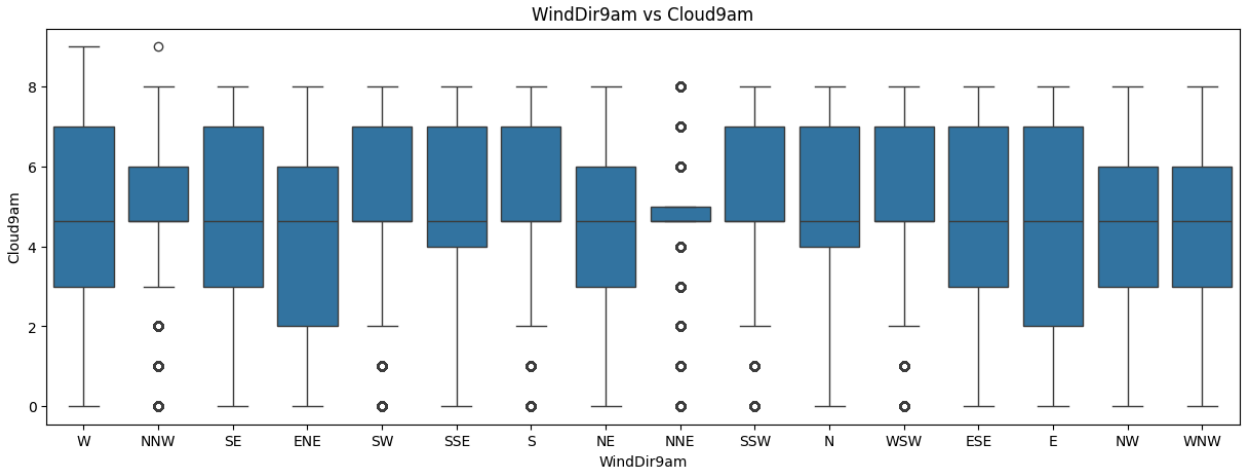

WindDir9am vs WindSpeed3pm
WindSpeed3pm
0
20
40
60
80
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

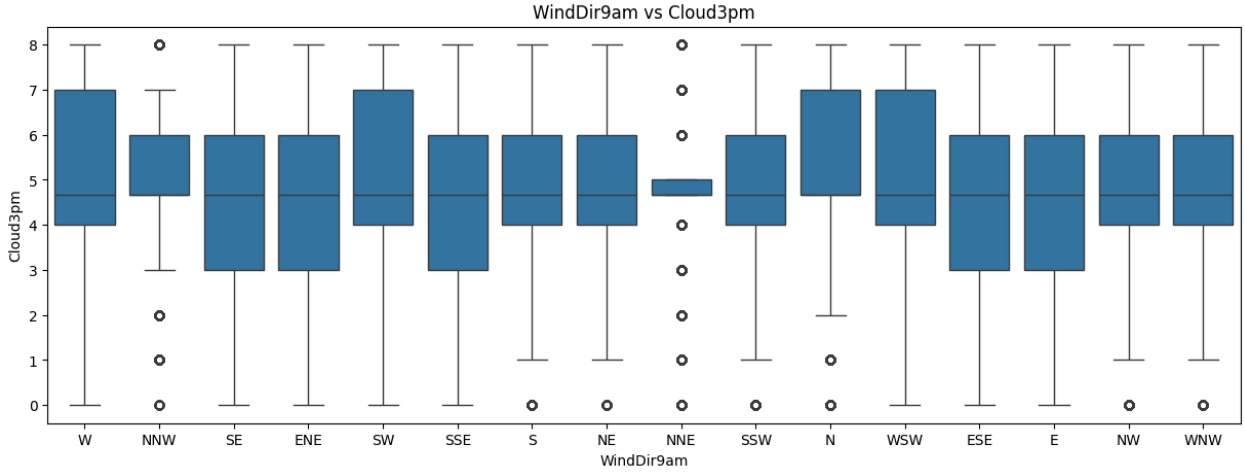

WindDir9am vs Humidity9am
Humidity9am
0
20
40
60
80
100
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

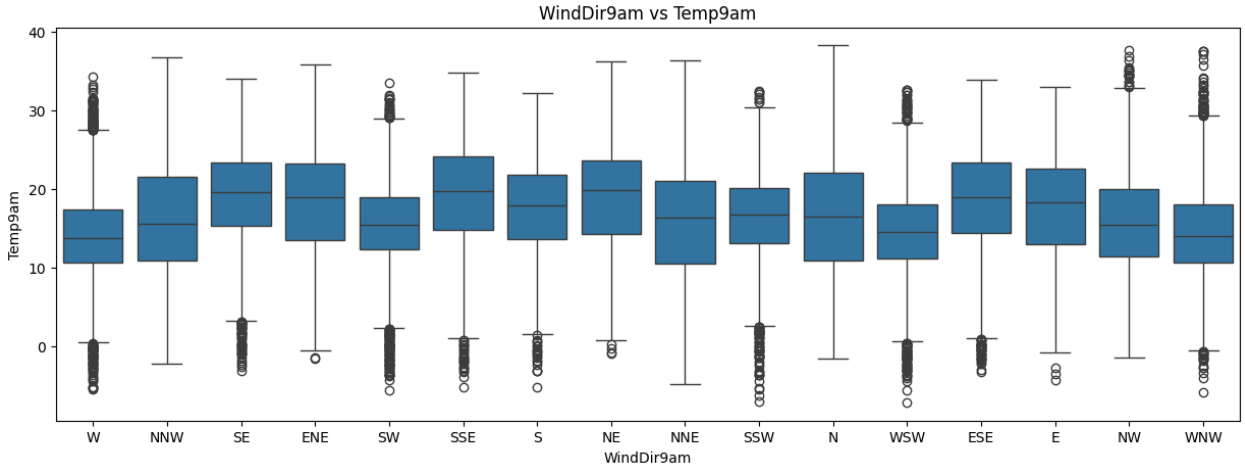

WindDir9am vs Humidity3pm
Humidity3pm
0
20
40
60
80
100
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

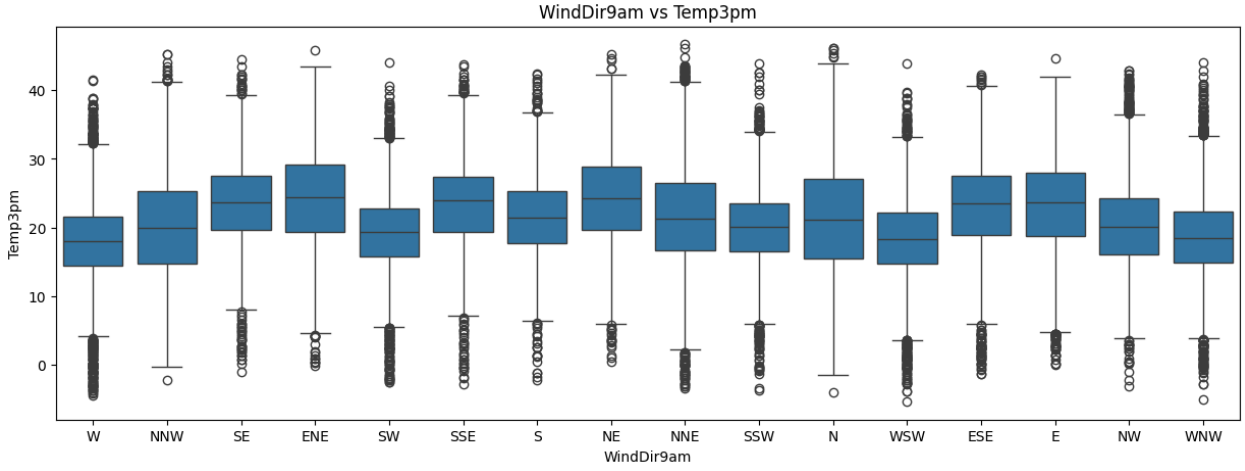

WindDir9am vs Pressure9am
Pressure9am
1040
1030
1020
1010
1000
990
980
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

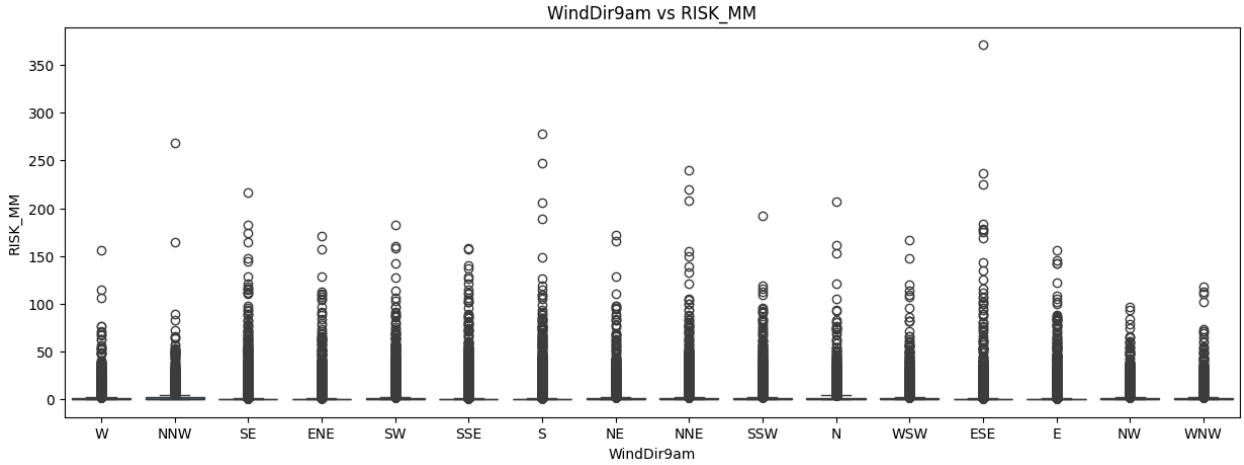

WindDir9am vs Pressure3pm
Pressure3pm
1040
1030
1020
1010
1000
990
980
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

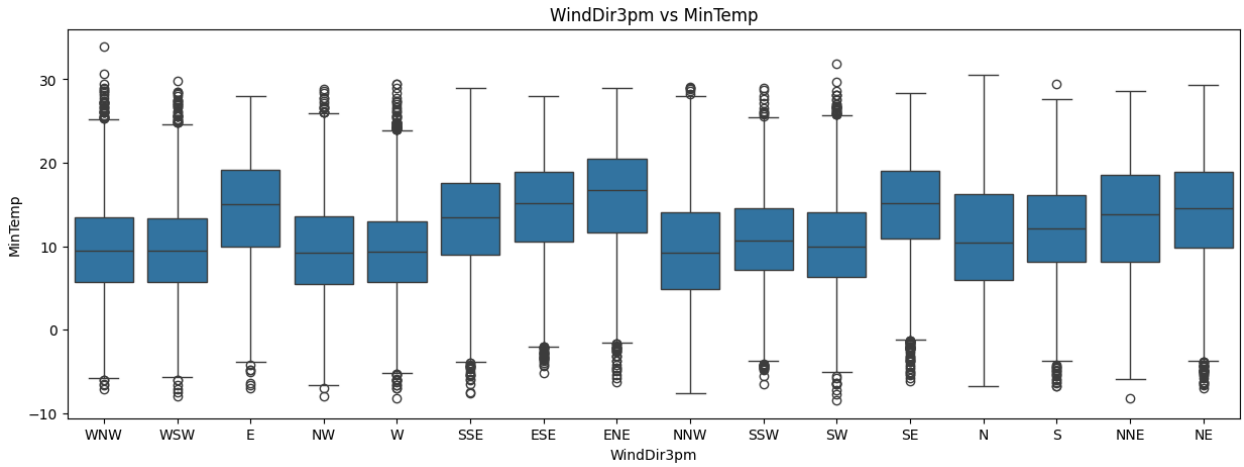

WindDir9am vs Cloud9am
Cloud9am
8
6
4
2
0
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

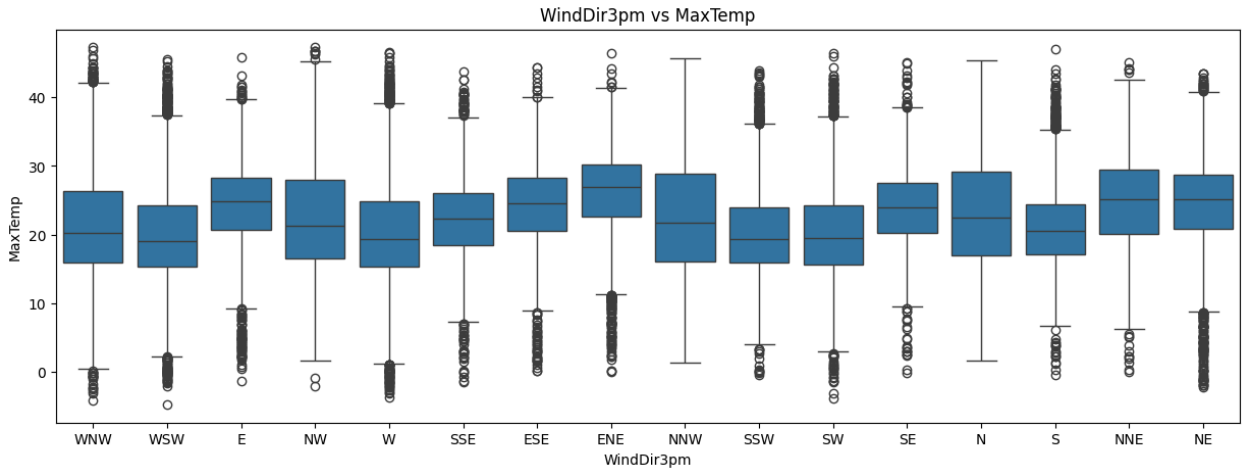

WindDir9am vs Cloud3pm
Cloud3pm
0
1
2
3
4
5
6
7
8
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

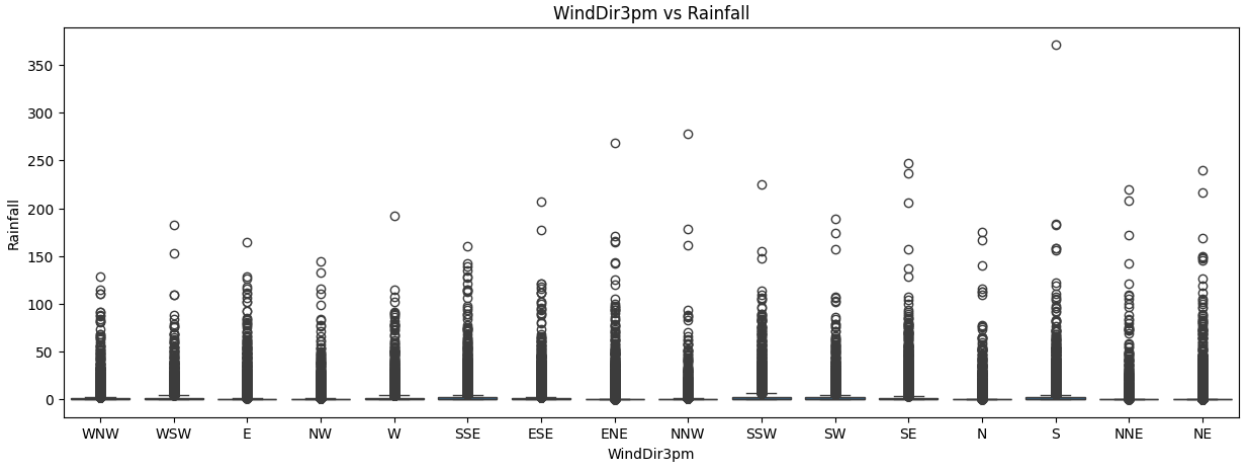

WindDir9am vs Temp9am
Temp9am
0
10
20
30
40
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

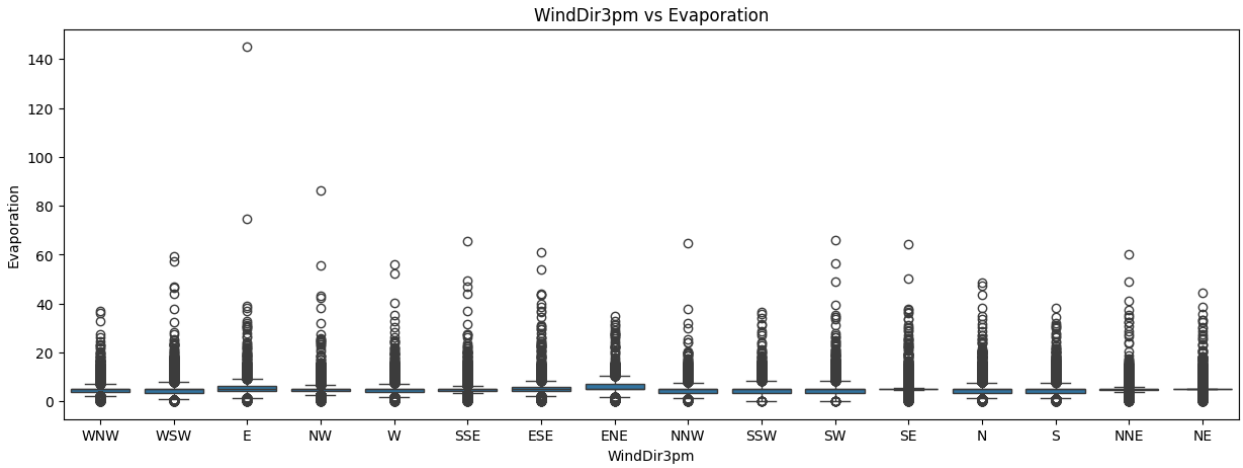

WindDir9am vs Temp3pm
Temp3pm
0
10
20
30
40
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

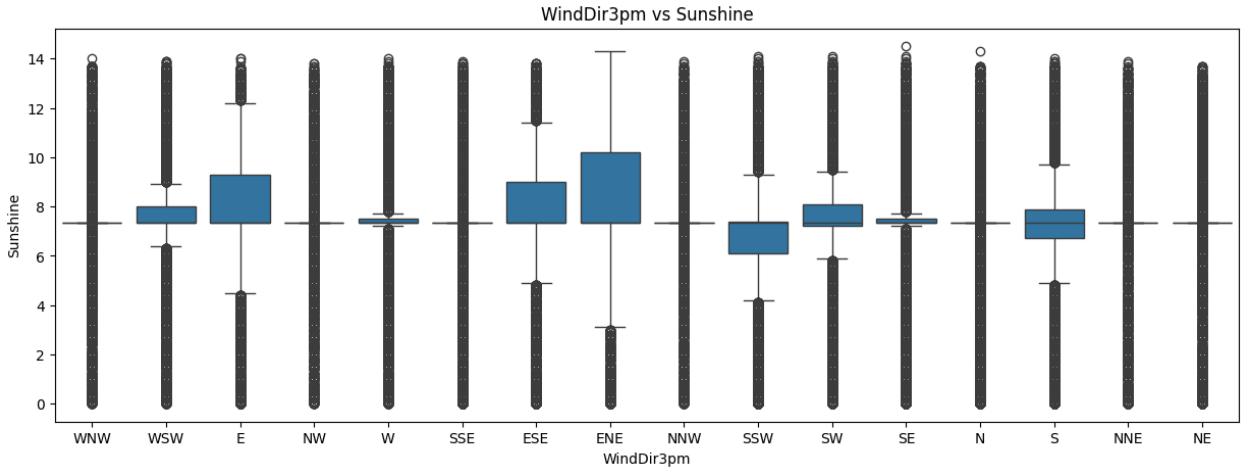

WindDir9am vs RISK_MM
RISK_MM
0
50
100
150
200
250
300
350
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am

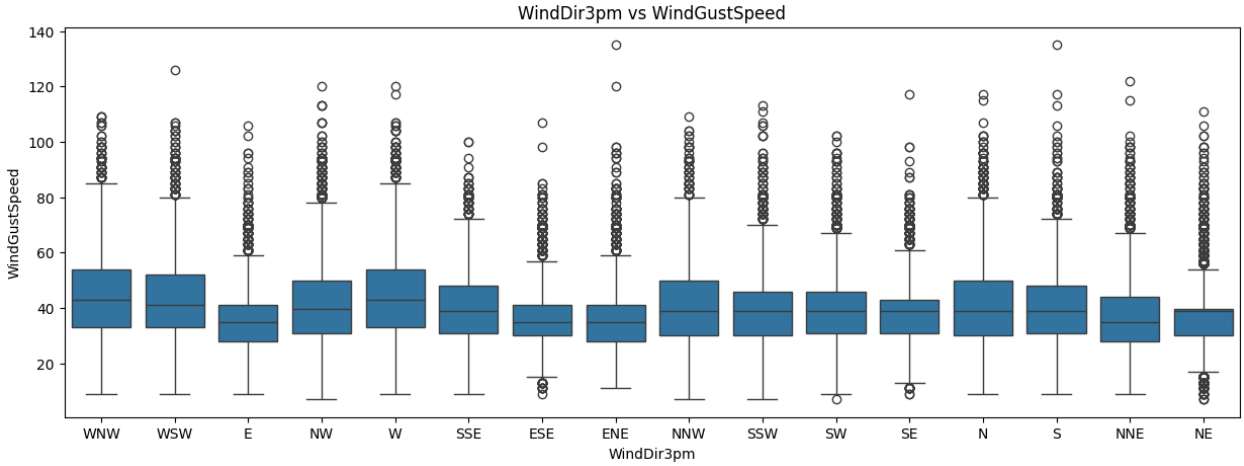

WindDir3pm vs MinTemp
MinTemp
−10
0
10
20
30
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

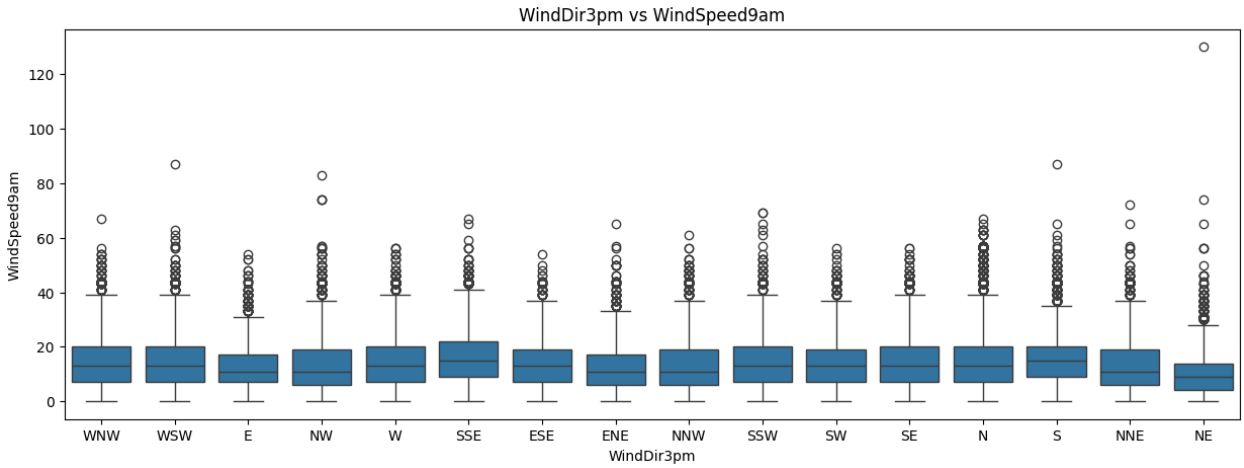

WindDir3pm vs MaxTemp
MaxTemp
0
10
20
30
40
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

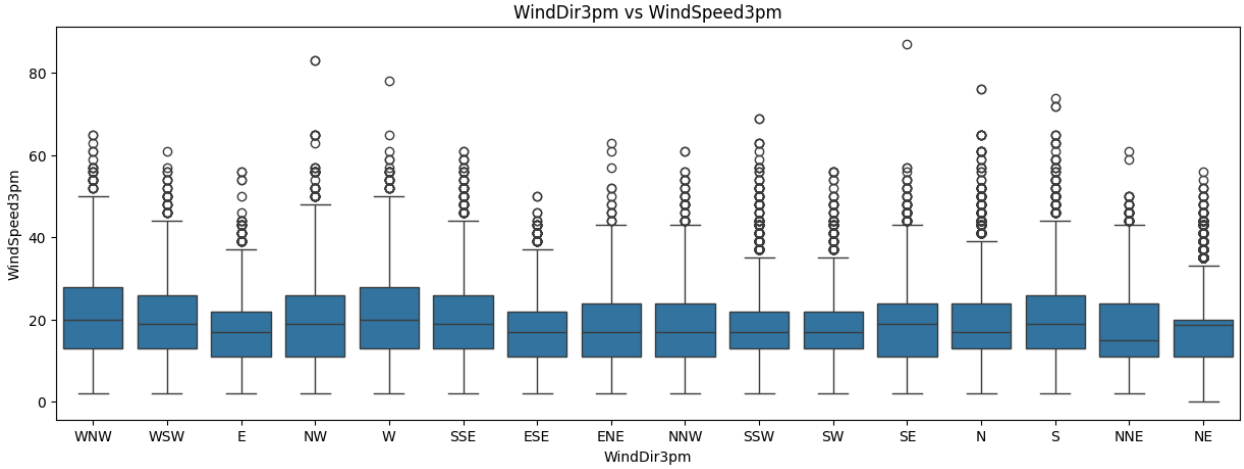

WindDir3pm vs Rainfall
Rainfall
0
50
100
150
200
250
300
350
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

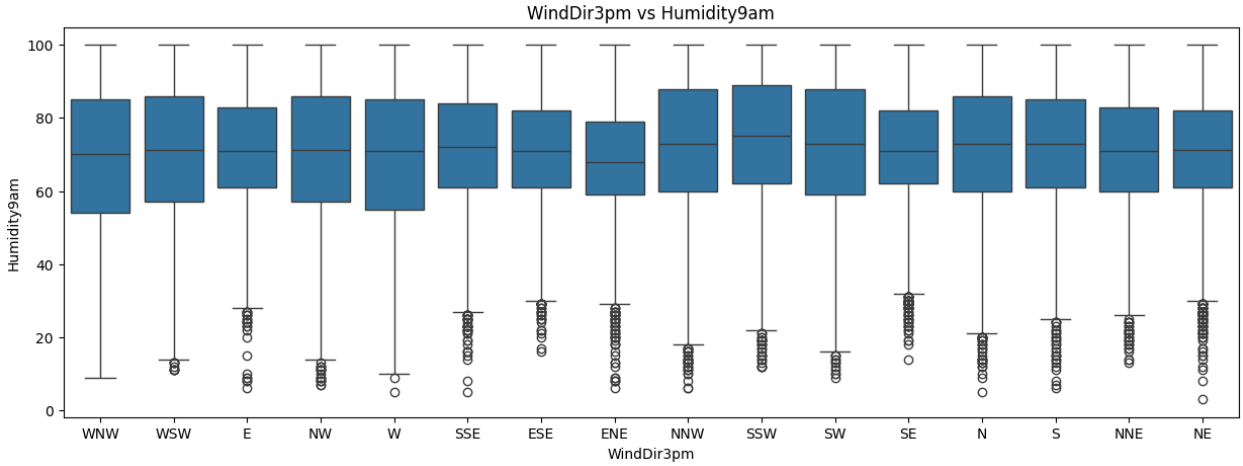

WindDir3pm vs Evaporation
Evaporation
0
20
40
60
80
100
120
140
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

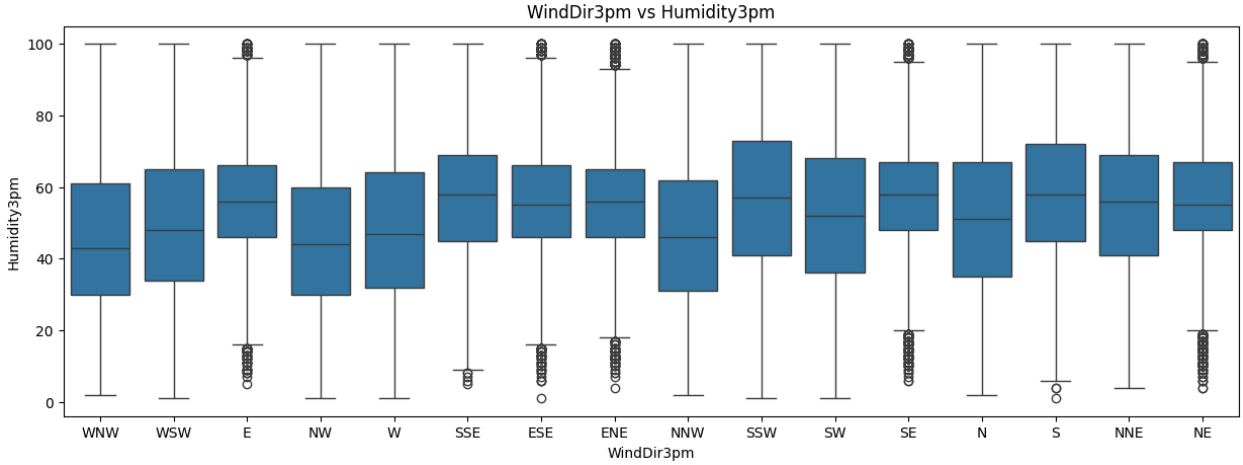

WindDir3pm vs Sunshine
Sunshine
0
2
4
6
8
10
12
14
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

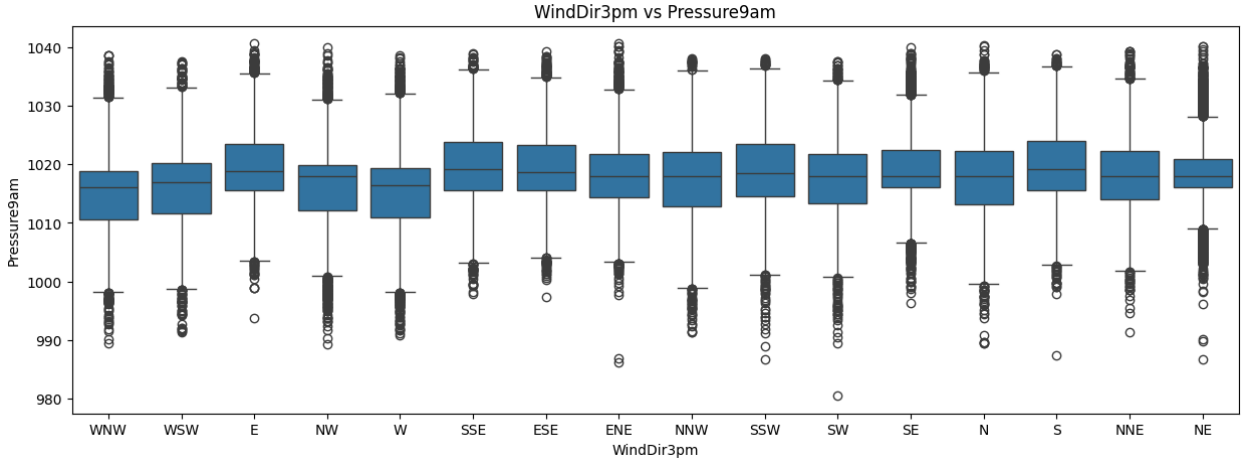

WindDir3pm vs WindGustSpeed
WindGustSpeed
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE

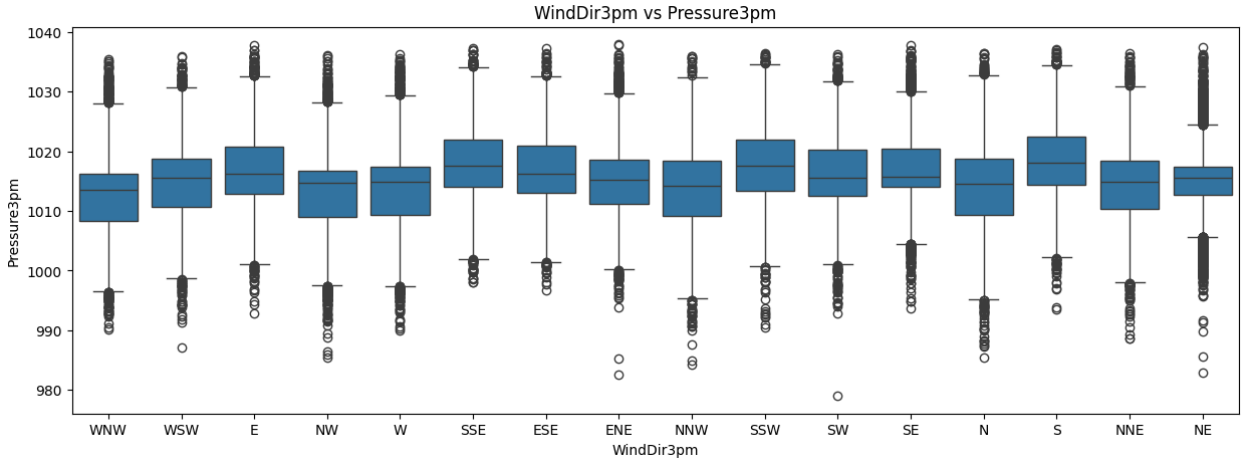

WindDir3pm vs WindSpeed9am
WindSpeed9am
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE

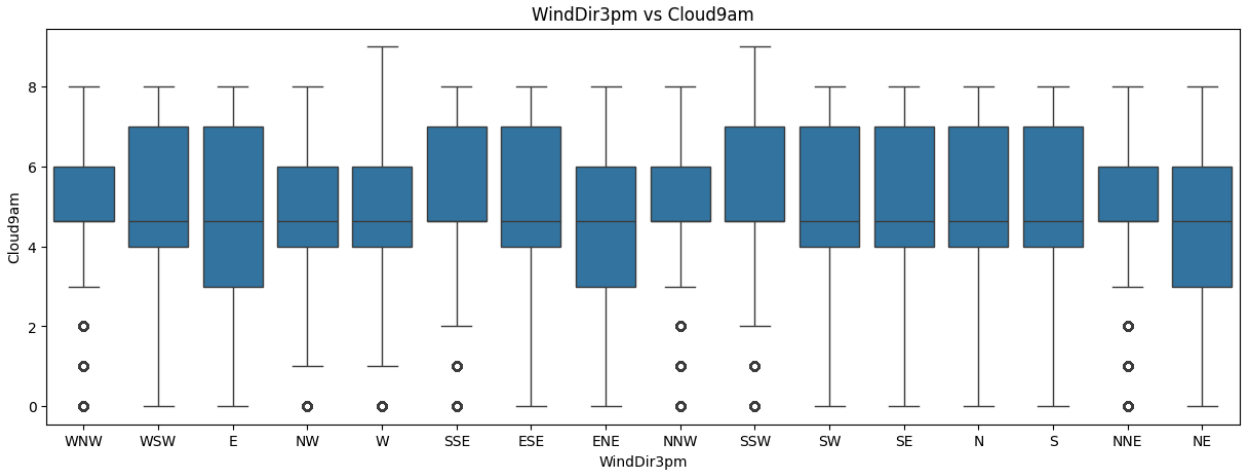

WindDir3pm vs WindSpeed3pm
WindSpeed3pm
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE

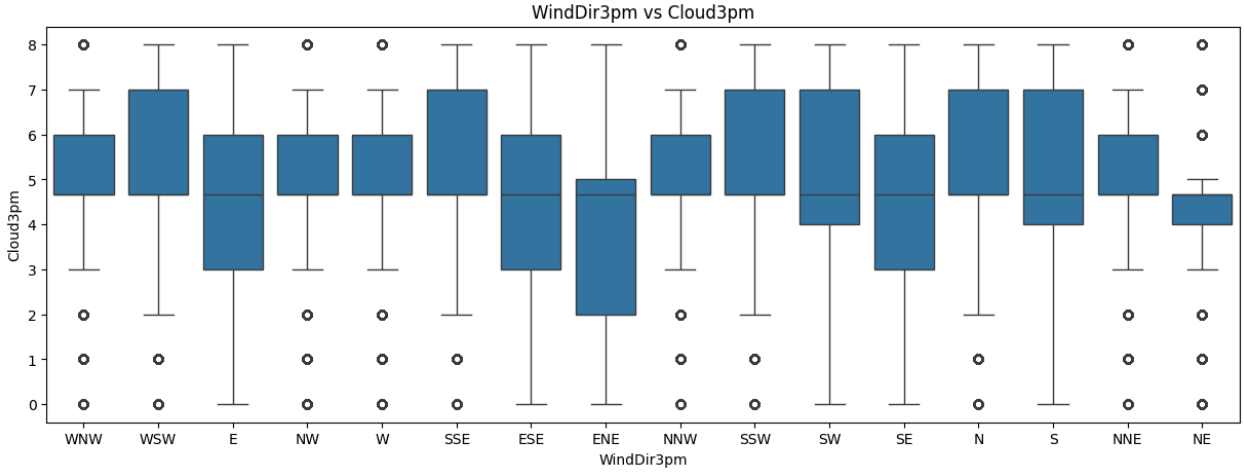

WindDir3pm vs Humidity9am
Humidity9am
0
20
40
60
80
100
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

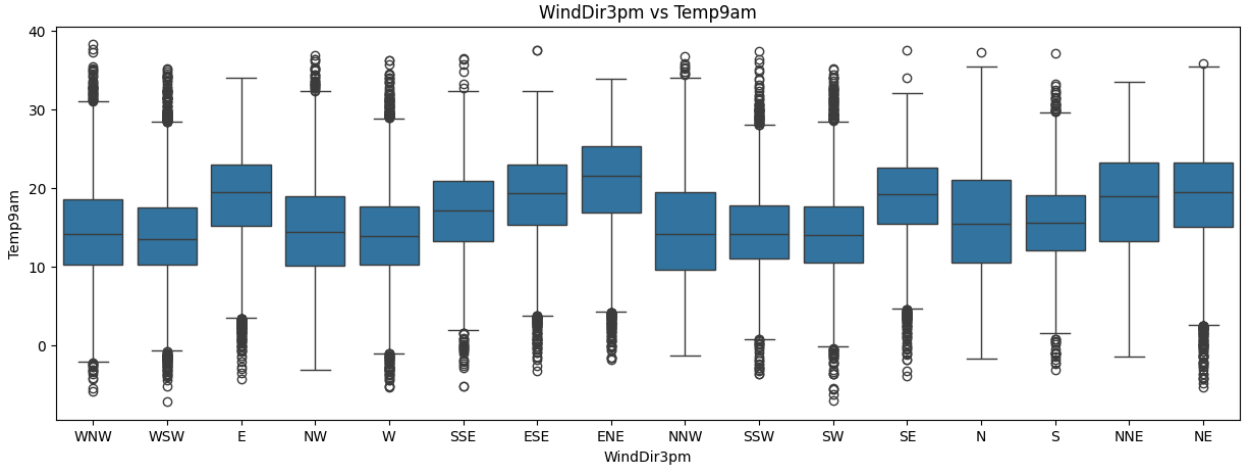

WindDir3pm vs Humidity3pm
Humidity3pm
0
20
40
60
80
100
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

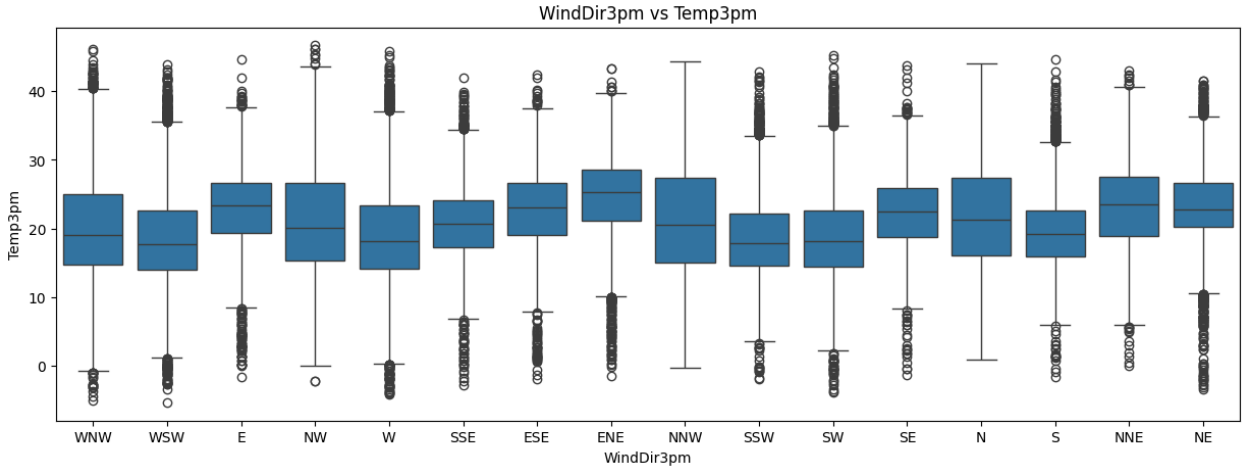

WindDir3pm vs Pressure9am
Pressure9am
980
990
1000
1010
1020
1030
1040
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

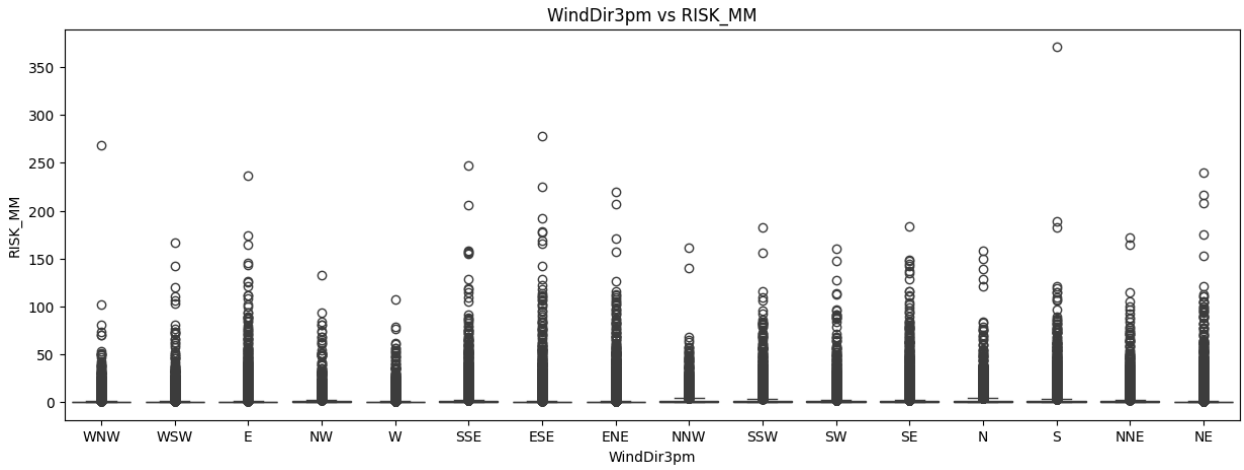

WindDir3pm vs Pressure3pm
Pressure3pm
1040
1030
1020
1010
1000
990
980
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

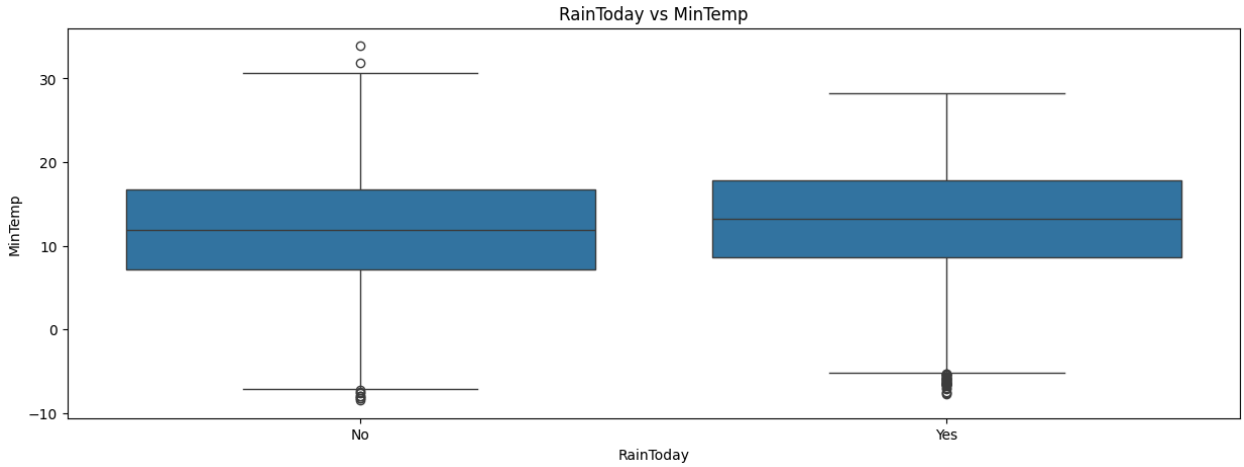

WindDir3pm vs Cloud9am
Cloud9am
8
6
4
2
0
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

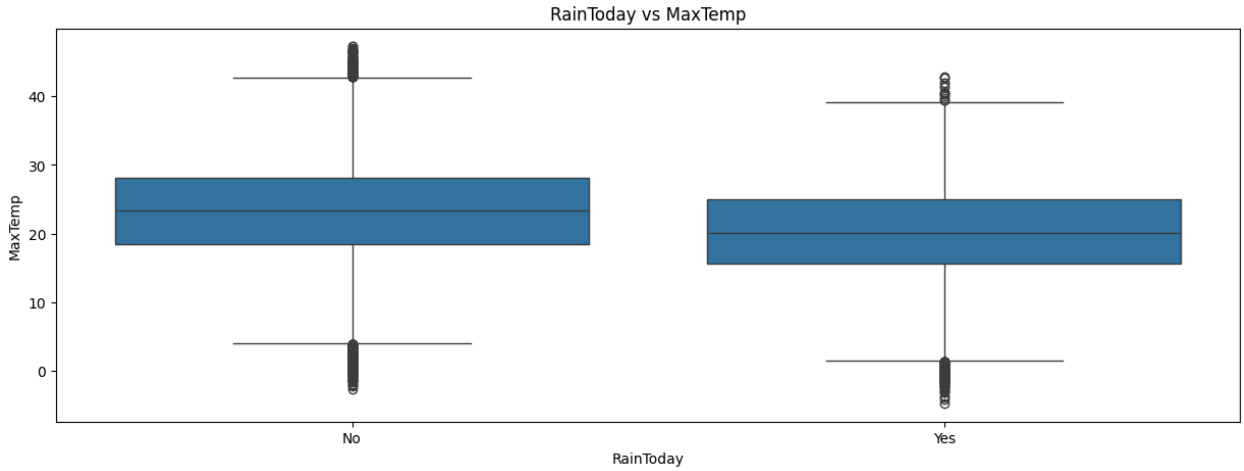

WindDir3pm vs Cloud3pm
Cloud3pm
8
7
6
5
4
3
2
1
0
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm

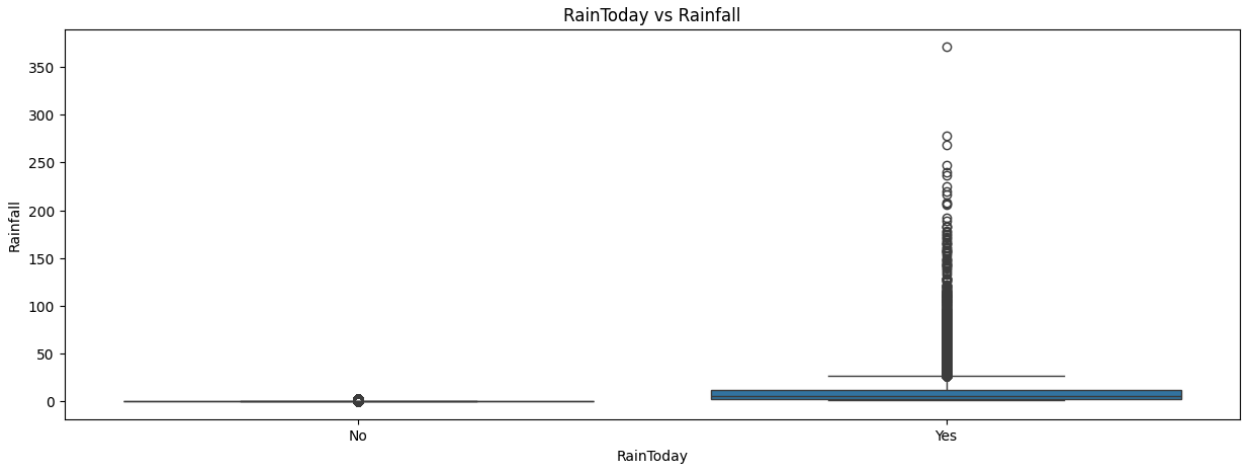

WindDir3pm vs Temp9am
Temp9am
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE

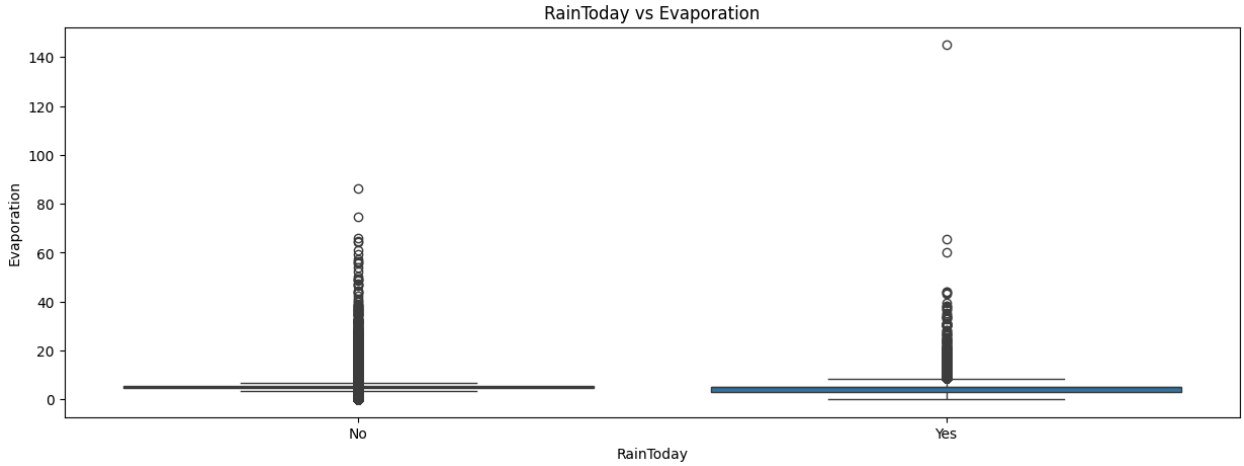

WindDir3pm vs Temp3pm
Temp3pm
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE

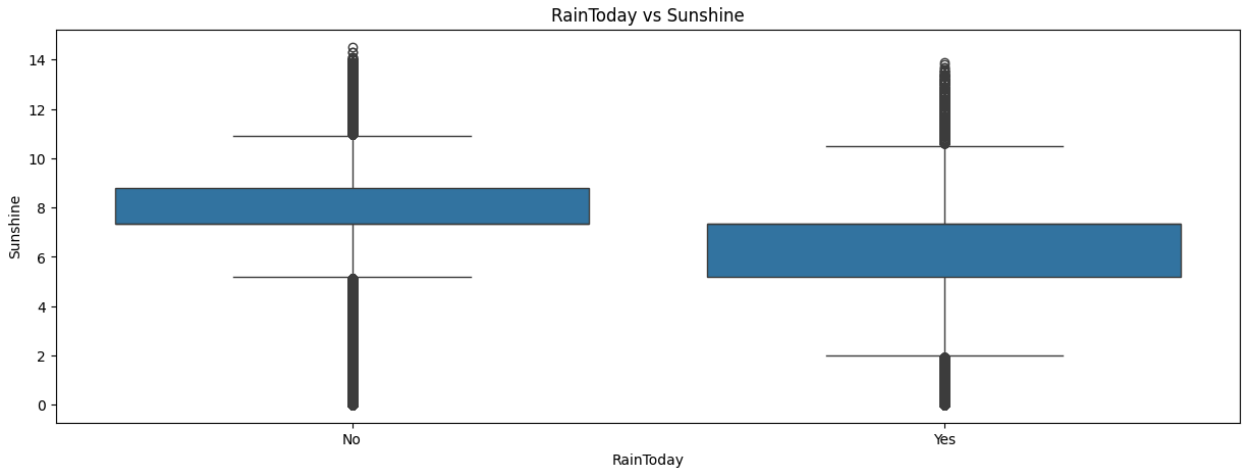

WindDir3pm vs RISK_MM
RISK_MM
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE

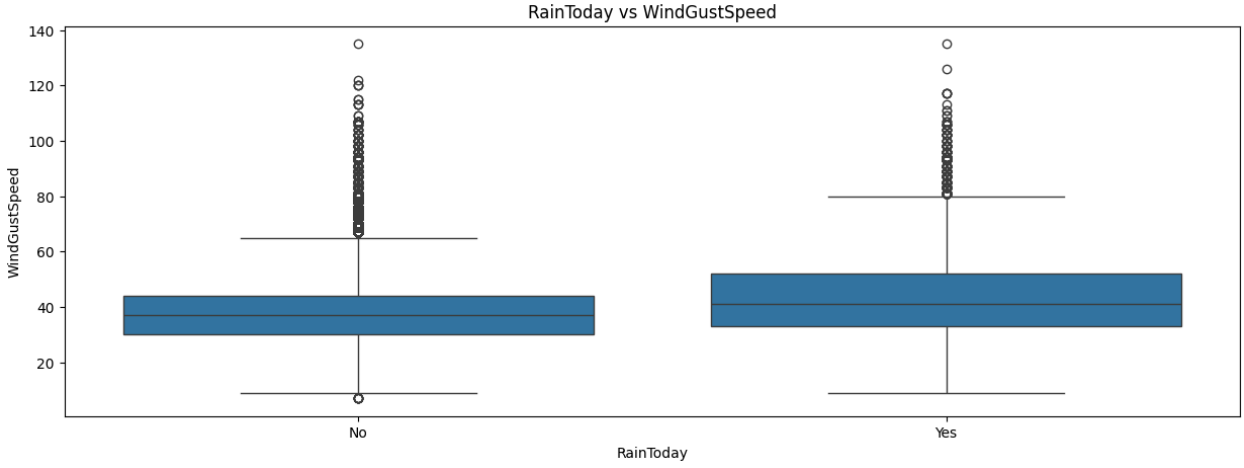

RainToday vs MinTemp
MinTemp
30
20
10
0
−10
No
Yes
RainToday

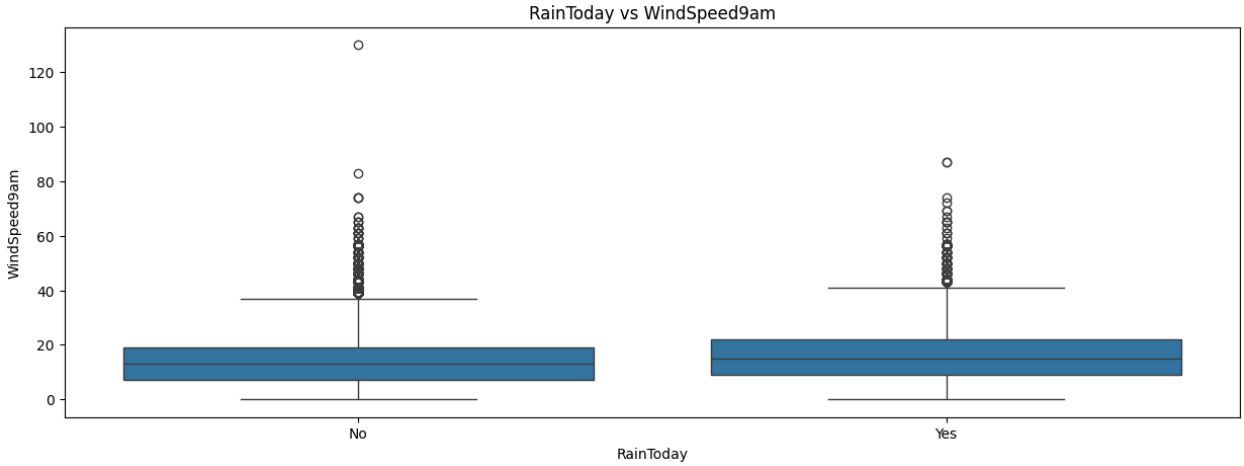

RainToday vs MaxTemp
MaxTemp
40
30
20
10
0
No
Yes
RainToday

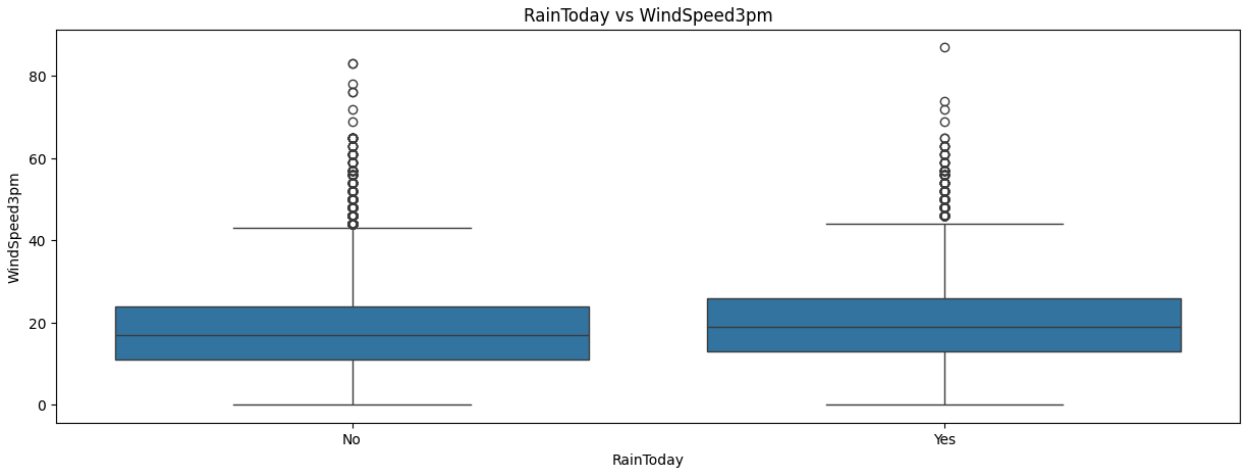

RainToday vs Rainfall
Rainfall
350
300
250
200
150
100
50
0
No
Yes
RainToday

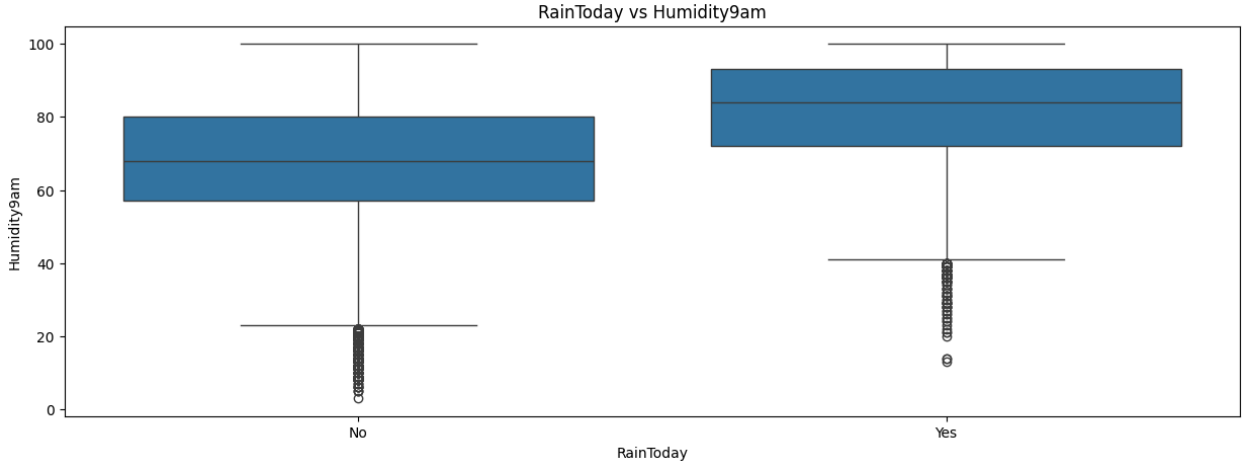

RainToday vs Evaporation
Evaporation
RainToday
No
Yes
0
20
40
60
80
100
120
140

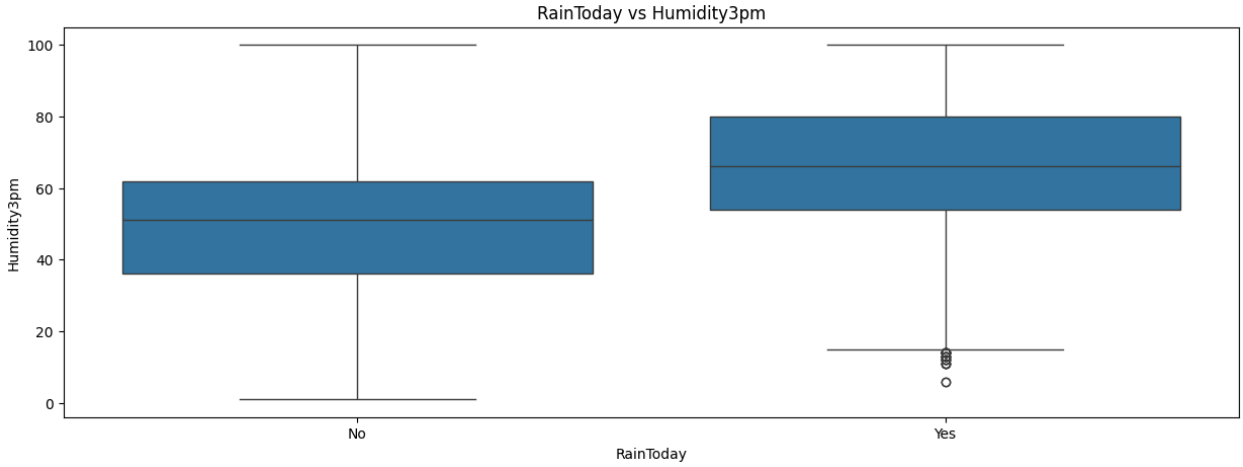

RainToday vs Sunshine
Sunshine
RainToday
No
Yes
0
2
4
6
8
10
12
14

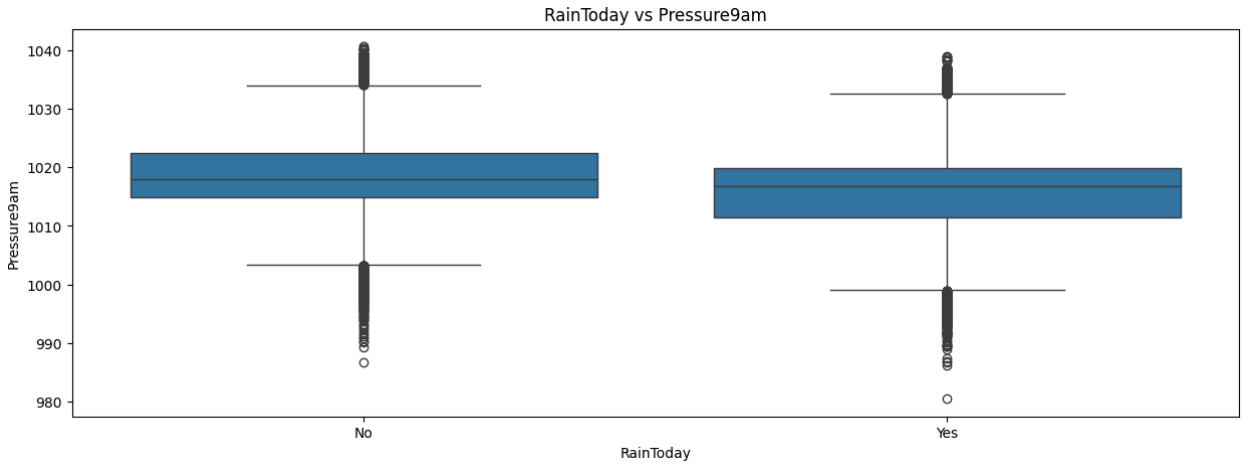

RainToday vs WindGustSpeed
WindGustSpeed
RainToday
No
Yes
20
40
60
80
100
120
140

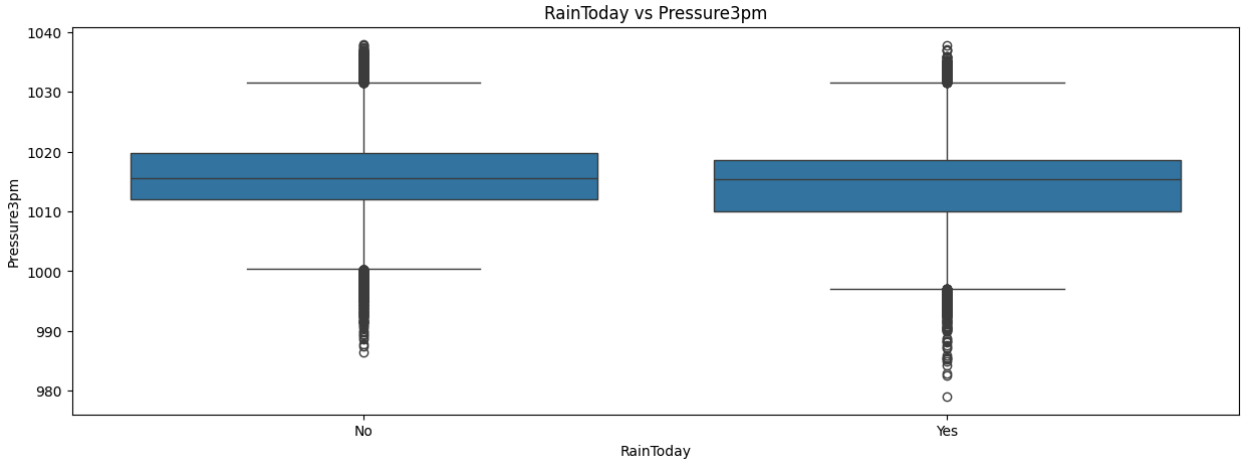

RainToday vs WindSpeed9am
WindSpeed9am
0
20
40
60
80
100
120
No
Yes
RainToday

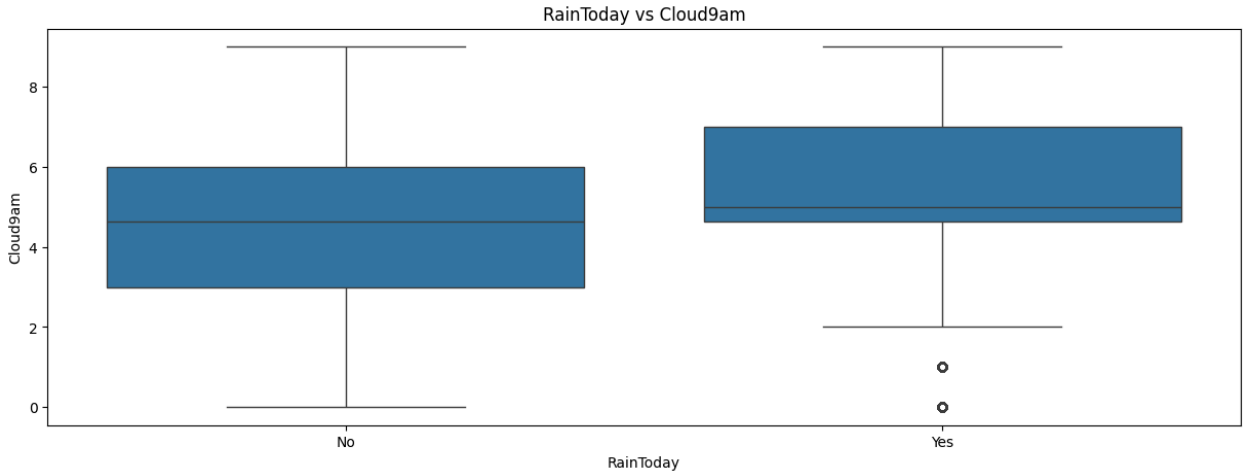

RainToday vs WindSpeed3pm
WindSpeed3pm
0
20
40
60
80
No
Yes
RainToday

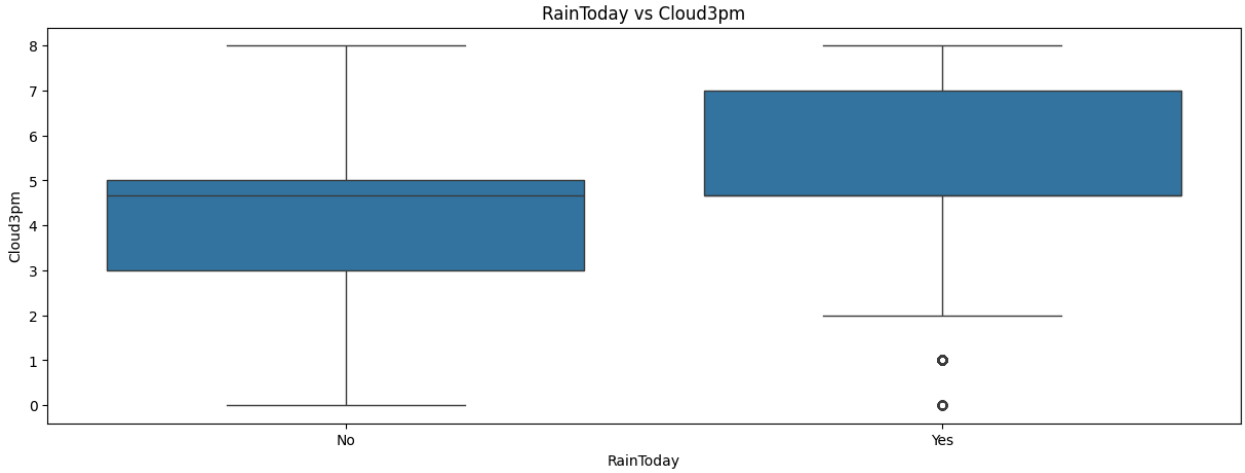

RainToday vs Humidity9am
Humidity9am
0
20
40
60
80
100
No
Yes
RainToday

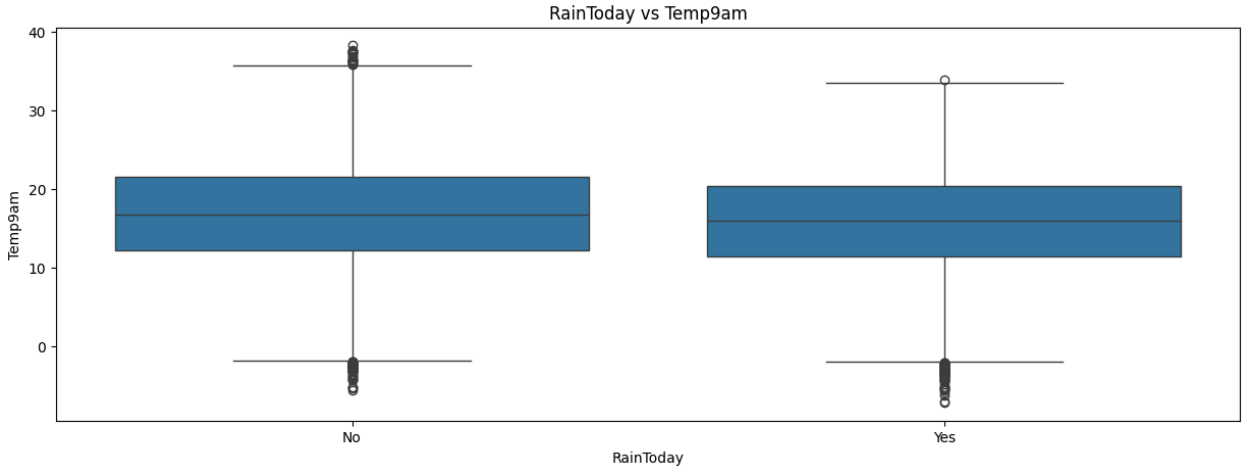

RainToday vs Humidity3pm
Humidity3pm
100
80
60
40
20
0
No
Yes
RainToday

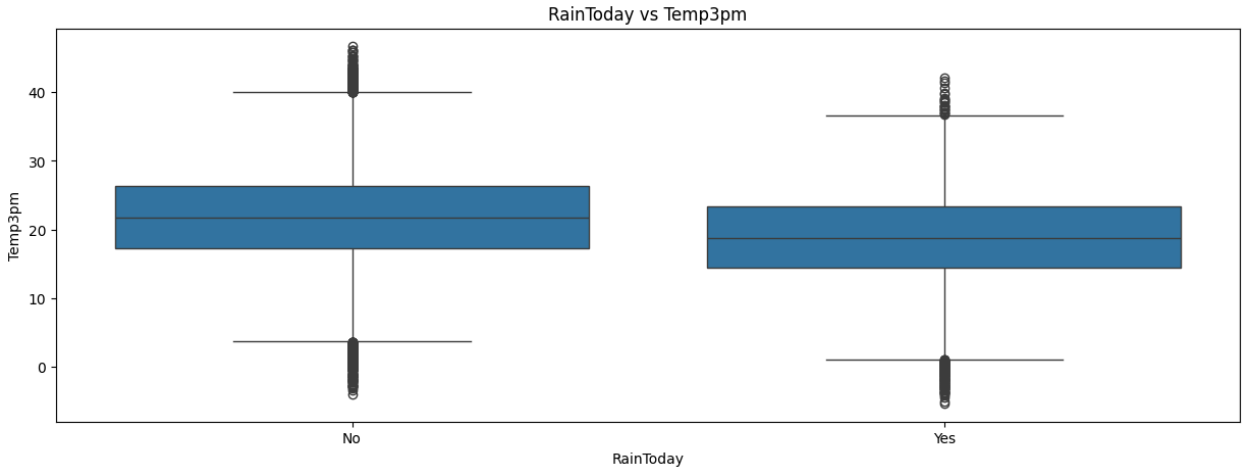

RainToday vs Pressure9am
Pressure9am
1040
1030
1020
1010
1000
990
980
No
Yes
RainToday

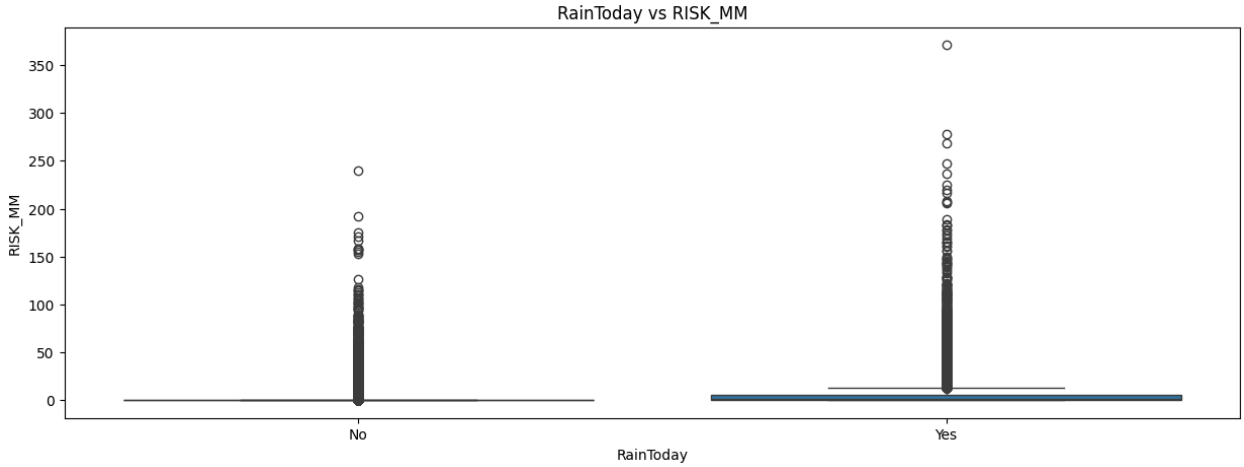

RainToday vs Pressure3pm
Pressure3pm
1040
1030
1020
1010
1000
990
980
No
Yes
RainToday

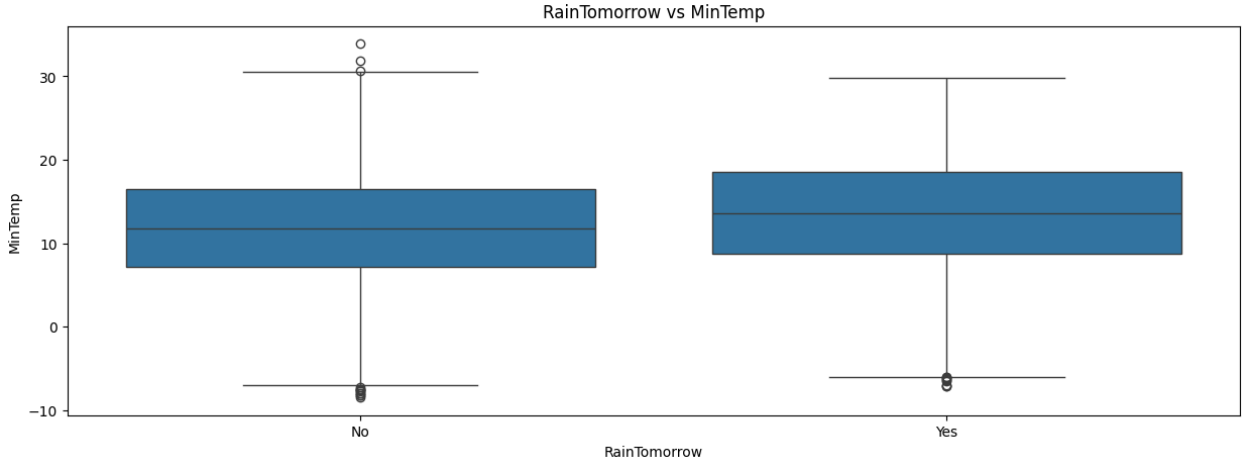

RainToday vs Cloud9am
Cloud9am
0
2
4
6
8
No
Yes
RainToday

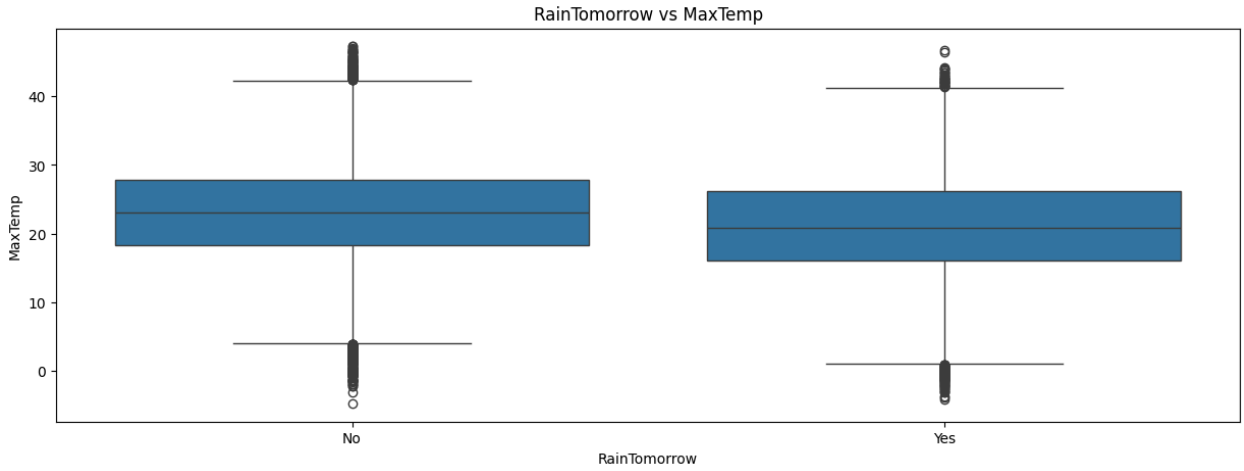

RainToday vs Cloud3pm
Cloud3pm
0
1
2
3
4
5
6
7
8
No
Yes
RainToday

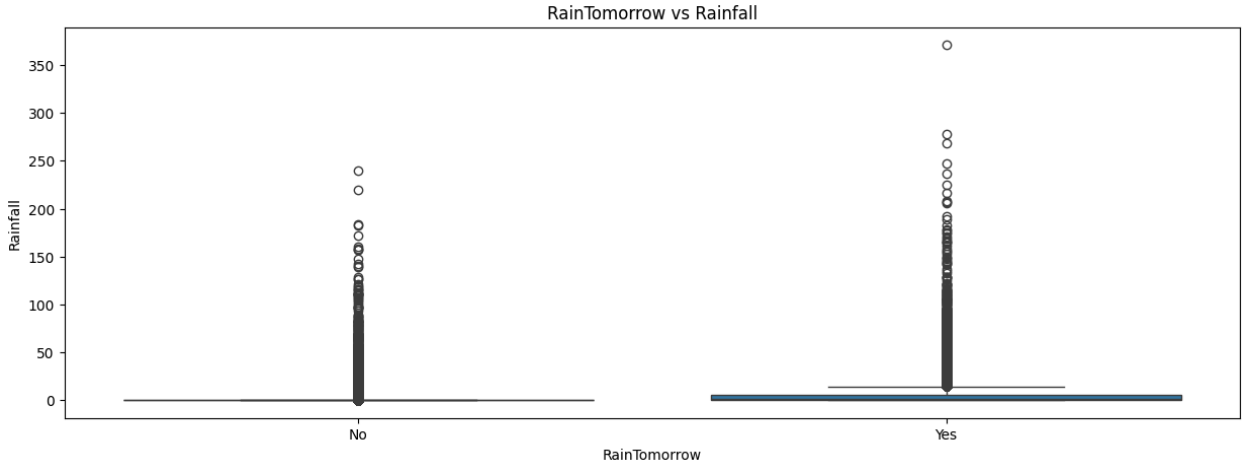

RainToday vs Temp9am
Temp9am
0
10
20
30
40
No
Yes
RainToday

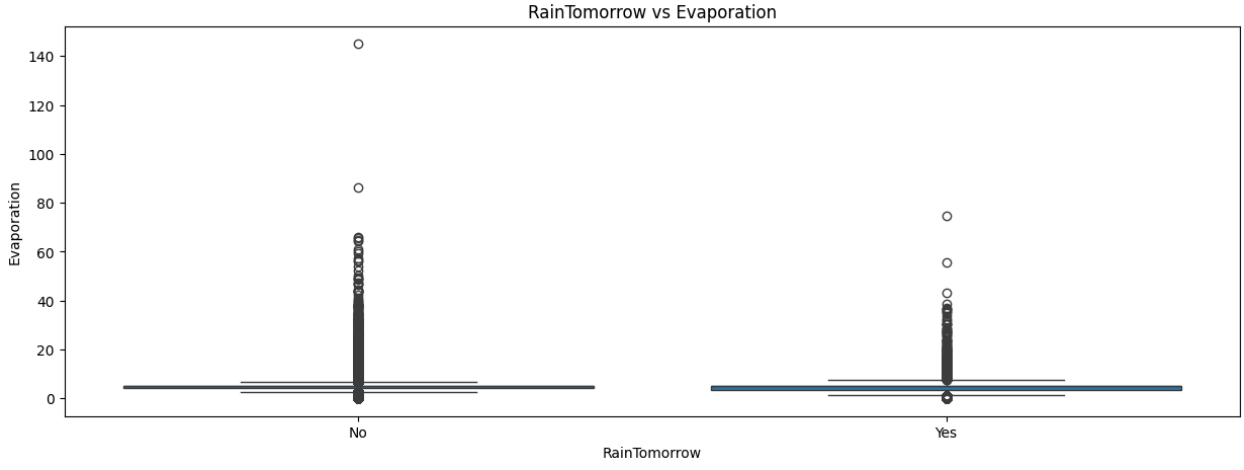

RainToday vs Temp3pm
Temp3pm
40
30
20
10
0
No
Yes
RainToday

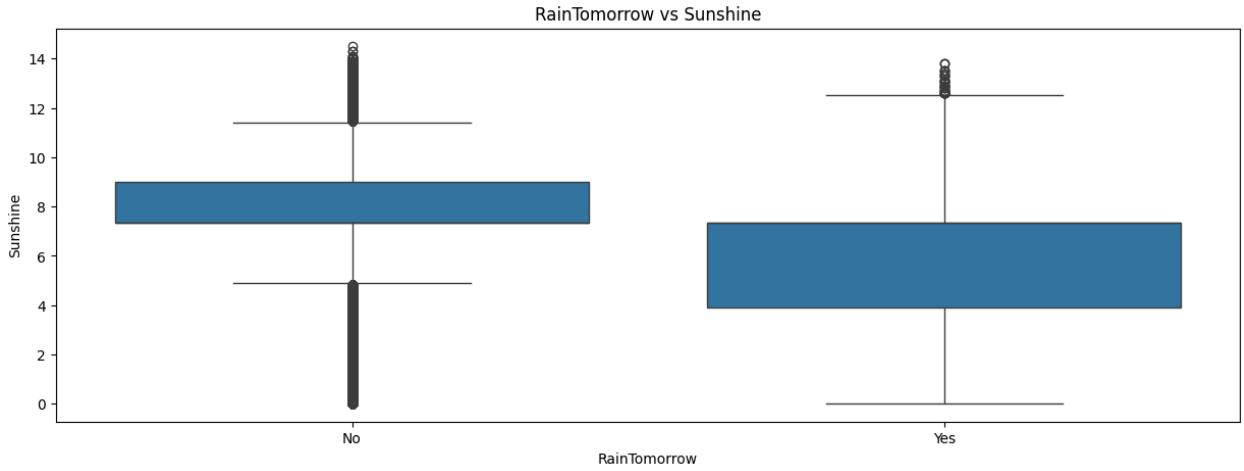

RainToday vs RISK_MM
RISK_MM
350
300
250
200
150
100
50
0
No
Yes
RainToday

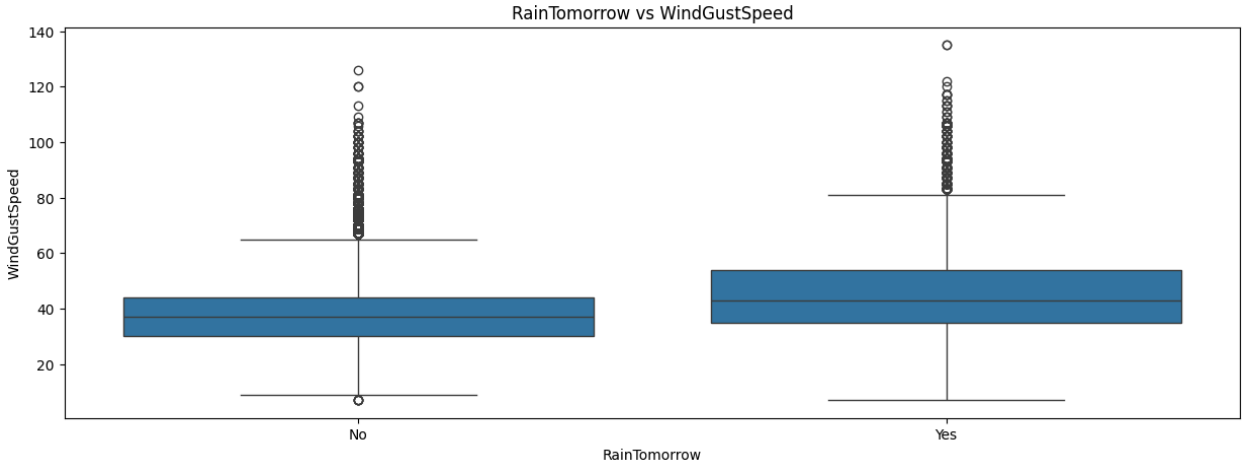

RainTomorrow vs MinTemp
MinTemp
30
20
10
0
−10
No
Yes
RainTomorrow

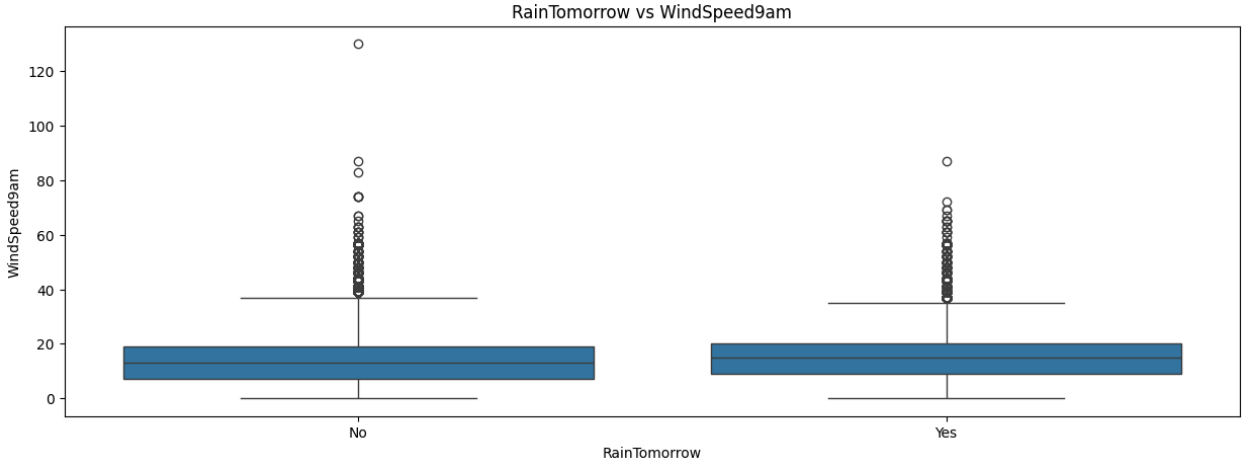

RainTomorrow vs MaxTemp
MaxTemp
40
30
20
10
0
No
Yes
RainTomorrow

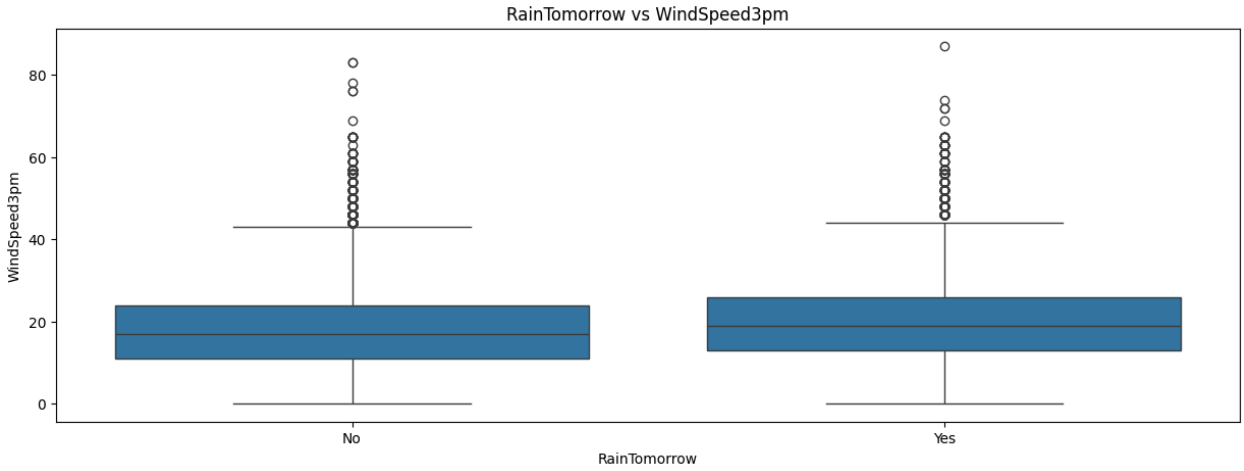

RainTomorrow vs Rainfall
Rainfall
350
300
250
200
150
100
50
0
No
Yes
RainTomorrow

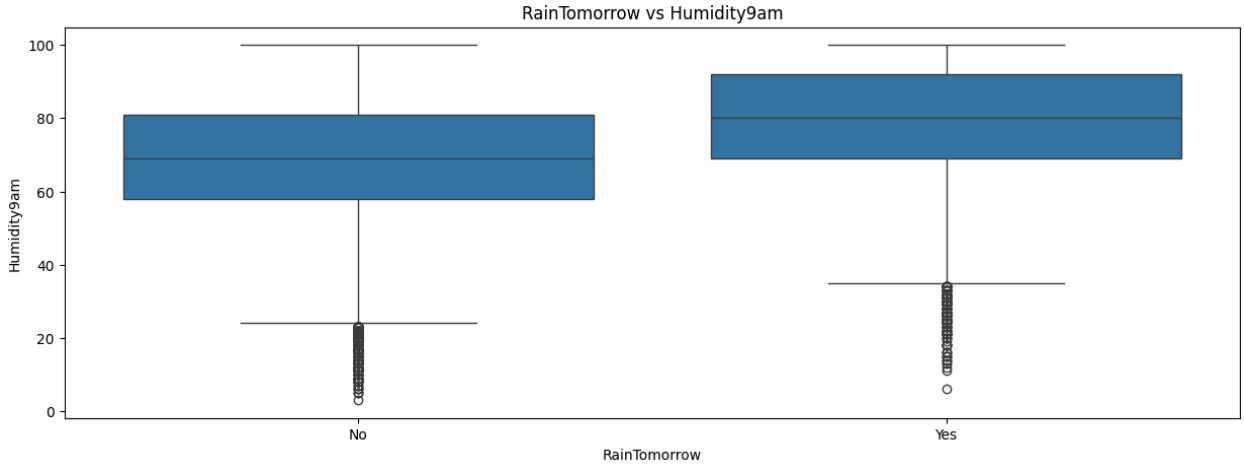

RainTomorrow vs Evaporation
Evaporation
140
120
100
80
60
40
20
0
No
Yes
RainTomorrow

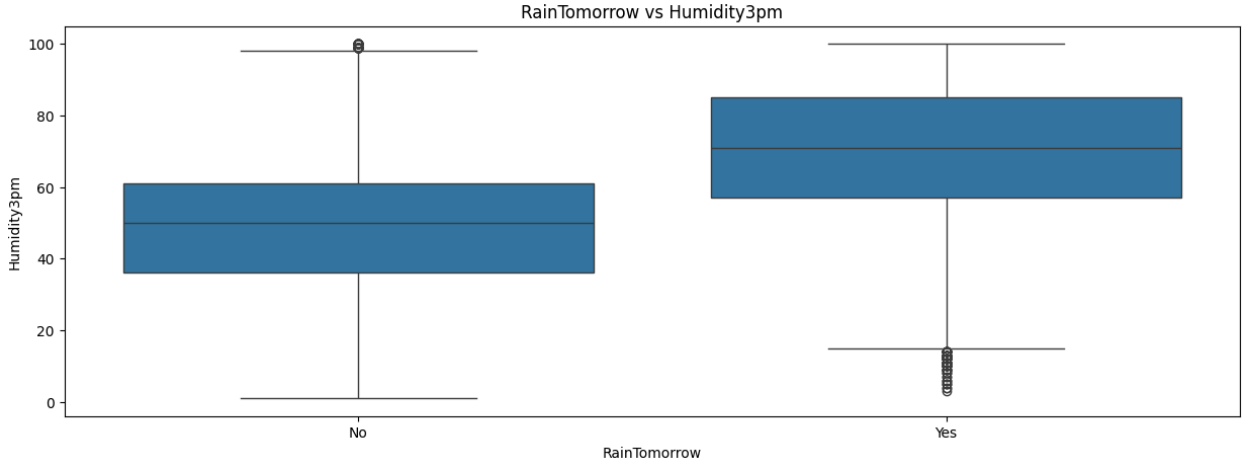

RainTomorrow vs Sunshine
Sunshine
0
2
4
6
8
10
12
14
No
Yes
RainTomorrow

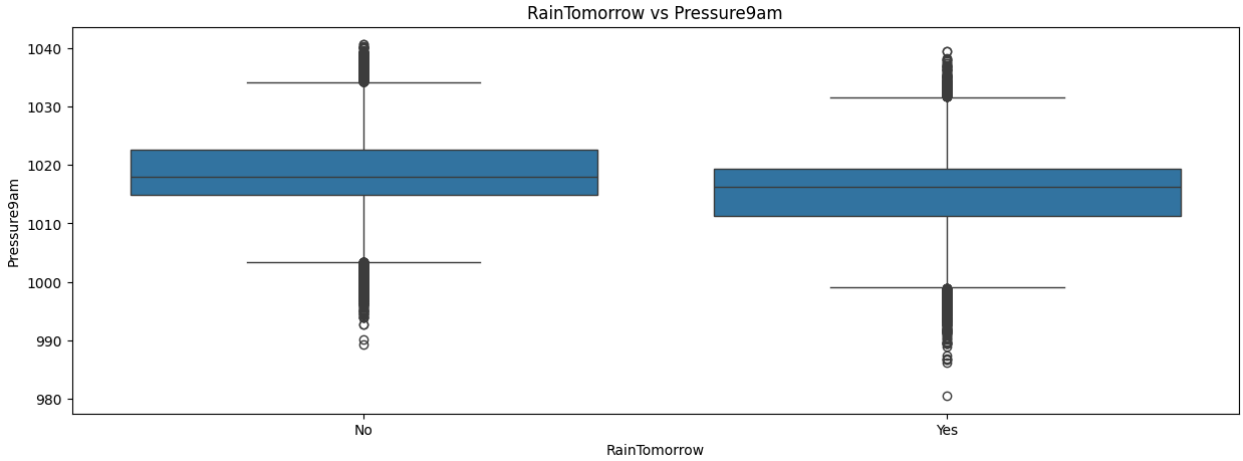

RainTomorrow vs WindGustSpeed
WindGustSpeed
20
40
60
80
100
120
140
No
Yes
RainTomorrow

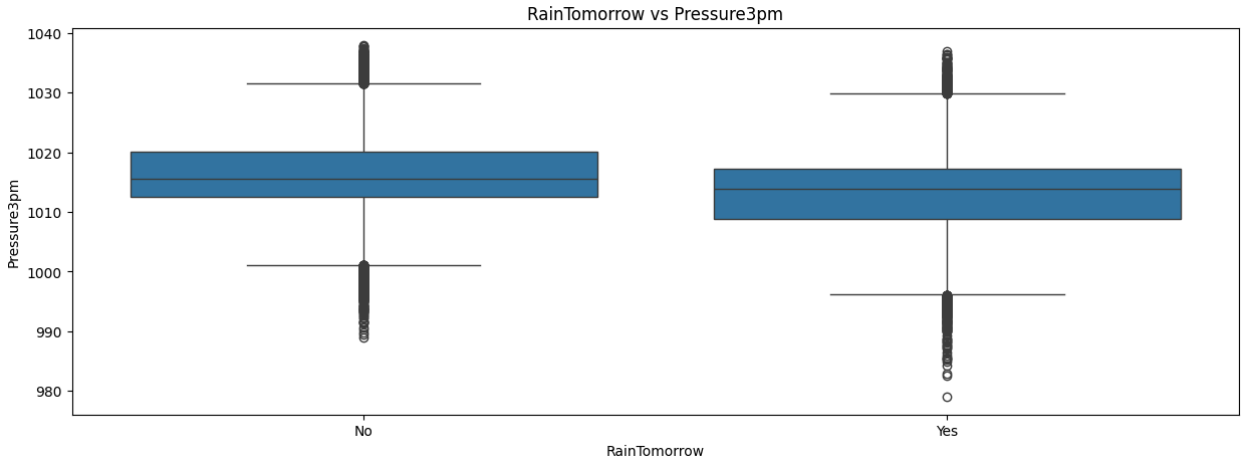

RainTomorrow vs WindSpeed9am
WindSpeed9am
0
20
40
60
80
100
120
No
Yes
RainTomorrow

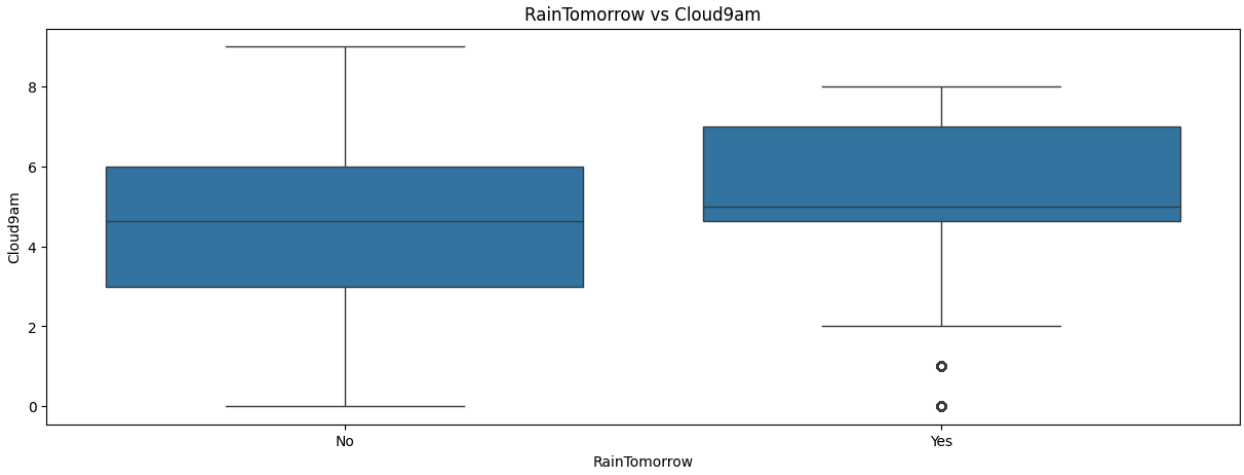

RainTomorrow vs WindSpeed3pm
WindSpeed3pm
0
20
40
60
80
No
Yes
RainTomorrow

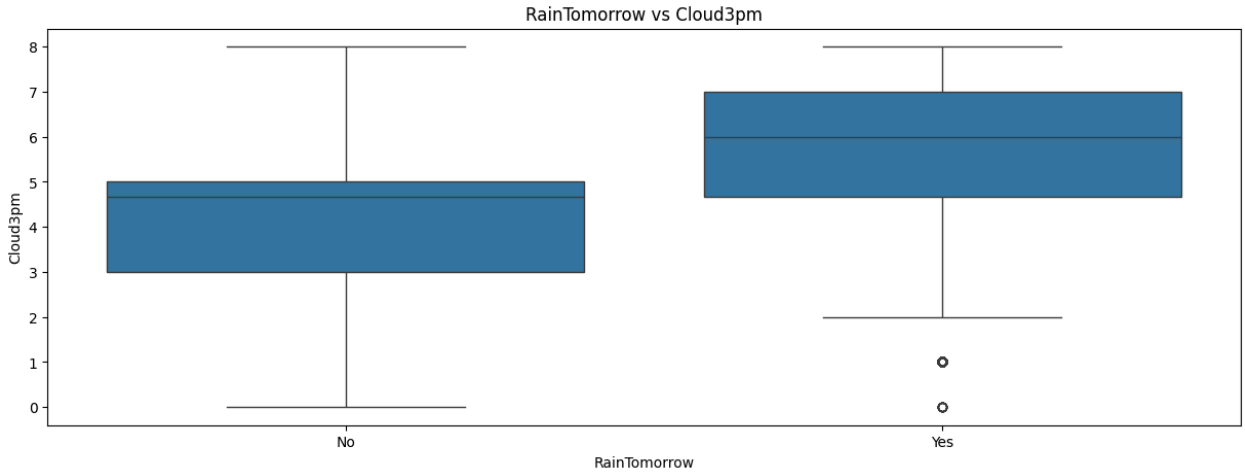

RainTomorrow vs Humidity9am
Humidity9am
0
20
40
60
80
100
No
Yes
RainTomorrow

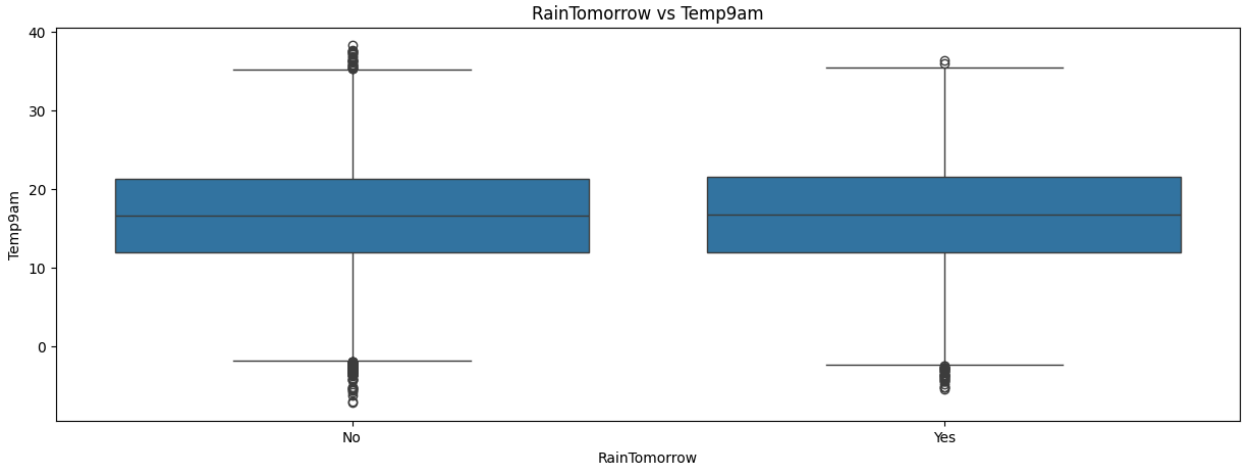

RainTomorrow vs Humidity3pm
Humidity3pm
0
20
40
60
80
100
No
Yes
RainTomorrow

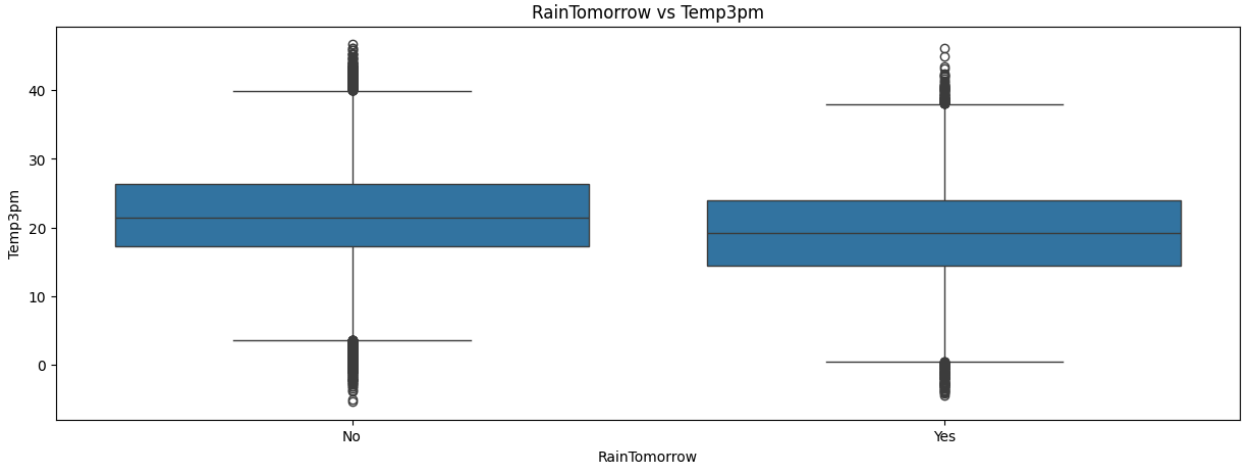

RainTomorrow vs Pressure9am
Pressure9am
1040
1030
1020
1010
1000
990
980
No
Yes
RainTomorrow

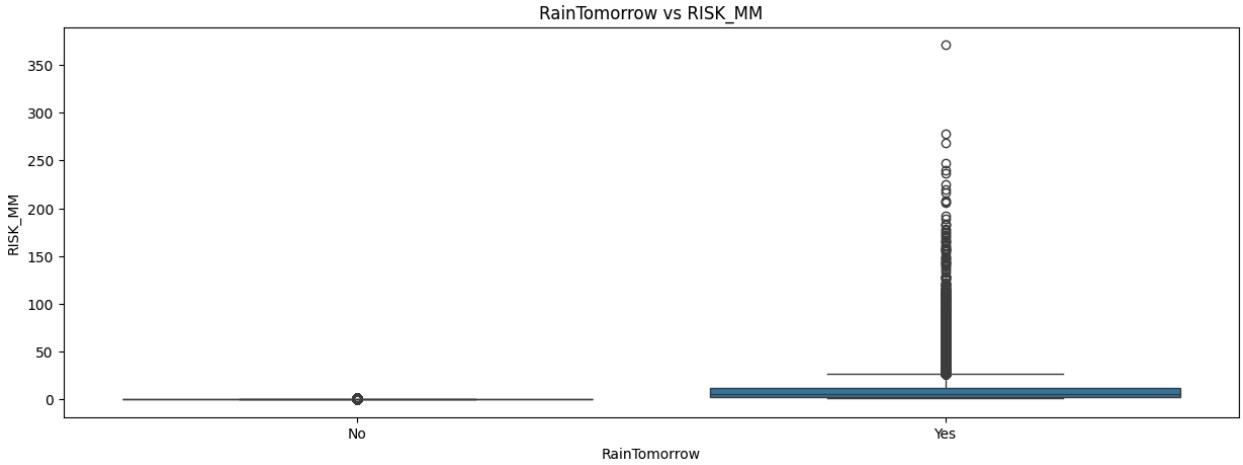

RainTomorrow vs Pressure3pm
Pressure3pm
1040
1030
1020
1010
1000
990
980
No
Yes
RainTomorrow


RainTomorrow vs Cloud9am
Cloud9am
8
6
4
2
0
No
Yes
RainTomorrow


RainTomorrow vs Cloud3pm
Cloud3pm
RainTomorrow
No
Yes
0
1
2
3
4
5
6
7
8


RainTomorrow vs Temp9am
Temp9am
RainTomorrow
No
Yes
0
10
20
30
40


RainTomorrow vs Temp3pm
Temp3pm
RainTomorrow
No
Yes
0
10
20
30
40



In [ ]:
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for i in range(len(categorical5.columns)):
  for j in range(i+1,len(categorical5.columns)):
   if categorical5.columns[i]!='Date' and categorical5.columns[j]!='Date' and
    plt.figure(figsize=(15,5))
    sns.countplot(x=df5[categorical5.columns[i]],hue=df5[categorical5.columns[
    plt.title(categorical5.columns[i]+' vs '+categorical5.columns[j])
    plt.show()
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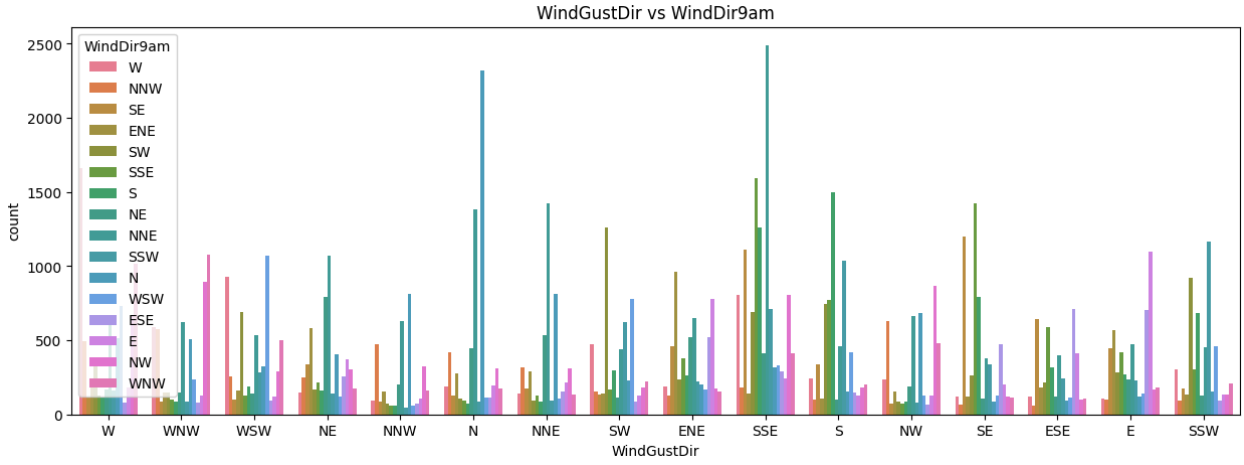
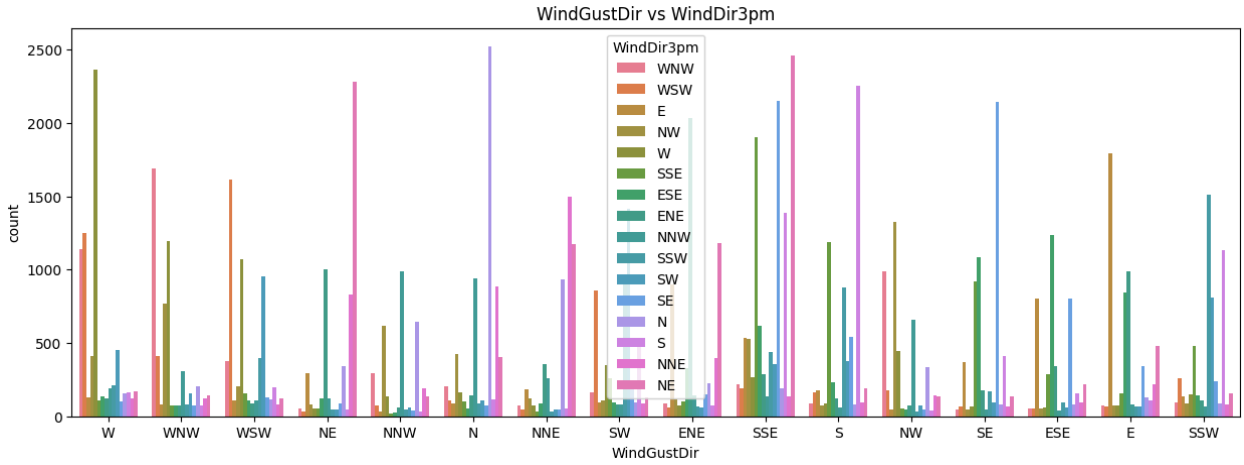
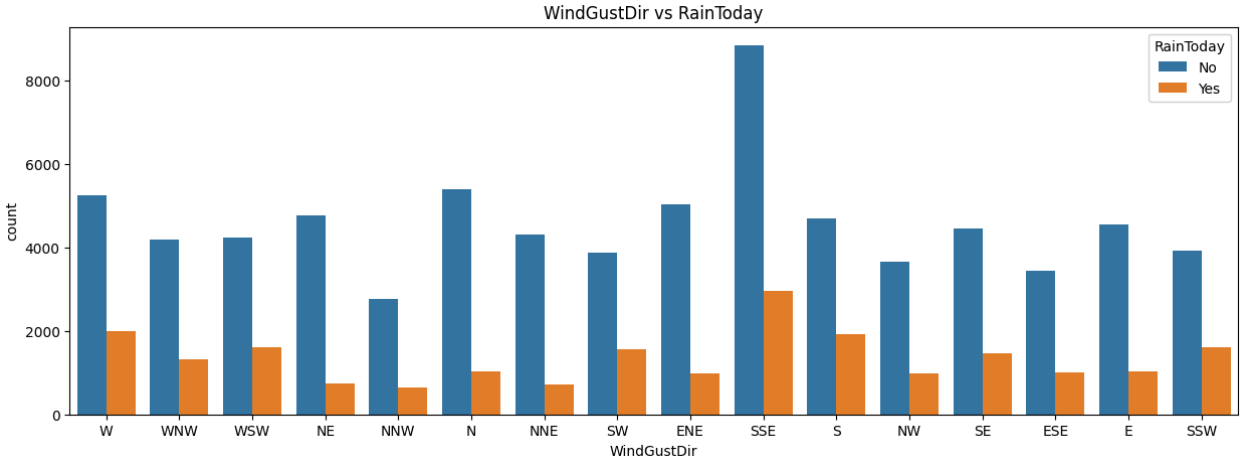
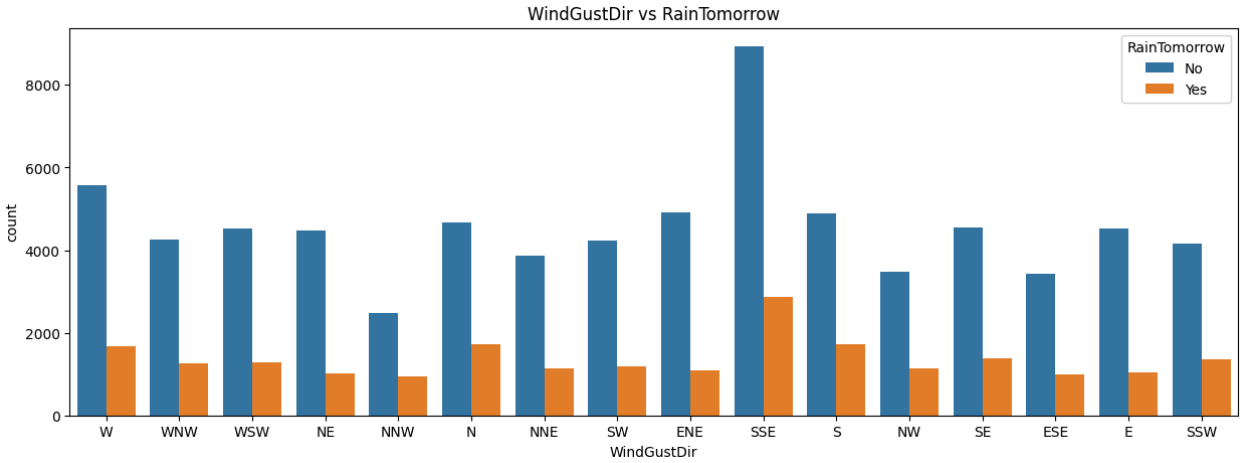
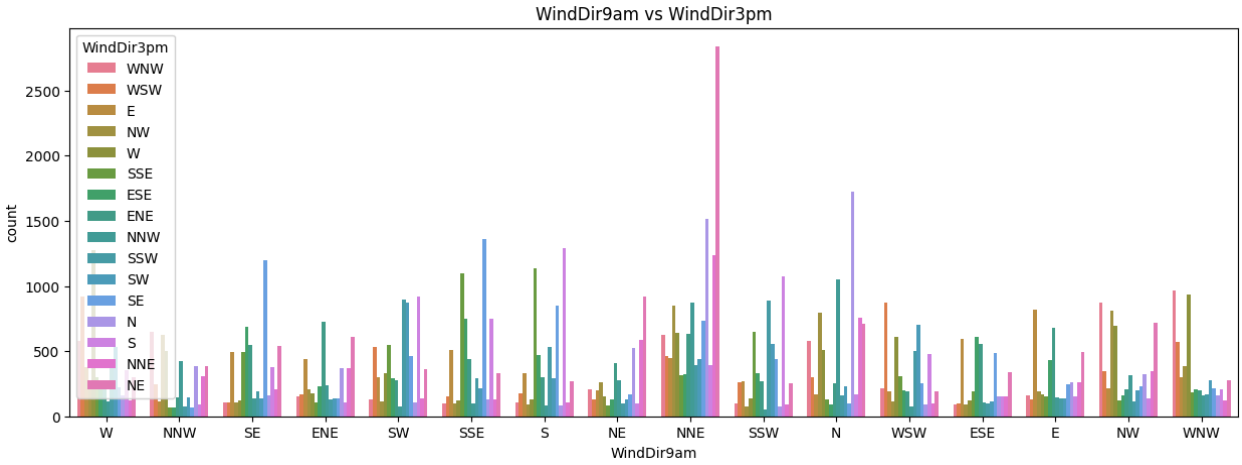
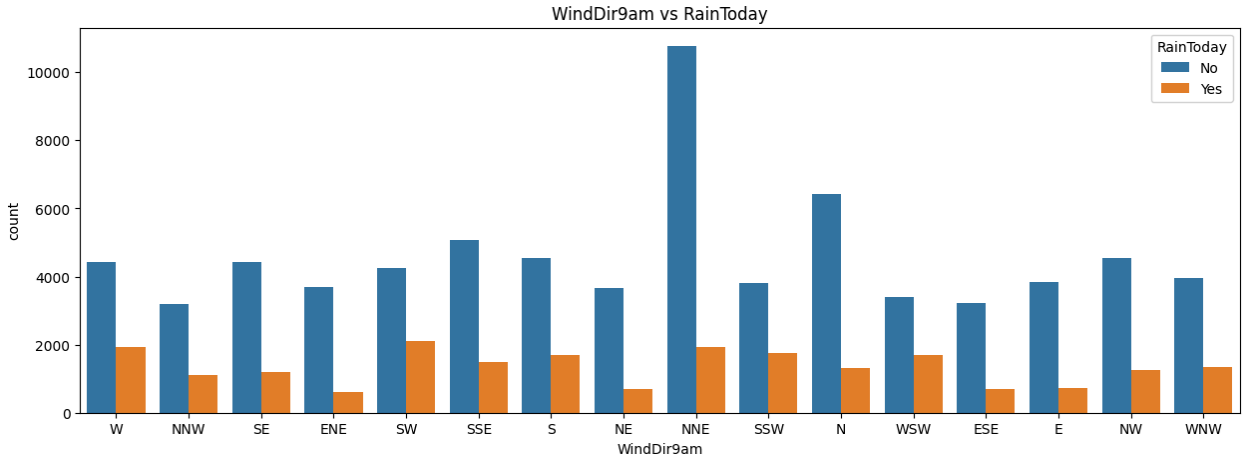


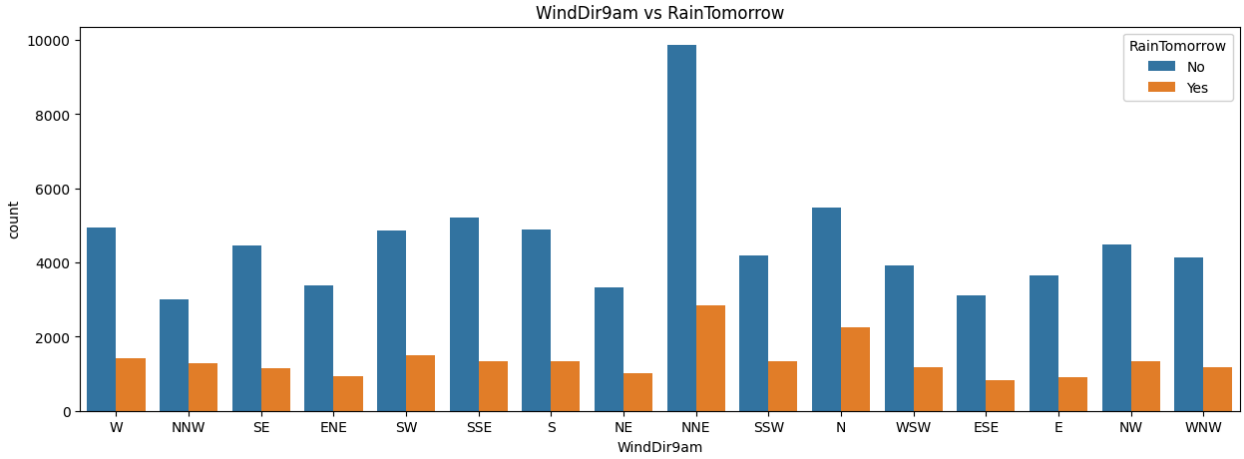


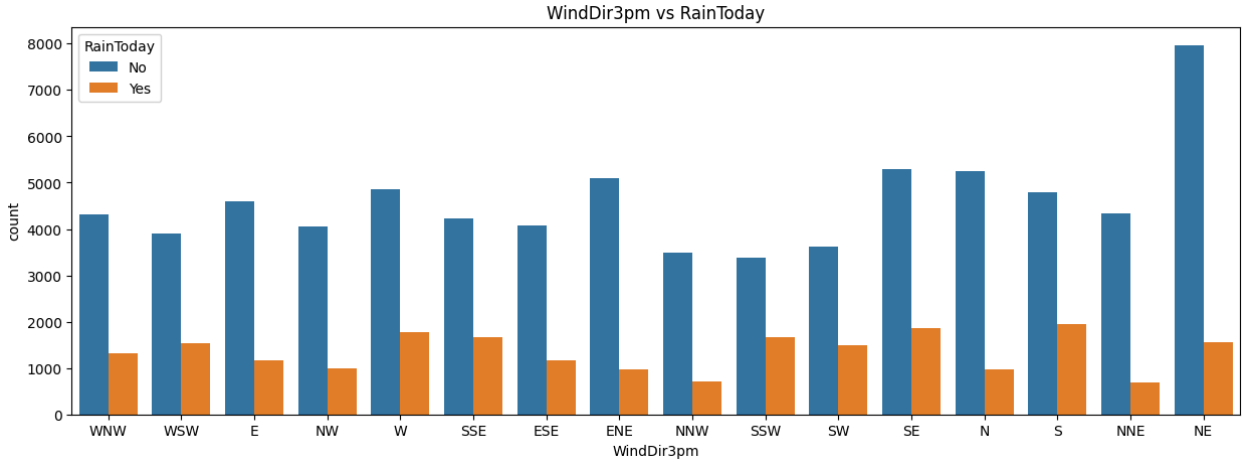

WindGustDir vs RainToday
RainToday
No
Yes
count
0
2000
4000
6000
8000
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir


WindGustDir vs RainTomorrow
RainTomorrow
No
Yes
count
0
2000
4000
6000
8000
W
WNW
WSW
NE
NNW
N
NNE
SW
ENE
SSE
S
NW
SE
ESE
E
SSW
WindGustDir


WindDir9am vs WindDir3pm
WindDir3pm
WNW
WSW
E
NW
W
SSE
ESE
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
count
0
500
1000
1500
2000
2500
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am


WindDir9am vs RainToday
RainToday
No
Yes
count
0
2000
4000
6000
8000
10000
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am


WindDir9am vs RainTomorrow
RainTomorrow
No
Yes
count
0
2000
4000
6000
8000
10000
W
NNW
SE
ENE
SW
SSE
S
NE
NNE
SSW
N
WSW
ESE
E
NW
WNW
WindDir9am


WindDir3pm vs RainToday
RainToday
No
Yes
count
0
1000
2000
3000
4000
5000
6000
7000
8000
WNW
WSW
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NW
W
SSE
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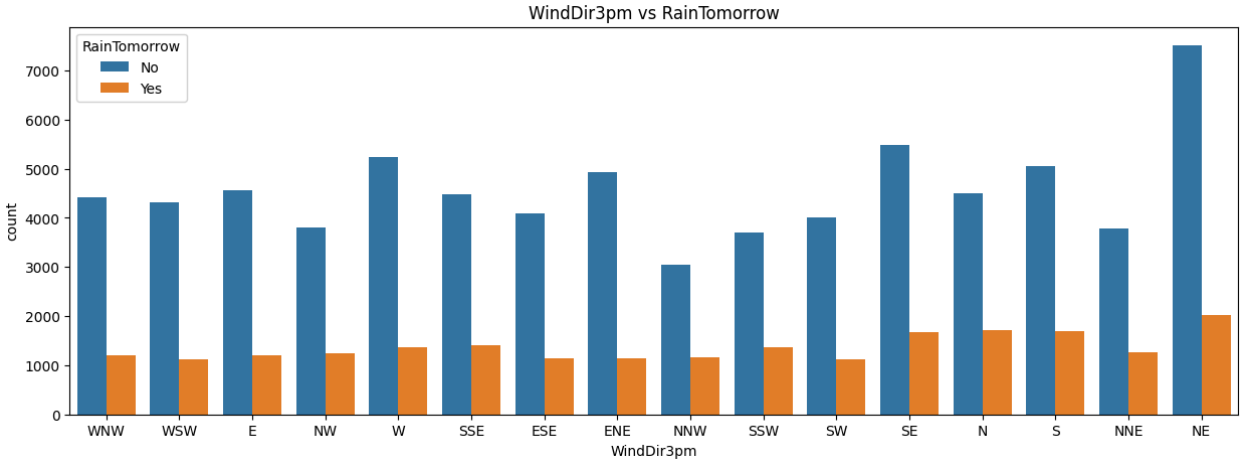
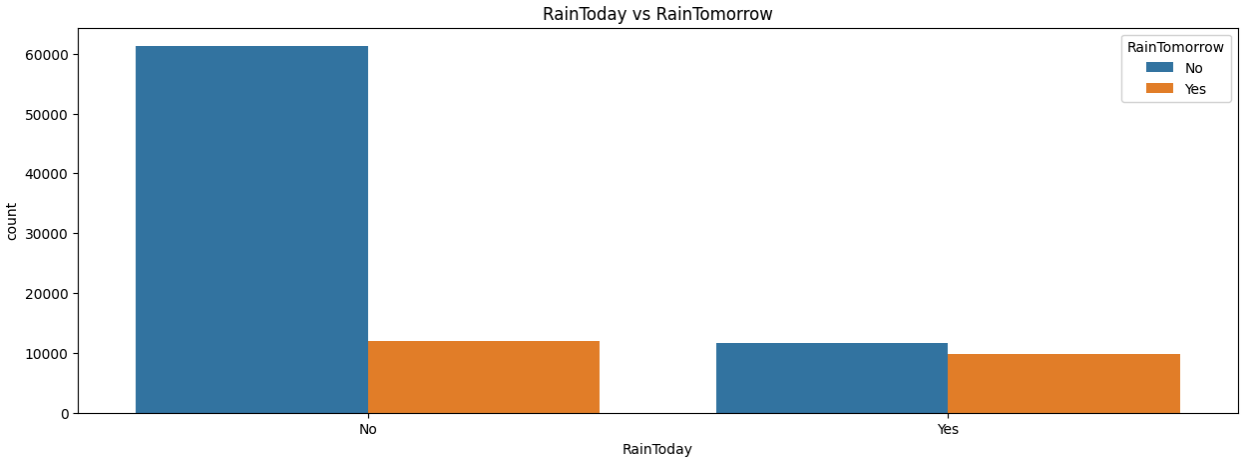
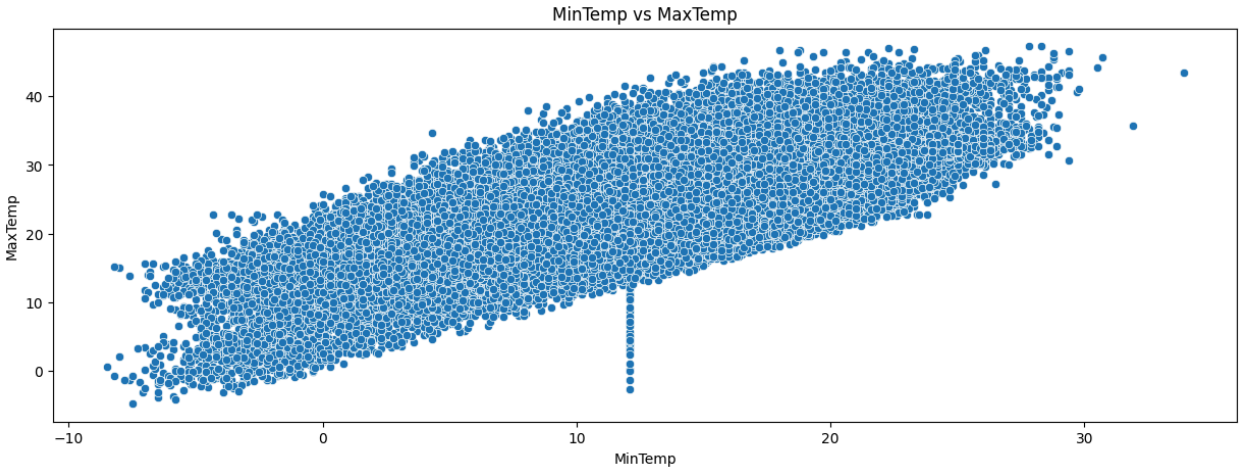
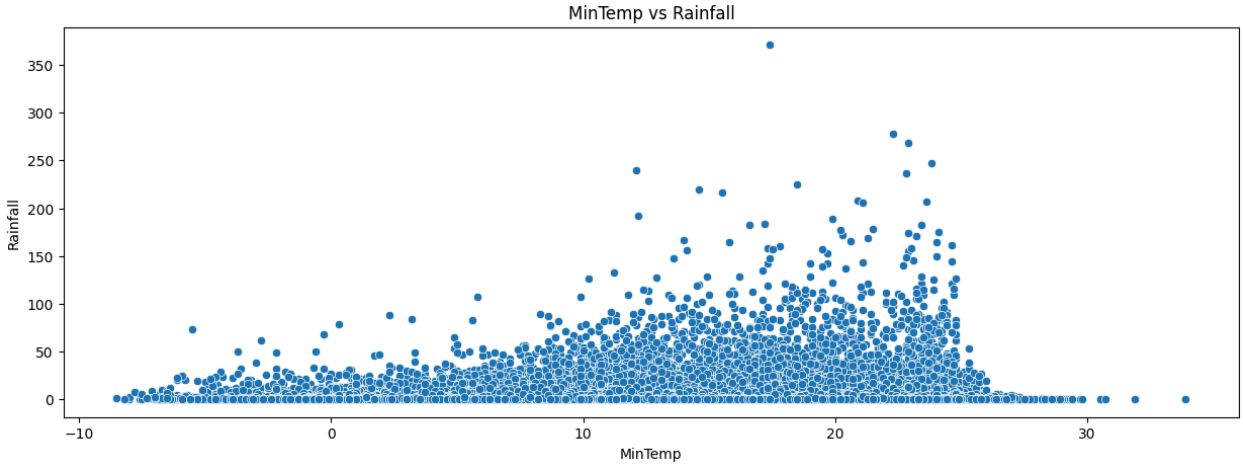
ENE
NNW
SSW
SW
SE
N
S
NNE
NE
WindDir3pm





In [ ]:
```
for i in range(len(Numerical5.columns)):
  for j in range(i+1,len(Numerical5.columns)):
    plt.figure(figsize=(15,5))
    sns.scatterplot(x=df5[Numerical5.columns[i]],y=df5[Numerical5.columns[j]])
    plt.title(Numerical5.columns[i]+' vs '+Numerical5.columns[j])
    plt.show()
```




MinTemp vs Rainfall
Rainfall
MinTemp
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50
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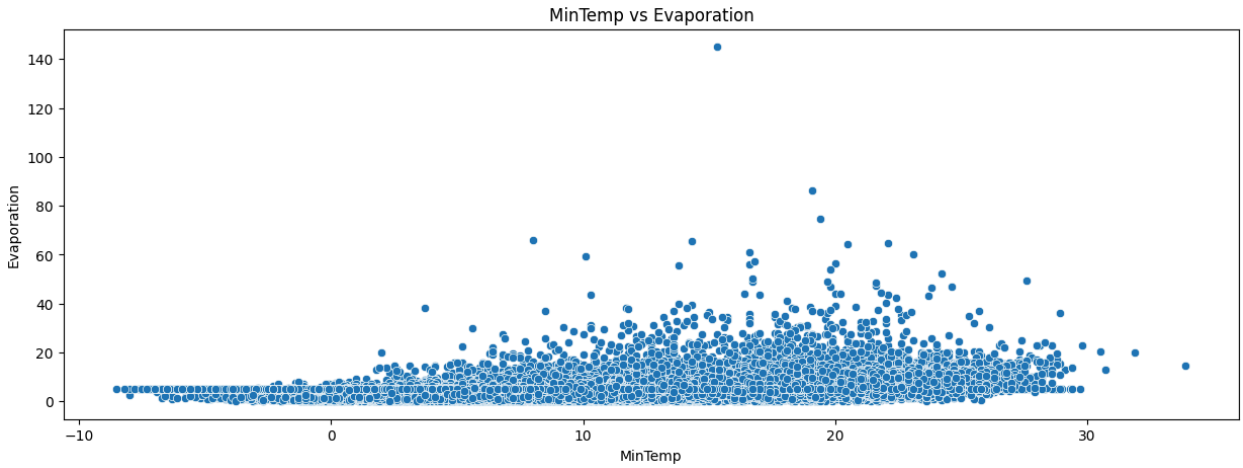
0
10
20
30


MinTemp vs Evaporation
Evaporation
MinTemp
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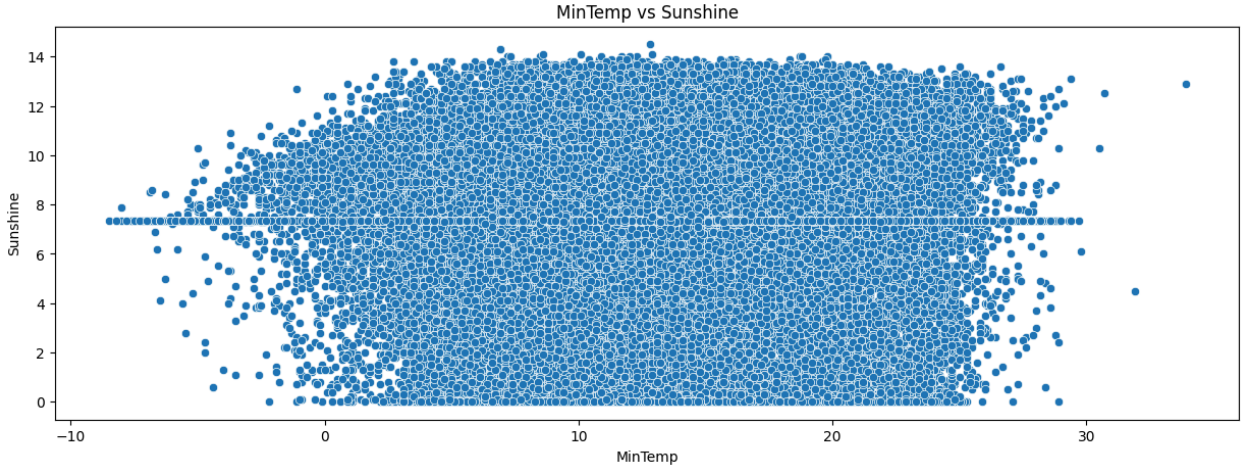
MinTemp vs Sunshine
Sunshine
MinTemp
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0
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20
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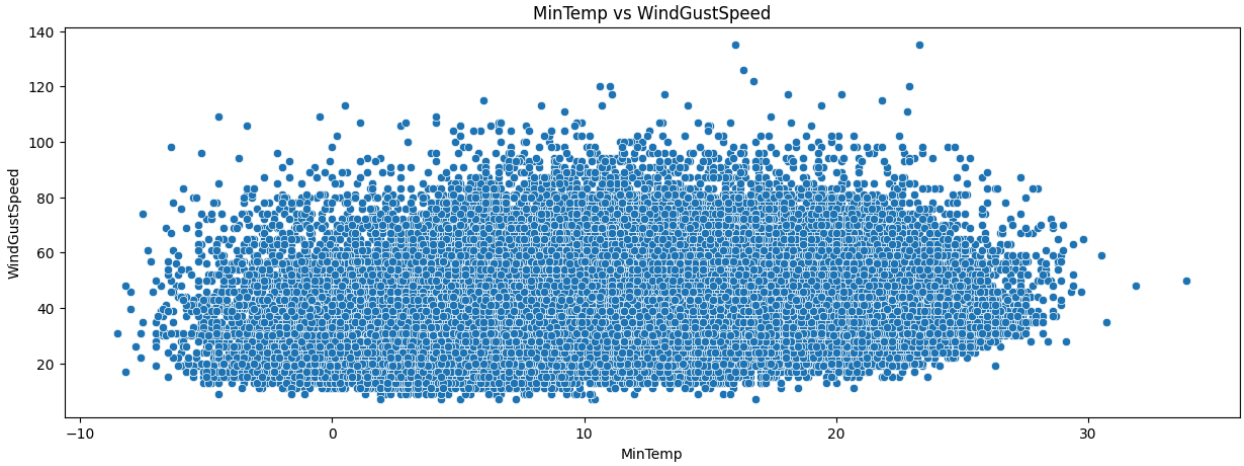
MinTemp vs WindGustSpeed
WindGustSpeed
MinTemp
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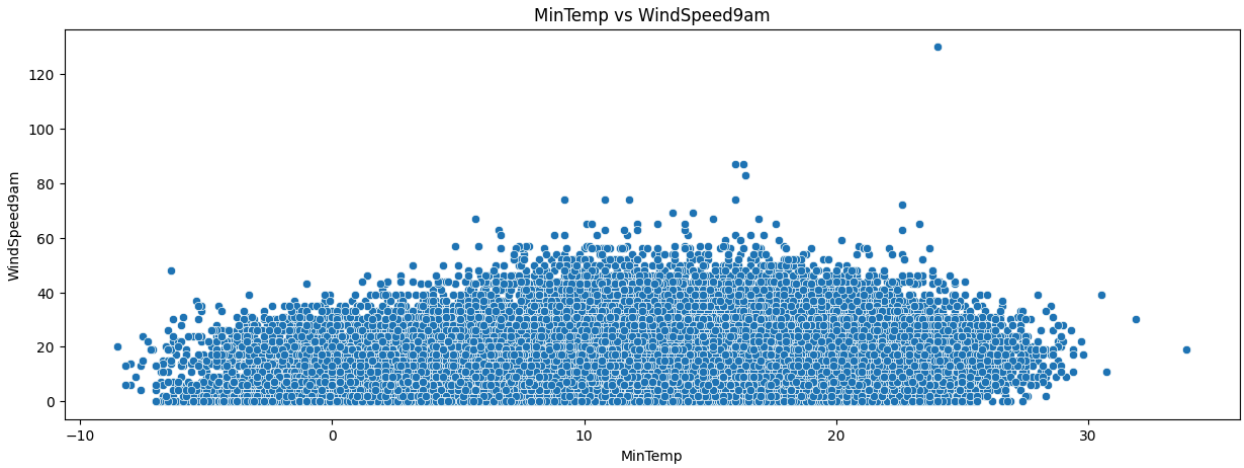
MinTemp vs WindSpeed9am
WindSpeed9am
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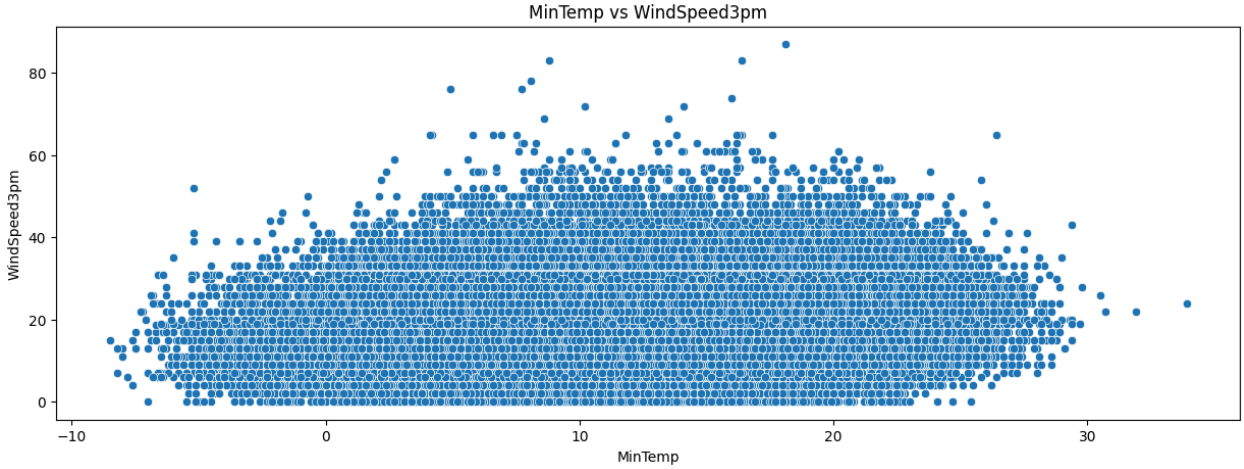
MinTemp vs WindSpeed3pm
WindSpeed3pm
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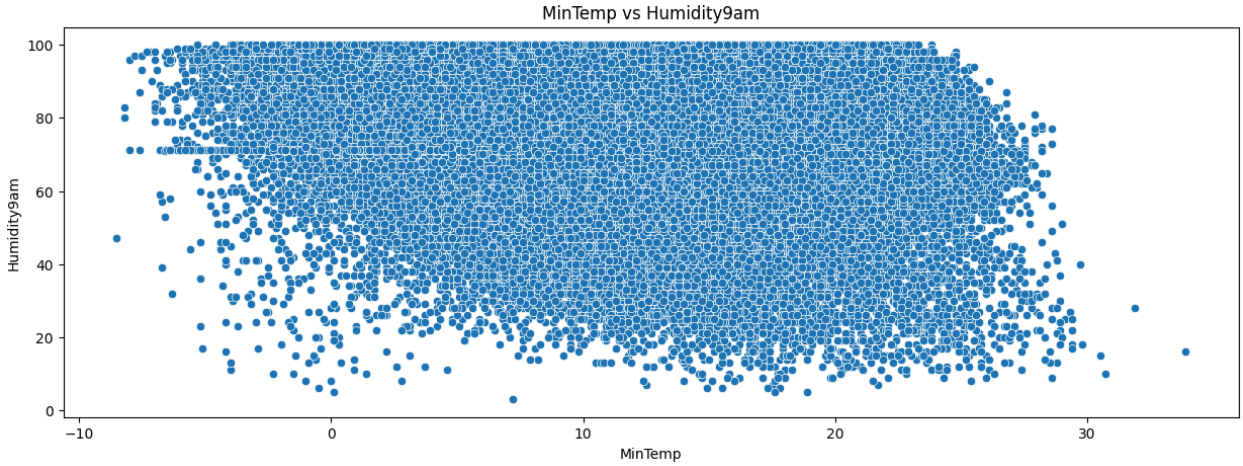
MinTemp vs Humidity9am
Humidity9am
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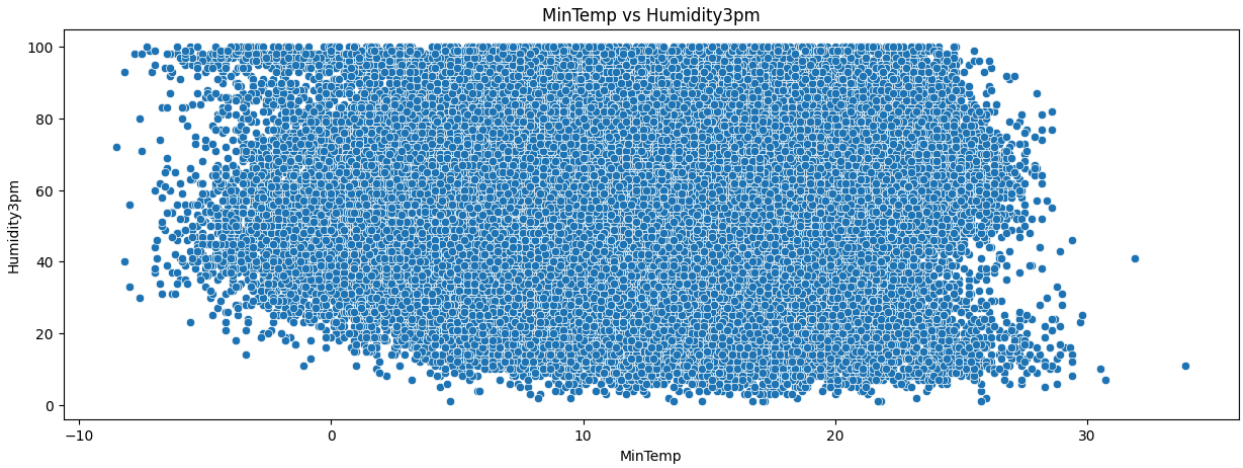
MinTemp vs Humidity3pm
Humidity3pm
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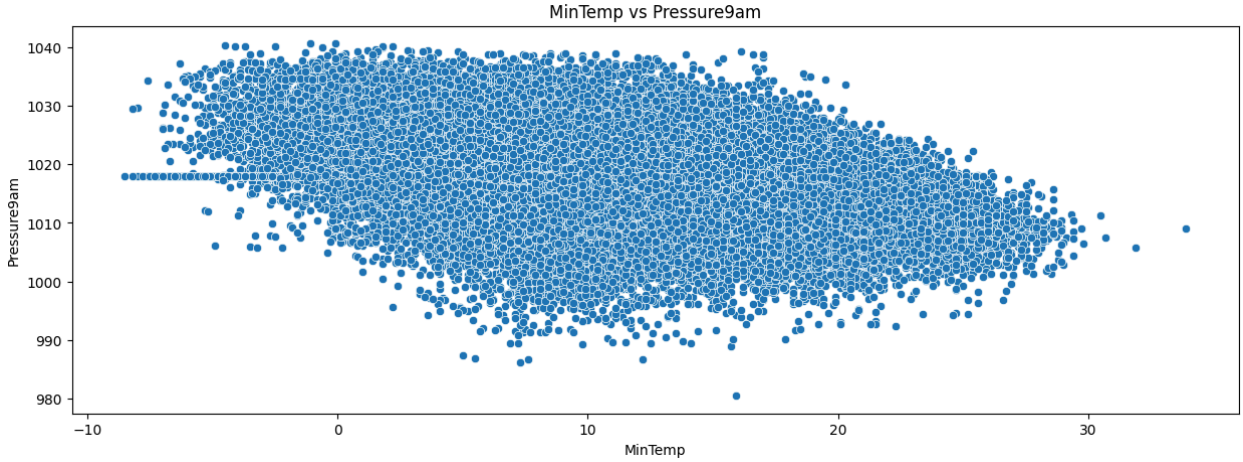
MinTemp vs Pressure9am
Pressure9am
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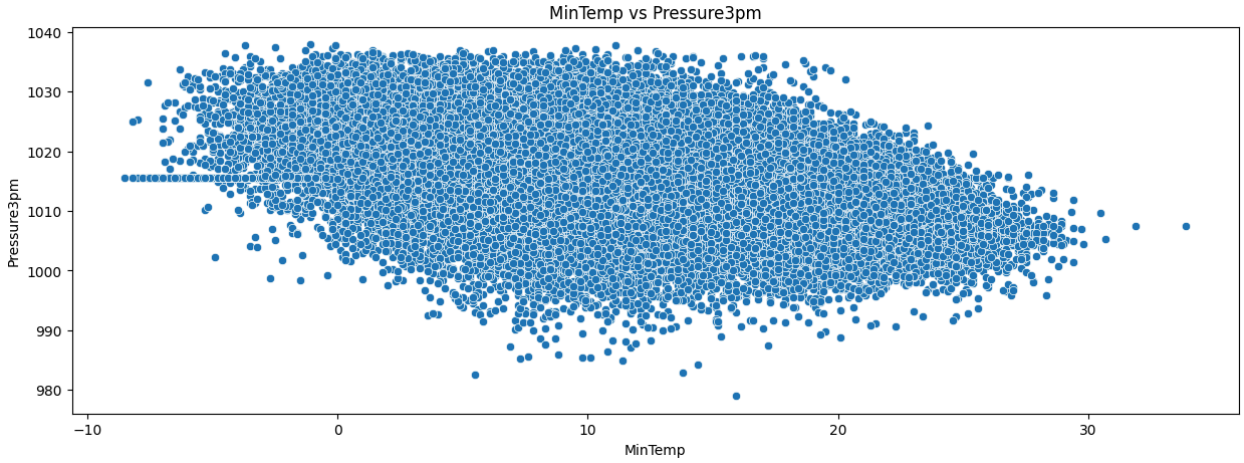
MinTemp vs Pressure3pm
Pressure3pm
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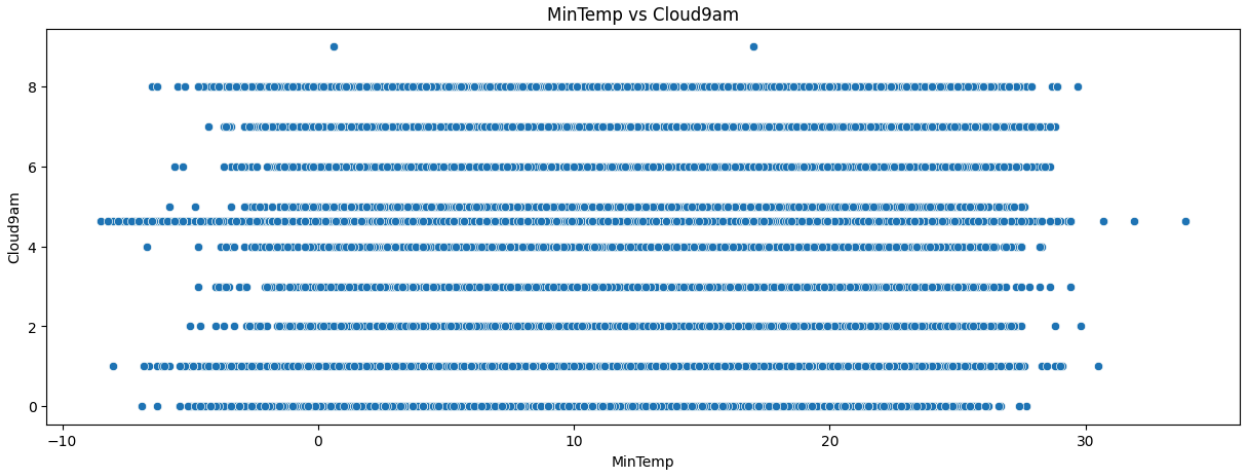
MinTemp vs Cloud9am
Cloud9am
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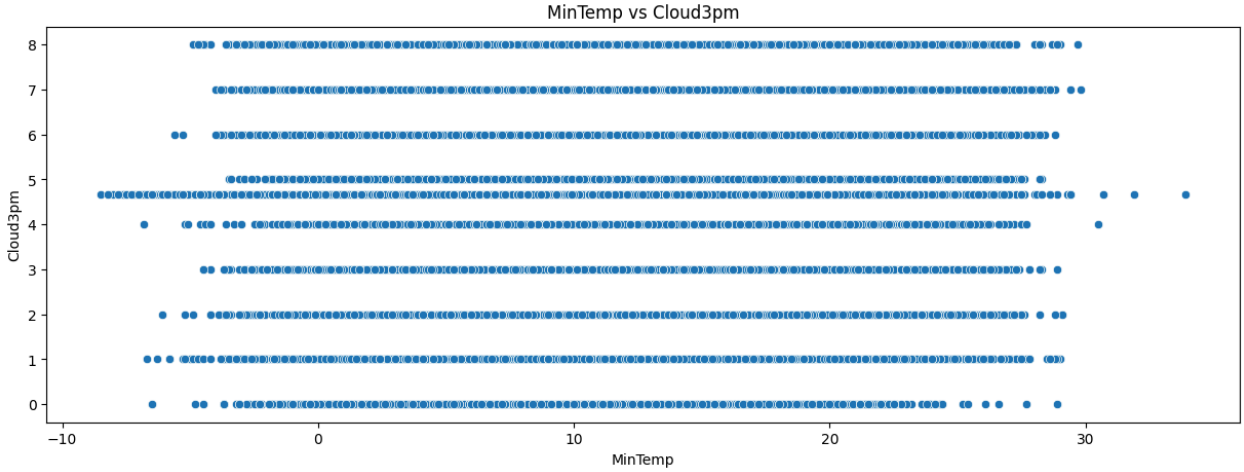
MinTemp vs Cloud3pm
Cloud3pm
MinTemp
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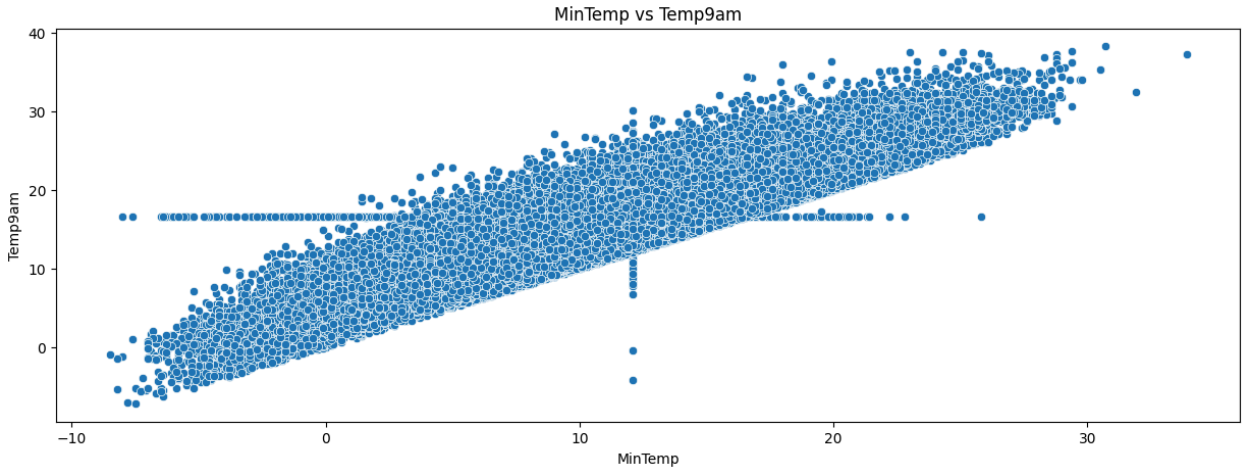
MinTemp vs Temp9am
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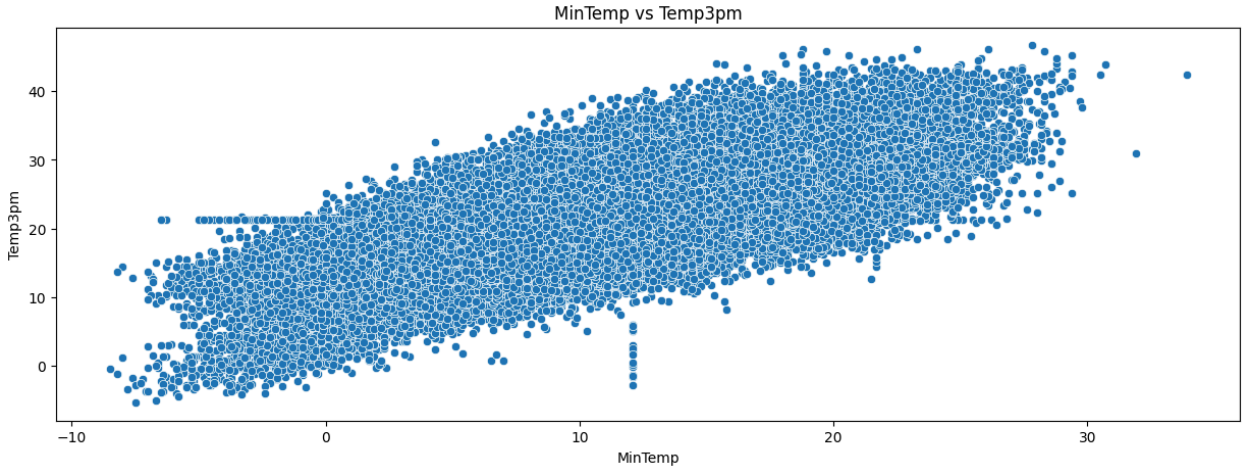
MinTemp vs Temp3pm
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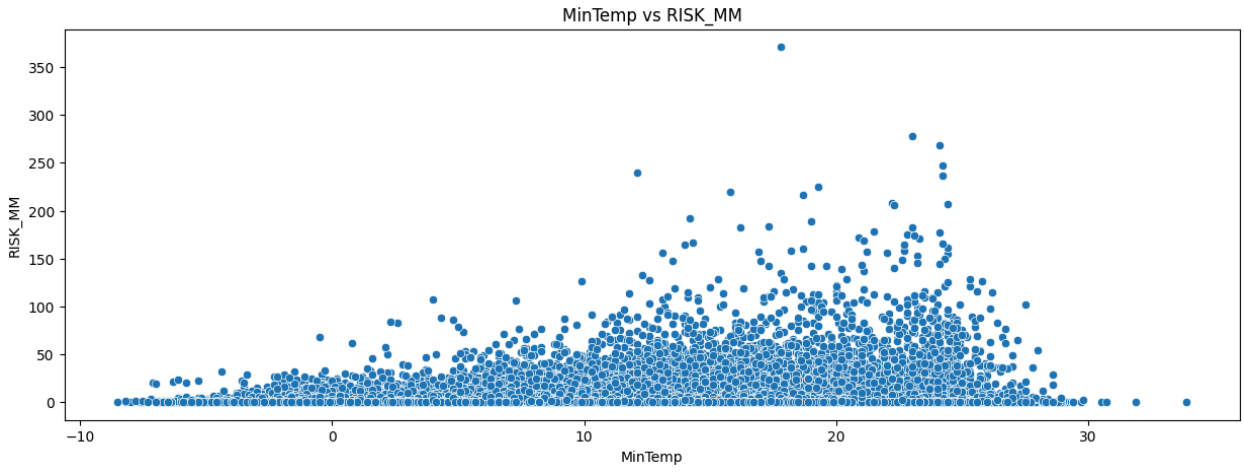
MinTemp vs RISK_MM
RISK_MM
MinTemp
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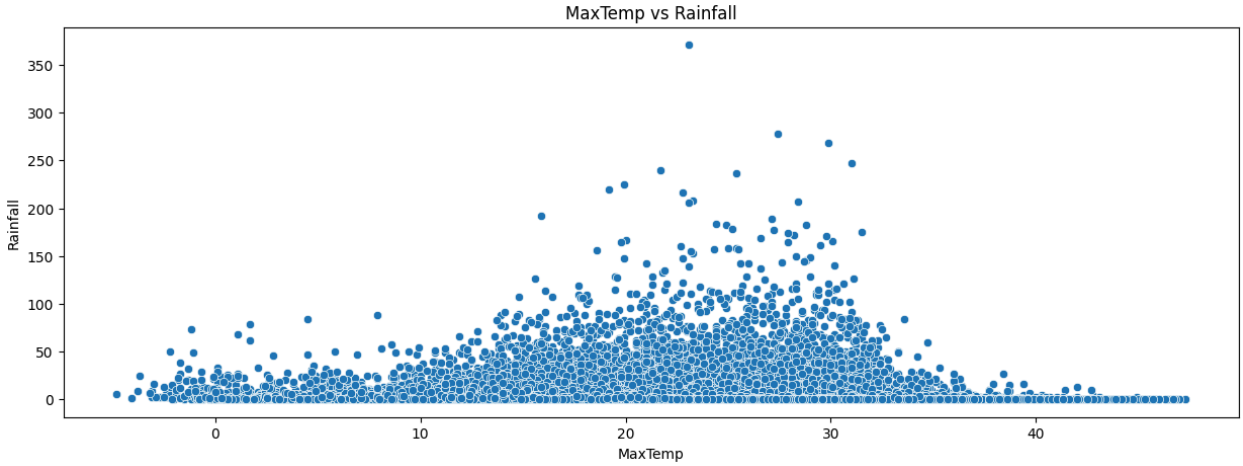
MaxTemp vs Rainfall
Rainfall
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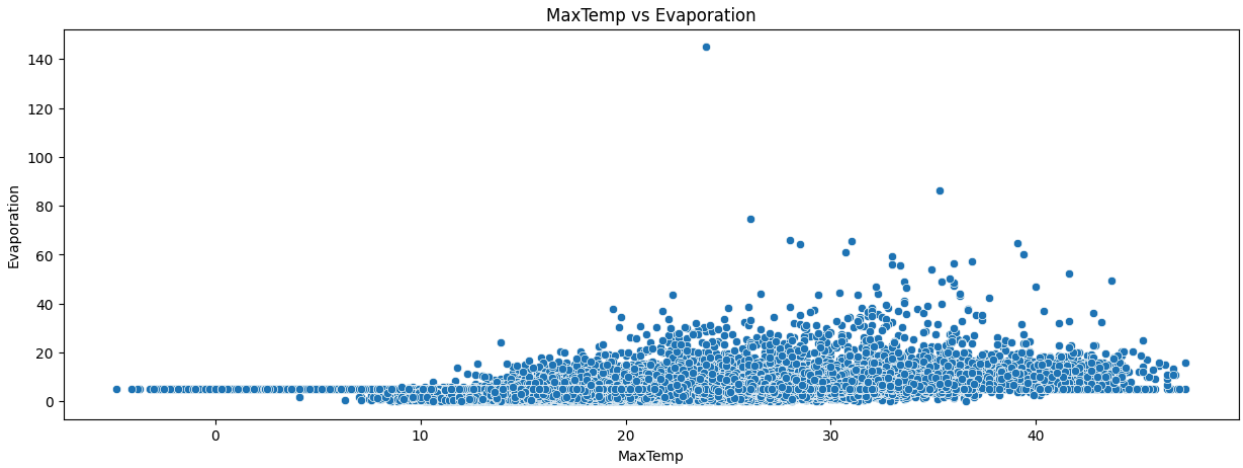
MaxTemp vs Evaporation
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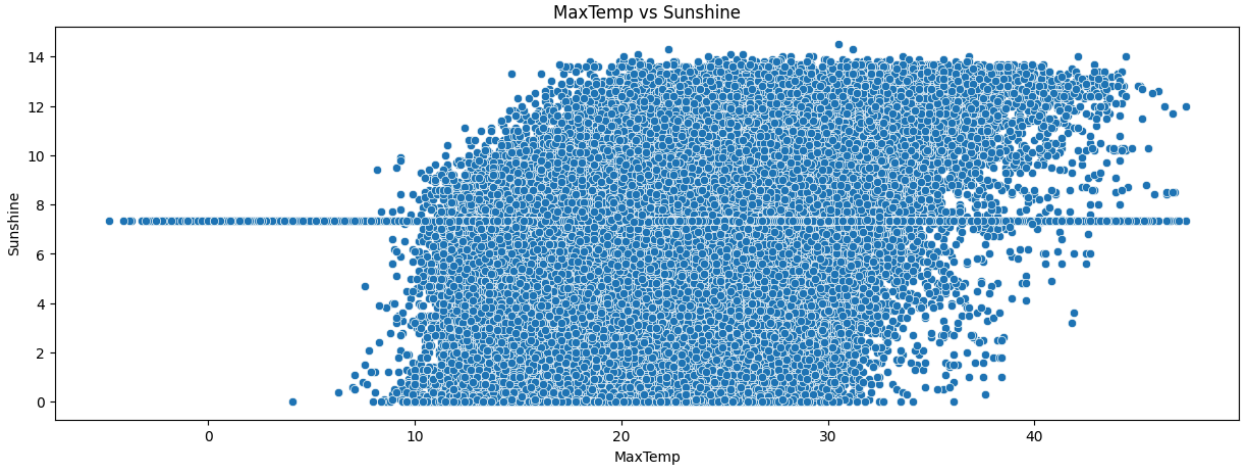
MaxTemp vs Sunshine
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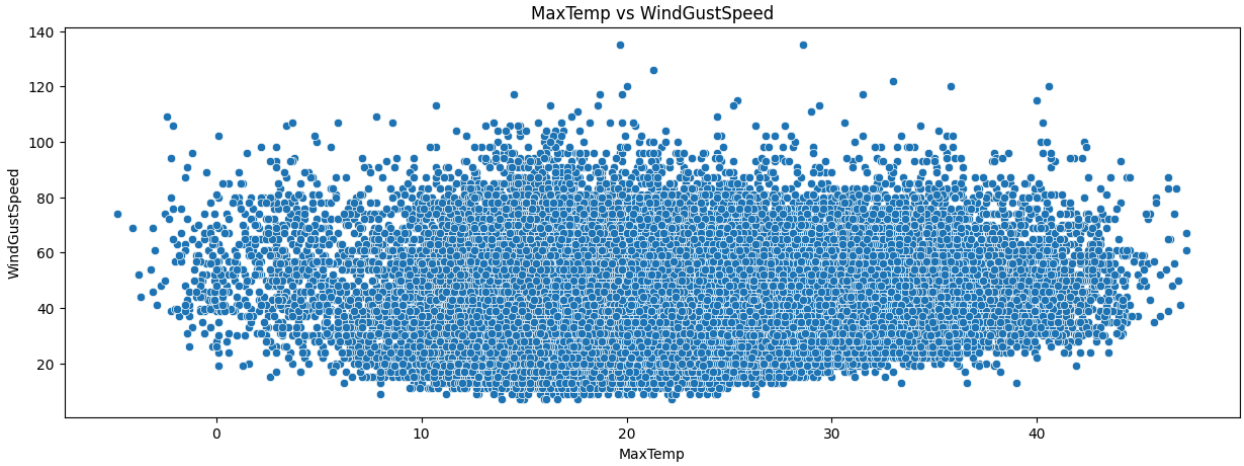
MaxTemp vs WindGustSpeed
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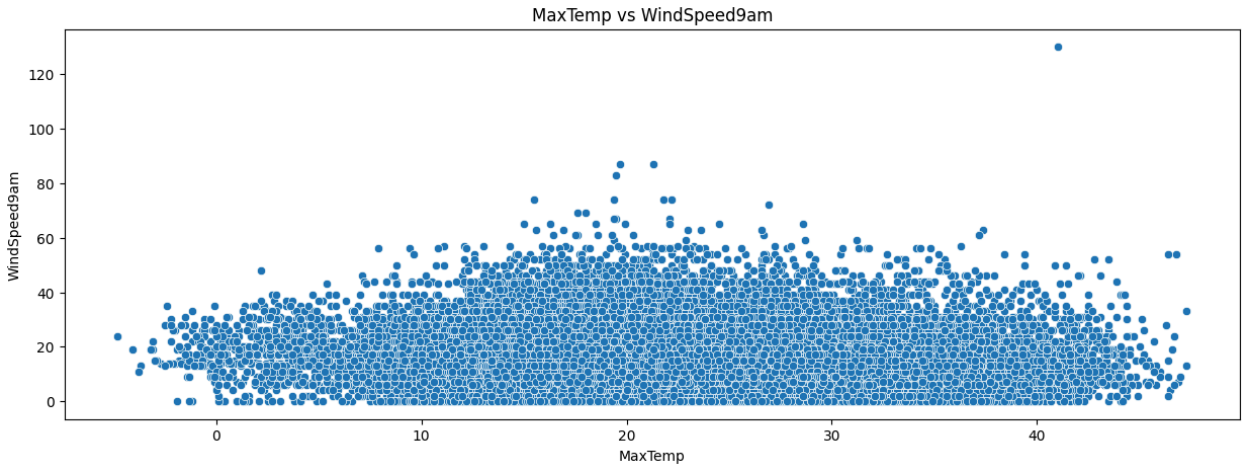
MaxTemp vs WindSpeed9am
WindSpeed9am
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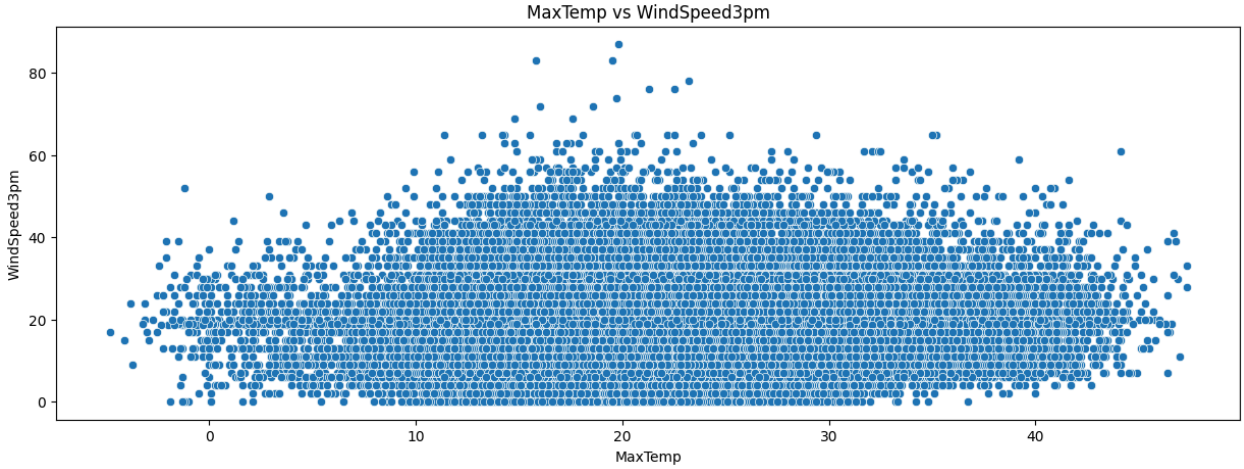
MaxTemp vs WindSpeed3pm
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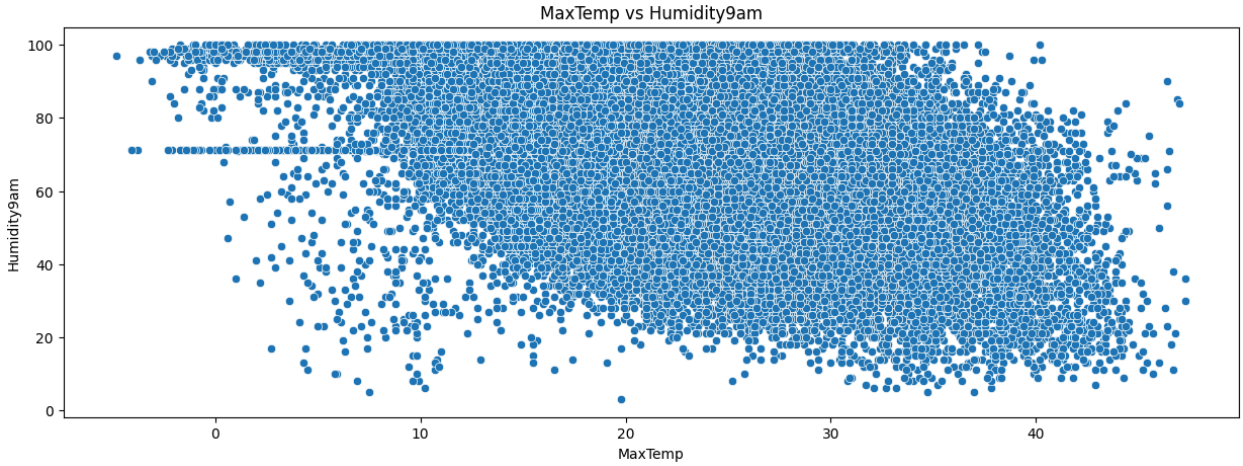
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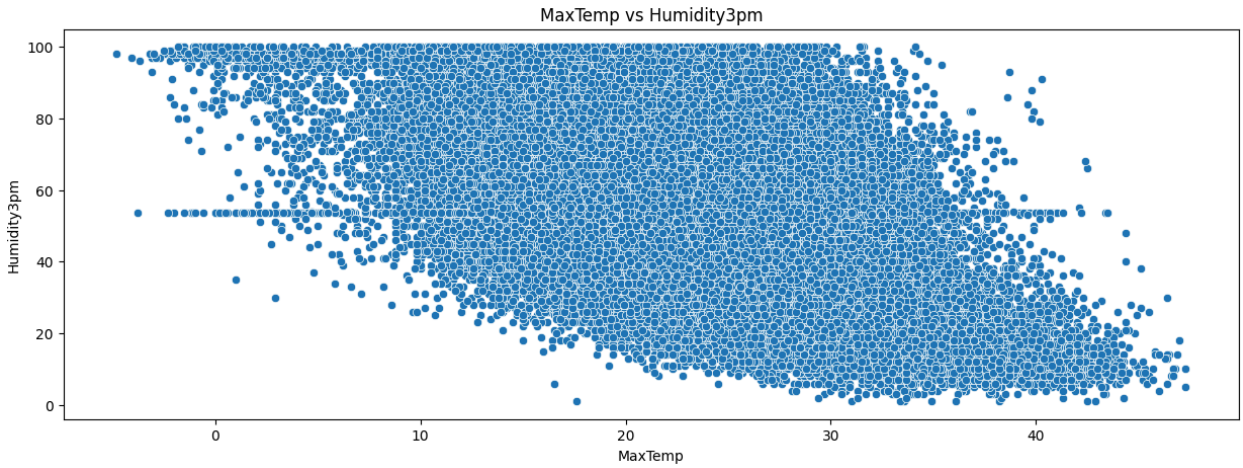
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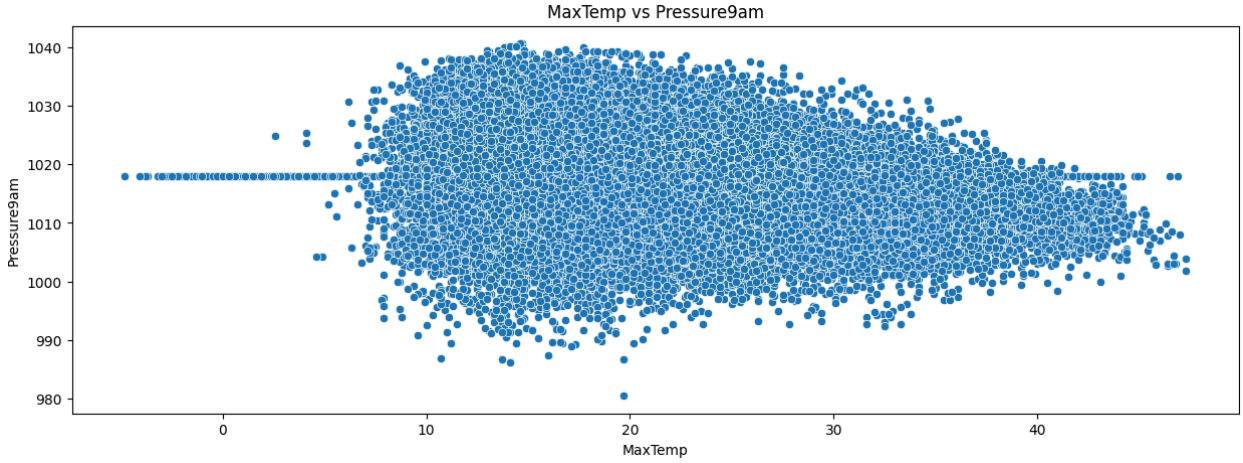
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Pressure9am
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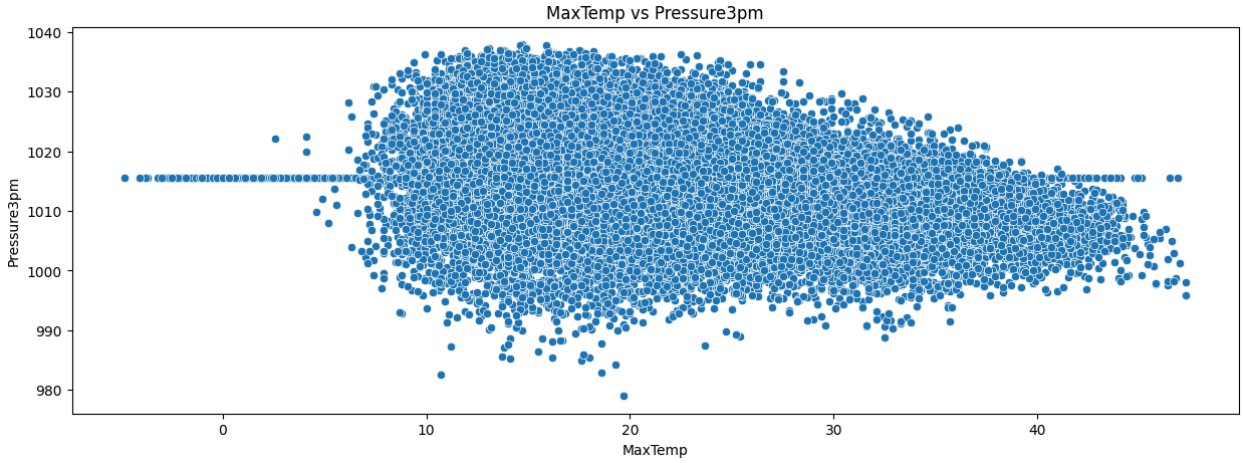
MaxTemp vs Pressure3pm
Pressure3pm
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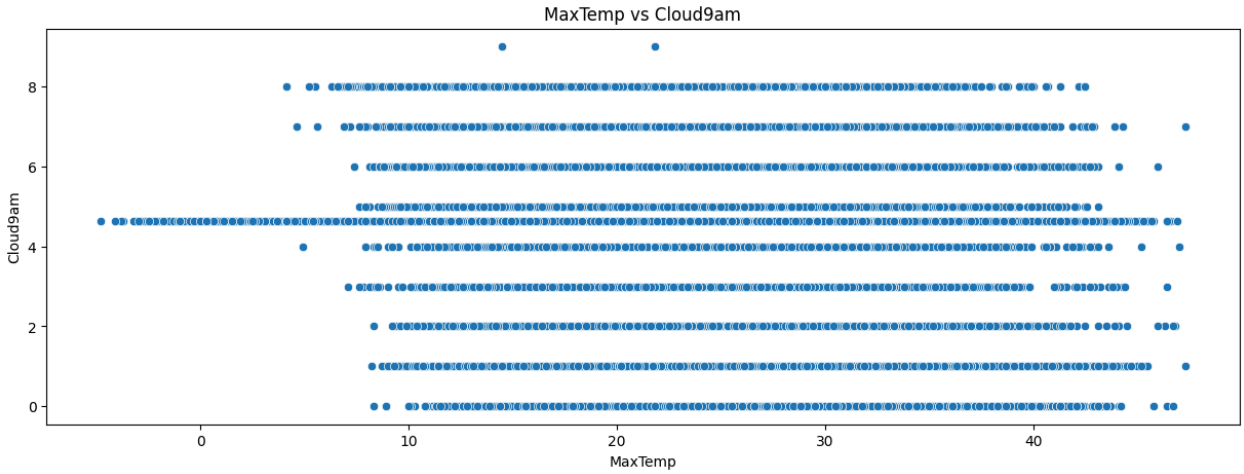
MaxTemp vs Cloud9am
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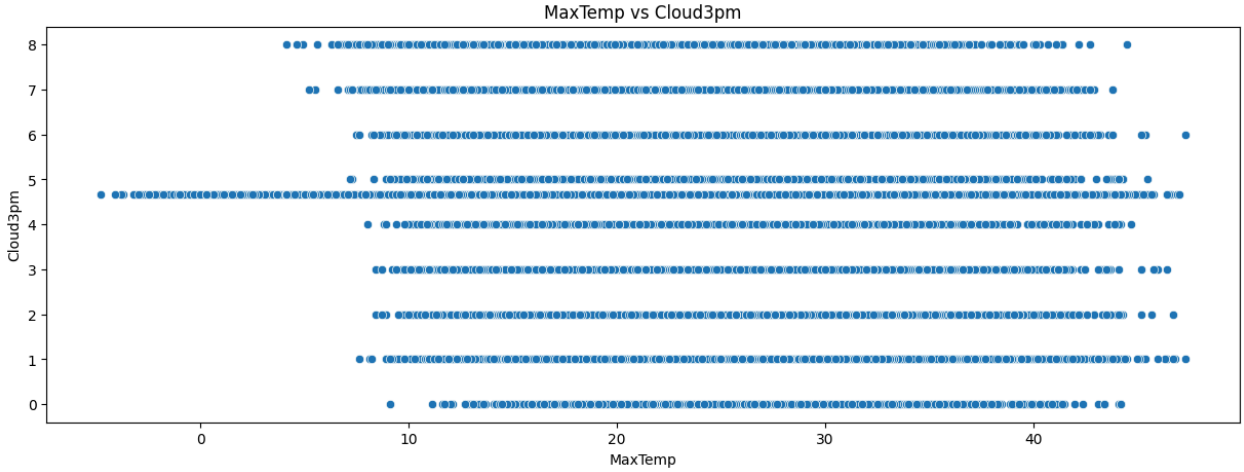
MaxTemp vs Cloud3pm
Cloud3pm
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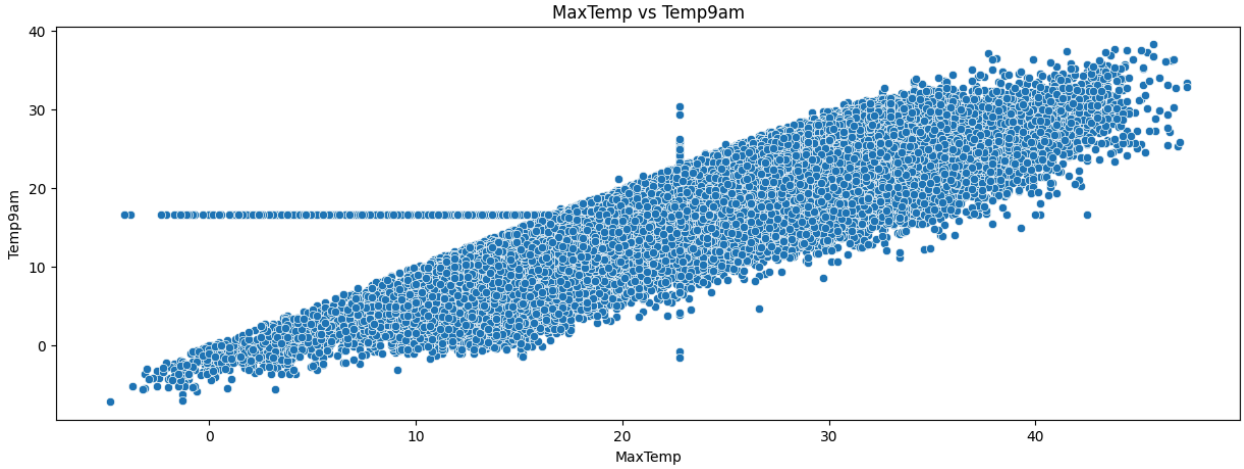
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Temp9am
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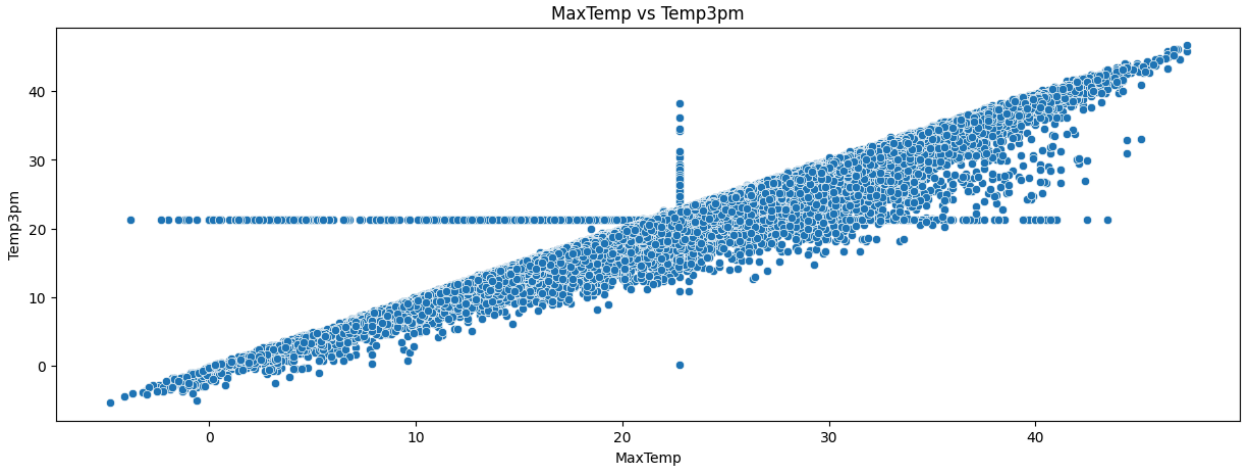
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Temp3pm
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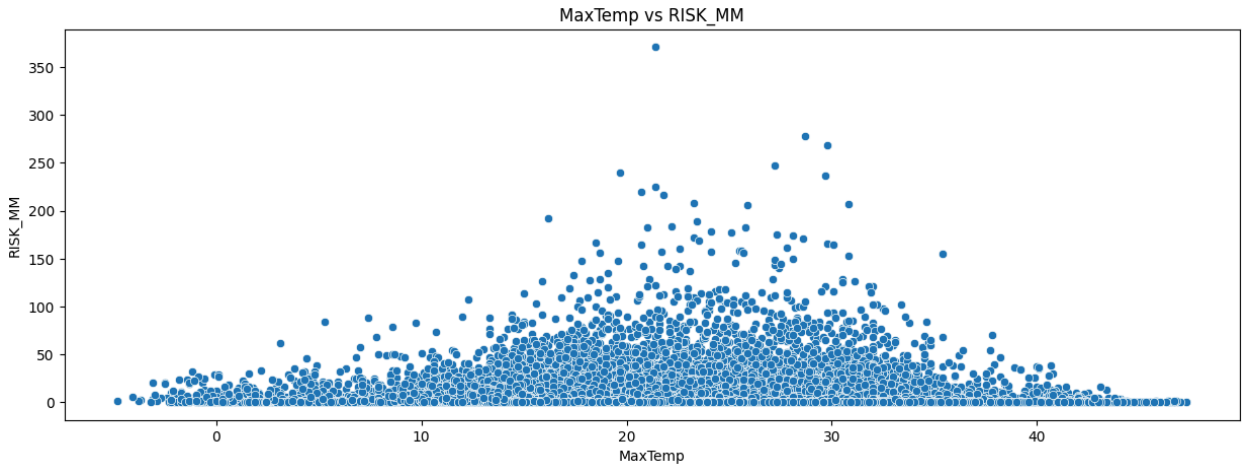
MaxTemp vs RISK_MM
RISK_MM
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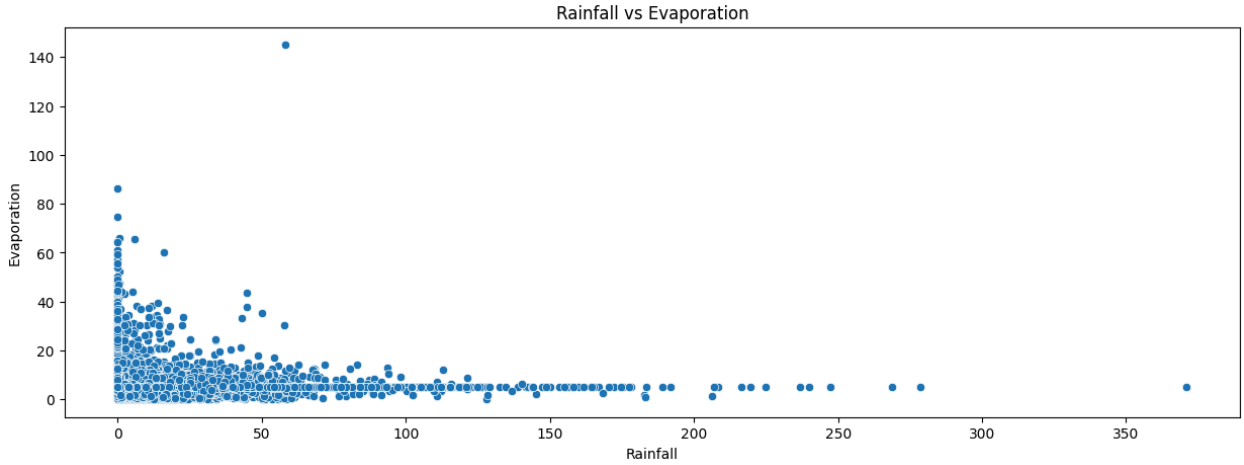
Rainfall vs Evaporation
Evaporation
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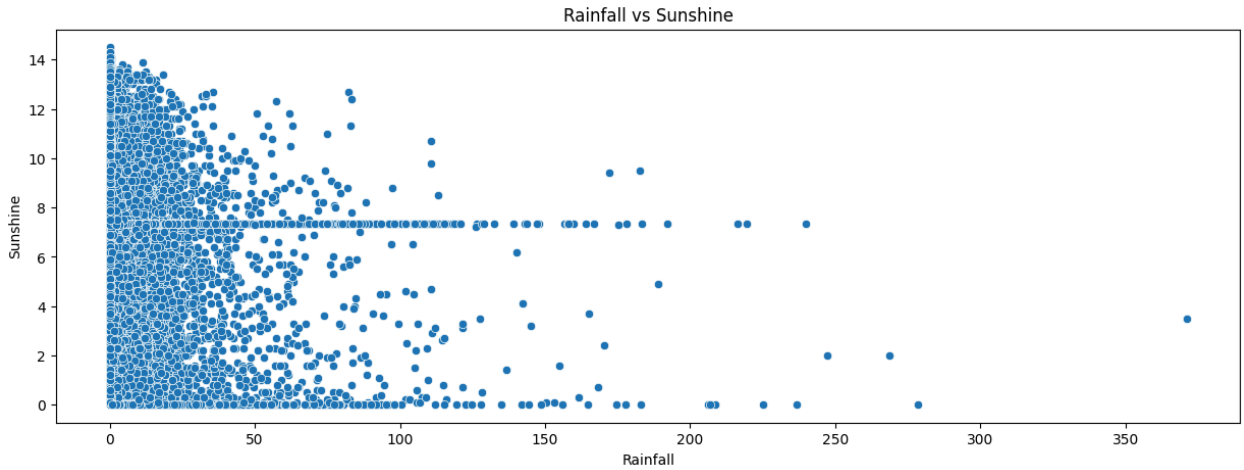
Rainfall vs Sunshine
Sunshine
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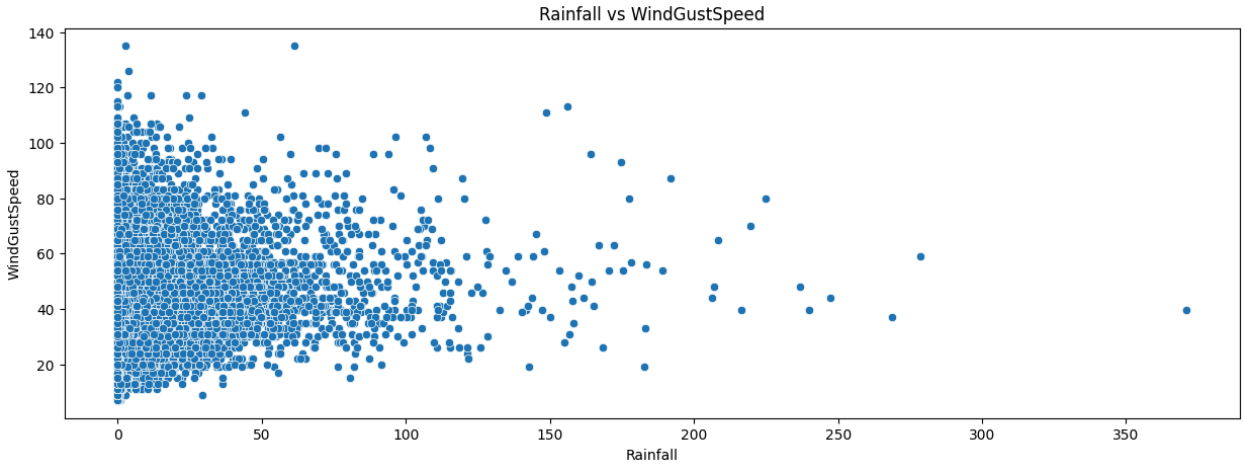
Rainfall vs WindGustSpeed
WindGustSpeed
Rainfall
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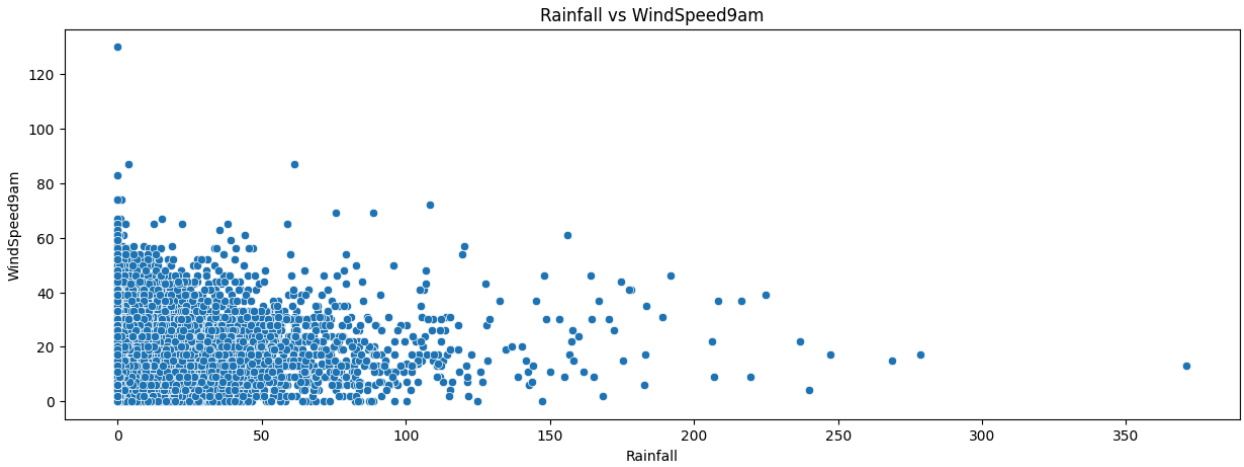
Rainfall vs WindSpeed9am
WindSpeed9am
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100
150
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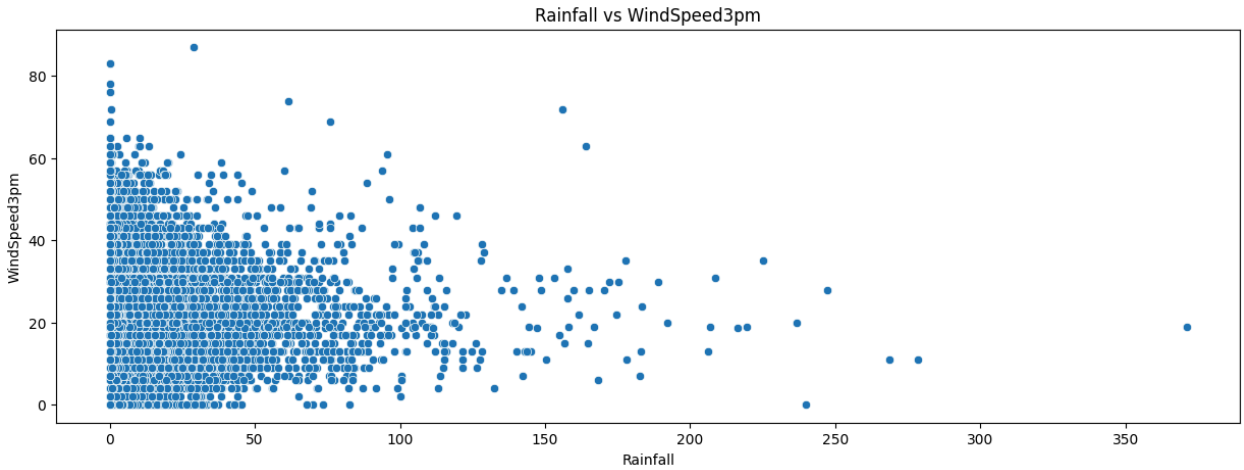
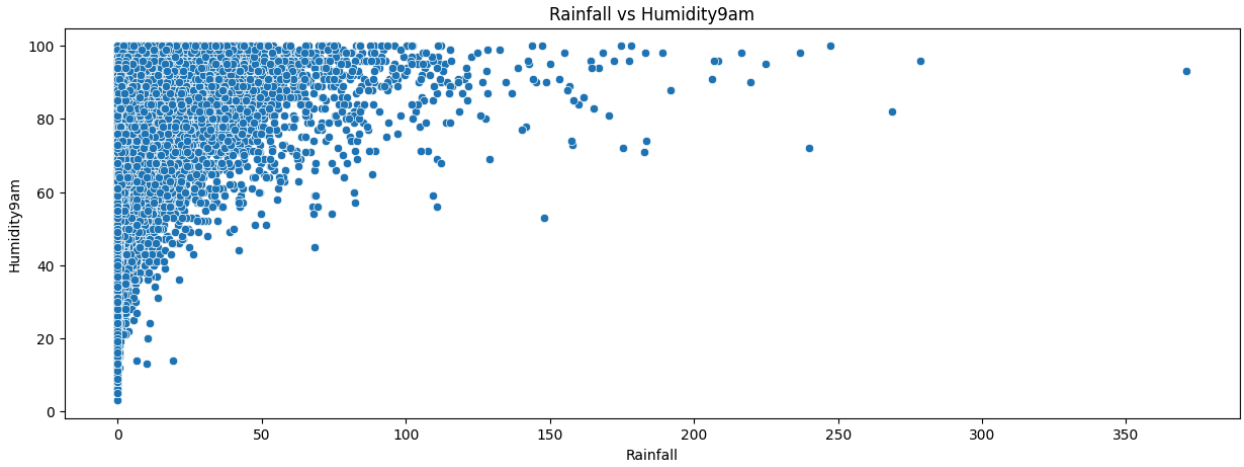
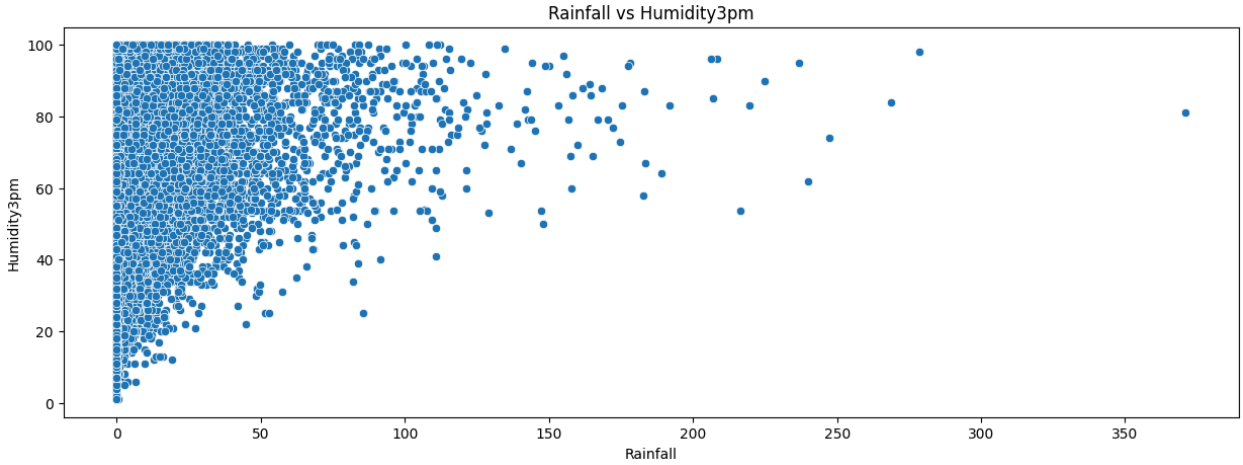
250
300
350


Rainfall vs WindSpeed3pm
WindSpeed3pm
Rainfall
0
20
40
60
80
0
50
100
150
200
250
300
350


Rainfall vs Humidity9am
Humidity9am
Rainfall
0
20
40
60
80
100
0
50
100
150
200
250
300
350


Rainfall vs Humidity3pm
Humidity3pm
Rainfall
0
20
40
60
80
100
0
50
100
150
200
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300
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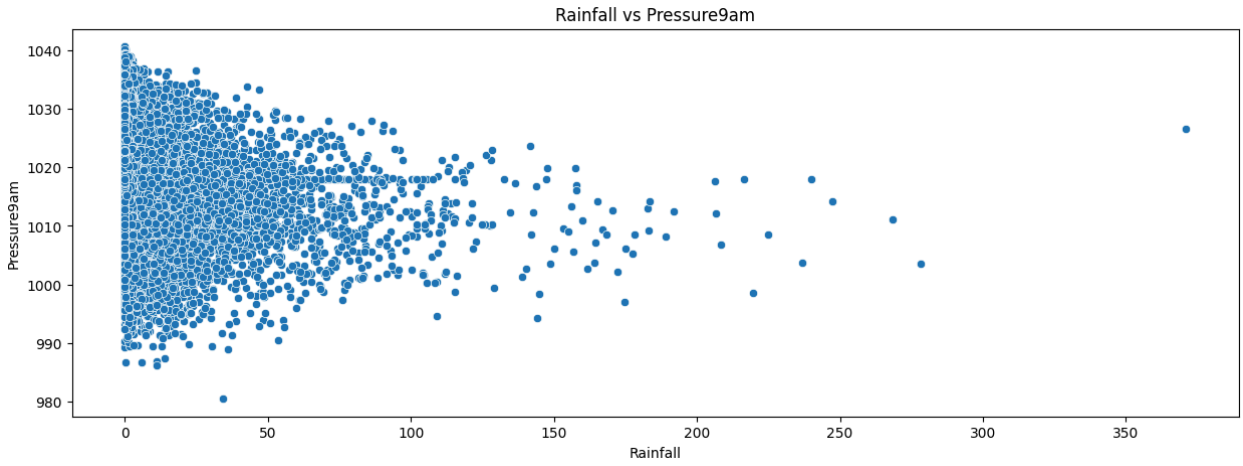
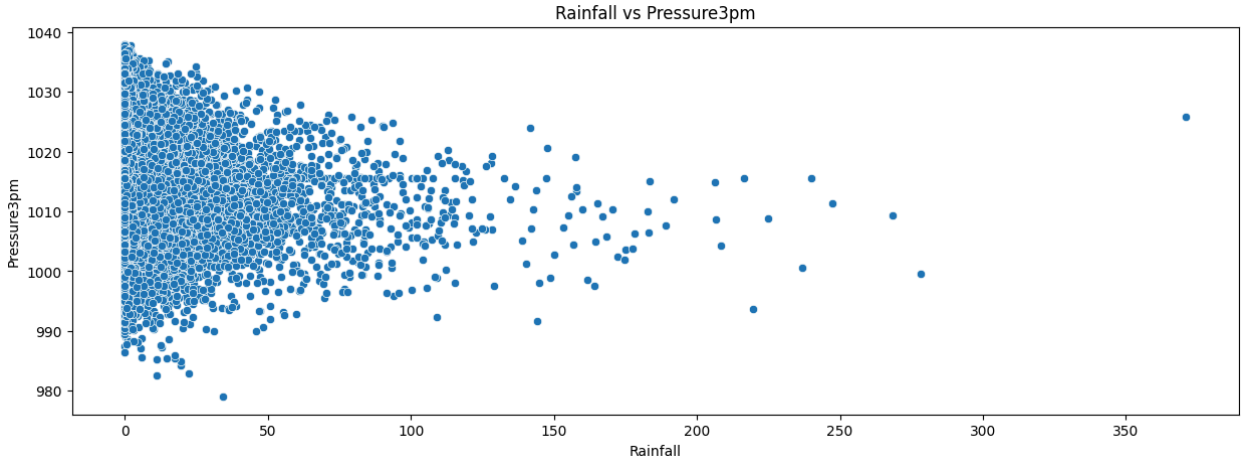

Rainfall vs Pressure9am
Pressure9am
Rainfall
980
990
1000
1010
1020
1030
1040
0
50
100
150
200
250
300
350


Rainfall vs Pressure3pm
Pressure3pm
Rainfall
980
990
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1010
1020
1030
1040
0
50
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200
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300
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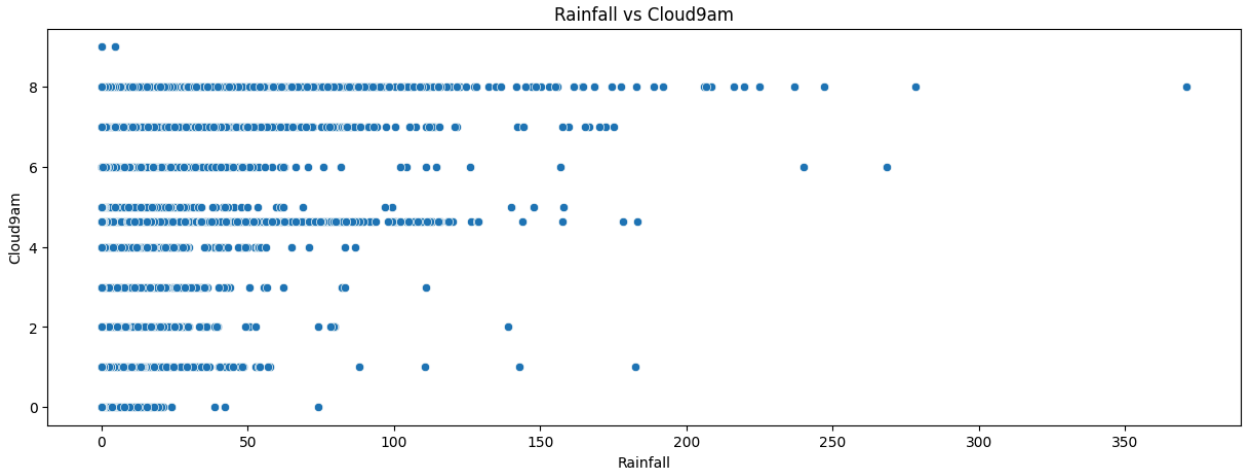
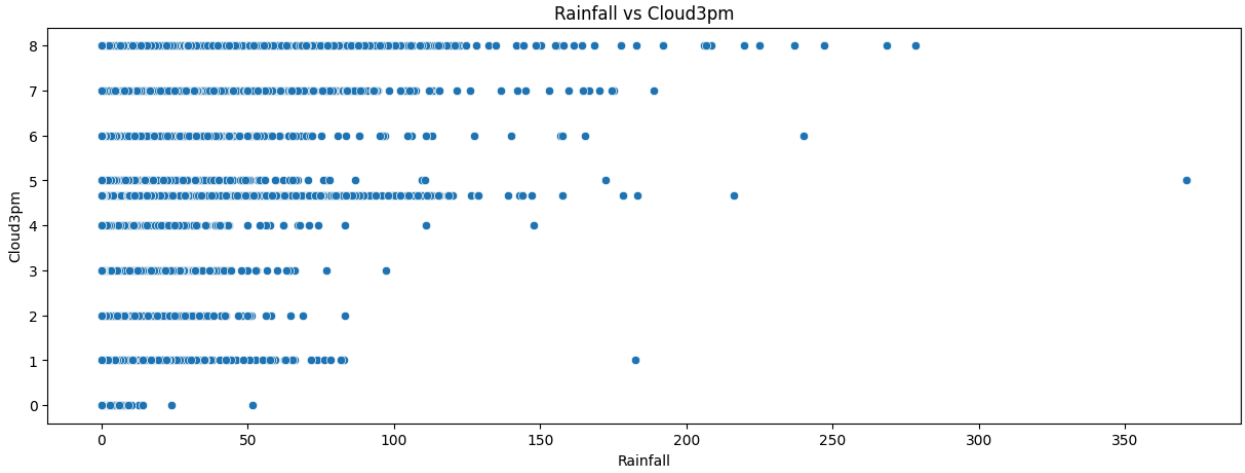
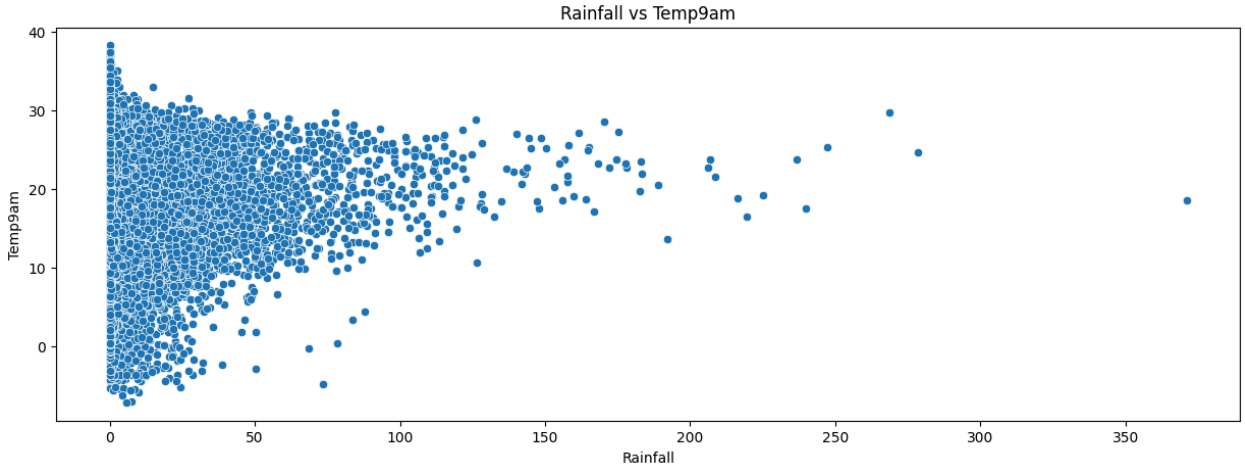
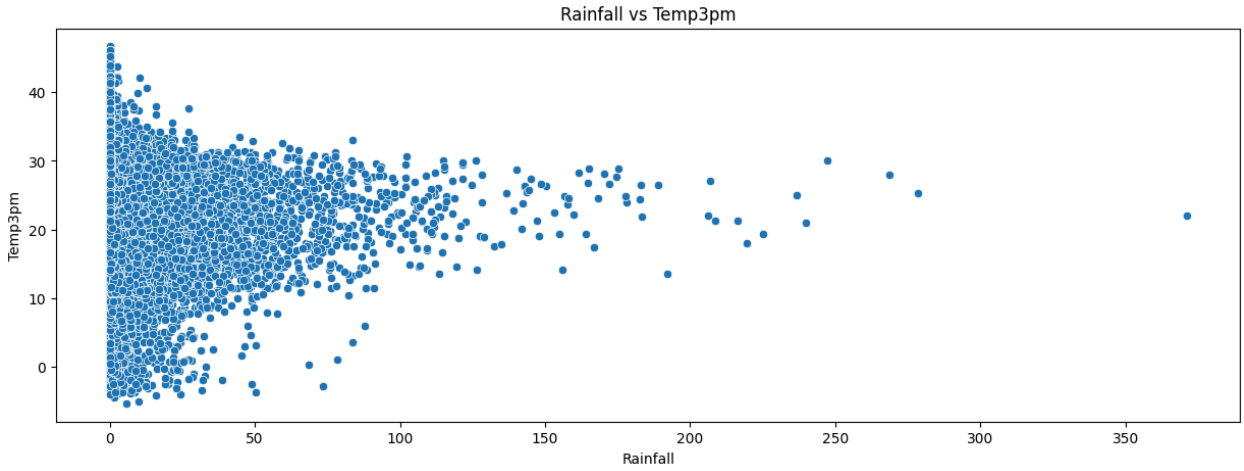

Rainfall vs Cloud9am
Cloud9am
Rainfall
0
2
4
6
8
0
50
100
150
200
250
300
350


Rainfall vs Cloud3pm
Cloud3pm
Rainfall
0
1
2
3
4
5
6
7
8
0
50
100
150
200
250
300
350


Rainfall vs Temp9am
Temp9am
Rainfall
0
10
20
30
40
0
50
100
150
200
250
300
350


Rainfall vs Temp3pm
Temp3pm
Rainfall
0
10
20
30
40
0
50
100
150
200
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300
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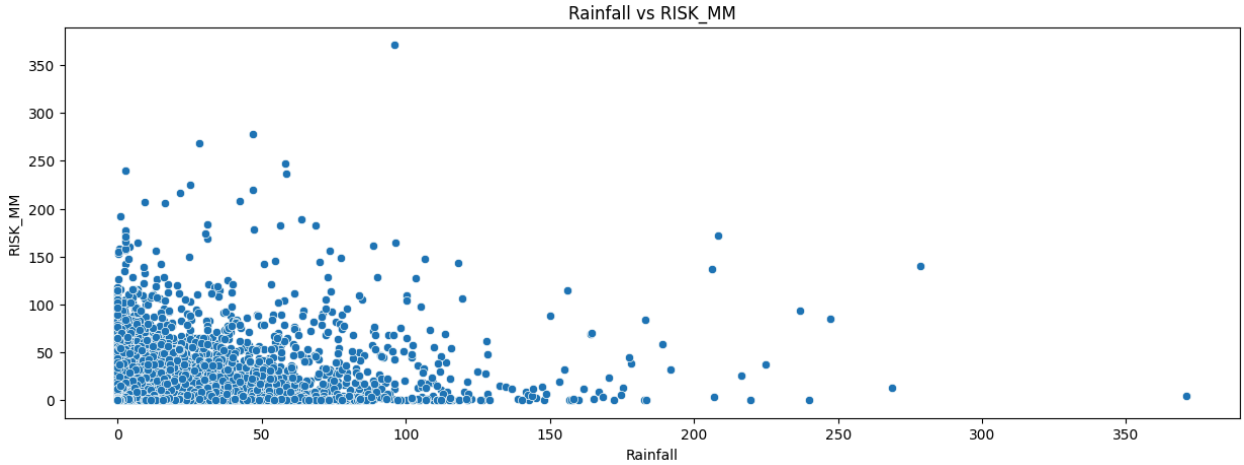
Rainfall vs RISK_MM
RISK_MM
Rainfall
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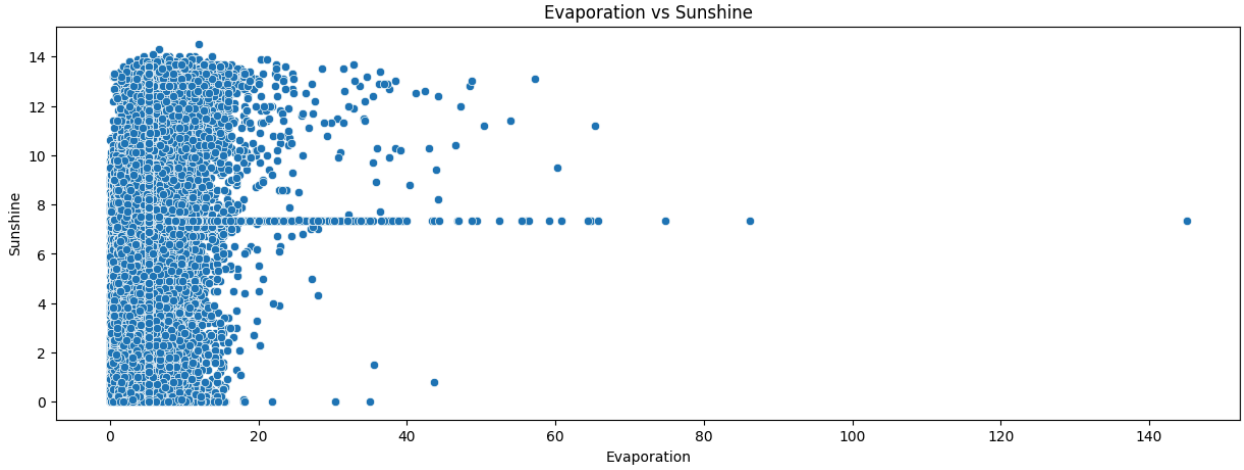
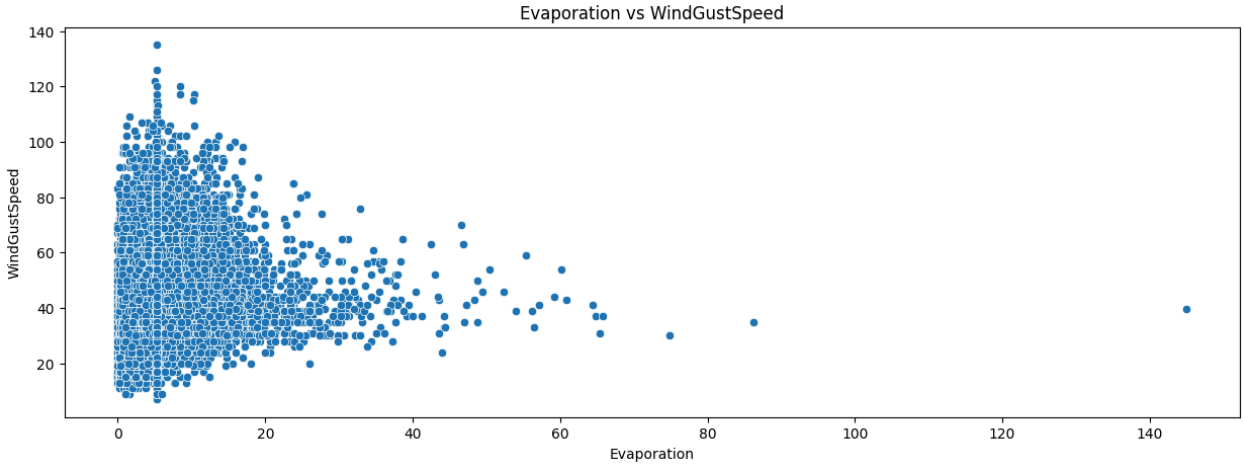
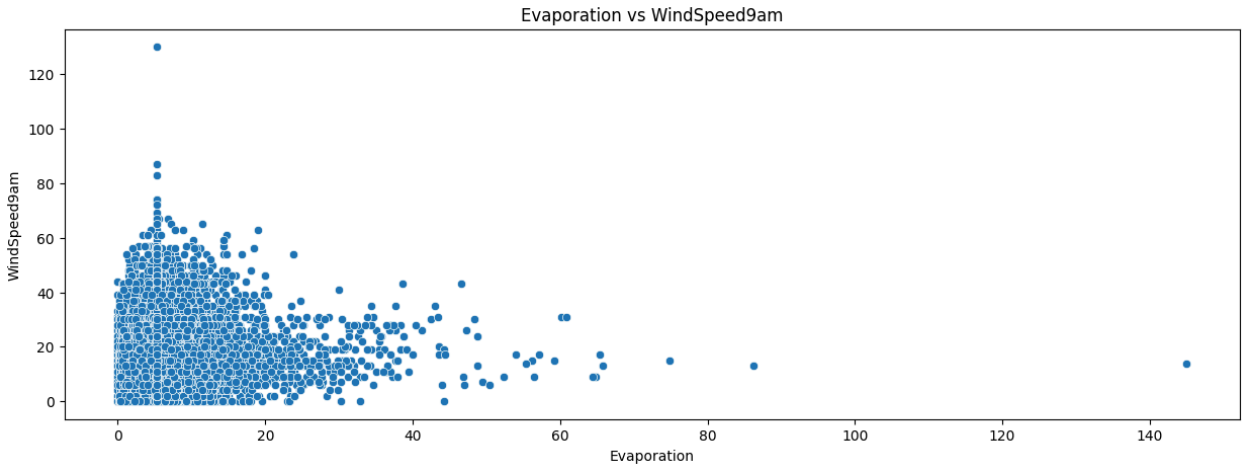
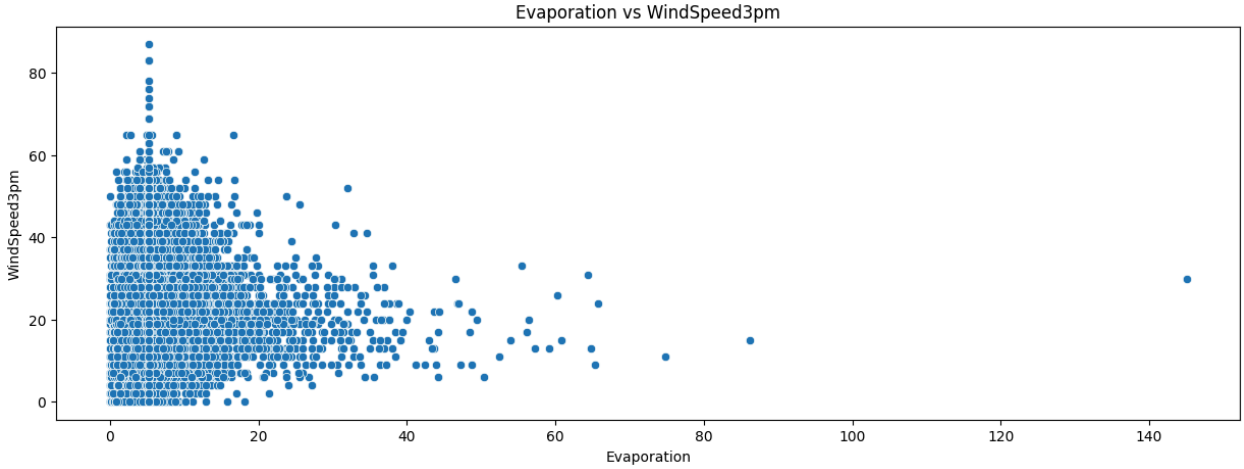
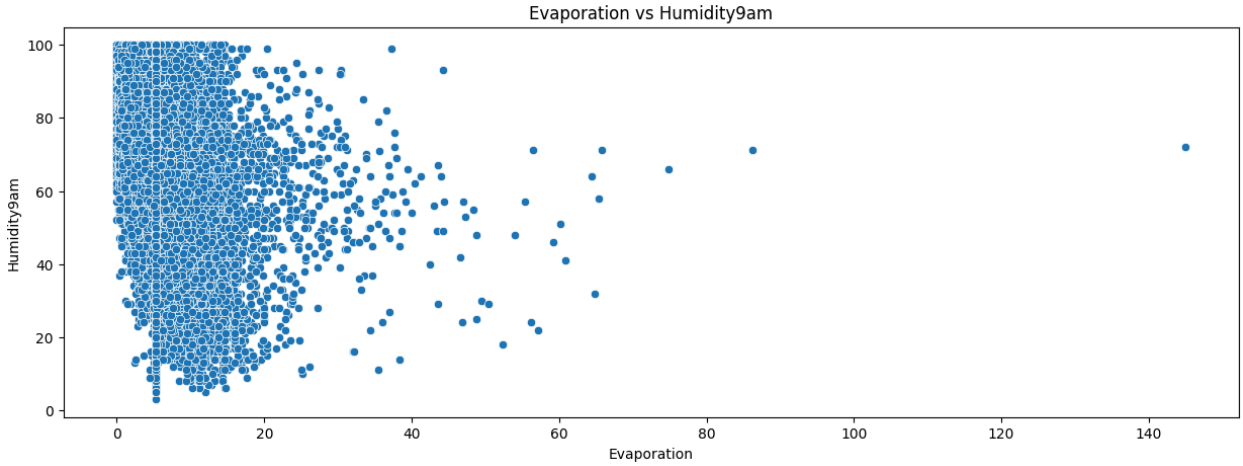
50
100
150
200
250
300
350
0
50
100
150
200
250
300
350

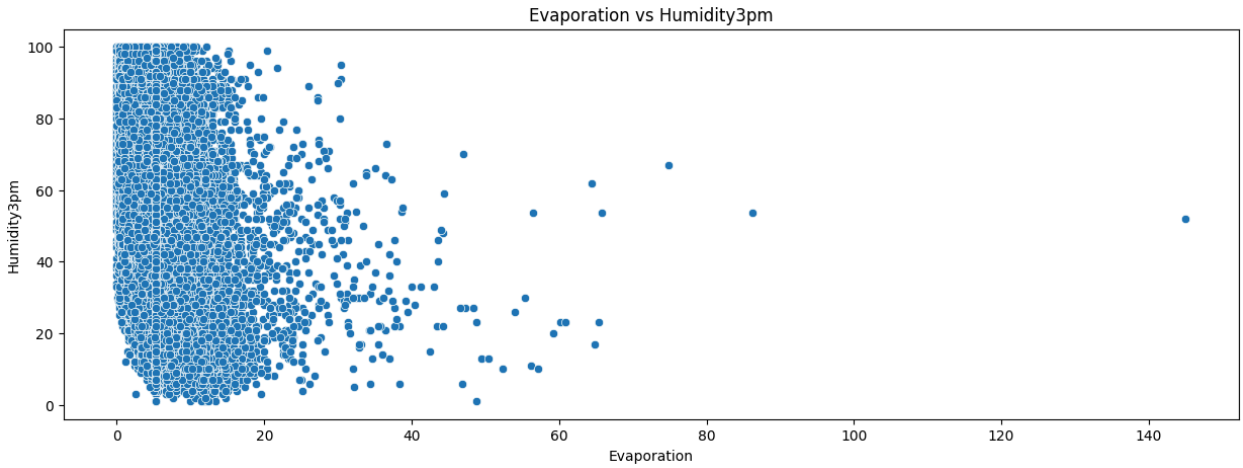

Evaporation vs Sunshine
Sunshine
Evaporation
0
2
4
6
8
10
12
14
0
20
40
60
80
100
120
140

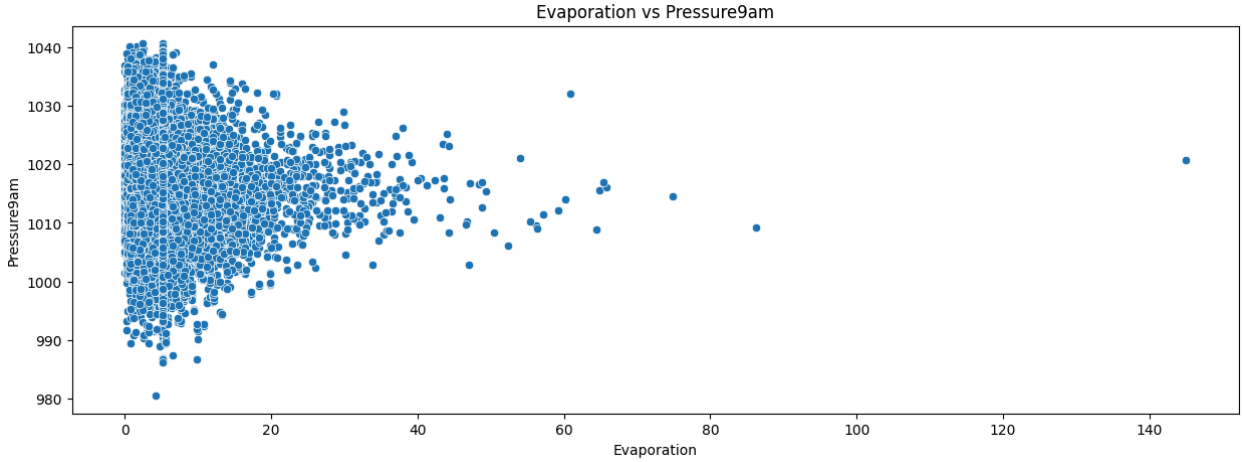

Evaporation vs WindGustSpeed
WindGustSpeed
Evaporation
0
20
40
60
80
100
120
140

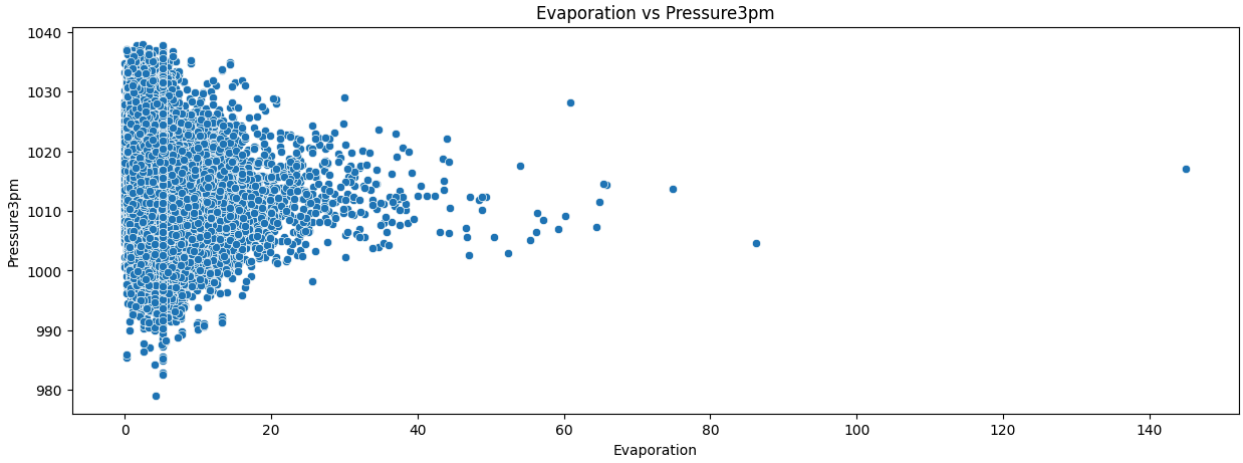

Evaporation vs WindSpeed9am
WindSpeed9am
Evaporation
0
20
40
60
80
100
120
140


Evaporation vs WindSpeed3pm
WindSpeed3pm
Evaporation
0
20
40
60
80
100
120
140


Evaporation vs Humidity9am
Humidity9am
Evaporation
0
20
40
60
80
100
120
140


Evaporation vs Humidity3pm
Humidity3pm
Evaporation
0
20
40
60
80
100
120
140


Evaporation vs Pressure9am
Pressure9am
Evaporation
980
990
1000
1010
1020
1030
1040
0
20
40
60
80
100
120
140


Evaporation vs Pressure3pm
Pressure3pm
Evaporation
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1020
1010
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990
980
0
20
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80
100
120
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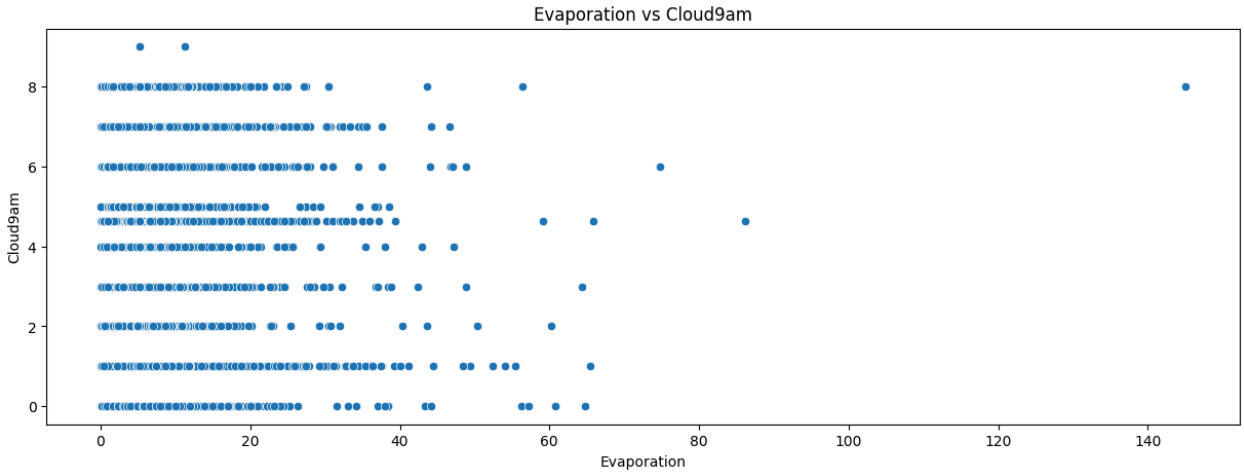
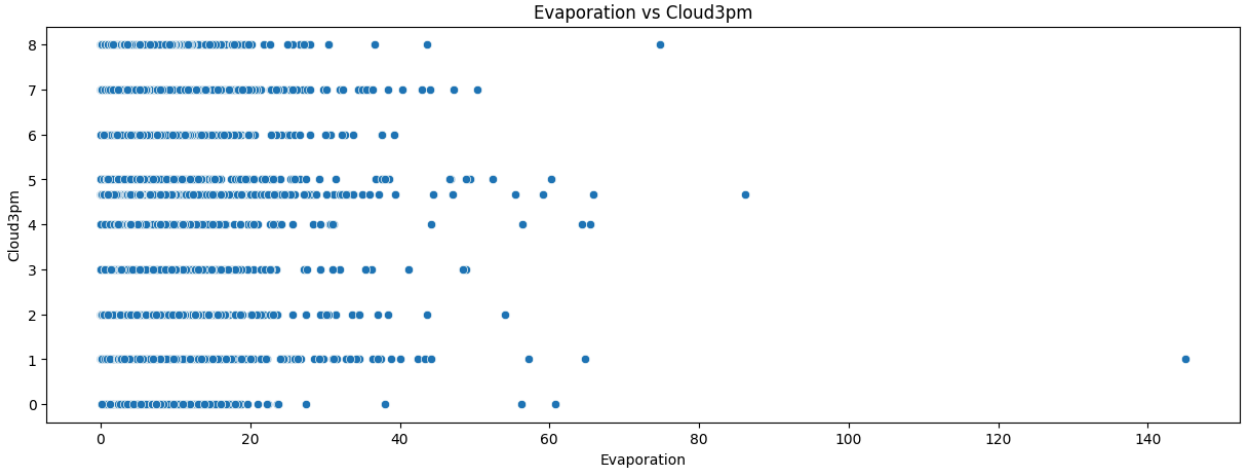

Evaporation vs Cloud9am
Cloud9am
Evaporation
8
6
4
2
0
0
20
40
60
80
100
120
140


Evaporation vs Cloud3pm
Cloud3pm
Evaporation
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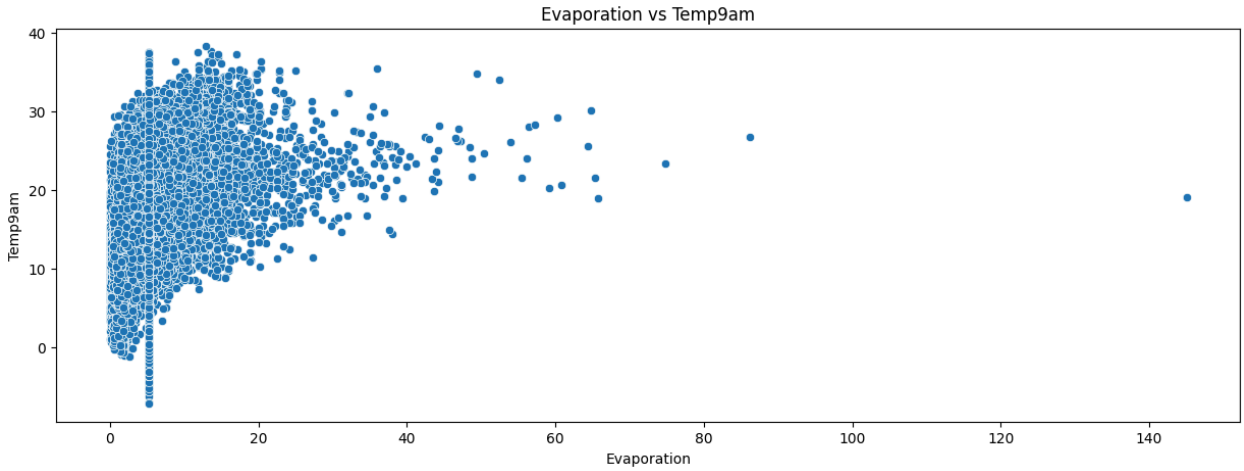
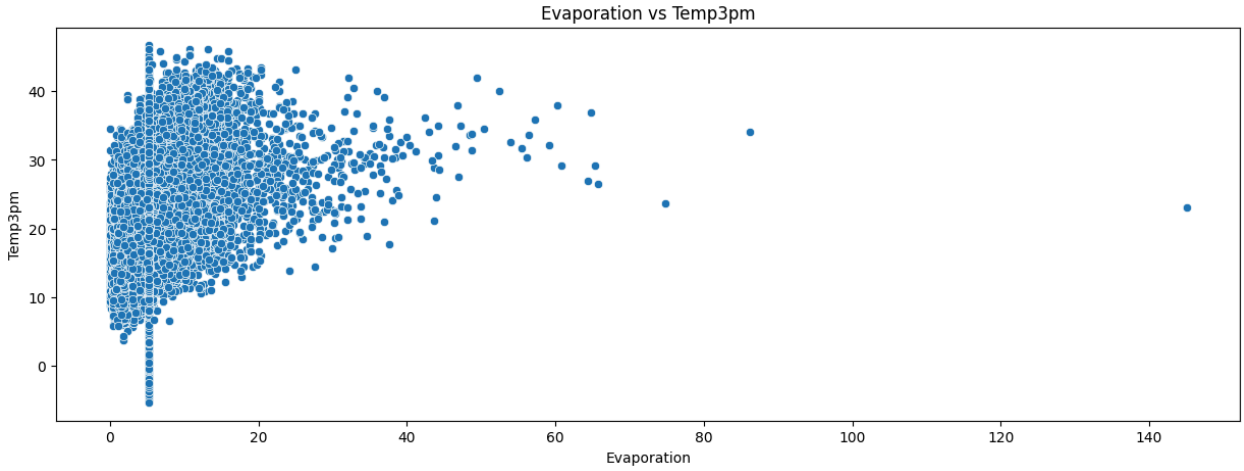
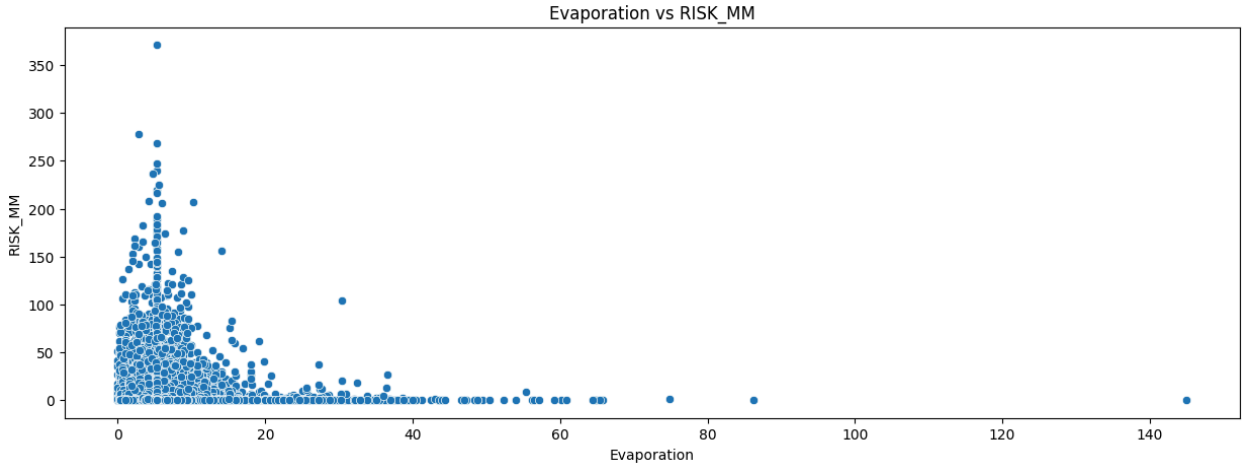
7
6
5
4
3
2
1
0
0
20
40
60
80
100
120
140


Evaporation vs Temp9am
Temp9am
Evaporation
0
10
20
30
40
0
20
40
60
80
100
120
140


Evaporation vs Temp3pm
Temp3pm
Evaporation
0
10
20
30
40
0
20
40
60
80
100
120
140


Evaporation vs RISK_MM
RISK_MM
Evaporation
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100
150
200
250
300
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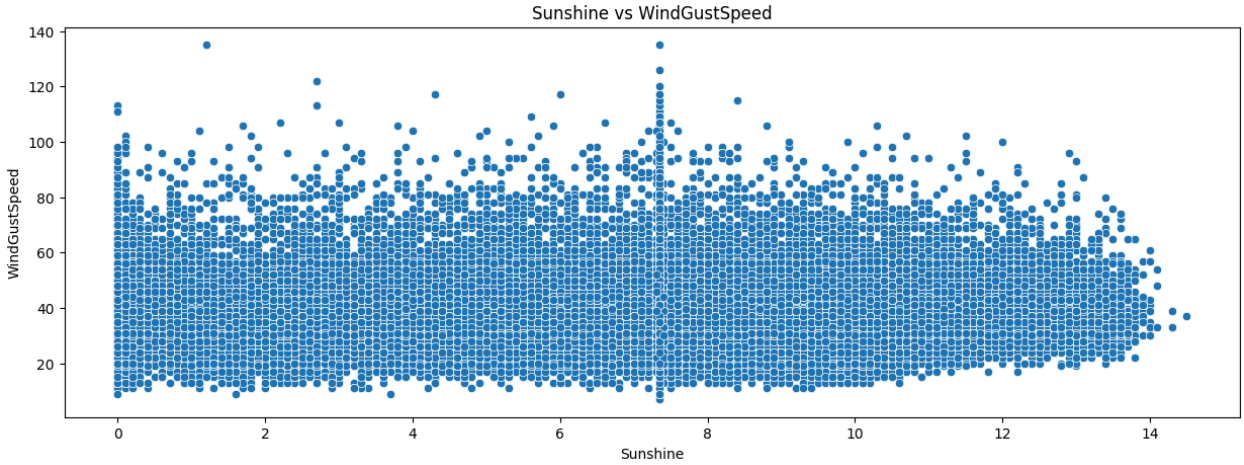
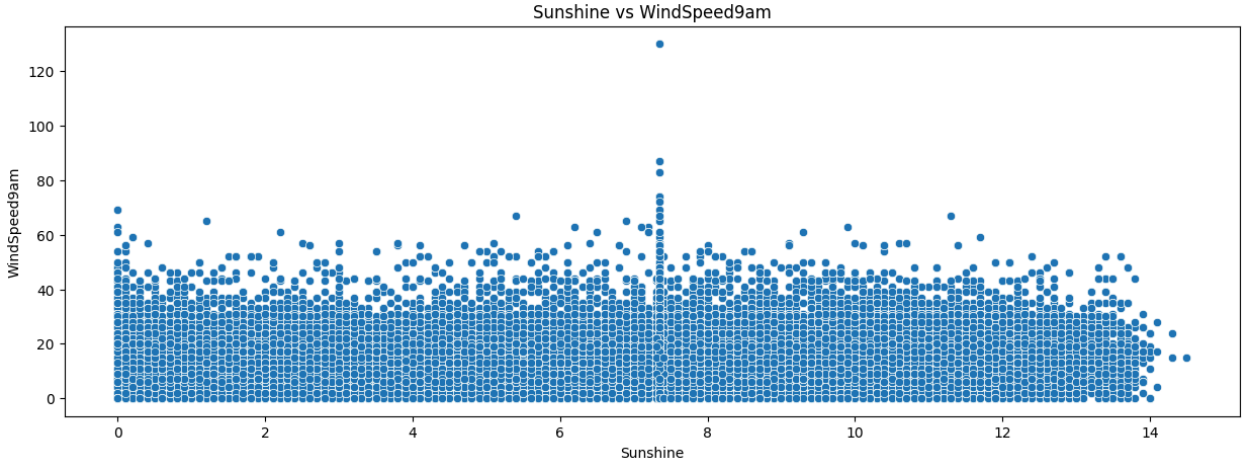
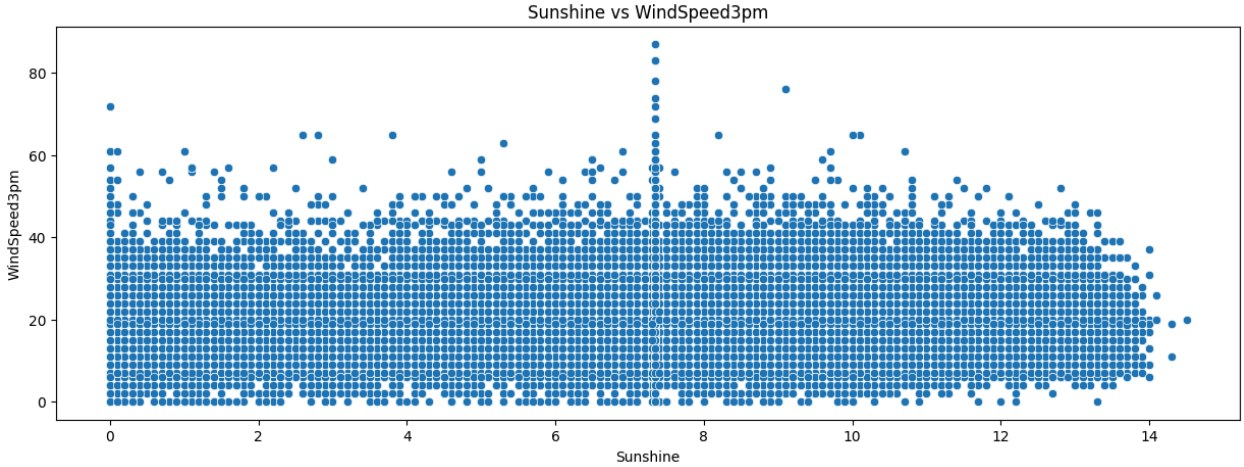
0
20
40
60
80
100
120
140


Sunshine vs WindGustSpeed
WindGustSpeed
Sunshine
0
2
4
6
8
10
12
14
20
40
60
80
100
120
140


Sunshine vs WindSpeed9am
WindSpeed9am
Sunshine
0
2
4
6
8
10
12
14
0
20
40
60
80
100
120


Sunshine vs WindSpeed3pm
WindSpeed3pm
Sunshine
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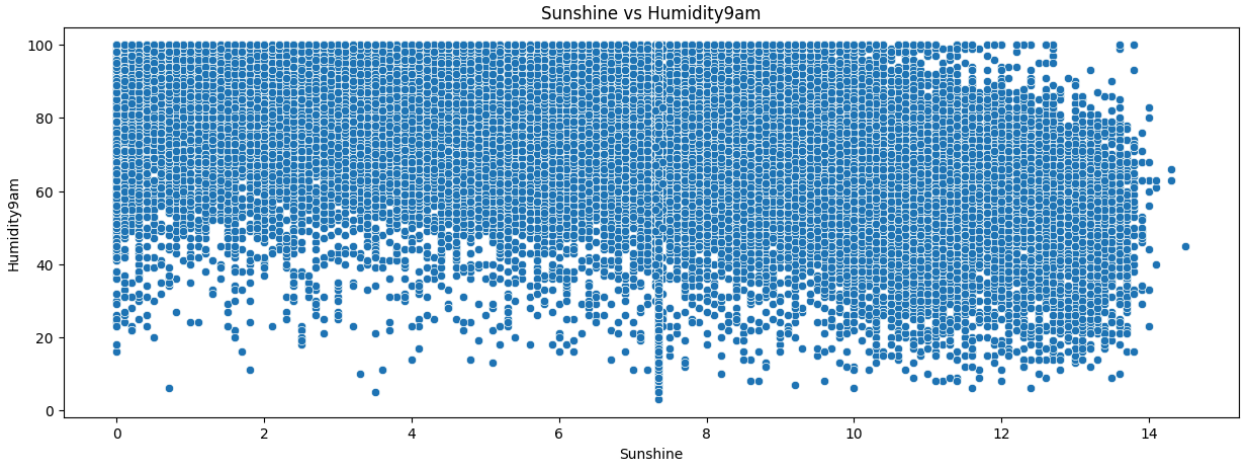
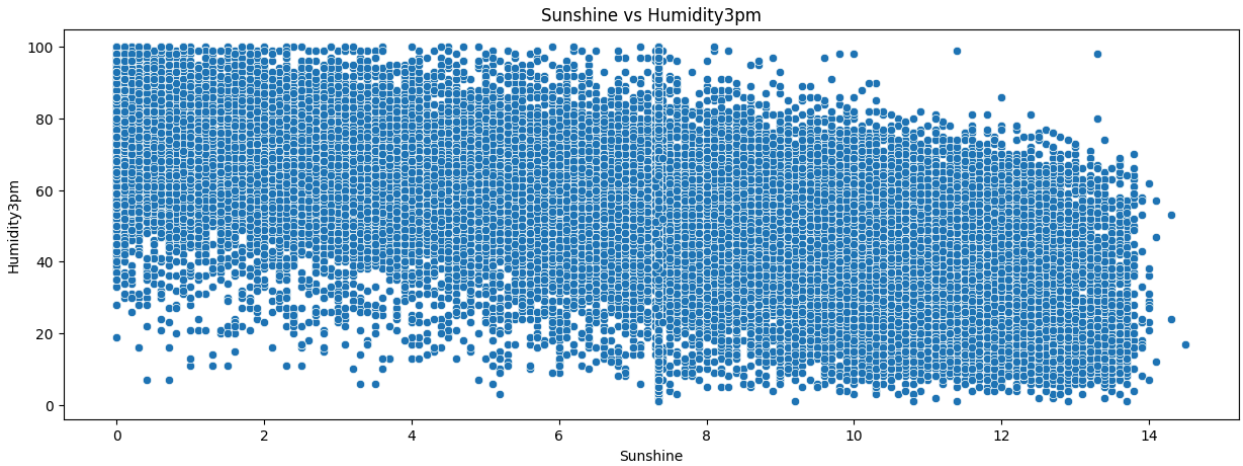
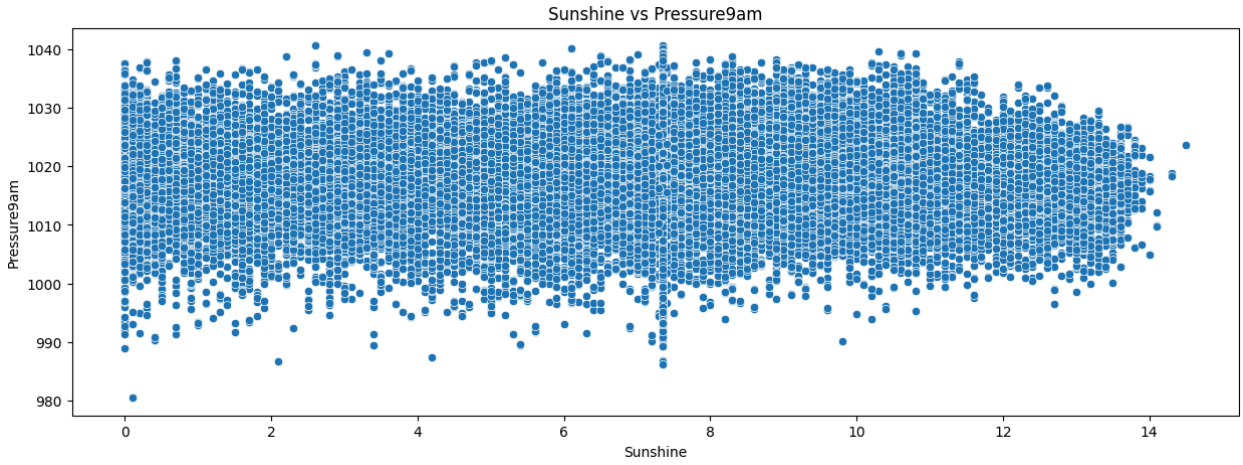
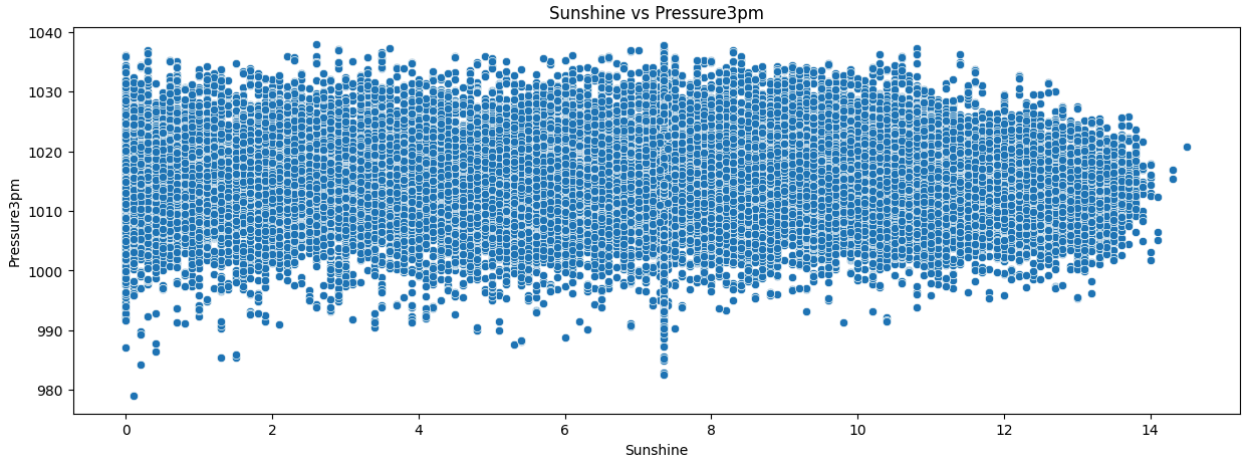
2
4
6
8
10
12
14
0
20
40
60
80


Sunshine vs Humidity9am
Humidity9am
Sunshine
0
20
40
60
80
100
0
2
4
6
8
10
12
14


Sunshine vs Humidity3pm
Humidity3pm
Sunshine
0
20
40
60
80
100
0
2
4
6
8
10
12
14


Sunshine vs Pressure9am
Pressure9am
Sunshine
980
990
1000
1010
1020
1030
1040
0
2
4
6
8
10
12
14


Sunshine vs Pressure3pm
Pressure3pm
Sunshine
1040
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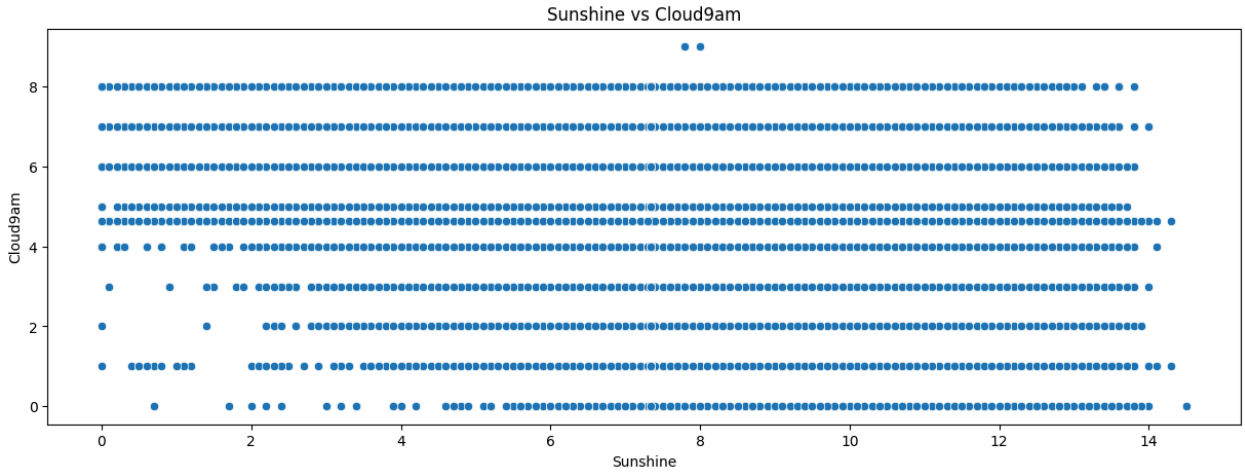
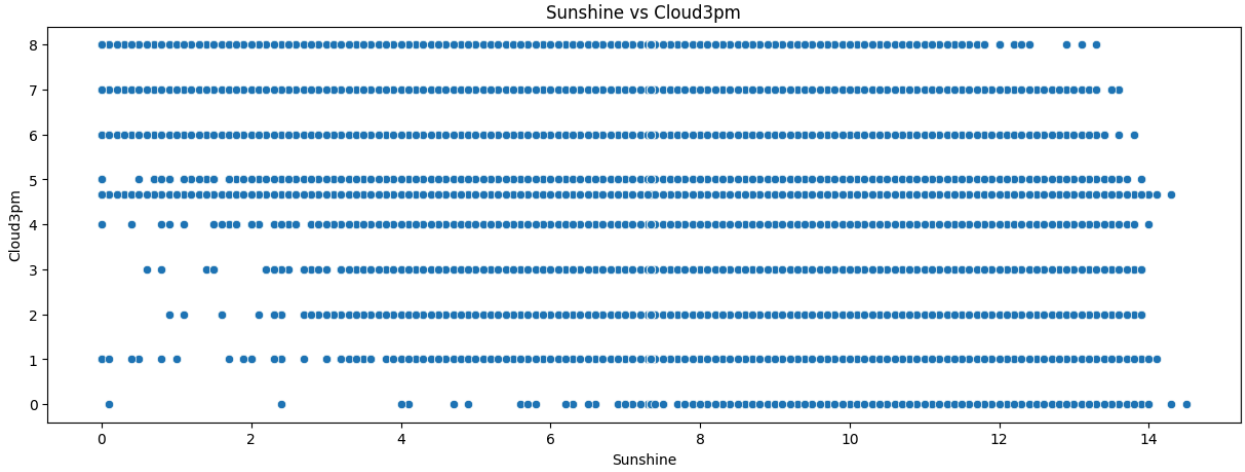
1010
1000
990
980
0
2
4
6
8
10
12
14


Sunshine vs Cloud9am
Cloud9am
Sunshine
8
6
4
2
0
0
2
4
6
8
10
12
14


Sunshine vs Cloud3pm
Cloud3pm
Sunshine
8
7
6
5
4
3
2
1
0
0
2
4
6
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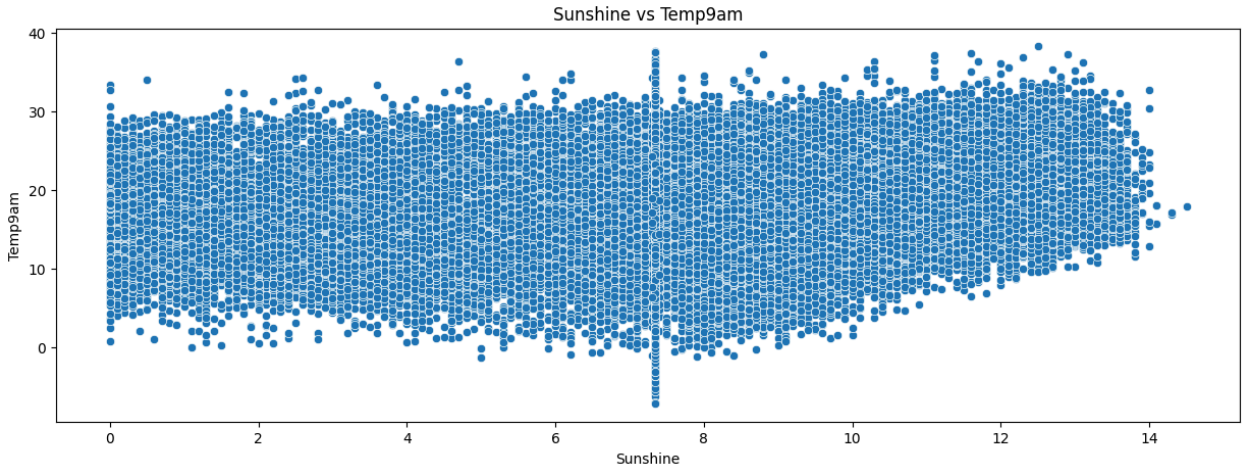
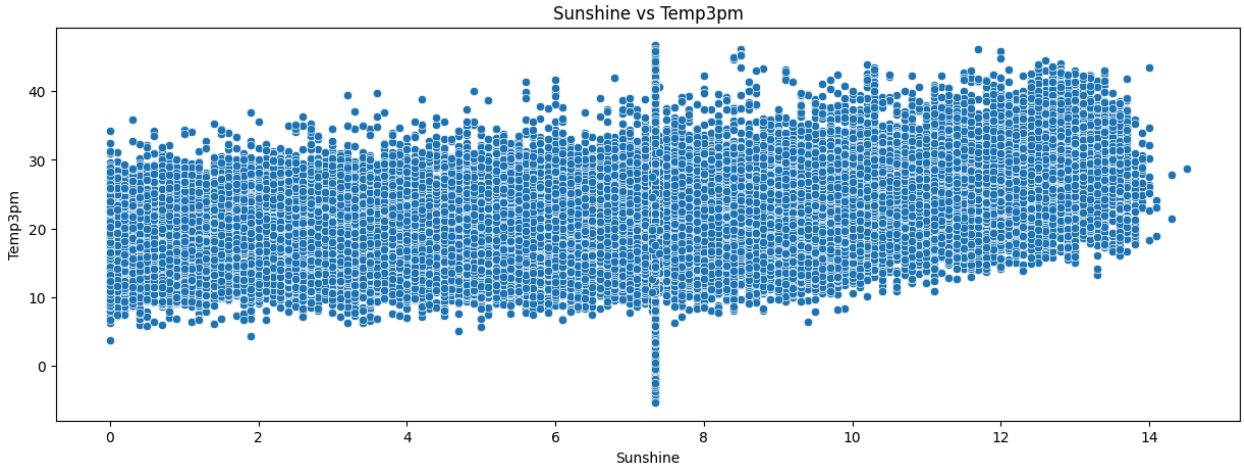

Sunshine vs Temp9am
Temp9am
Sunshine
40
30
20
10
0
0
2
4
6
8
10
12
14


Sunshine vs Temp3pm
Temp3pm
Sunshine
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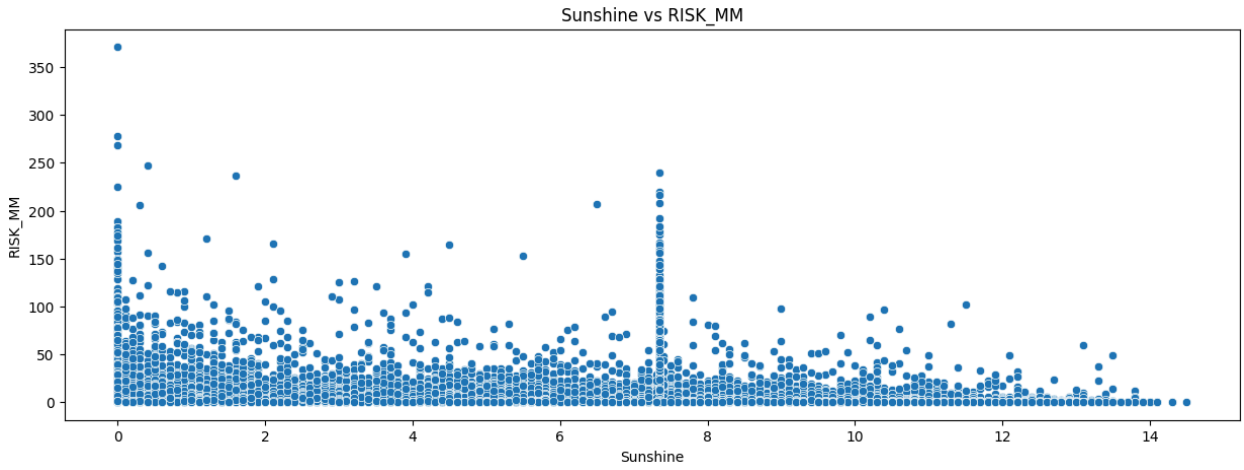
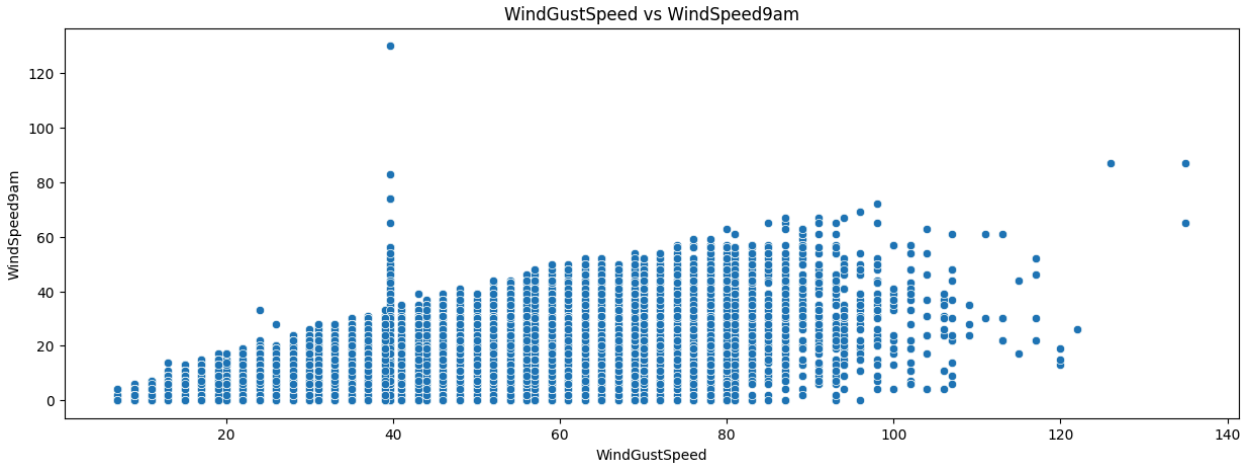
30
20
10
0
0
2
4
6
8
10
12
14


Sunshine vs RISK_MM
RISK_MM
Sunshine
350
300
250
200
150
100
50
0
0
2
4
6
8
10
12
14


WindGustSpeed vs WindSpeed9am
WindSpeed9am
WindGustSpeed
0
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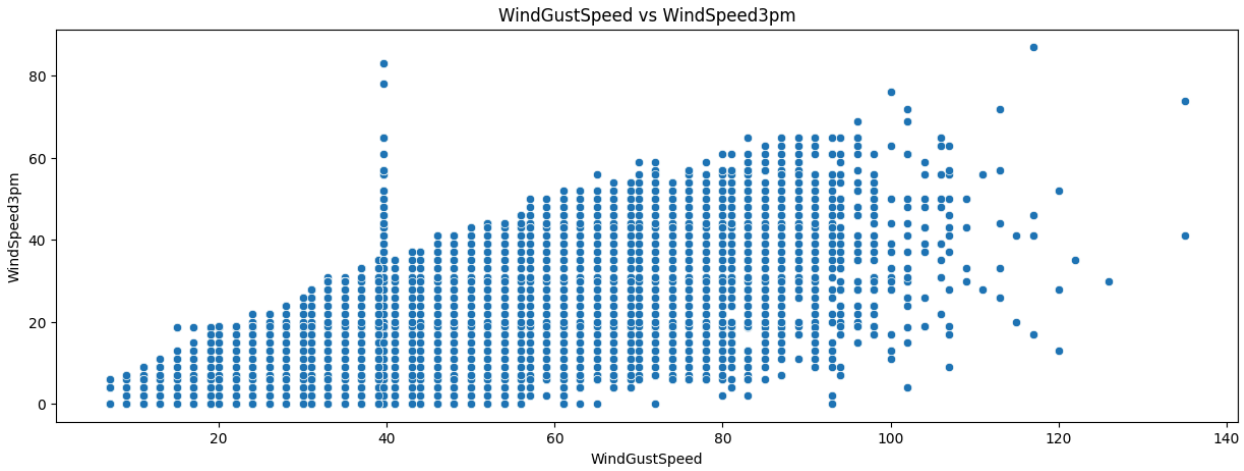
40
60
80
100
120
20
40
60
80
100
120
140


WindGustSpeed vs WindSpeed3pm
WindSpeed3pm
WindGustSpeed
0
20
40
60
80
20
40
60
80
100
120
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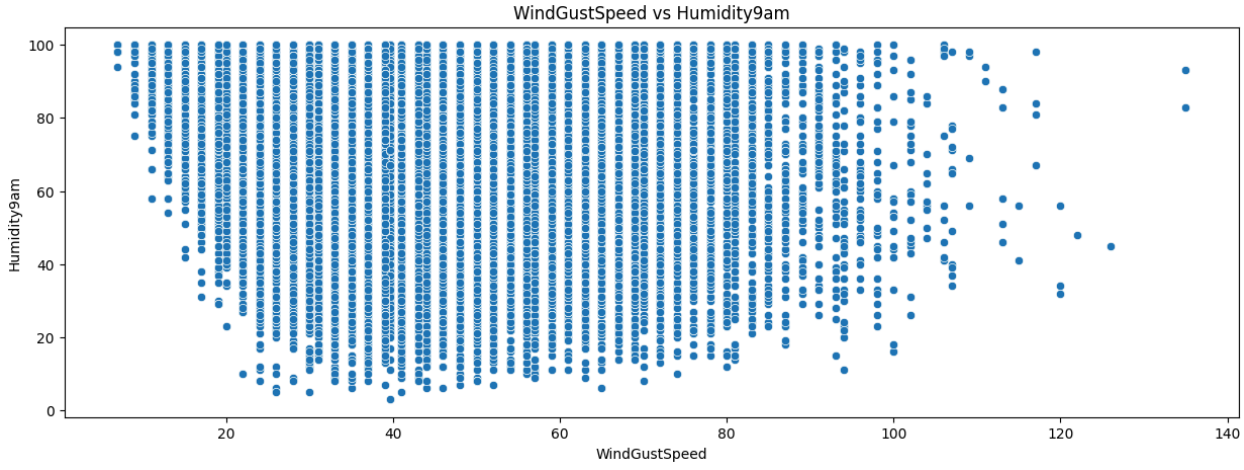
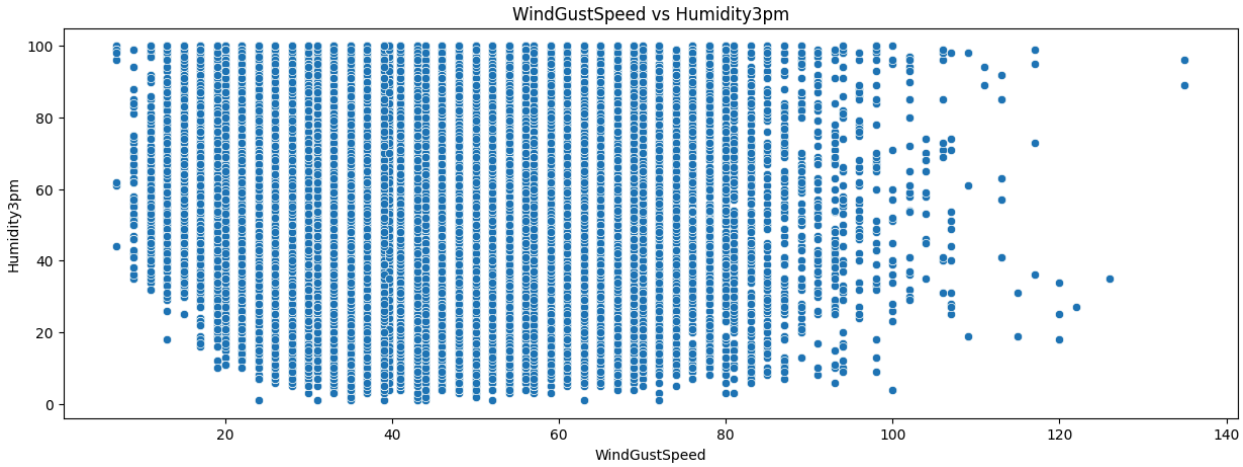
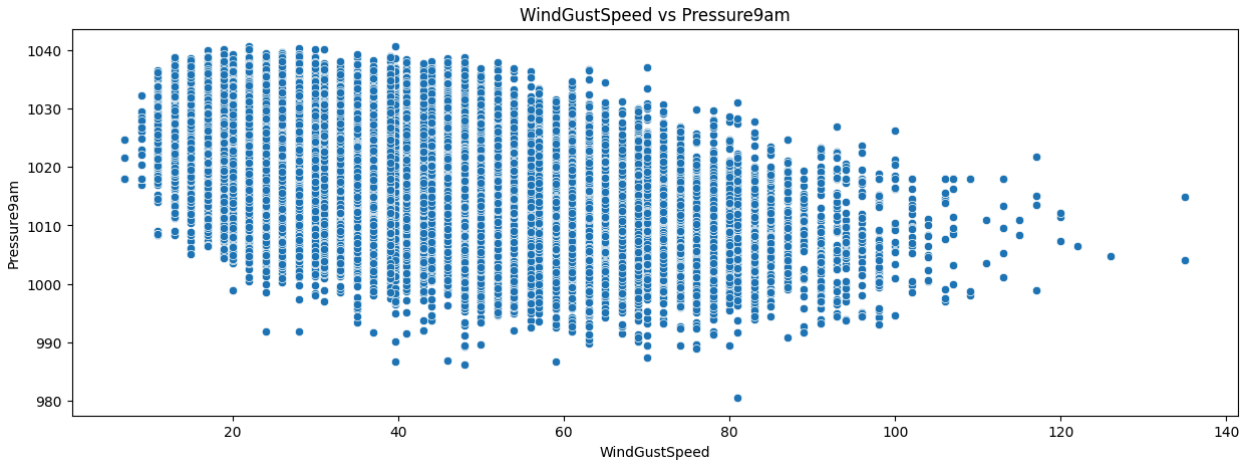
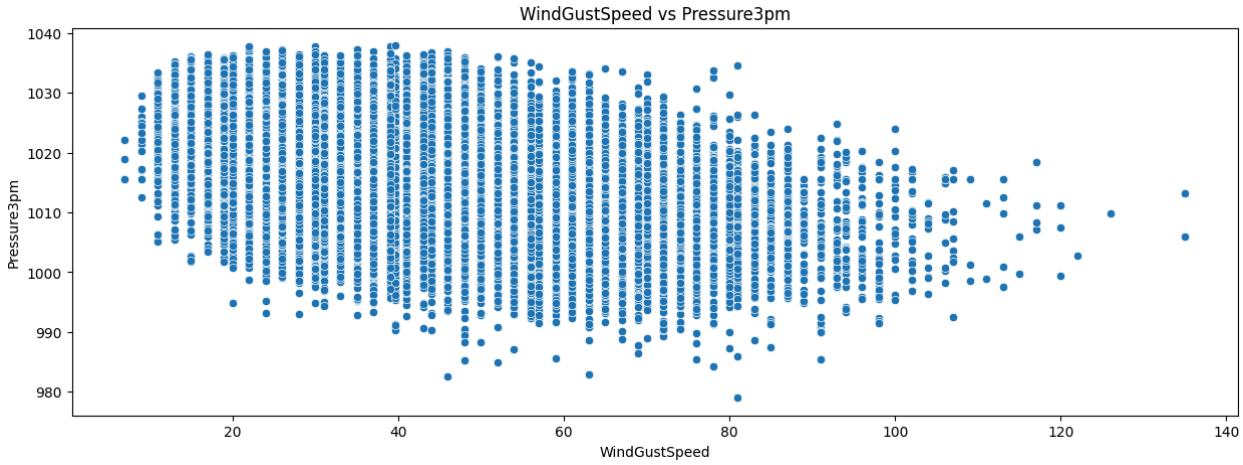
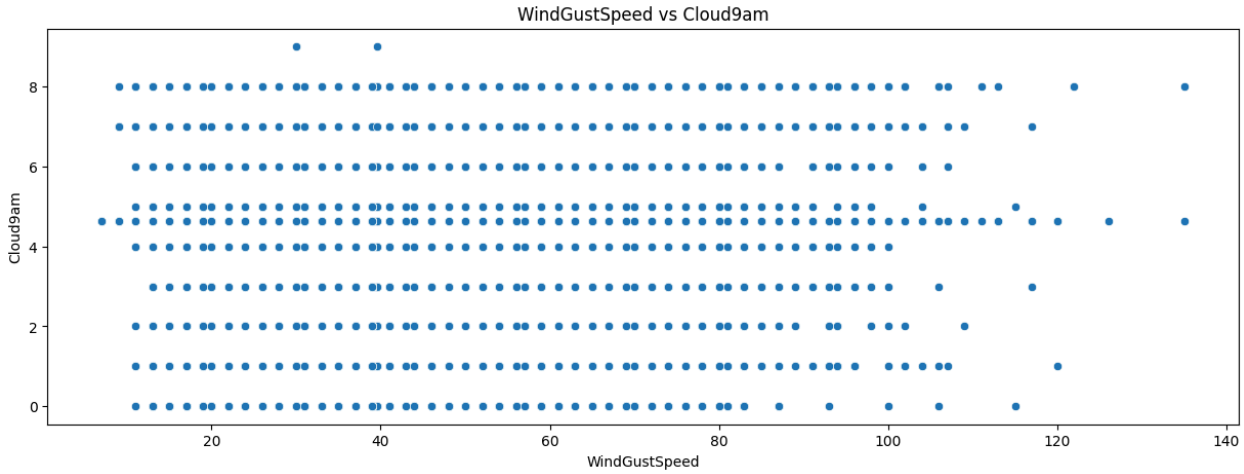
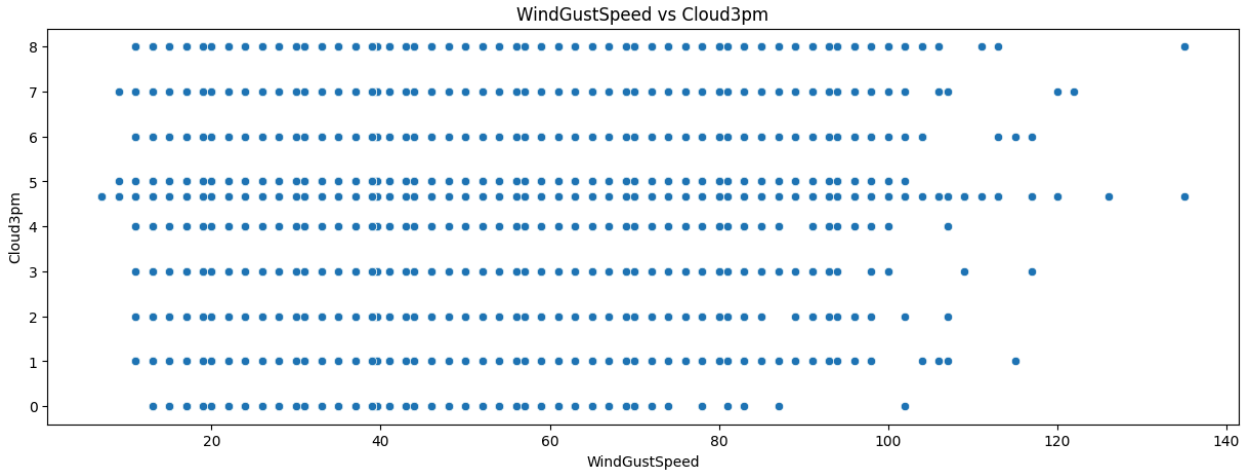

WindGustSpeed vs Humidity9am
Humidity9am
WindGustSpeed
0
20
40
60
80
100
20
40
60
80
100
120
140


WindGustSpeed vs Humidity3pm
Humidity3pm
WindGustSpeed
0
20
40
60
80
100
20
40
60
80
100
120
140


WindGustSpeed vs Pressure9am
Pressure9am
WindGustSpeed
980
990
1000
1010
1020
1030
1040
20
40
60
80
100
120
140


WindGustSpeed vs Pressure3pm
Pressure3pm
WindGustSpeed
980
990
1000
1010
1020
1030
1040
20
40
60
80
100
120
140


WindGustSpeed vs Cloud9am
Cloud9am
WindGustSpeed
0
2
4
6
8
20
40
60
80
100
120
140


WindGustSpeed vs Cloud3pm
Cloud3pm
WindGustSpeed
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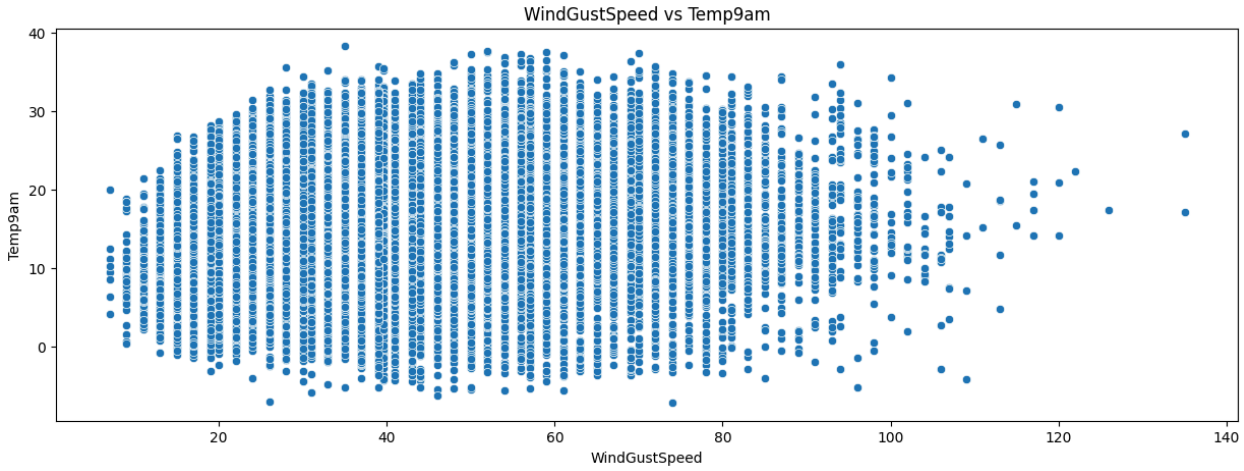
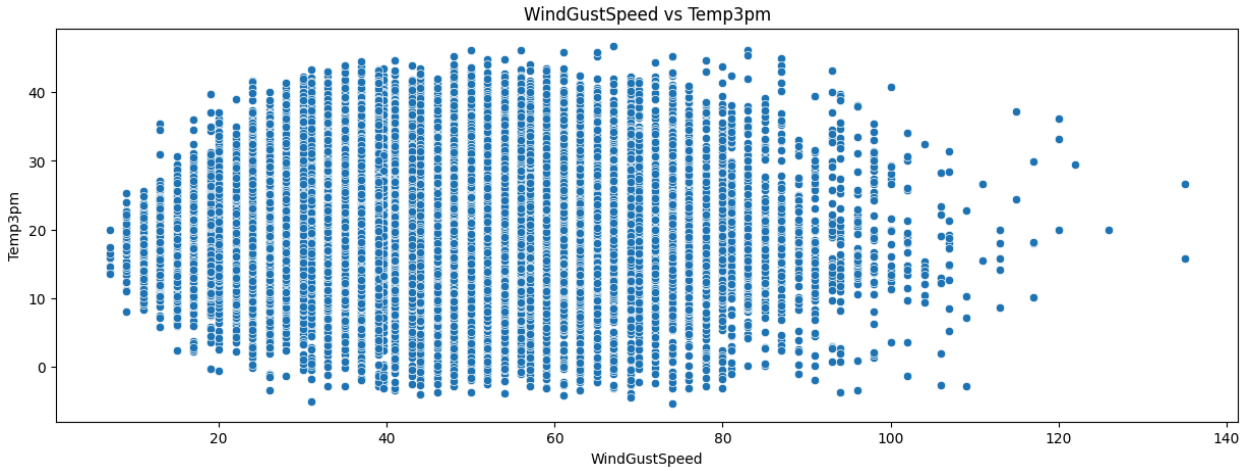
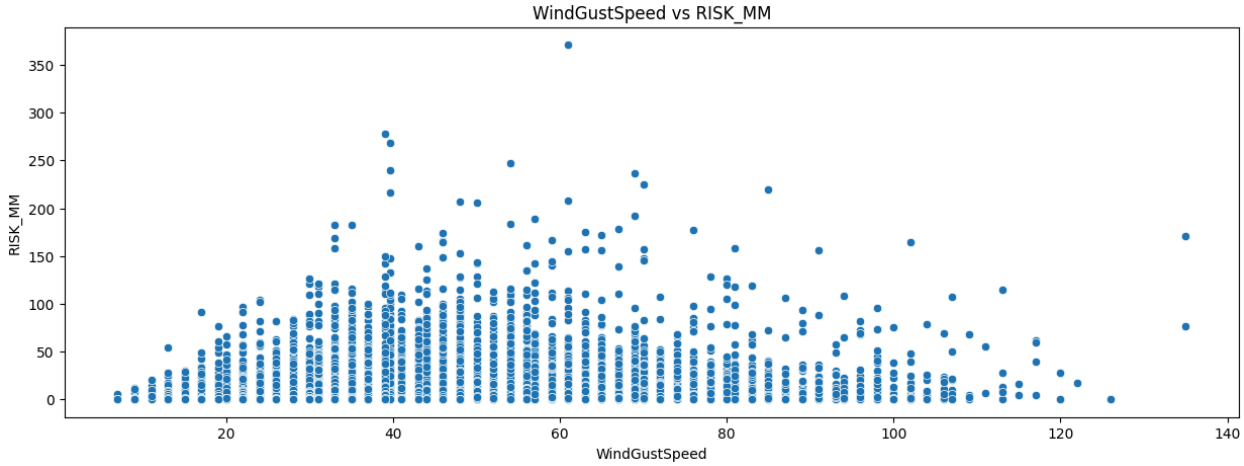
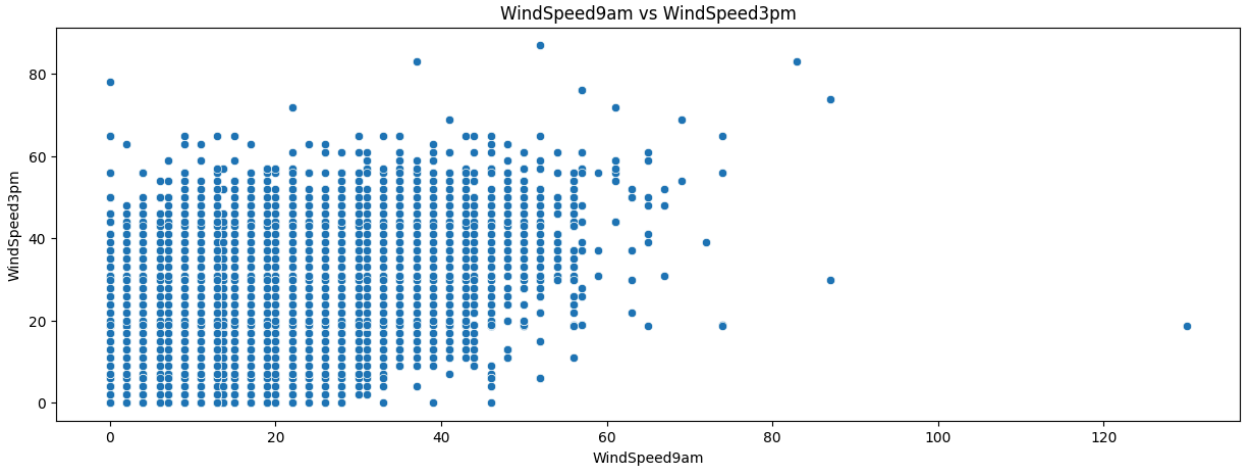
1
2
3
4
5
6
7
8
20
40
60
80
100
120
140


WindGustSpeed vs Temp9am
Temp9am
WindGustSpeed
0
10
20
30
40
20
40
60
80
100
120
140


WindGustSpeed vs Temp3pm
Temp3pm
WindGustSpeed
0
10
20
30
40
20
40
60
80
100
120
140


WindGustSpeed vs RISK_MM
RISK_MM
WindGustSpeed
0
50
100
150
200
250
300
350
20
40
60
80
100
120
140


WindSpeed9am vs WindSpeed3pm
WindSpeed3pm
WindSpeed9am
0
20
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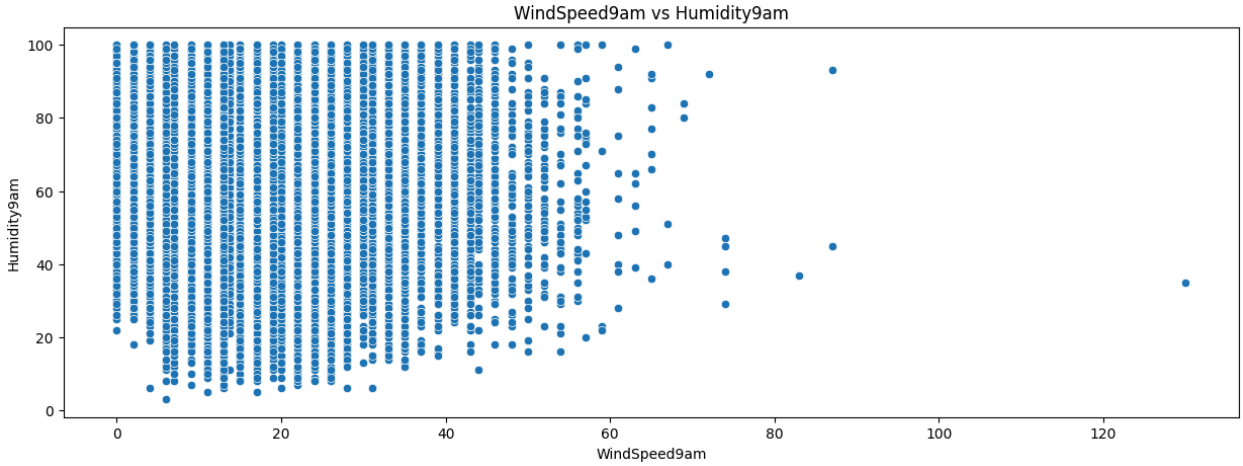
80
0
20
40
60
80
100
120


WindSpeed9am vs Humidity9am
Humidity9am
WindSpeed9am
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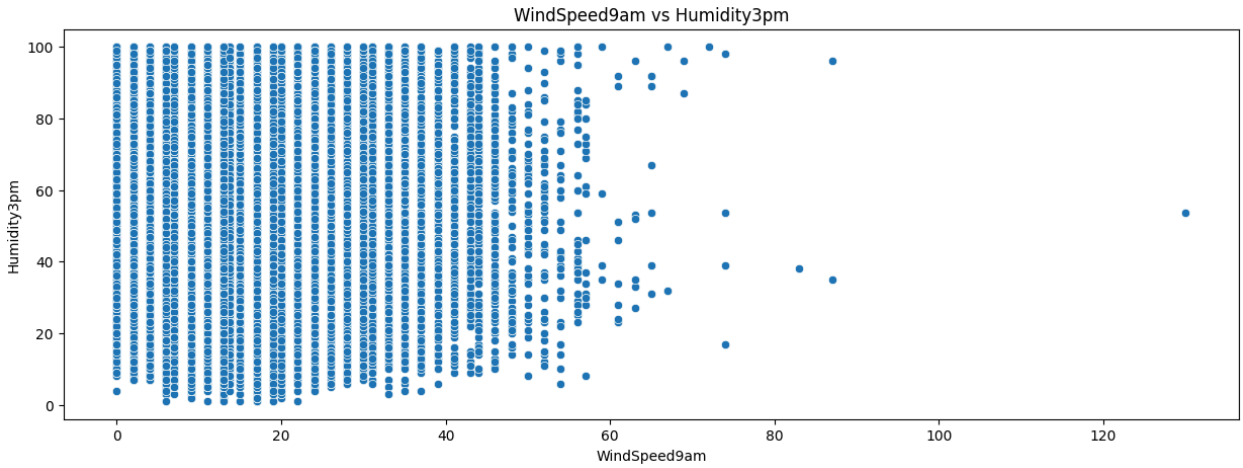
60
80
100
120


WindSpeed9am vs Humidity3pm
Humidity3pm
WindSpeed9am
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60
80
100
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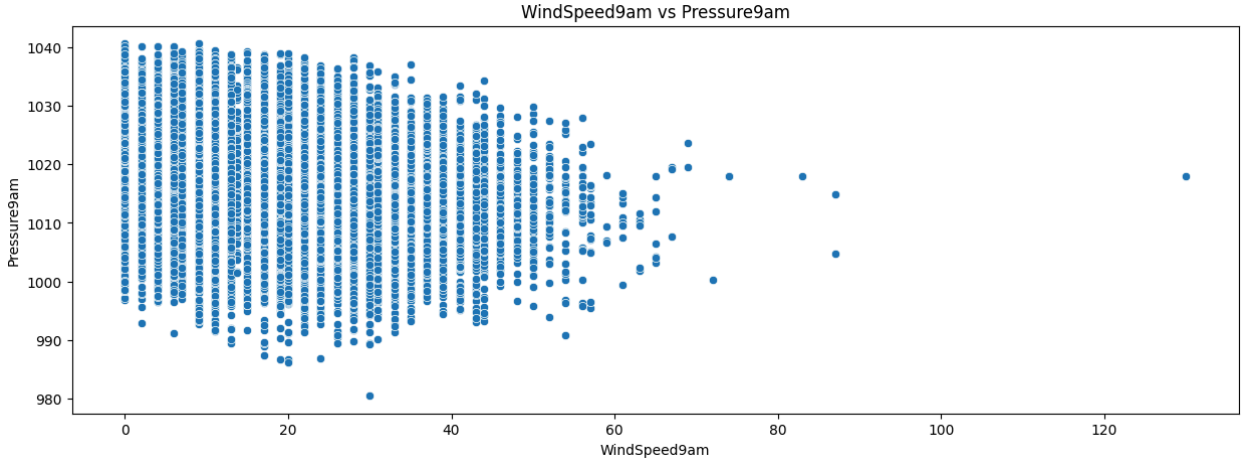
WindSpeed9am vs Pressure9am
Pressure9am
WindSpeed9am
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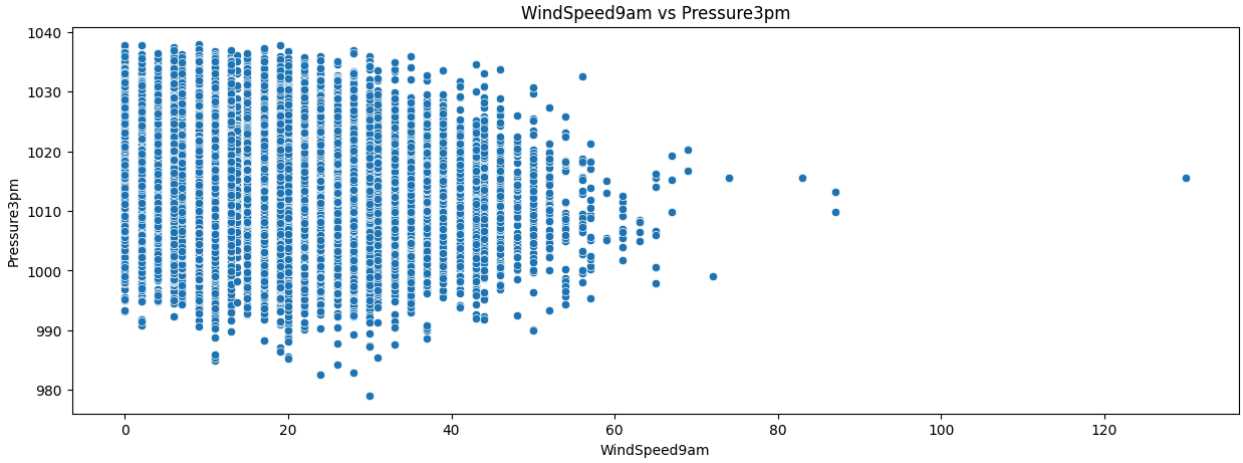
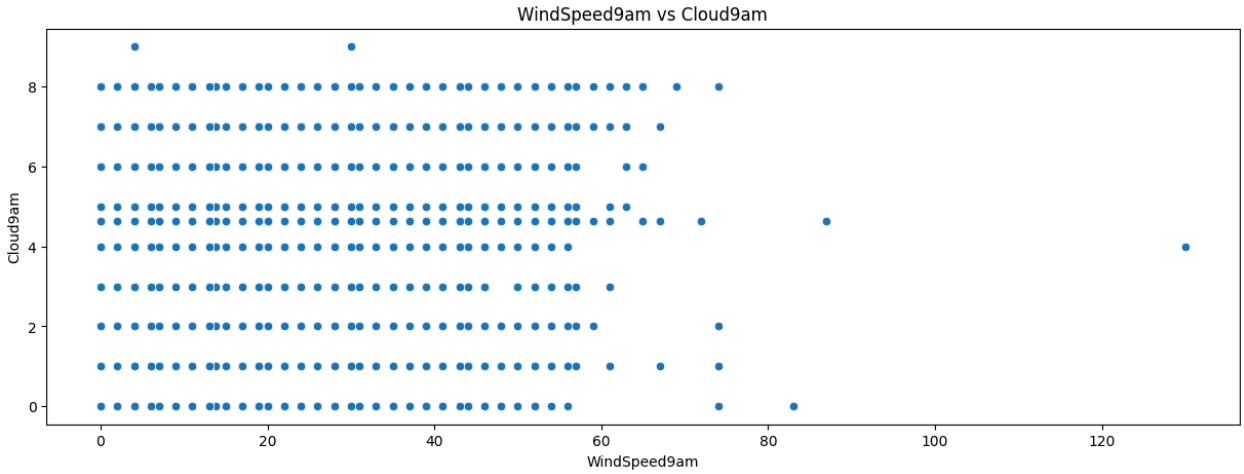
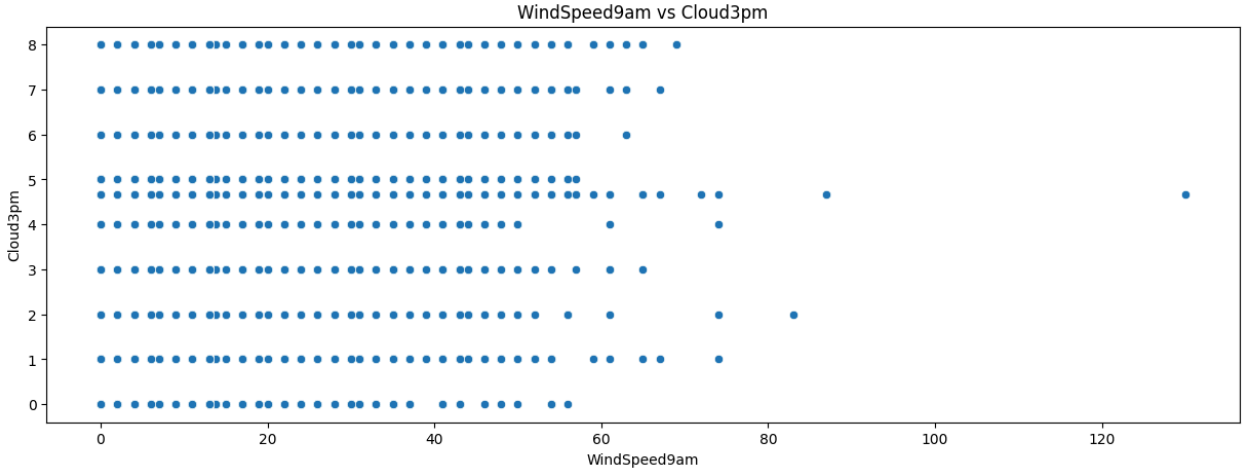
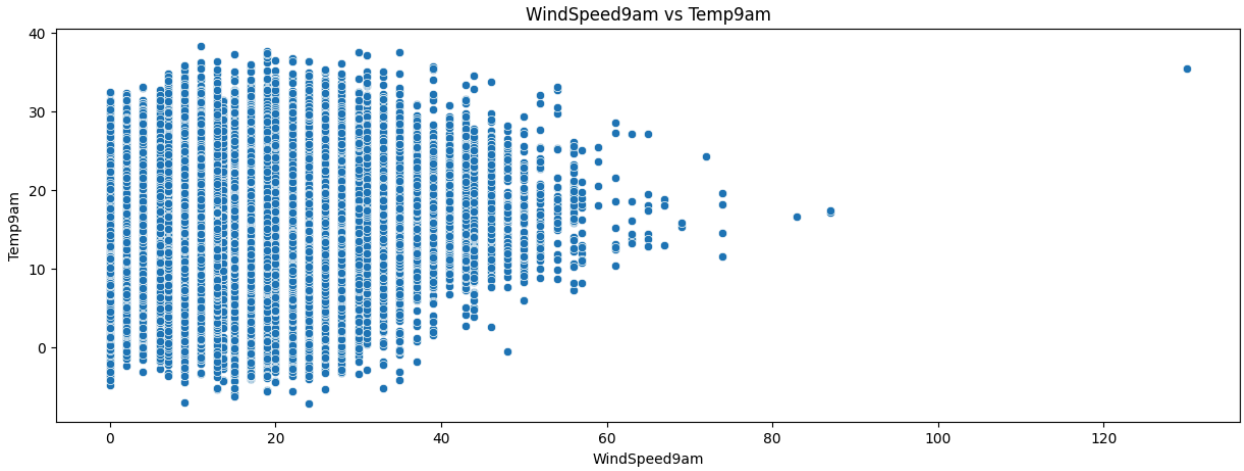
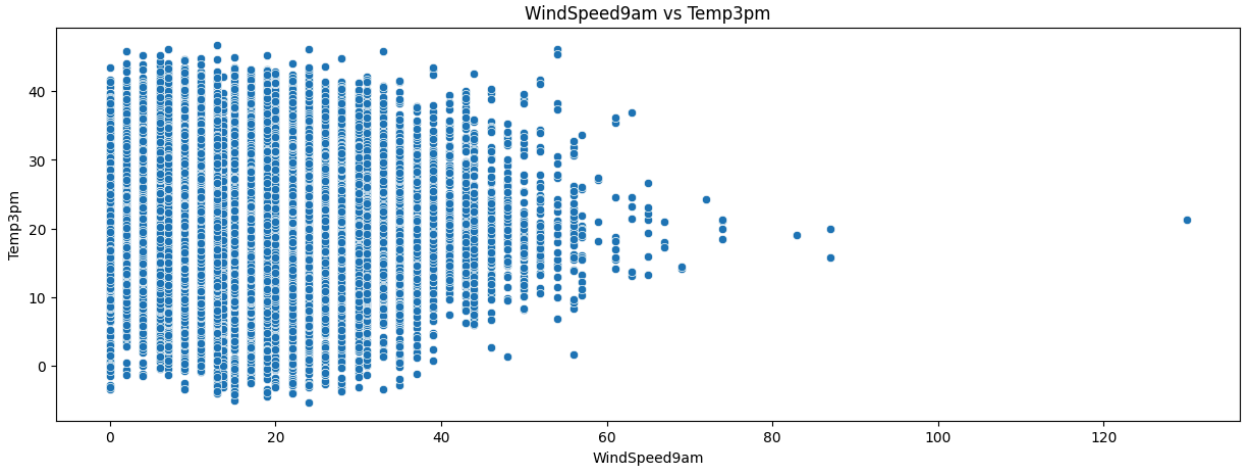
990
1000
1010
1020
1030
1040
0
20
40
60
80
100
120

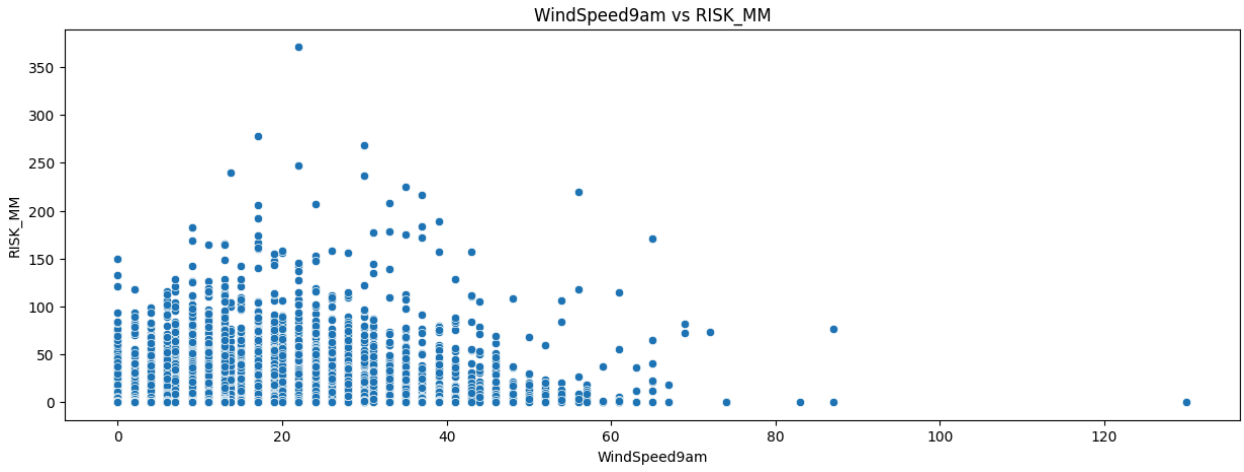

WindSpeed9am vs Pressure3pm
Pressure3pm
WindSpeed9am
1040
1030
1020
1010
1000
990
980
0
20
40
60
80
100
120


WindSpeed9am vs Cloud9am
Cloud9am
WindSpeed9am
8
6
4
2
0
0
20
40
60
80
100
120


WindSpeed9am vs Cloud3pm
Cloud3pm
WindSpeed9am
8
7
6
5
4
3
2
1
0
0
20
40
60
80
100
120


WindSpeed9am vs Temp9am
Temp9am
WindSpeed9am
0
10
20
30
40
0
20
40
60
80
100
120


WindSpeed9am vs Temp3pm
Temp3pm
WindSpeed9am
0
10
20
30
40
0
20
40
60
80
100
120


WindSpeed9am vs RISK_MM
RISK_MM
WindSpeed9am
0
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100
150
200
250
300
350
0
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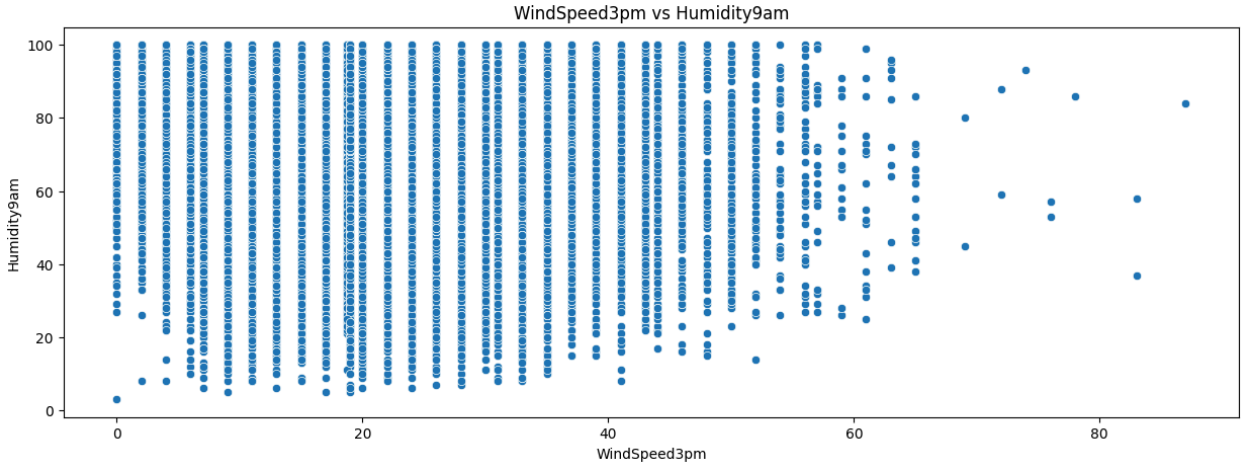
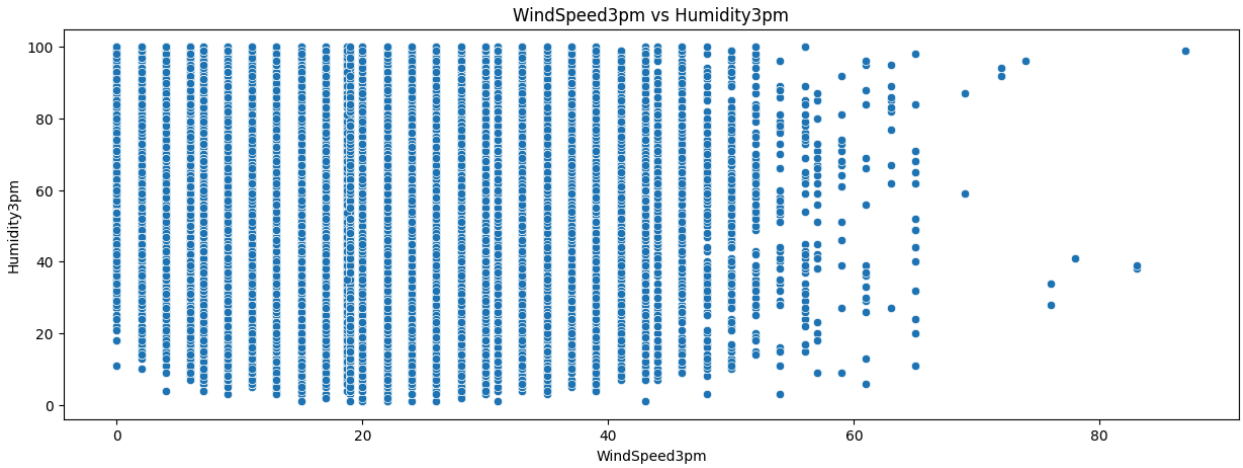
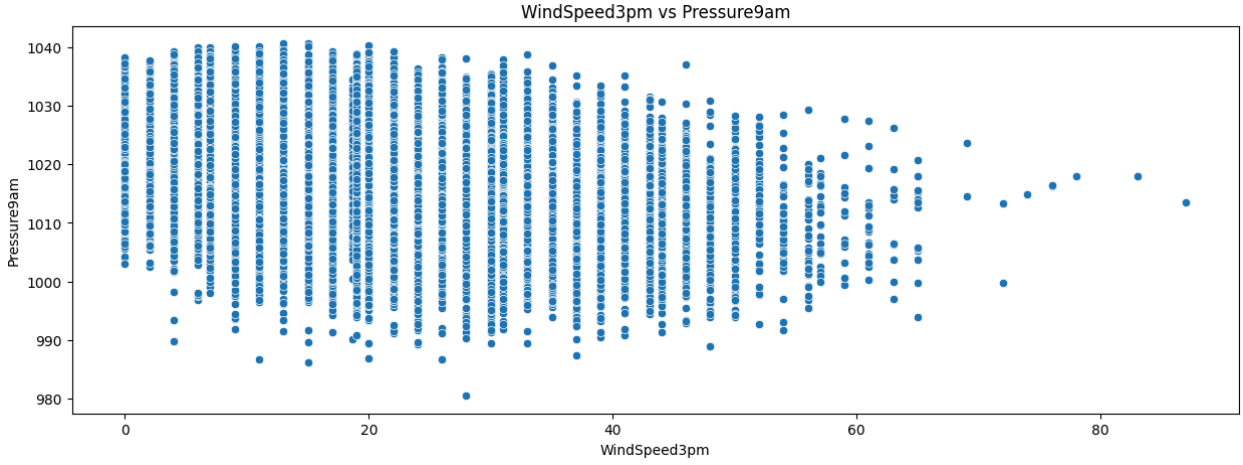
40
60
80
100
120


WindSpeed3pm vs Humidity9am
Humidity9am
WindSpeed3pm
0
20
40
60
80
100


WindSpeed3pm vs Humidity3pm
Humidity3pm
WindSpeed3pm
0
20
40
60
80
100


WindSpeed3pm vs Pressure9am
Pressure9am
WindSpeed3pm
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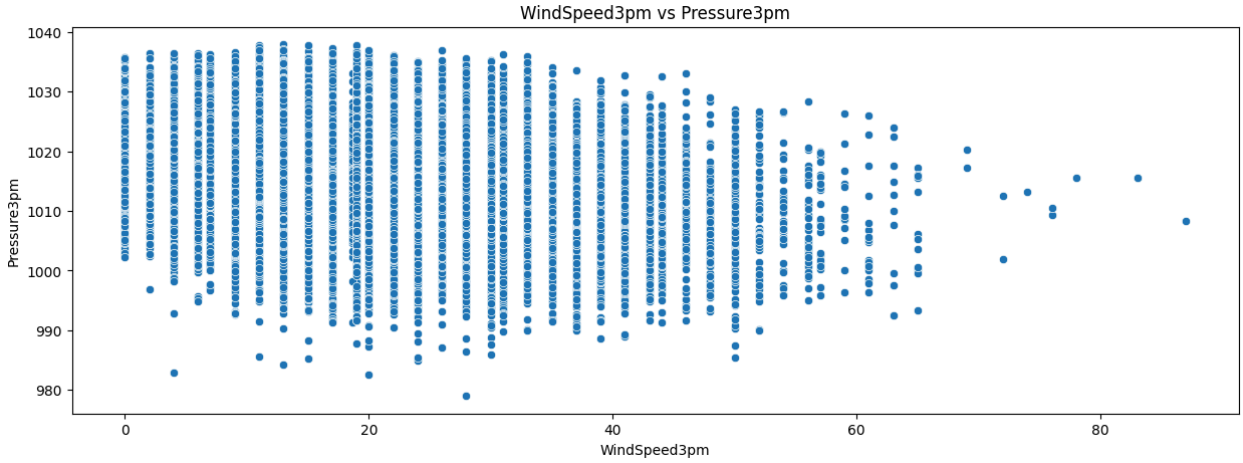
990
1000
1010
1020
1030
1040
0
20
40
60
80


WindSpeed3pm vs Pressure3pm
Pressure3pm
WindSpeed3pm
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1030
1020
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1000
990
980
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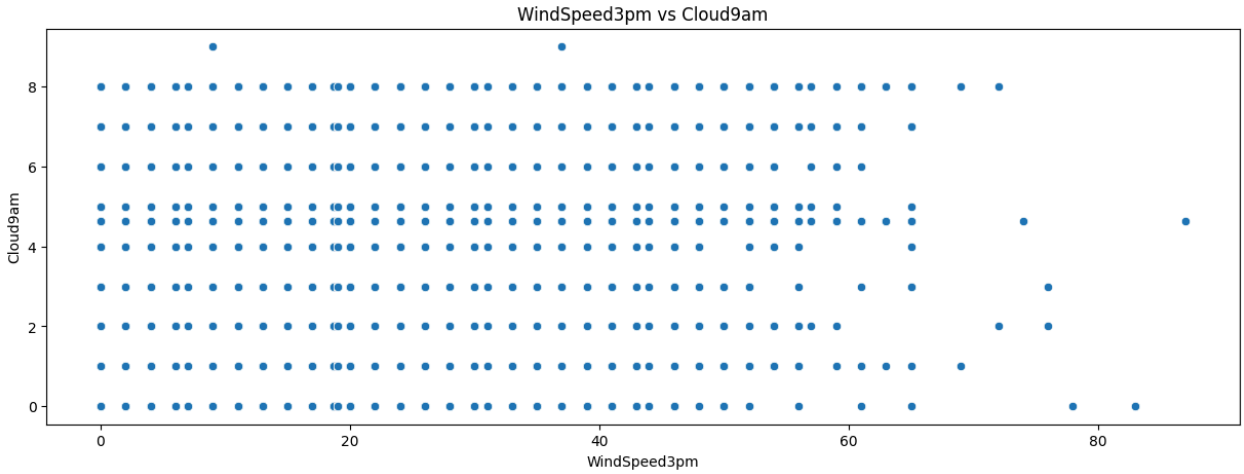
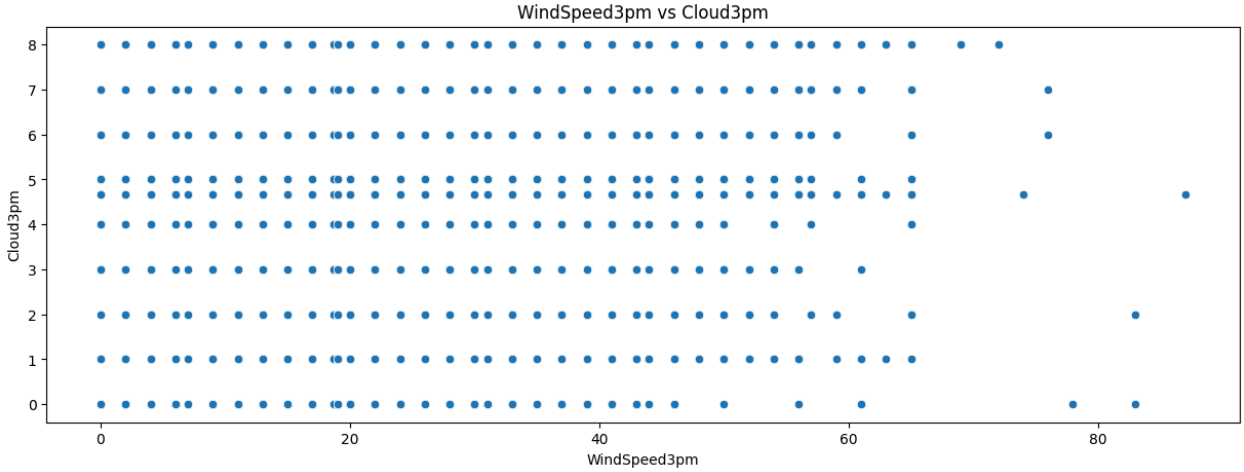
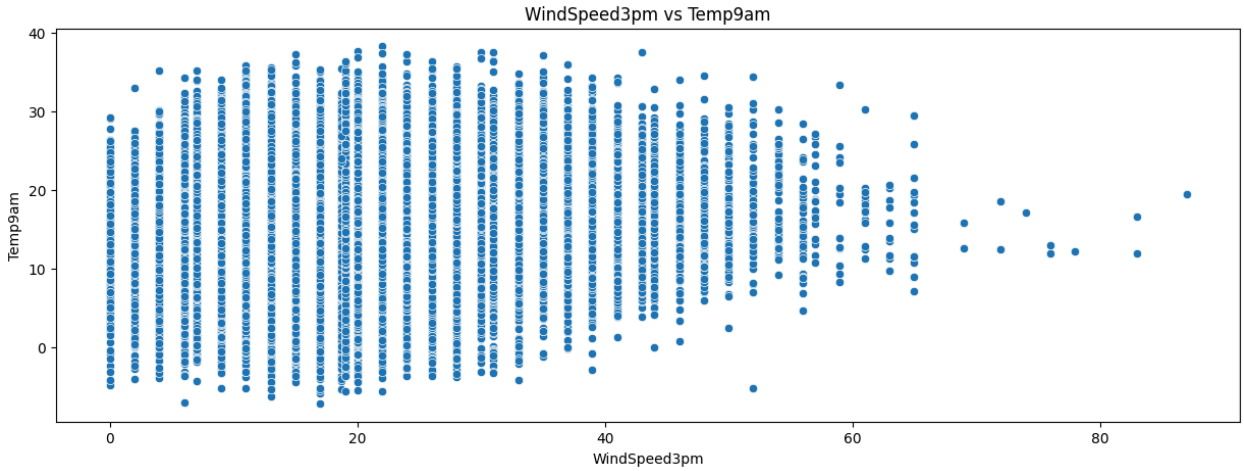
60
80


WindSpeed3pm vs Cloud9am
Cloud9am
WindSpeed3pm
8
6
4
2
0
0
20
40
60
80


WindSpeed3pm vs Cloud3pm
Cloud3pm
WindSpeed3pm
8
7
6
5
4
3
2
1
0
0
20
40
60
80


WindSpeed3pm vs Temp9am
Temp9am
WindSpeed3pm
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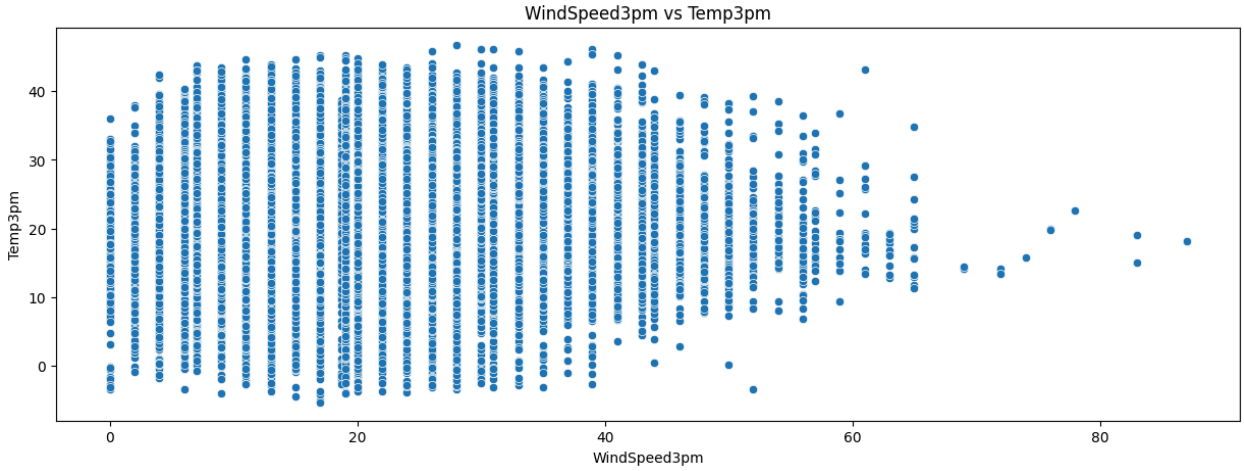
60
80
0
10
20
30
40


WindSpeed3pm vs Temp3pm
Temp3pm
WindSpeed3pm
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80
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30
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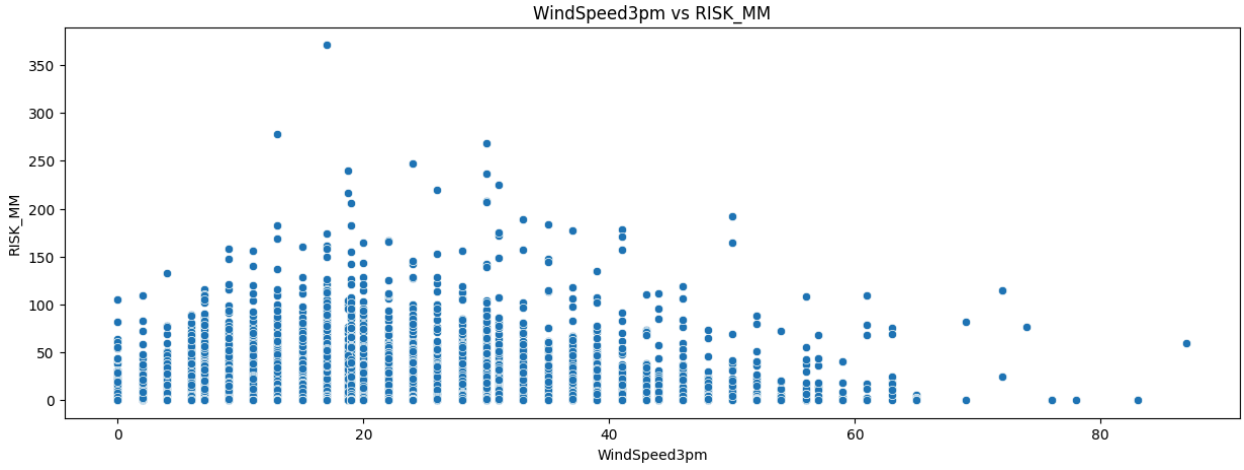
WindSpeed3pm vs RISK_MM
RISK_MM
WindSpeed3pm
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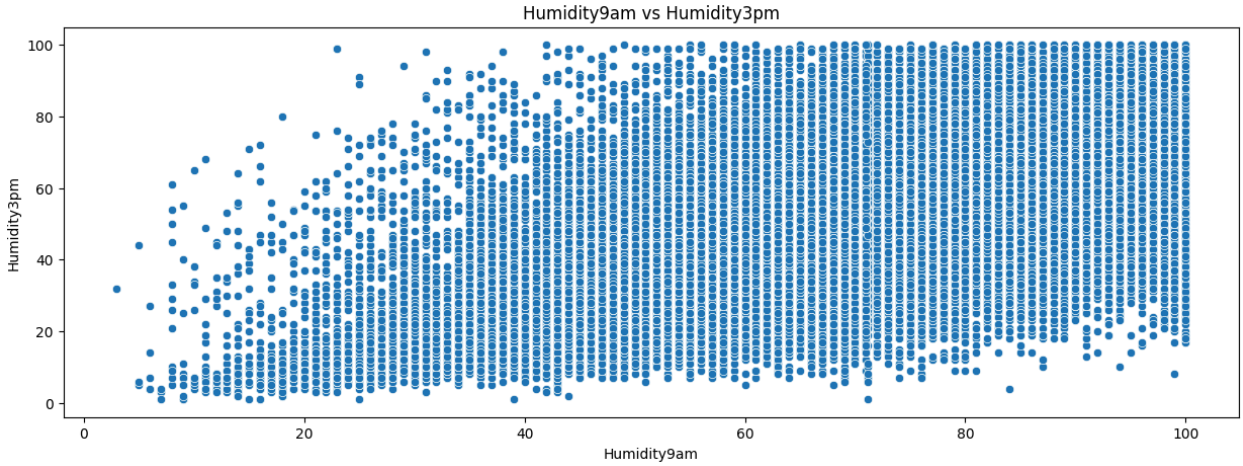
300
350


Humidity9am vs Humidity3pm
Humidity3pm
Humidity9am
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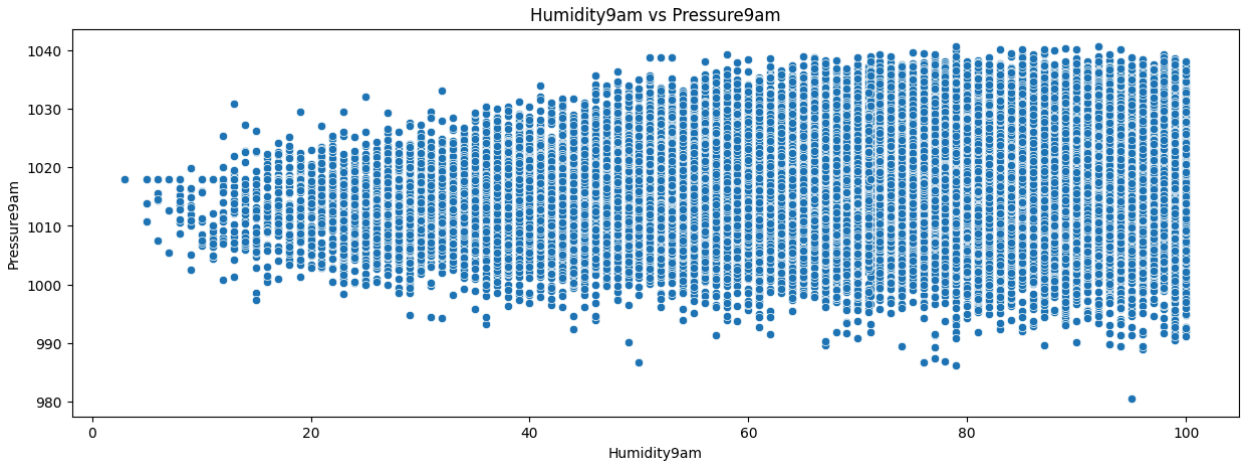
80
100


Humidity9am vs Pressure9am
Pressure9am
Humidity9am
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990
1000
1010
1020
1030
1040
0
20
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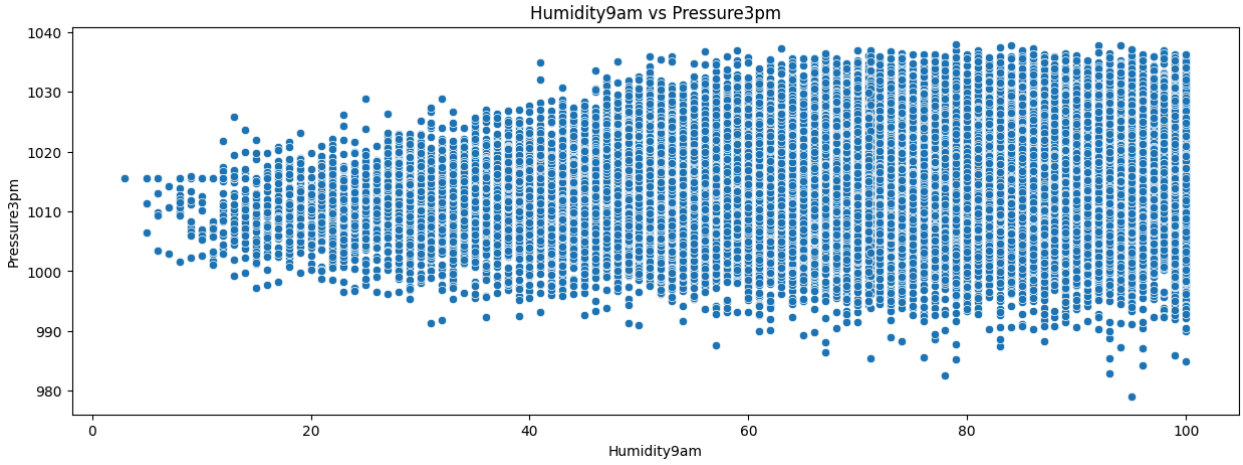
80
100


Humidity9am vs Pressure3pm
Pressure3pm
Humidity9am
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990
1000
1010
1020
1030
1040
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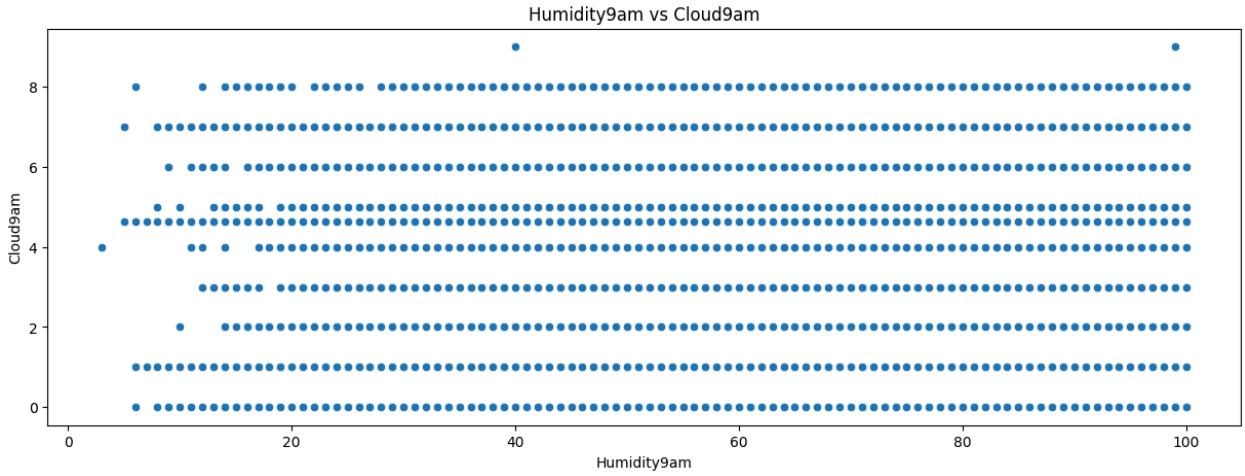
80
100


Humidity9am vs Cloud9am
Cloud9am
Humidity9am
0
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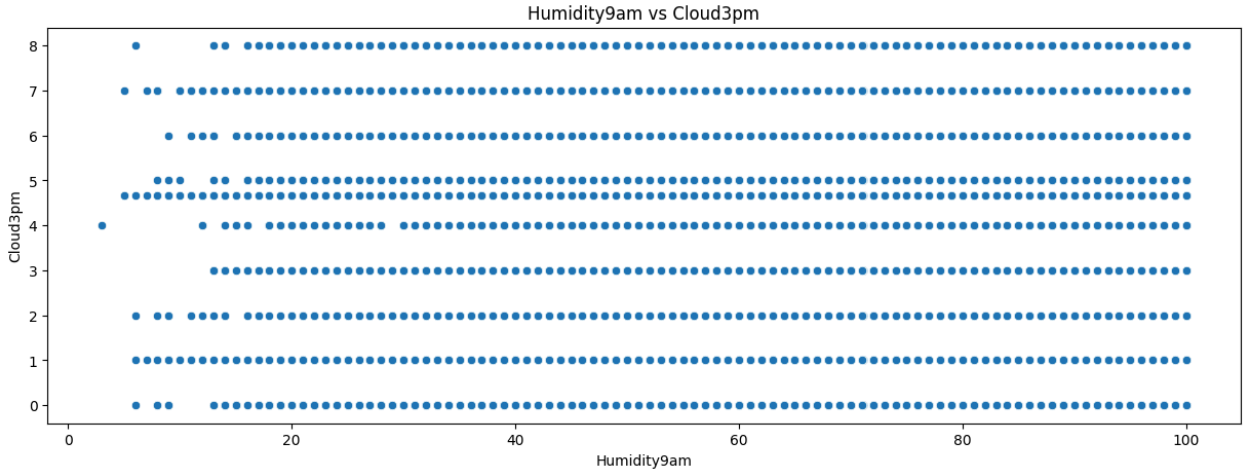
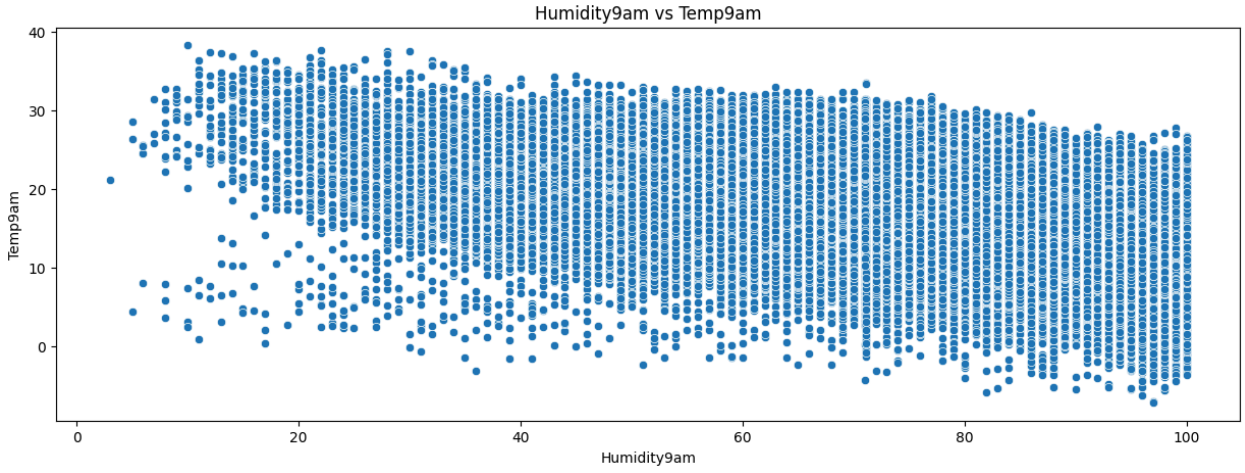
4
6
8
0
20
40
60
80
100


Humidity9am vs Cloud3pm
Cloud3pm
Humidity9am
0
1
2
3
4
5
6
7
8
0
20
40
60
80
100


Humidity9am vs Temp9am
Temp9am
Humidity9am
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30
40
0
20
40
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80
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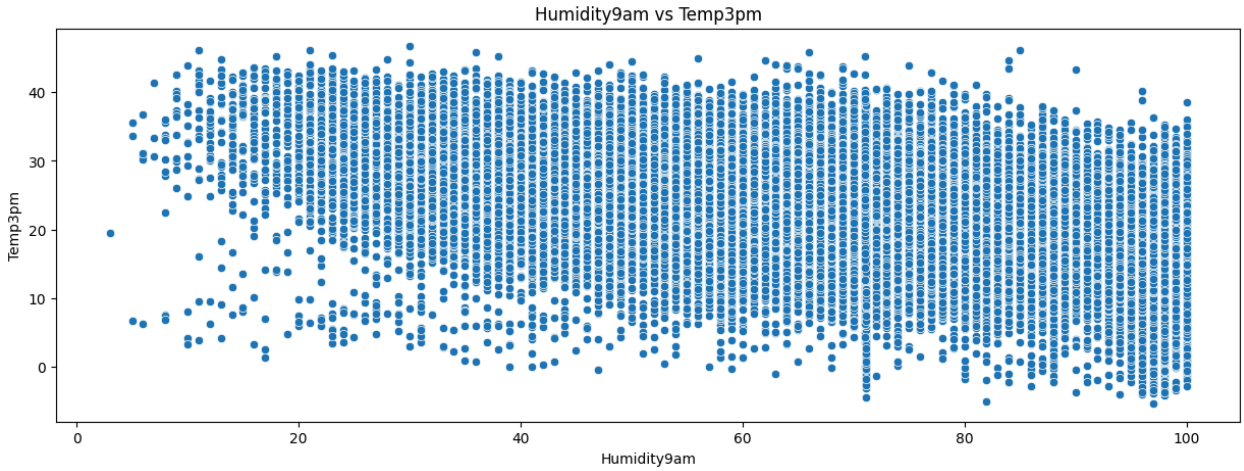
Humidity9am vs Temp3pm
Temp3pm
Humidity9am
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30
40
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80
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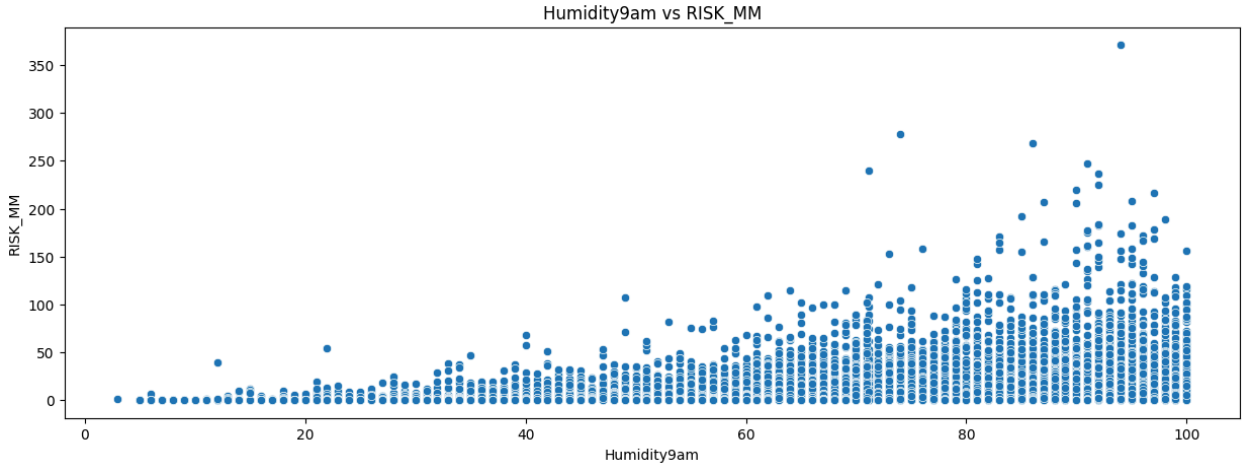
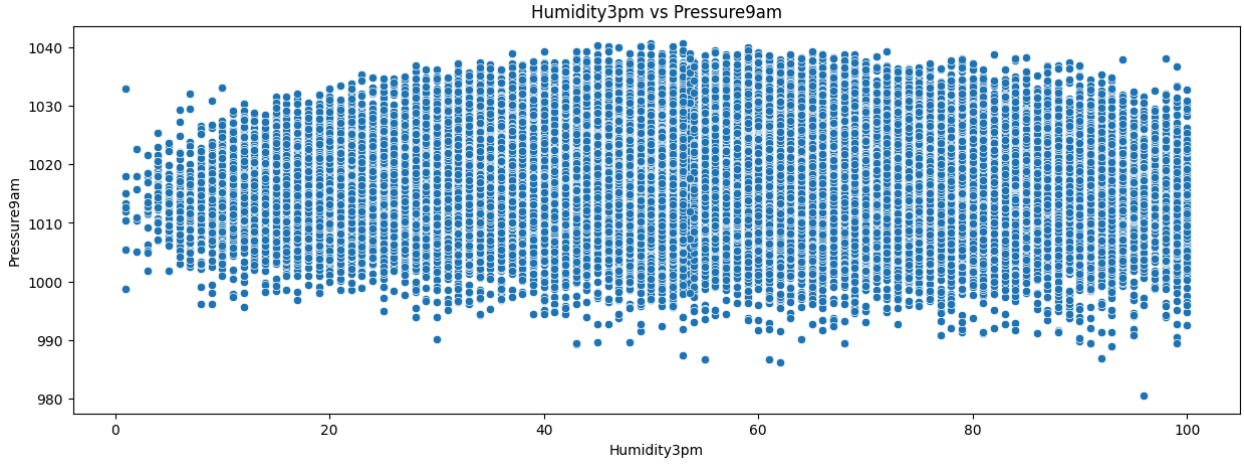

Humidity9am vs RISK_MM
RISK_MM
Humidity9am
0
50
100
150
200
250
300
350
0
20
40
60
80
100


Humidity3pm vs Pressure9am
Pressure9am
Humidity3pm
980
990
1000
1010
1020
1030
1040
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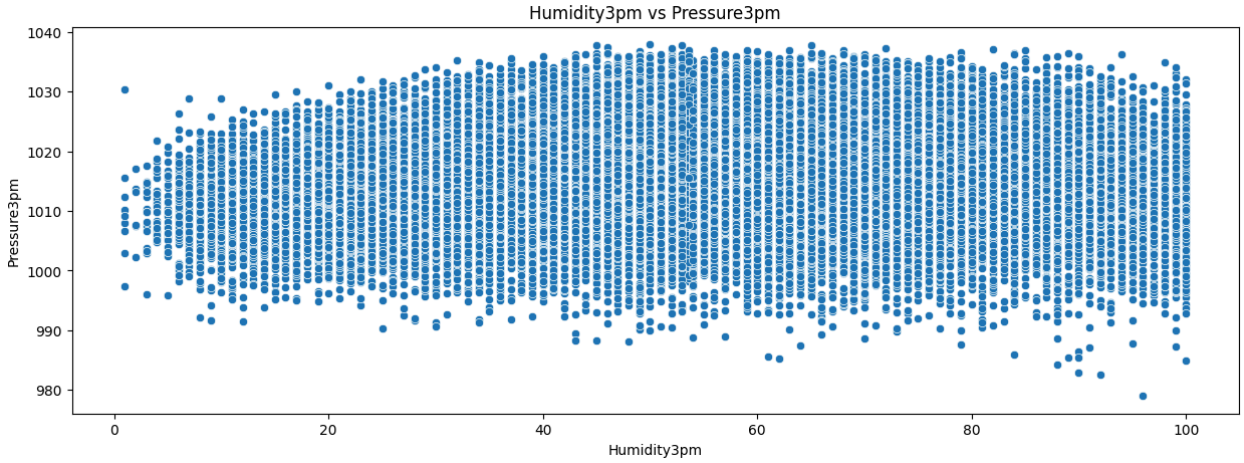
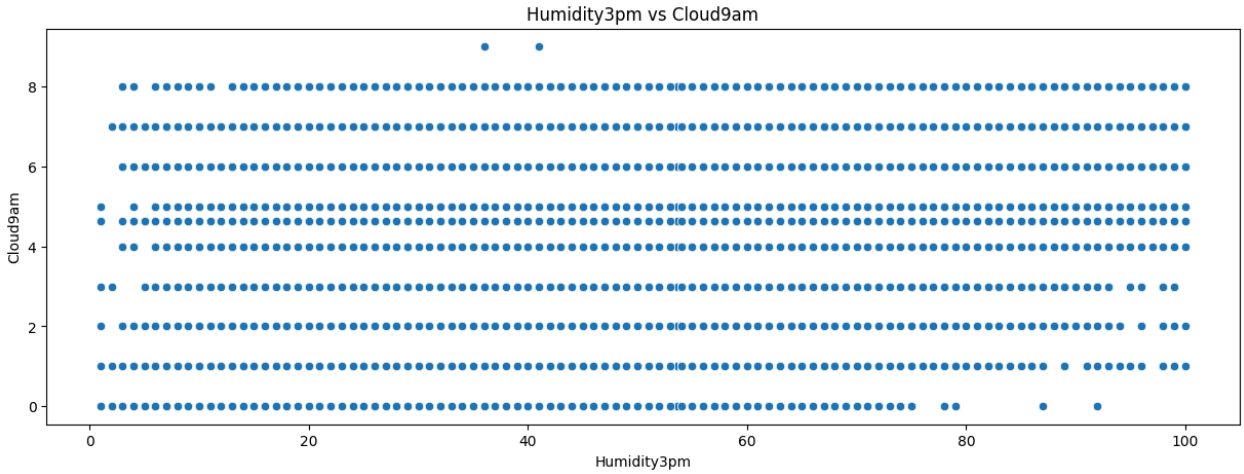
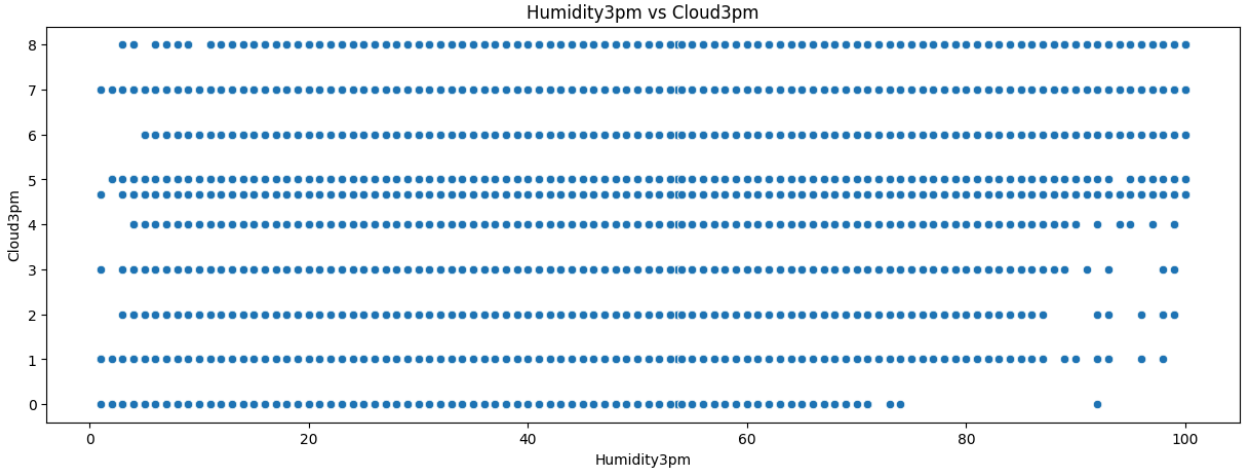
60
80
100


Humidity3pm vs Pressure3pm
Pressure3pm
Humidity3pm
1040
1030
1020
1010
1000
990
980
0
20
40
60
80
100


Humidity3pm vs Cloud9am
Cloud9am
Humidity3pm
8
6
4
2
0
0
20
40
60
80
100


Humidity3pm vs Cloud3pm
Cloud3pm
Humidity3pm
8
7
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5
4
3
2
1
0
0
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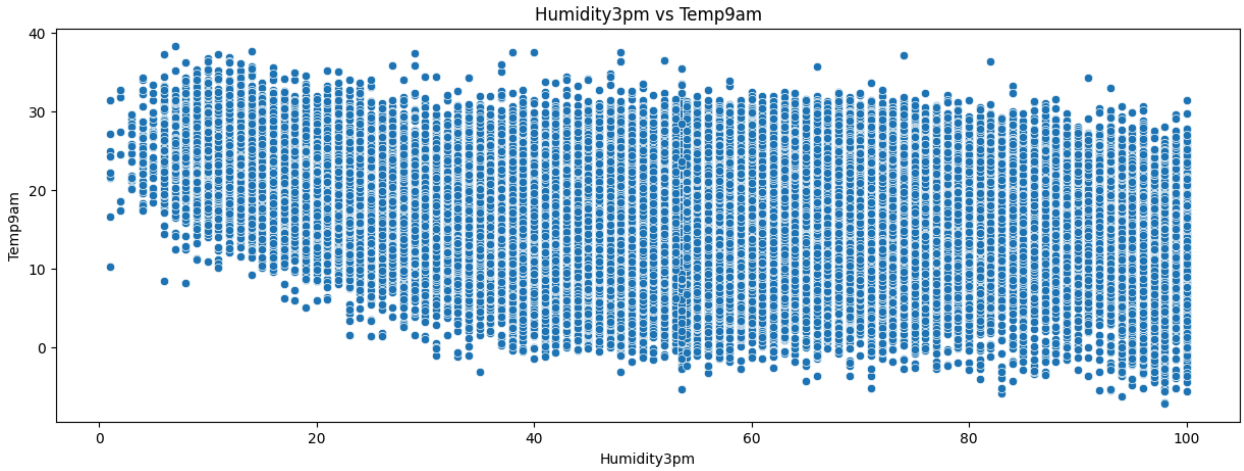
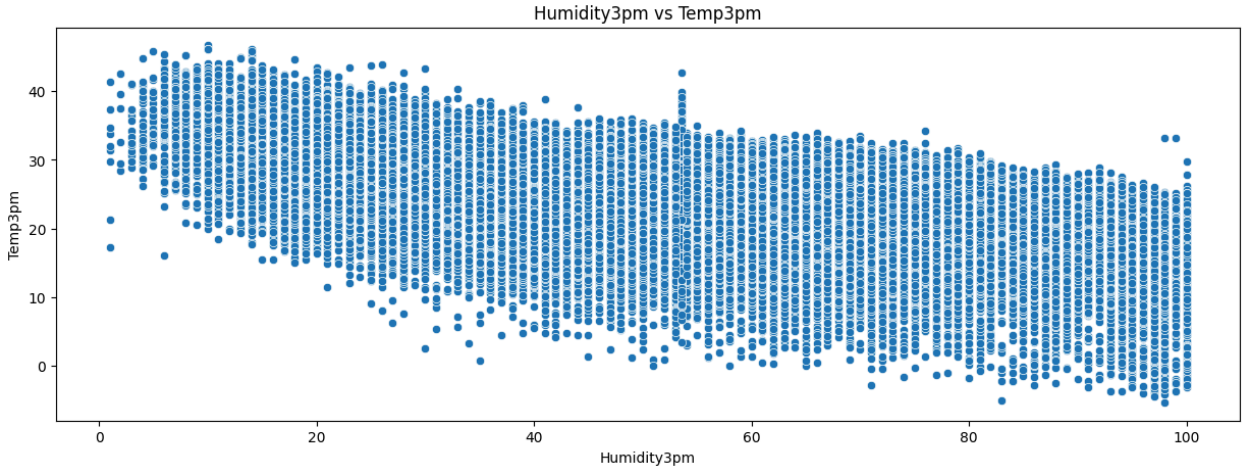
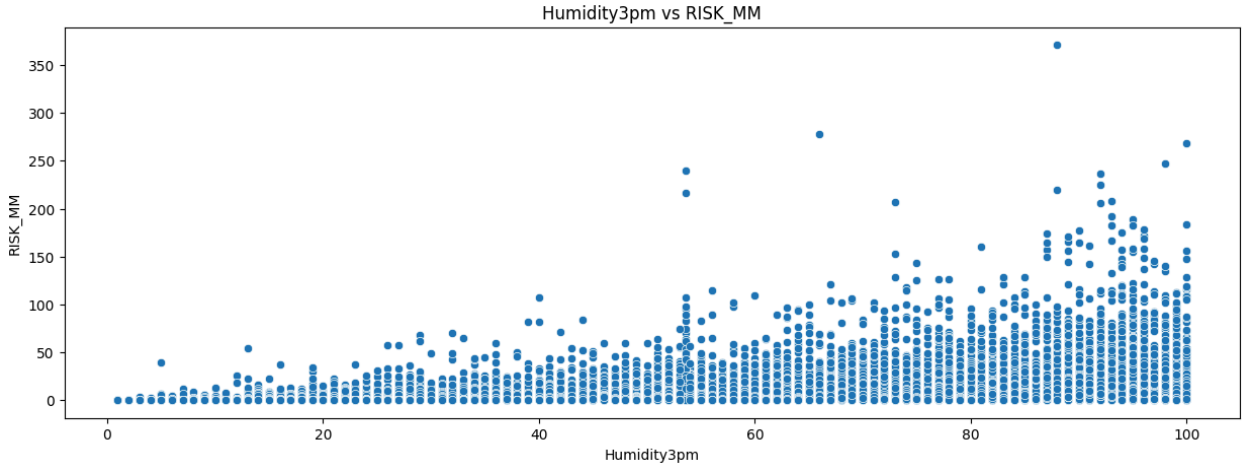
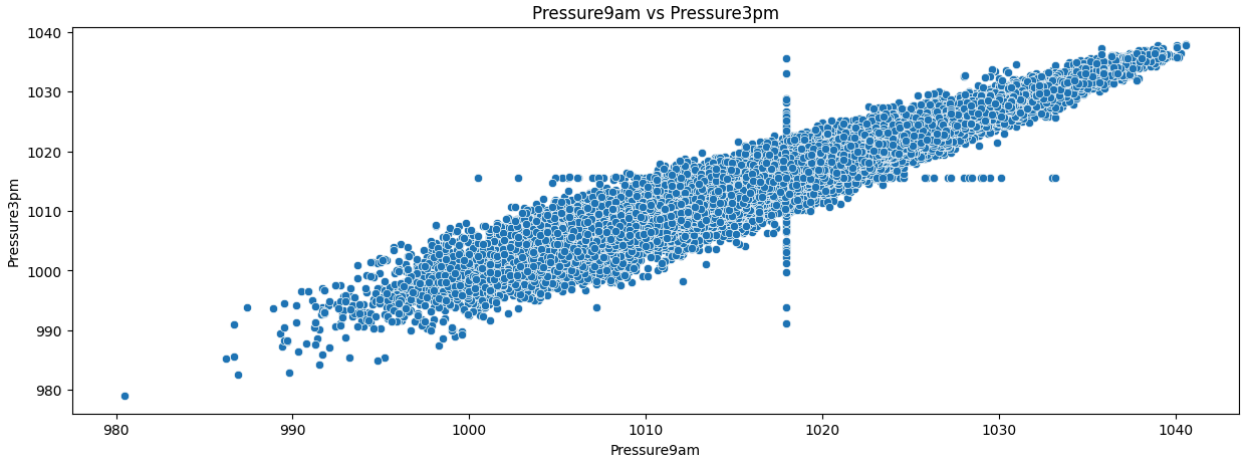
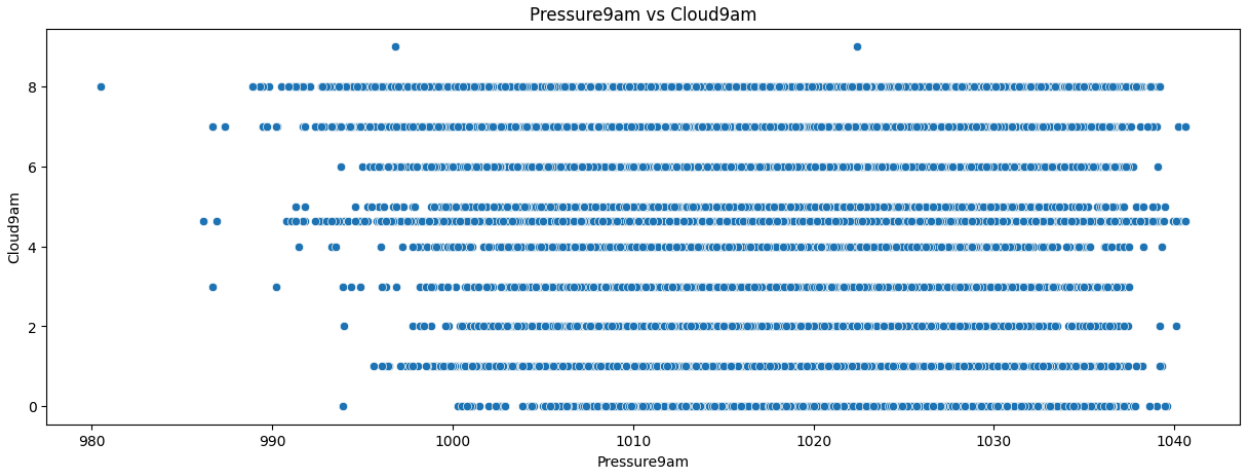
40
60
80
100

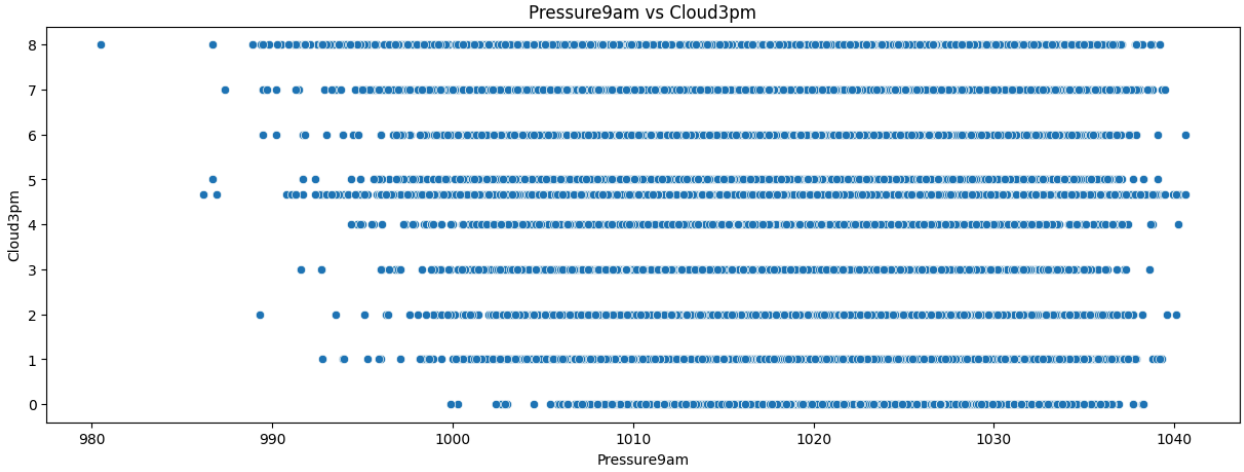

Humidity3pm vs Temp9am
Temp9am
Humidity3pm
0
20
40
60
80
100
0
10
20
30
40


Humidity3pm vs Temp3pm
Temp3pm
Humidity3pm
0
20
40
60
80
100
0
10
20
30
40


Humidity3pm vs RISK_MM
RISK_MM
Humidity3pm
0
20
40
60
80
100
0
50
100
150
200
250
300
350


Pressure9am vs Pressure3pm
Pressure3pm
Pressure9am
1040
1030
1020
1010
1000
990
980
980
990
1000
1010
1020
1030
1040


Pressure9am vs Cloud9am
Cloud9am
Pressure9am
8
6
4
2
0
980
990
1000
1010
1020
1030
1040


Pressure9am vs Cloud3pm
Cloud3pm
Pressure9am
8
7
6
5
4
3
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1
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980
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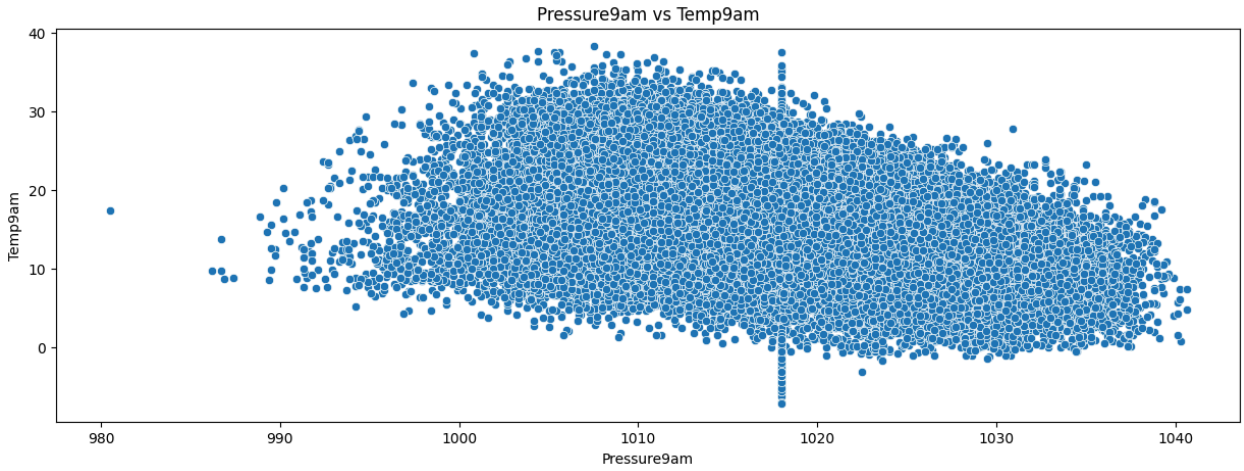
1010
1020
1030
1040


Pressure9am vs Temp9am
Temp9am
Pressure9am
40
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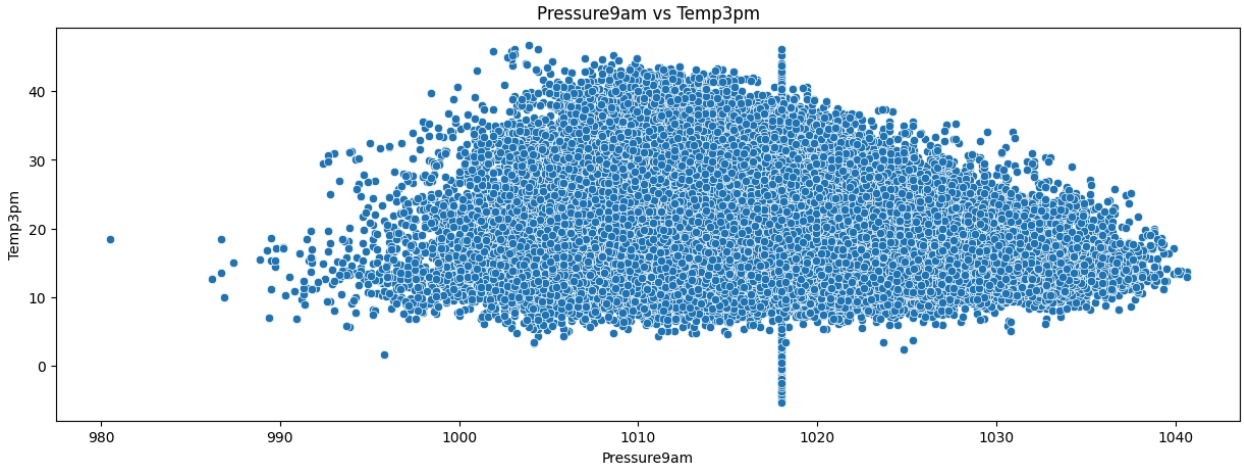
1040


Pressure9am vs Temp3pm
Temp3pm
Pressure9am
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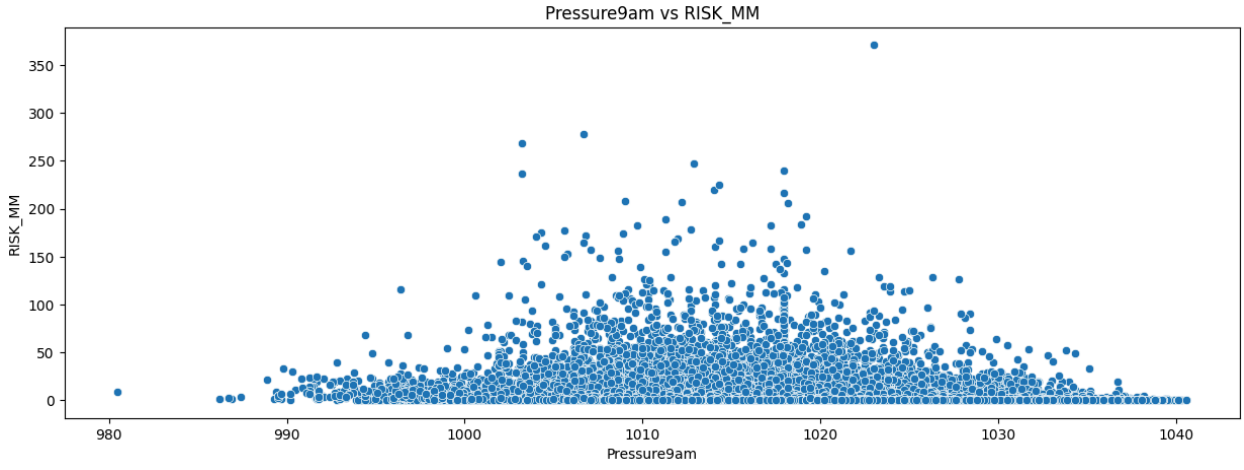
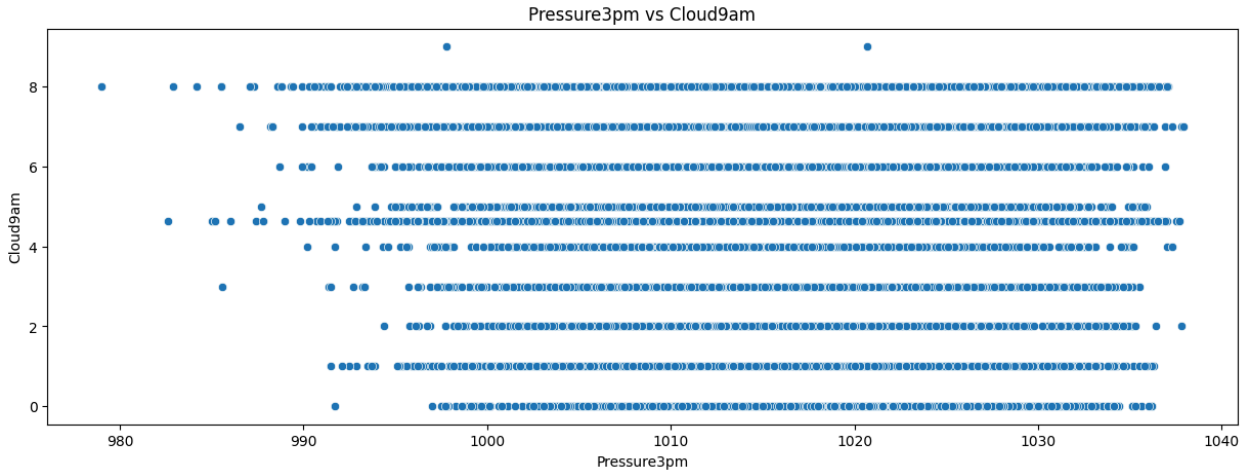
1040


Pressure9am vs RISK_MM
RISK_MM
Pressure9am
350
300
250
200
150
100
50
0
980
990
1000
1010
1020
1030
1040


Pressure3pm vs Cloud9am
Cloud9am
Pressure3pm
0
2
4
6
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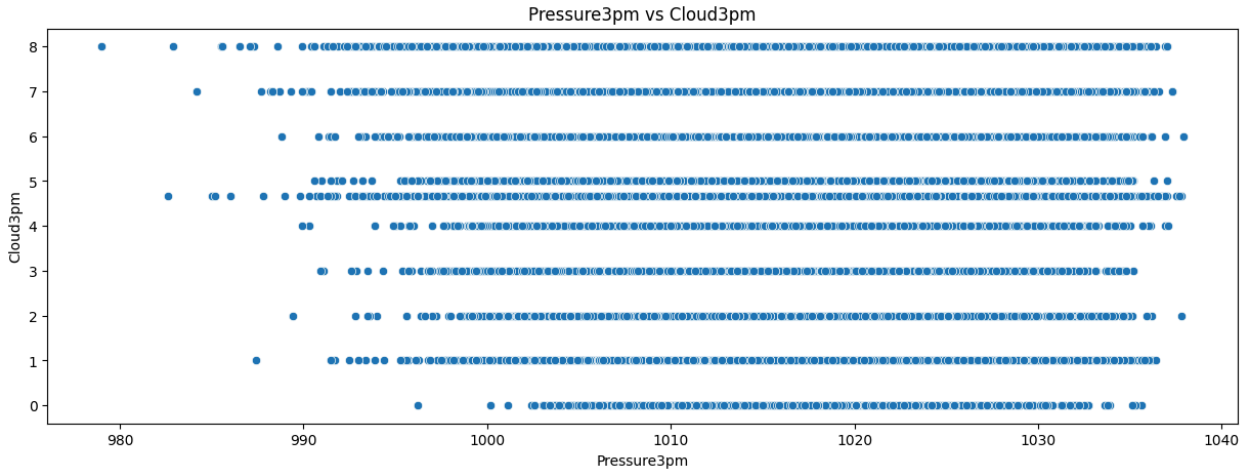
1000
1010
1020
1030
1040


Pressure3pm vs Cloud3pm
Cloud3pm
Pressure3pm
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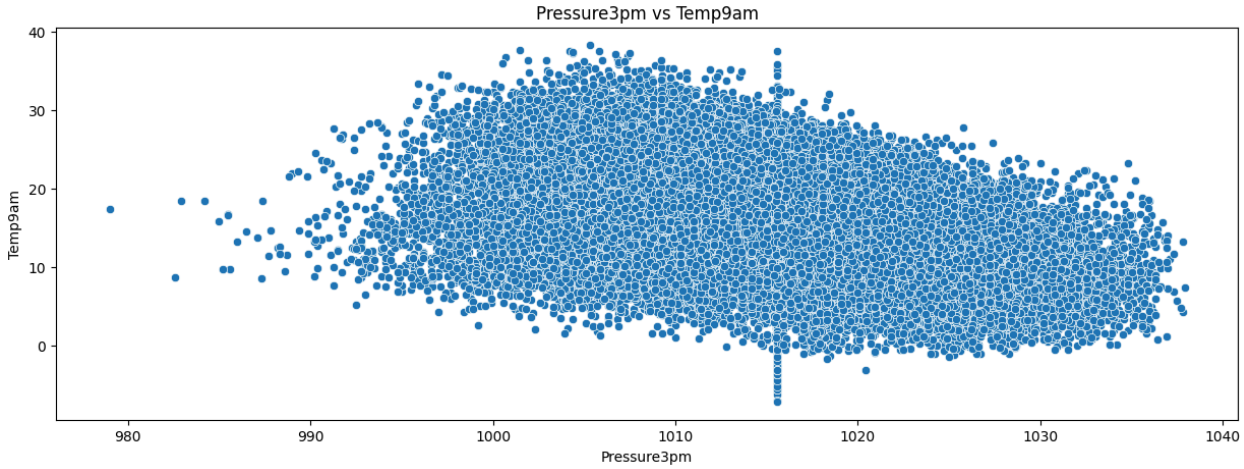
1040


Pressure3pm vs Temp9am
Temp9am
Pressure3pm
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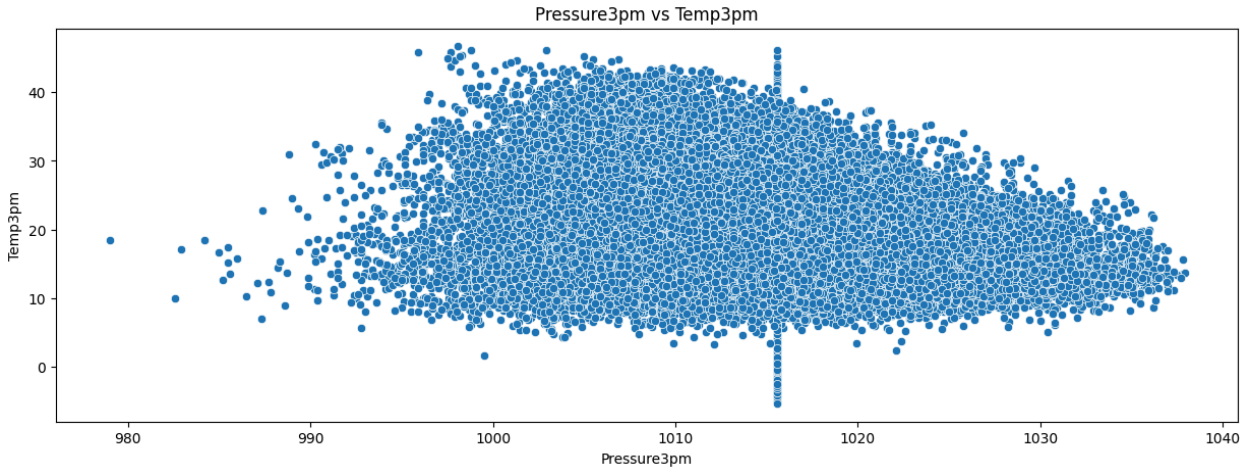
1040


Pressure3pm vs Temp3pm
Temp3pm
Pressure3pm
0
10
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990
1000
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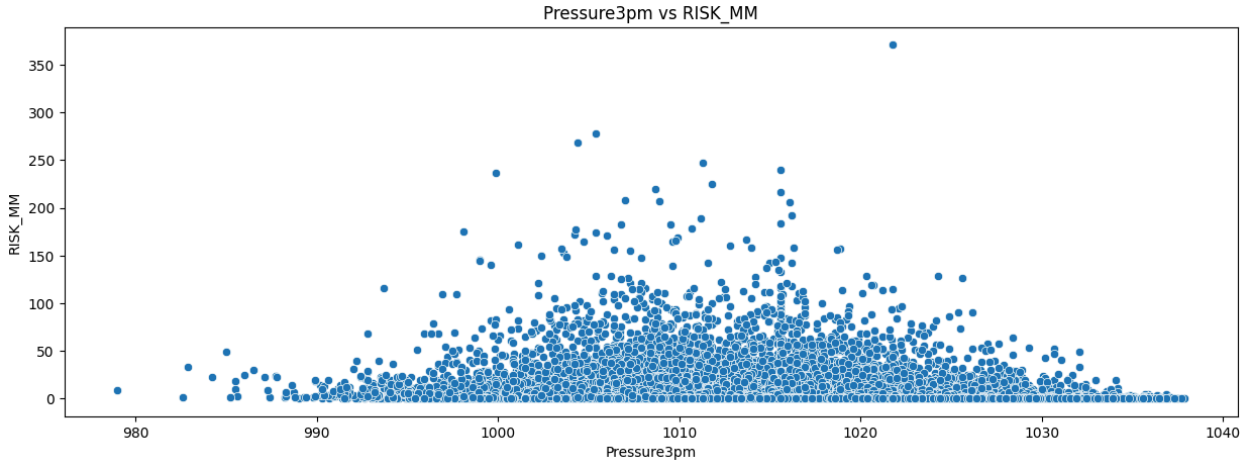
1030
1040


Pressure3pm vs RISK_MM
RISK_MM
Pressure3pm
0
50
100
150
200
250
300
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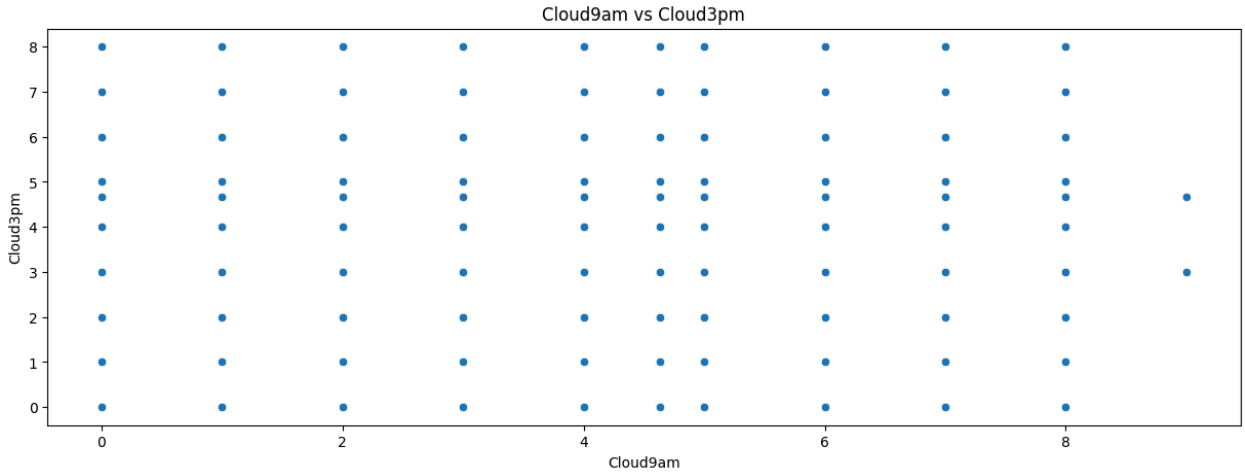
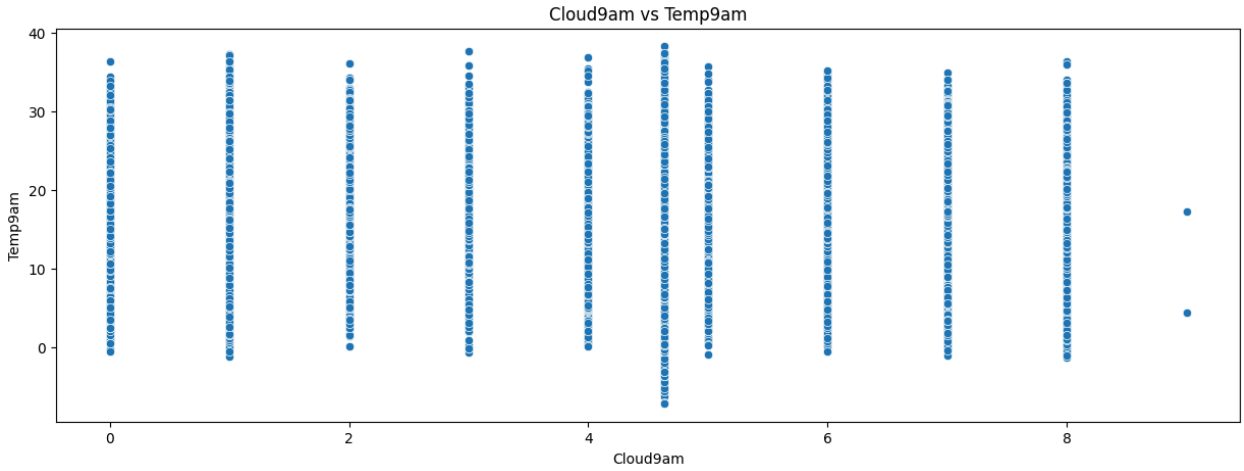
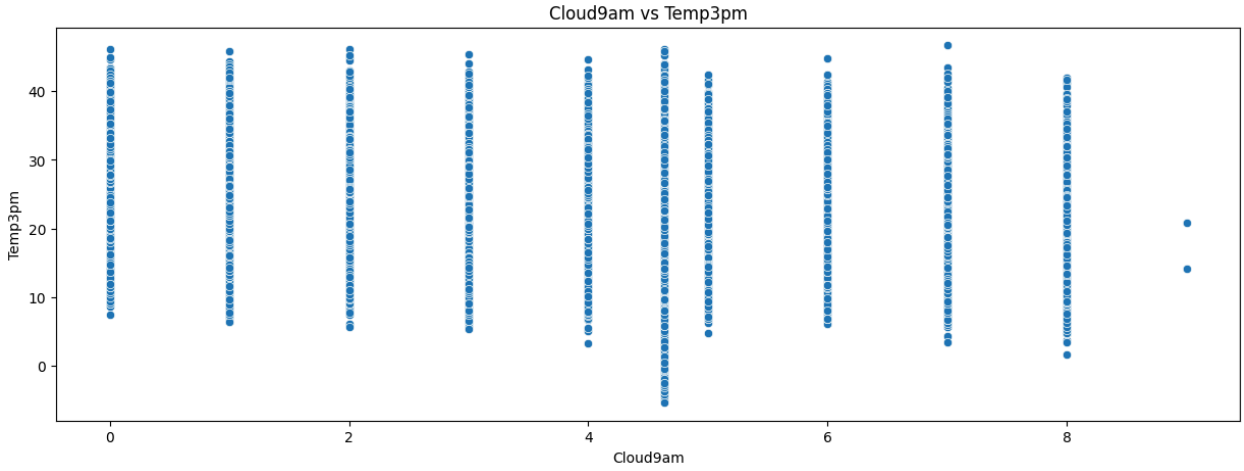
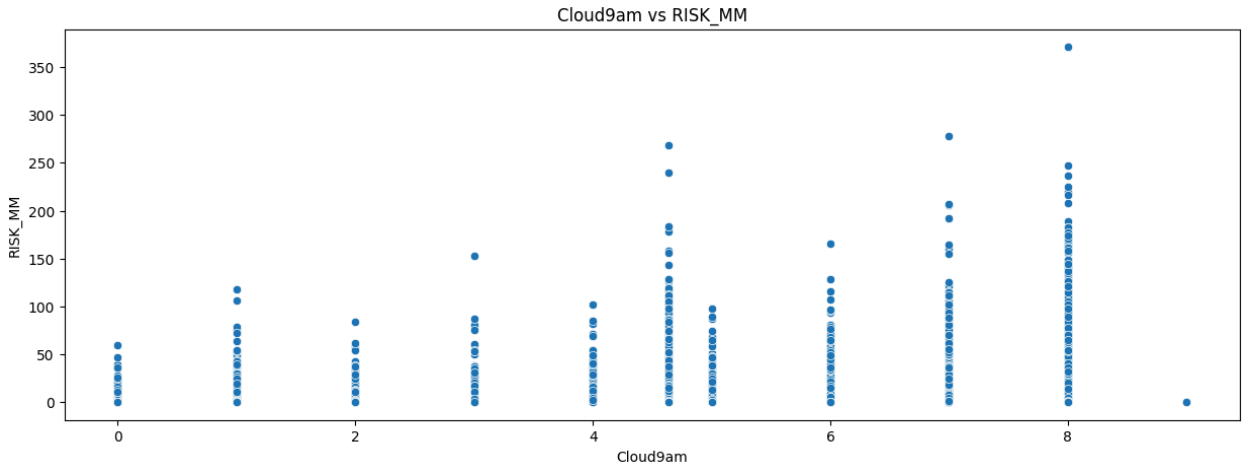
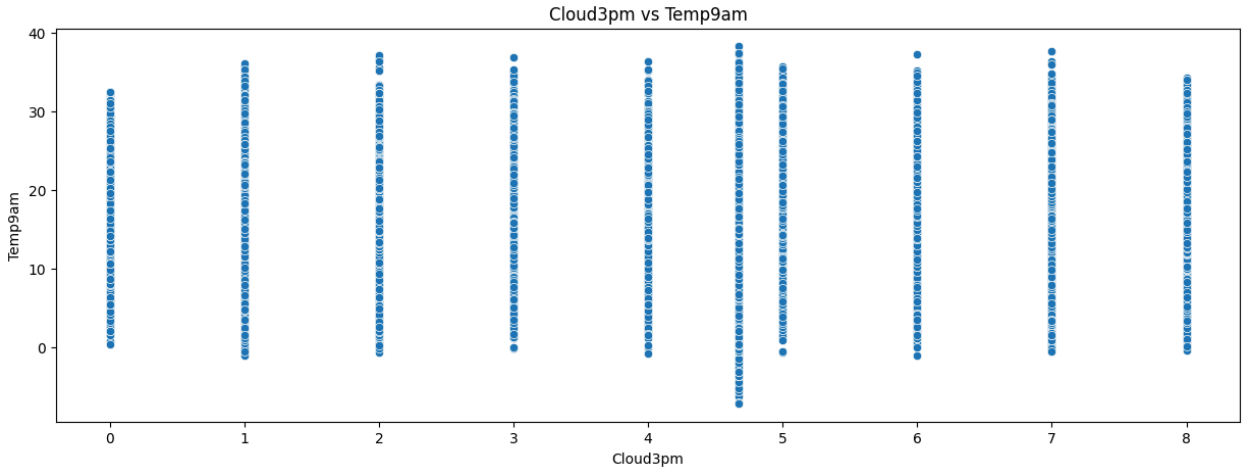
980
990
1000
1010
1020
1030
1040

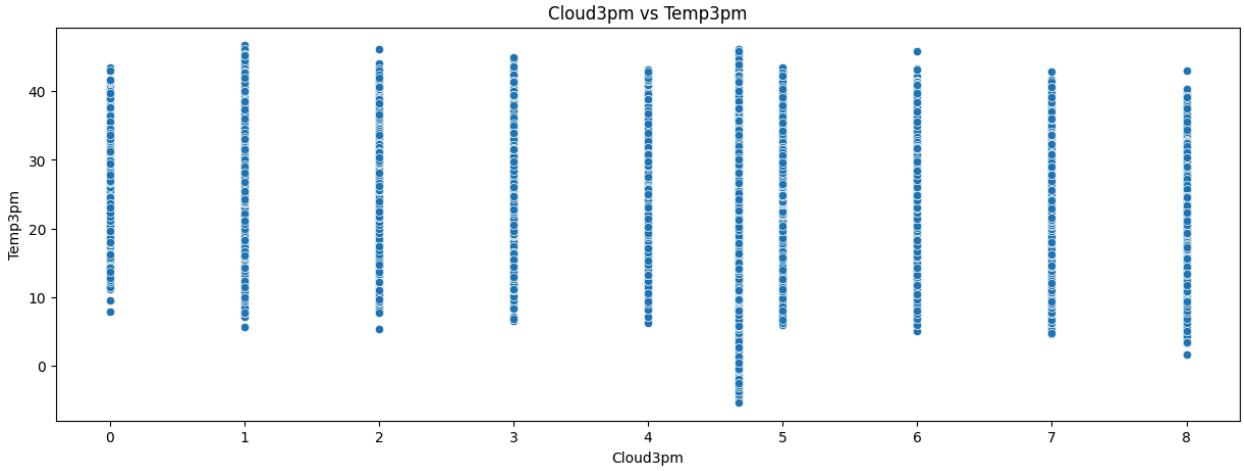

Cloud9am vs Cloud3pm
Cloud3pm
Cloud9am
0
1
2
3
4
5
6
7
8
0
2
4
6
8

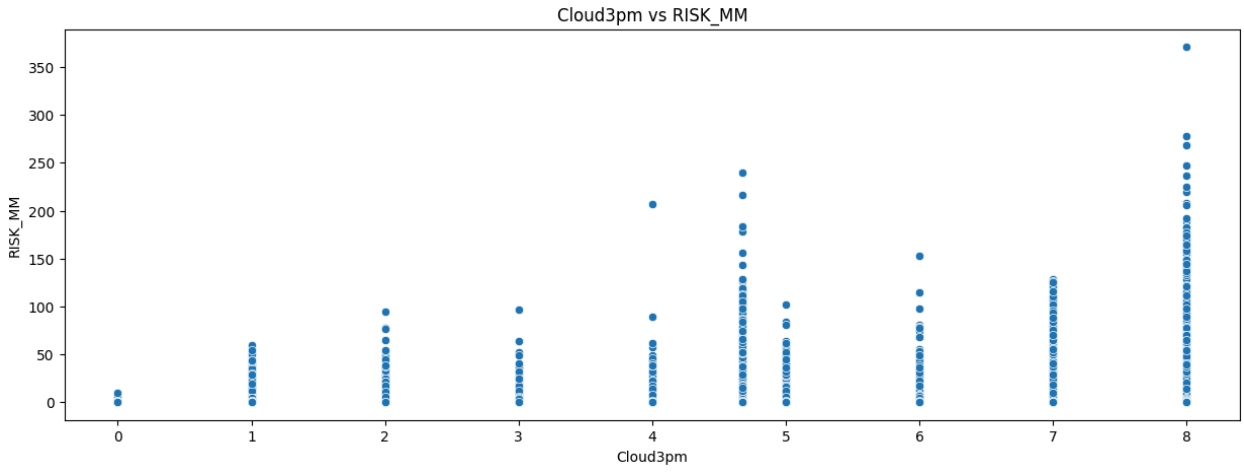

Cloud9am vs Temp9am
Temp9am
Cloud9am
40
30
20
10
0
0
2
4
6
8

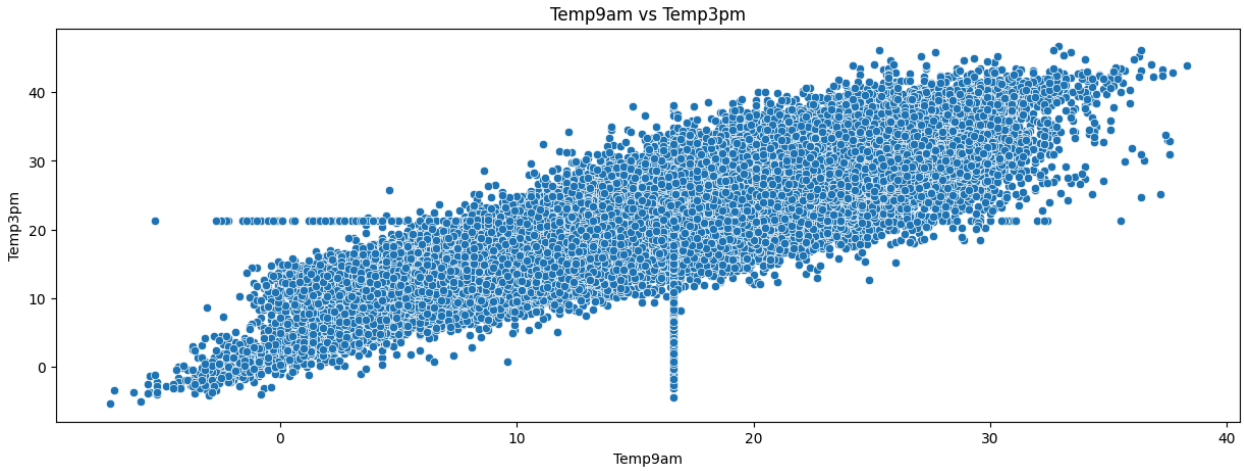

Cloud9am vs Temp3pm
Temp3pm
Cloud9am
40
30
20
10
0
0
2
4
6
8

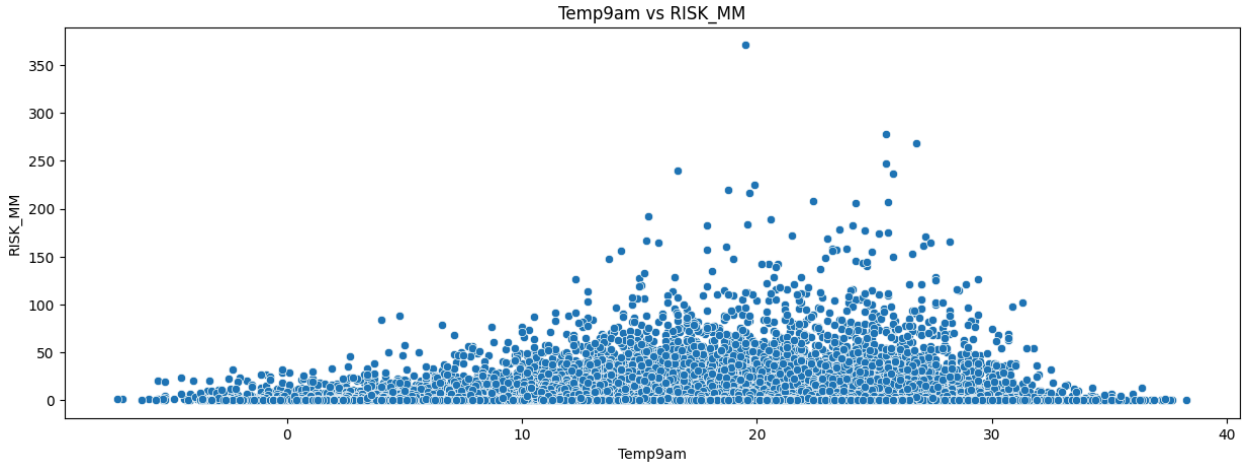

Cloud9am vs RISK_MM
RISK_MM
Cloud9am
350
300
250
200
150
100
50
0
0
2
4
6
8

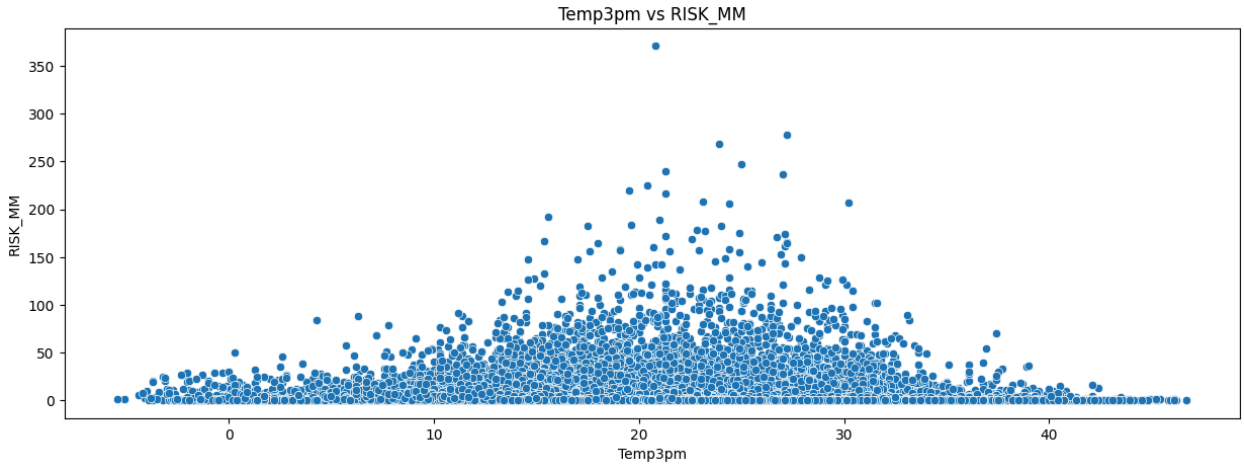

Cloud3pm vs Temp9am
Temp9am
Cloud3pm
0
10
20
30
40
0
1
2
3
4
5
6
7
8


Cloud3pm vs Temp3pm
Temp3pm
Cloud3pm
0
10
20
30
40
0
1
2
3
4
5
6
7
8


Cloud3pm vs RISK_MM
RISK_MM
Cloud3pm
0
50
100
150
200
250
300
350
0
1
2
3
4
5
6
7
8







In [ ]:
```
def remove_outliers(df):
  outeres12=set()
  for i in df.select_dtypes(exclude='object'):
    Q1=df[i].quantile(0.25)
    Q3=df[i].quantile(0.75)
    IQR=Q3-Q1
    lower=Q1-1.5*IQR
    upper=Q3+1.5*IQR
    outliers=df[(df[i]<lower) | (df[i]>upper)].index
    outeres12.update(outliers)
```

```
  return df.drop(index=outeres12)
df5_clean=remove_outliers(df5)
```

In [ ]:
```
df5_clean['Date']=pd.to_datetime(df5_clean['Date'])
```

In [ ]:
```
df5_clean['RainTomorrow']=df5_clean['RainTomorrow'].str.replace('No','0')
df5_clean['RainTomorrow']=df5_clean['RainTomorrow'].str.replace('Yes','1')
```

In [ ]:
```
df5_clean['RainToday']=df5_clean['RainToday'].str.replace('No','0')
df5_clean['RainToday']=df5_clean['RainToday'].str.replace('Yes','1')
```

In [ ]:
```
df5_clean['RainToday']=df5_clean['RainToday'].astype(int)
df5_clean['RainTomorrow']=df5_clean['RainTomorrow'].astype(int)
```

In [ ]:
```
from sklearn.preprocessing import LabelEncoder
```

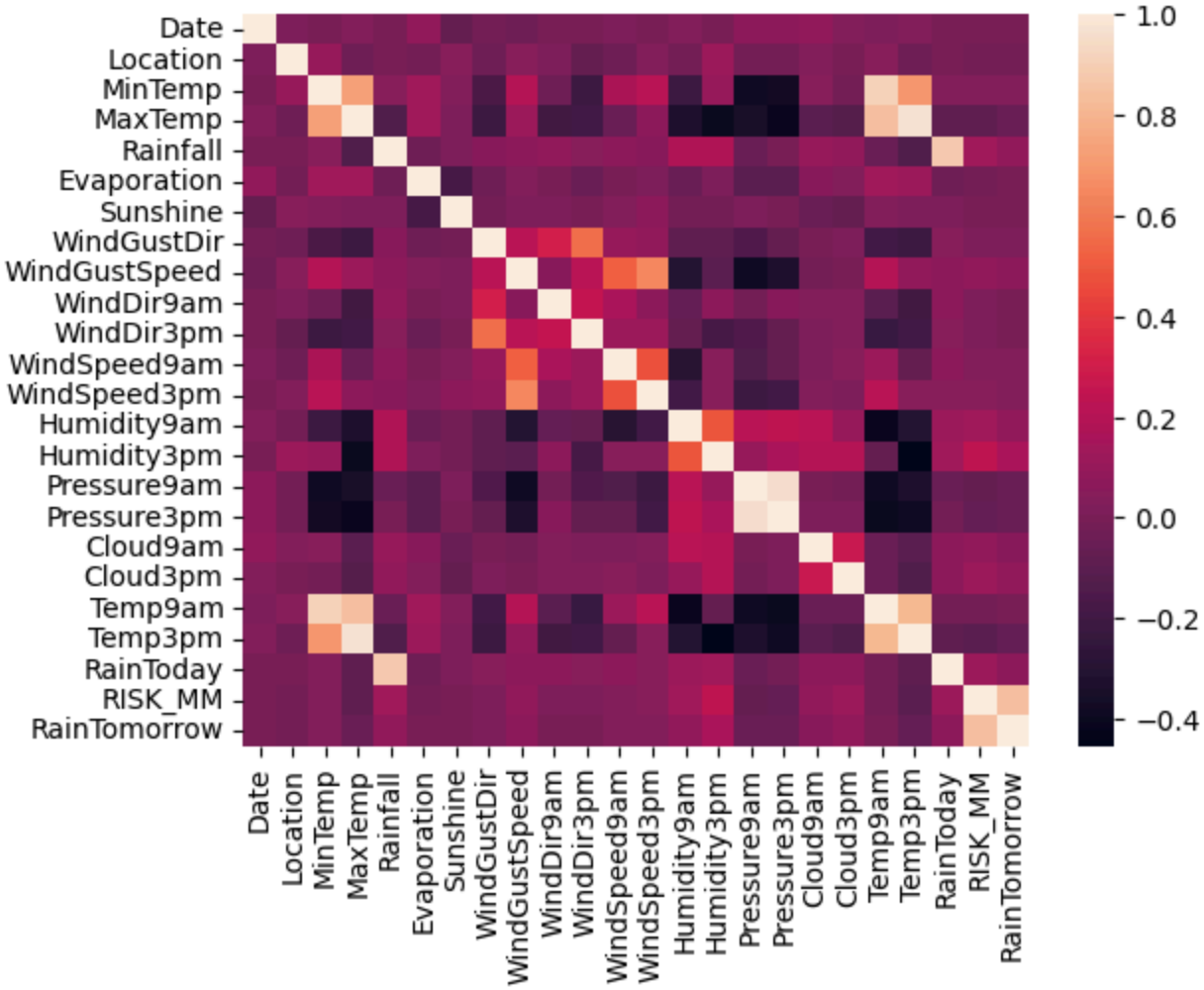
In [ ]:
```
le=LabelEncoder()
for i in df5.columns:
  df5_clean[i]=le.fit_transform(df5_clean[i])
```

In [ ]:
```
df5_clean['RainTomorrow'].unique()
```

Out[ ]:
```
array([0, 1])
```

In [ ]:
```
sns.heatmap(df5_clean.corr())
```

Out[ ]:
```
<Axes: >
```


Date
Location
MinTemp
MaxTemp
Rainfall
Evaporation
Sunshine
WindGustDir
WindGustSpeed
WindDir9am
WindDir3pm
WindSpeed9am
WindSpeed3pm
Humidity9am
Humidity3pm
Pressure9am
Pressure3pm
Cloud9am
Cloud3pm
Temp9am
Temp3pm
RainToday
RISK_MM
RainTomorrow
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4

In [ ]:
```
df5_clean
```

Out[ ]:

	Date	Location	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshine	W
0	101	1	200	197	6	31	10	
1	102	1	139	219	0	31	10	
2	103	1	195	225	0	31	10	
3	104	1	157	248	0	31	10	
4	105	1	241	291	9	31	10	
...	...	...	...	...	...	...	...	
94725	841	0	232	292	0	47	23	
94736	851	0	260	285	0	31	5	
94737	852	0	222	181	0	31	16	
94743	858	0	248	254	0	31	16	
94767	882	0	250	293	0	45	12	

33405 rows × 24 columns

In [ ]:
```
df5_clean['RainTomorrow'].unique()
```

Out[ ]:
```
array([0, 1])
```

In [ ]:
```
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report,accuracy_score
```

RAINTODAY

In [ ]:
```
x51=df5_clean.drop(['RainToday'],axis=1)
y51=df5_clean['RainToday']
```

In [ ]:
```
x51_train,x51_test,y51_train,y51_test=train_test_split(x51,y51,test_size=0.2,r
```

In [ ]:
```
model5.fit(x51_train,y51_train)
```

```
/usr/local/lib/python3.12/dist-packages/sklearn/linear_model/_logistic.py:465:
ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. OF ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regressi
on
  n_iter_i = _check_optimize_result(
```

Out[ ]:
```
▾ LogisticRegression
LogisticRegression()
```

In [ ]:
```
y51_pred=model5.predict(x51_test)
```

In [ ]:
```
y51_train_pred=model5.predict(x51_train)
```

In [ ]:
```
accuracy_score(y51_train,y51_train_pred)
```

Out[ ]:
```
0.9971935339021104
```

In [ ]:
```
accuracy_score(y51_test,y51_pred)
```

Out[ ]:
```
0.9970064361622512
```

In [ ]:
```
c51=classification_report(y51_test,y51_pred)
print(c51)
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00      6303
           1       0.98      0.97      0.97       378

    accuracy                           1.00      6681
   macro avg       0.99      0.98      0.99      6681
weighted avg       1.00      1.00      1.00      6681
```

RAINTOMORROW

In [ ]:
```
X5 = df5_clean.drop(['RainTomorrow'], axis=1)
```

In [ ]:
```
y5=df5_clean[['RainTomorrow']]
```

In [ ]:
```
x5_train,x5_test,y5_train,y5_test=train_test_split(X5,y5,test_size=0.2,random_
```

In [ ]:
```
x5_test
```

Out[ ]:

	Date	Location	MinTemp	MaxTemp	Rainfall	Evaporation	Sunshine	W
59300	2691	4	144	184	0	31	10	
16626	2036	17	170	161	0	31	10	
51856	1289	16	119	125	2	31	10	
58025	1418	4	67	99	19	31	10	
16916	2331	17	263	220	0	31	10	
...	...	...	...	...	...	...	...	
1173	1283	1	192	231	0	31	10	
49099	1450	28	64	149	0	31	10	
58951	2341	4	136	132	0	31	10	
75565	2944	22	187	145	2	31	10	
19648	2144	19	226	221	2	31	10	

6681 rows × 23 columns

In [ ]:
```
model5=LogisticRegression()
model5.fit(x5_train,y5_train)
```

```
/usr/local/lib/python3.12/dist-packages/sklearn/utils/validation.py:1408: DataC
onversionWarning: A column-vector y was passed when a 1d array was expected. Pl
ease change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
/usr/local/lib/python3.12/dist-packages/sklearn/linear_model/_logistic.py:465:
ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. OF ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regressi
on
  n_iter_i = _check_optimize_result(
```

Out[ ]:

▾ LogisticRegression

LogisticRegression()

In [ ]:
```
y5_pred=model5.predict(x5_test)
```

In [ ]:
```
y5_train_pred=model5.predict(x5_train)
```

In [ ]:
```
accuracy_score(y5_train,y5_train_pred)
```

Out[ ]: 0.997043855710223

In [ ]:
```
accuracy_score(y5_test,y5_pred)
```

Out[ ]: 0.9961083670109265

In [ ]:
```
c5=classification_report(y5_test,y5_pred)
print(c5)
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00      6407
           1       0.95      0.96      0.95       274

    accuracy                           1.00      6681
   macro avg       0.97      0.98      0.98      6681
weighted avg       1.00      1.00      1.00      6681
```