Dengue Case Prediction using Machine Learning

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

import warnings
warnings.filterwarnings('ignore')

df = pd.read_csv('dengue_data.csv')

df.head()
```

```
   serial    tempmax    tempmin       temp  feelslikemax  feelslikemin
\
0       0  34.053151  24.478082  28.709863     39.757808     25.317808

1       1  34.086179  25.694309  29.464228     41.338211     28.140650

2       2  34.573984  25.417886  29.526829     40.464228     26.560163

3       3  33.020325  25.080488  28.727642     37.878049     26.193496

4       4  30.660976  24.230894  26.774797     36.586992     24.263415


   feelslike        dew   humidity     precip  ...
sealevelpressure  \
0  32.306301  22.971233  73.508219   2.921726  ...       1007.911781

1  34.423577  23.484553  72.066667   3.783415  ...       1003.533333
```

```
2  33.085366  22.580488  69.424390   3.065854  ...       1005.731707

3  31.772358  21.752033  69.297561   6.025203  ...       1003.359350

4  28.943902  24.214634  86.652033  23.336585  ...       1009.995935


   cloudcover  visibility  solarradiation  solarenergy   uvindex
conditions  \
0   50.747945    3.789863      208.097808    17.973699  7.232877
2.558904
1   48.313821    2.884553      222.926016    19.246341  7.504065
1.658537
2   55.621138    4.242276      229.413008    19.802439  7.829268
1.910569
3   50.208130    2.991057      225.421951    19.480488  7.593496
1.300813
4   45.542276    3.886992      176.598374    15.261789  6.186992
0.967480

   stations  cases  labels
0  1.197260   4925  normal
1  0.991870   5077  normal
2  1.170732   7579  normal
3  0.146341  13706  normal
4  3.951220     82  normal

[5 rows x 26 columns]

df.tail()

     serial  tempmax  tempmin  temp  feelslikemax  feelslikemin
feelslike  \
597     597     32.3     24.4  28.5          35.9          24.4
31.2
598     598     32.7     26.4  29.3          36.3          26.4
32.5
599     599     33.0     26.3  29.8          40.5          26.3
34.5
600     600     35.1     26.8  30.6          42.9          29.1
35.1
601     601     34.0     26.3  30.2          38.1          26.3
33.1

      dew  humidity  precip  ...  sealevelpressure  cloudcover
visibility  \
597  23.3      75.0     0.0  ...            1008.9        50.4
3.1
598  22.6      68.5     0.0  ...            1010.4        50.5
```

```
3.1
599  23.9      71.1     0.0  ...             1010.8         30.5
3.1
600  23.3      65.9     0.0  ...             1009.7         32.7
3.3
601  21.5      60.4     0.0  ...             1008.7         46.5
3.9

     solarradiation  solarenergy  uvindex  conditions  stations  cases
labels
597           252.5         21.9      9.0         1.0       1.0   6729
normal
598           242.7         20.9      8.0         1.0       1.0  10541
normal
599           195.3         16.9      8.0         1.0       1.0   6396
normal
600           187.6         16.0      7.0         1.0       1.0  10883
normal
601           136.2         11.7      5.0         1.0       1.0   7311
normal

[5 rows x 26 columns]
```

```
df.shape
```

```
(602, 26)
```

```
df.columns
```

```
Index(['serial', 'tempmax', 'tempmin', 'temp', 'feelslikemax',
'feelslikemin',
       'feelslike', 'dew', 'humidity', 'precip', 'precipprob',
'precipcover',
       'snow', 'snowdepth', 'windspeed', 'winddir',
'sealevelpressure',
       'cloudcover', 'visibility', 'solarradiation', 'solarenergy',
'uvindex',
       'conditions', 'stations', 'cases', 'labels'],
      dtype='object')
```

```
df = df.drop('serial', axis = 1)
```

```
df.duplicated().sum()
```

```
0
```

```
df.isnull().sum()
```

```
tempmax             0
tempmin             0
temp                0
```

```
feelslikemax         0
feelslikemin         0
feelslike            0
dew                  0
humidity             0
precip               0
precipprob           0
precipcover          0
snow                 0
snowdepth            0
windspeed            0
winddir              0
sealevelpressure     0
cloudcover           0
visibility           0
solarradiation       0
solarenergy          0
uvindex              0
conditions           0
stations             0
cases                0
labels               0
dtype: int64
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 602 entries, 0 to 601
Data columns (total 25 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   tempmax           602 non-null    float64
 1   tempmin           602 non-null    float64
 2   temp              602 non-null    float64
 3   feelslikemax      602 non-null    float64
 4   feelslikemin      602 non-null    float64
 5   feelslike         602 non-null    float64
 6   dew               602 non-null    float64
 7   humidity          602 non-null    float64
 8   precip            602 non-null    float64
 9   precipprob        602 non-null    float64
 10  precipcover       602 non-null    float64
 11  snow              602 non-null    int64  
 12  snowdepth         602 non-null    int64  
 13  windspeed         602 non-null    float64
 14  winddir           602 non-null    float64
 15  sealevelpressure  602 non-null    float64
 16  cloudcover        602 non-null    float64
 17  visibility        602 non-null    float64
 18  solarradiation    602 non-null    float64
```

```
 19  solarenergy       602 non-null    float64
 20  uvindex           602 non-null    float64
 21  conditions        602 non-null    float64
 22  stations          602 non-null    float64
 23  cases             602 non-null    int64
 24  labels            602 non-null    object
dtypes: float64(21), int64(3), object(1)
memory usage: 117.7+ KB

df.describe()

          tempmax     tempmin        temp  feelslikemax  feelslikemin
\
count  602.000000  602.000000  602.000000    602.000000    602.000000

mean    31.918079   24.588318   27.813181     38.476069     25.613154

std      2.737215    2.727919    2.412416      4.776400      4.178797

min     25.000000   12.740000   18.820000     25.000000     12.360000

25%     30.025000   23.200000   26.500000     35.600000     23.200000

50%     31.700000   25.000000   27.900000     38.400000     25.000000

75%     33.600000   26.500000   29.448171     41.900000     26.600000

max     41.200000   29.400000   33.300000     49.600000     37.900000


        feelslike         dew    humidity      precip  precipprob  ...
\
count  602.000000  602.000000  602.000000  602.000000  602.000000  ...

mean    31.485111   23.984349   81.254786   13.120862   69.625588  ...

std      4.672951    2.668014    9.406354   28.463365   45.539264  ...

min     18.626667    4.480000   40.833333    0.000000    0.000000  ...

25%     28.100000   23.300000   75.800000    0.000000    0.000000  ...

50%     31.500000   24.529268   82.800000    3.000000  100.000000  ...

75%     34.875000   25.475000   88.175000   12.589000  100.000000  ...

max     42.900000   28.100000   99.300000  302.000000  100.000000  ...


          winddir  sealevelpressure  cloudcover  visibility
solarradiation  \
```

```
count  602.000000        602.000000  602.000000  602.000000
602.000000
mean   191.498693       1004.690531   59.701192    3.632620
199.802695
std     81.604668         41.364967   20.832639    1.890352
54.128192
min      0.500000          0.000000    0.000000    0.800000
57.900000
25%    134.425000       1002.025000   47.400000    2.523780
160.350000
50%    207.300000       1007.000000   63.700000    3.200000
205.750000
75%    252.375000       1010.185772   73.200000    4.300000
238.800610
max    359.200000       1020.000000   97.900000   24.033333
318.500000

       solarenergy     uvindex  conditions    stations         cases
count   602.000000  602.000000  602.000000  602.000000    602.000000
mean     17.251785    6.877674    1.827725    0.859734   8502.342193
std       4.676051    1.763928    1.237389    0.973575   6780.749627
min       5.000000    2.000000    0.000000    0.000000     52.000000
25%      13.900000    6.000000    1.000000    0.000000   3017.750000
50%      17.750000    7.000000    2.000000    1.000000   7490.000000
75%      20.600610    8.000000    3.000000    1.000000  12702.500000
max      27.700000   10.000000    4.000000    5.000000  24983.000000

[8 rows x 24 columns]
```

```
df.nunique()
```

```
tempmax             118
tempmin             126
temp                125
feelslikemax        192
feelslikemin        157
feelslike           202
dew                 123
humidity            295
precip              207
precipprob           17
precipcover          35
snow                  1
snowdepth             1
windspeed           165
winddir             539
sealevelpressure    221
cloudcover          408
visibility           77
solarradiation      523
```

```
solarenergy          196
uvindex               24
conditions            20
stations              17
cases                578
labels                 1
dtype: int64
```

```
object_columns = df.select_dtypes(include=['object']).columns
print("Object type columns:")
print(object_columns)

numerical_columns = df.select_dtypes(include=['int64',
'float64']).columns
print("\nNumerical type columns:")
print(numerical_columns)
```

```
Object type columns:
Index(['labels'], dtype='object')

Numerical type columns:
Index(['tempmax', 'tempmin', 'temp', 'feelslikemax', 'feelslikemin',
       'feelslike', 'dew', 'humidity', 'precip', 'precipprob',
'precipcover',
       'snow', 'snowdepth', 'windspeed', 'winddir',
'sealevelpressure',
       'cloudcover', 'visibility', 'solarradiation', 'solarenergy',
'uvindex',
       'conditions', 'stations', 'cases'],
      dtype='object')
```

```
def classify_features(df):
    categorical_features = []
    non_categorical_features = []
    discrete_features = []
    continuous_features = []

    for column in df.columns:
        if df[column].dtype == 'object':
            if df[column].nunique() < 20:
                categorical_features.append(column)
            else:
                non_categorical_features.append(column)
        elif df[column].dtype in ['int64', 'float64']:
            if df[column].nunique() < 10:
                discrete_features.append(column)
            else:
                continuous_features.append(column)
```

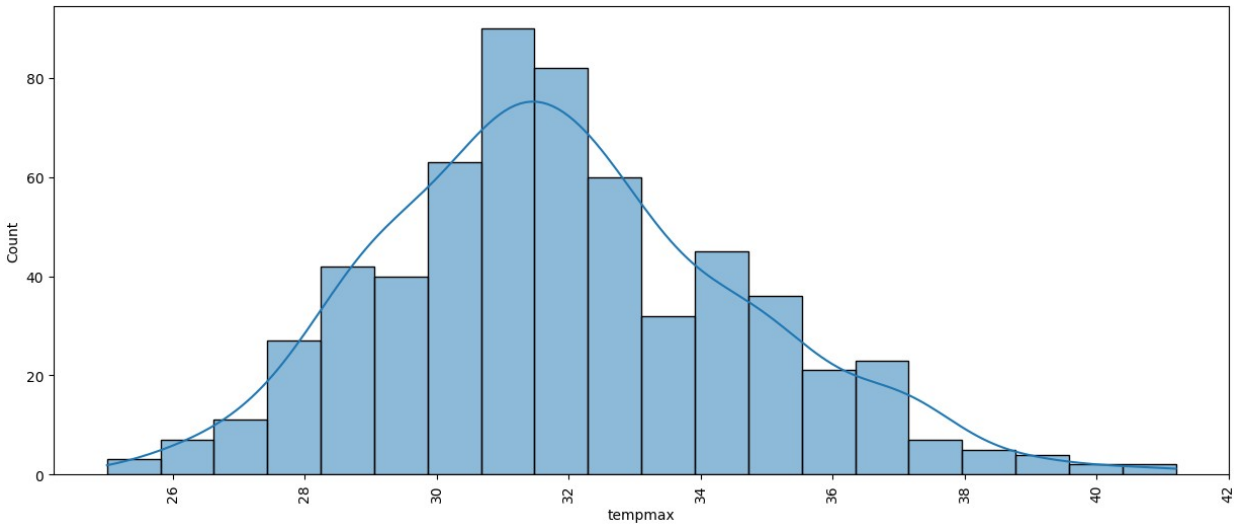
```
    return categorical_features, non_categorical_features,
discrete_features, continuous_features

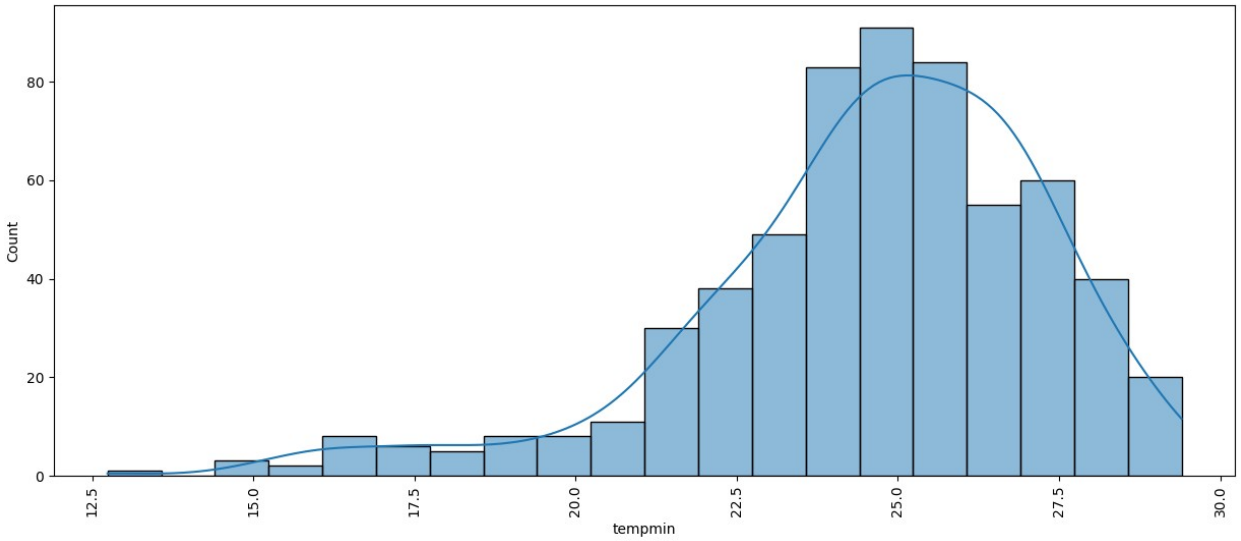
categorical, non_categorical, discrete, continuous =
classify_features(df)

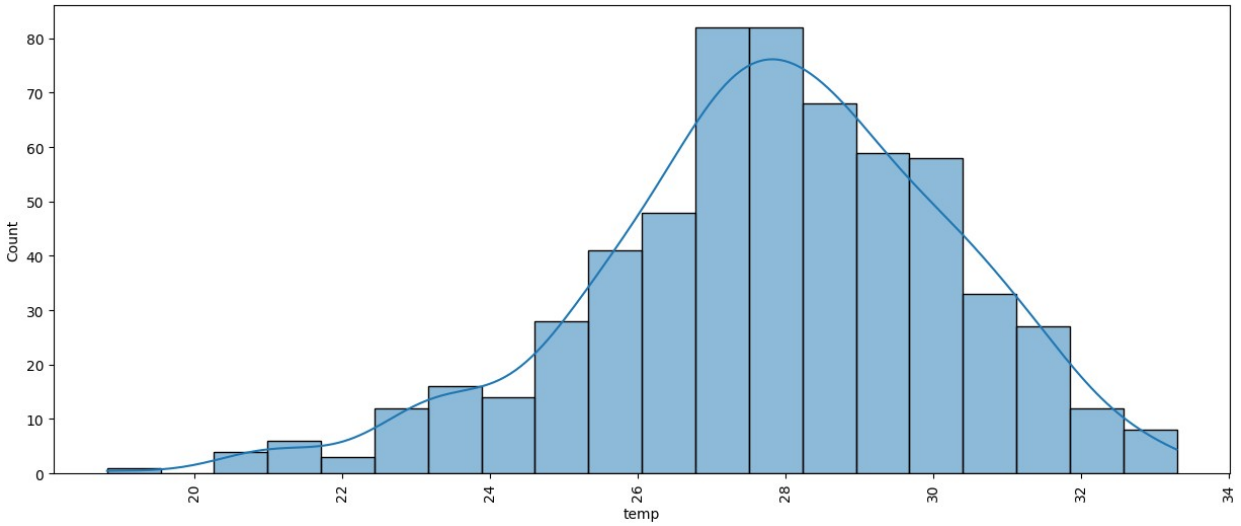
print("Categorical Features:", categorical)
print("Non-Categorical Features:", non_categorical)
print("Discrete Features:", discrete)
print("Continuous Features:", continuous)
```

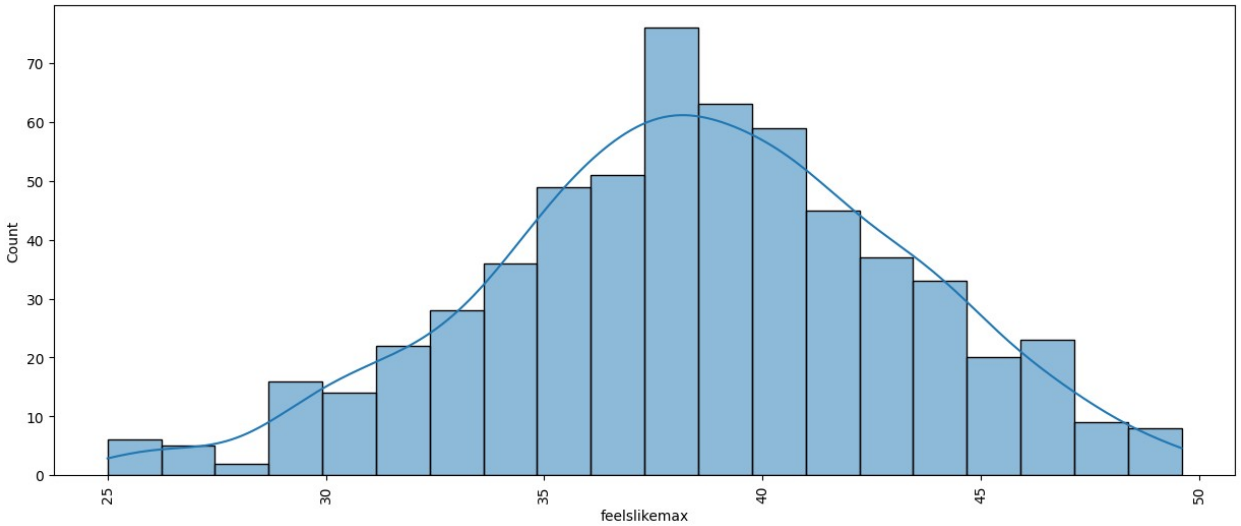
```
Categorical Features: ['labels']
Non-Categorical Features: []
Discrete Features: ['snow', 'snowdepth']
Continuous Features: ['tempmax', 'tempmin', 'temp', 'feelslikemax',
'feelslikemin', 'feelslike', 'dew', 'humidity', 'precip',
'precipprob', 'precipcover', 'windspeed', 'winddir',
'sealevelpressure', 'cloudcover', 'visibility', 'solarradiation',
'solarenergy', 'uvindex', 'conditions', 'stations', 'cases']
```

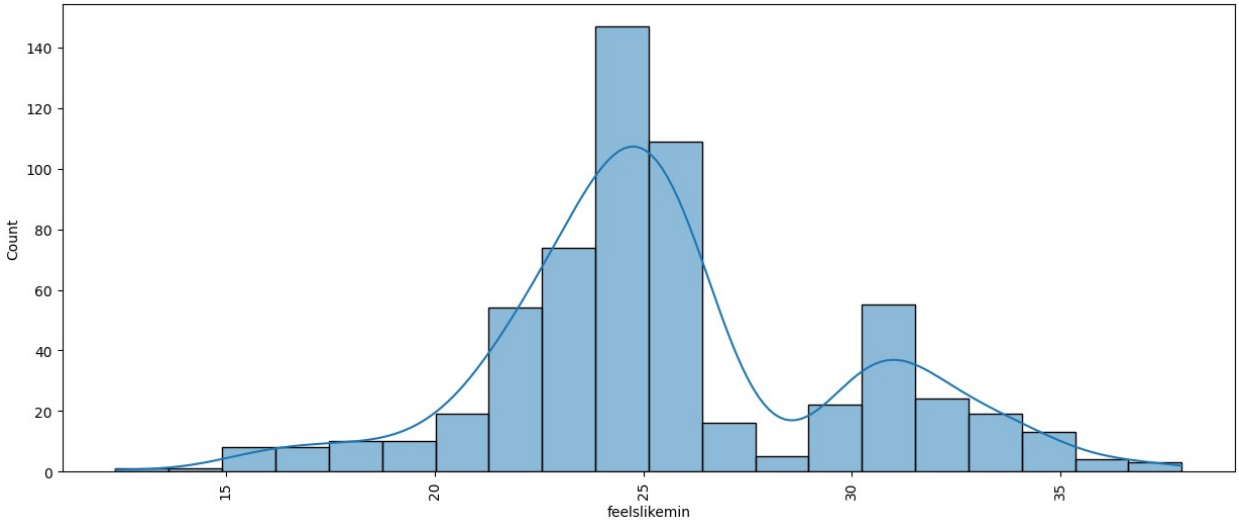
```
for i in continuous:
    plt.figure(figsize=(15,6))
    sns.histplot(df[i], bins = 20, kde = True, palette='hls')
    plt.xticks(rotation = 90)
    plt.show()
```

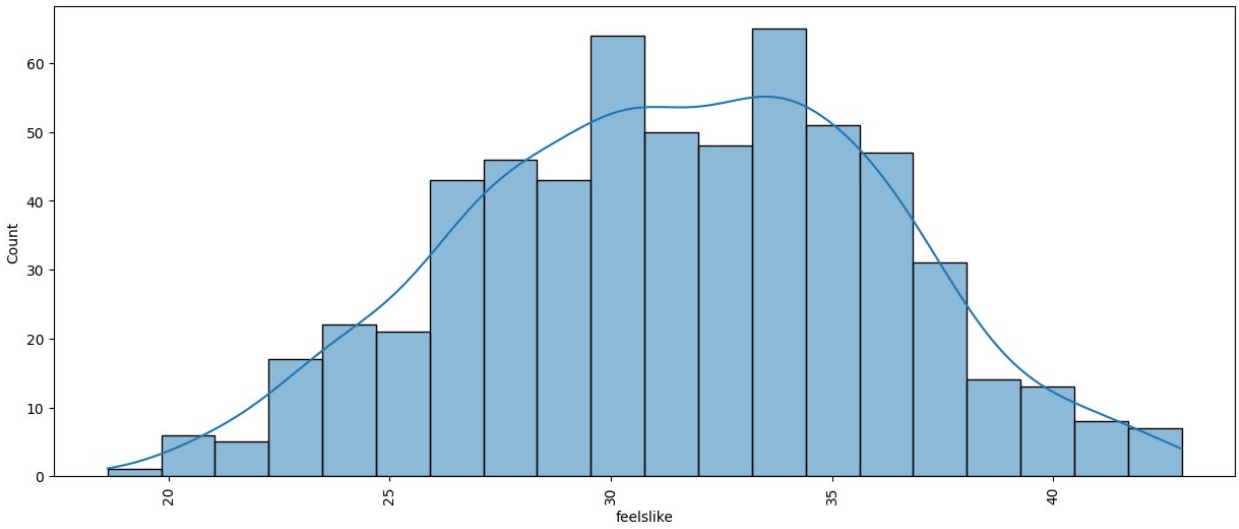


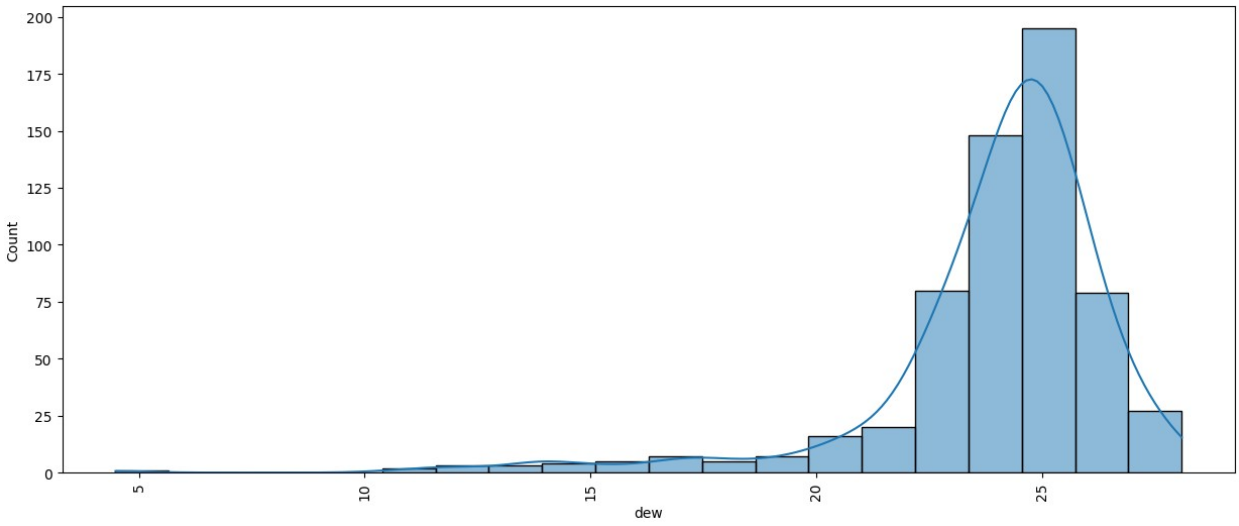

Count
tempmin
0
20
40
60
80
12.5
15.0
17.5
20.0
22.5
25.0
27.5
30.0

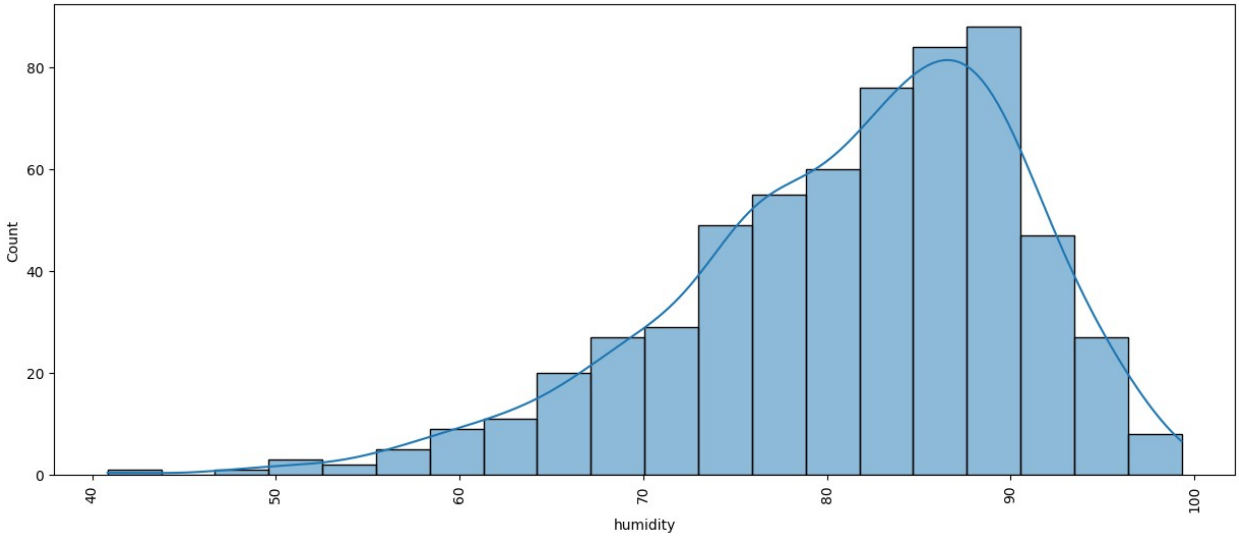

Count
temp
0
10
20
30
40
50
60
70
80
20
22
24
26
28
30
32
34

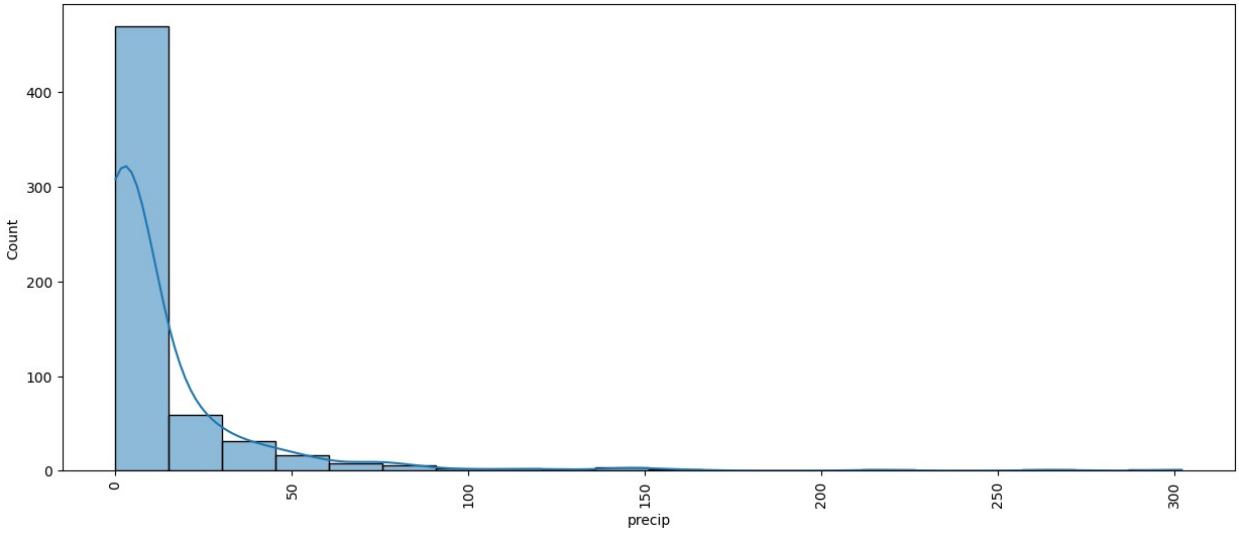

Count
feelslikemax
0
10
20
30
40
50
60
70
25
30
35
40
45
50

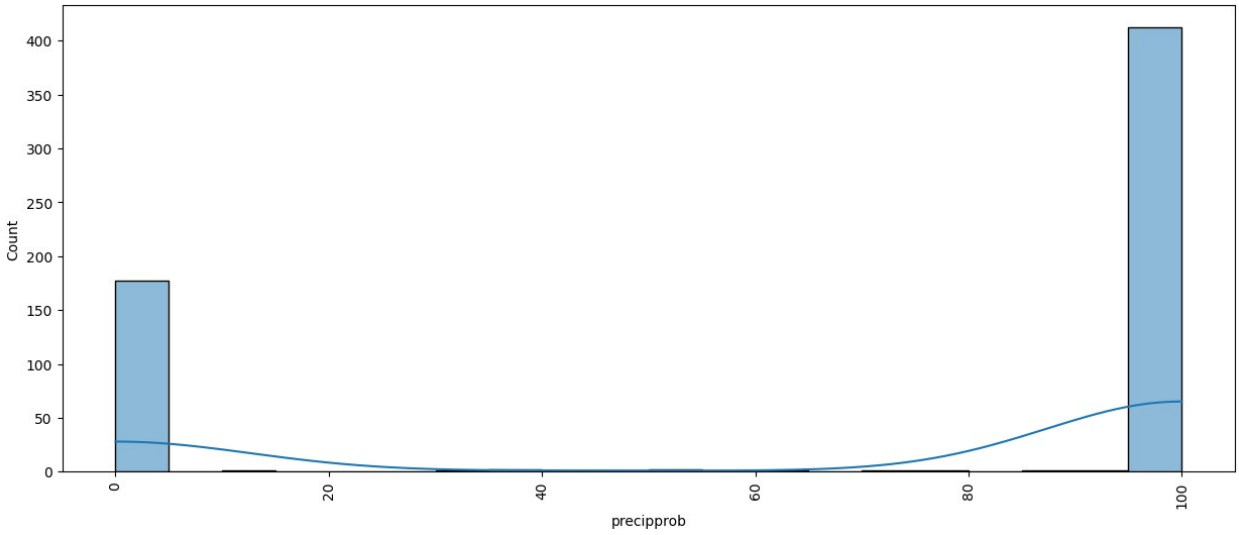

Count
feelslikemin

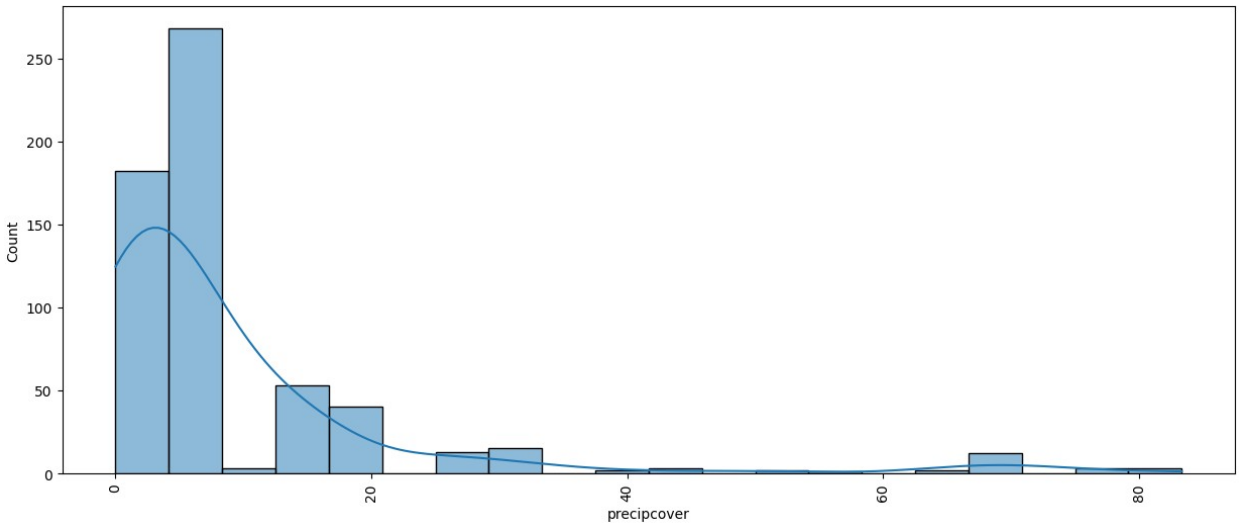

Count
feelslike

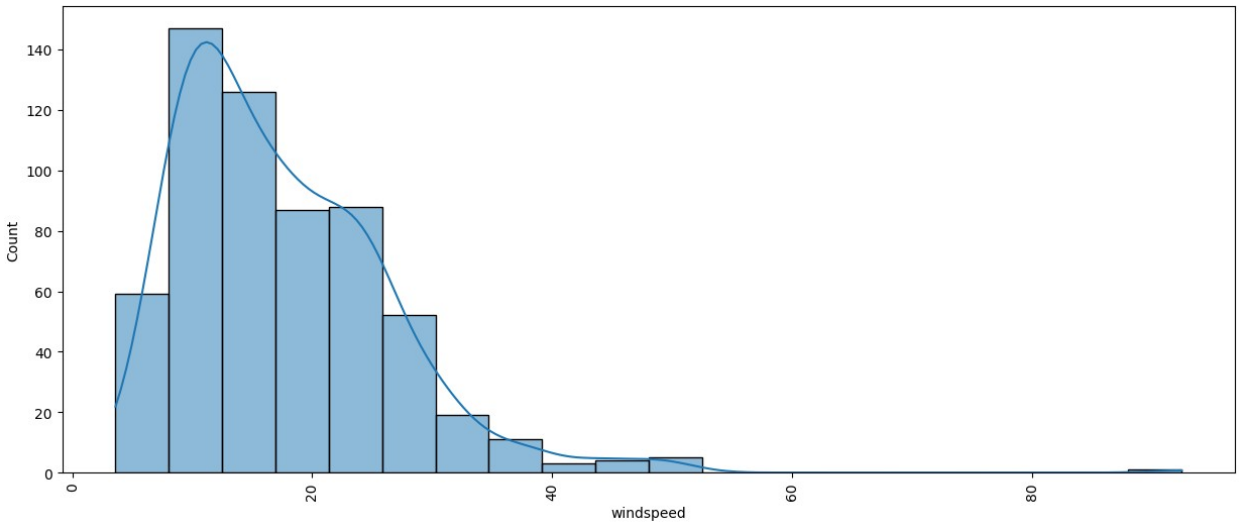

Count
dew

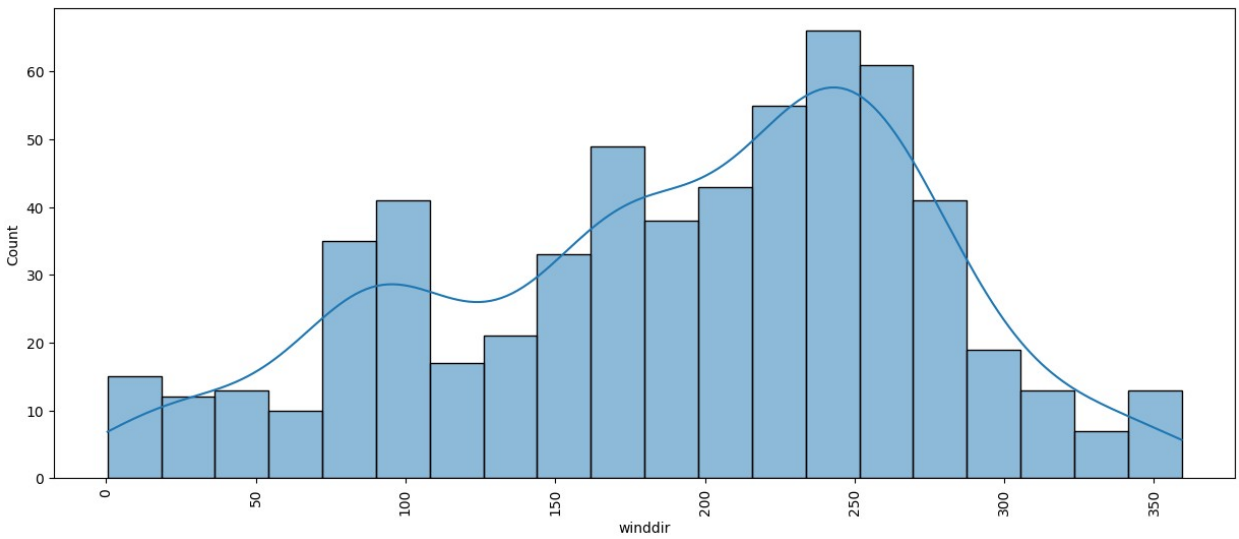

Count
humidity

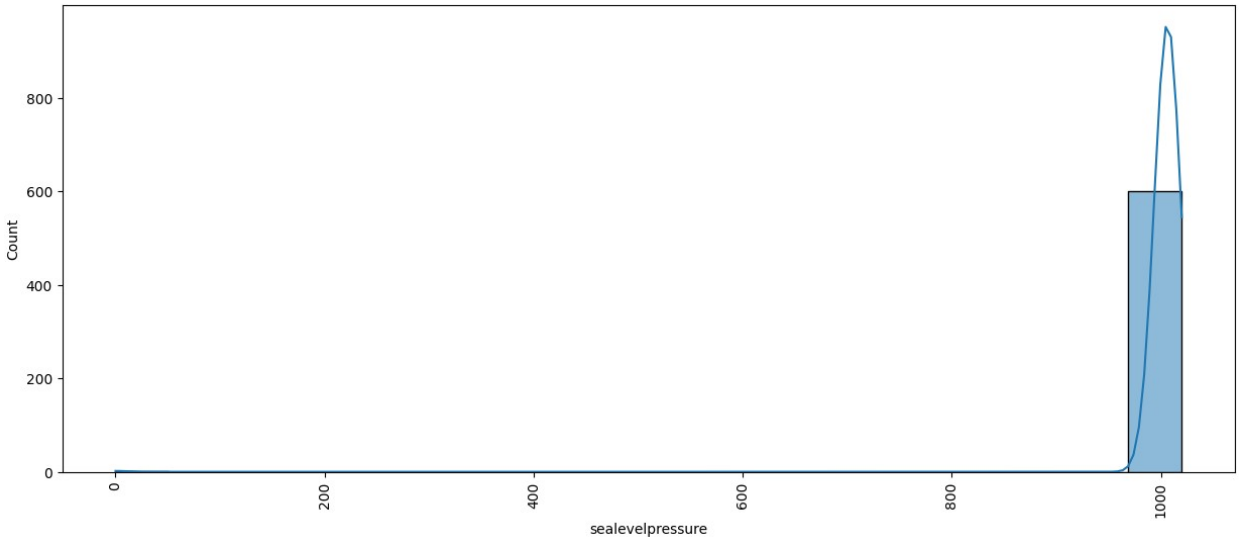

Count
precip

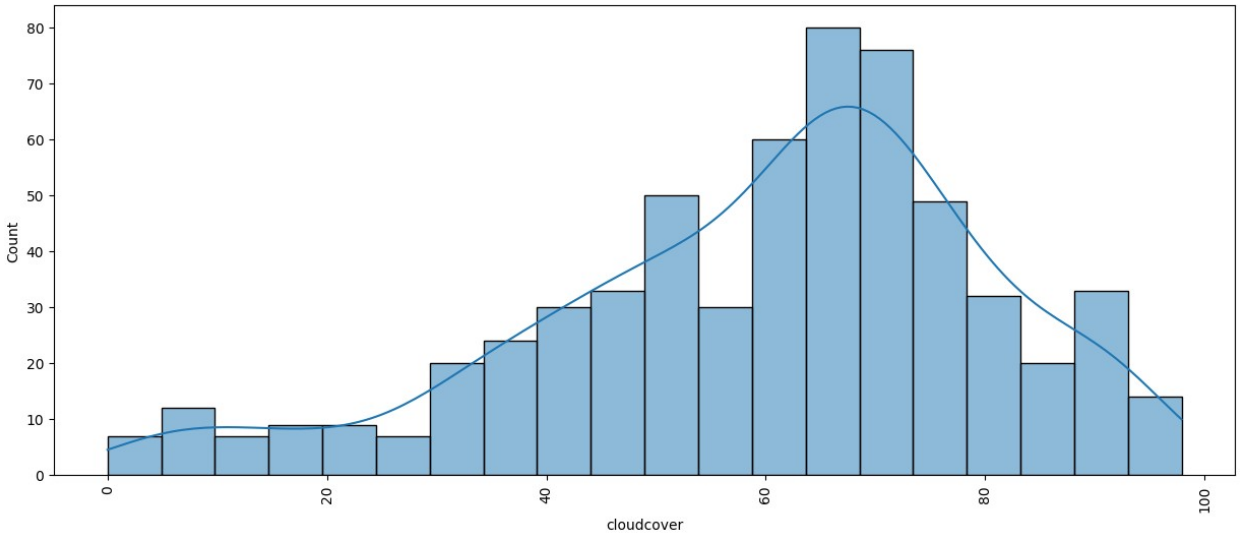

Count
precipprob

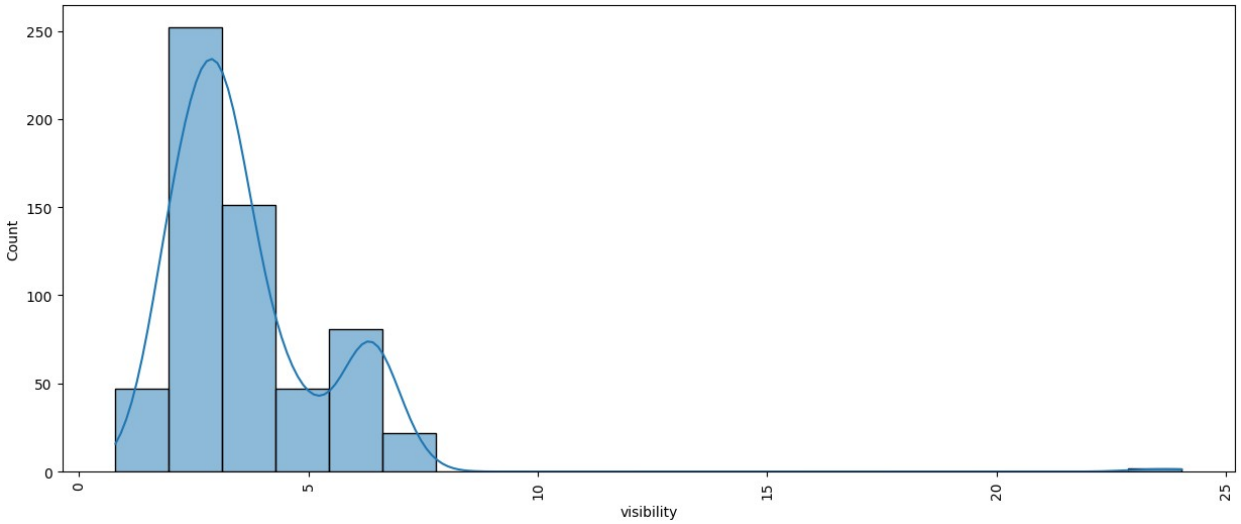

Count
precipcover

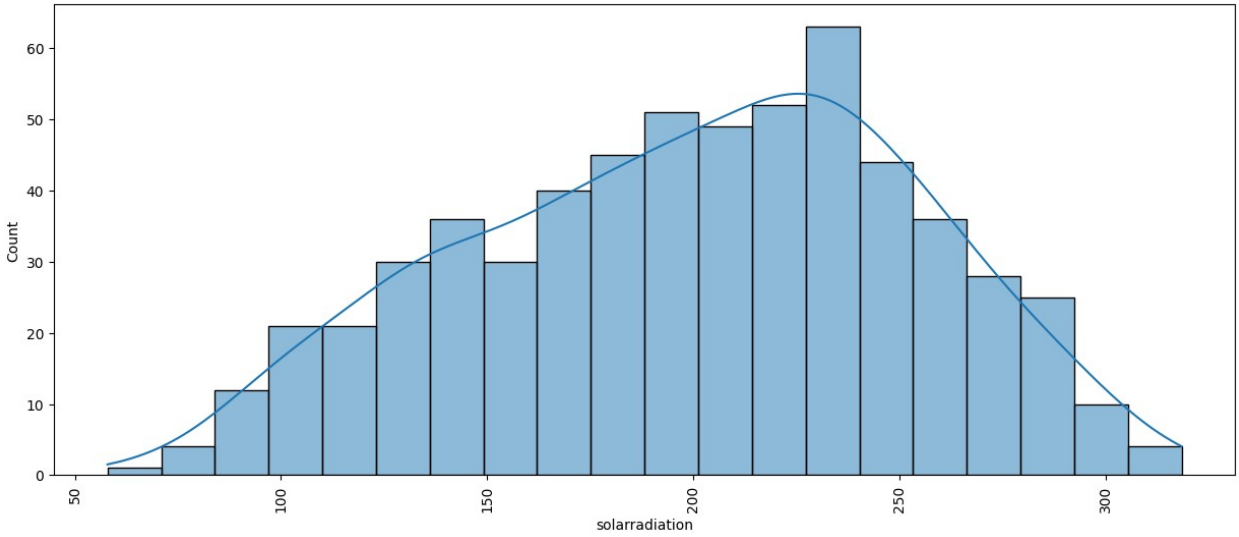

Count
windspeed

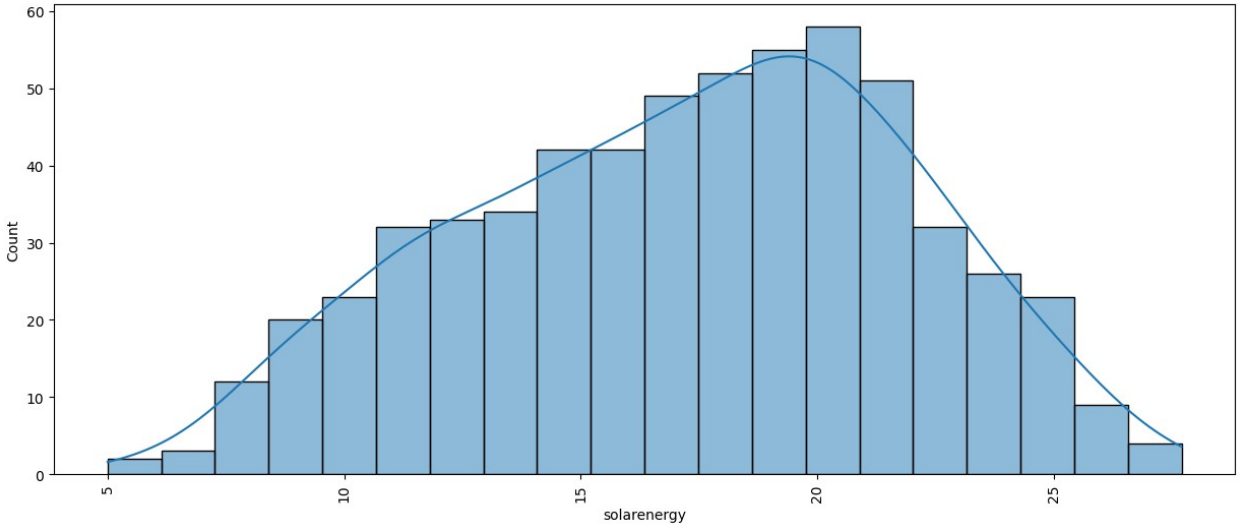

Count
winddir

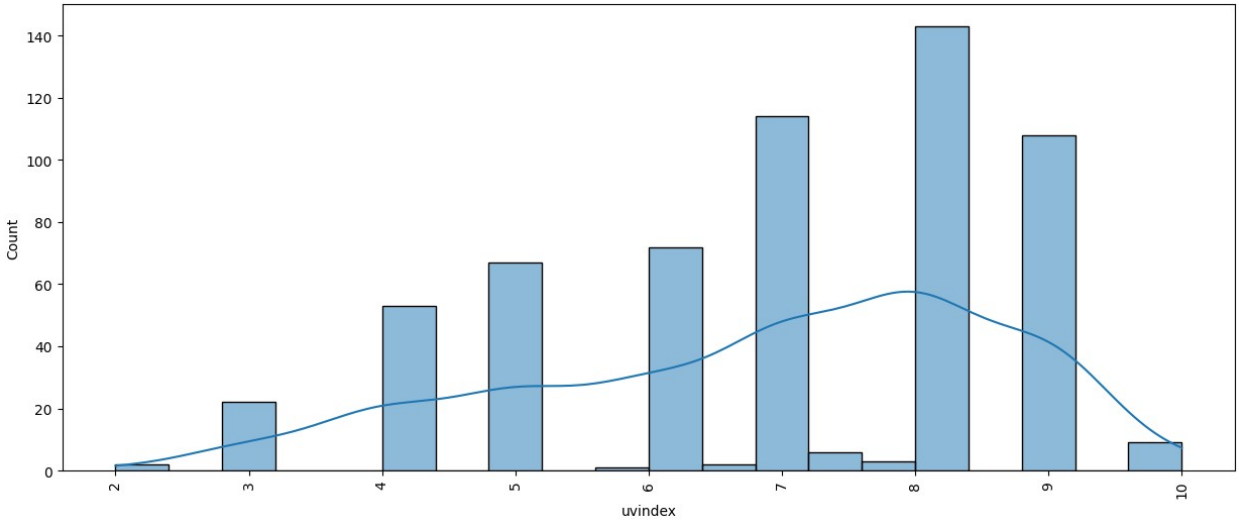

Count
0
200
400
600
800
0
200
400
600
800
1000
sealevelpressure

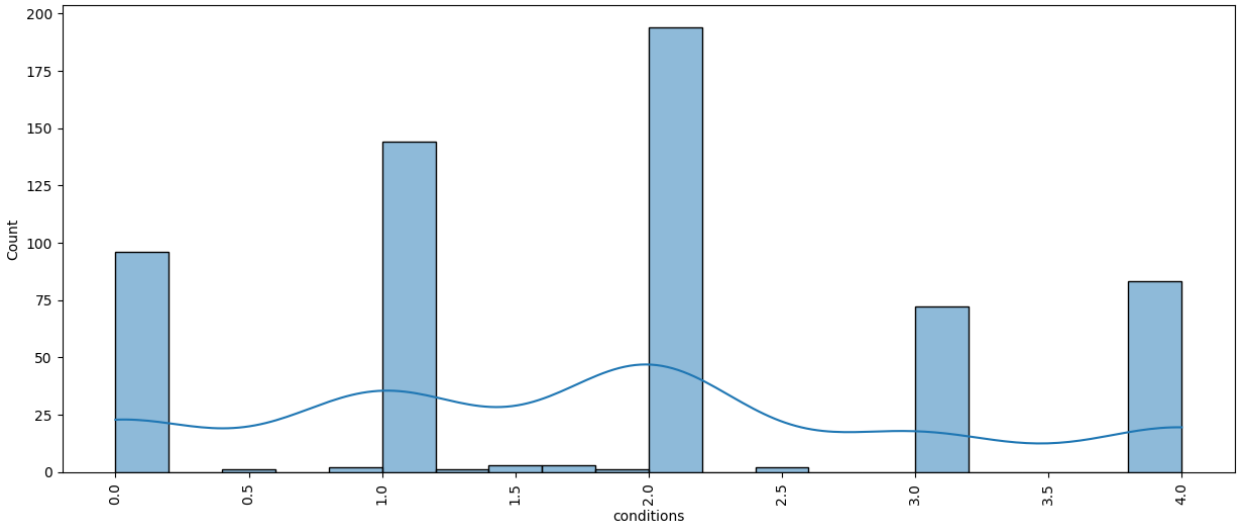

Count
0
10
20
30
40
50
60
70
80
0
20
40
60
80
100
cloudcover

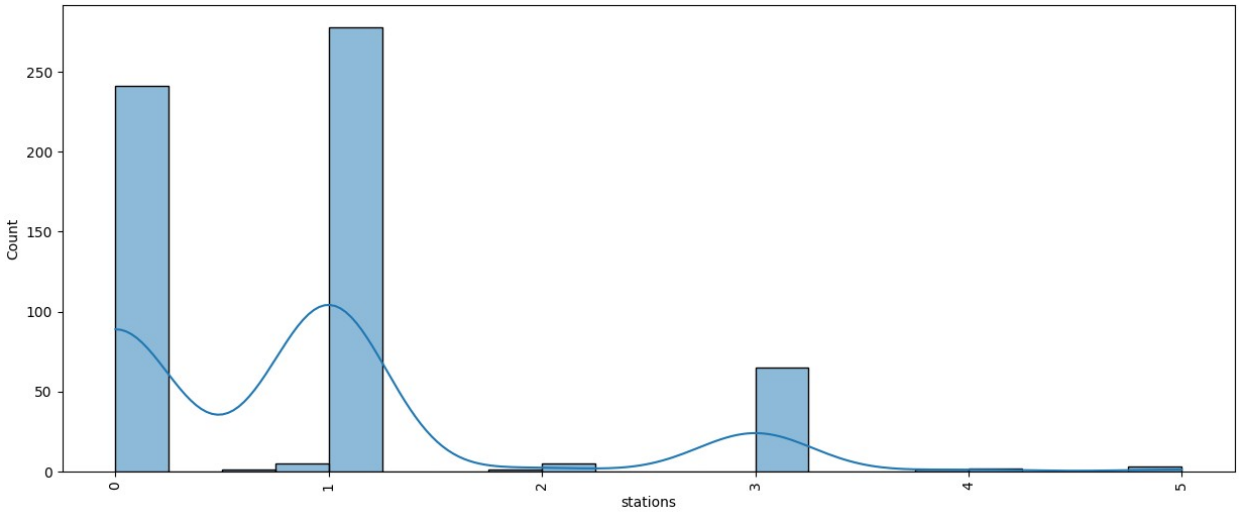

Count
0
50
100
150
200
250
0
5
10
15
20
25
visibility

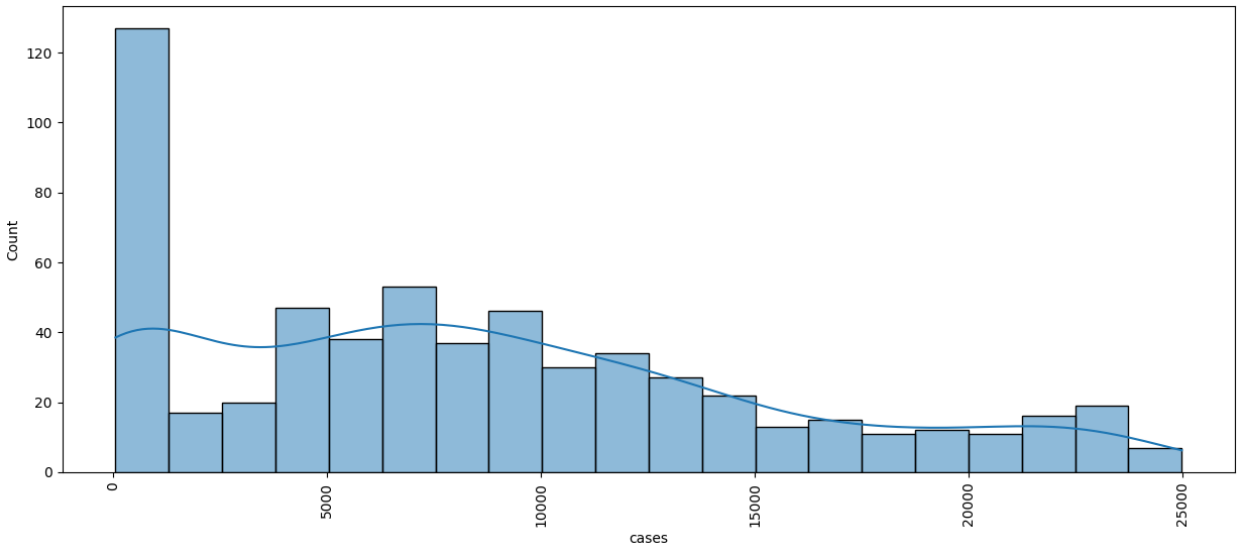

Count
0
10
20
30
40
50
60
50
100
150
200
250
300
solarradiation


Count
0
10
20
30
40
50
60
5
10
15
20
25
solarenergy

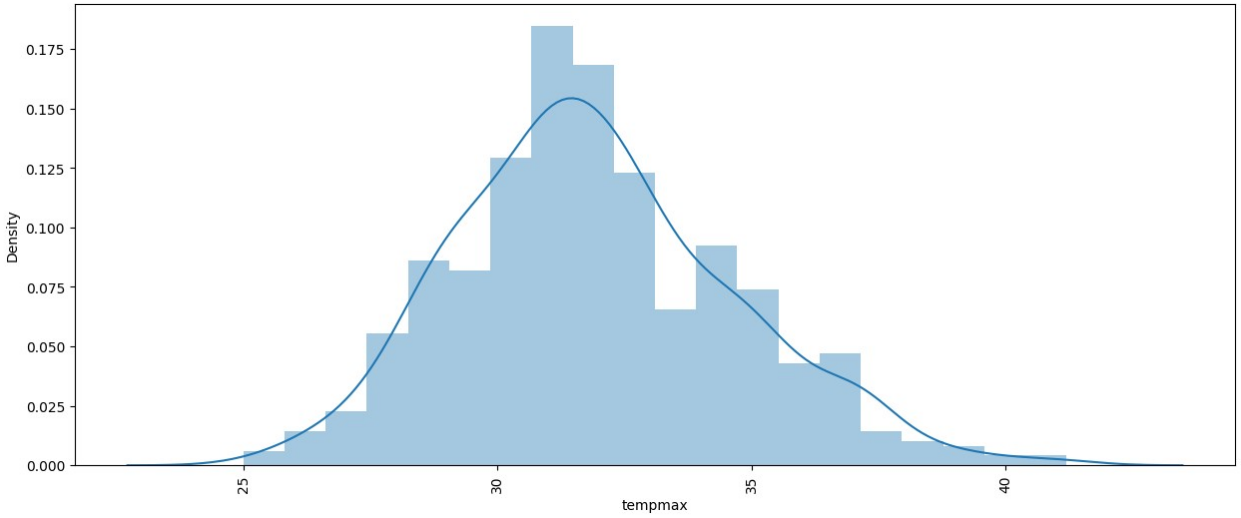

Count
0
20
40
60
80
100
120
140
2
3
4
5
6
7
8
9
10
uvindex

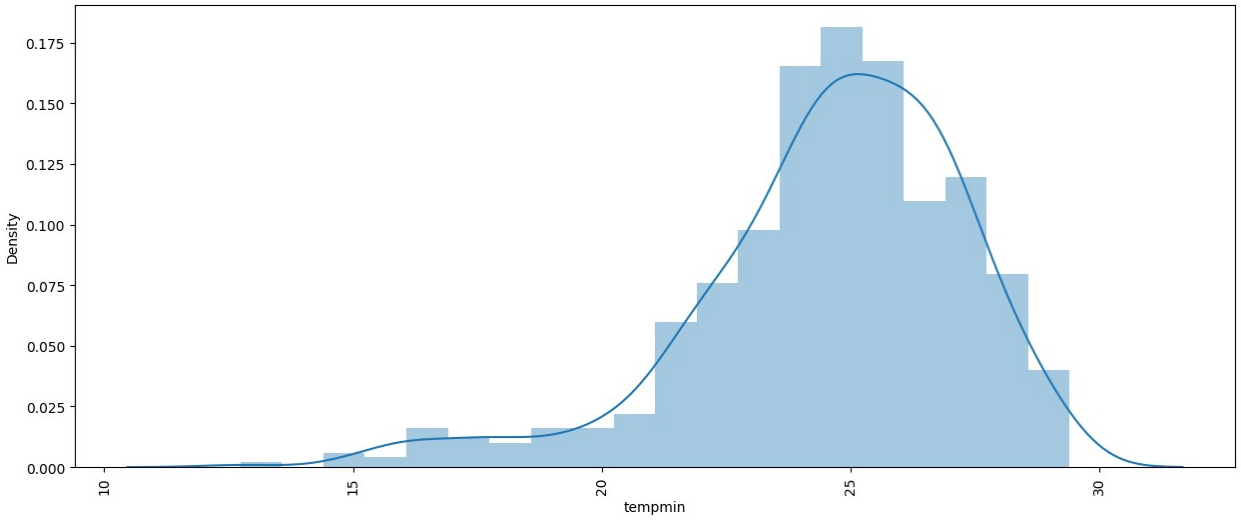

Count
conditions
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

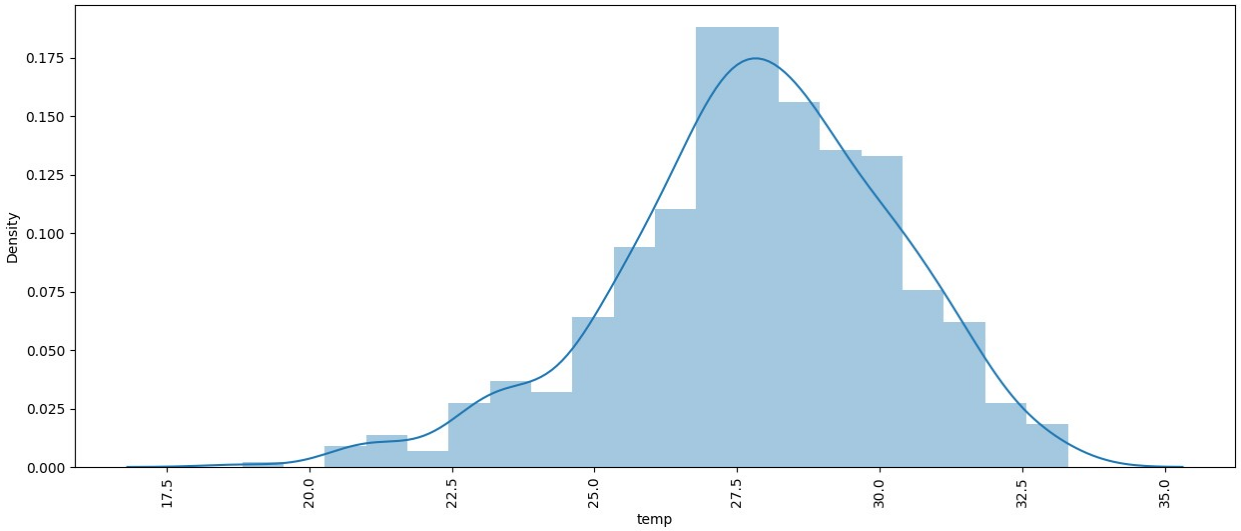

Count
stations
0
1
2
3
4
5


Count
cases
0
5000
10000
15000
20000
25000

```
for i in continuous:
    plt.figure(figsize=(15,6))
    sns.distplot(df[i], bins = 20, kde = True)
    plt.xticks(rotation = 90)
    plt.show()
```



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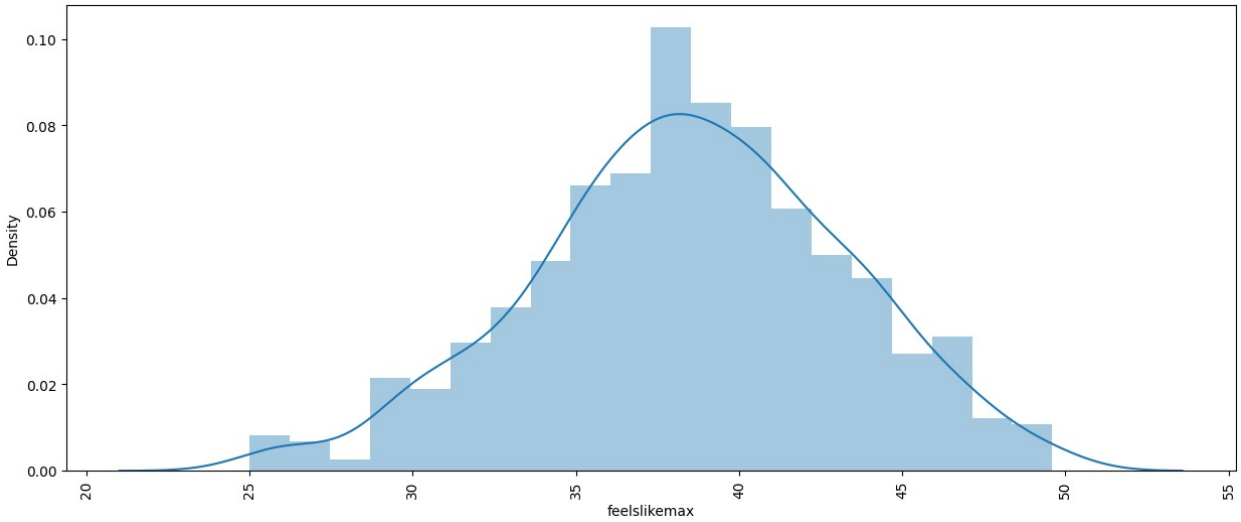
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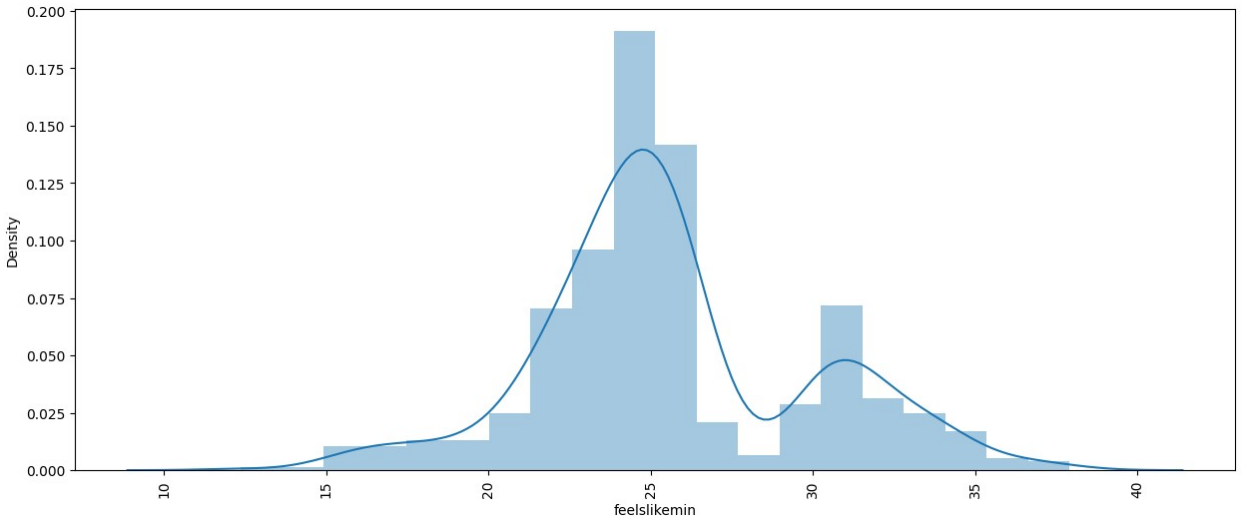
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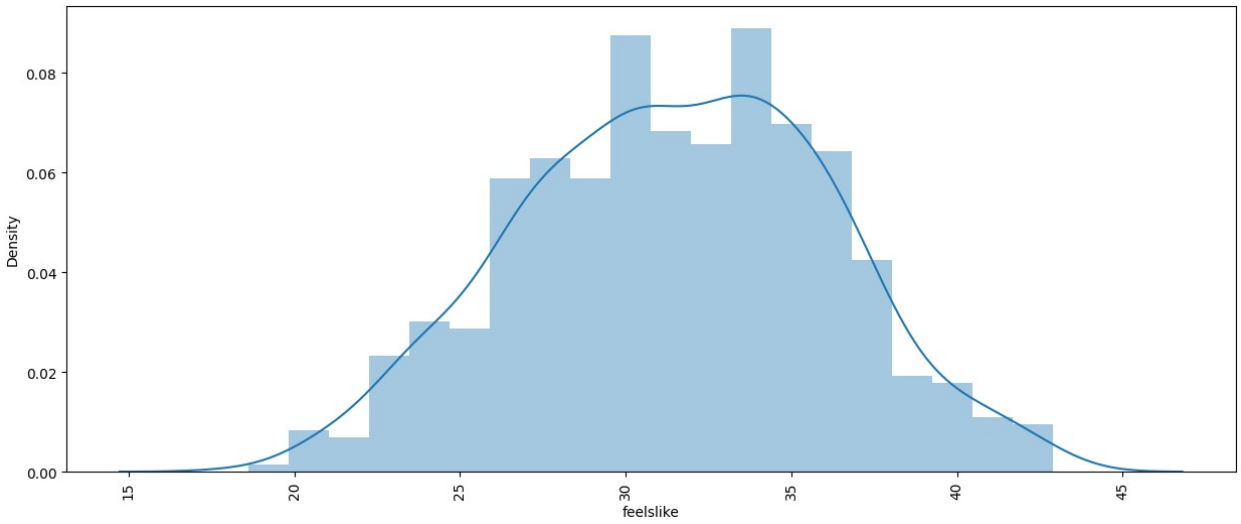
feelslikemin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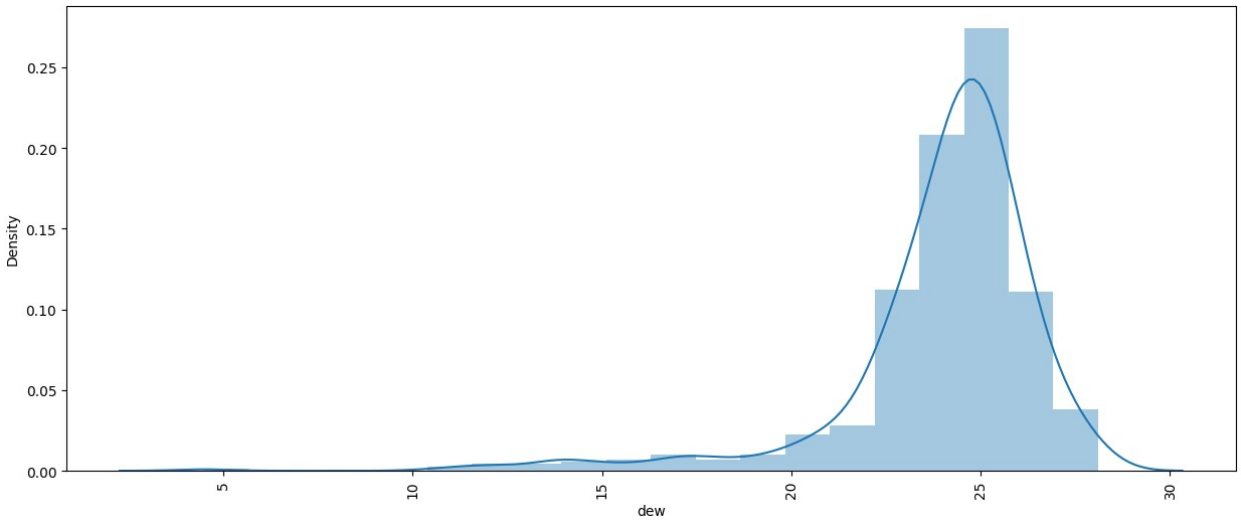
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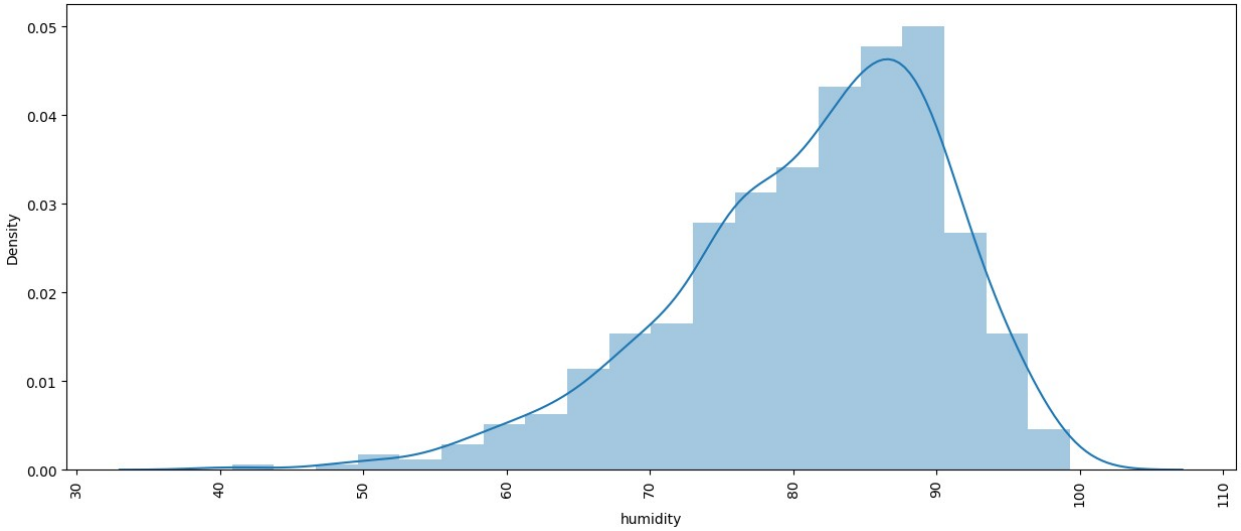
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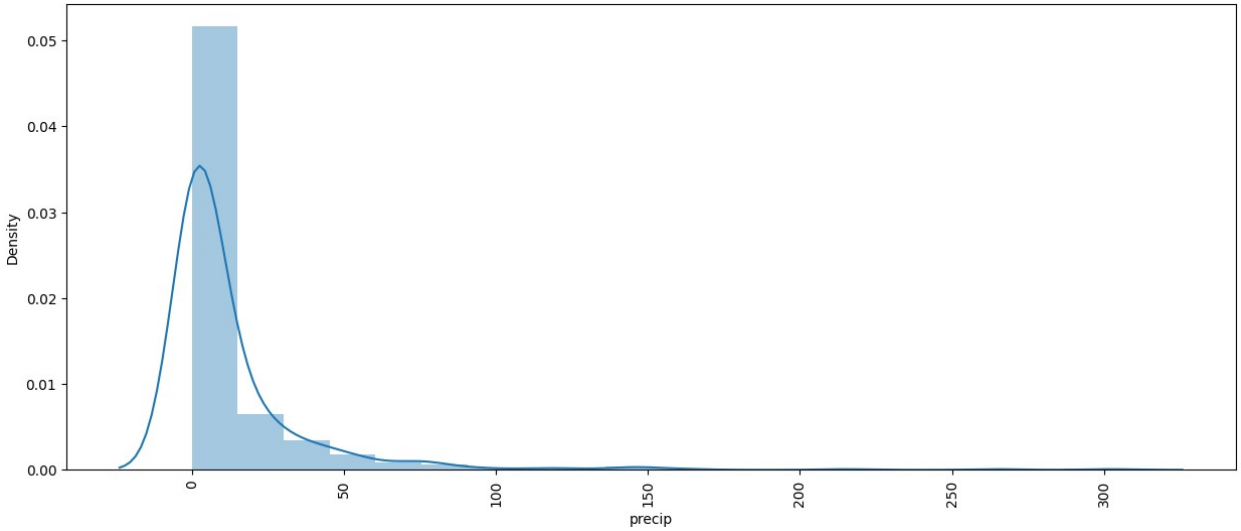
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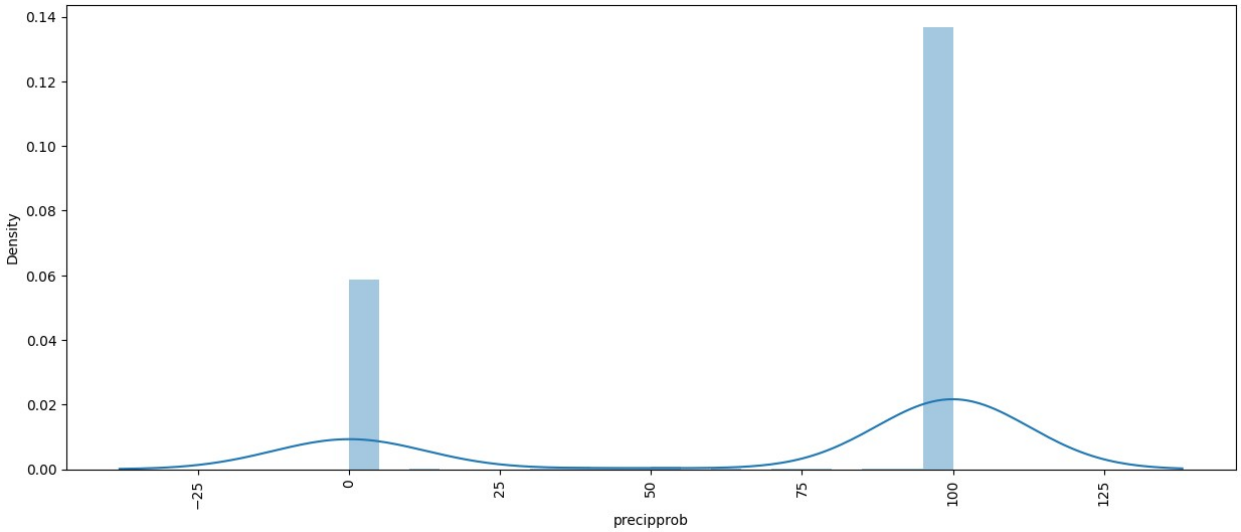
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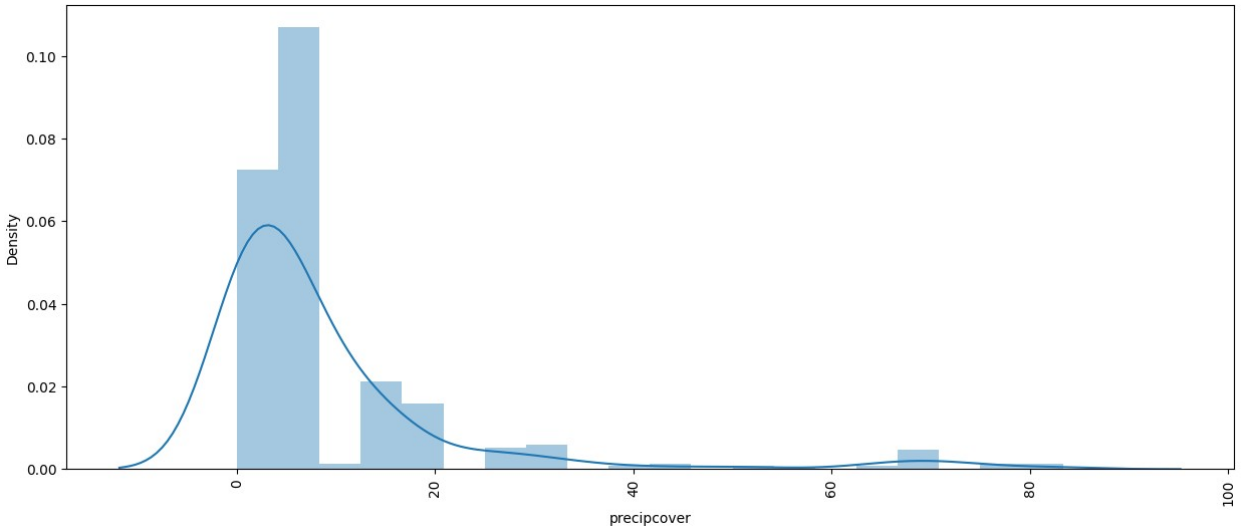
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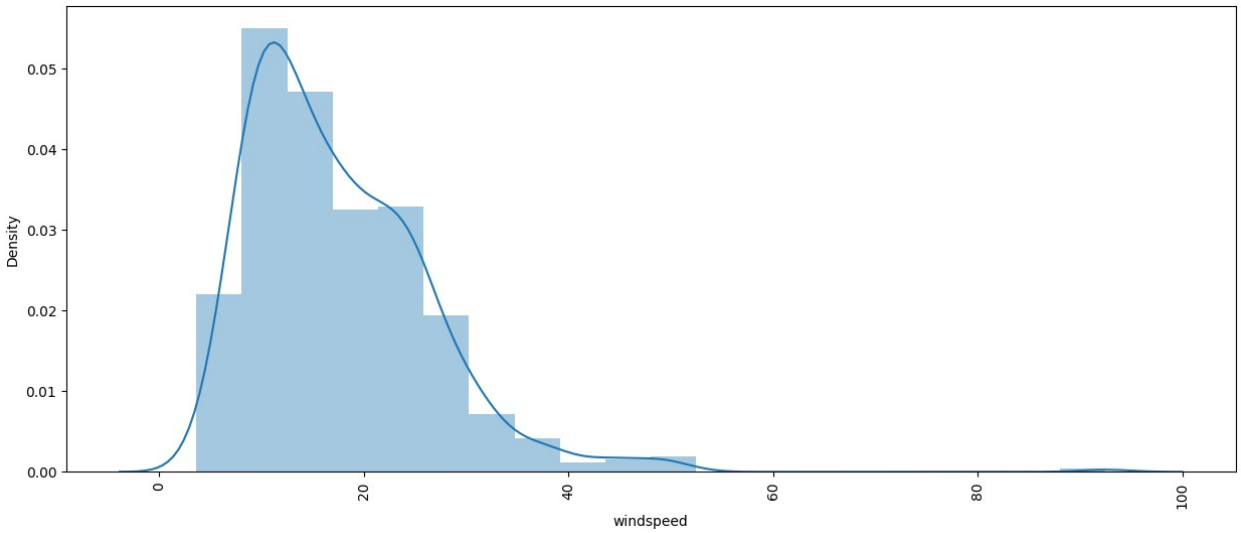
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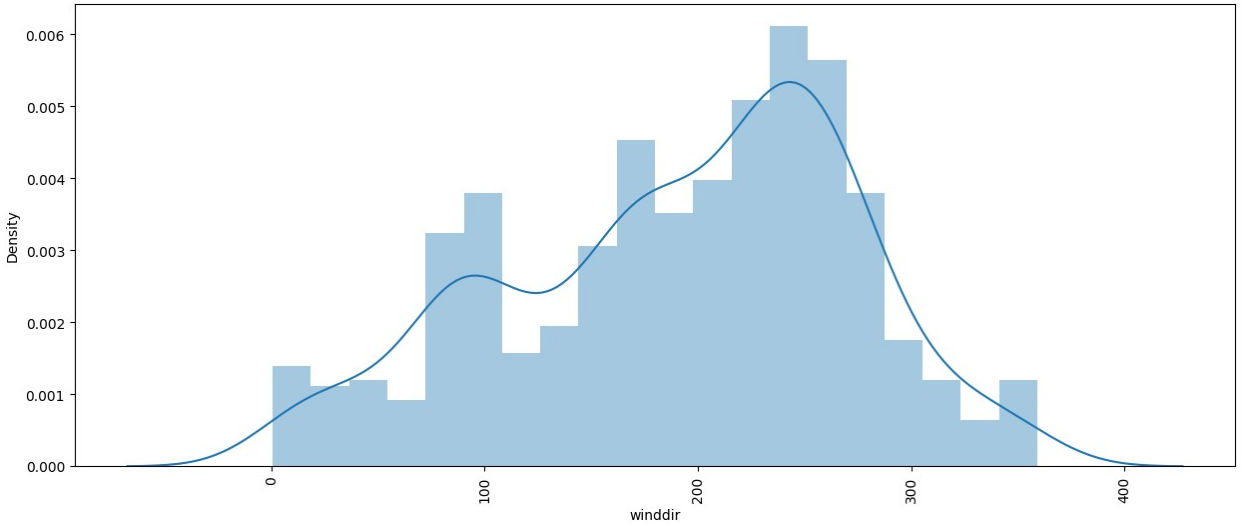
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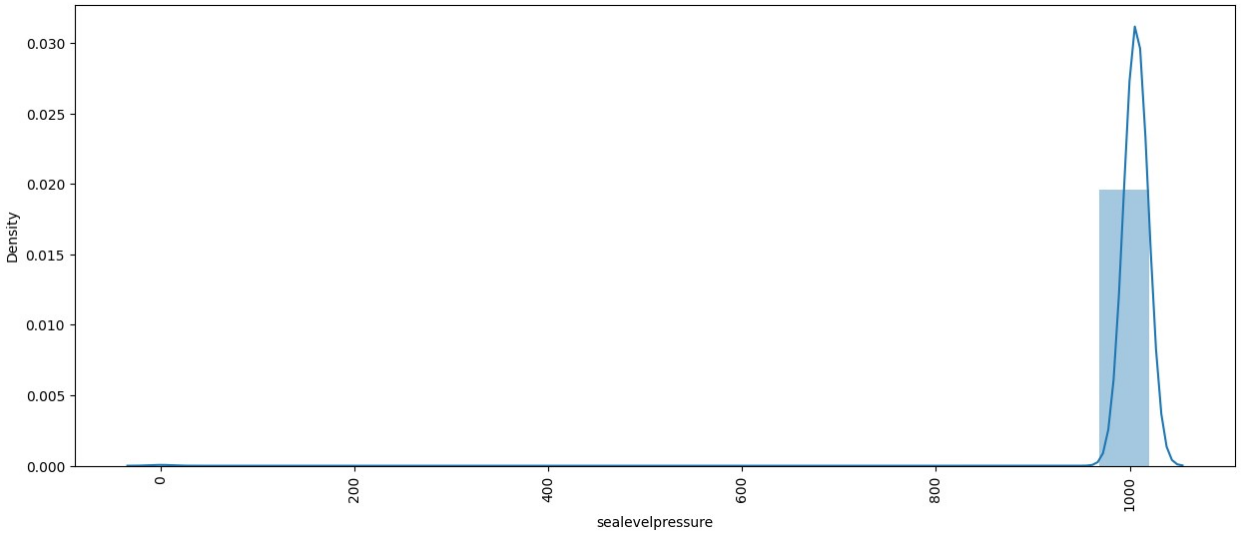
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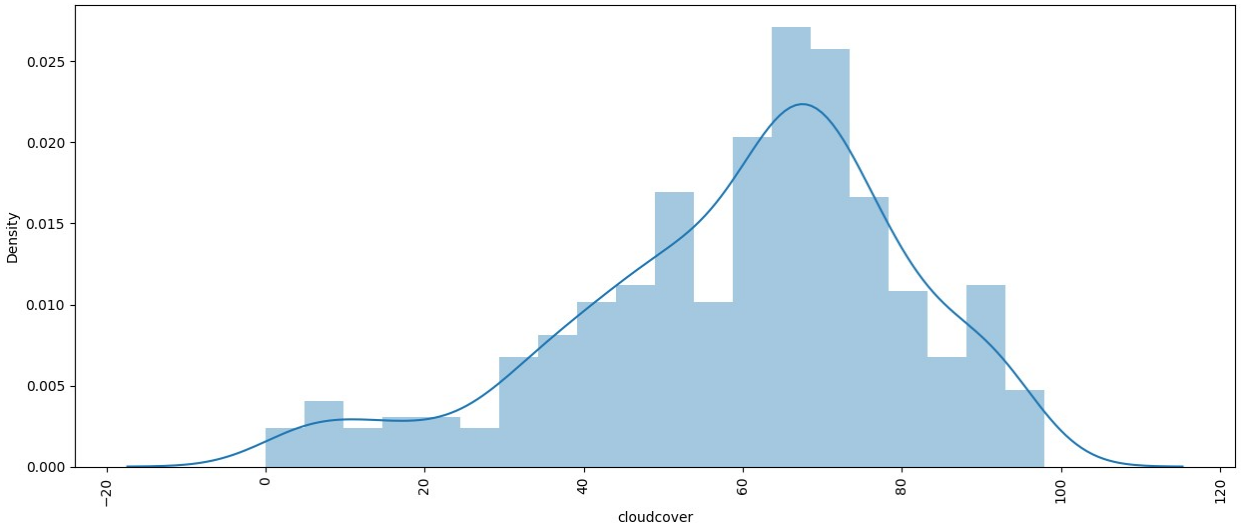
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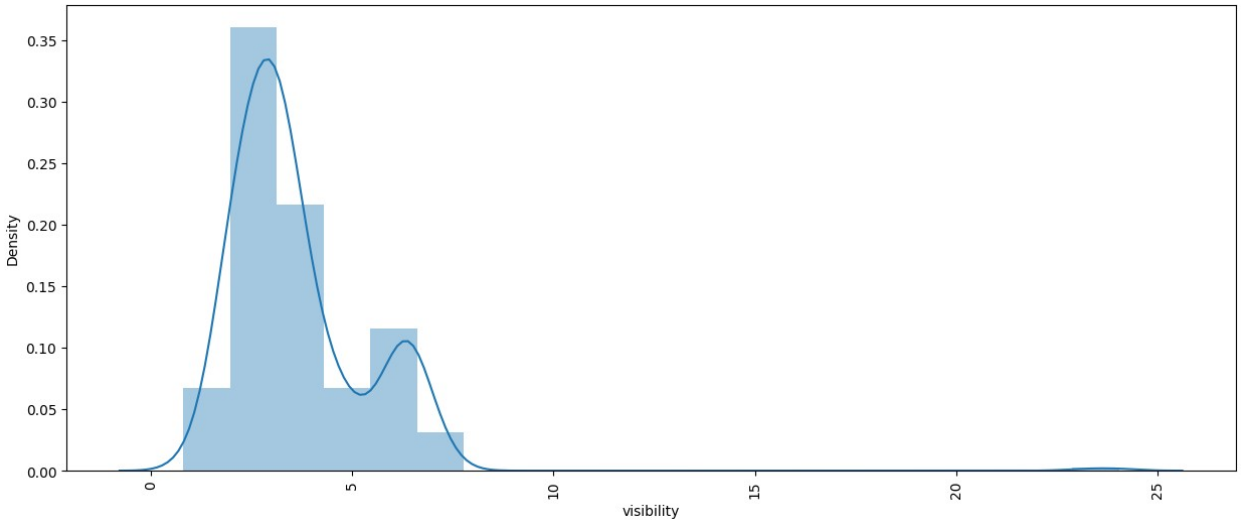
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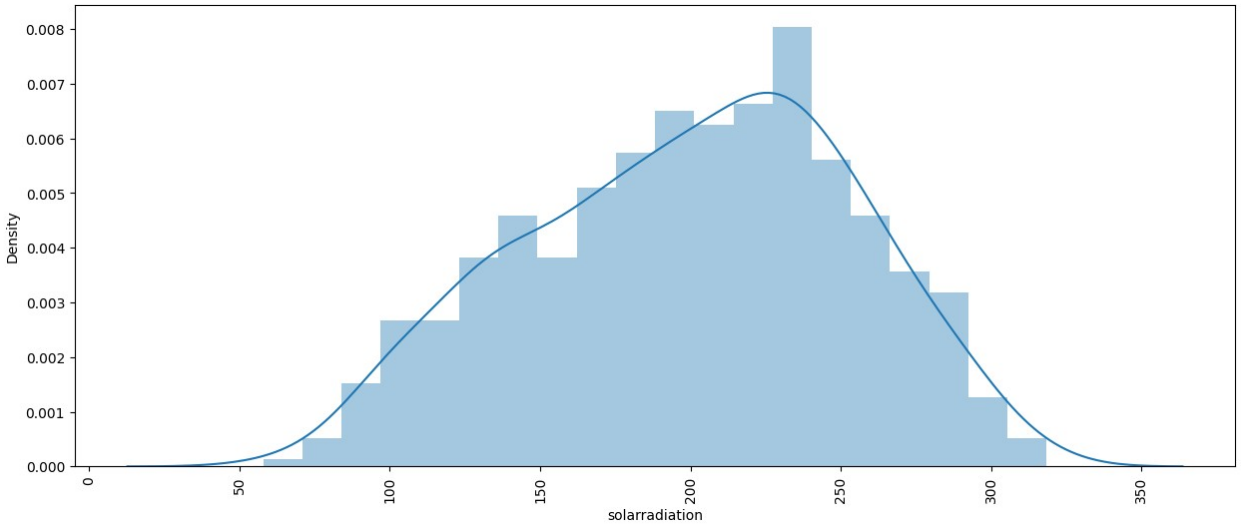
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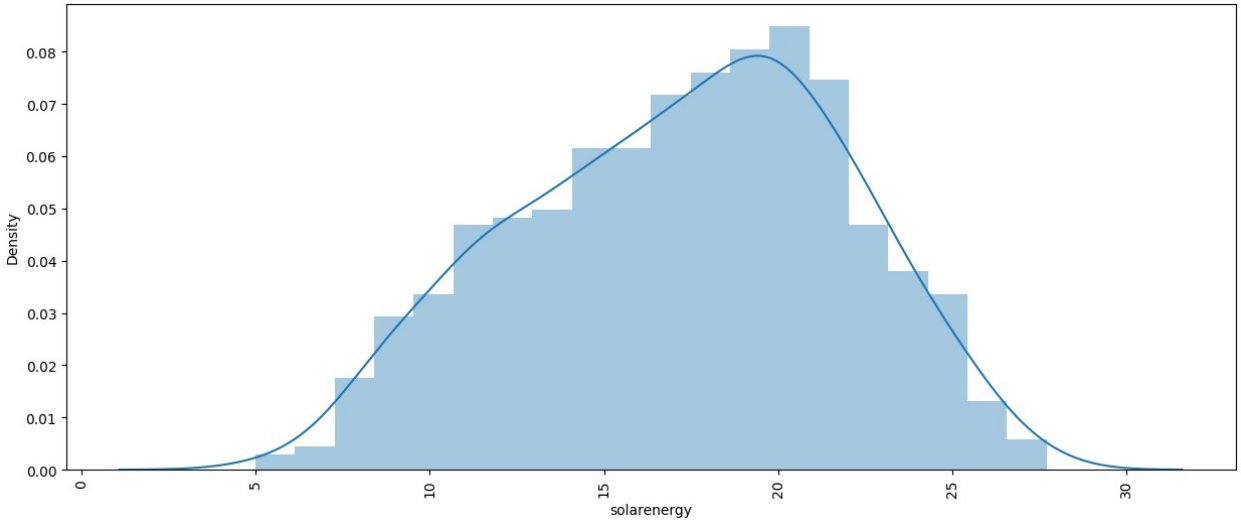
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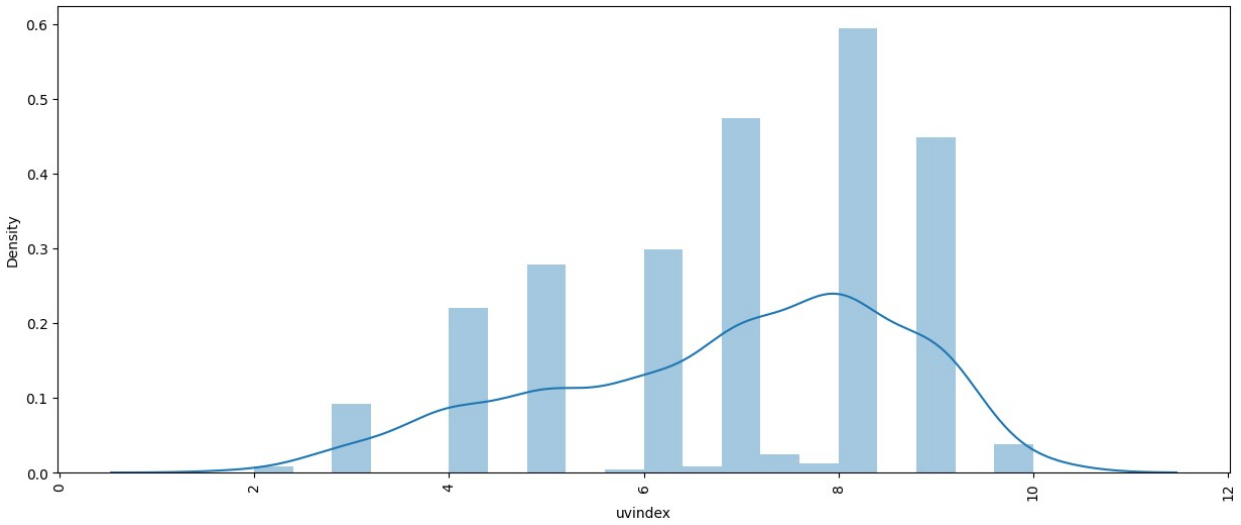
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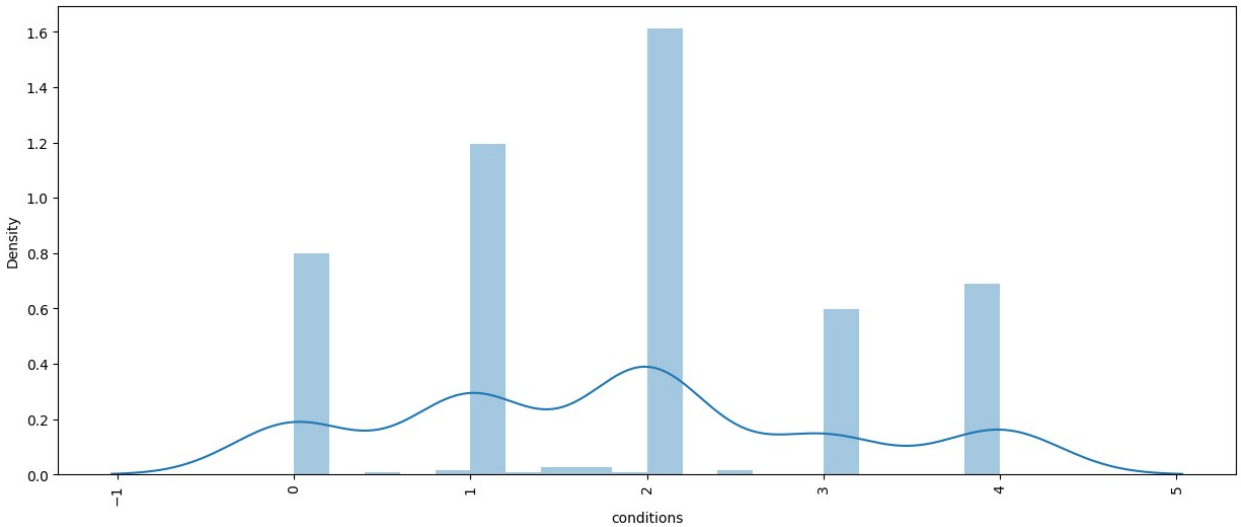
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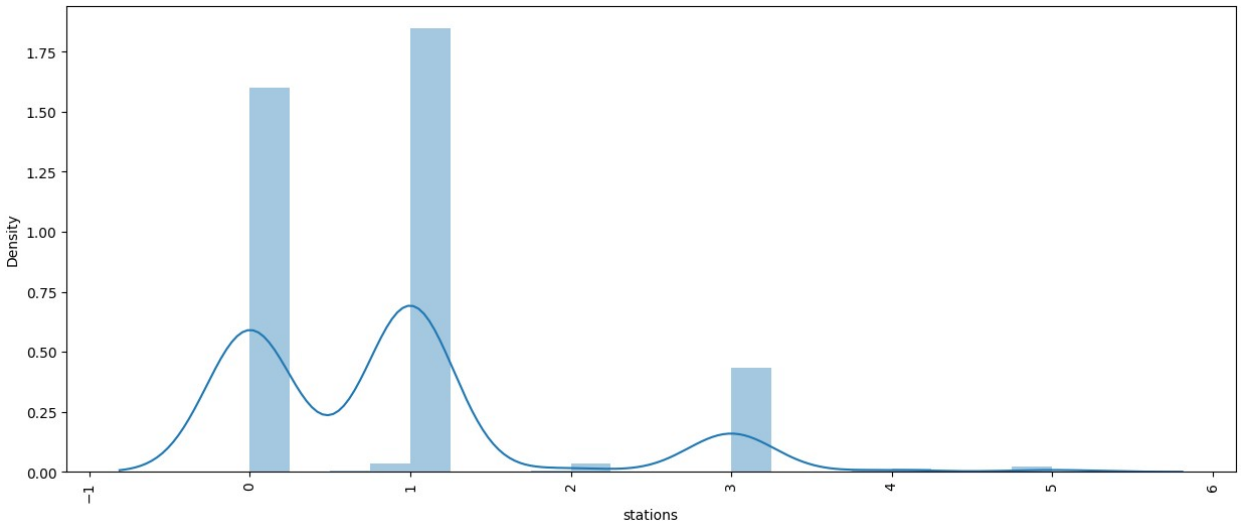
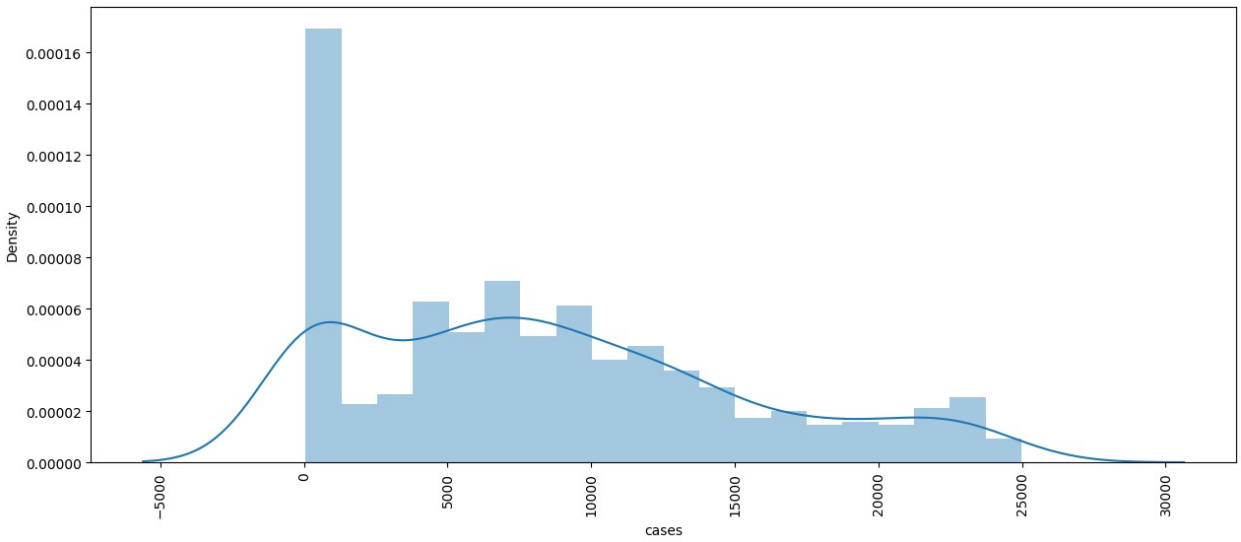
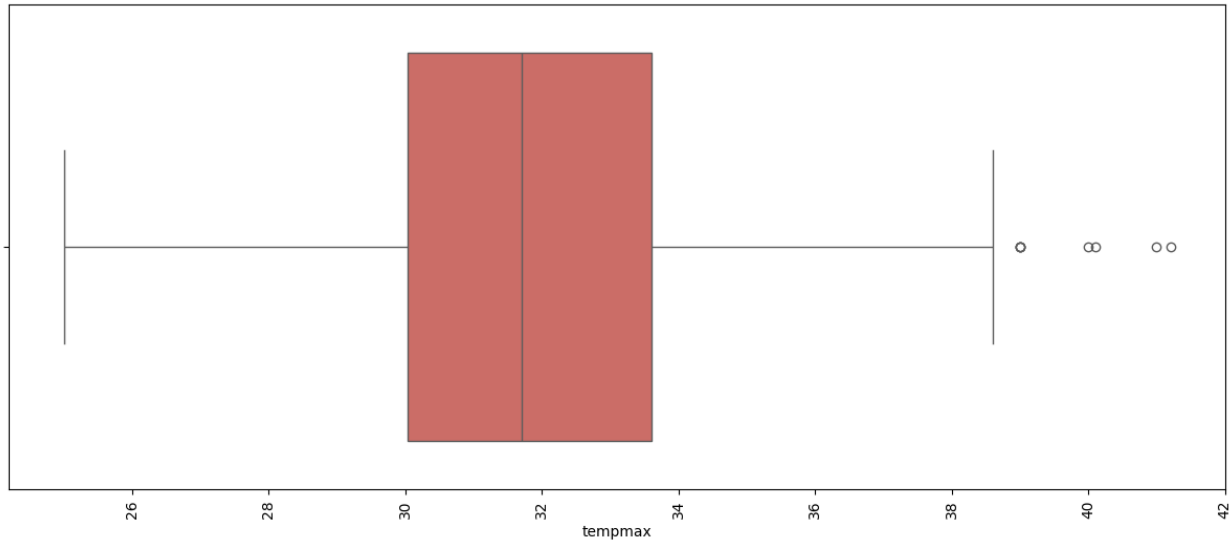
5
conditions






```
for i in continuous:
    plt.figure(figsize=(15, 6))
    sns.boxplot(x=i, data=df, palette='hls')
    plt.xticks(rotation=90)
    plt.show()
```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42
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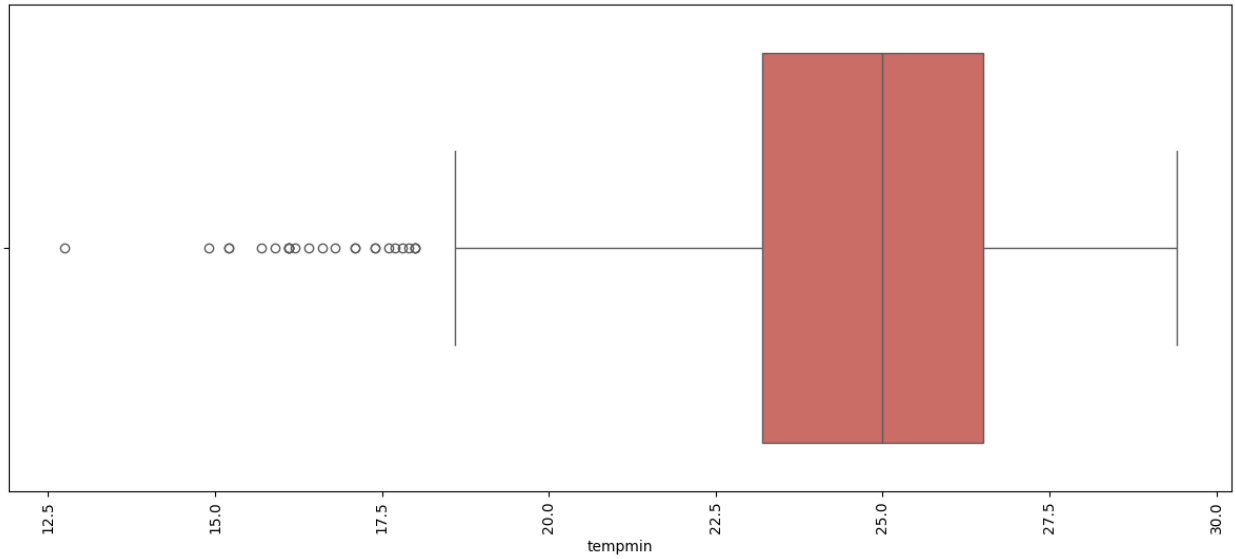
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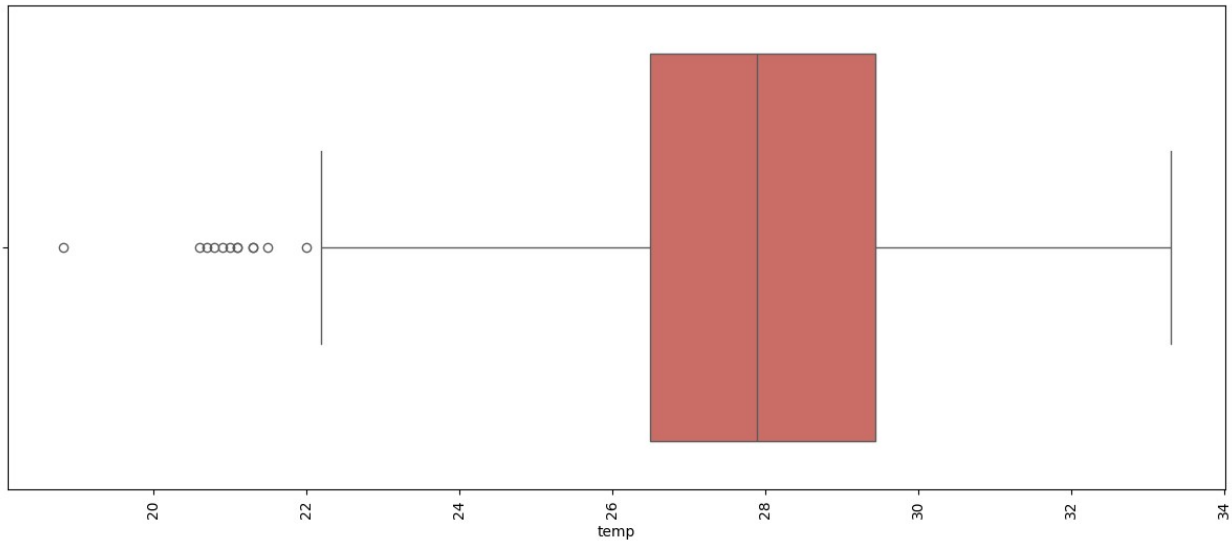
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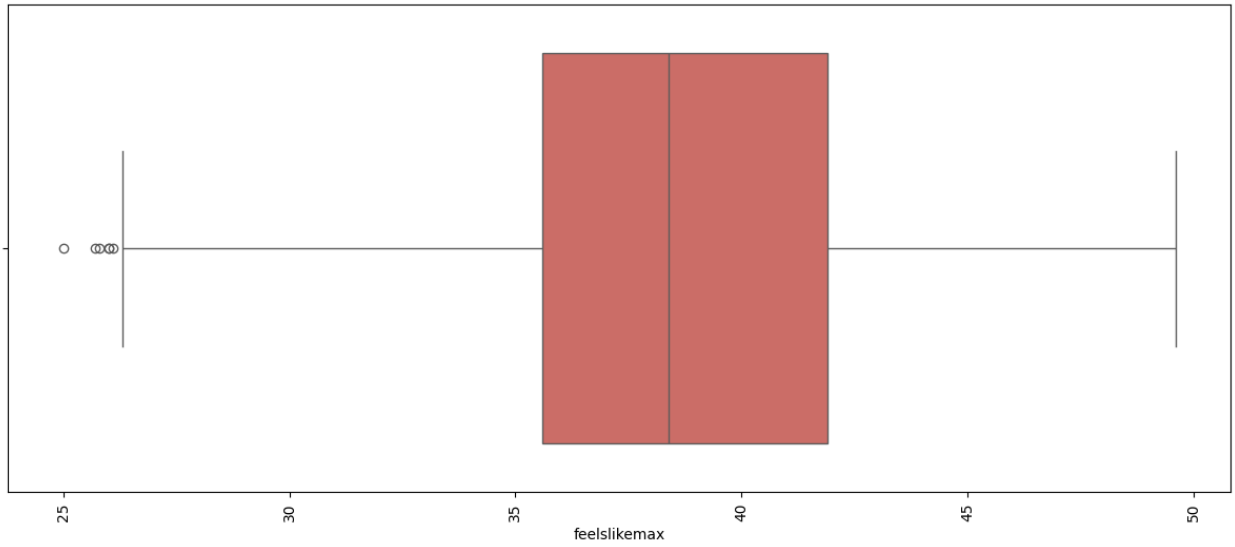
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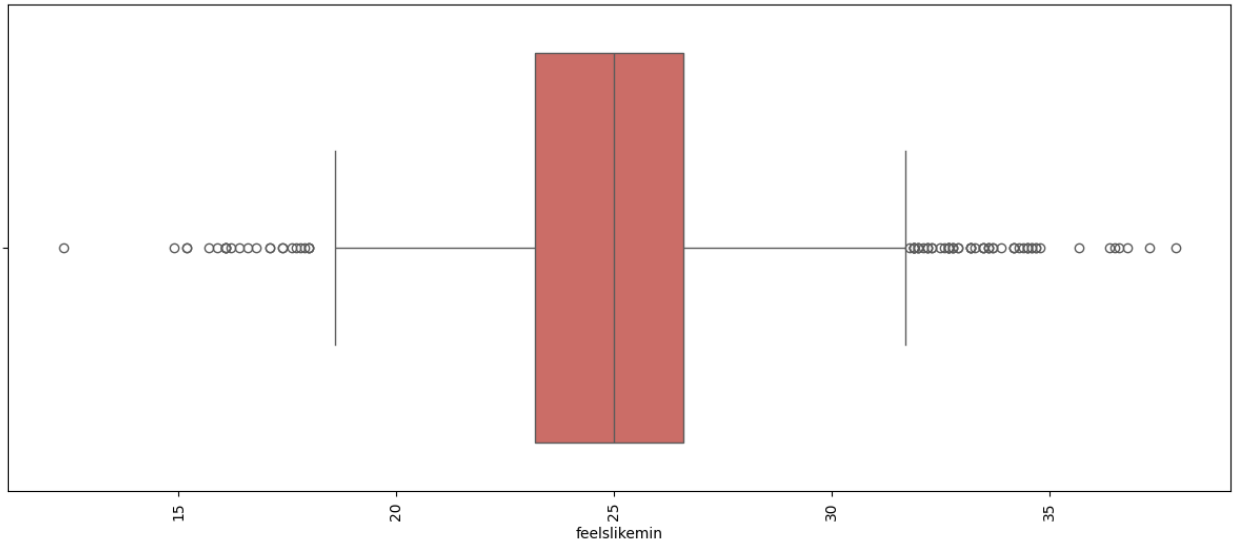
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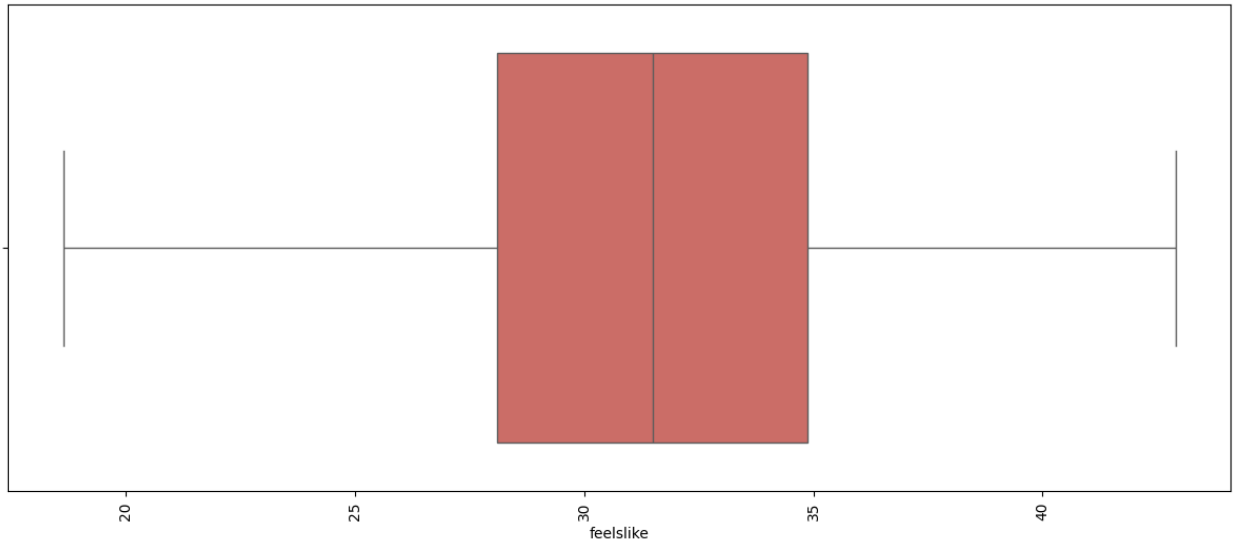
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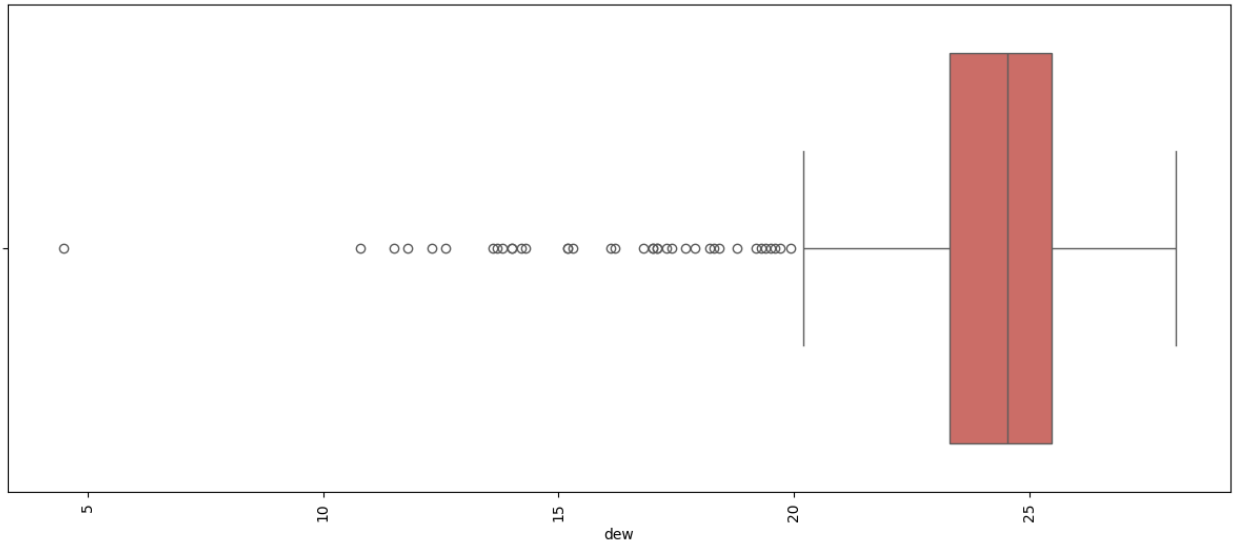
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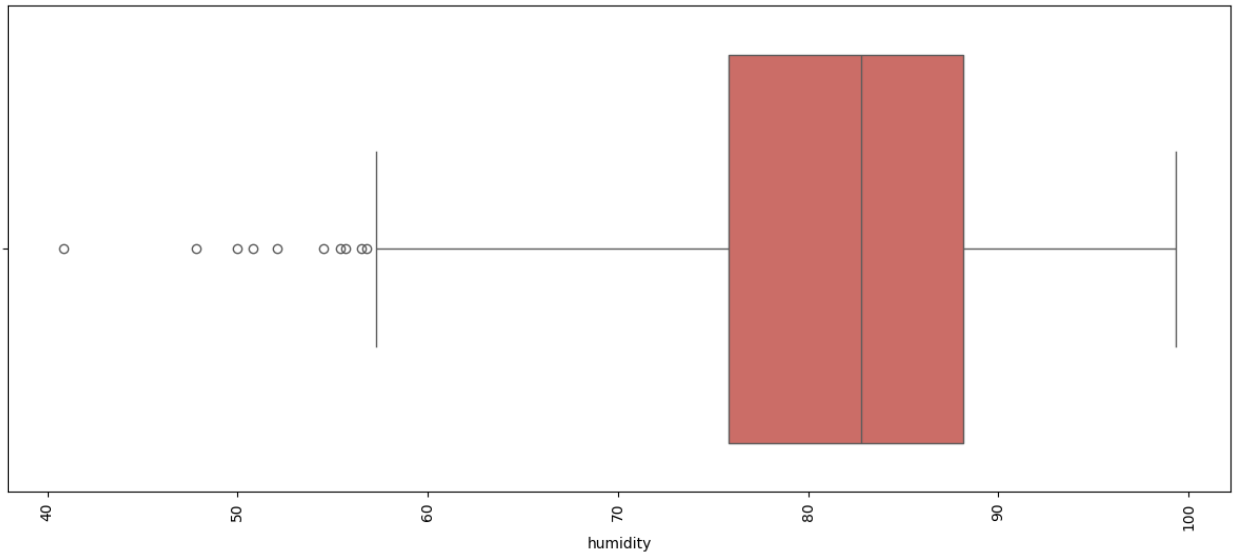
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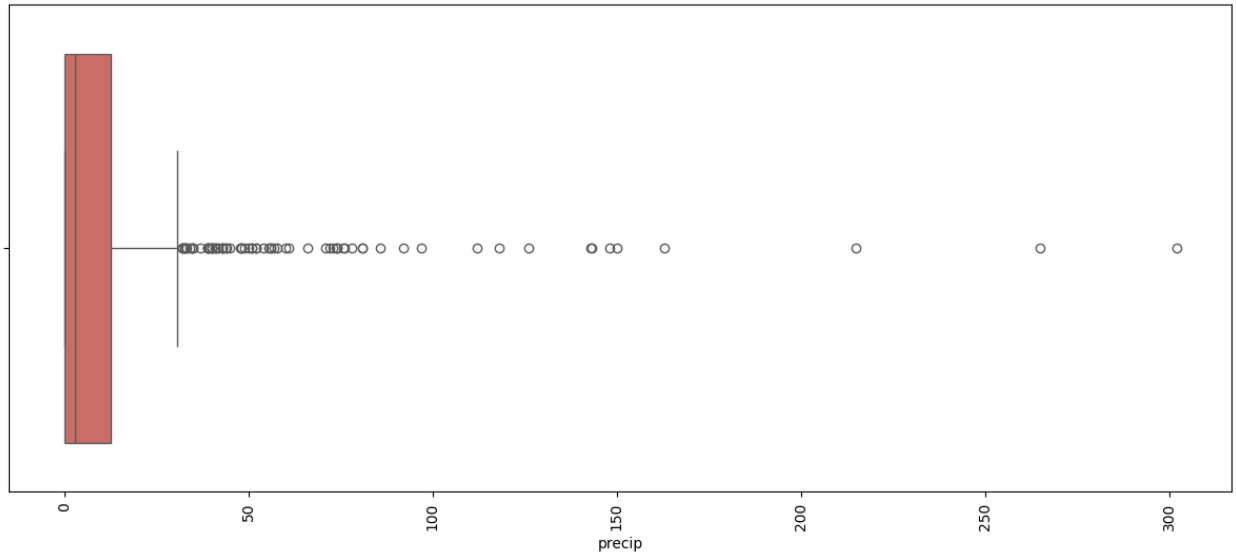
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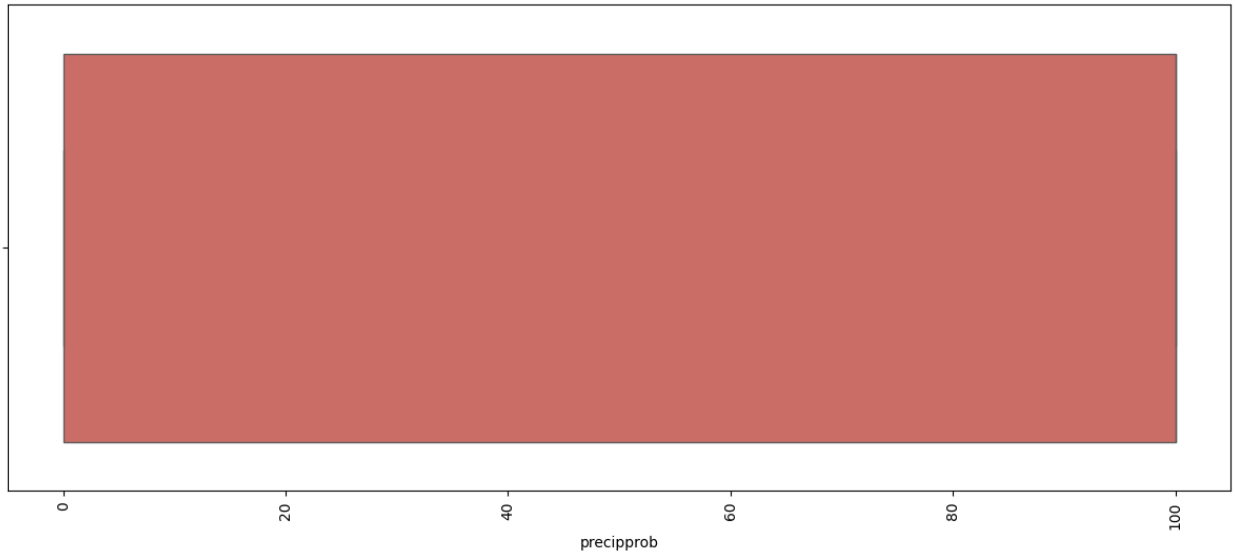
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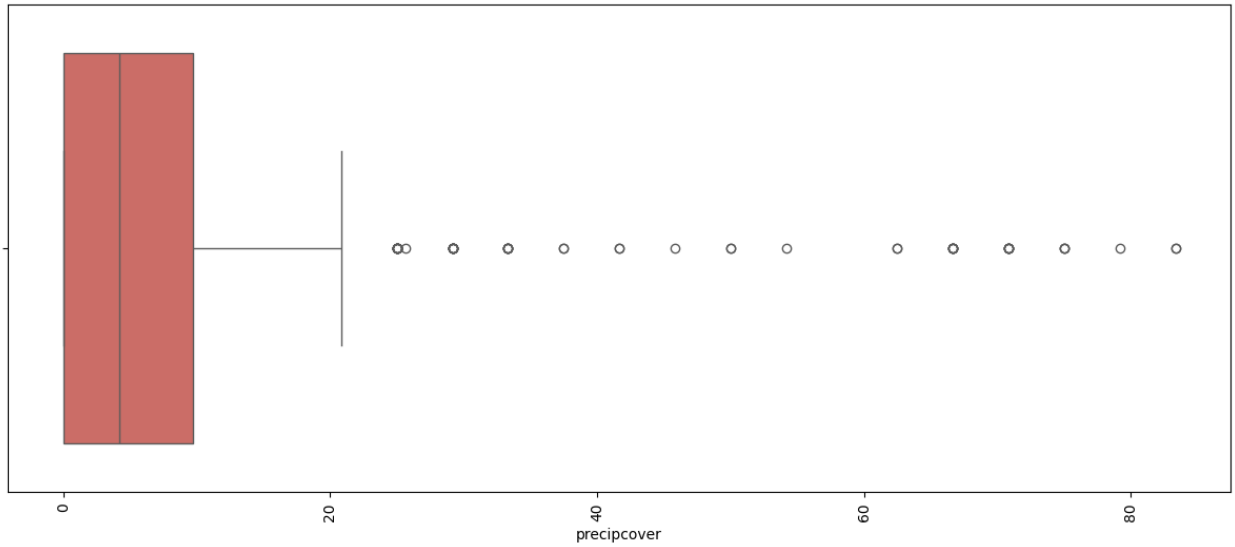
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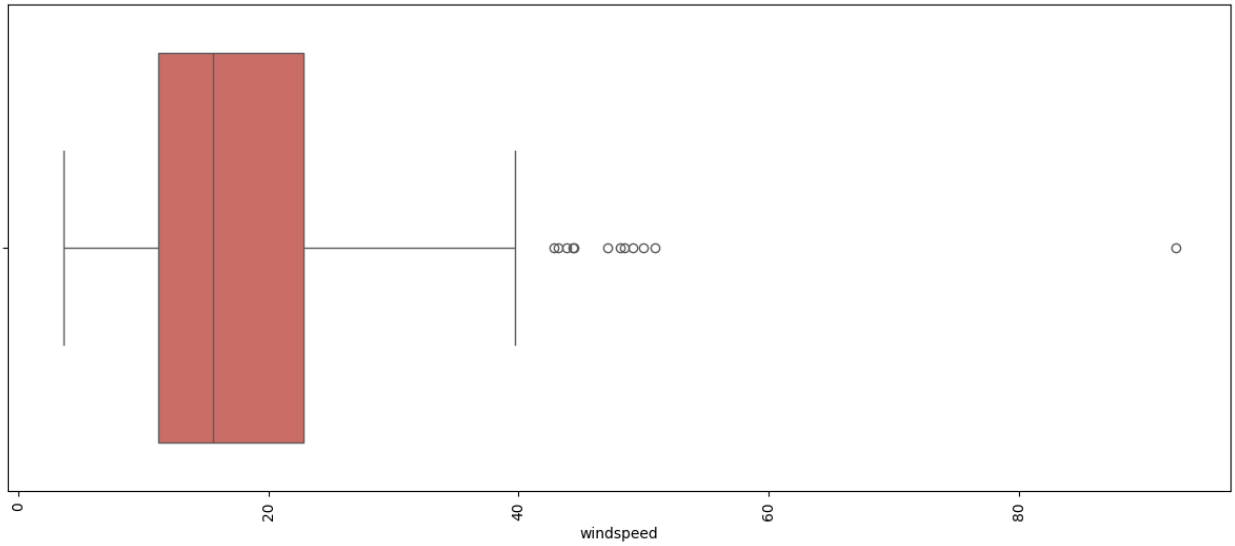
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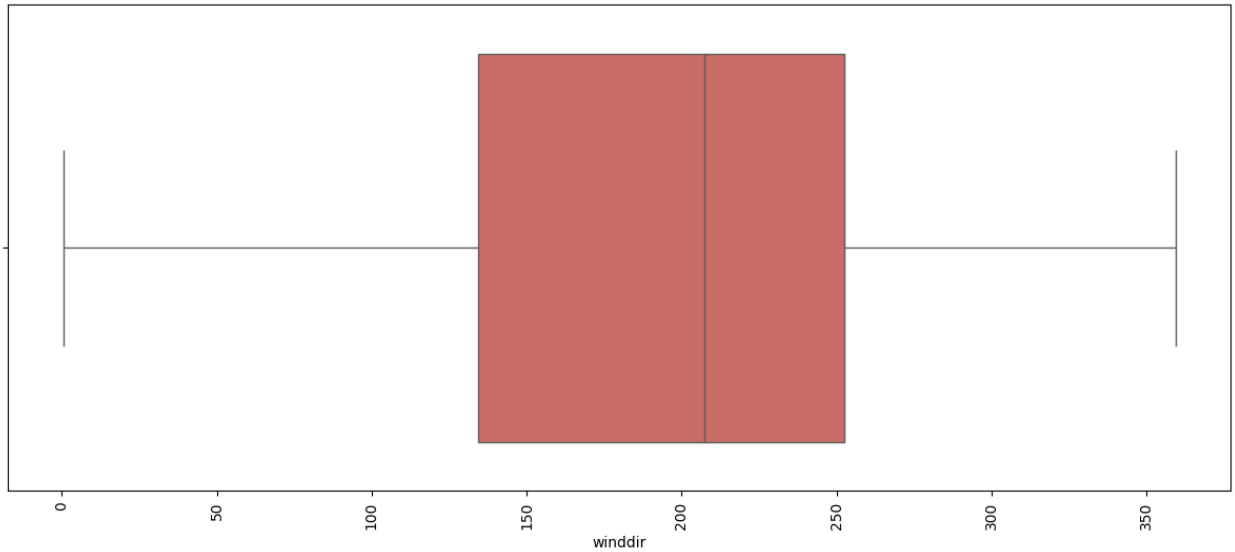
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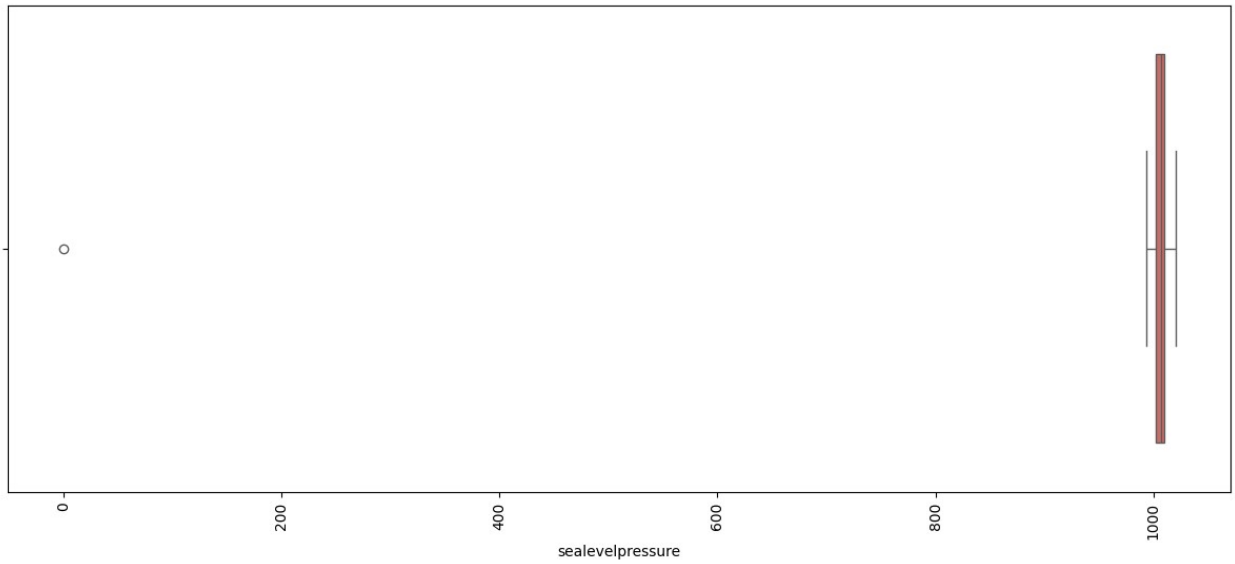
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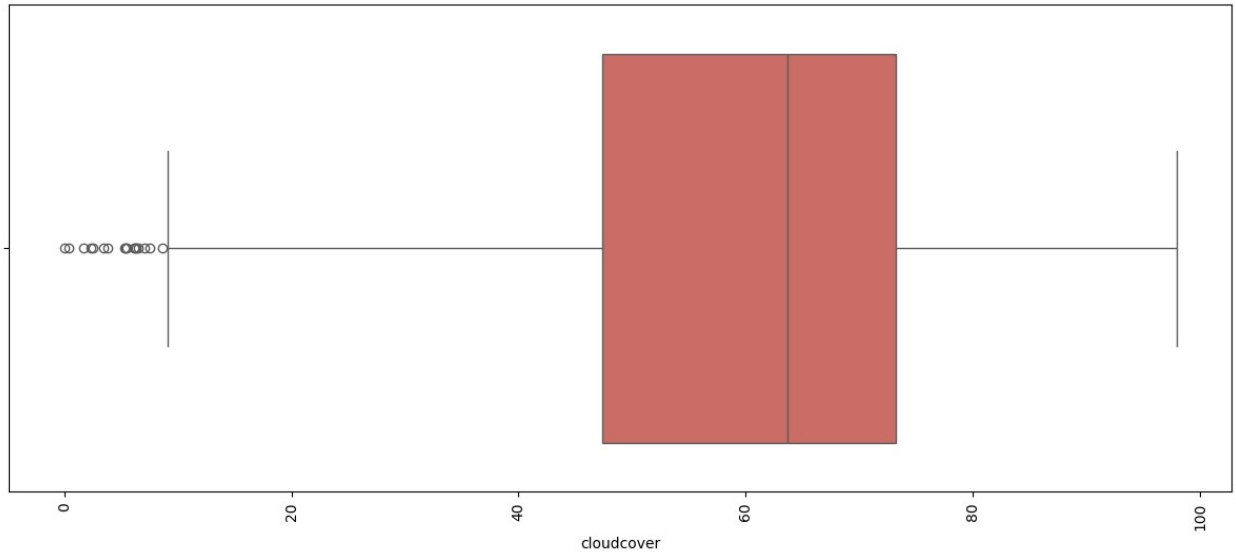
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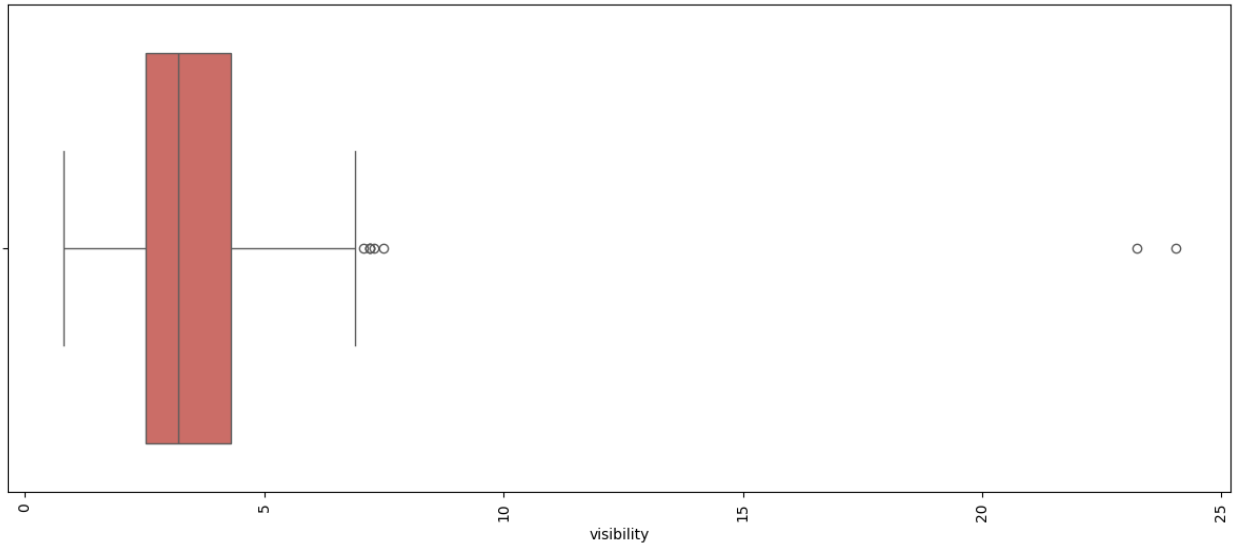
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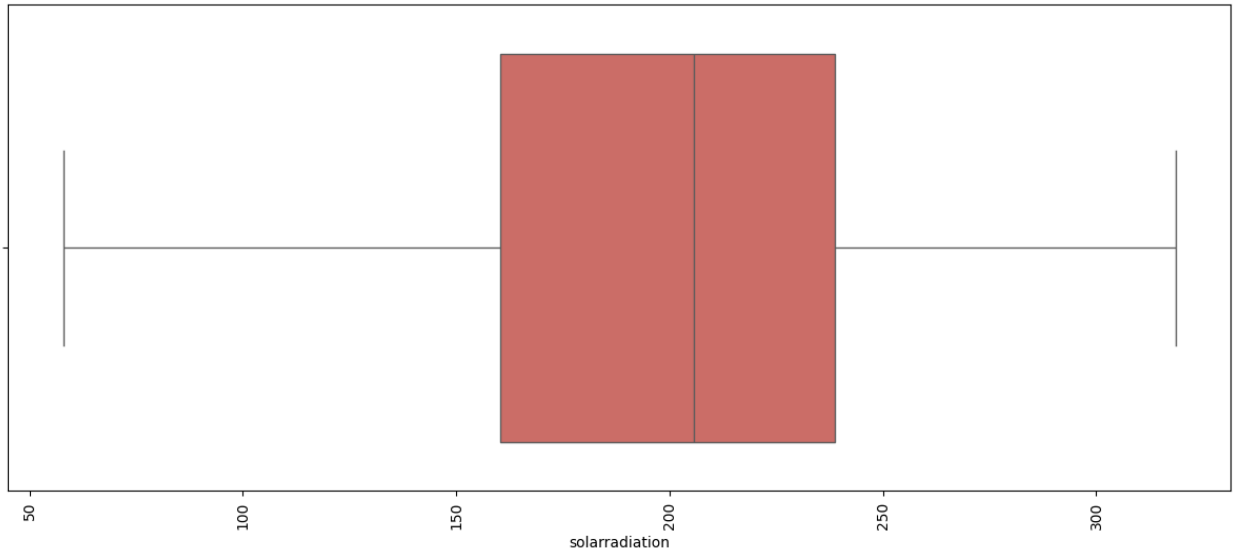
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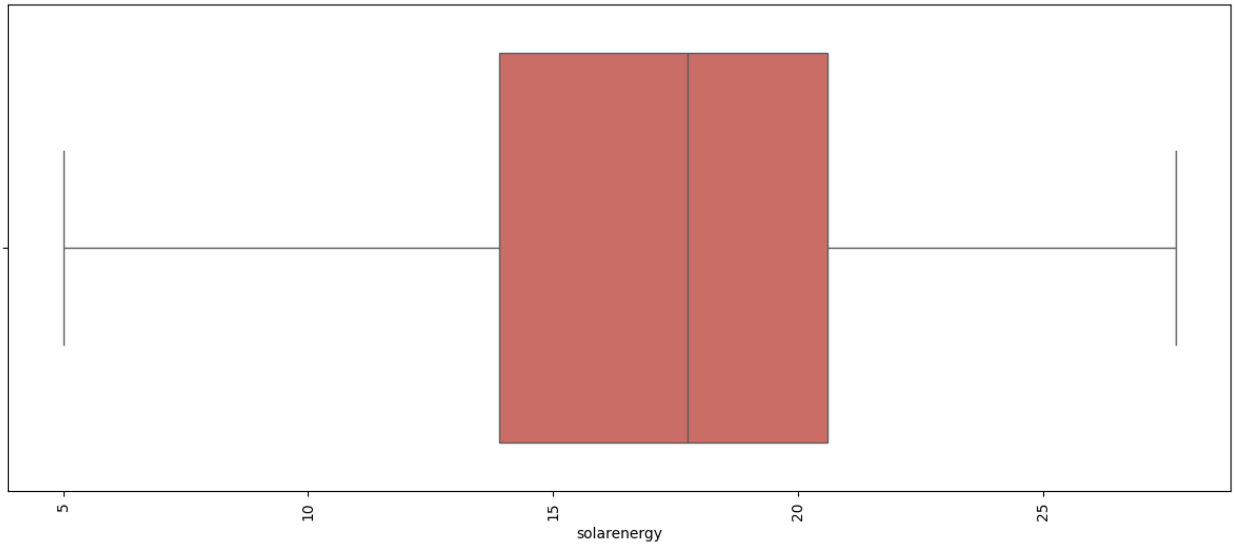
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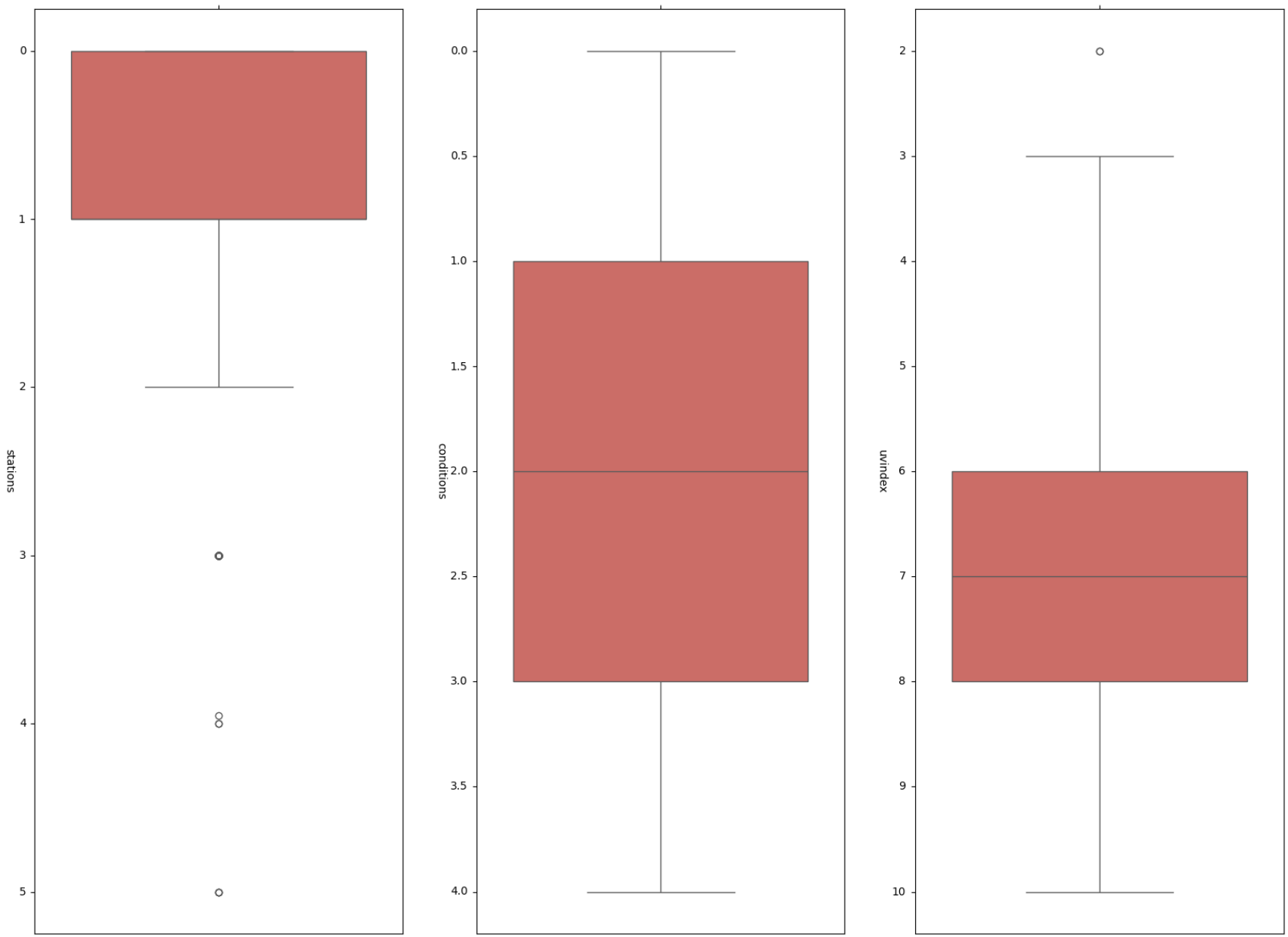
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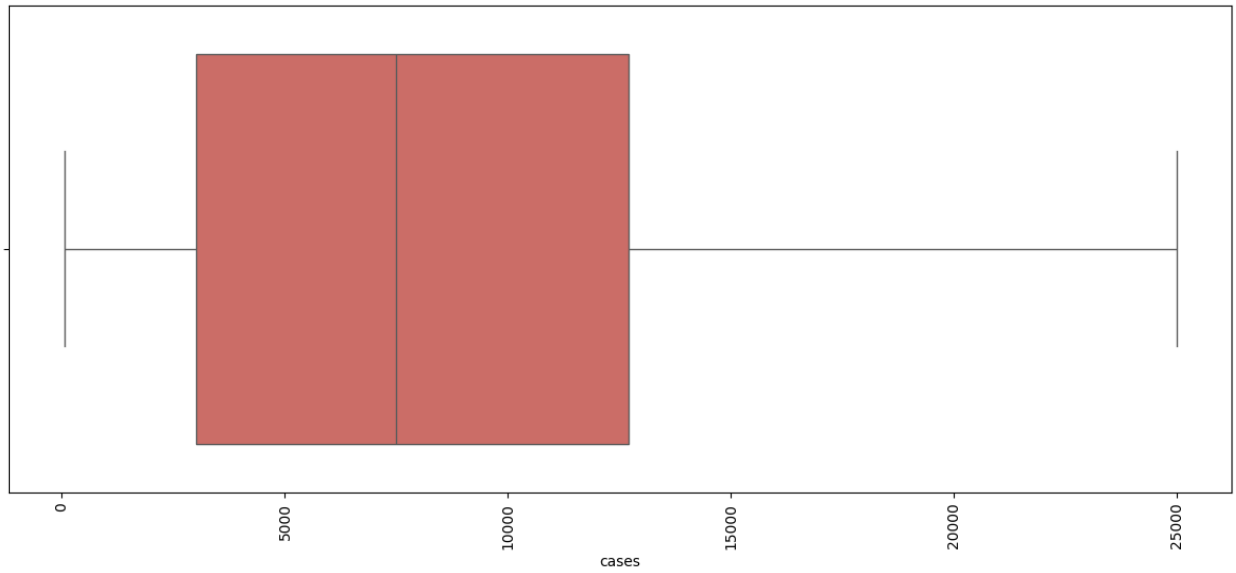
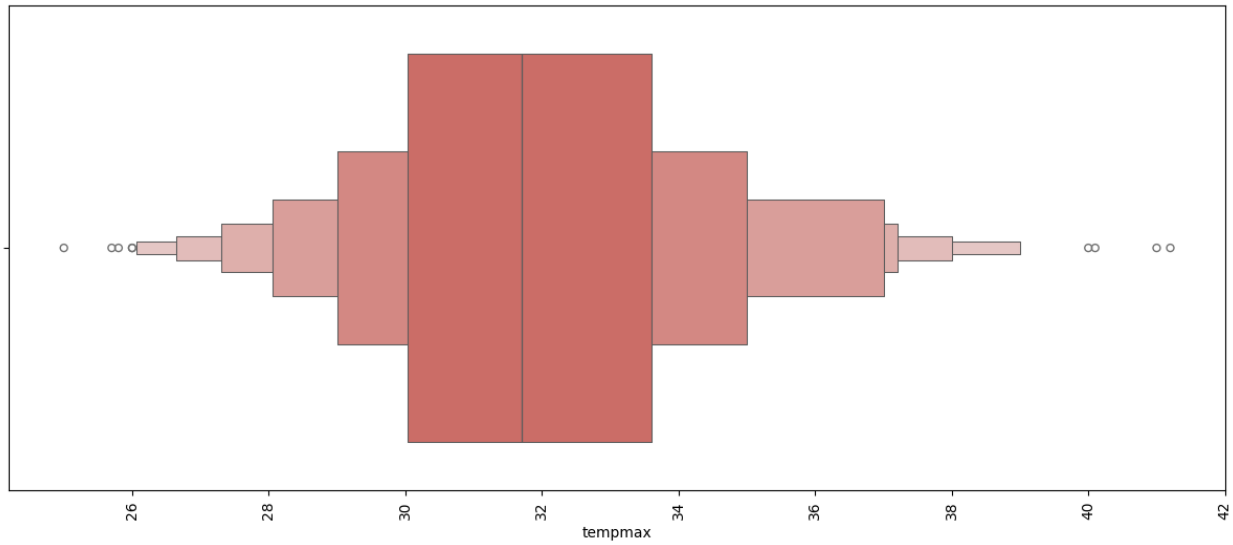
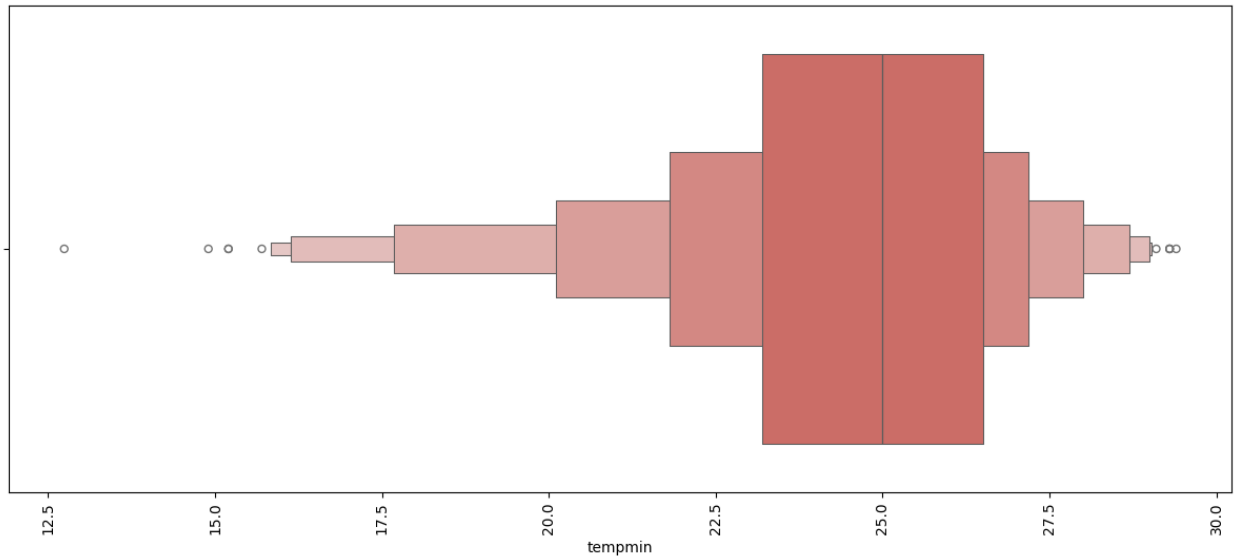



```
for i in continuous:
    plt.figure(figsize=(15, 6))
    sns.boxenplot(x=i, data=df, palette='hls')
    plt.xticks(rotation=90)
    plt.show()
```

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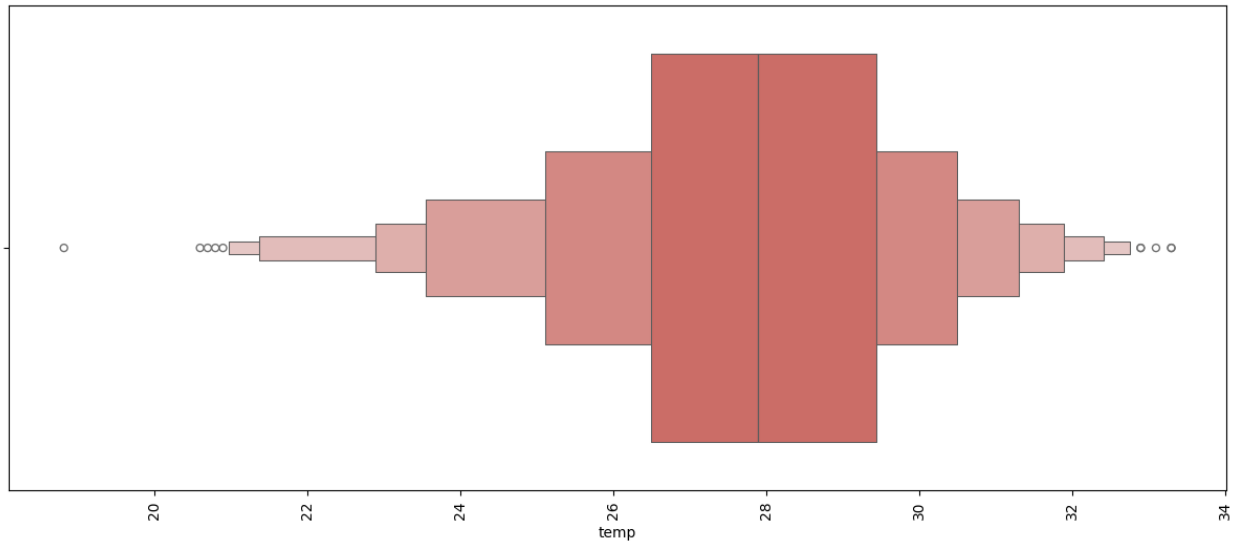
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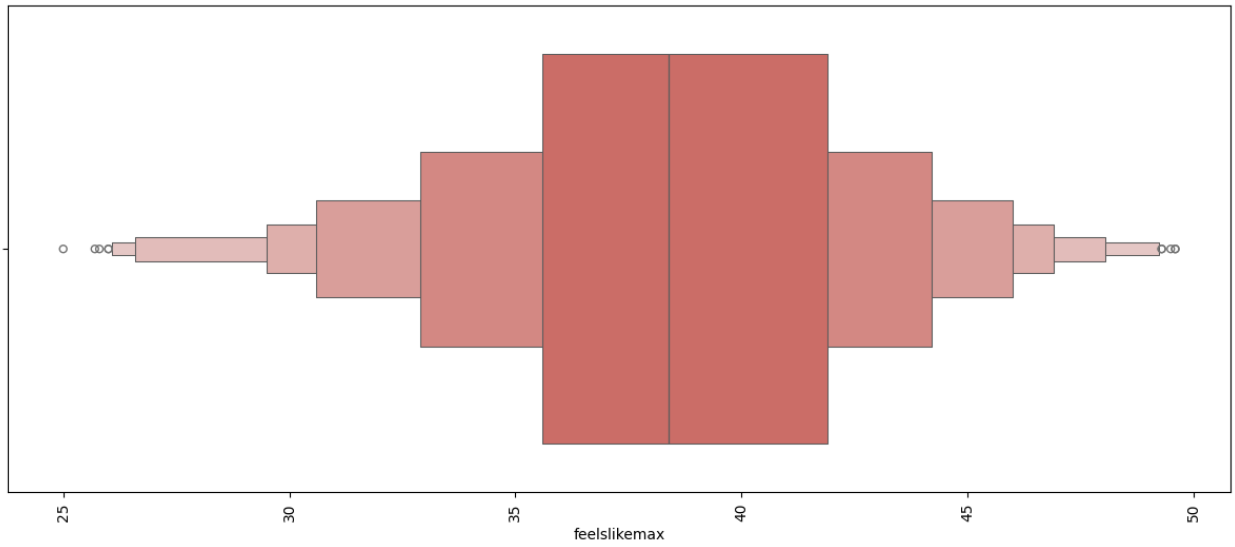
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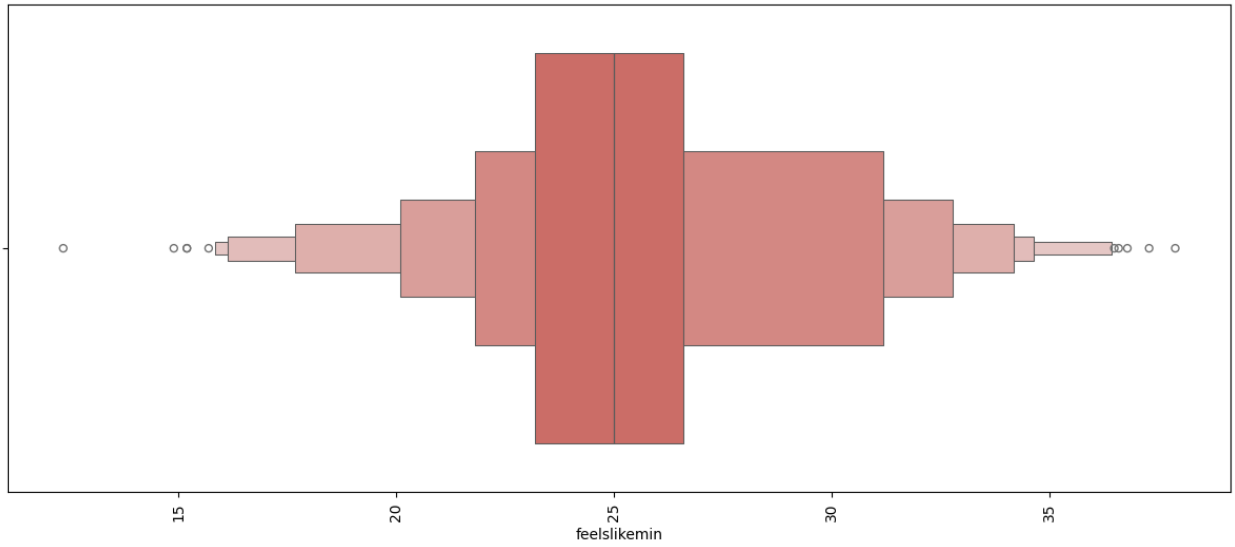
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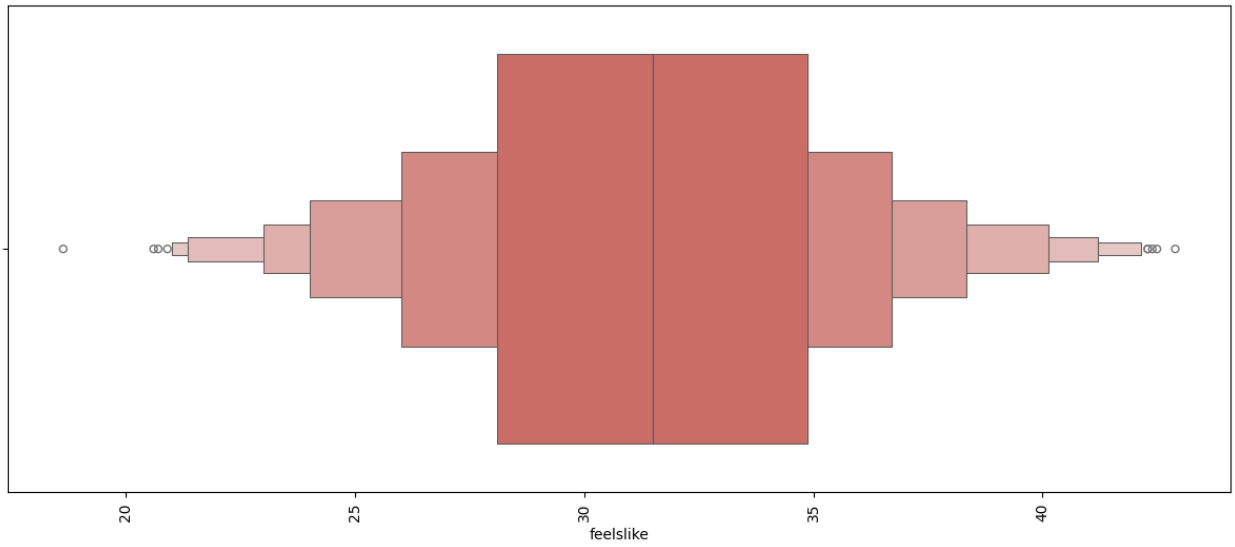
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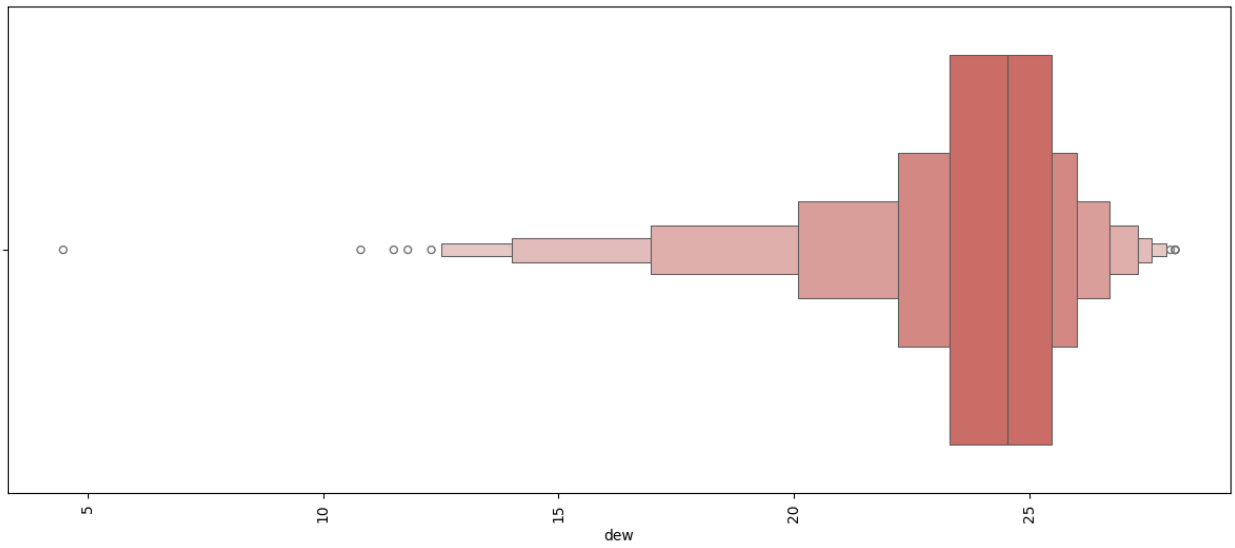
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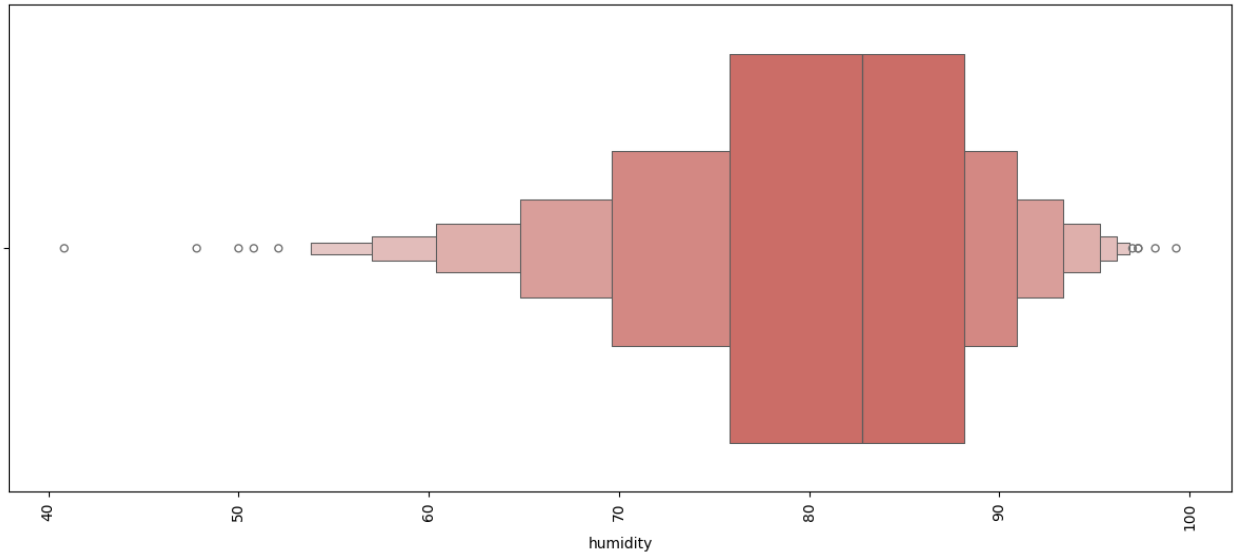
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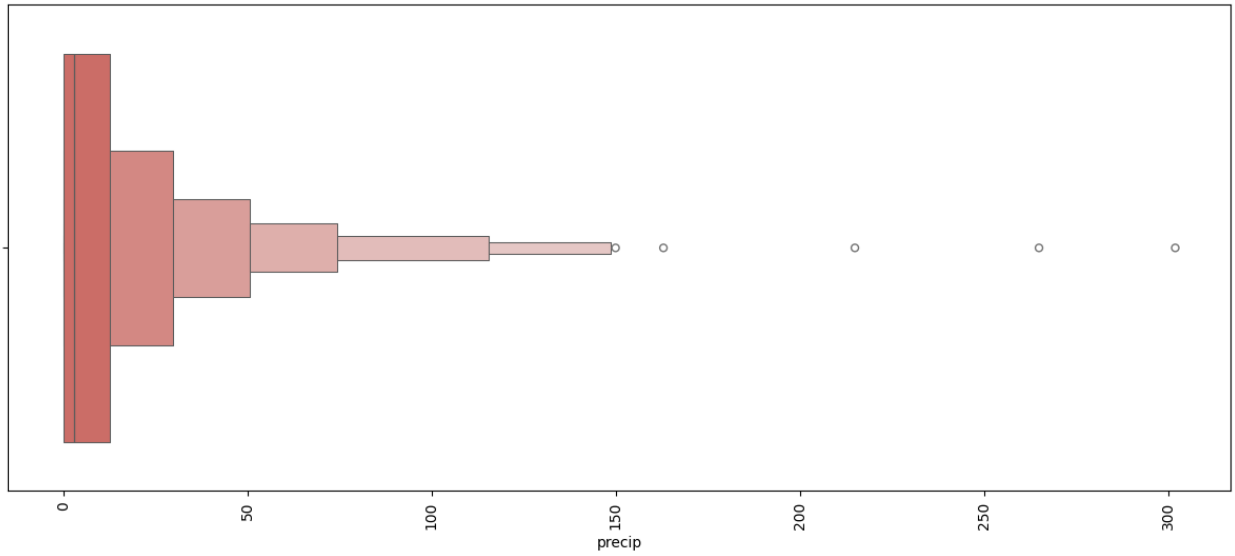
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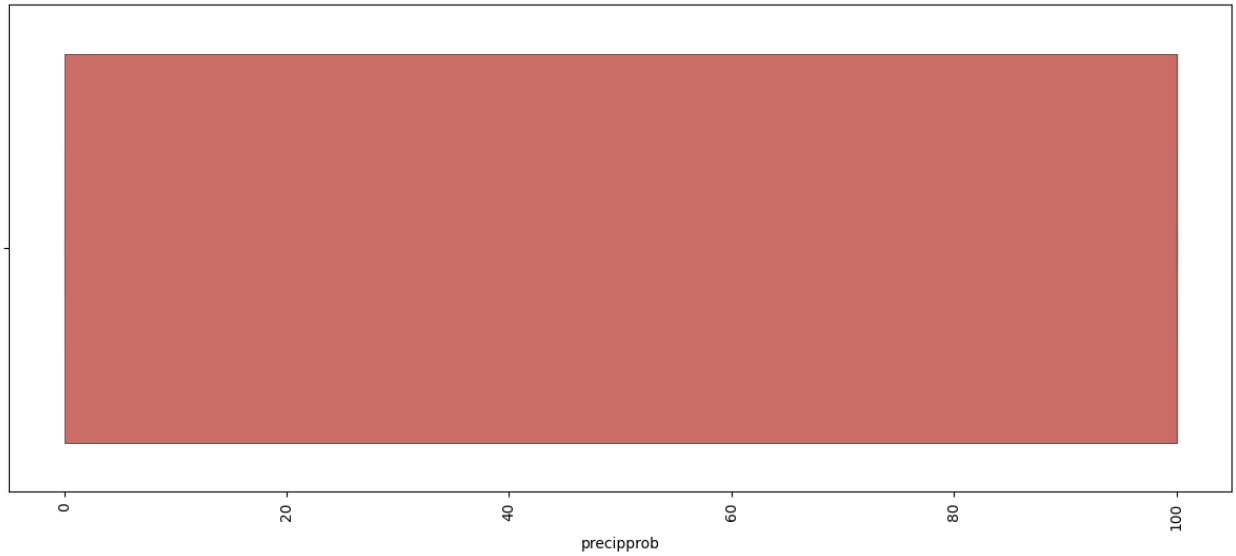
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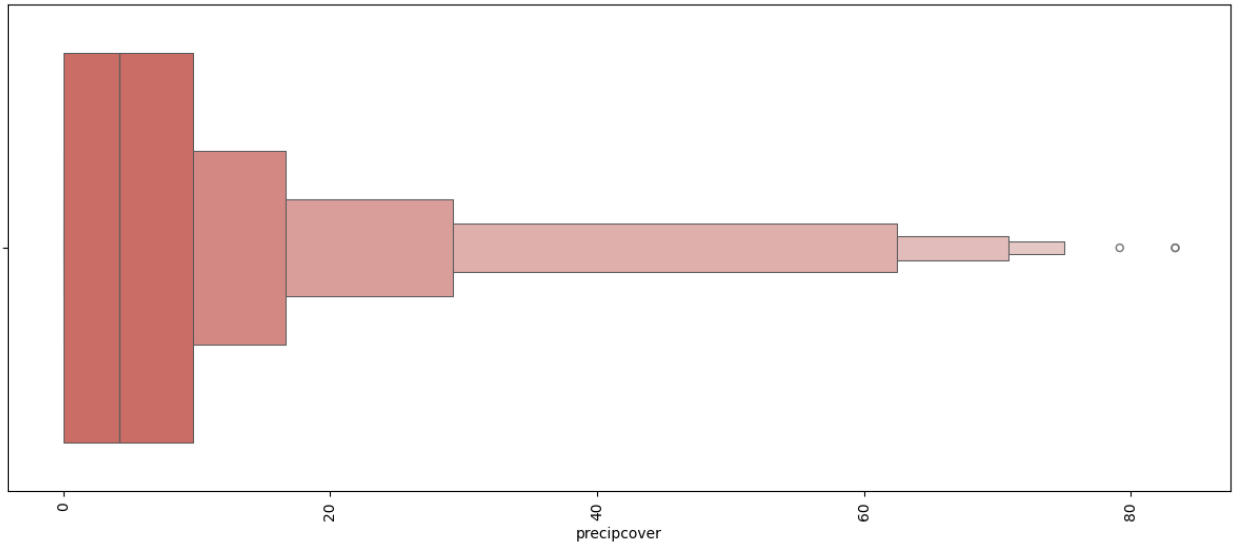
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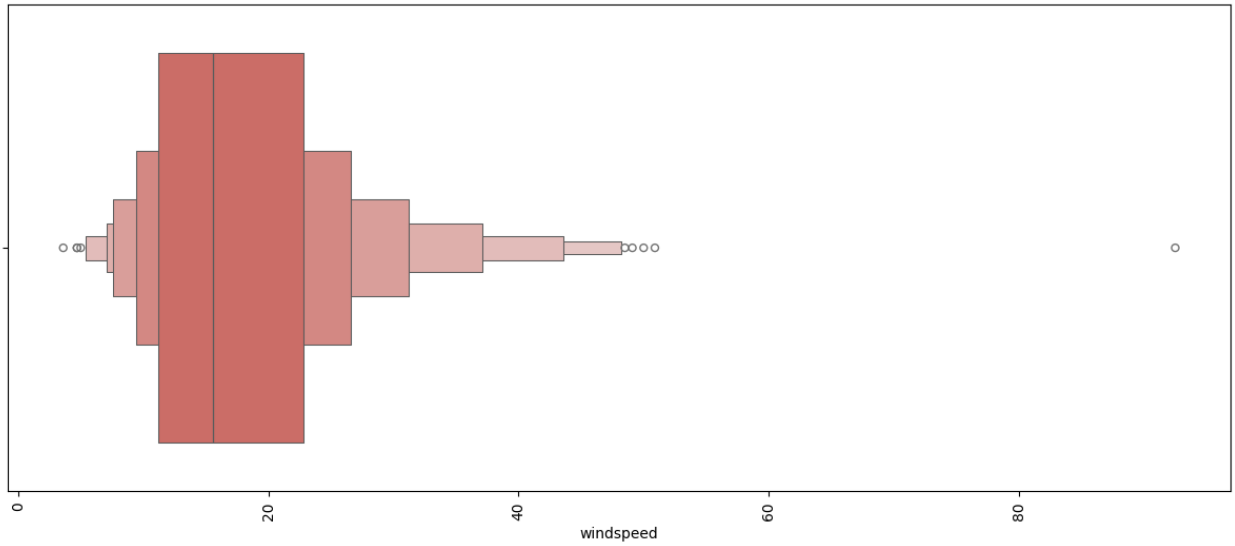
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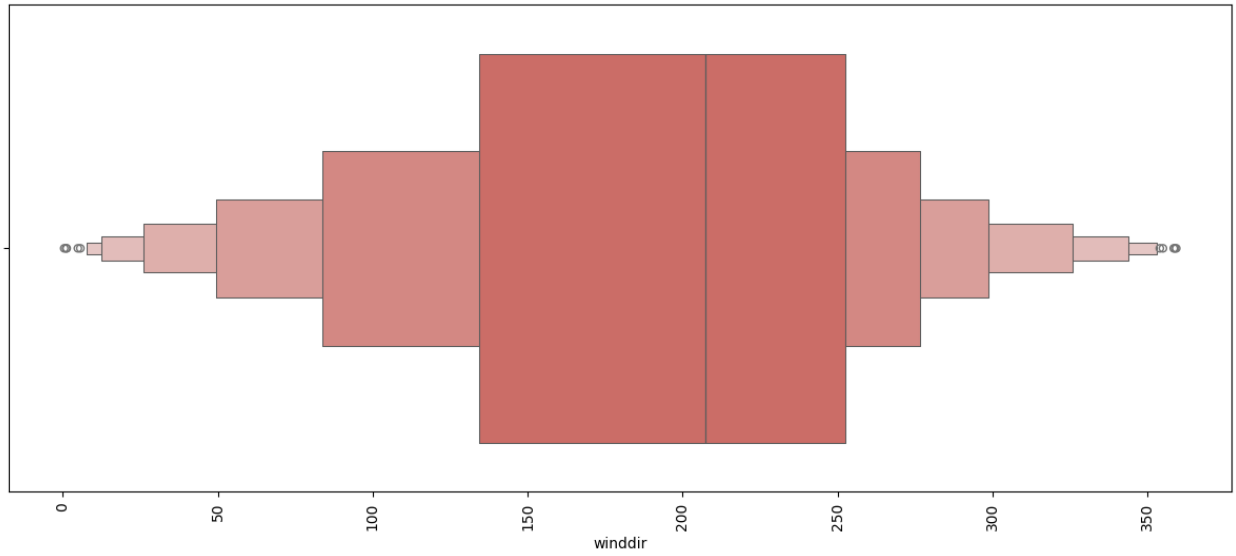
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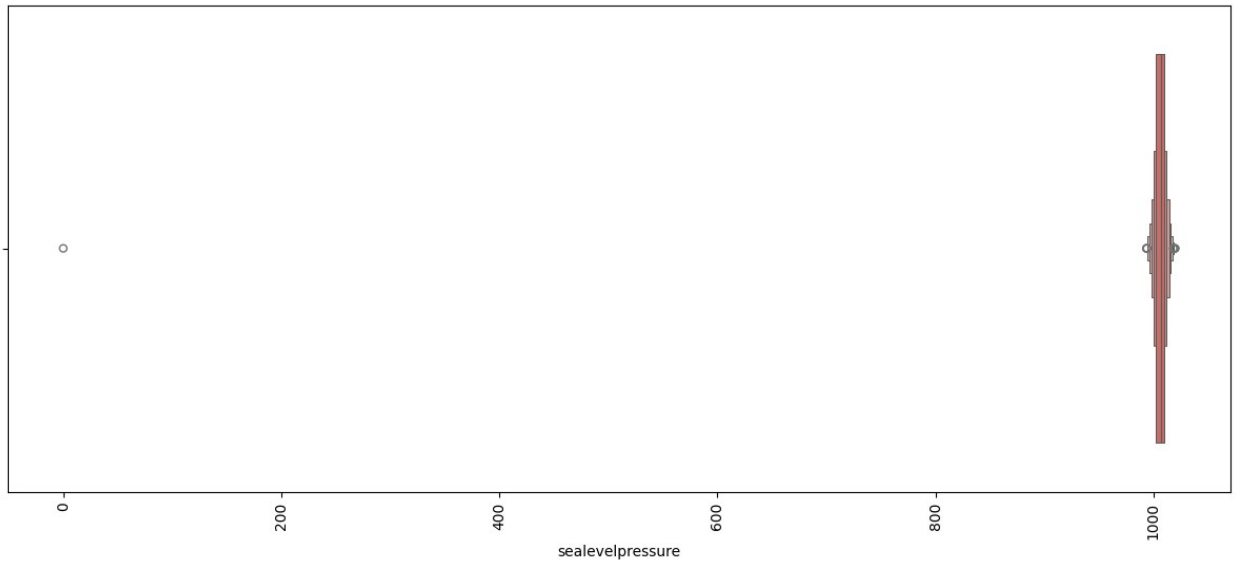
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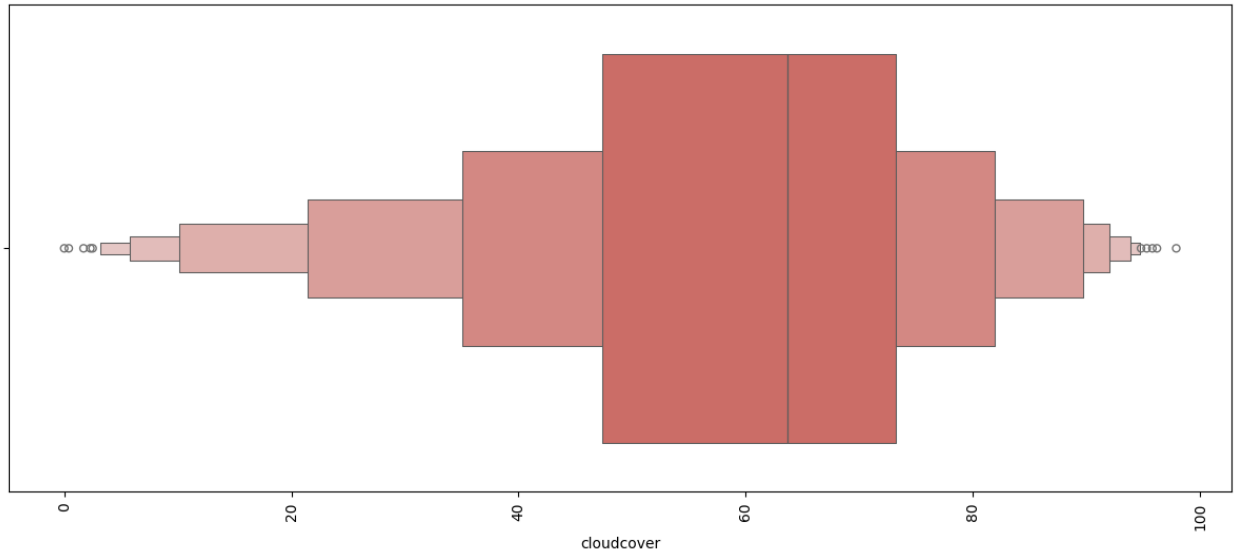
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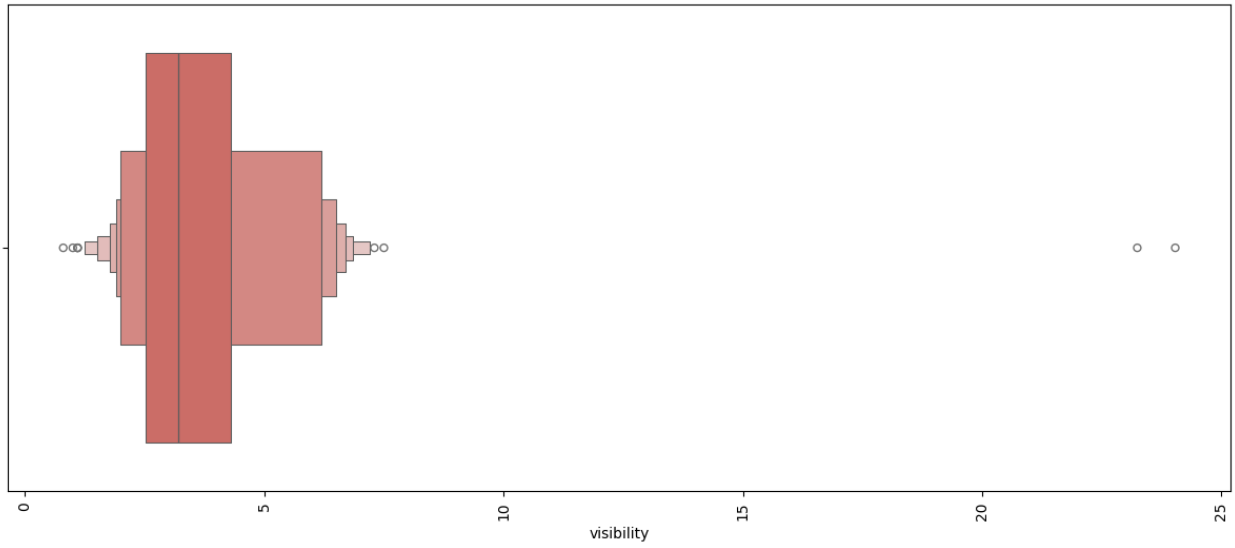
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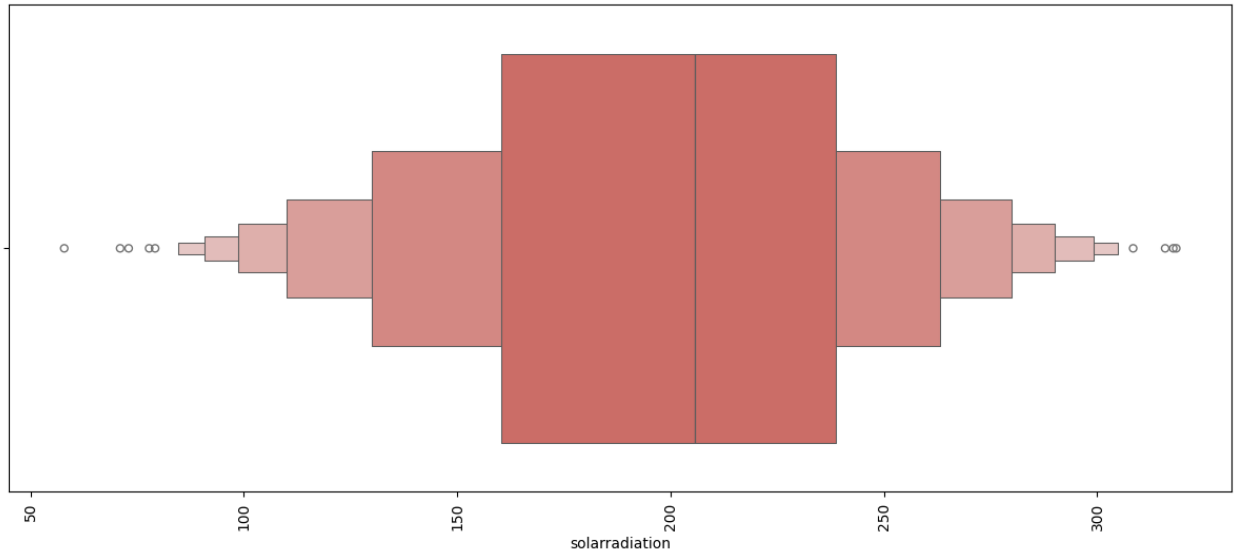
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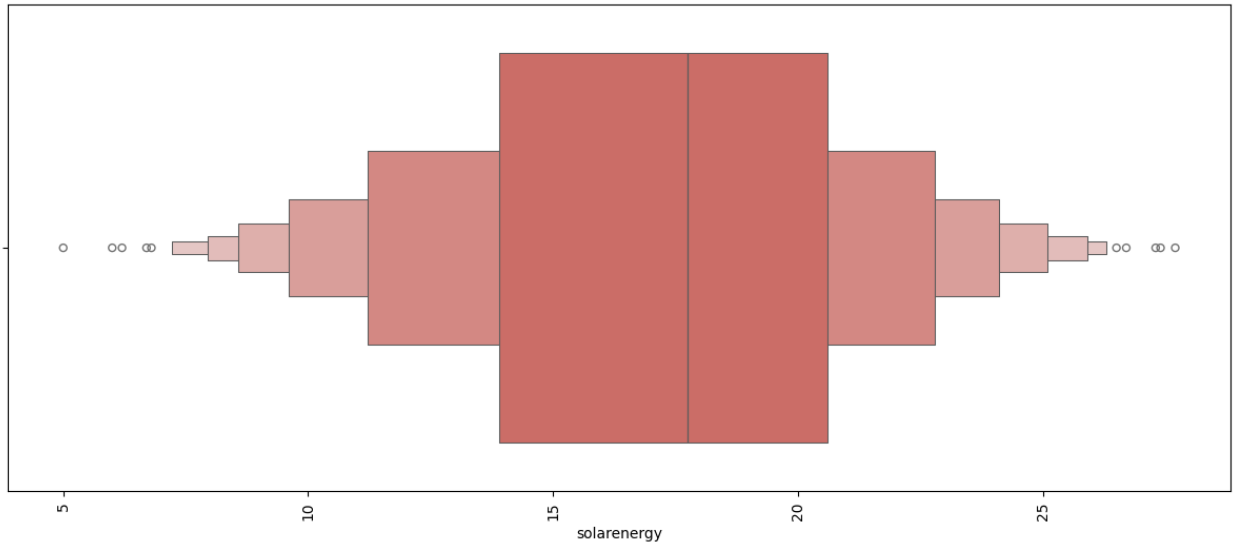
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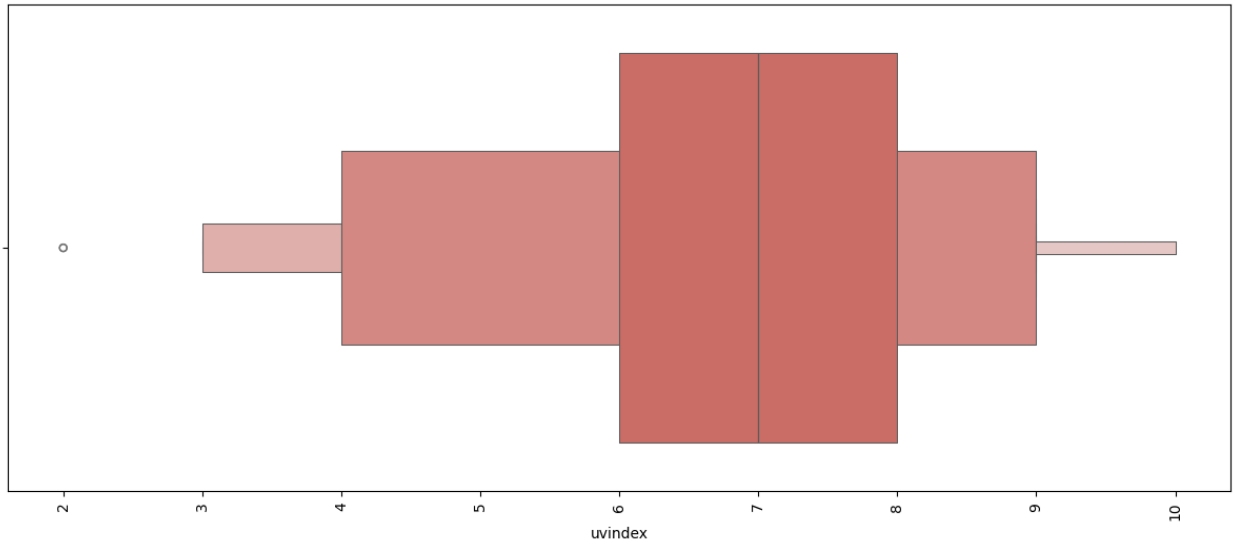
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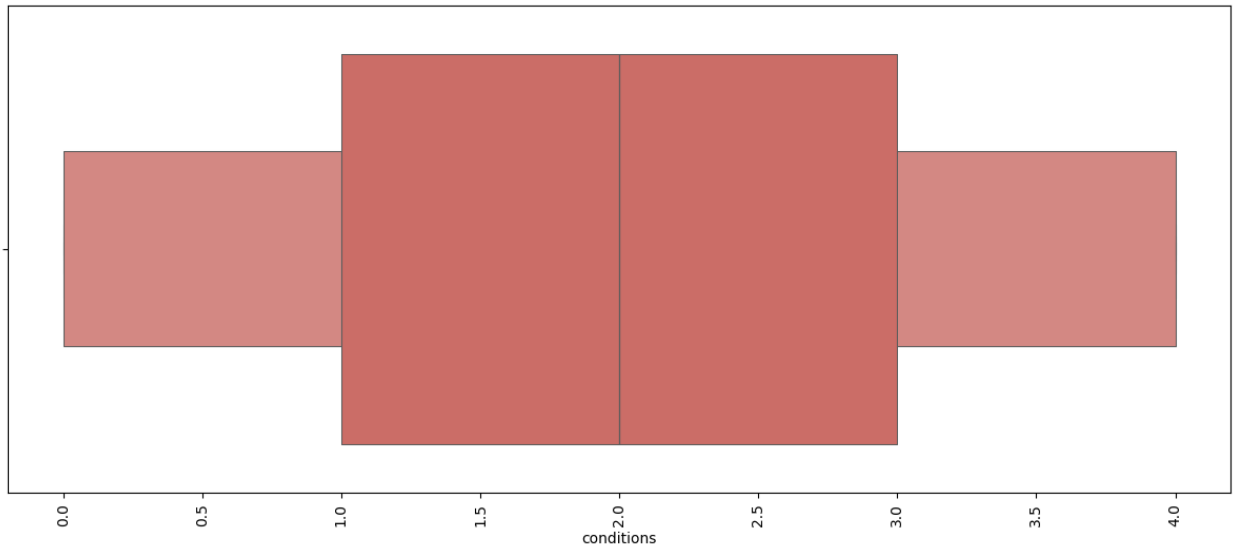
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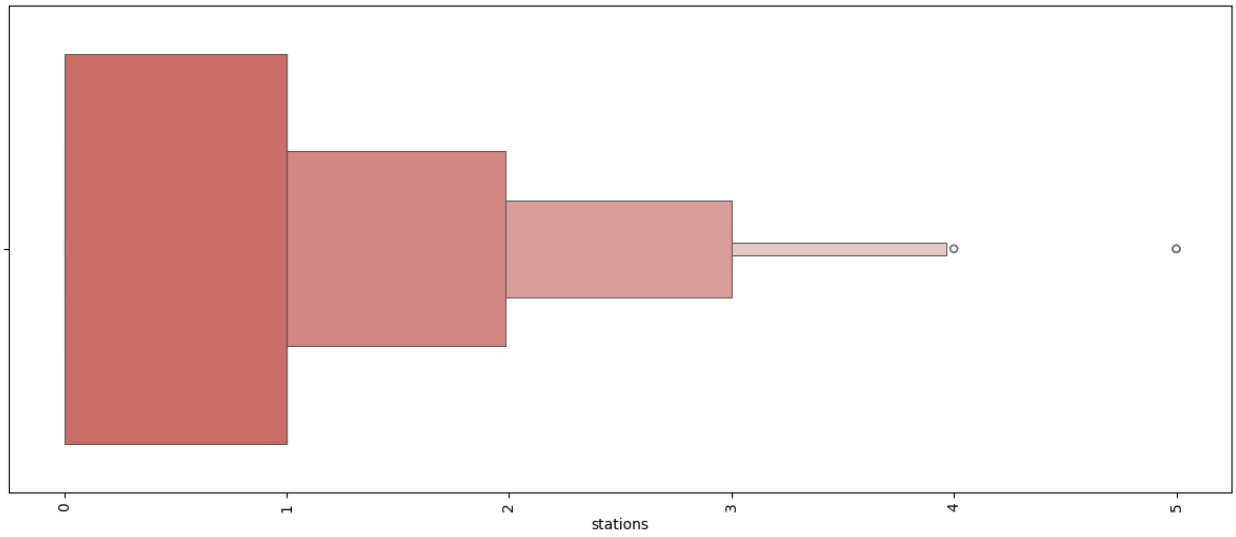
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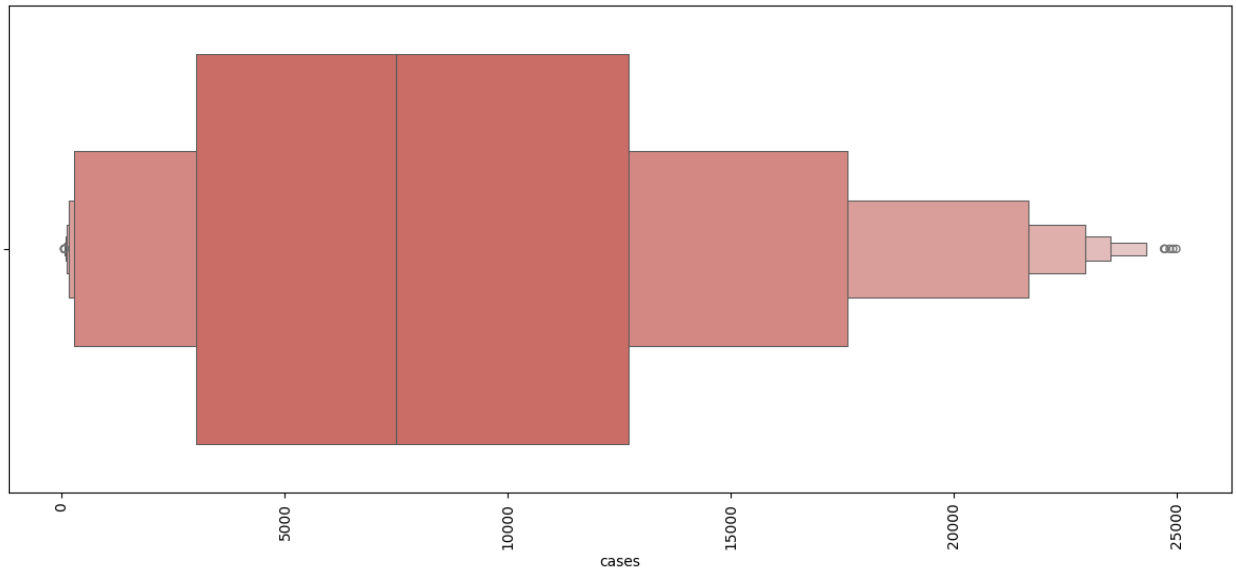
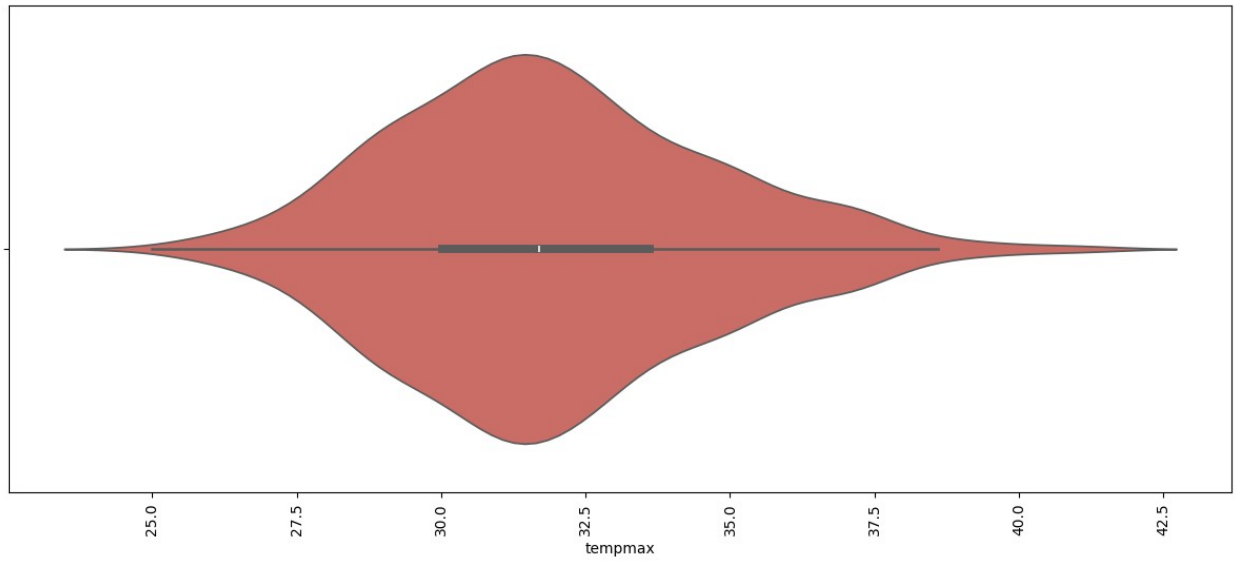
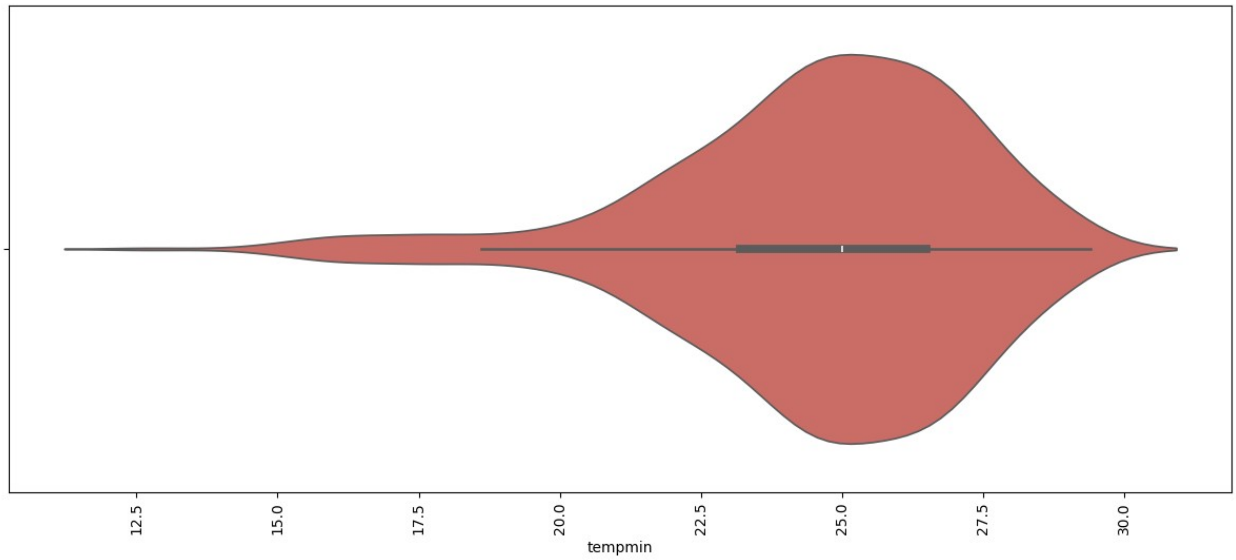



```
for i in continuous:
    plt.figure(figsize=(15, 6))
    sns.violinplot(x=i, data=df, palette='hls')
    plt.xticks(rotation=90)
    plt.show()
```

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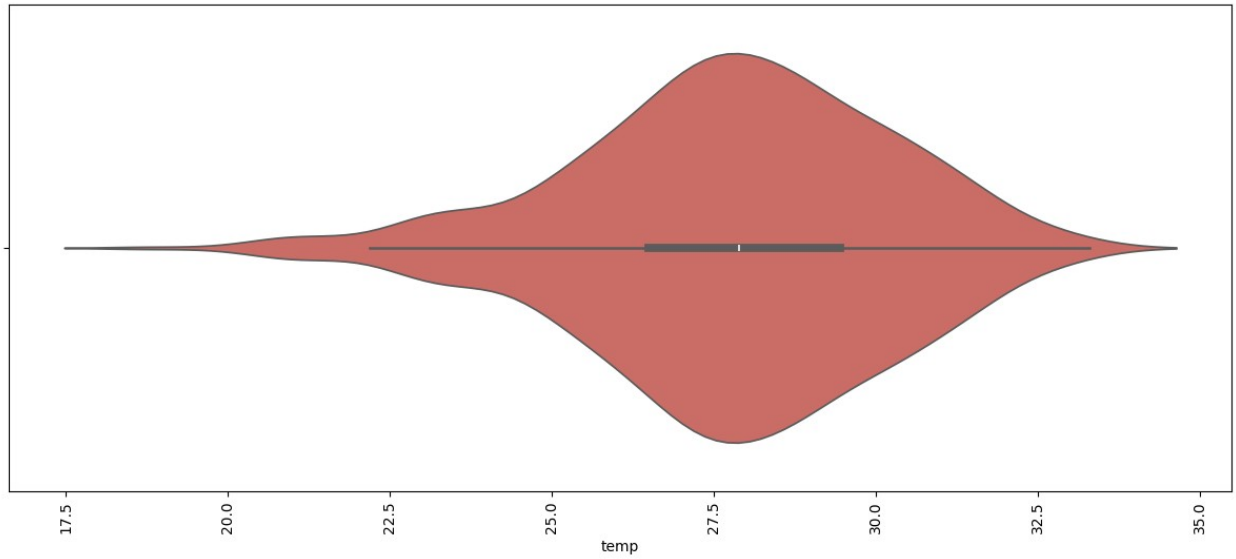
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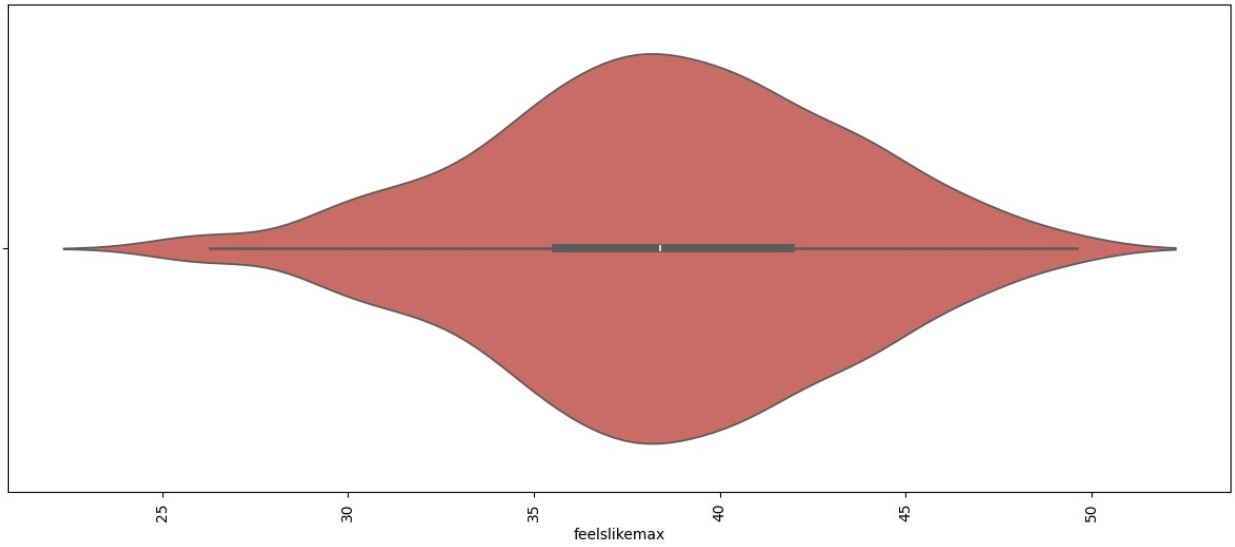
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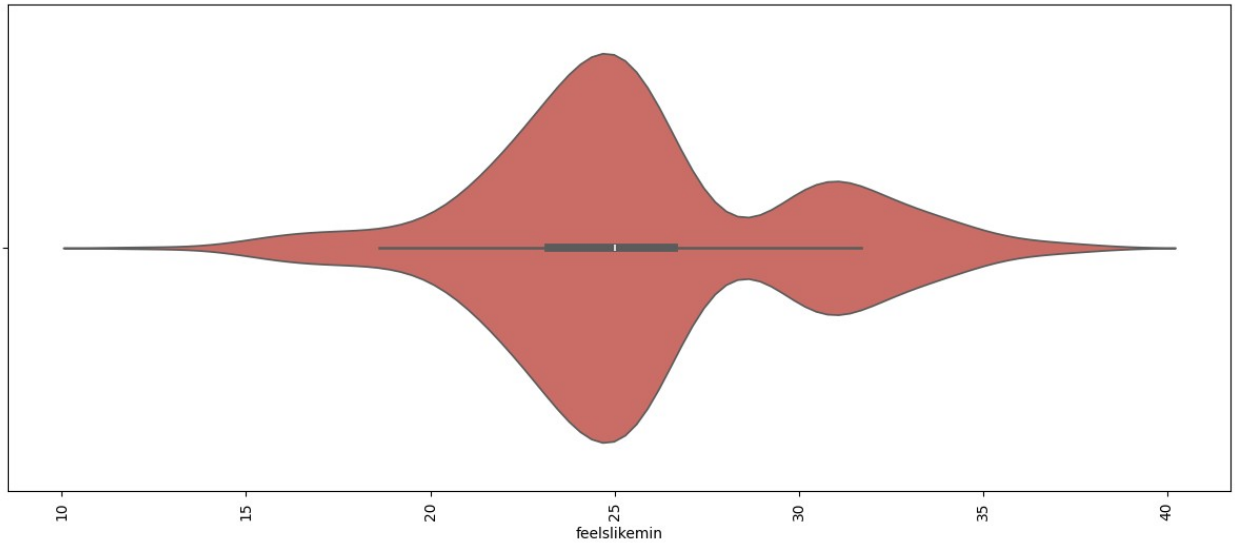
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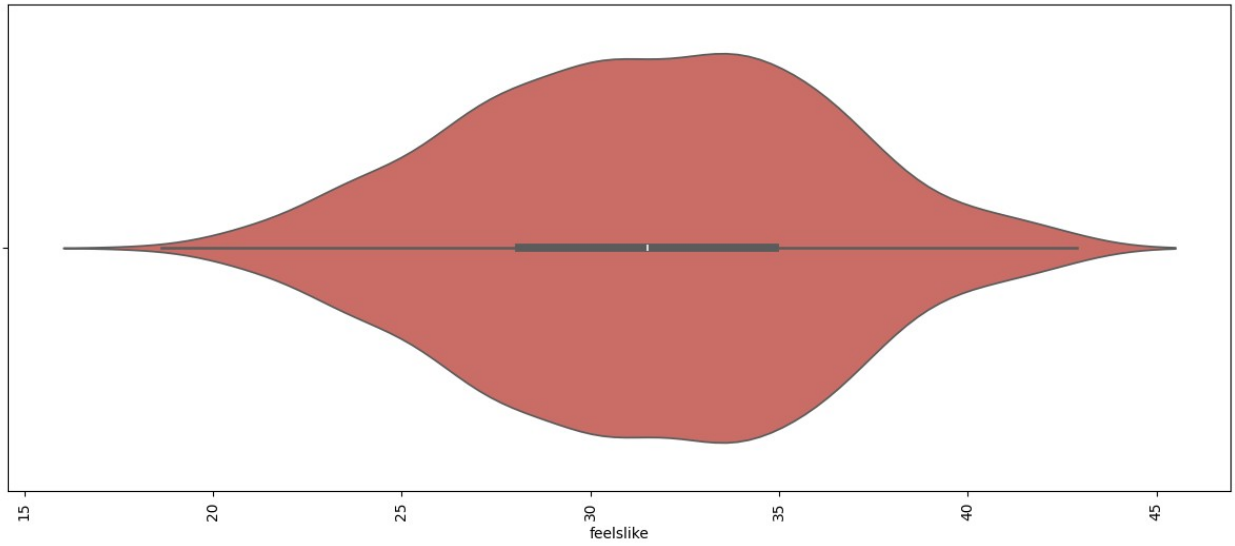
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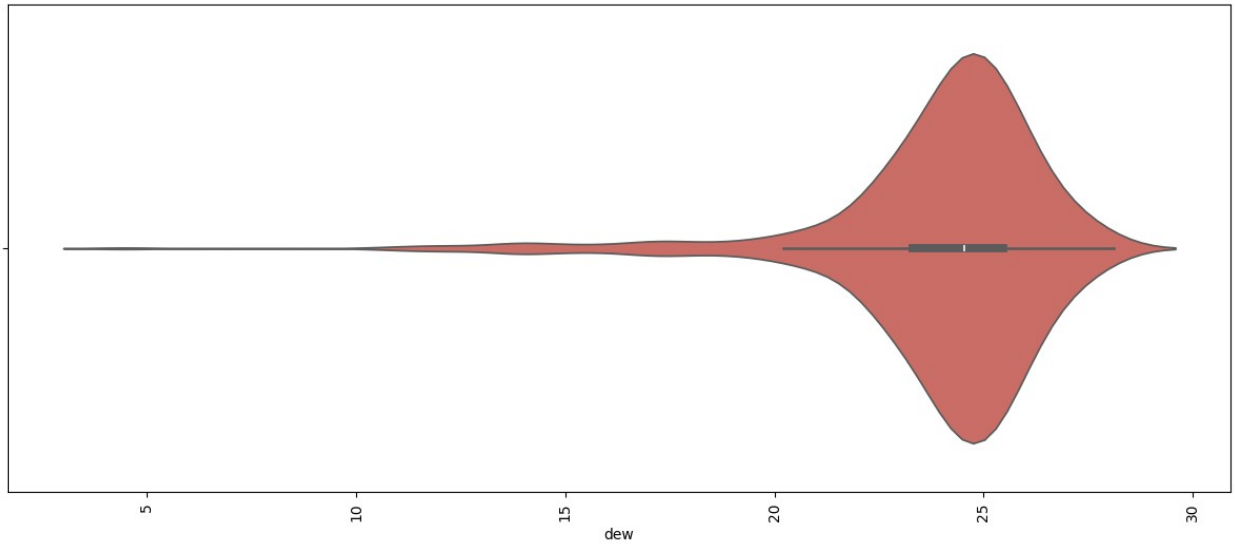
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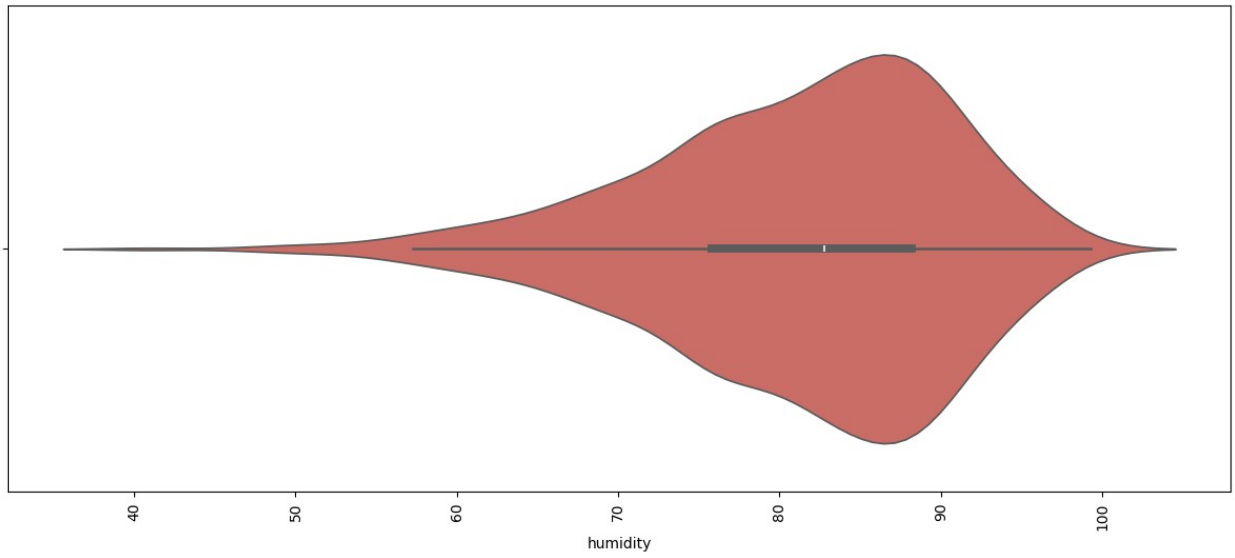
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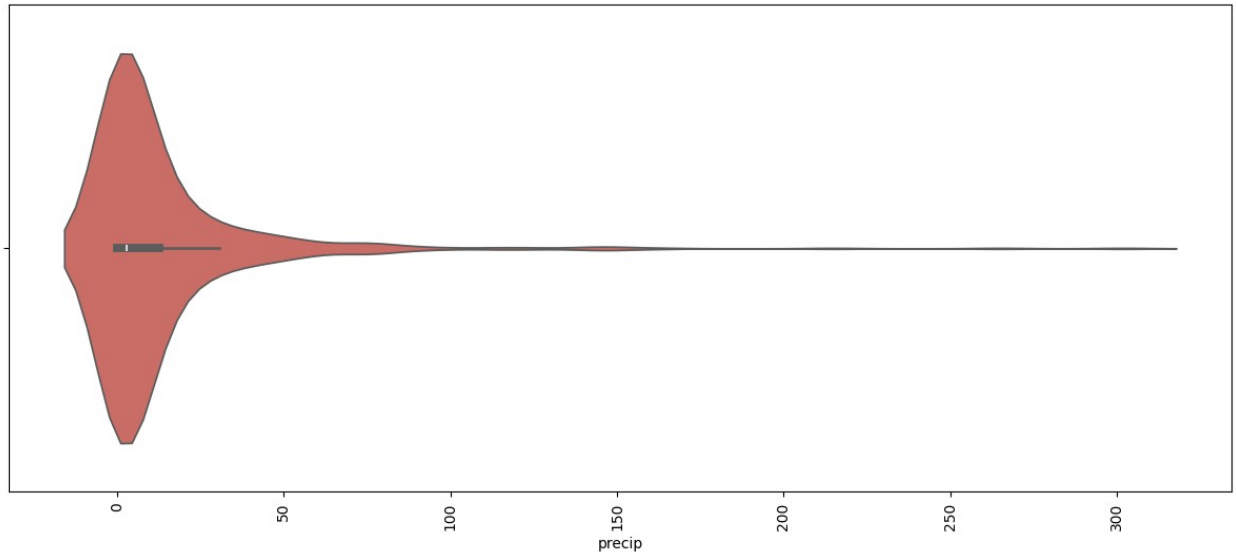
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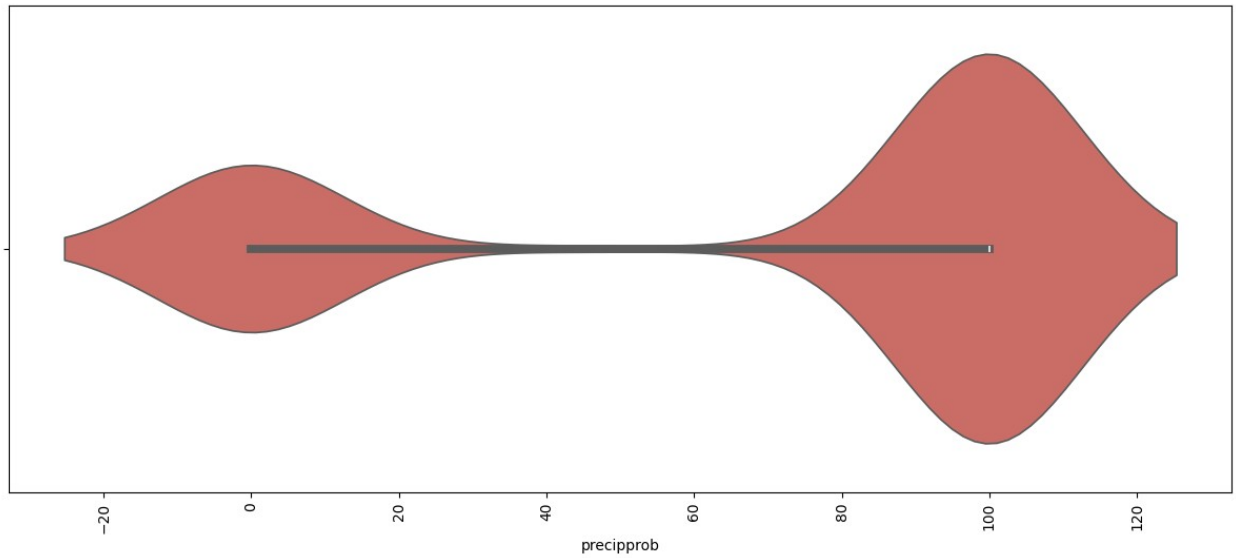
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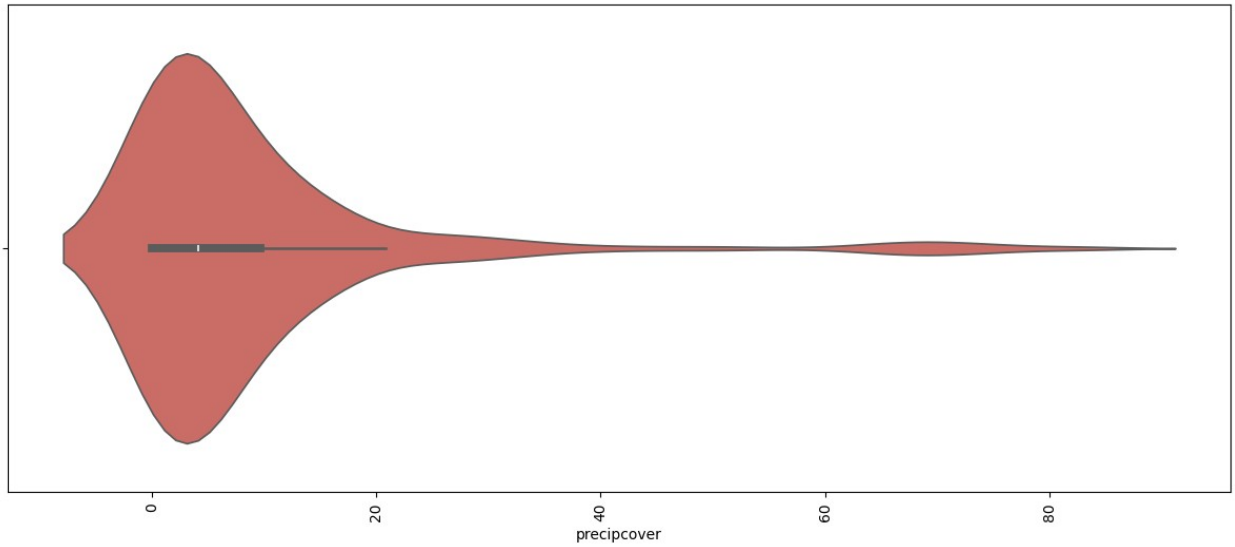
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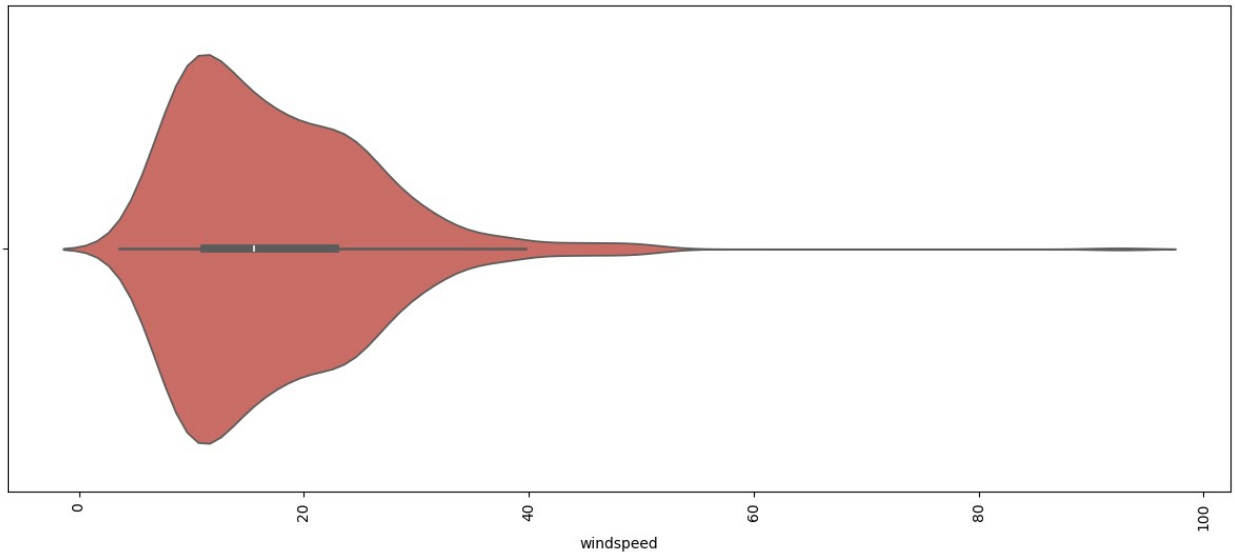
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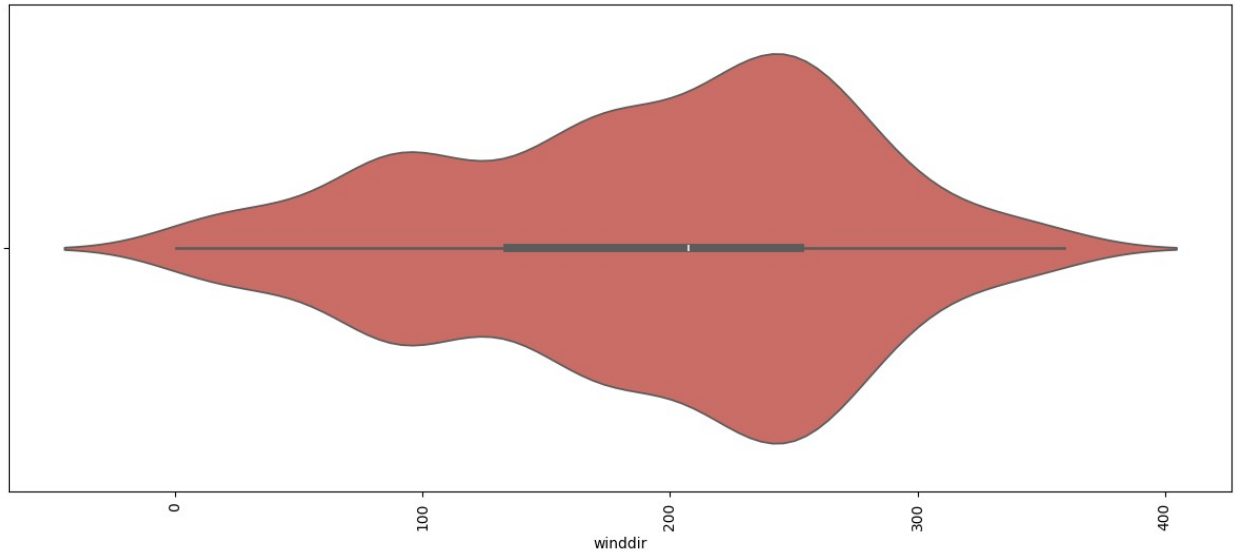
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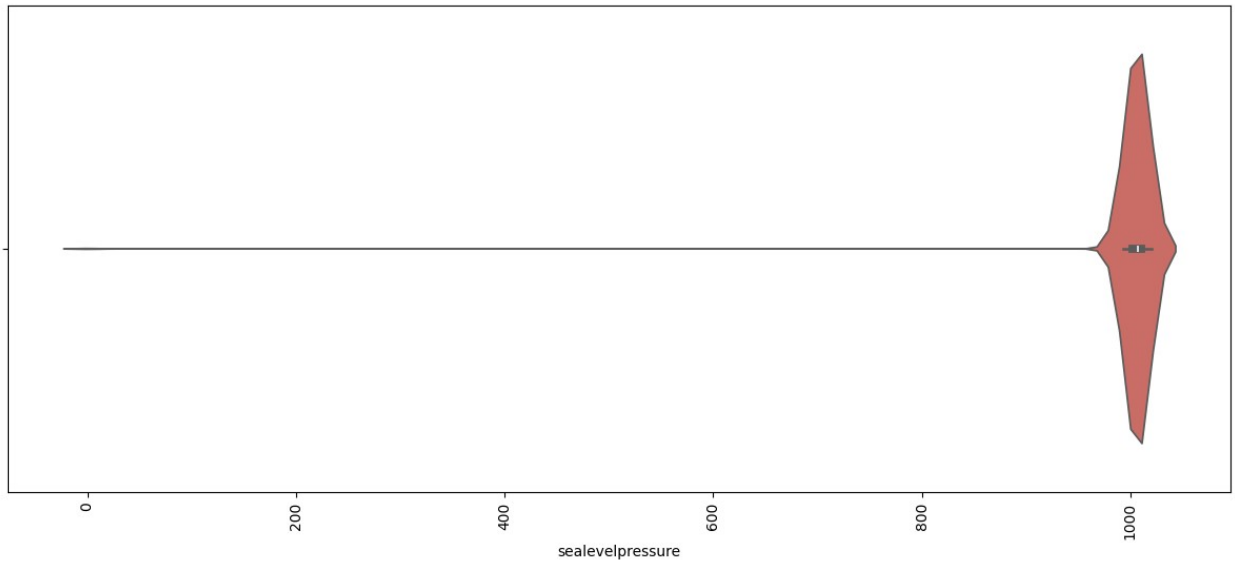
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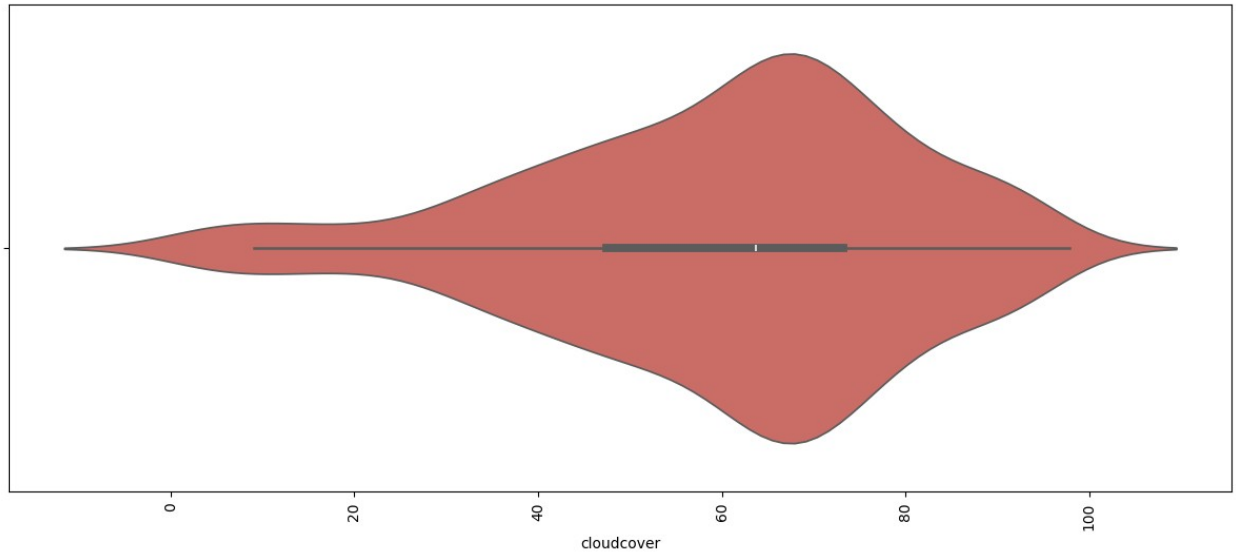
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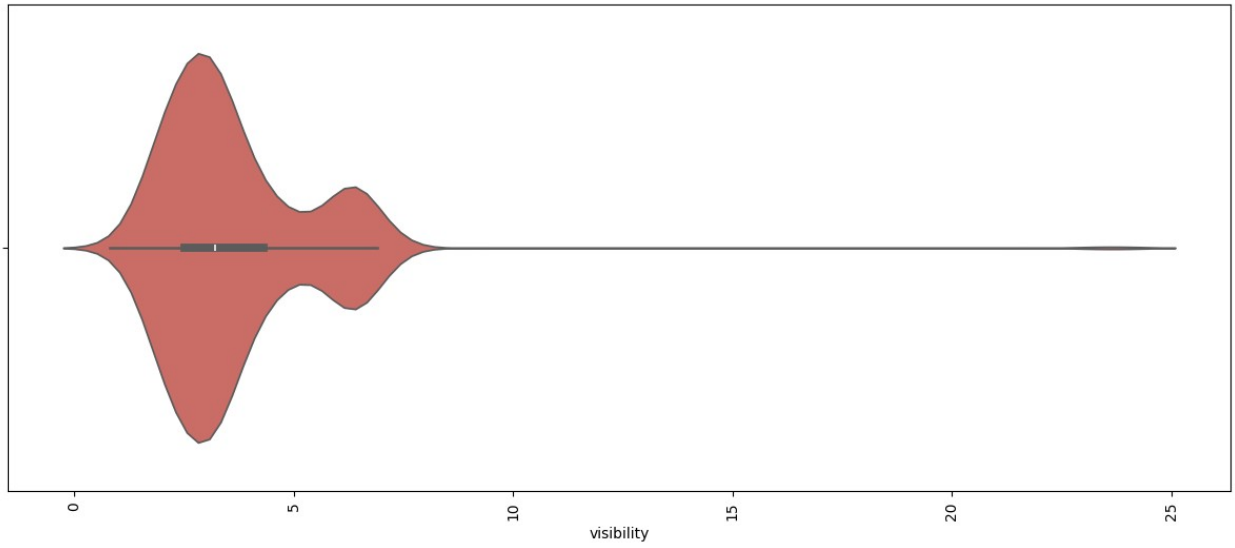
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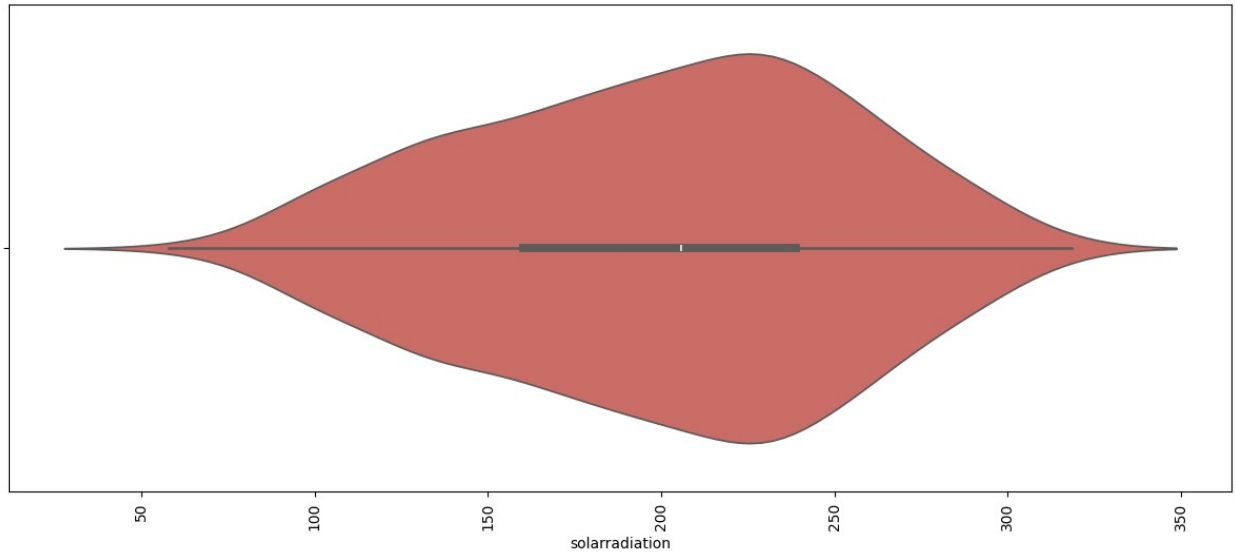
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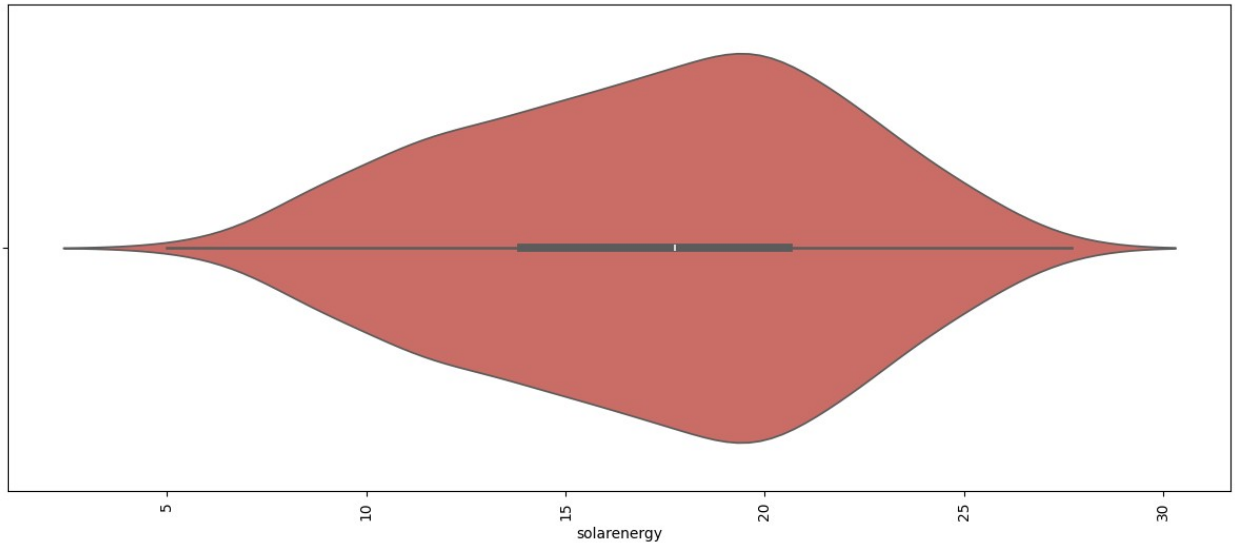
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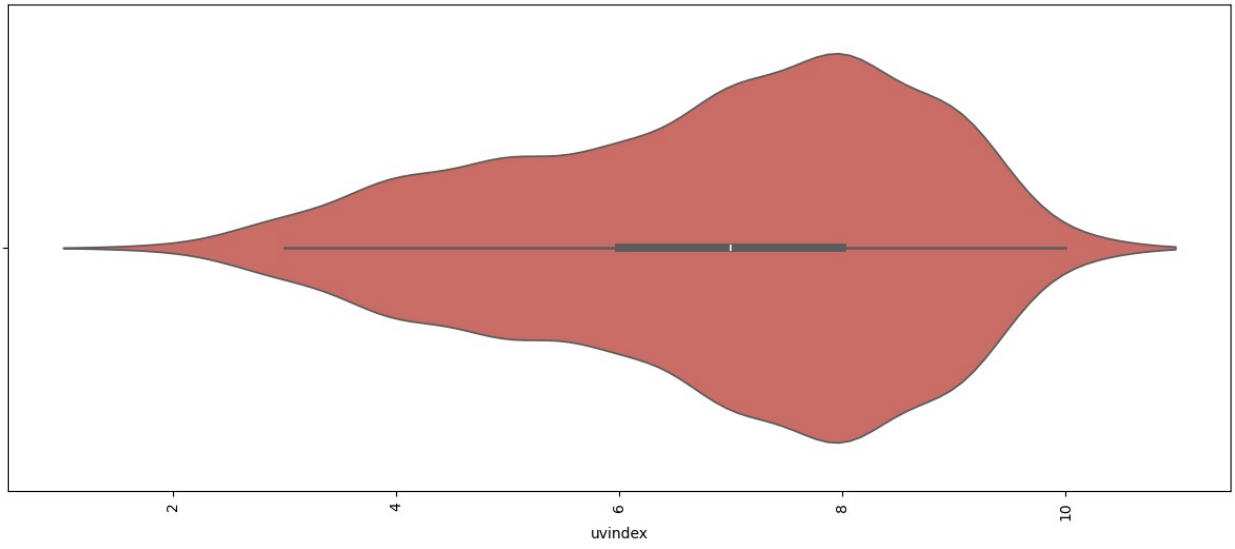
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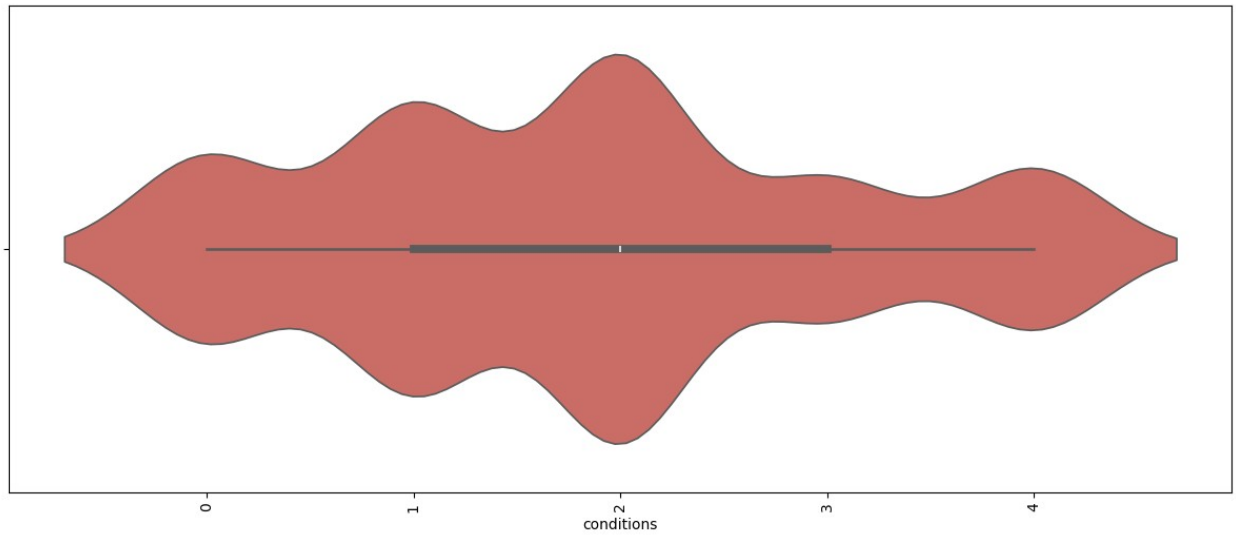
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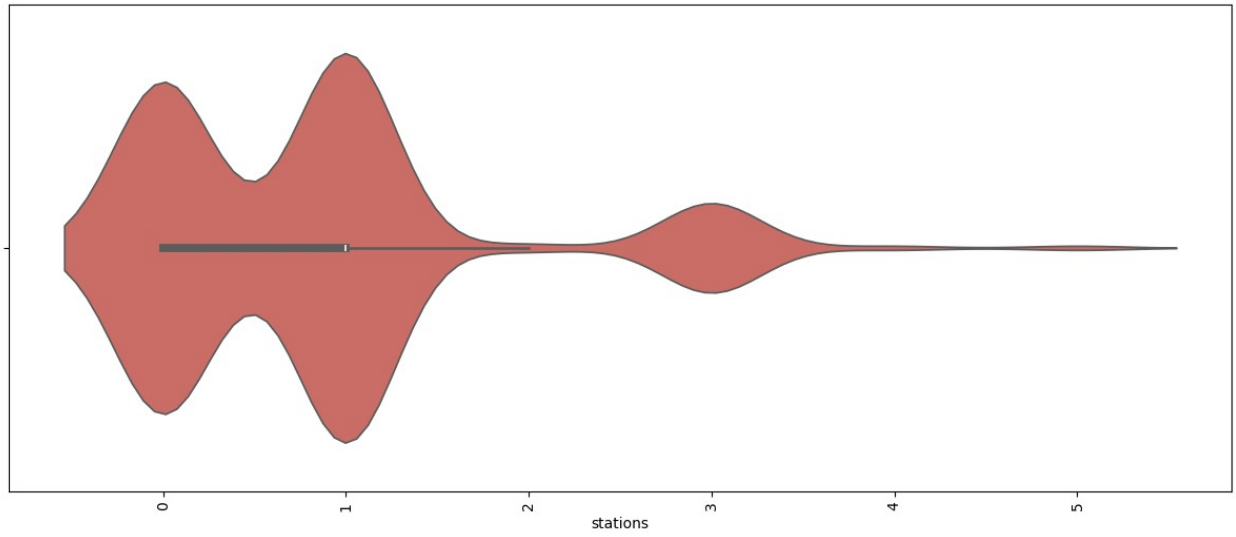
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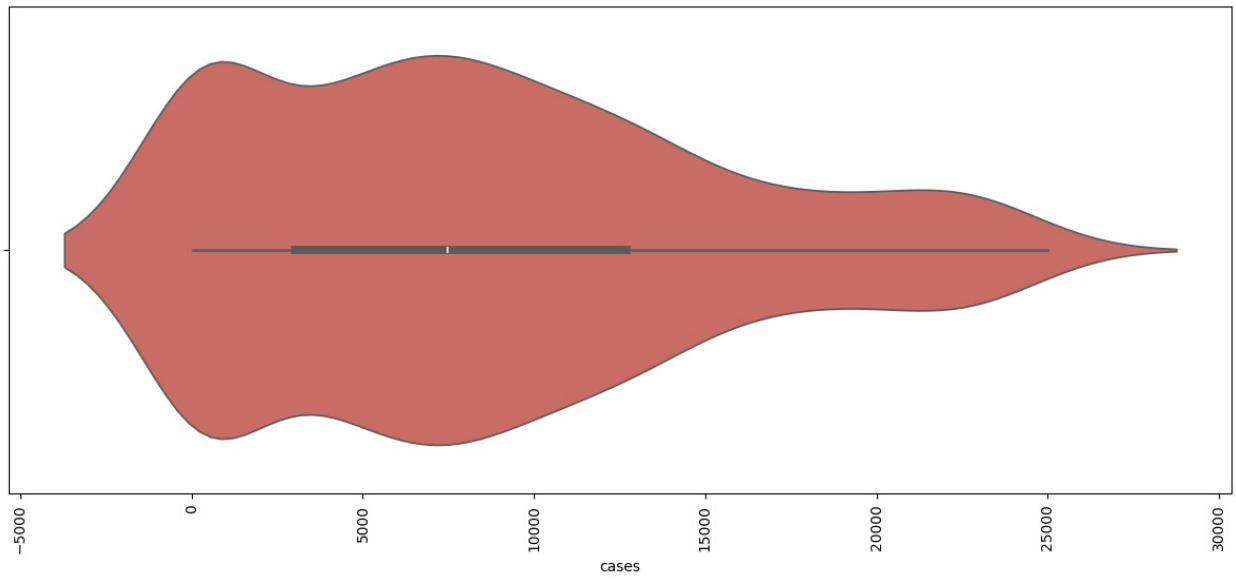
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30000
cases

```
for i in range(len(continuous)):
    for j in range(i + 1, len(continuous)):
        plt.figure(figsize=(15, 6))
        sns.scatterplot(x=continuous[i], y=continuous[j], data=df,
palette='hls')
        plt.title(f'Scatter plot of {continuous[i]} vs
{continuous[j]}')
        plt.show()
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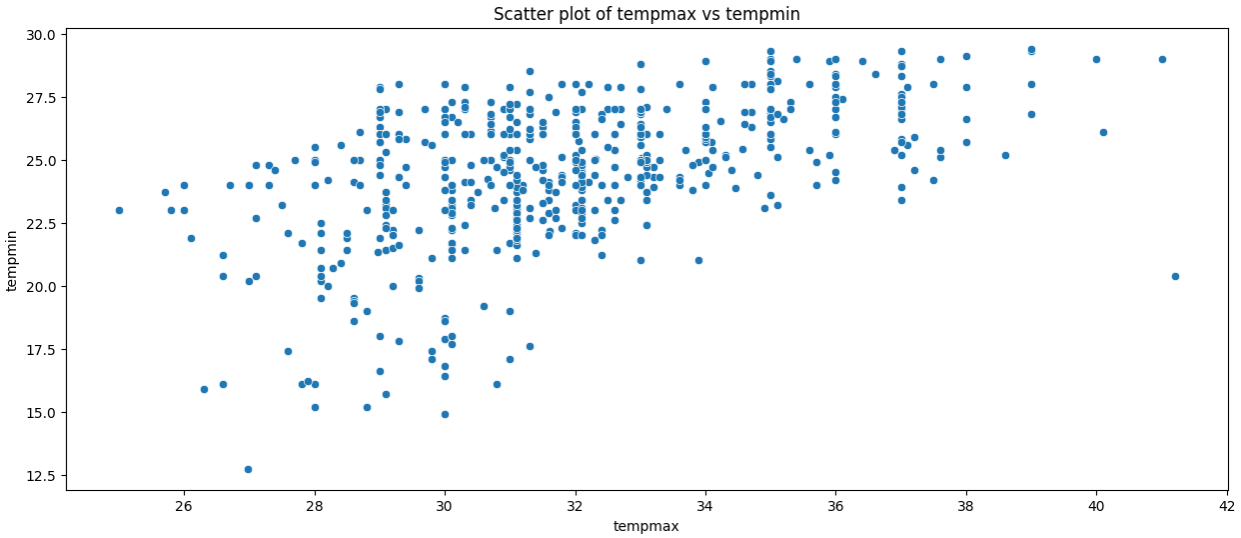

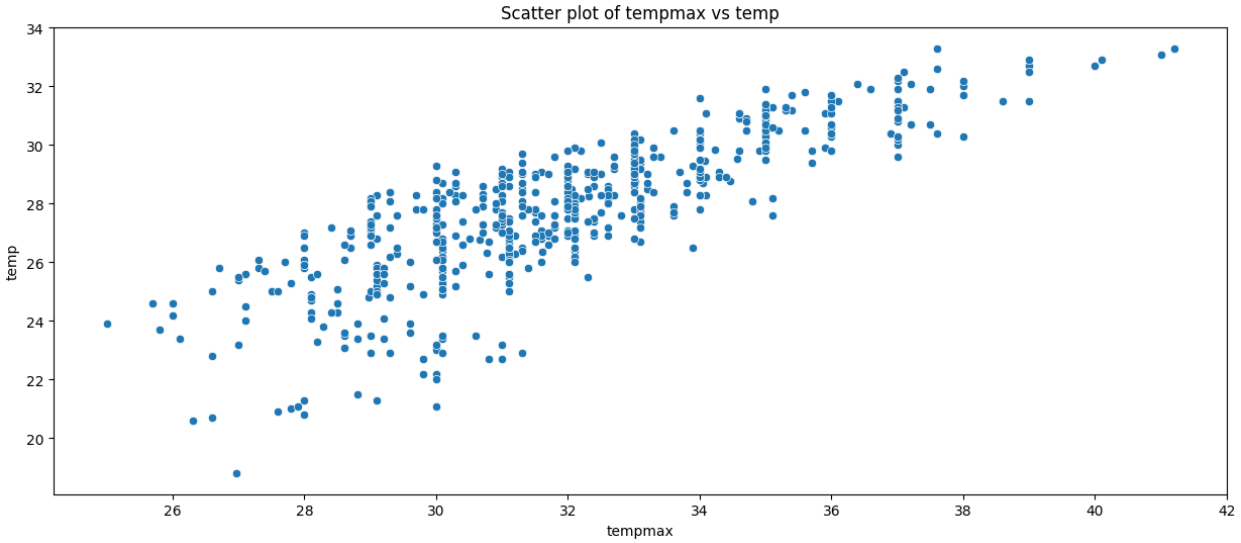

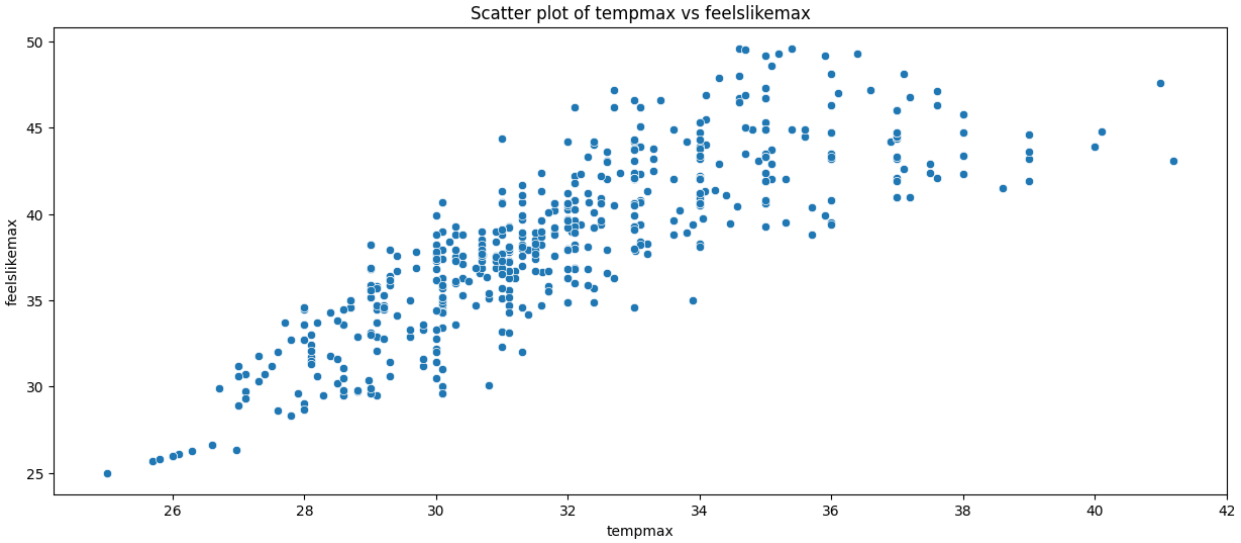
Scatter plot of tempmax vs feelslikemax
feelslikemax
tempmax
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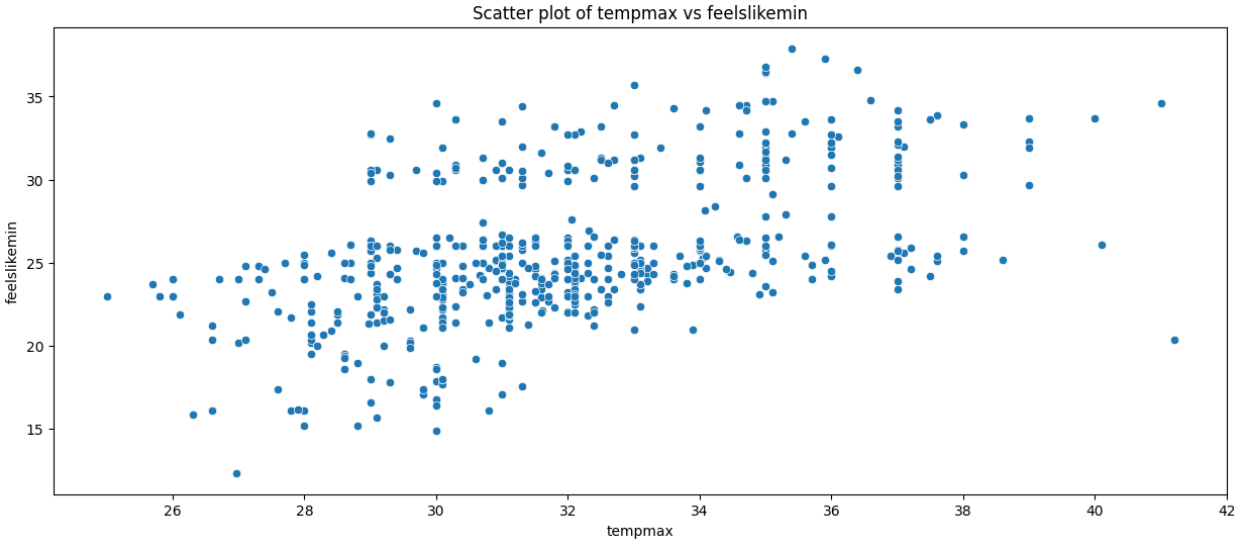
Scatter plot of tempmax vs feelslikemin
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tempmax
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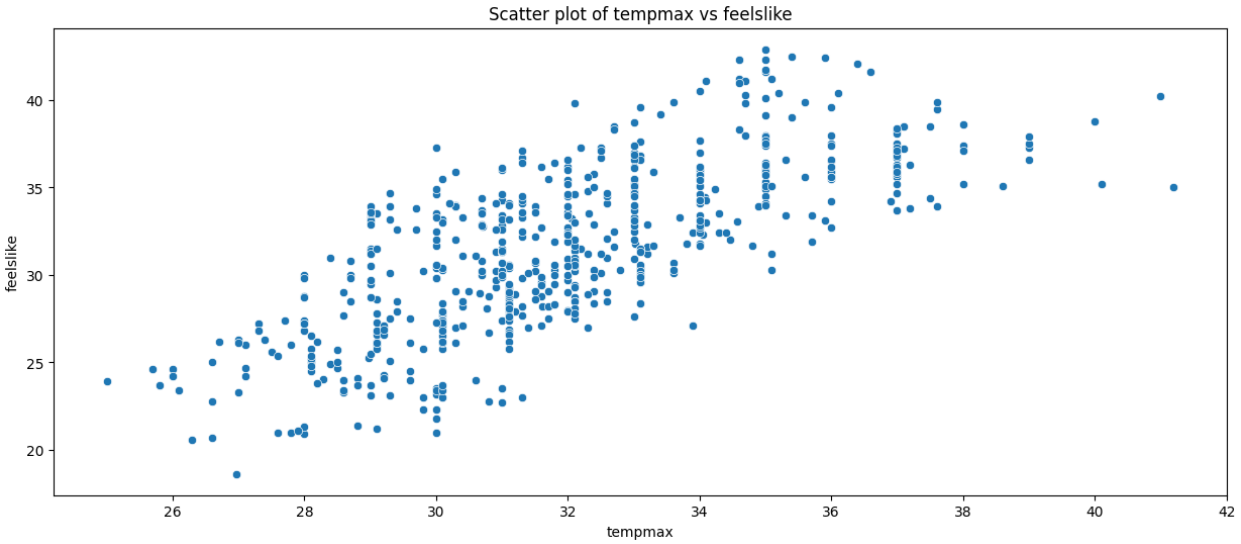
Scatter plot of tempmax vs feelslike
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tempmax
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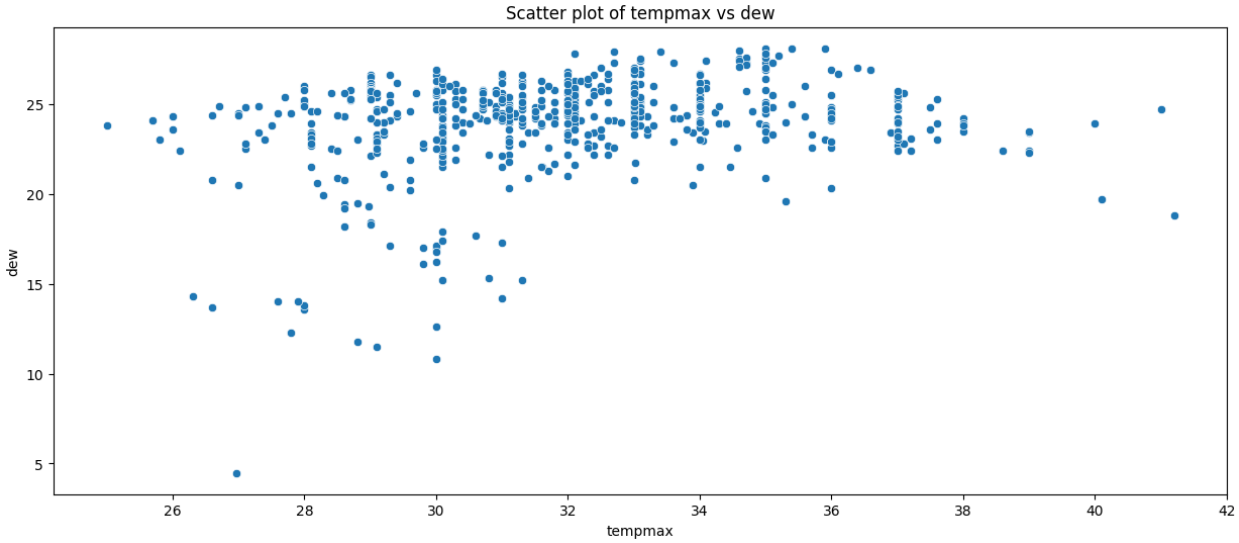
Scatter plot of tempmax vs dew
dew
tempmax
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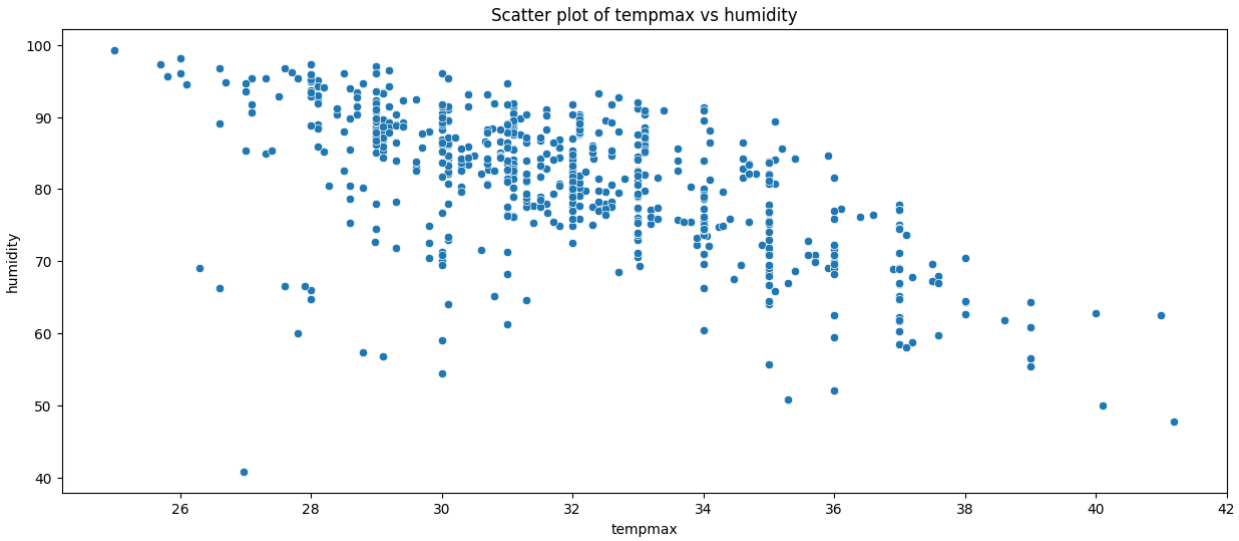
Scatter plot of tempmax vs humidity
humidity
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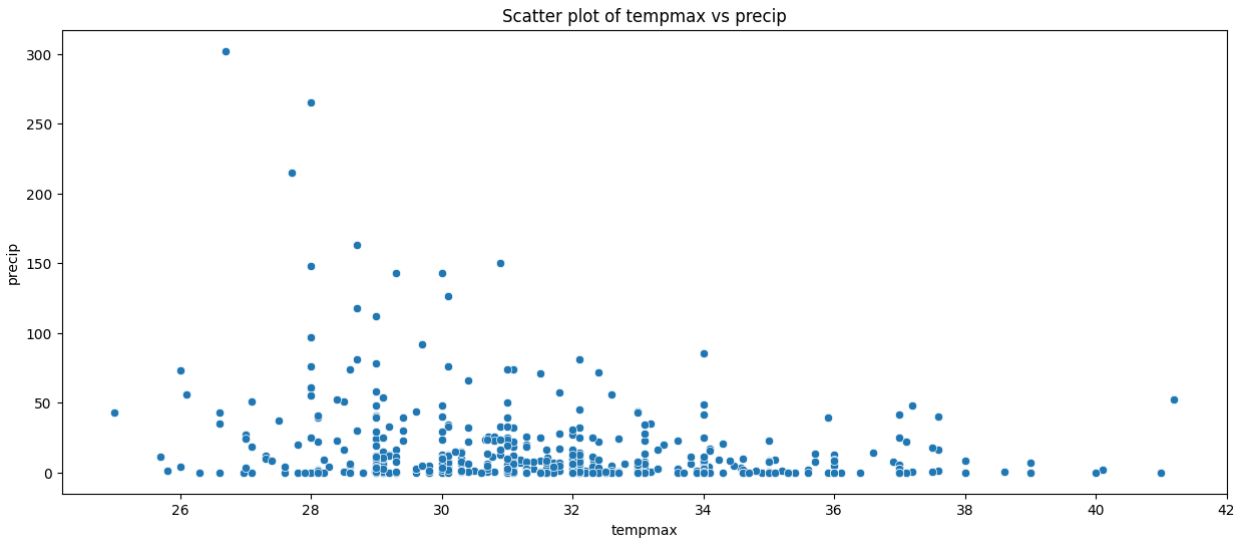
Scatter plot of tempmax vs precip
precip
tempmax
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50
100
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300
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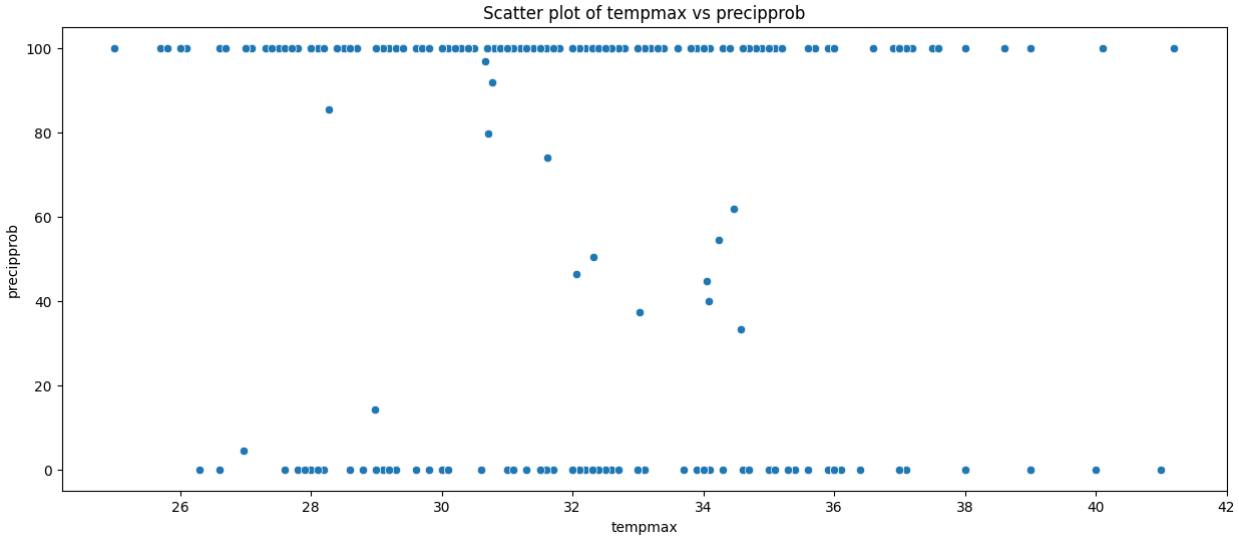
Scatter plot of tempmax vs precipprob
precipprob
tempmax
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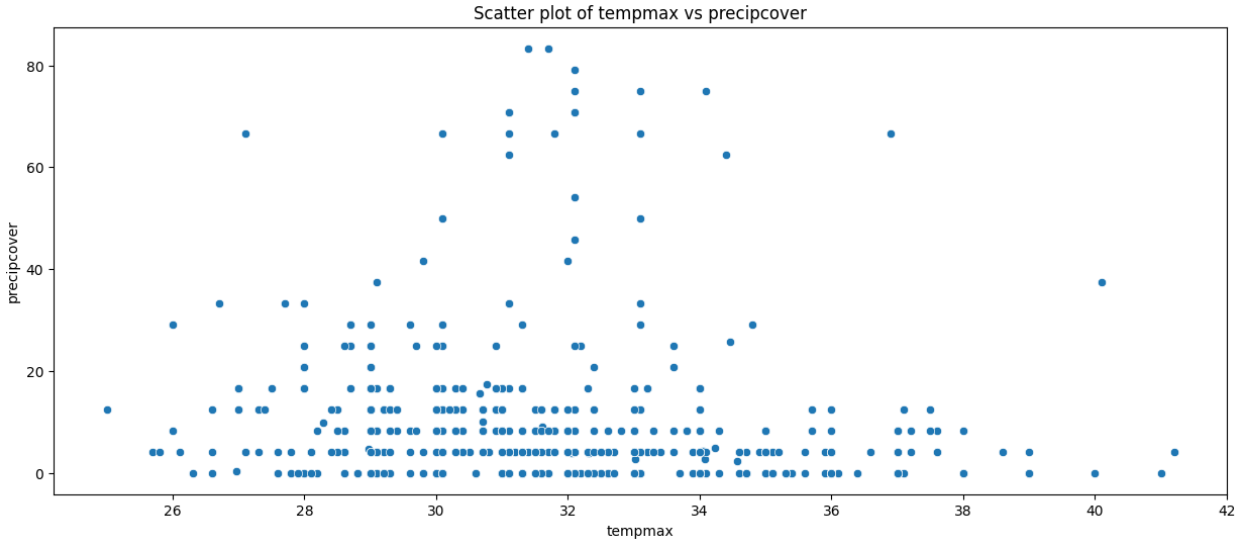
Scatter plot of tempmax vs precipcover
precipcover
tempmax
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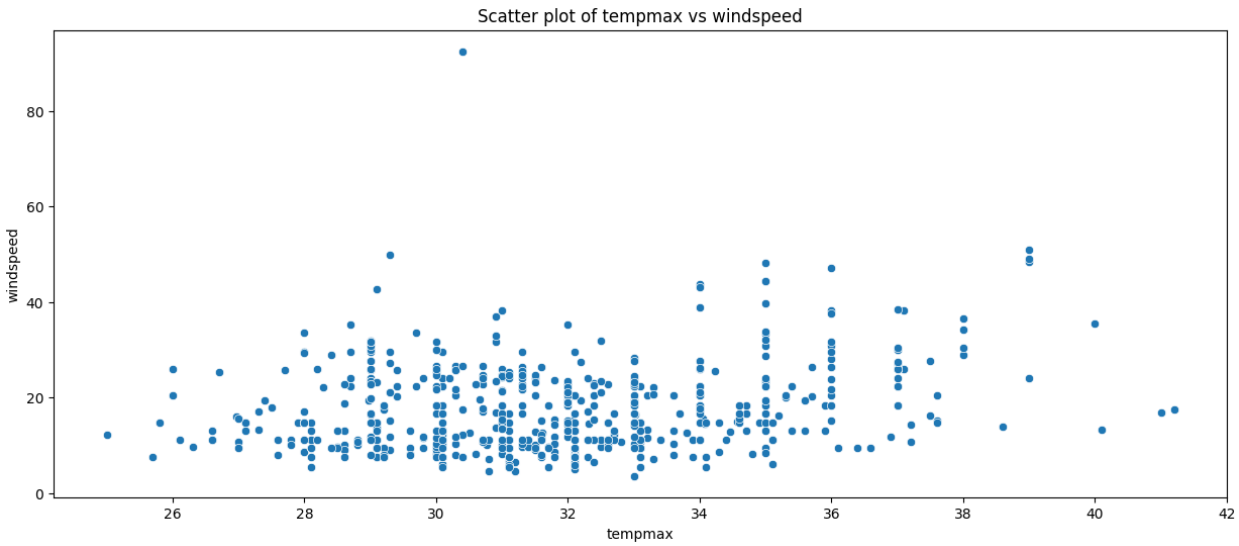
Scatter plot of tempmax vs windspeed
windspeed
tempmax
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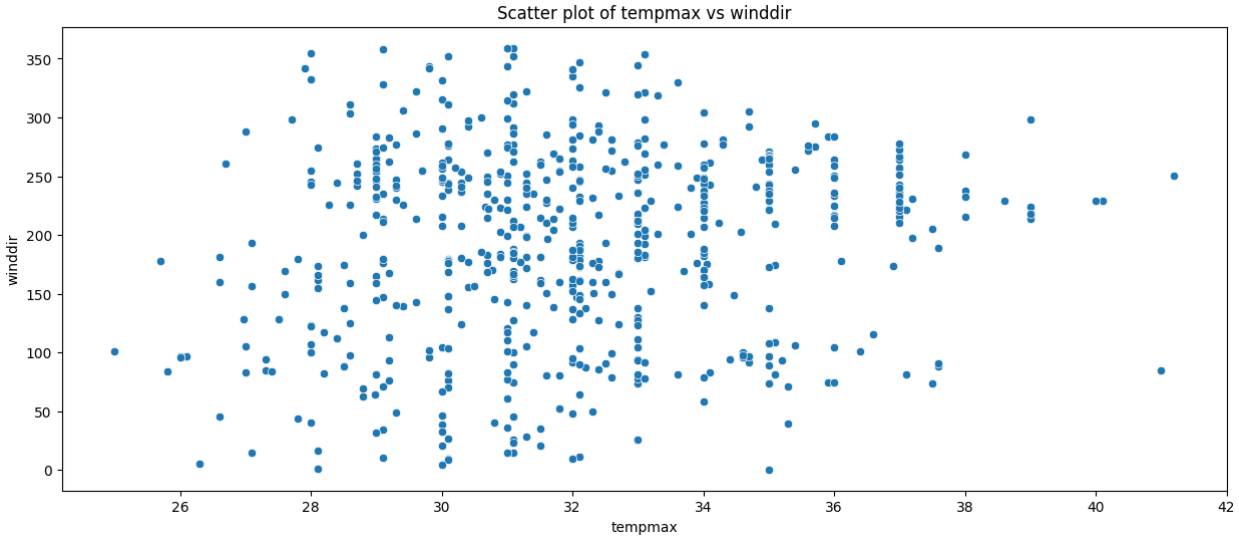
Scatter plot of tempmax vs winddir
winddir
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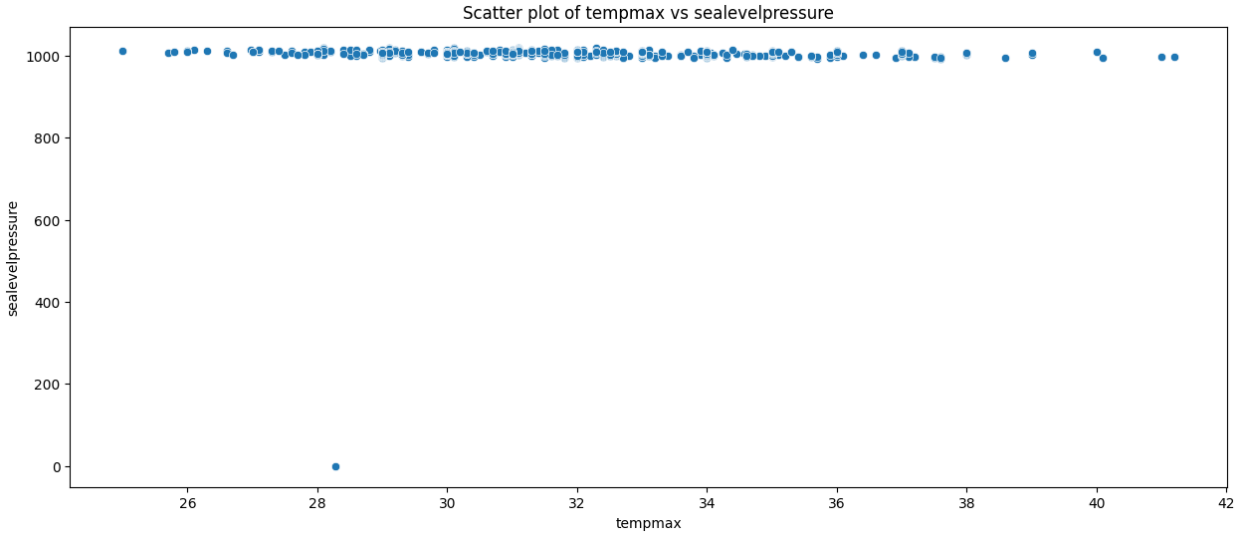
Scatter plot of tempmax vs sealevelpressure
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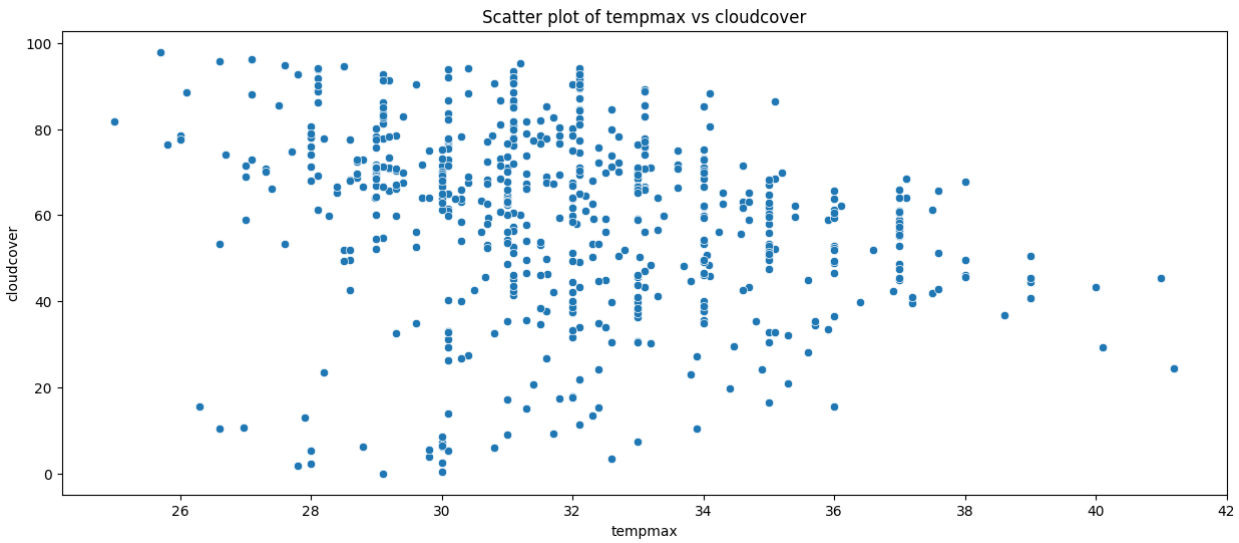
Scatter plot of tempmax vs cloudcover
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tempmax
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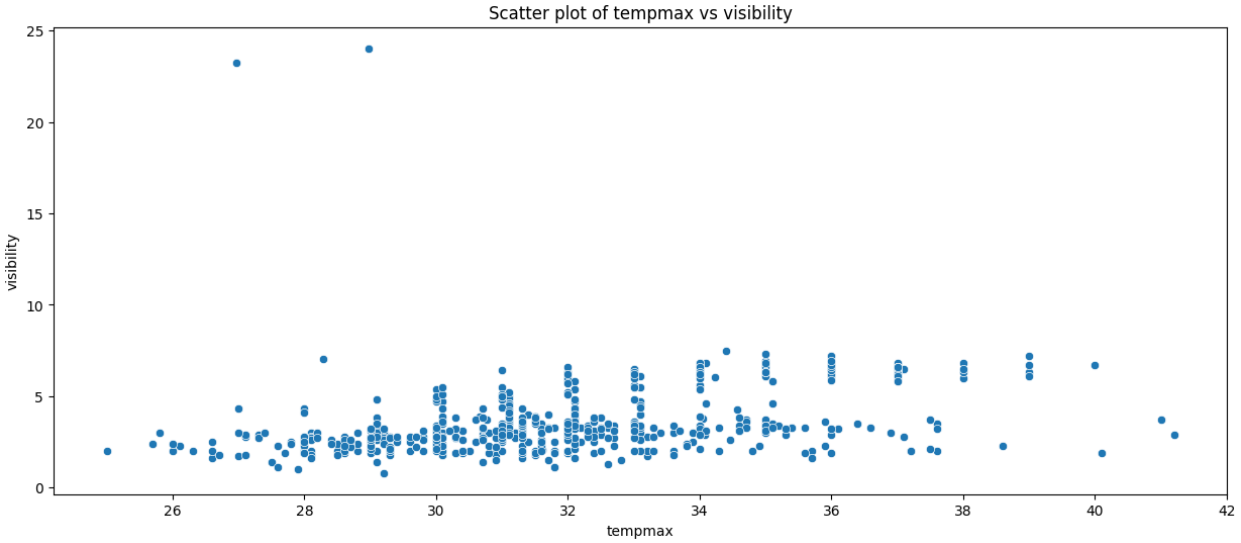
Scatter plot of tempmax vs visibility
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tempmax
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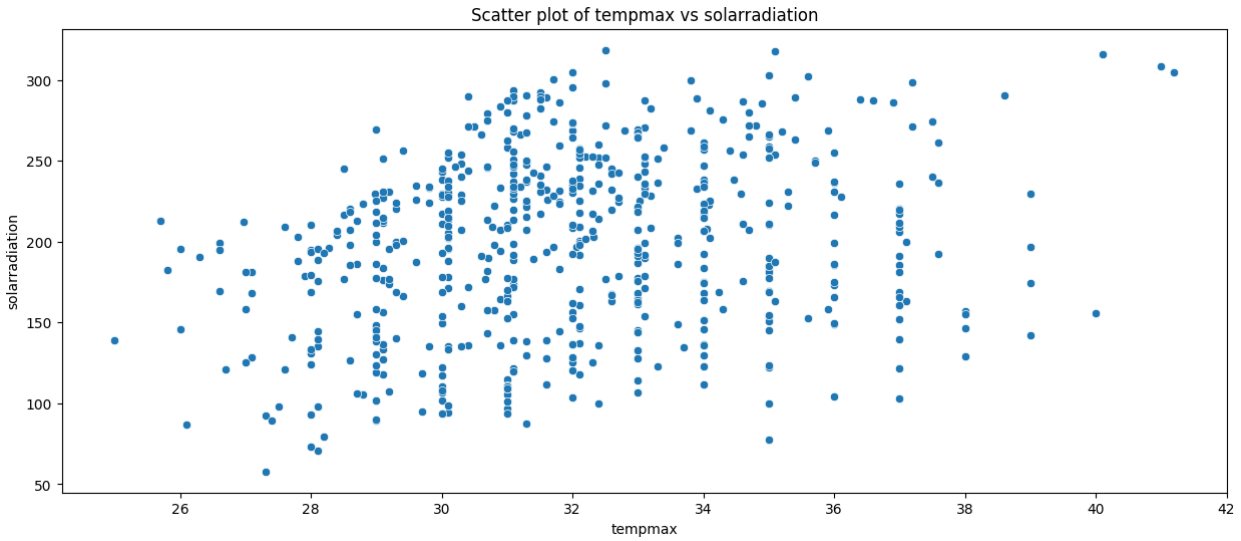
Scatter plot of tempmax vs solarradiation
solarradiation
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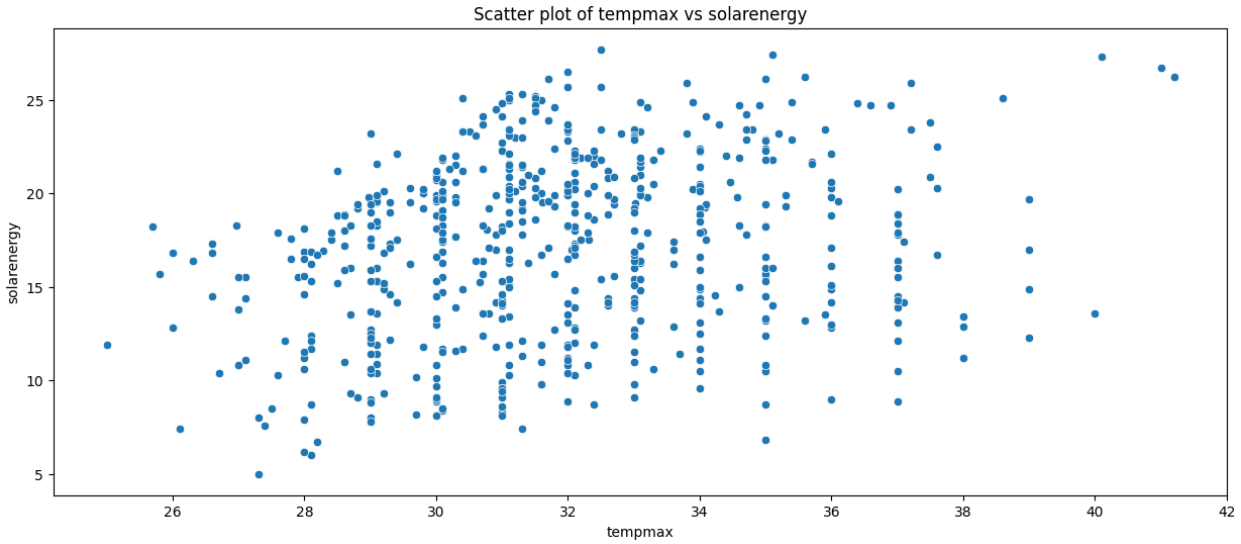
Scatter plot of tempmax vs solarenergy
solarenergy
tempmax
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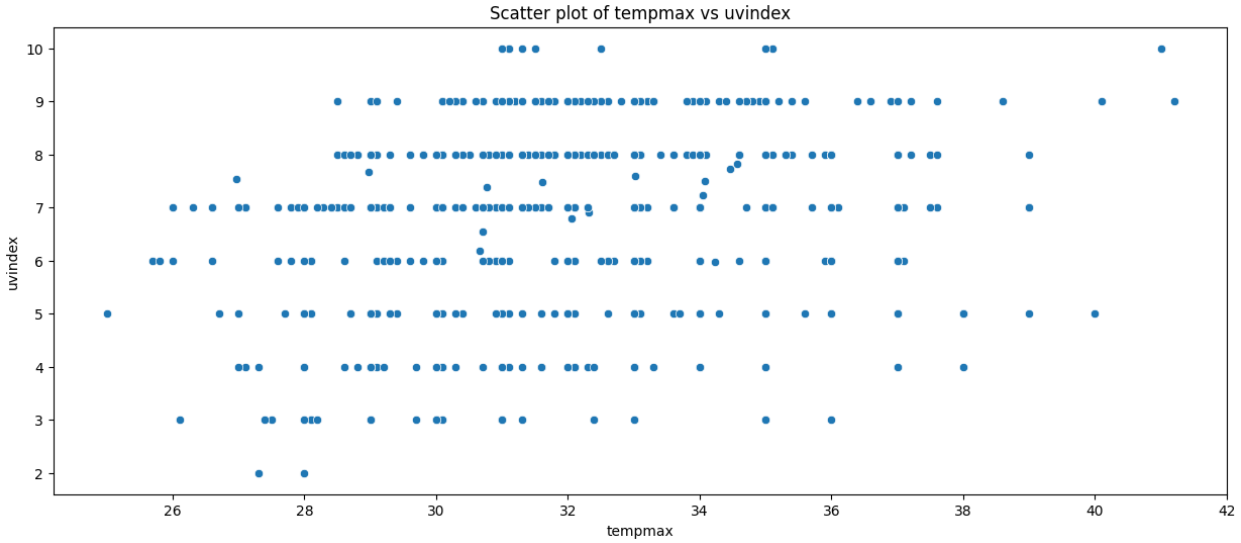
Scatter plot of tempmax vs uvindex
uvindex
tempmax
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9
8
7
6
5
4
3
2
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28
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36
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40
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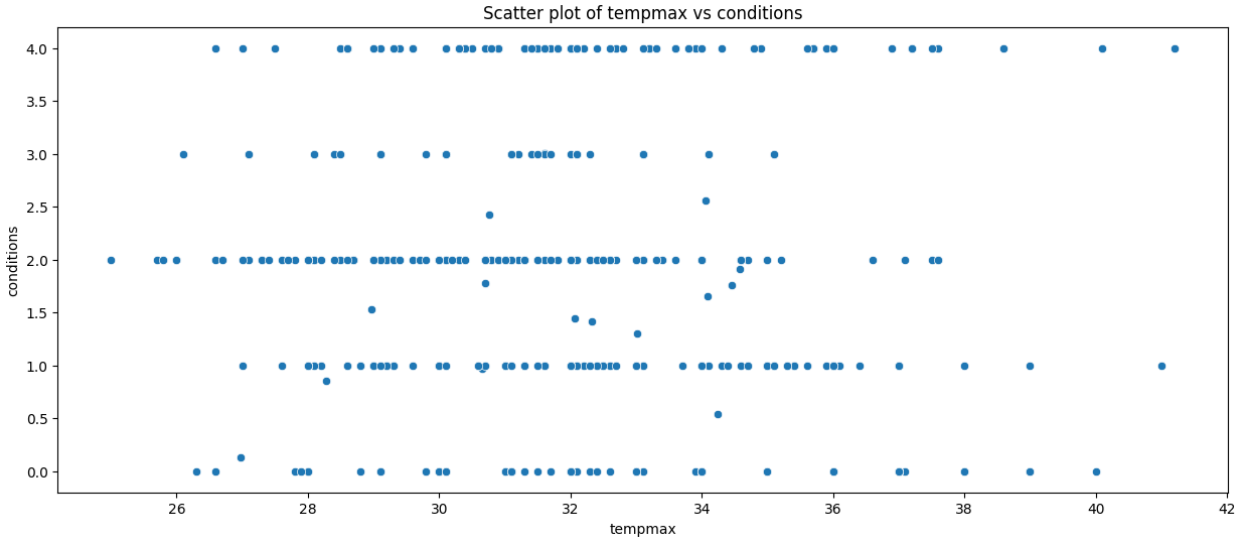
Scatter plot of tempmax vs conditions
conditions
tempmax
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
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40
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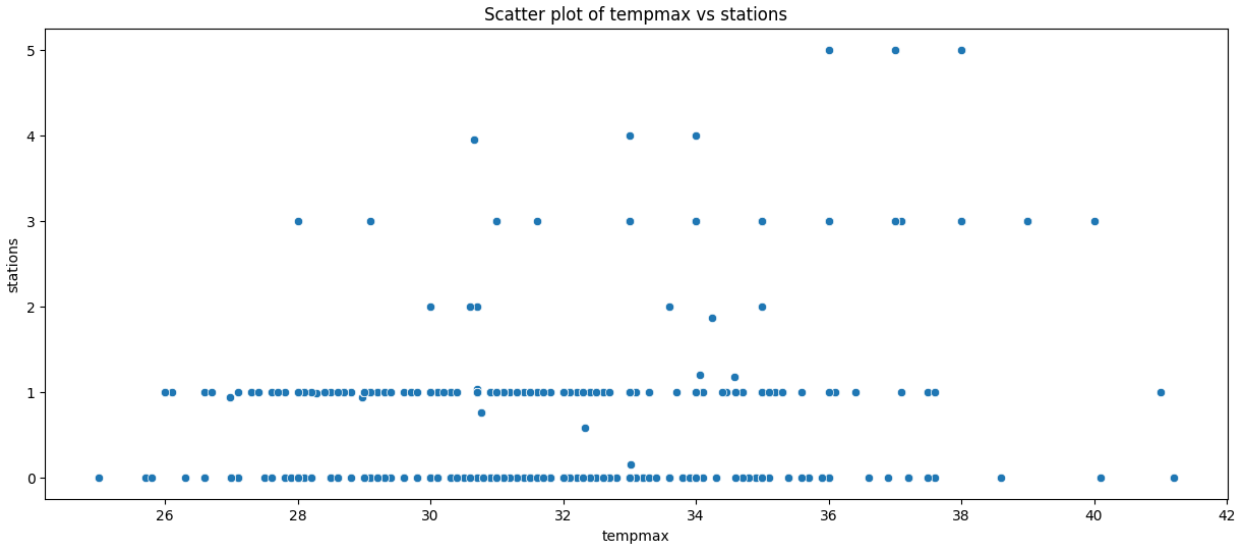
Scatter plot of tempmax vs stations
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tempmax
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2
1
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26
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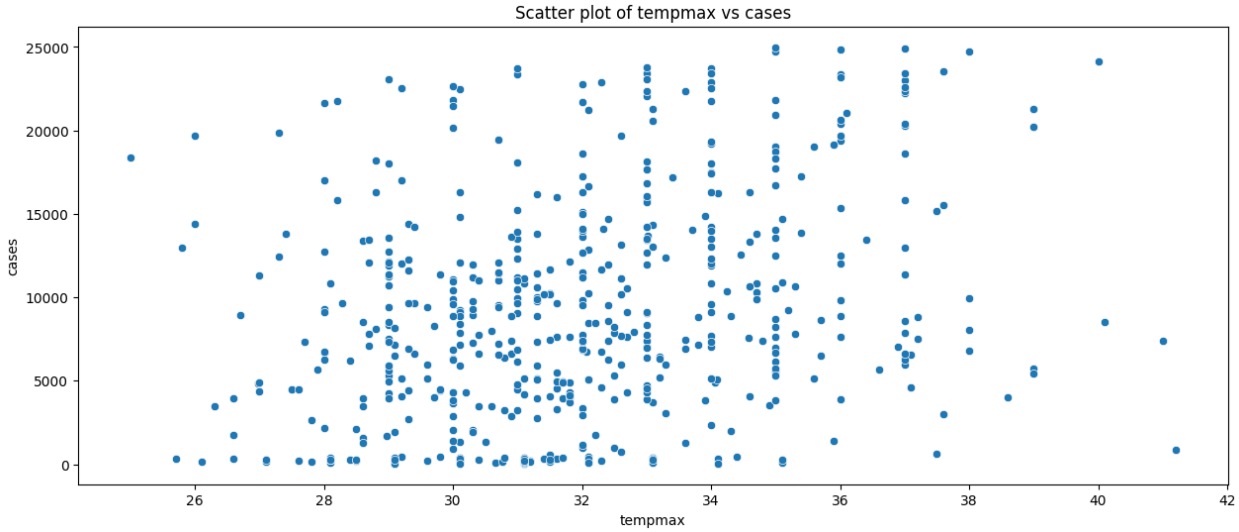
38
40
42


Scatter plot of tempmax vs cases
cases
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5000
10000
15000
20000
25000
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30
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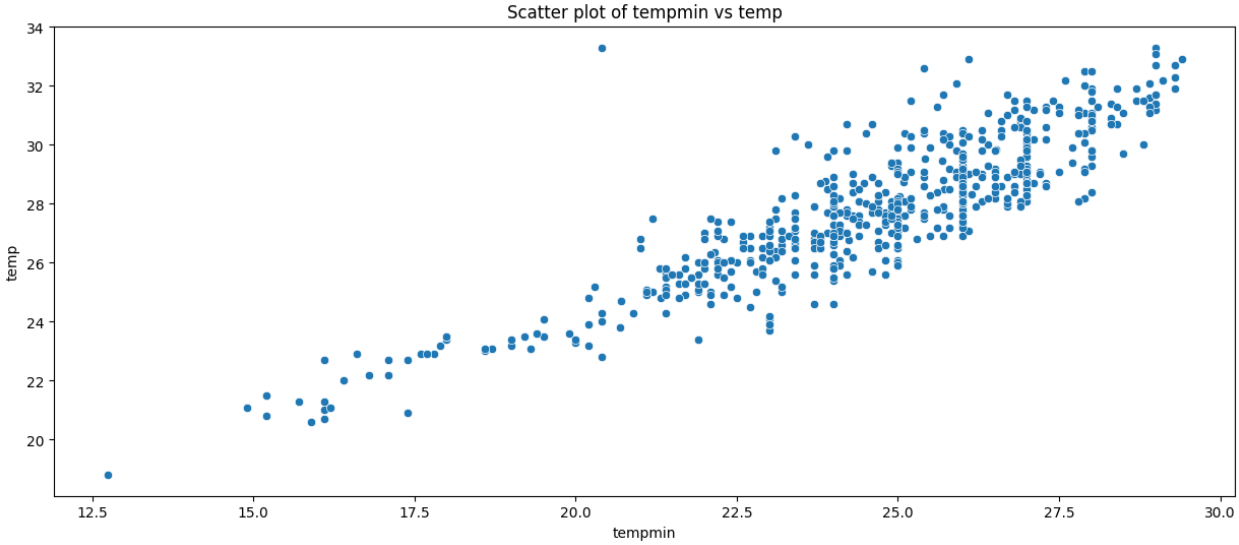
36
38
40
42


Scatter plot of tempmin vs temp
temp
tempmin
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30
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17.5
20.0
22.5
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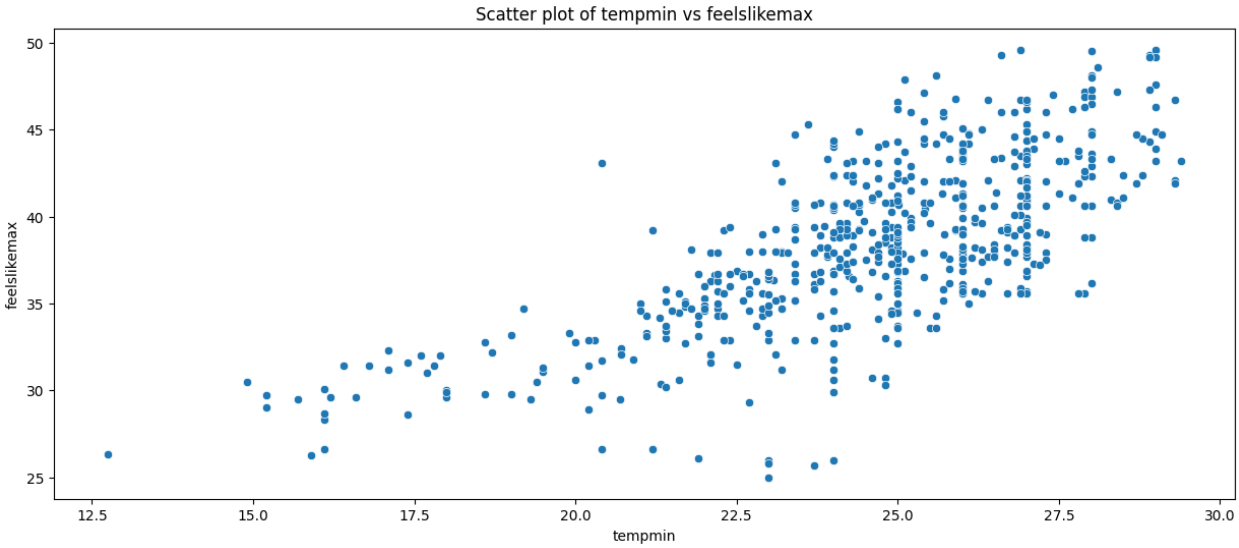
27.5
30.0


Scatter plot of tempmin vs feelslikemax
feelslikemax
tempmin
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40
45
50
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20.0
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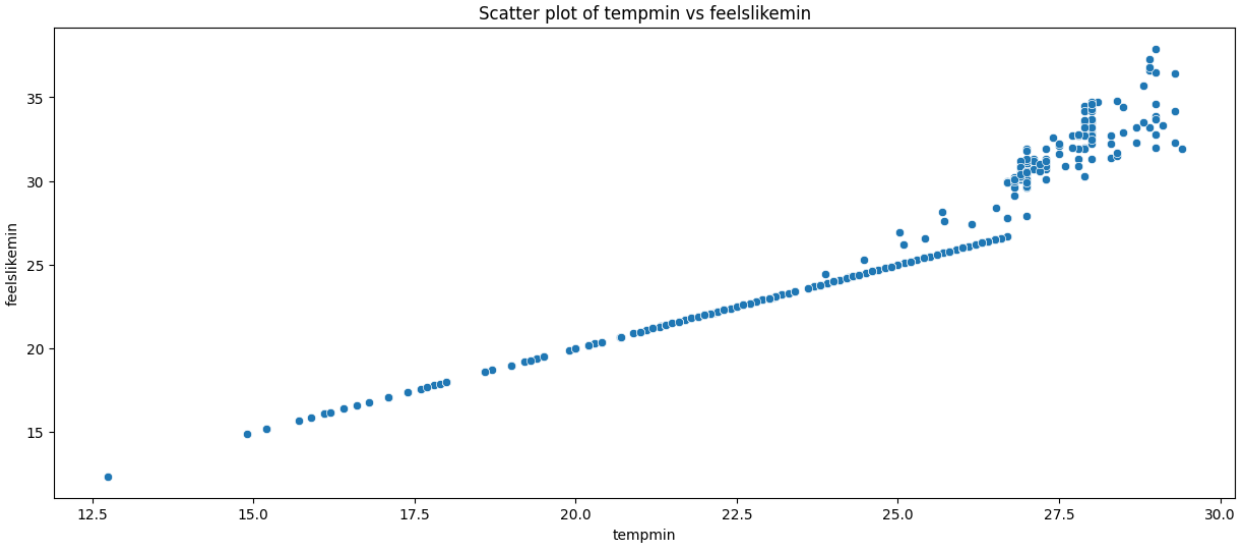
30.0


Scatter plot of tempmin vs feelslikemin
feelslikemin
tempmin
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27.5
30.0
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20
25
30
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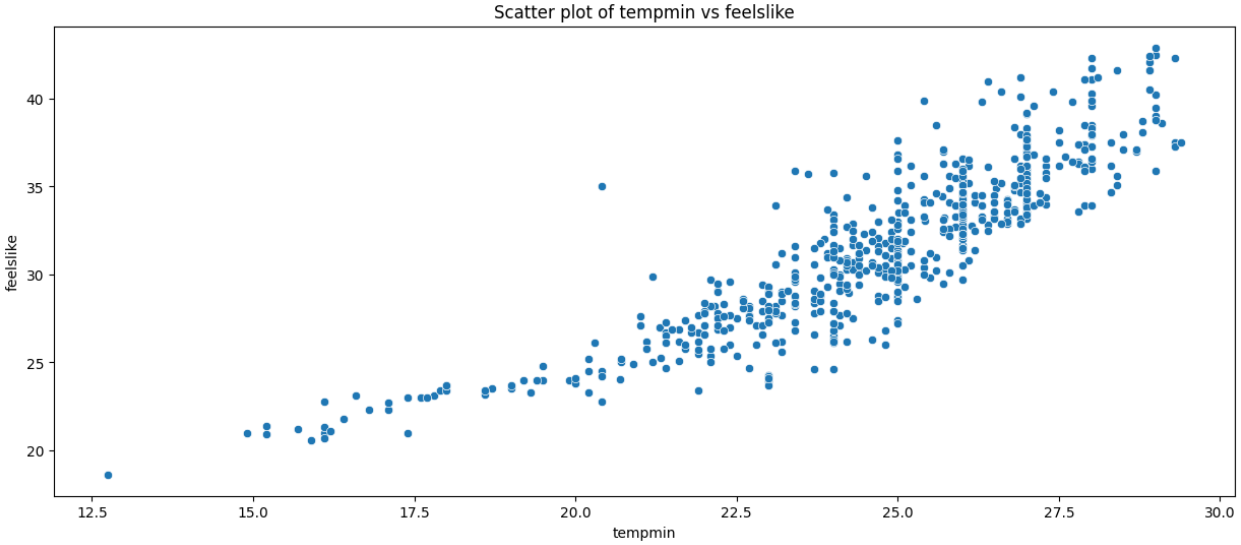
Scatter plot of tempmin vs feelslike
feelslike
tempmin
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27.5
30.0
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25
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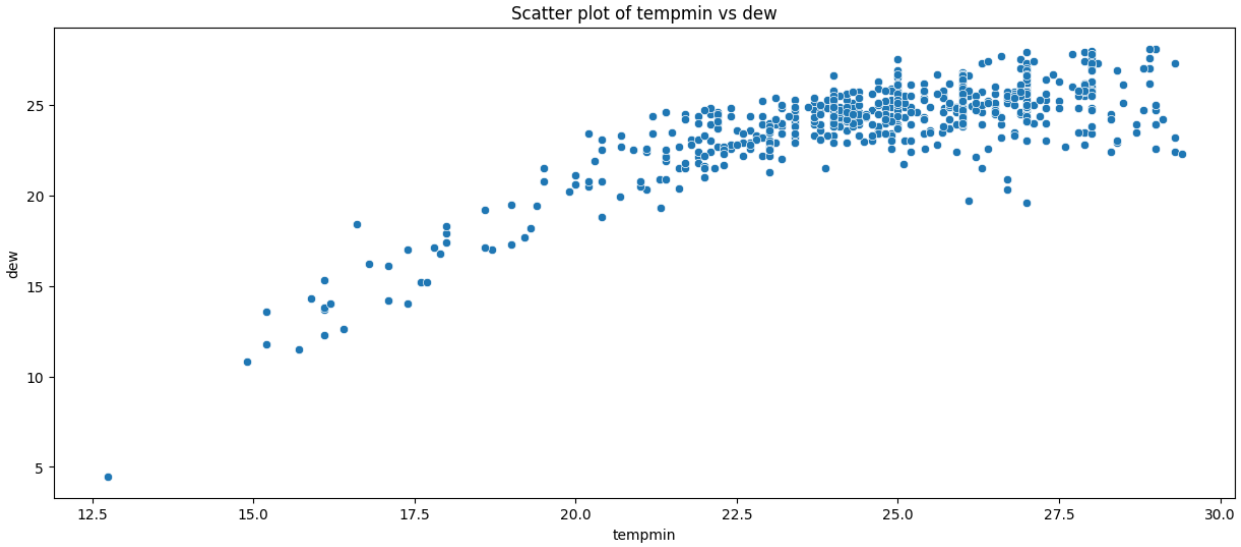
Scatter plot of tempmin vs dew
dew
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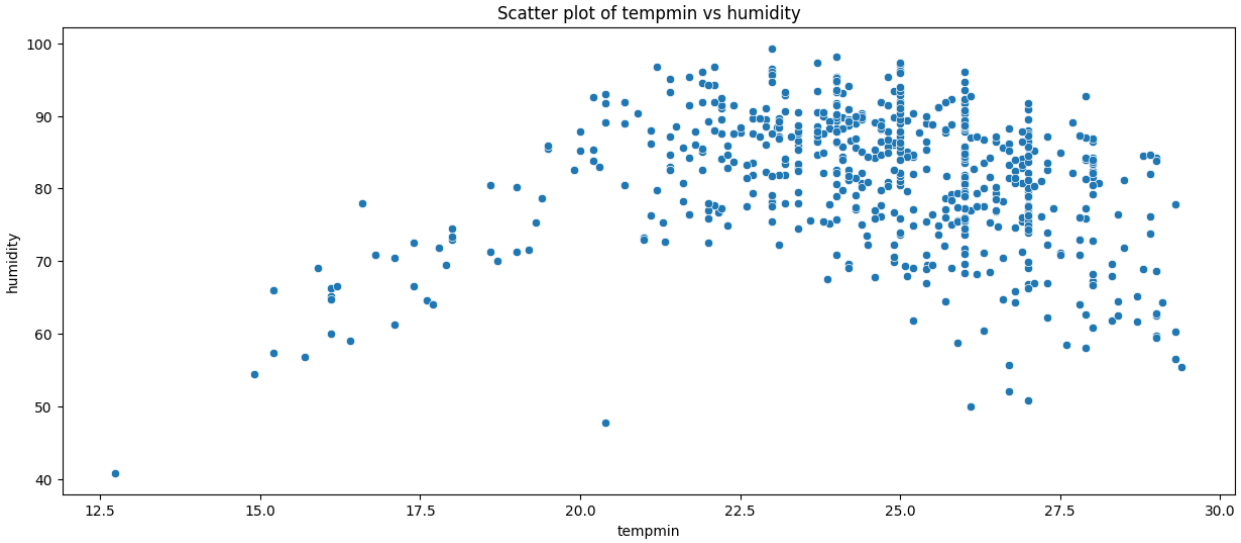
20
25


Scatter plot of tempmin vs humidity
humidity
tempmin
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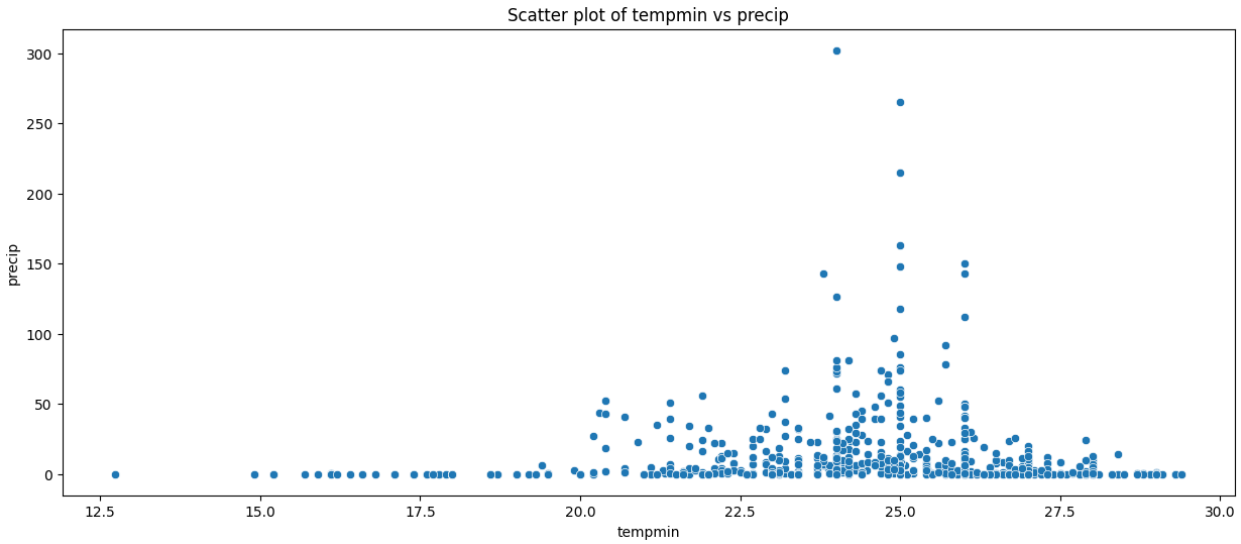
Scatter plot of tempmin vs precip
precip
tempmin
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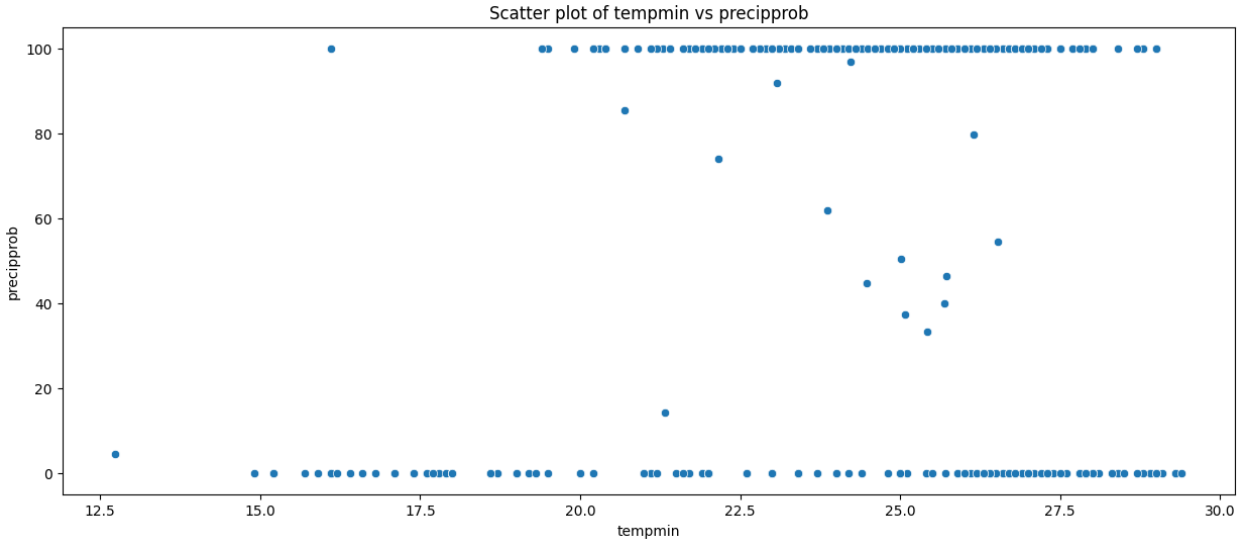
Scatter plot of tempmin vs precipprob
precipprob
tempmin
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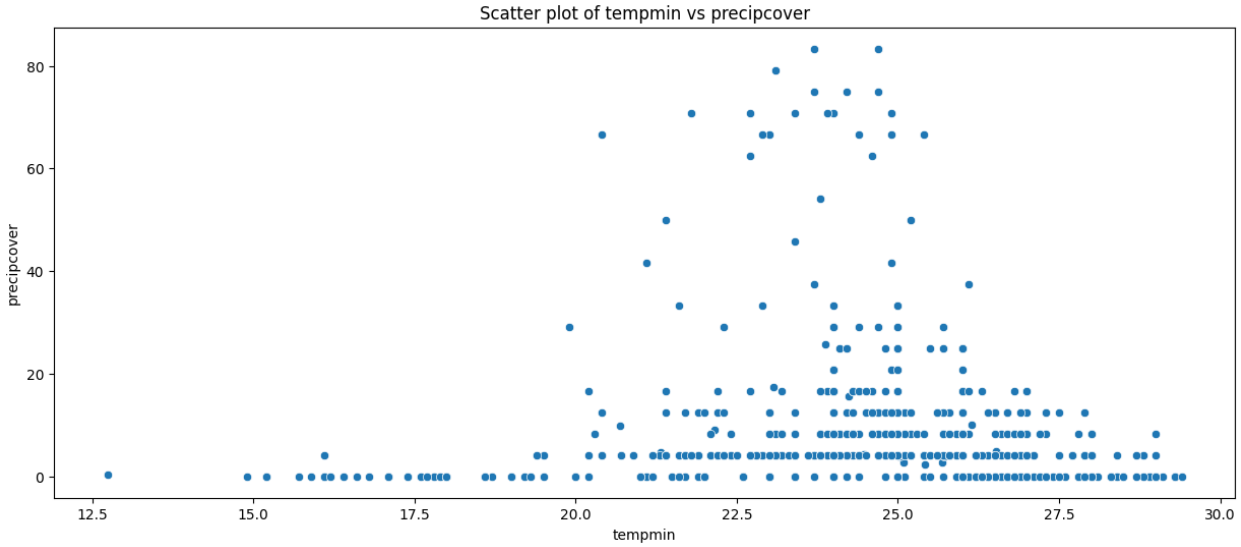
Scatter plot of tempmin vs precipcover
precipcover
tempmin
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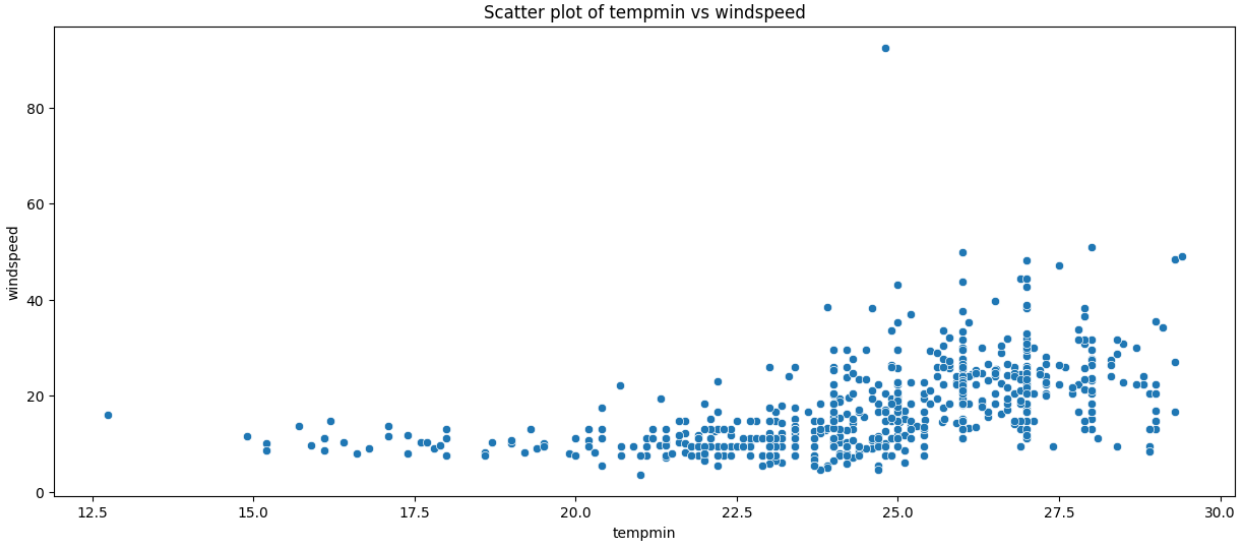
Scatter plot of tempmin vs windspeed
windspeed
tempmin
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80
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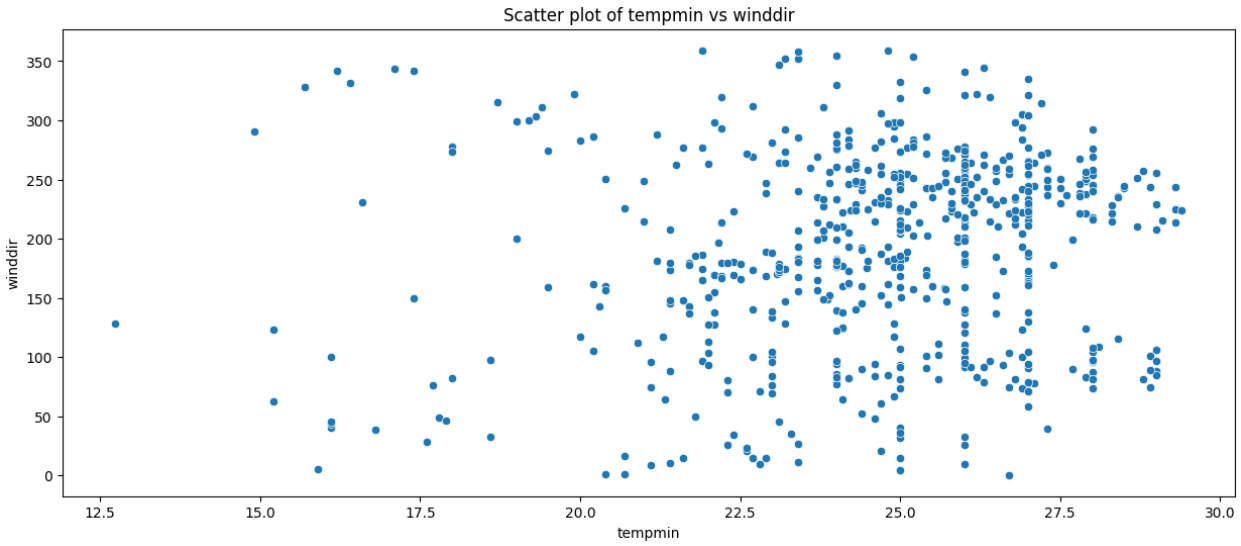
Scatter plot of tempmin vs winddir
winddir
tempmin
0
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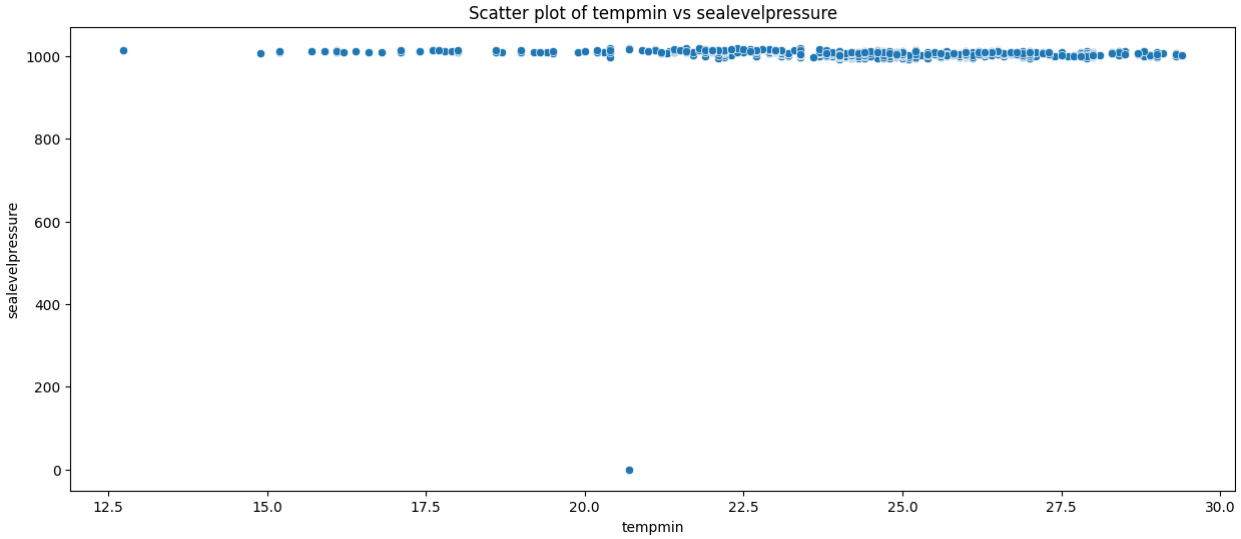
Scatter plot of tempmin vs sealevelpressure
sealevelpressure
tempmin
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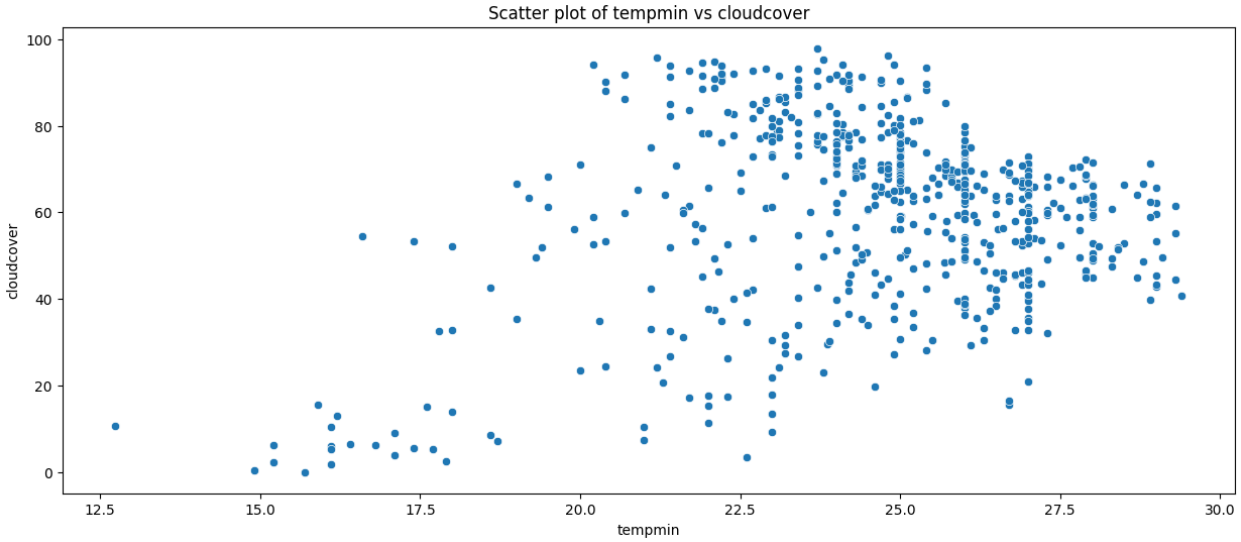
Scatter plot of tempmin vs cloudcover
cloudcover
tempmin
100
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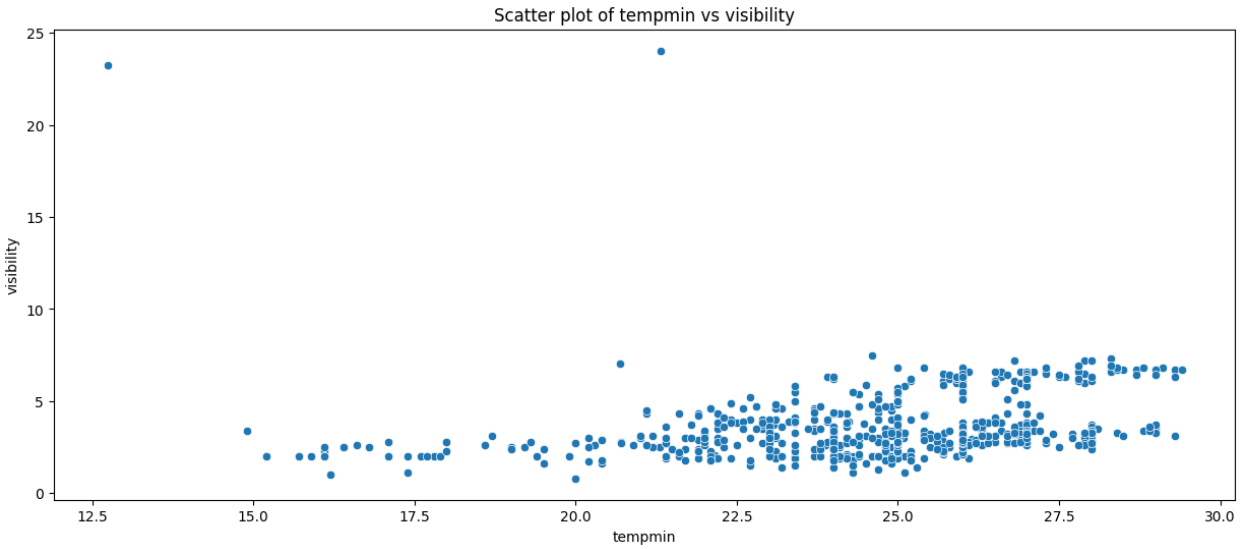
Scatter plot of tempmin vs visibility
visibility
tempmin
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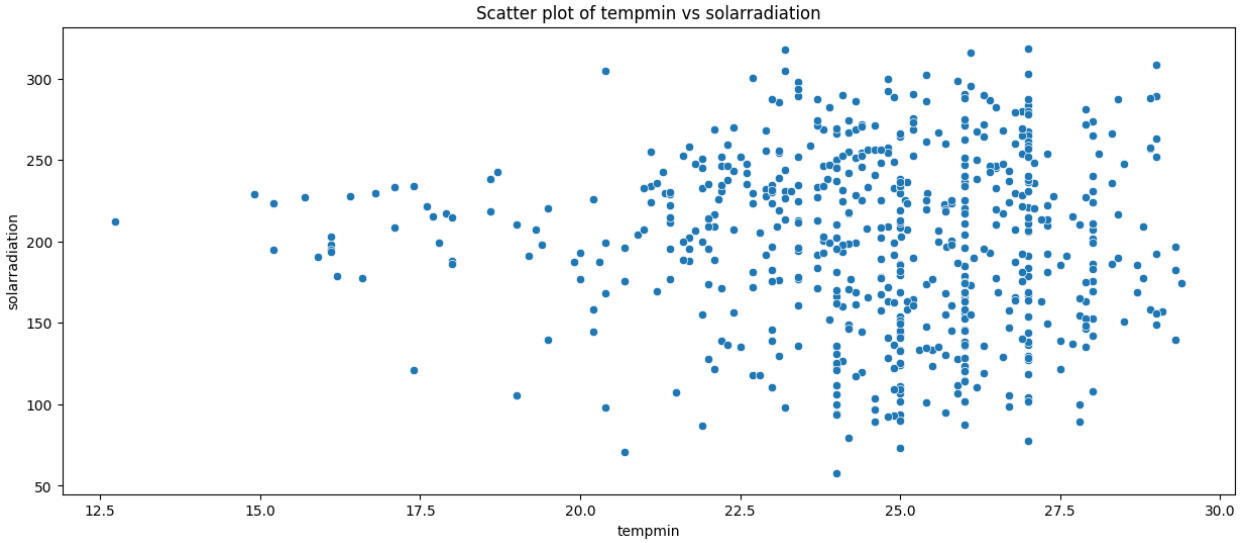
Scatter plot of tempmin vs solarradiation
solarradiation
tempmin
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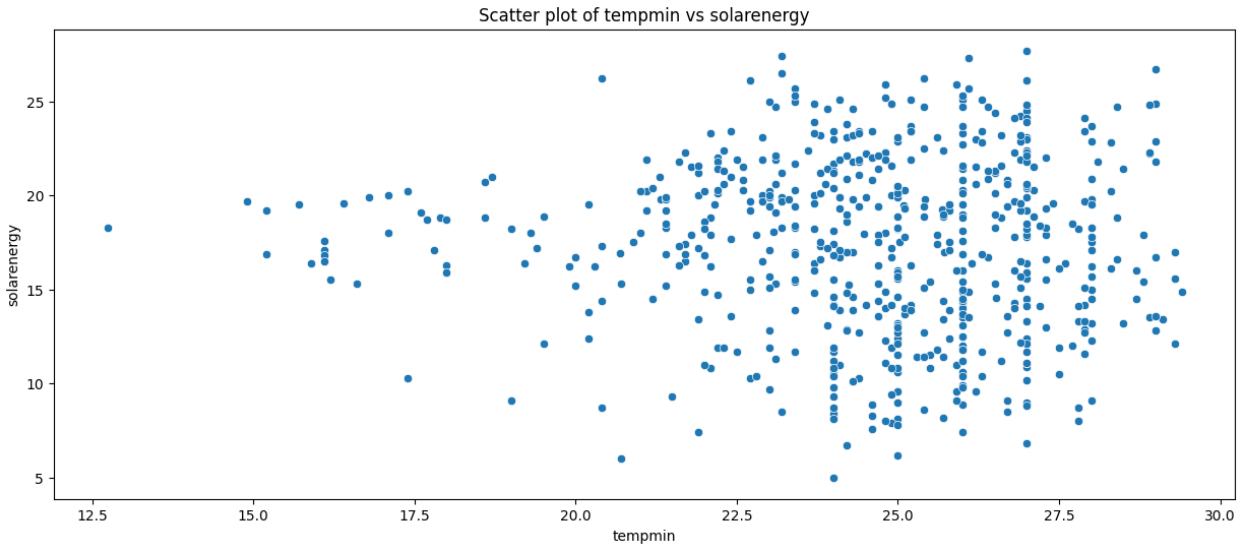
30.0


Scatter plot of tempmin vs solarenergy
solarenergy
tempmin
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10
15
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25
12.5
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17.5
20.0
22.5
25.0
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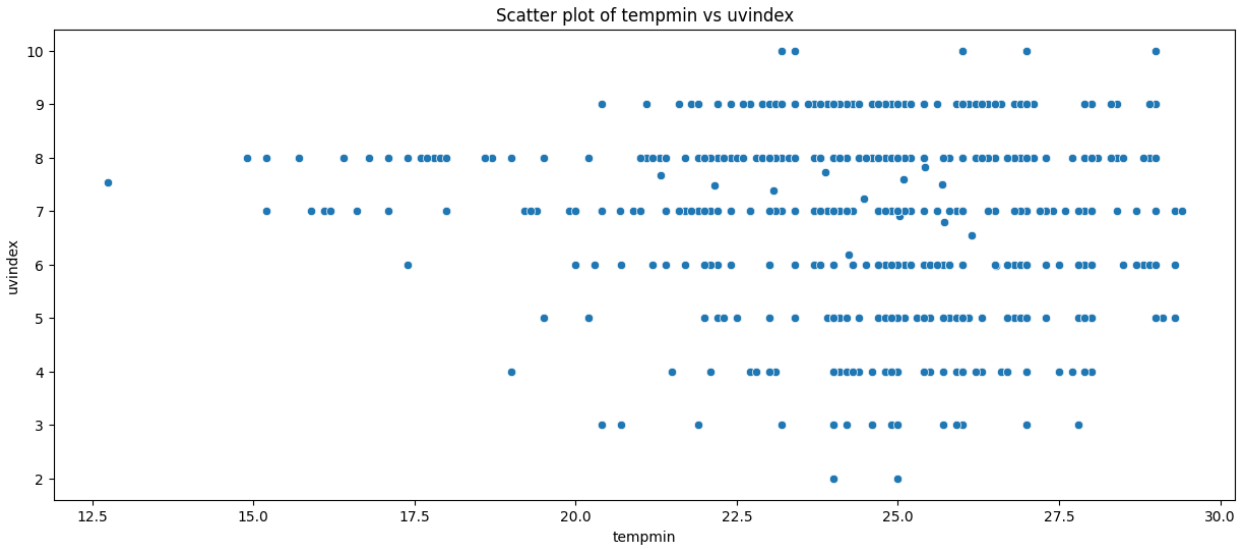
30.0


Scatter plot of tempmin vs uvindex
uvindex
tempmin
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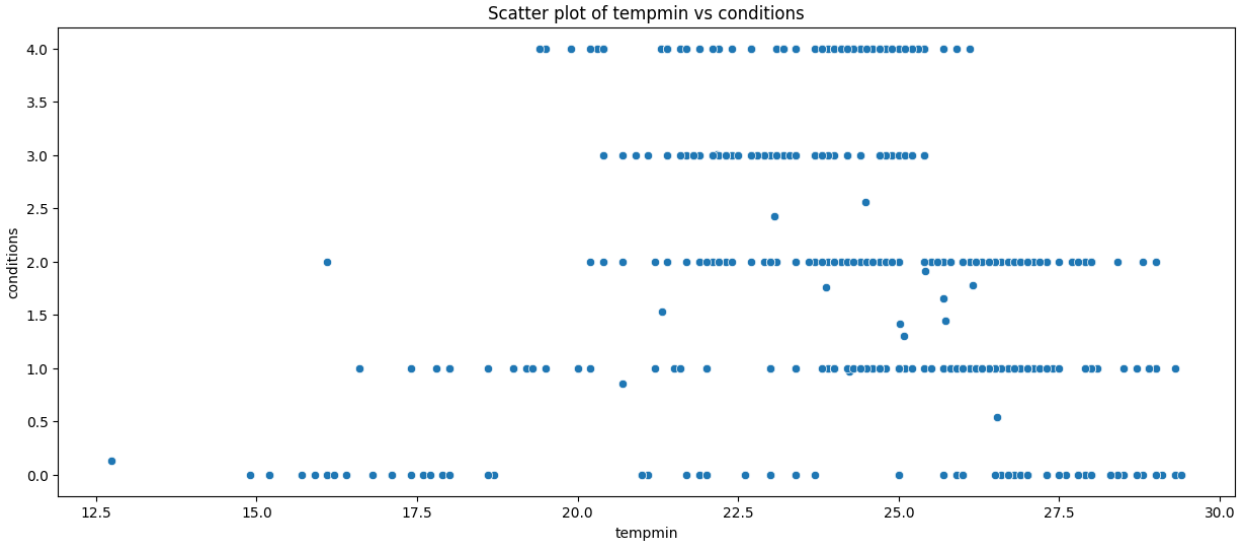
Scatter plot of tempmin vs conditions
conditions
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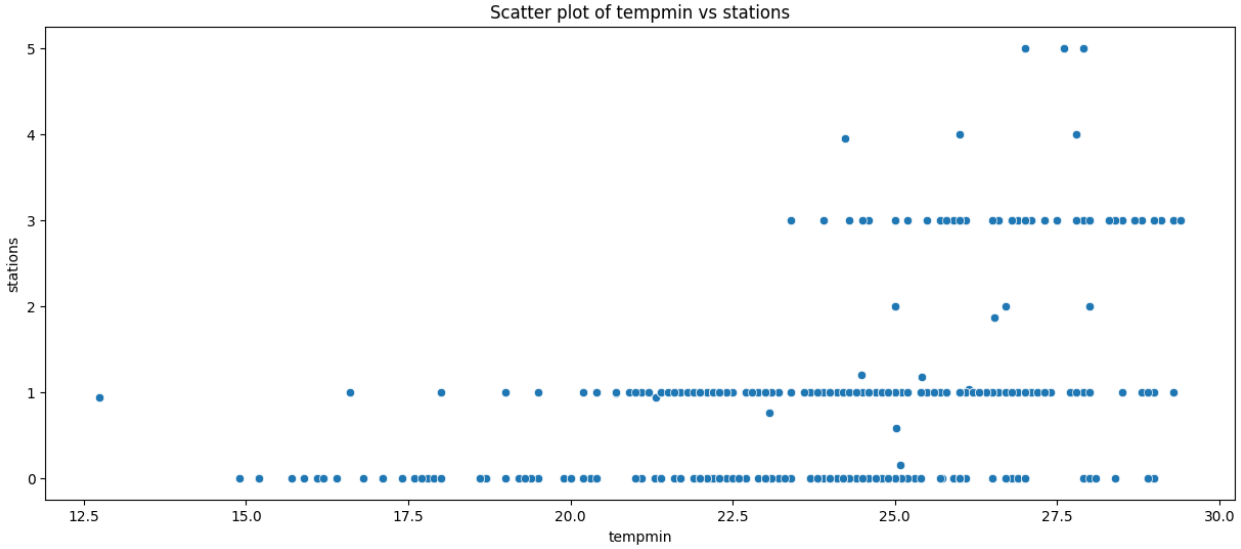
Scatter plot of tempmin vs stations
stations
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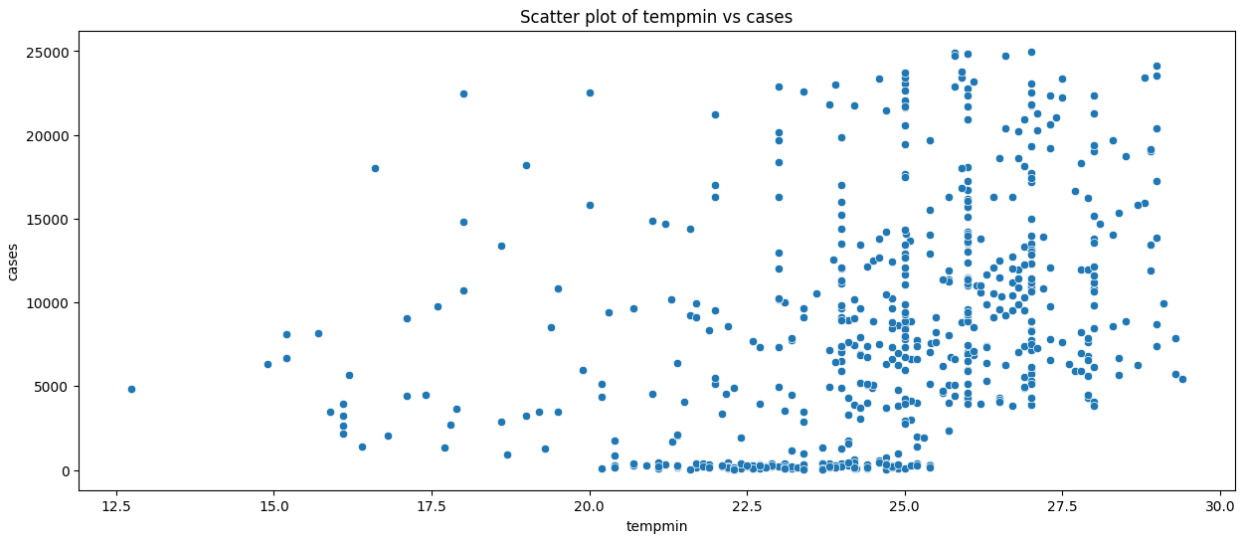
Scatter plot of tempmin vs cases
cases
tempmin
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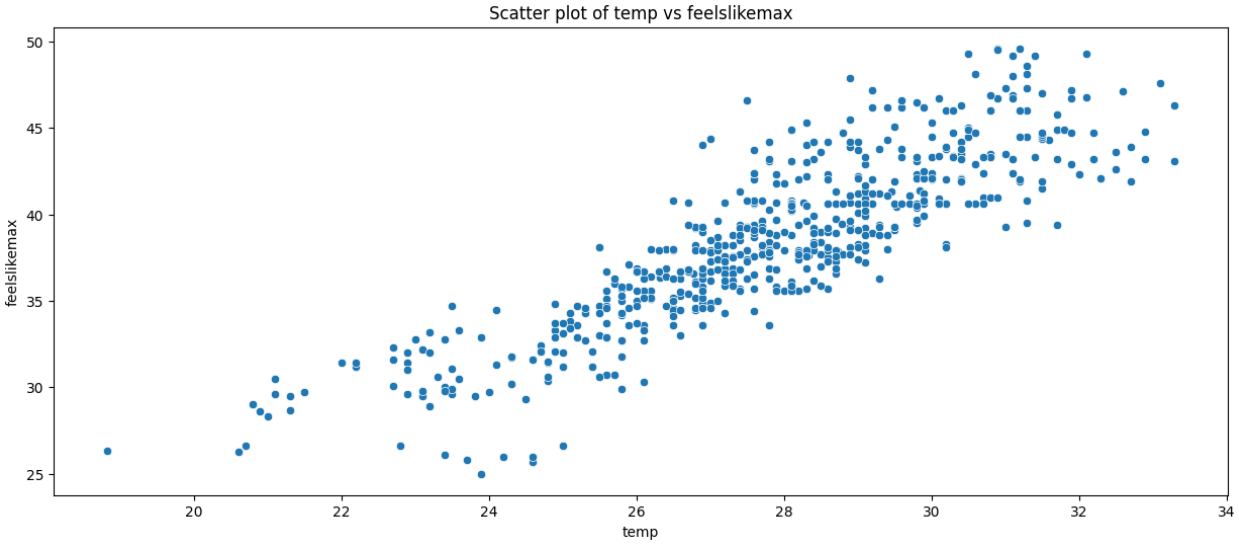
Scatter plot of temp vs feelslikemax
feelslikemax
temp
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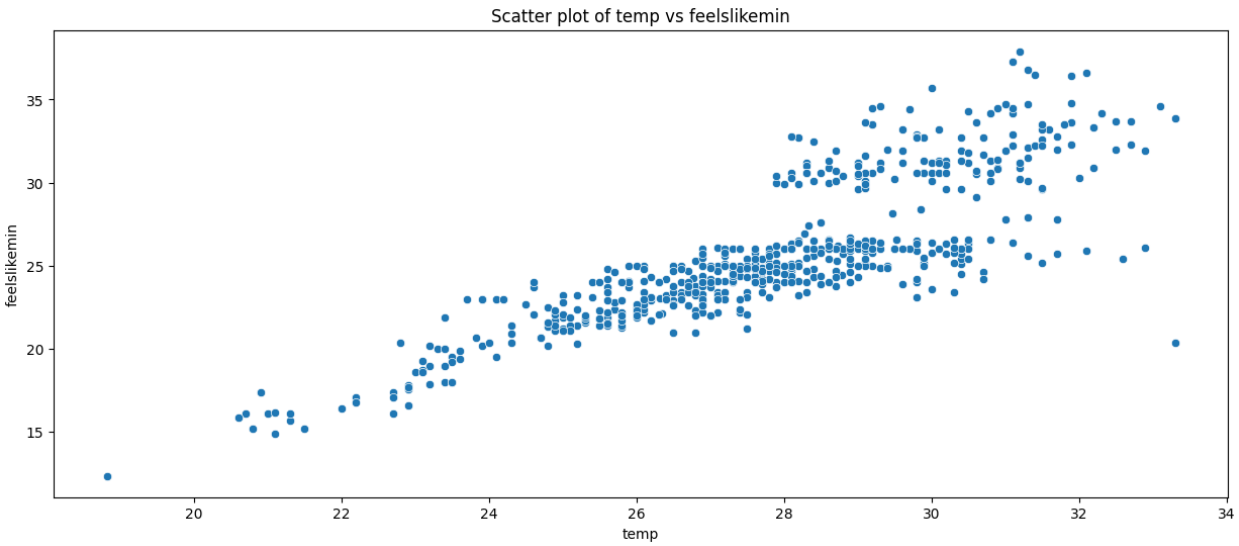
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feelslikemin
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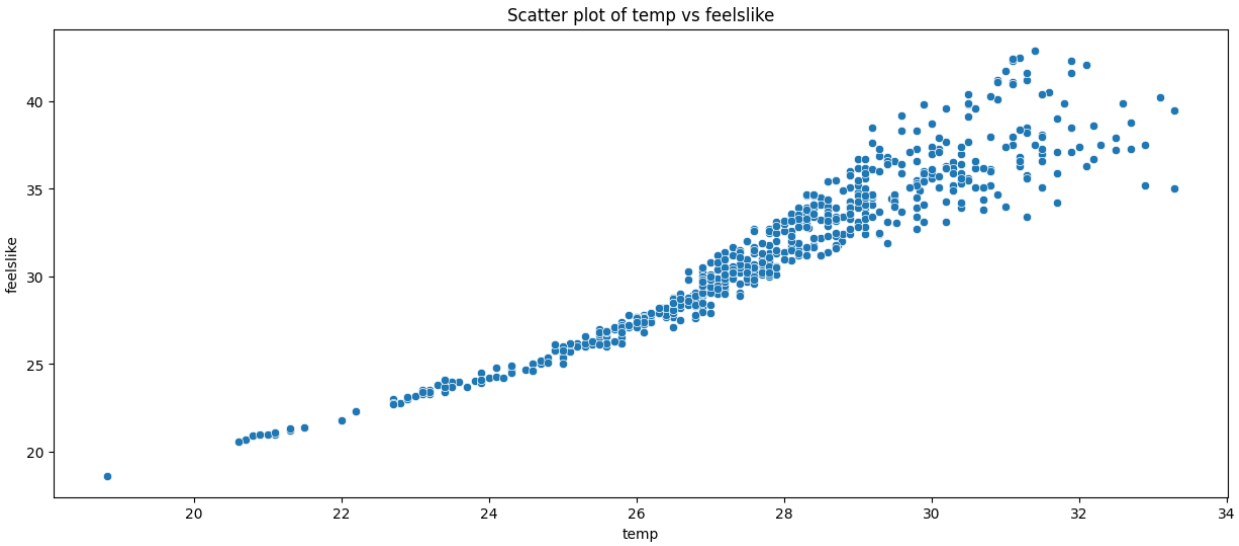
Scatter plot of temp vs feelslike
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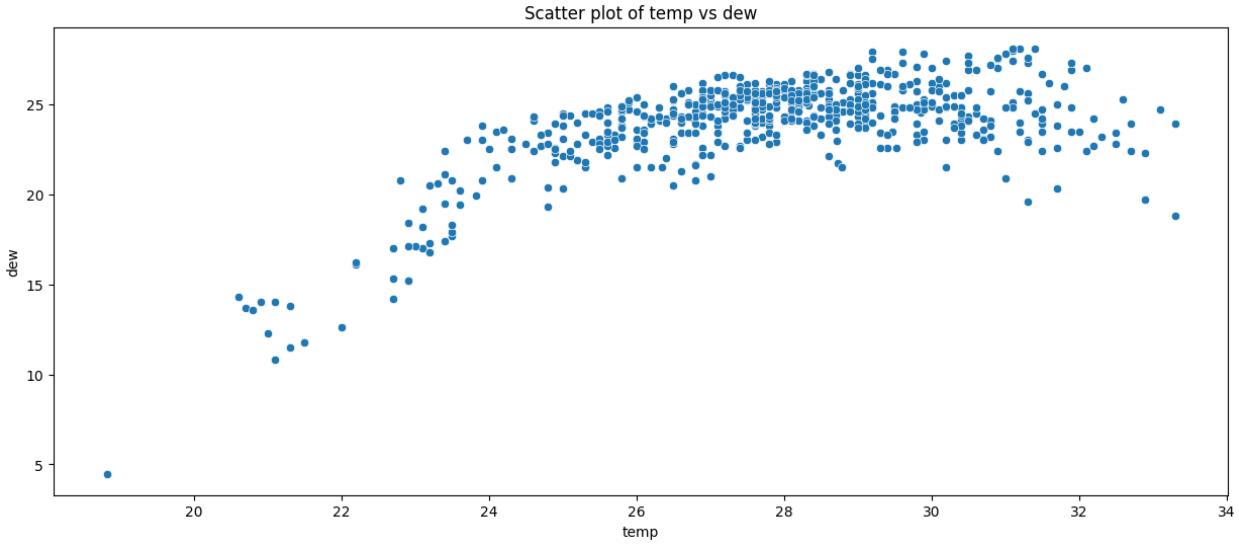
Scatter plot of temp vs dew
dew
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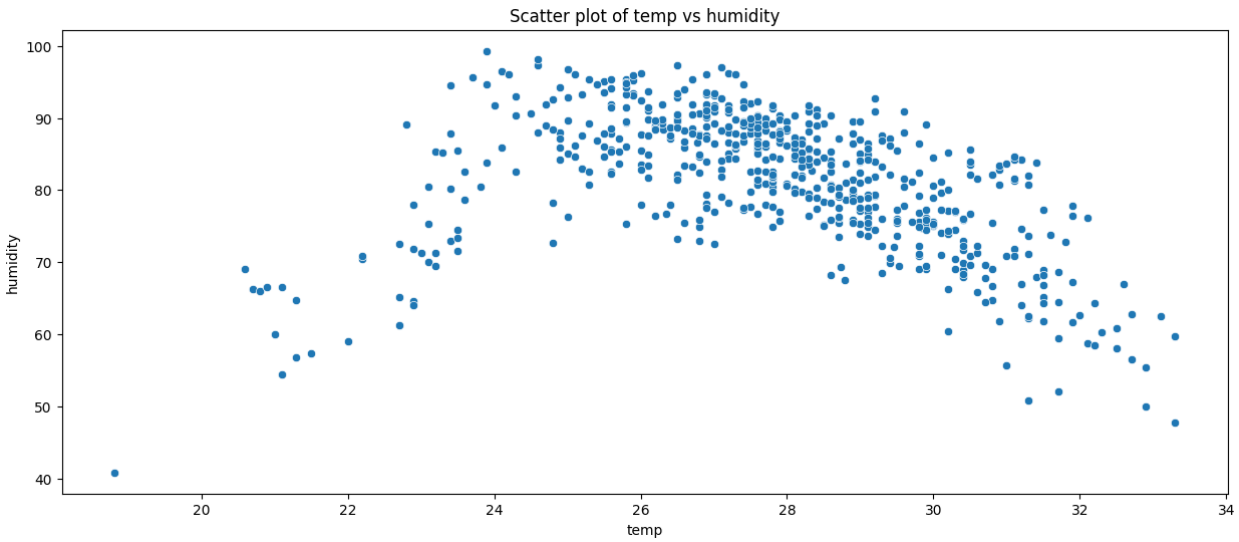
Scatter plot of temp vs humidity
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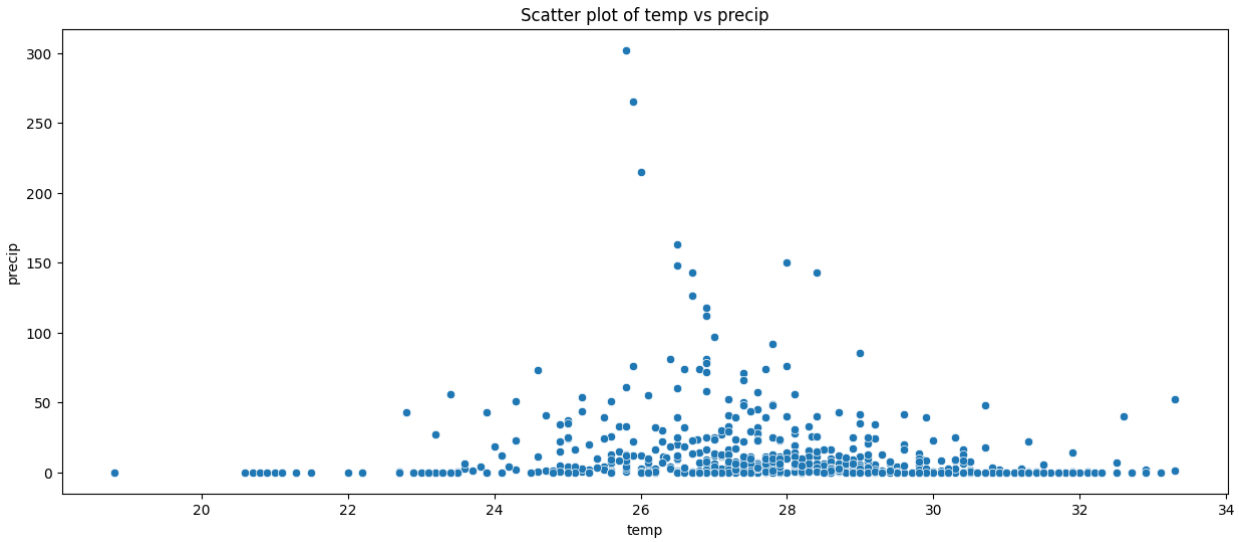
Scatter plot of temp vs precip
precip
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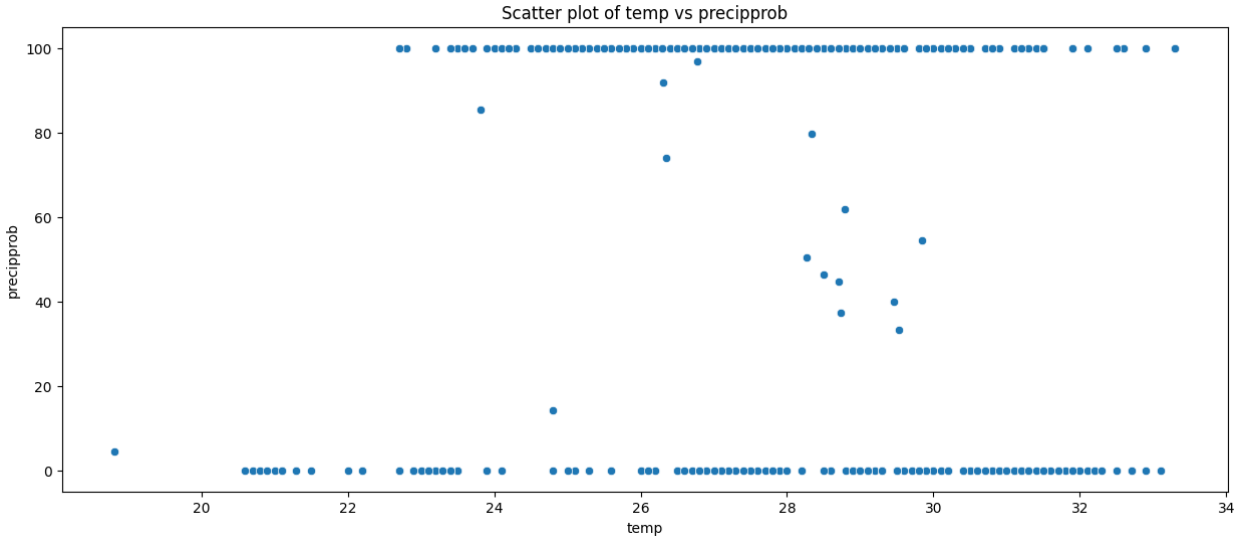
Scatter plot of temp vs precipprob
precipprob
temp
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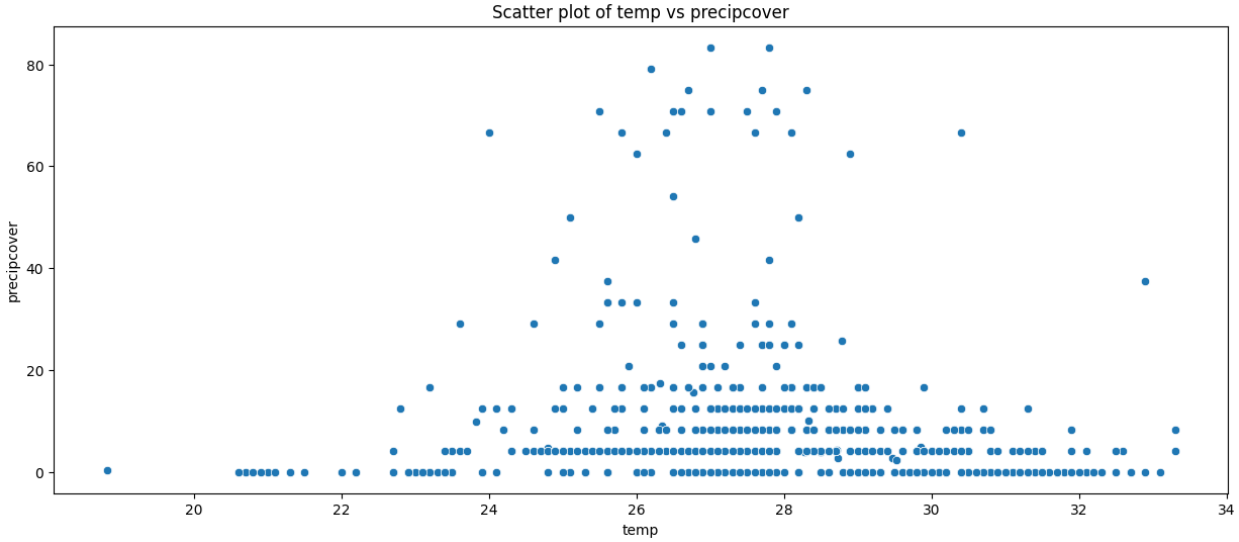
Scatter plot of temp vs precipcover
precipcover
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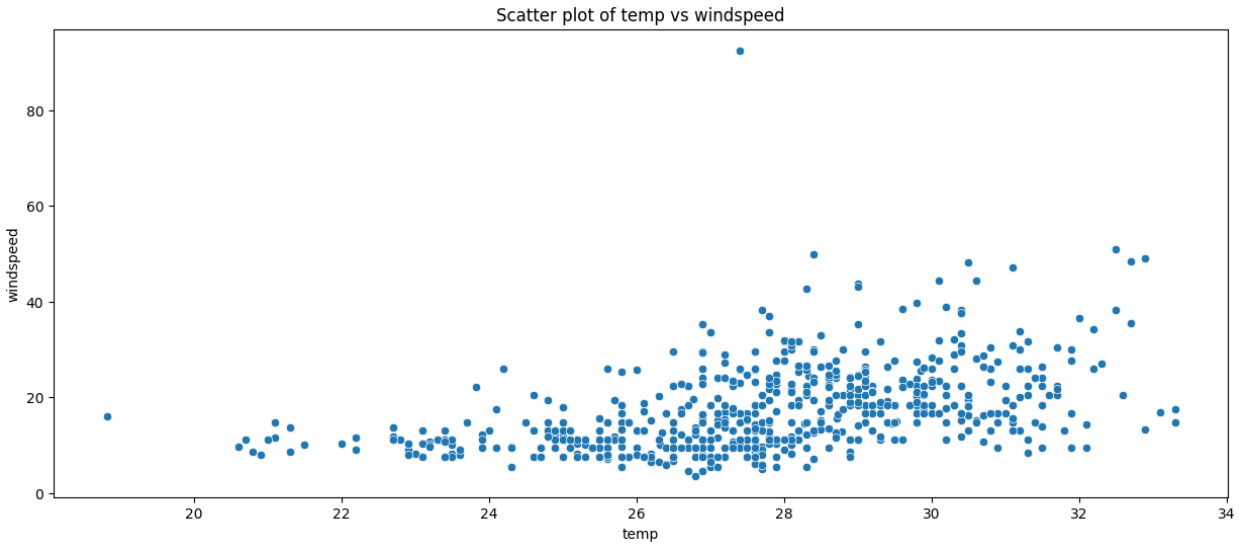
Scatter plot of temp vs windspeed
windspeed
temp
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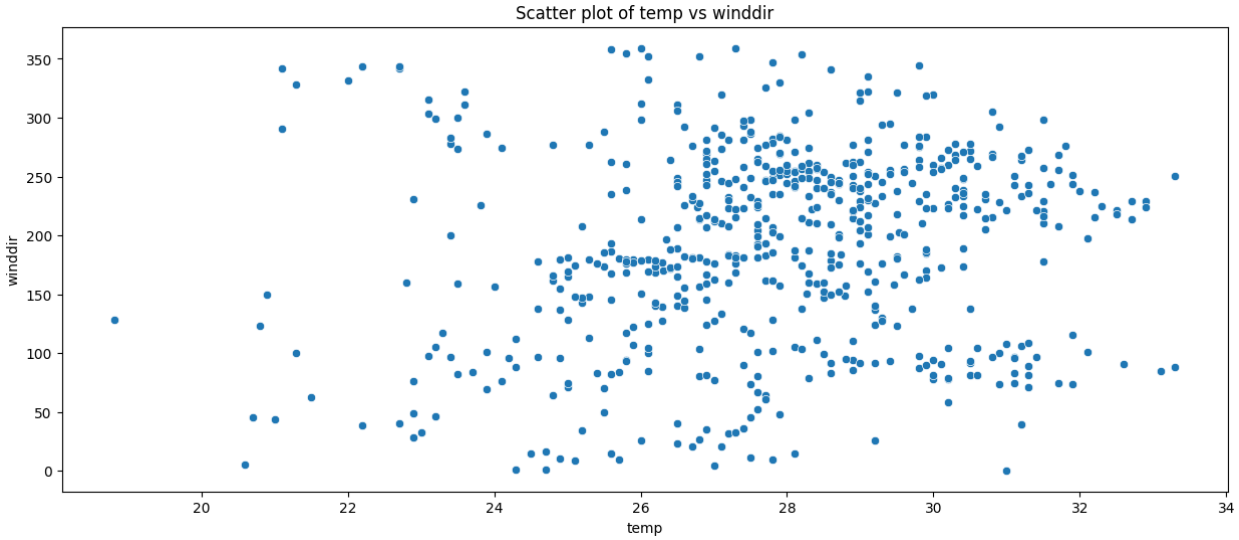
Scatter plot of temp vs winddir
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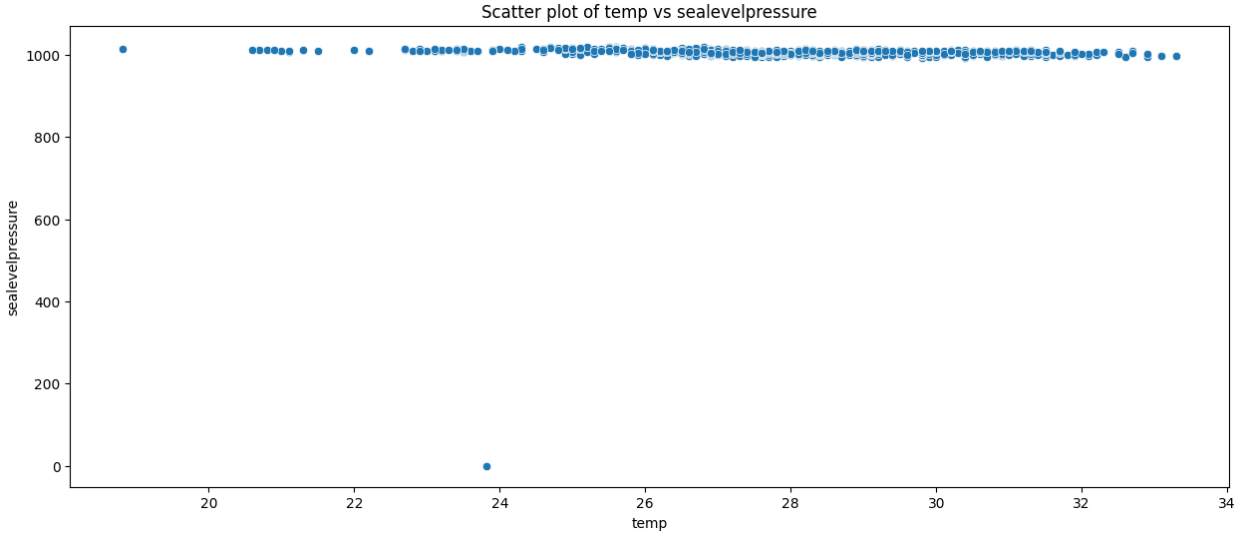
Scatter plot of temp vs sealevelpressure
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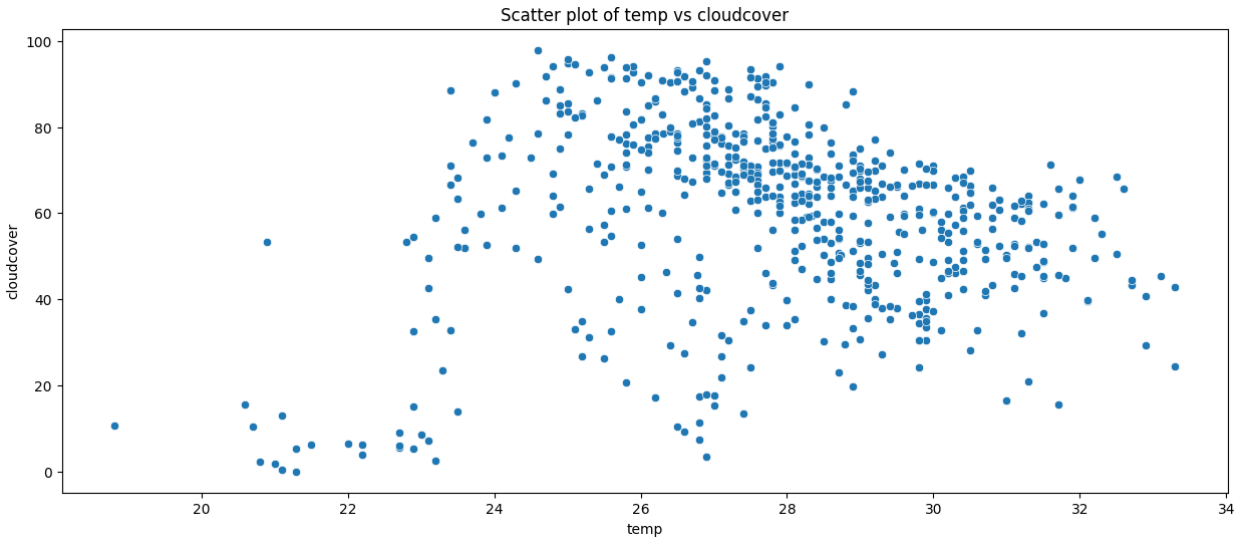
Scatter plot of temp vs cloudcover
cloudcover
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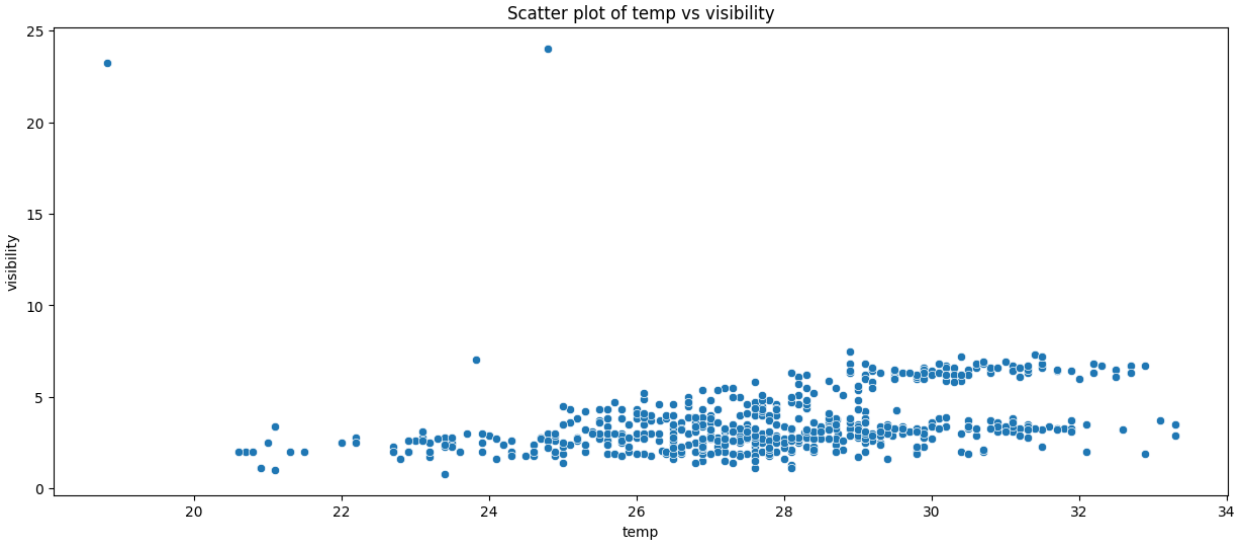
Scatter plot of temp vs visibility
visibility
temp
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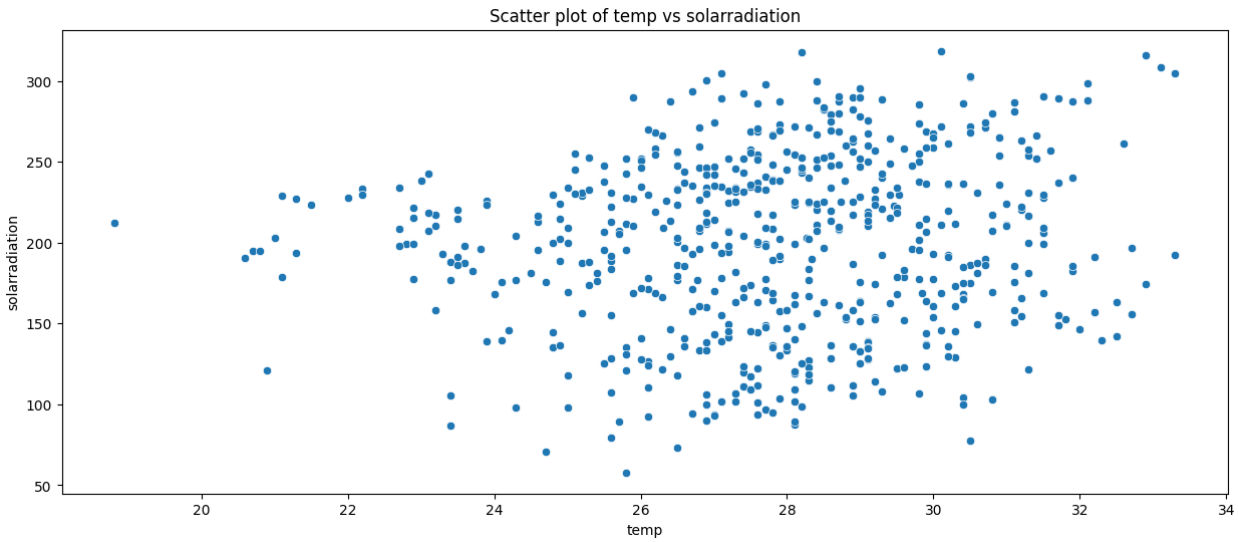
Scatter plot of temp vs solarradiation
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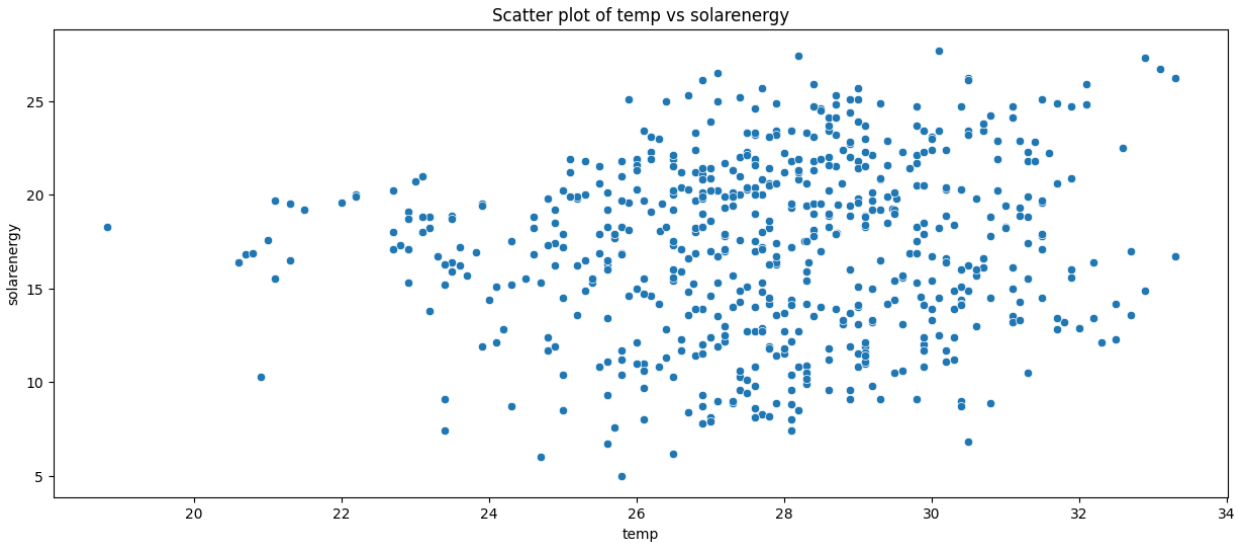
Scatter plot of temp vs solarenergy
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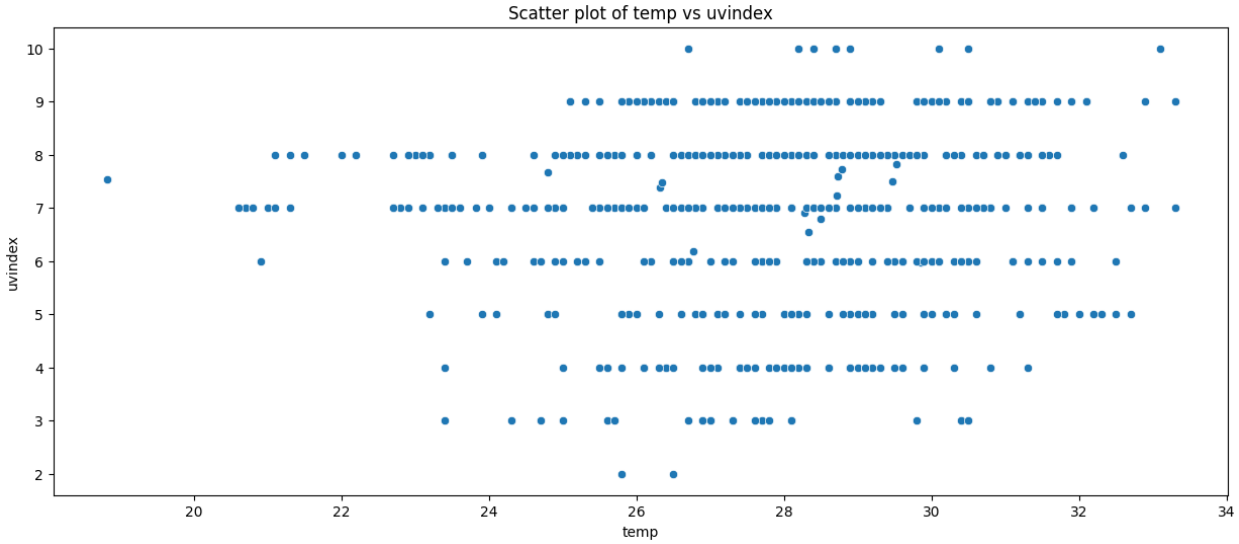
Scatter plot of temp vs uvindex
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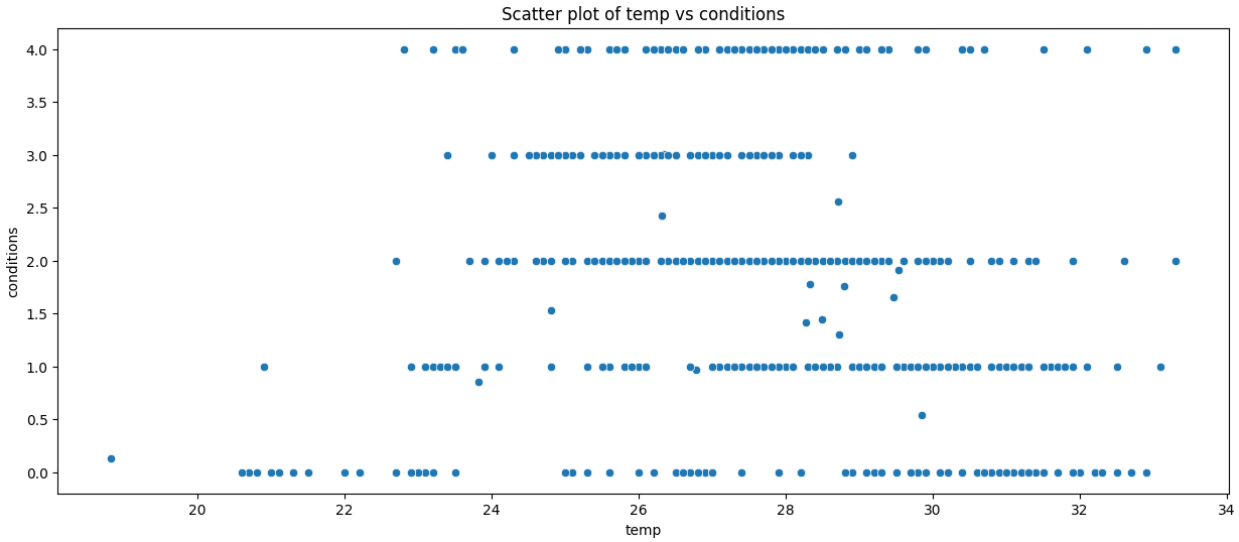
Scatter plot of temp vs conditions
conditions
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3.5
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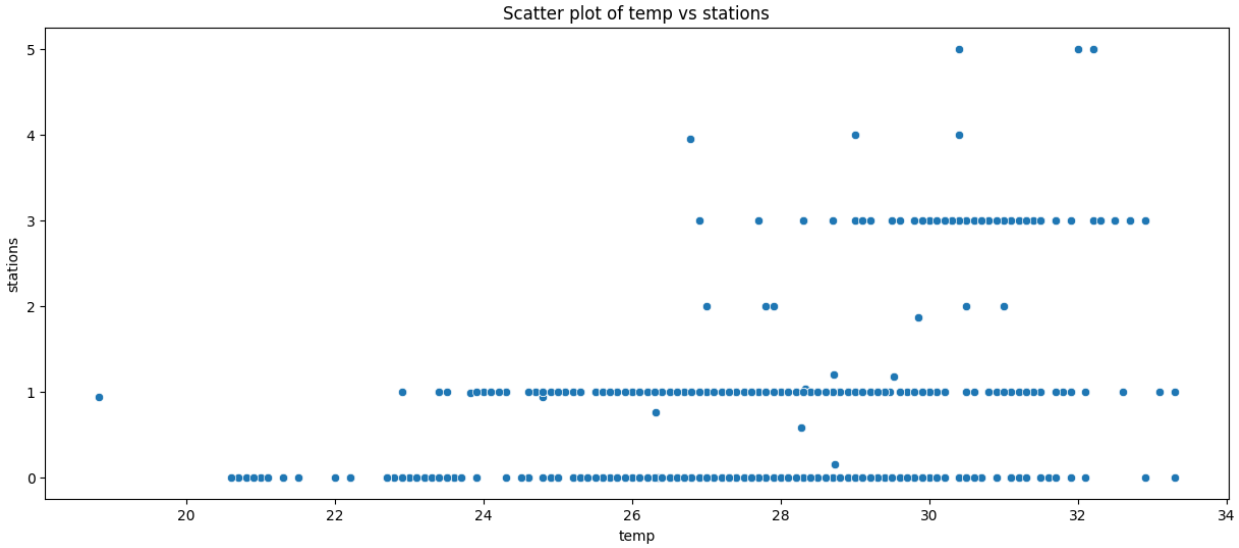
Scatter plot of temp vs stations
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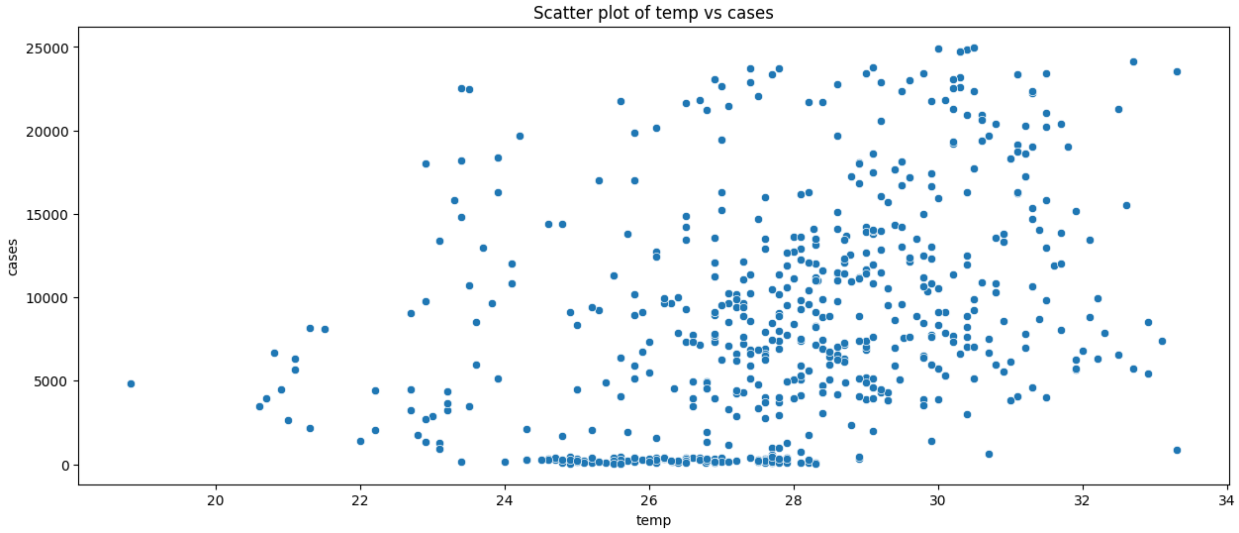
Scatter plot of temp vs cases
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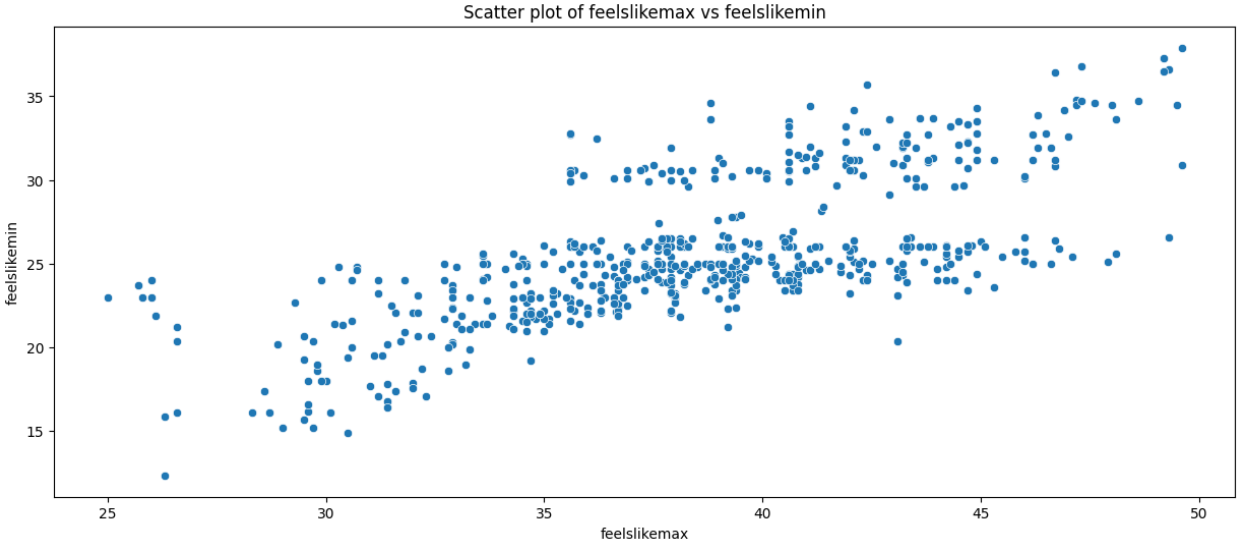
Scatter plot of feelslikemax vs feelslikemin
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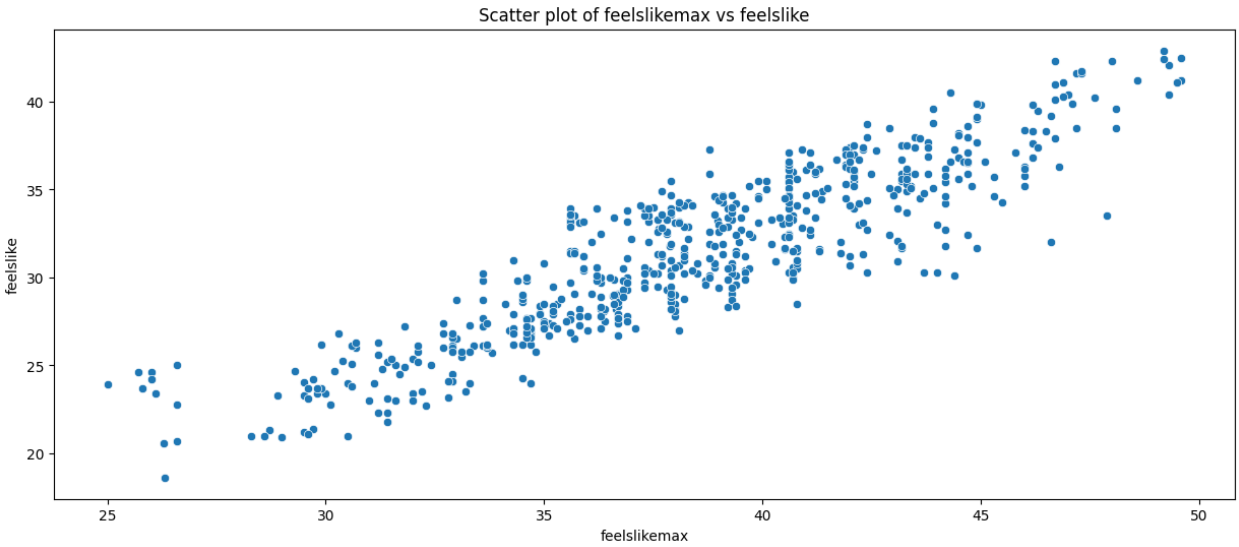
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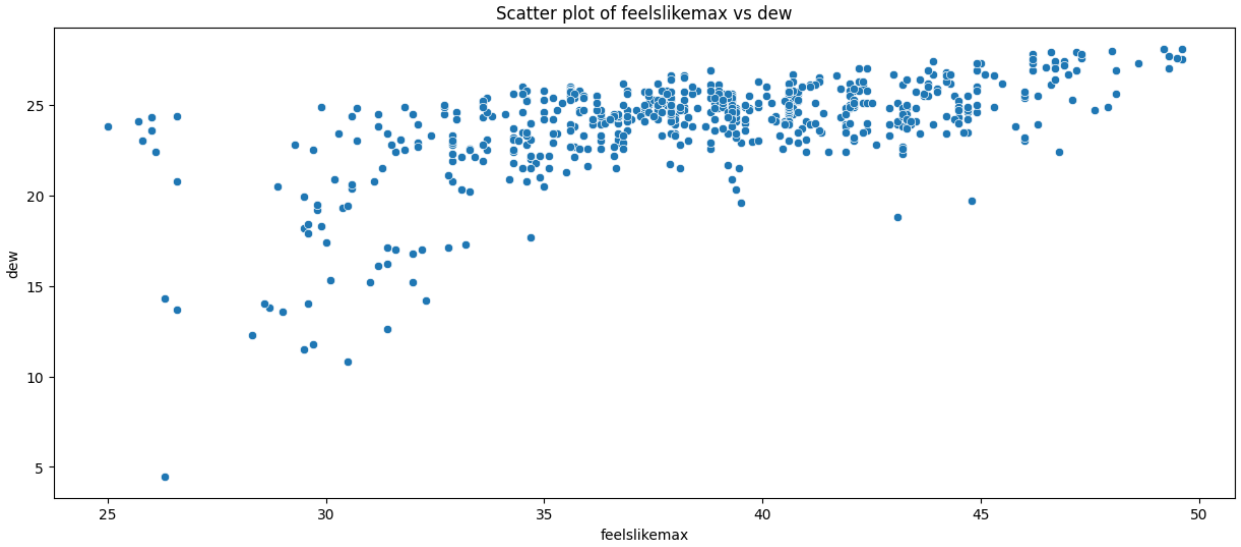
Scatter plot of feelslikemax vs dew
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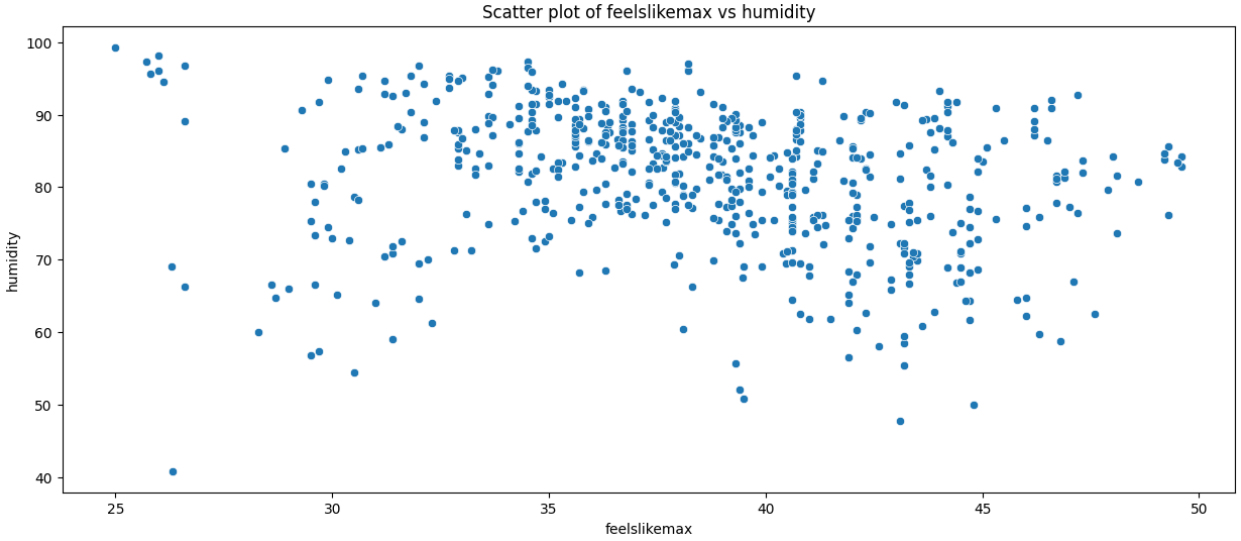
Scatter plot of feelslikemax vs humidity
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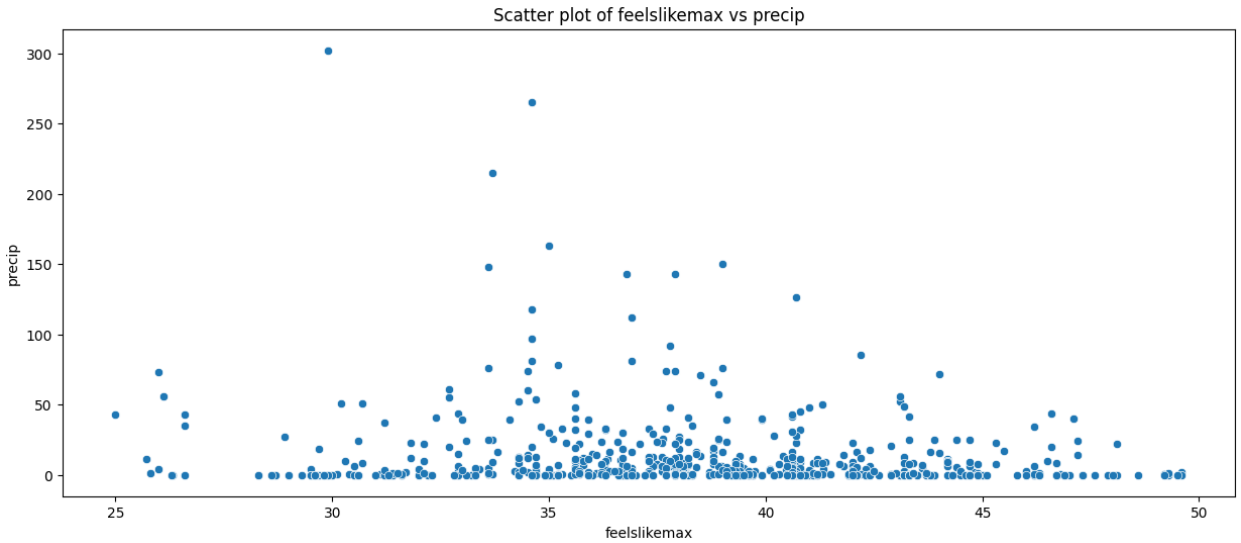
Scatter plot of feelslikemax vs precip
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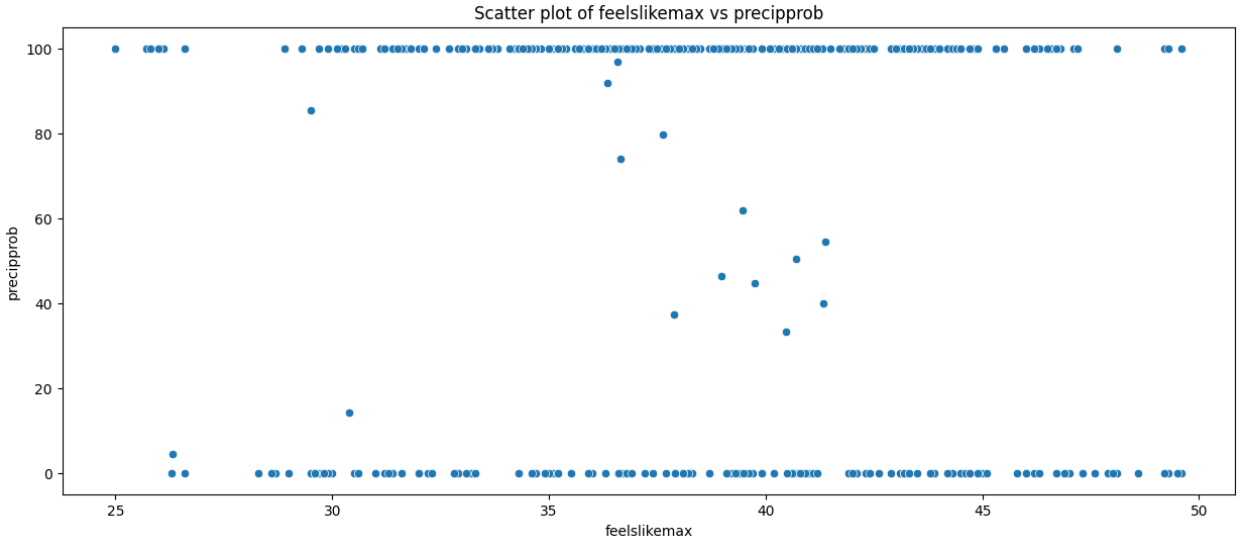
Scatter plot of feelslikemax vs precipprob
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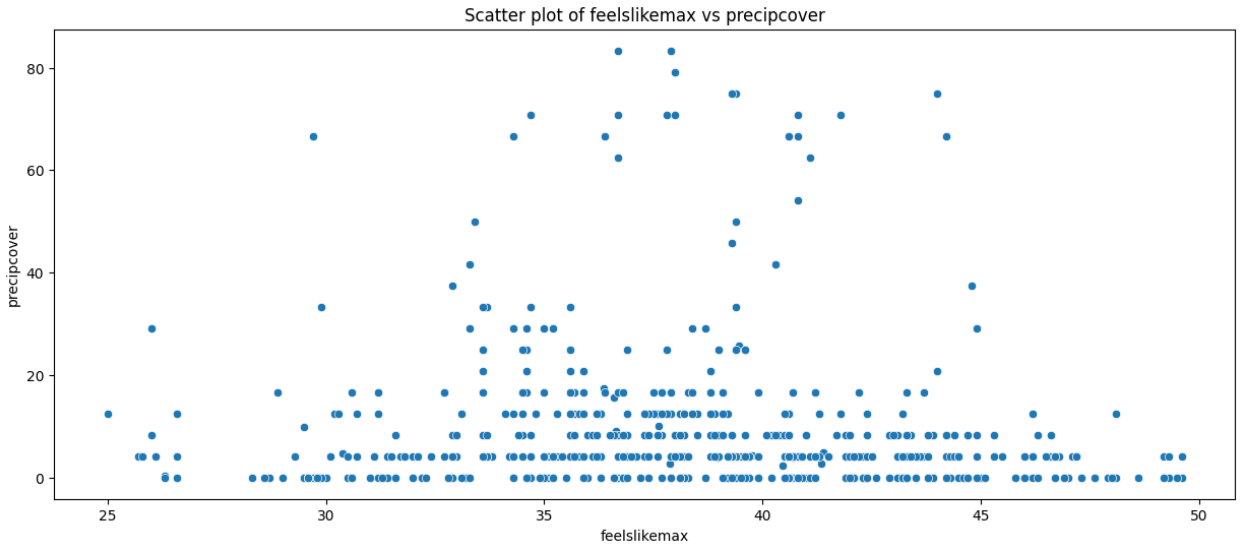
Scatter plot of feelslikemax vs precipcover
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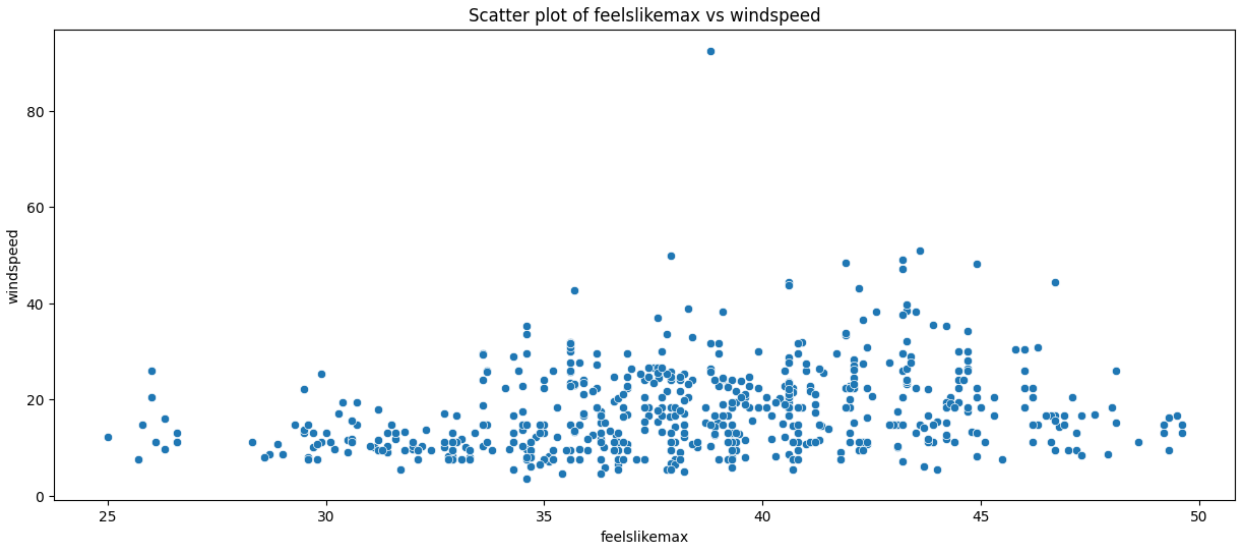
Scatter plot of feelslikemax vs windspeed
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feelslikemax
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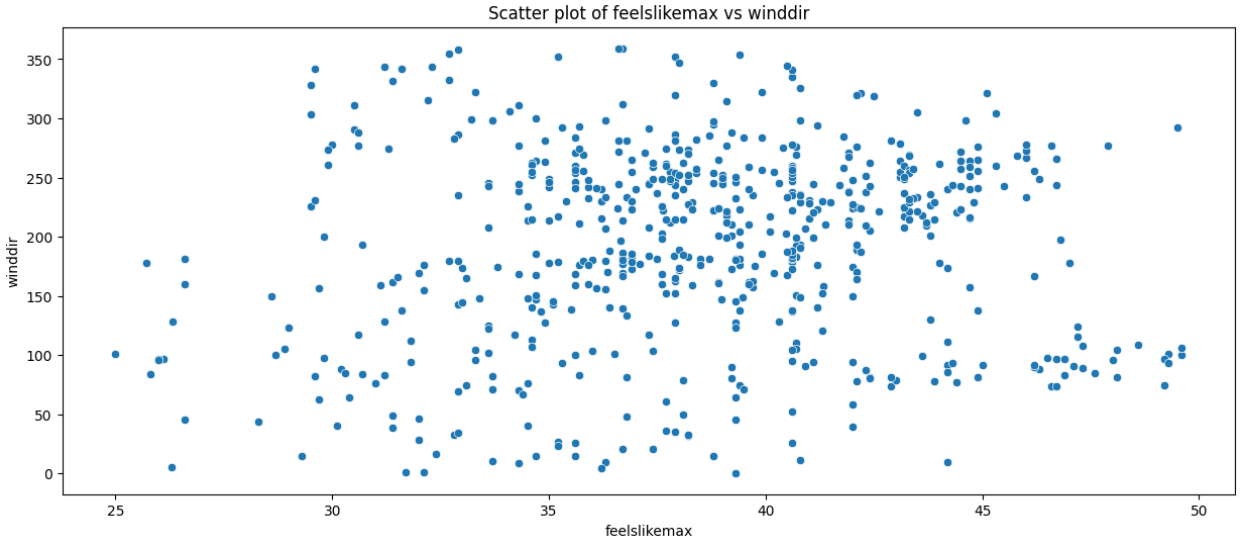
Scatter plot of feelslikemax vs winddir
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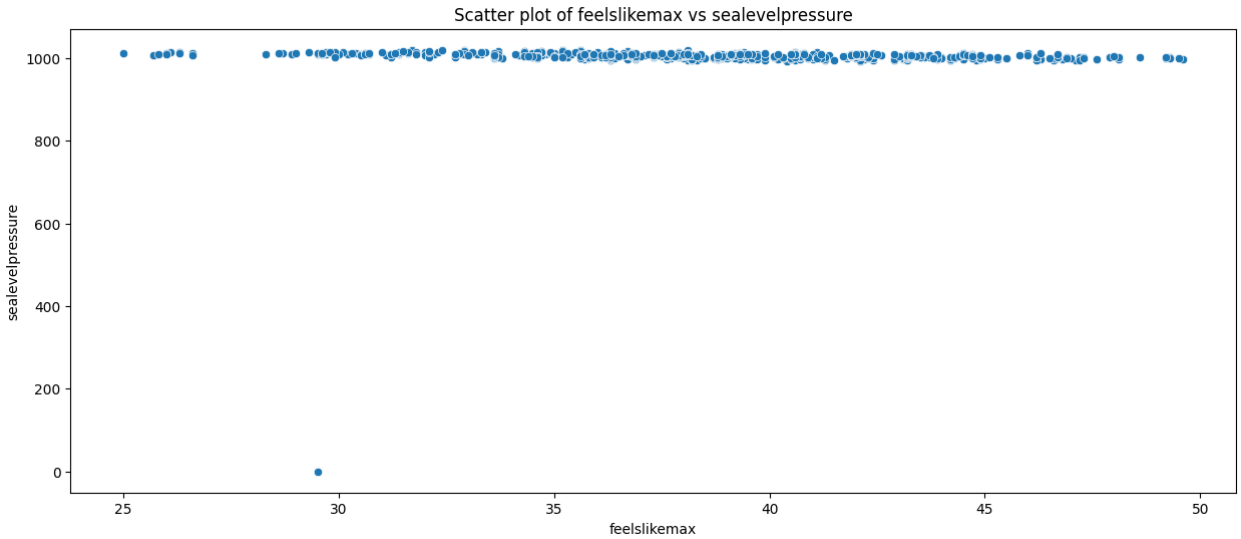
Scatter plot of feelslikemax vs sealevelpressure
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feelslikemax
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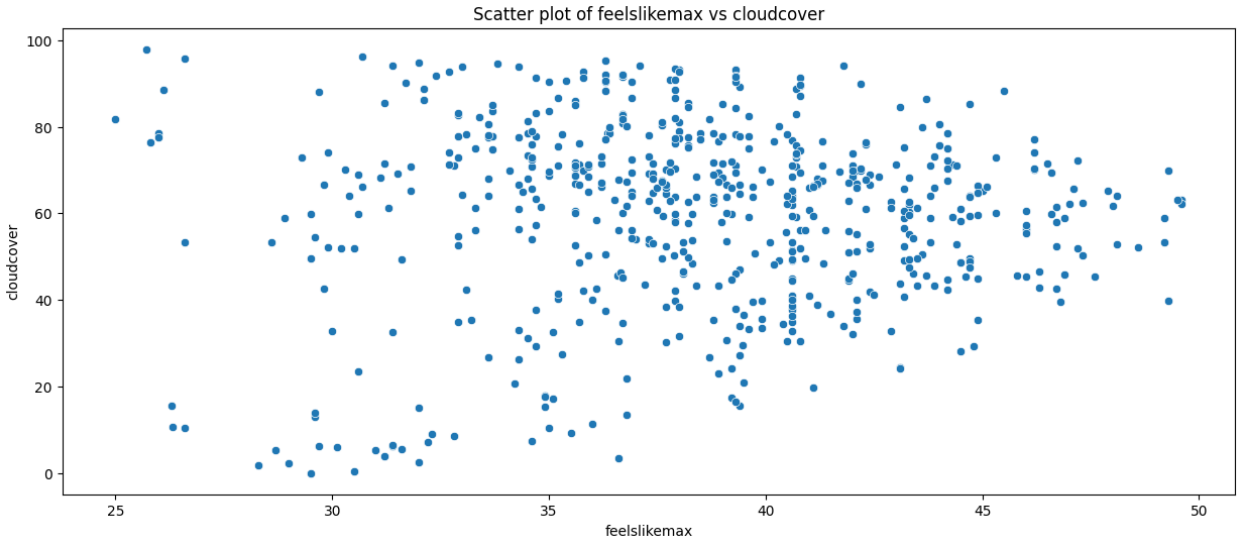
Scatter plot of feelslikemax vs cloudcover
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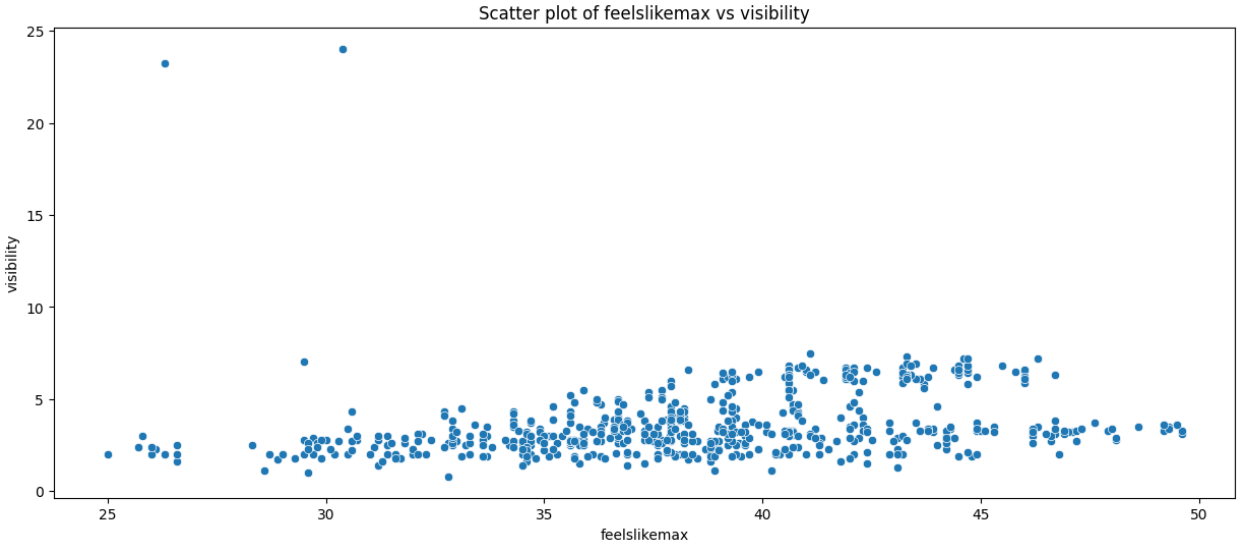
Scatter plot of feelslikemax vs visibility
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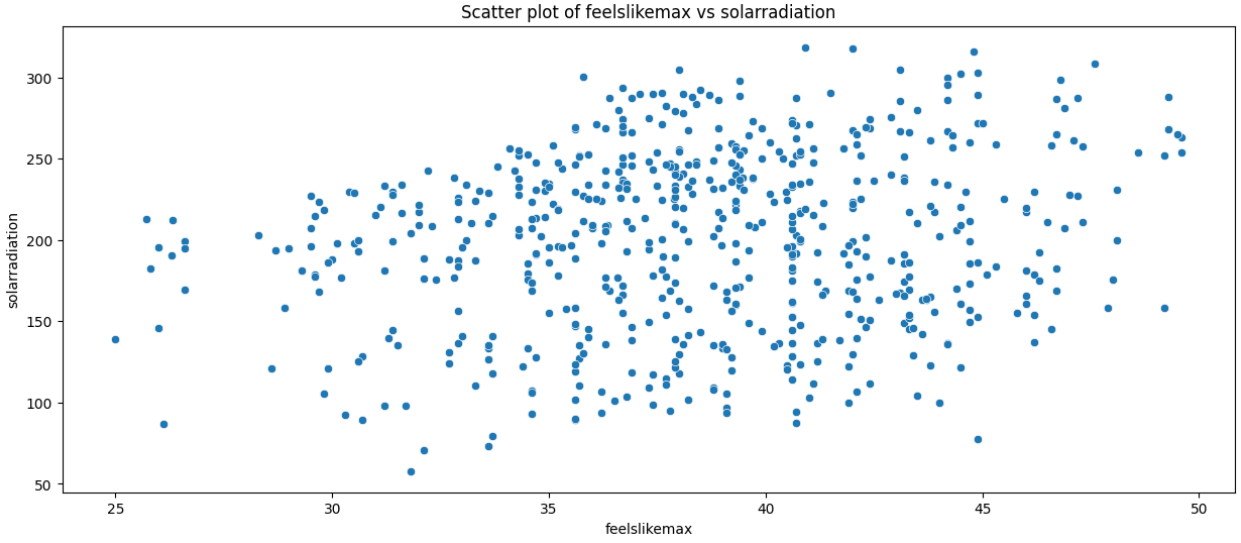
Scatter plot of feelslikemax vs solarradiation
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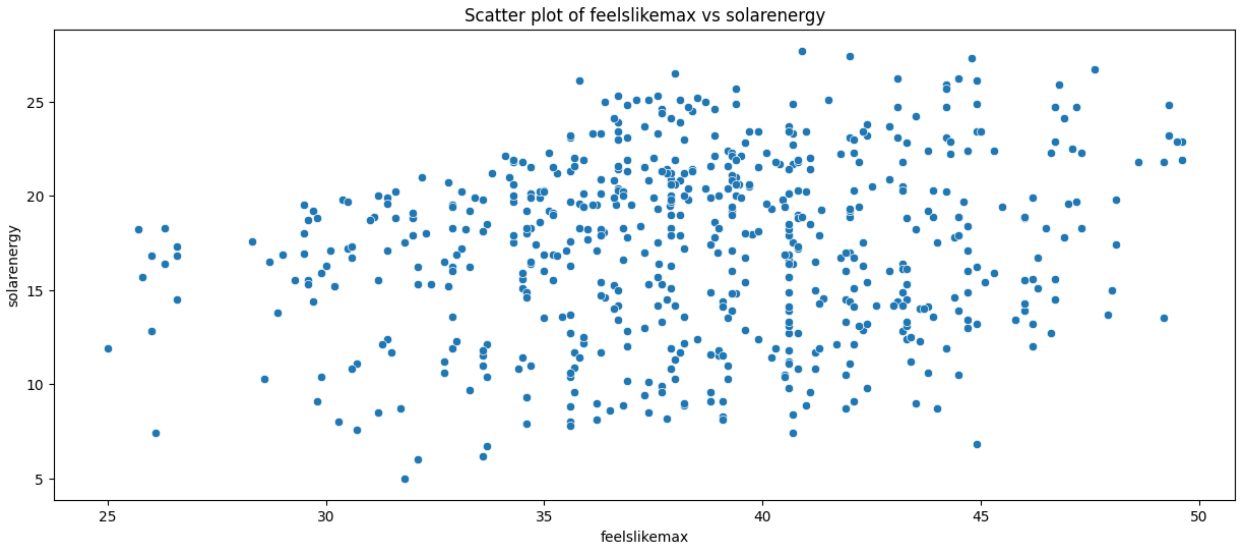
Scatter plot of feelslikemax vs solarenergy
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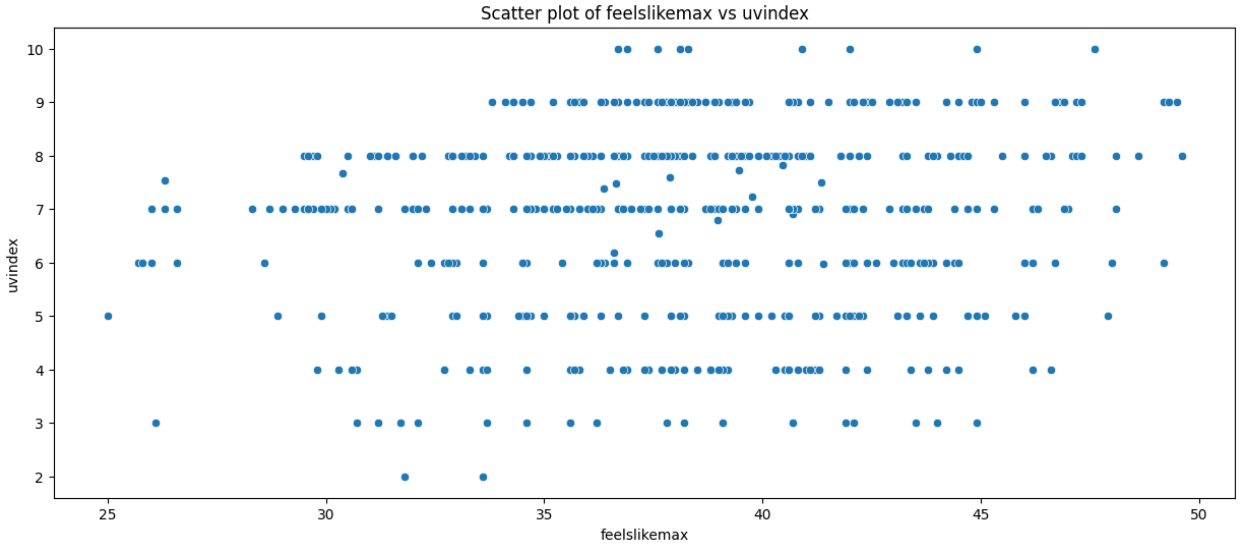
Scatter plot of feelslikemax vs uvindex
uvindex
feelslikemax
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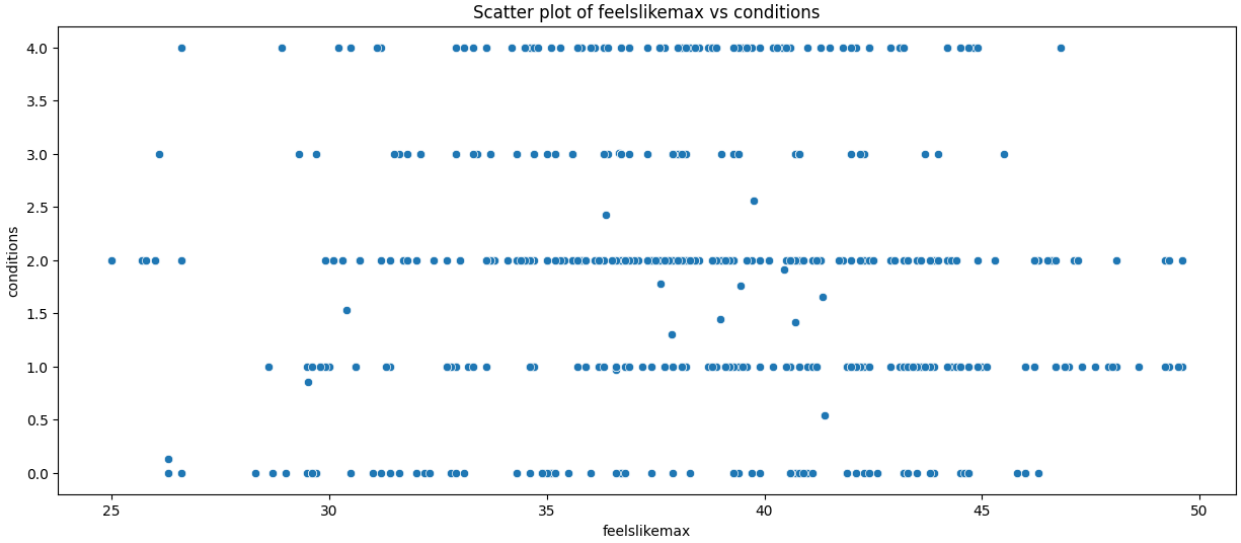
Scatter plot of feelslikemax vs conditions
conditions
feelslikemax
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2.5
2.0
1.5
1.0
0.5
0.0
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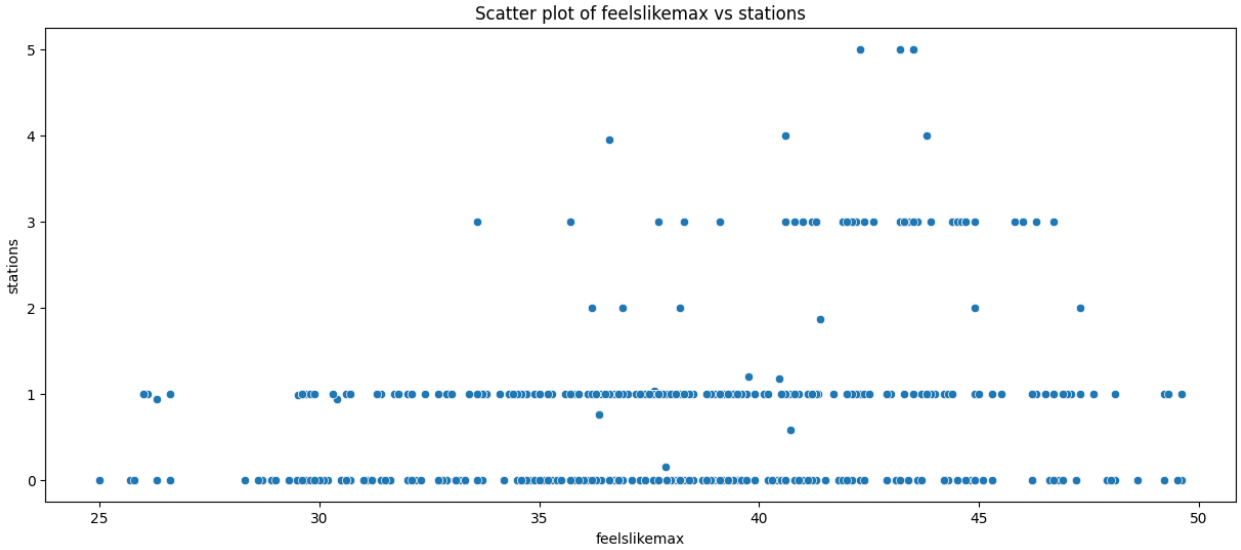
Scatter plot of feelslikemax vs stations
stations
feelslikemax
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1
0
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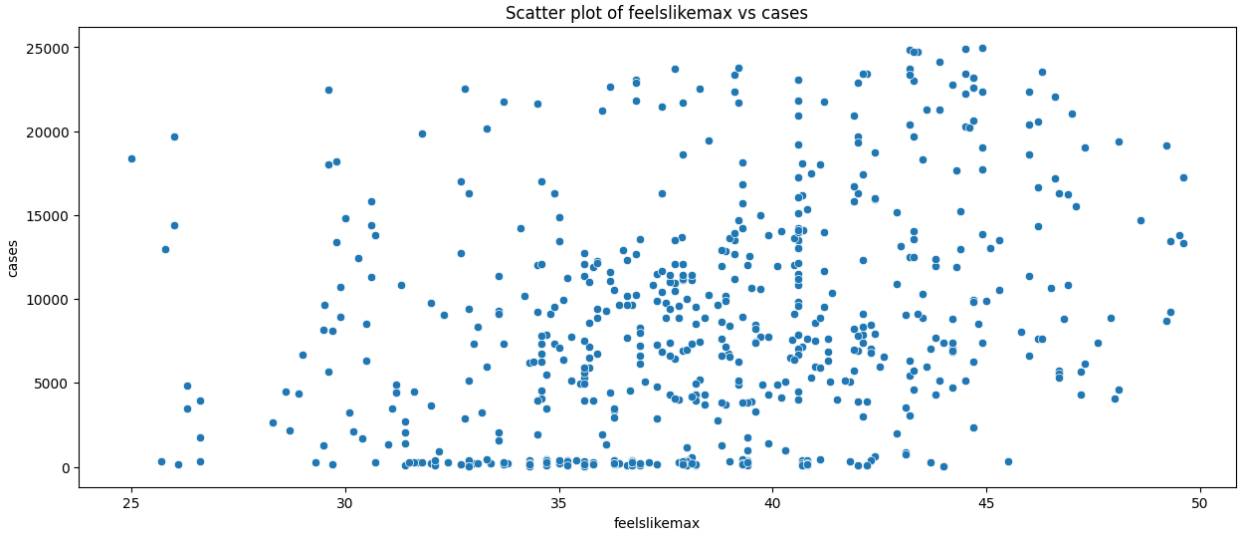
Scatter plot of feelslikemax vs cases
cases
feelslikemax
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5000
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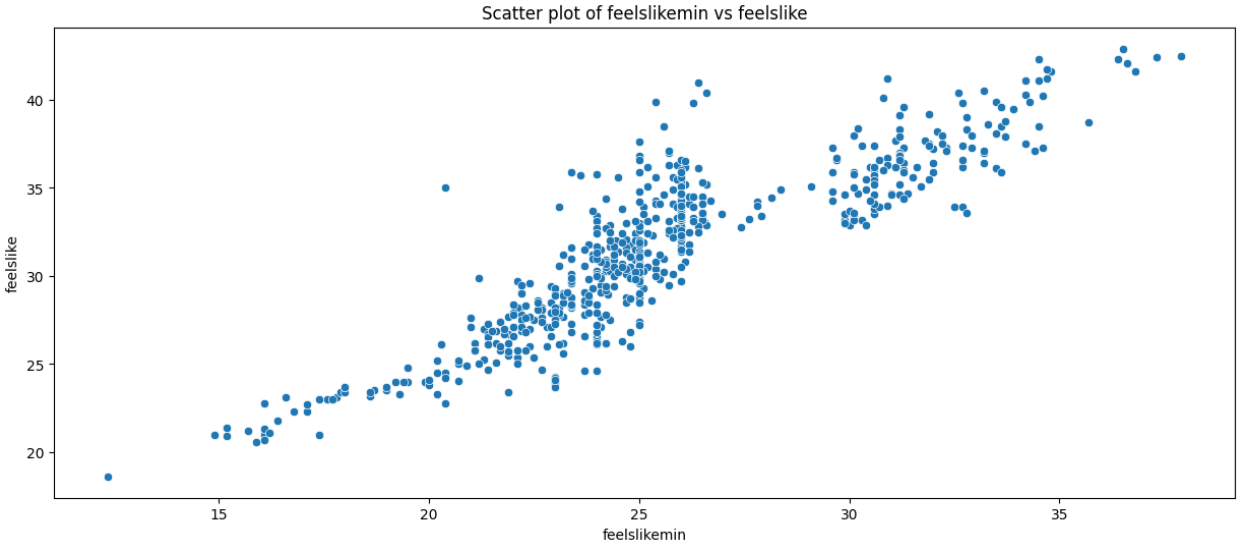
Scatter plot of feelslikemin vs feelslike
feelslike
feelslikemin
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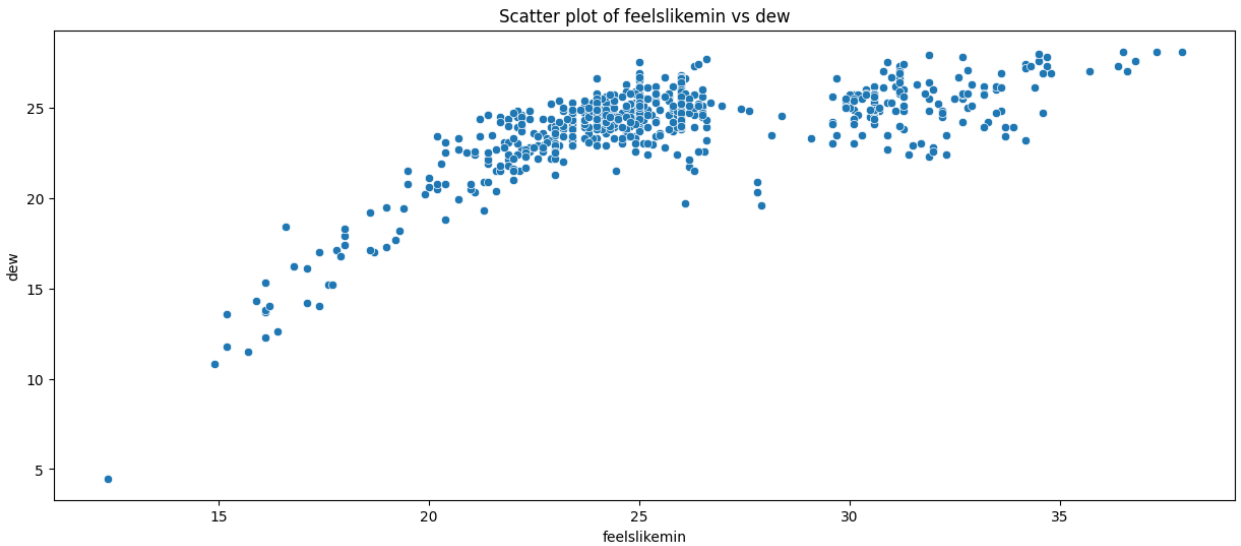
Scatter plot of feelslikemin vs dew
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feelslikemin
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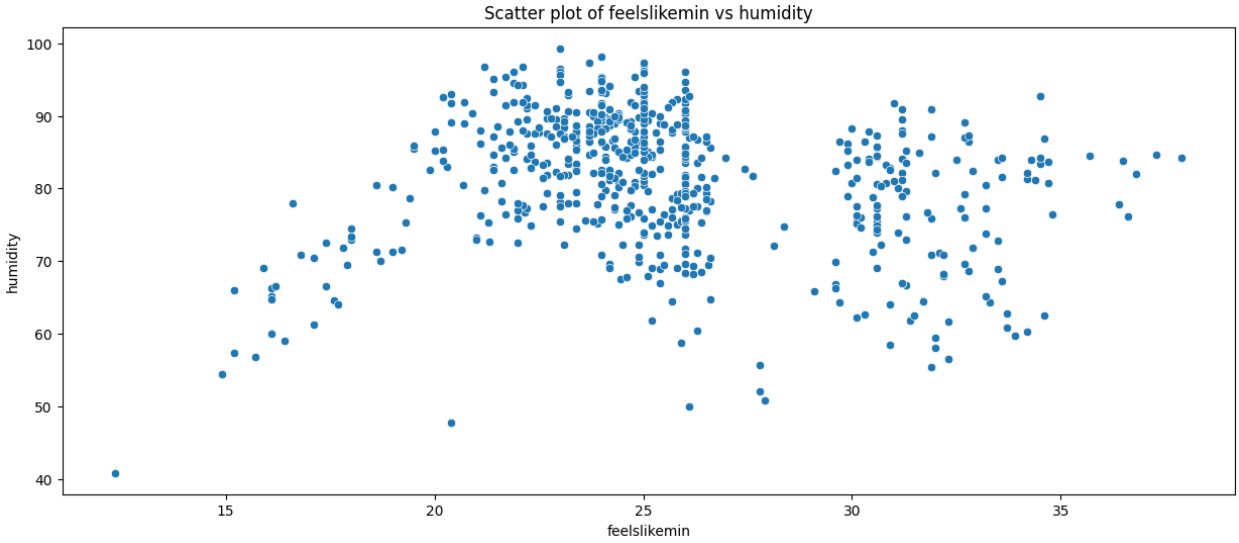
Scatter plot of feelslikemin vs humidity
humidity
feelslikemin
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90
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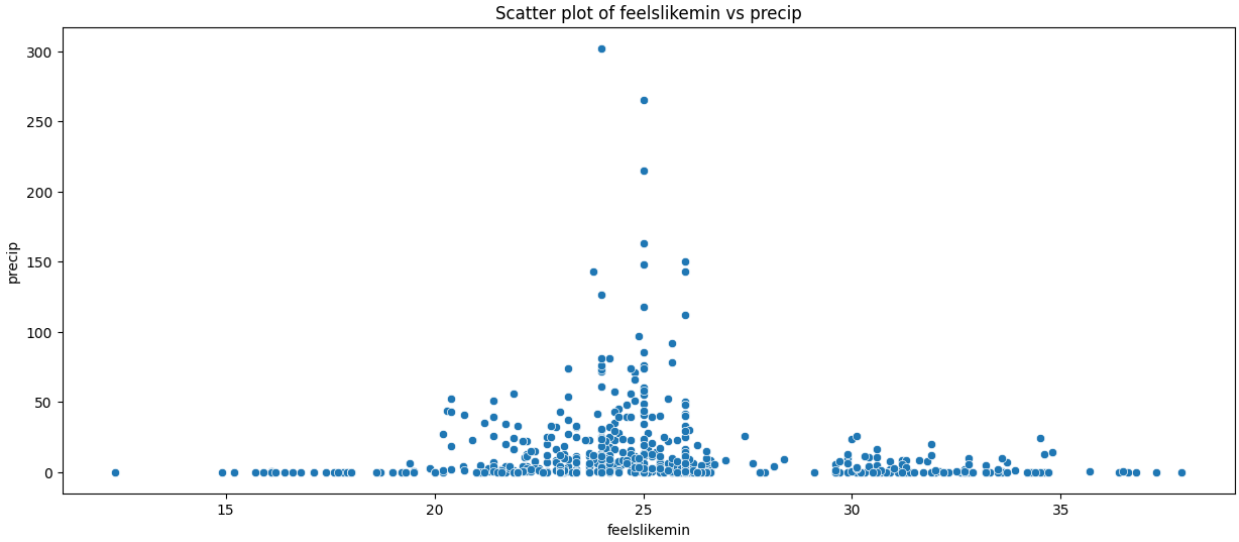
Scatter plot of feelslikemin vs precip
precip
feelslikemin
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250
200
150
100
50
0
15
20
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30
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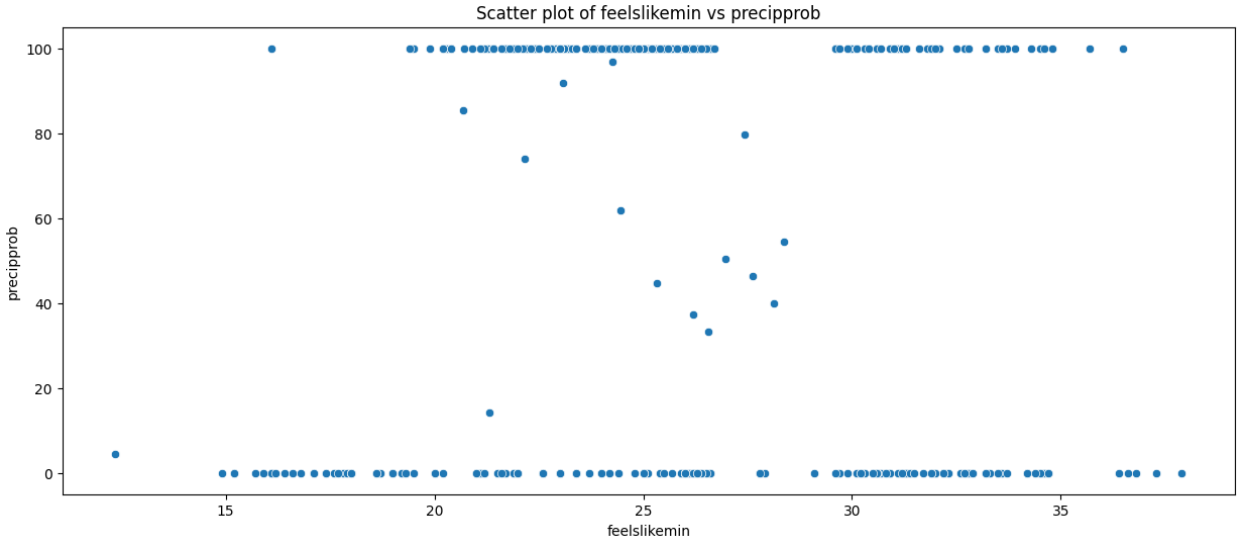
Scatter plot of feelslikemin vs precipprob
precipprob
feelslikemin
100
80
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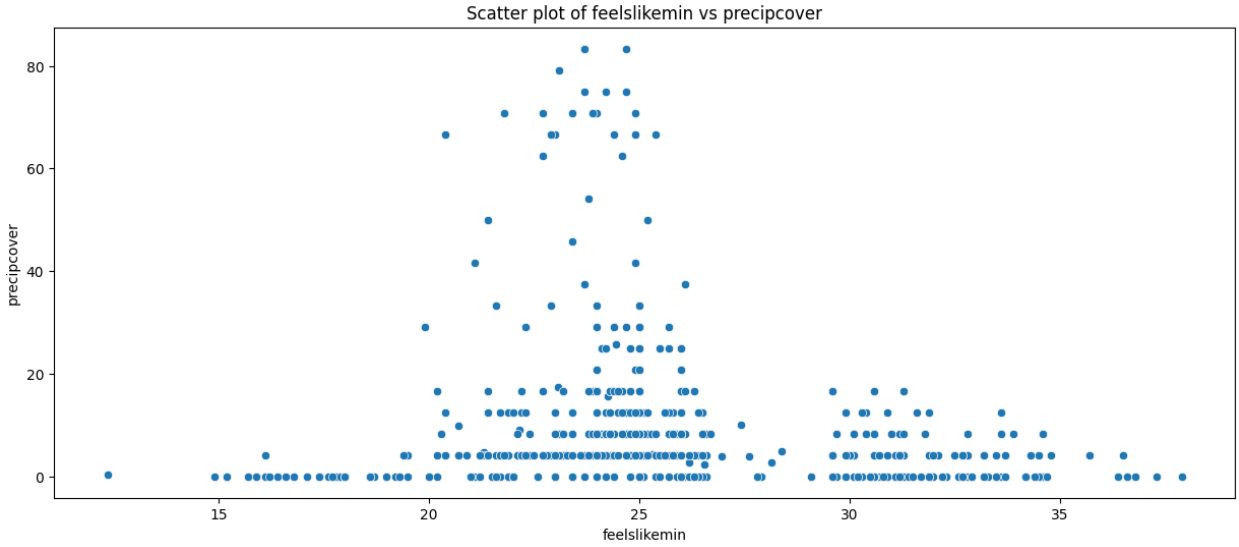
Scatter plot of feelslikemin vs precipcover
precipcover
feelslikemin
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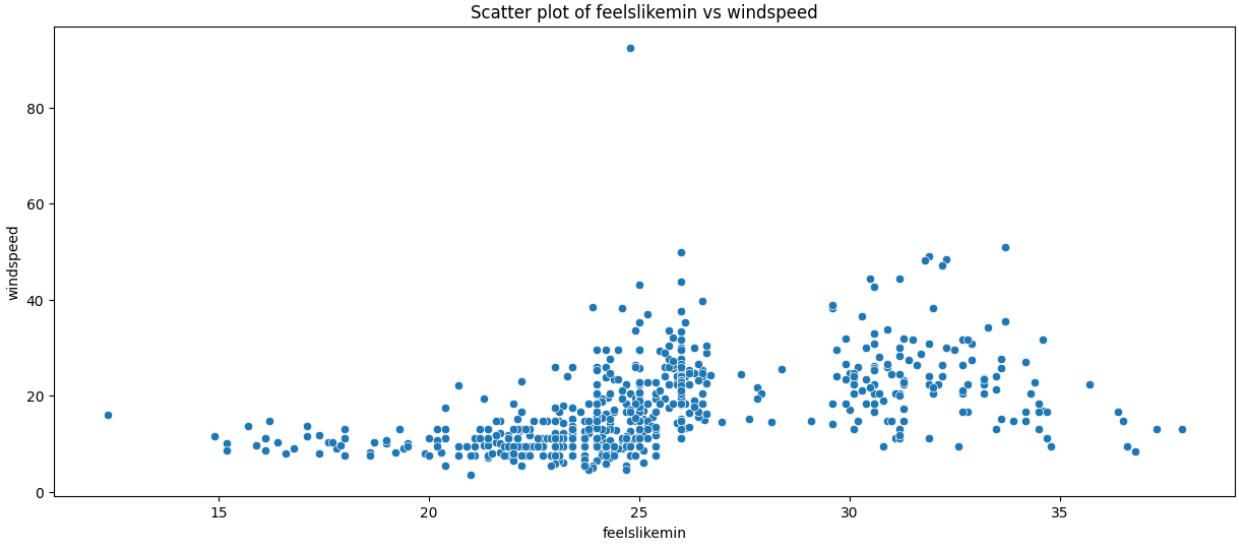
Scatter plot of feelslikemin vs windspeed
windspeed
feelslikemin
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60
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15
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25
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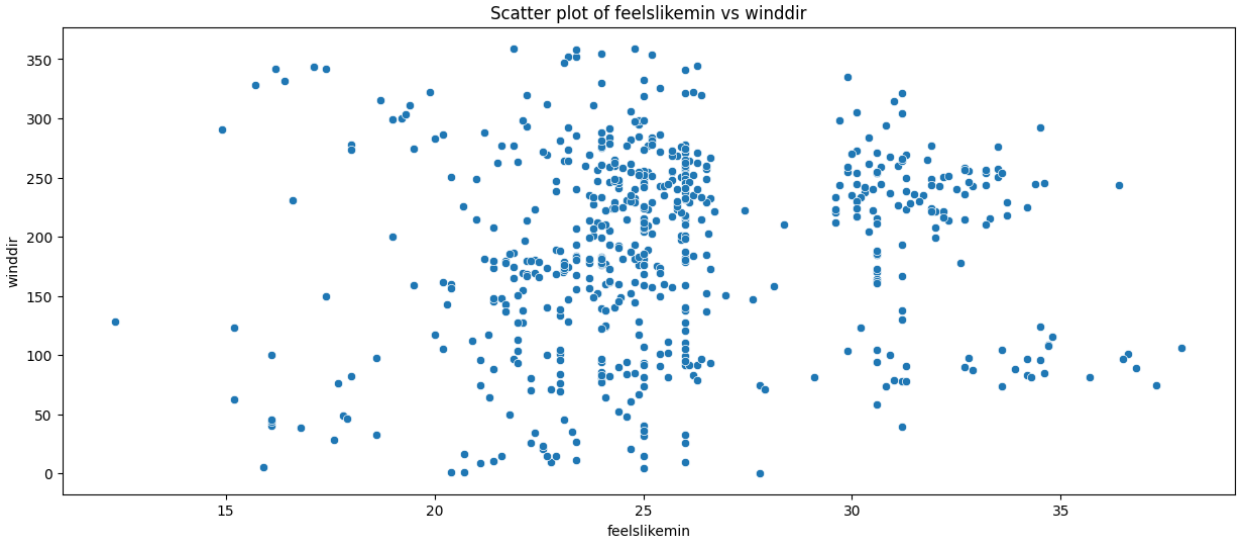
Scatter plot of feelslikemin vs winddir
winddir
feelslikemin
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150
200
250
300
350
15
20
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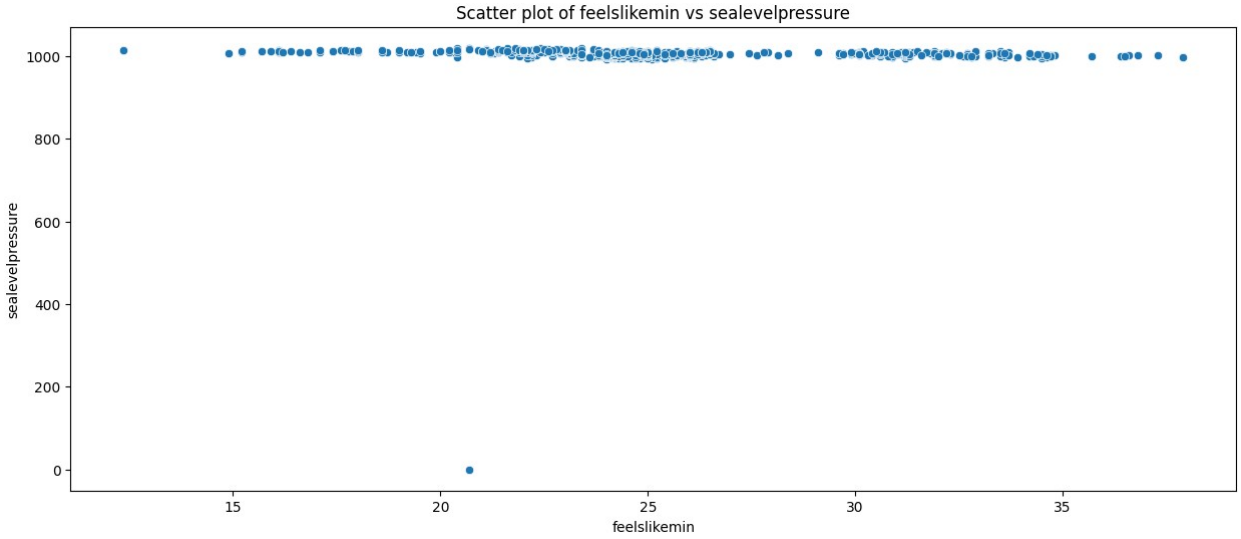
30
35


Scatter plot of feelslikemin vs sealevelpressure
sealevelpressure
feelslikemin
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800
600
400
200
0
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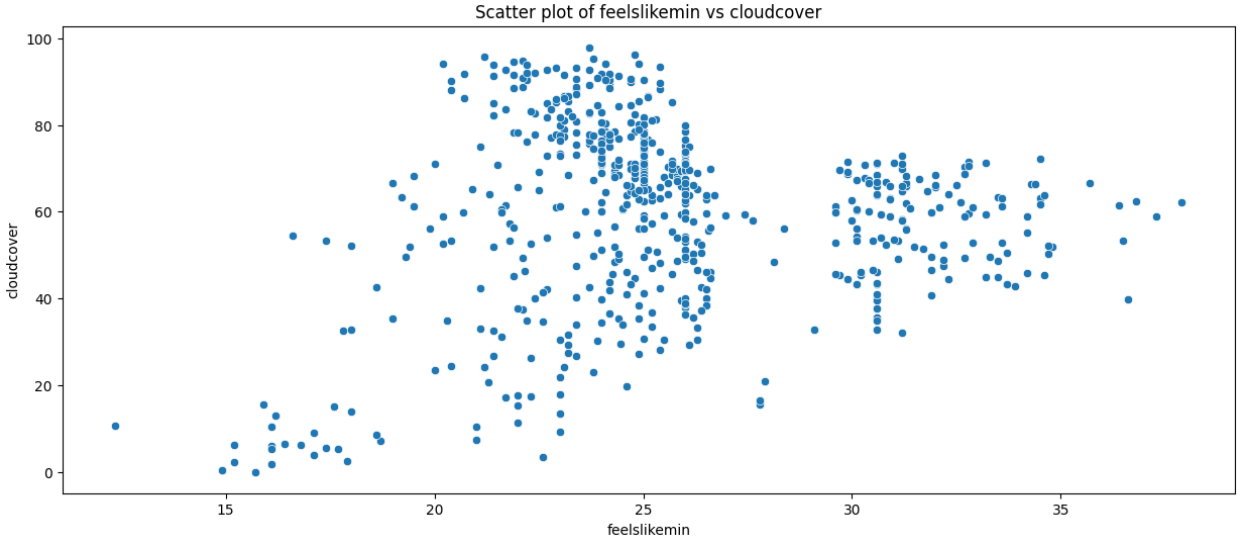
Scatter plot of feelslikemin vs cloudcover
cloudcover
feelslikemin
100
80
60
40
20
0
15
20
25
30
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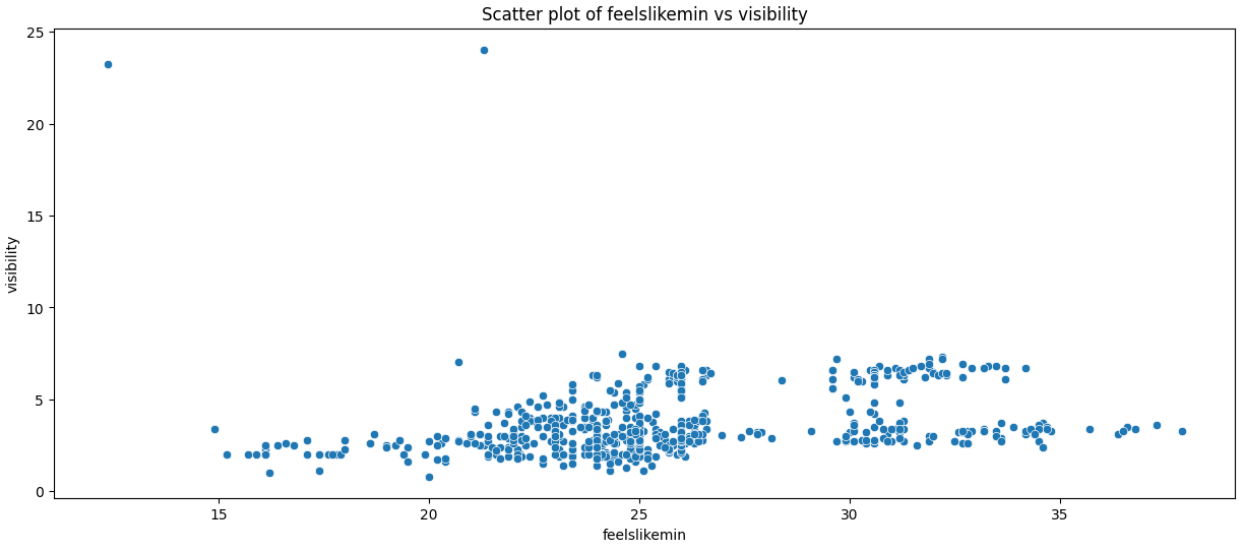
Scatter plot of feelslikemin vs visibility
visibility
feelslikemin
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25
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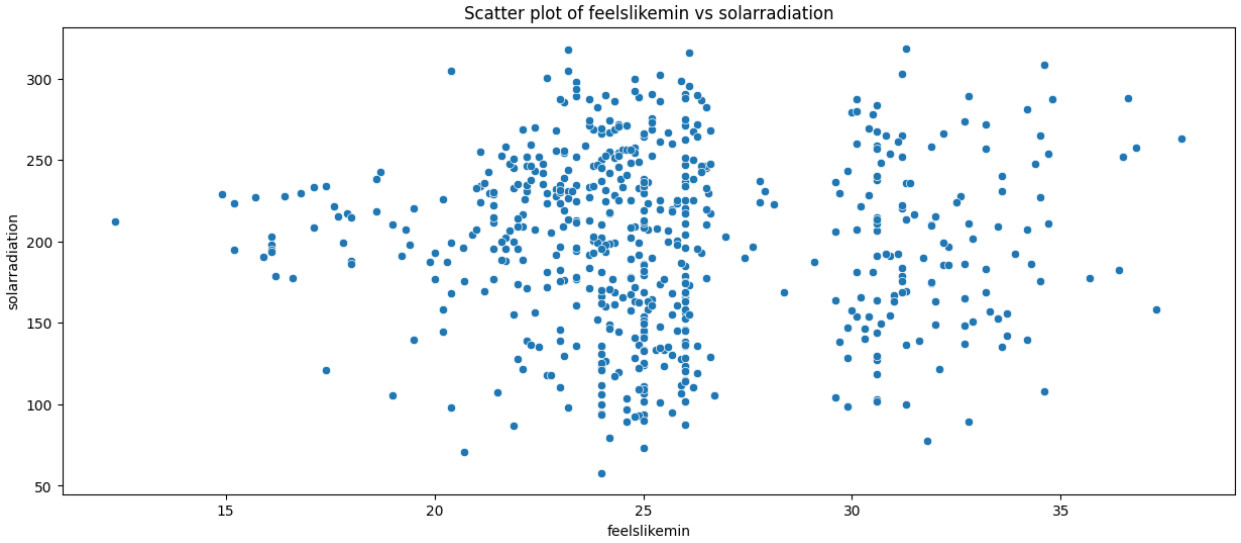
Scatter plot of feelslikemin vs solarradiation
solarradiation
feelslikemin
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150
100
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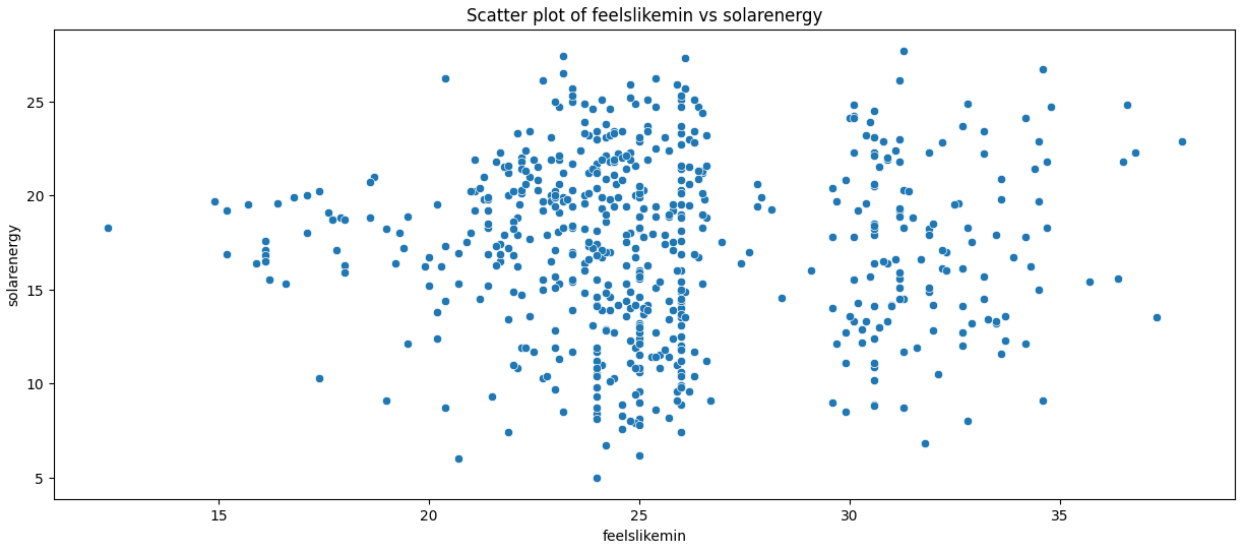
Scatter plot of feelslikemin vs solarenergy
solarenergy
feelslikemin
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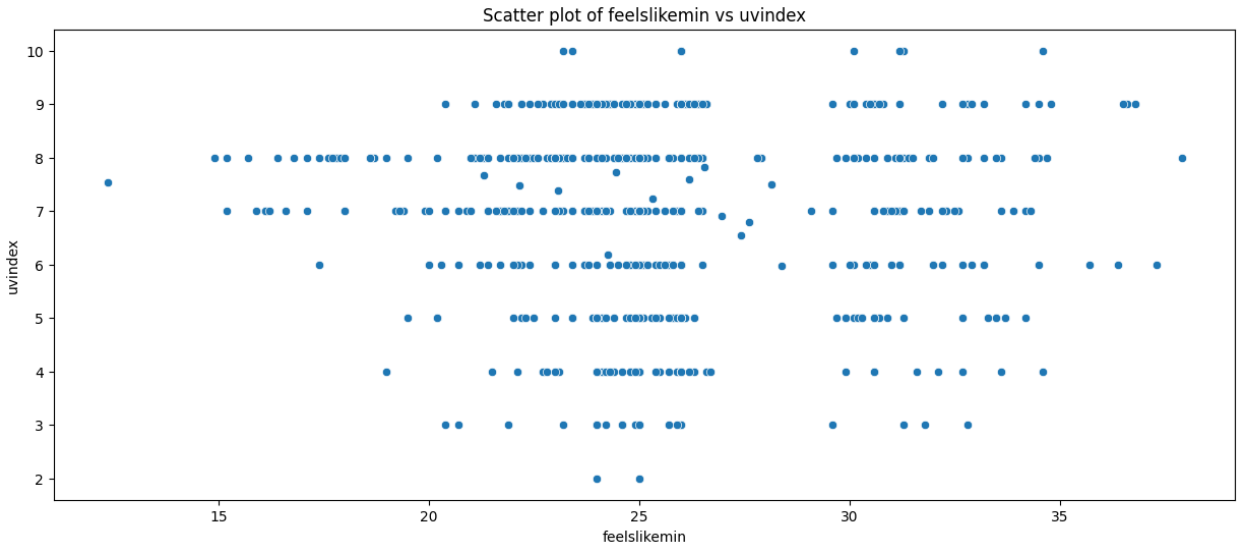
Scatter plot of feelslikemin vs uvindex
uvindex
feelslikemin
10
9
8
7
6
5
4
3
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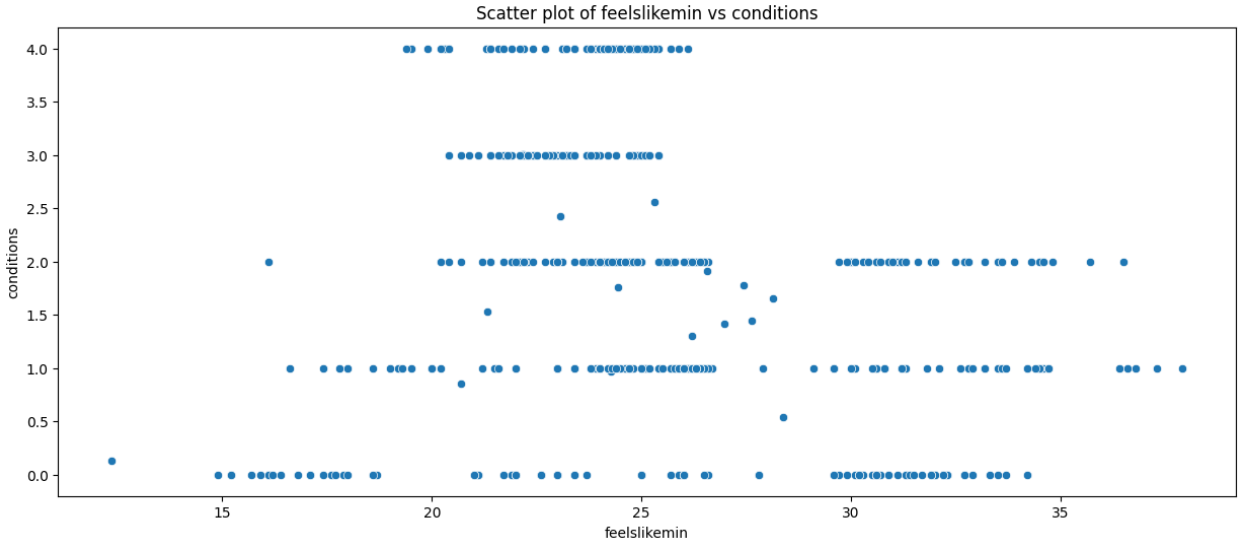
25
30
35


Scatter plot of feelslikemin vs conditions
conditions
feelslikemin
4.0
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3.0
2.5
2.0
1.5
1.0
0.5
0.0
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30
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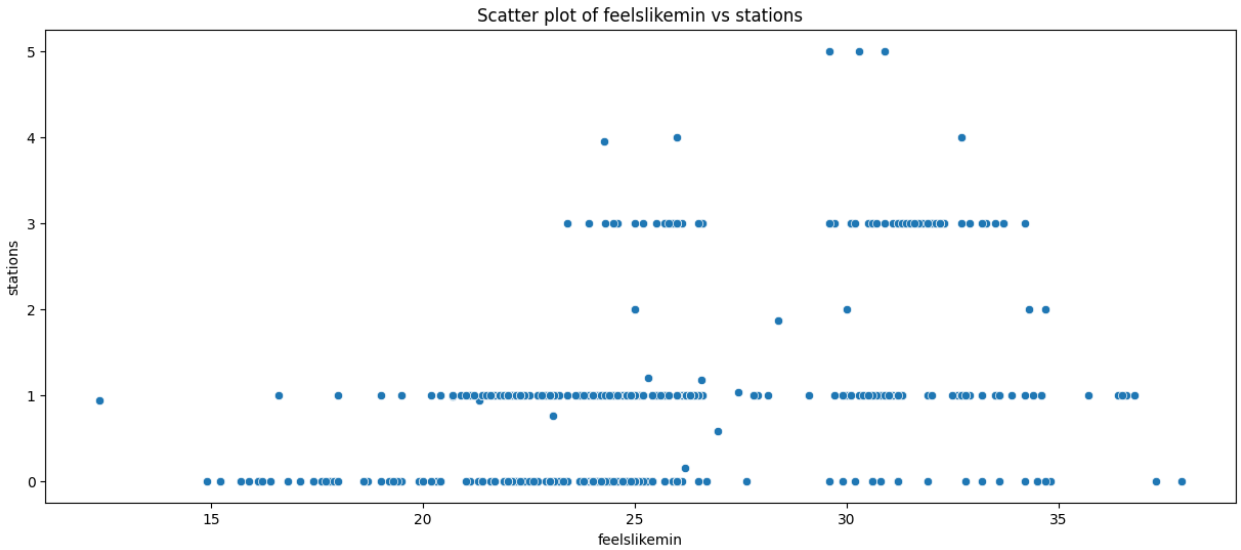
Scatter plot of feelslikemin vs stations
stations
feelslikemin
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4
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2
1
0
15
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30
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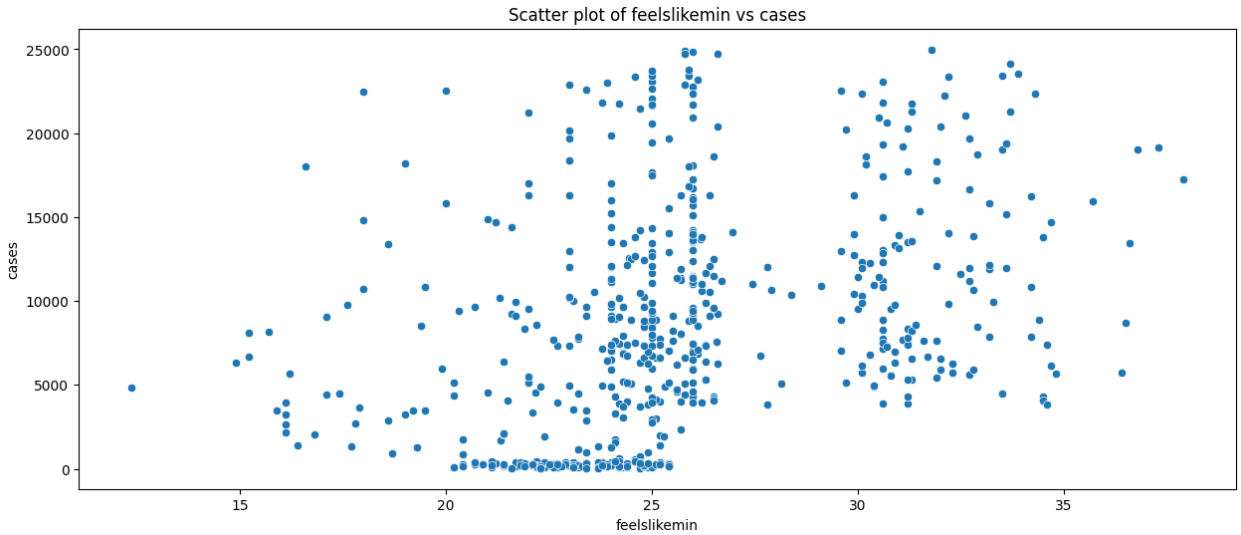
Scatter plot of feelslikemin vs cases
cases
feelslikemin
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20000
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10000
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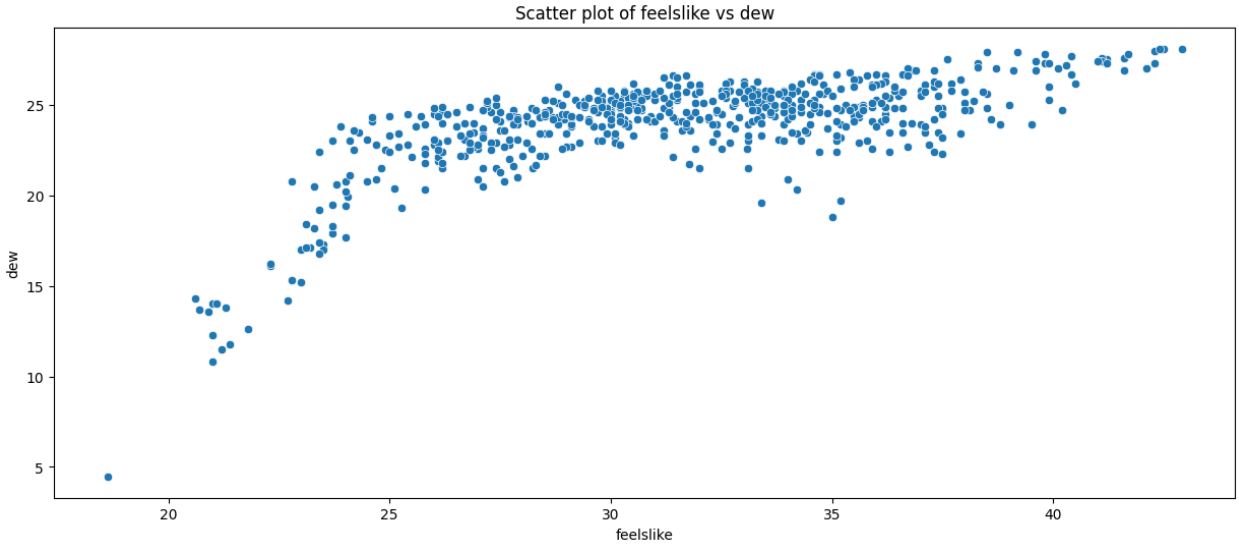
Scatter plot of feelslike vs dew
dew
feelslike
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25
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35
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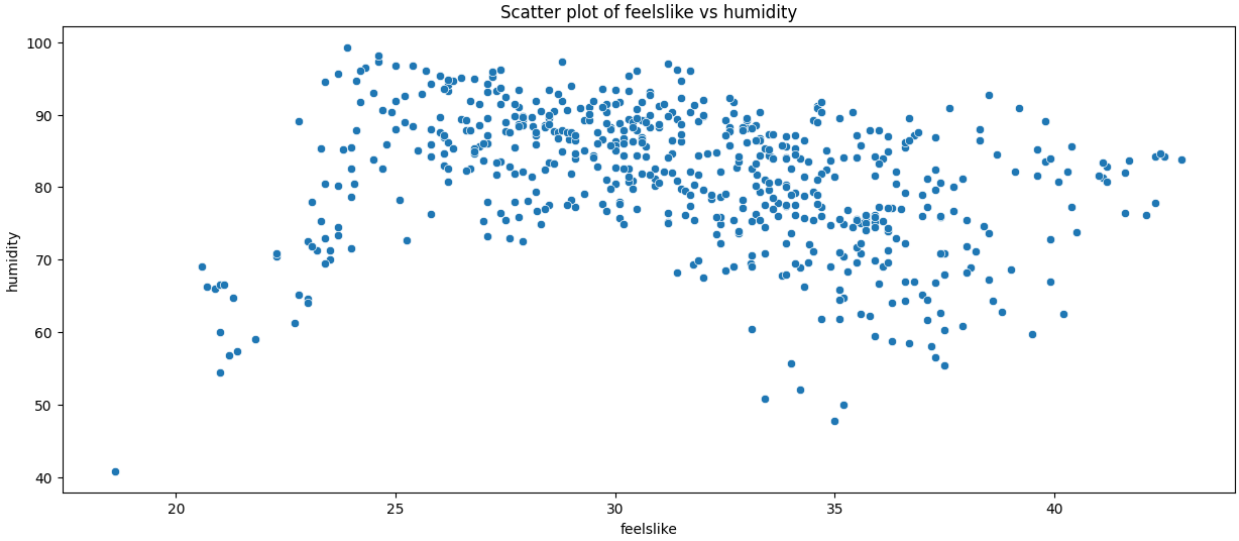
Scatter plot of feelslike vs humidity
humidity
feelslike
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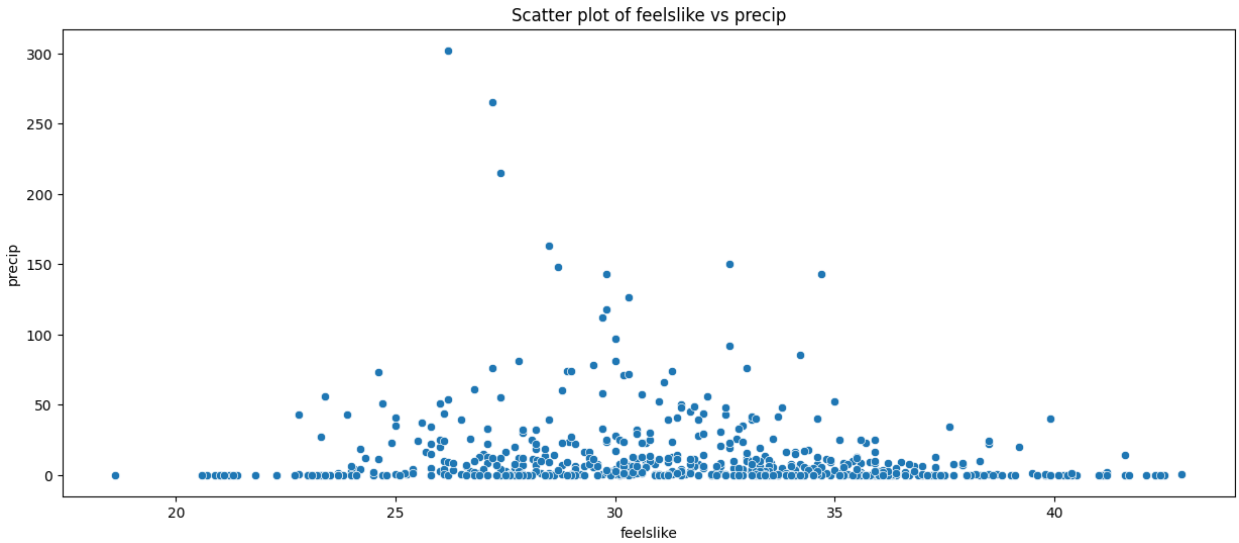
80
90
100
20
25
30
35
40


Scatter plot of feelslike vs precip
precip
feelslike
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250
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25
30
35
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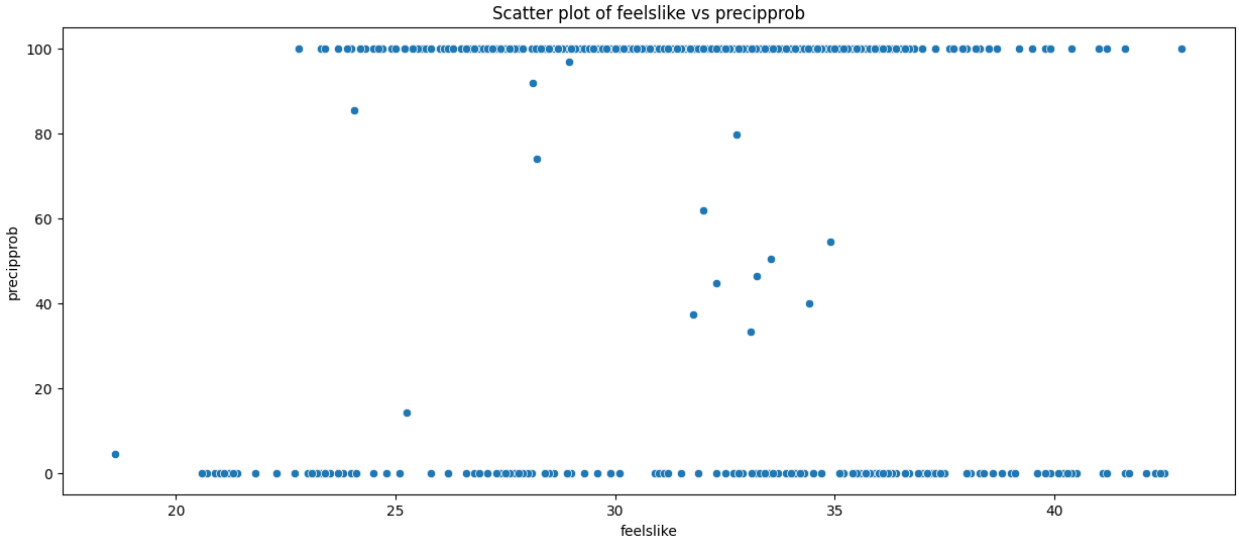
Scatter plot of feelslike vs precipprob
precipprob
feelslike
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100
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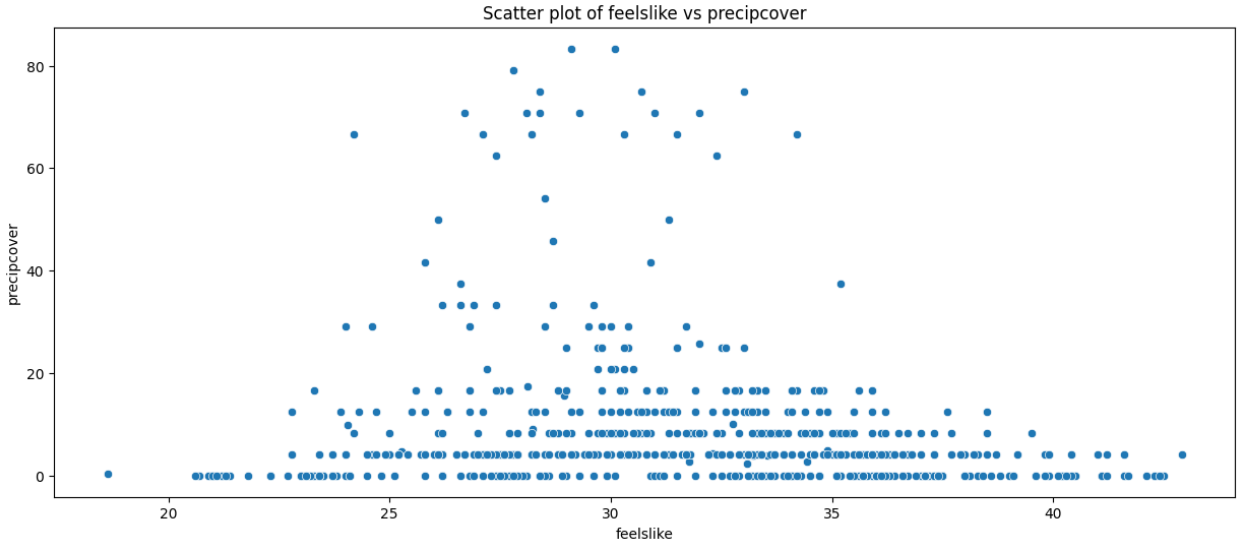
Scatter plot of feelslike vs precipcover
precipcover
feelslike
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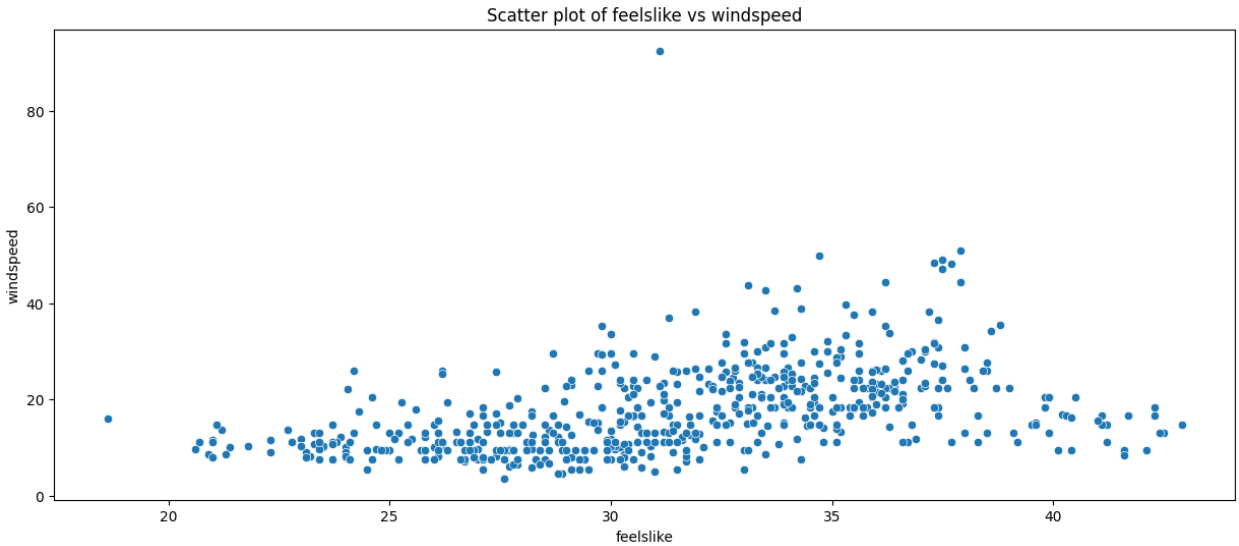
Scatter plot of feelslike vs windspeed
windspeed
feelslike
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25
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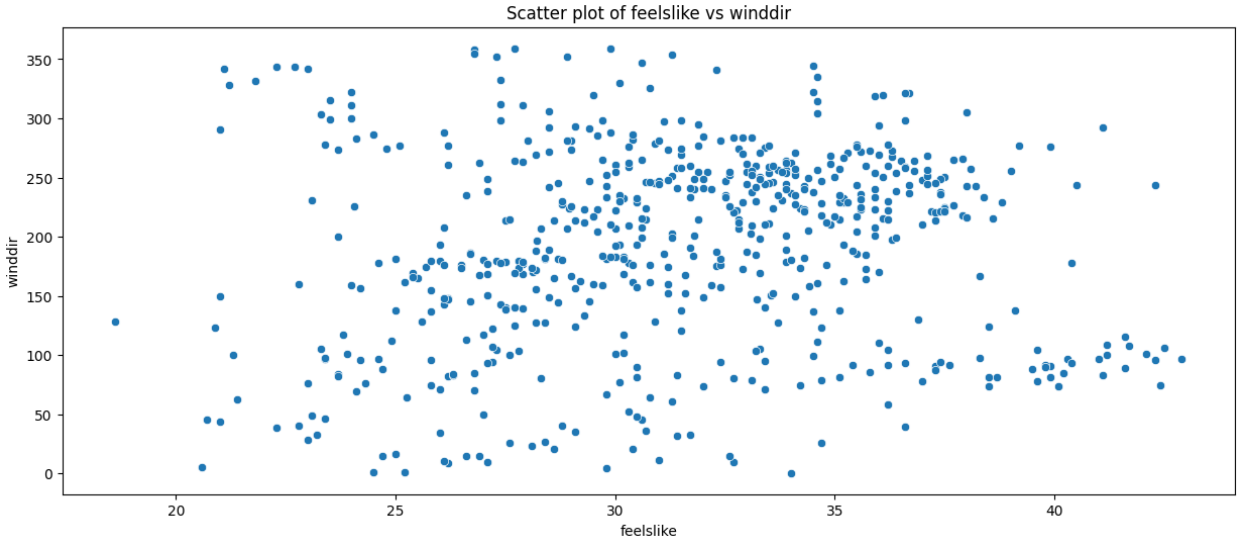
Scatter plot of feelslike vs winddir
winddir
feelslike
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300
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30
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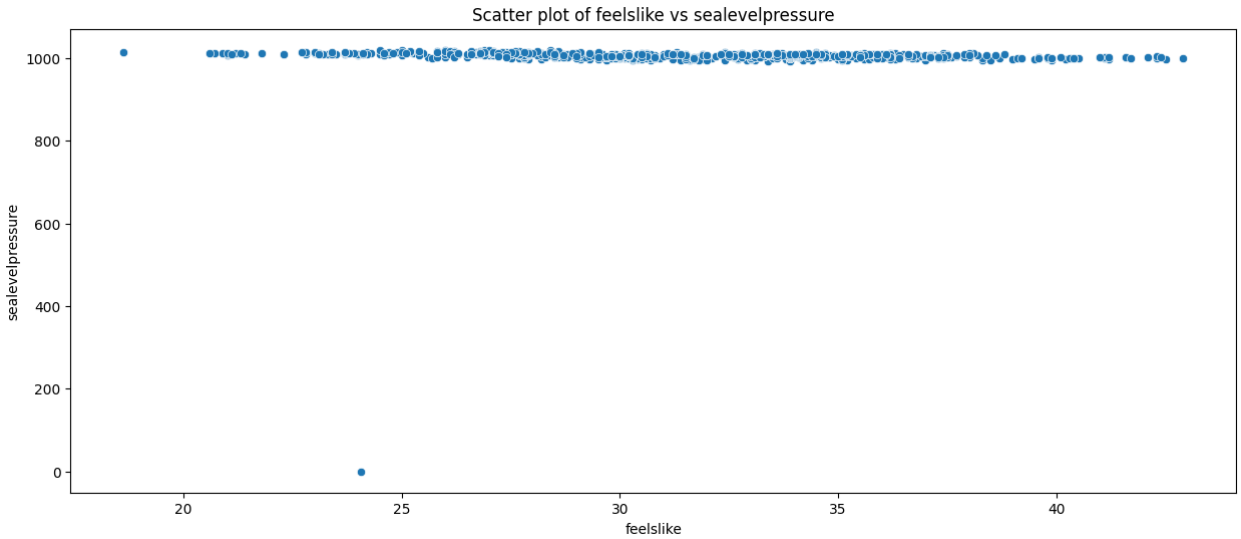
Scatter plot of feelslike vs sealevelpressure
sealevelpressure
feelslike
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800
1000
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35
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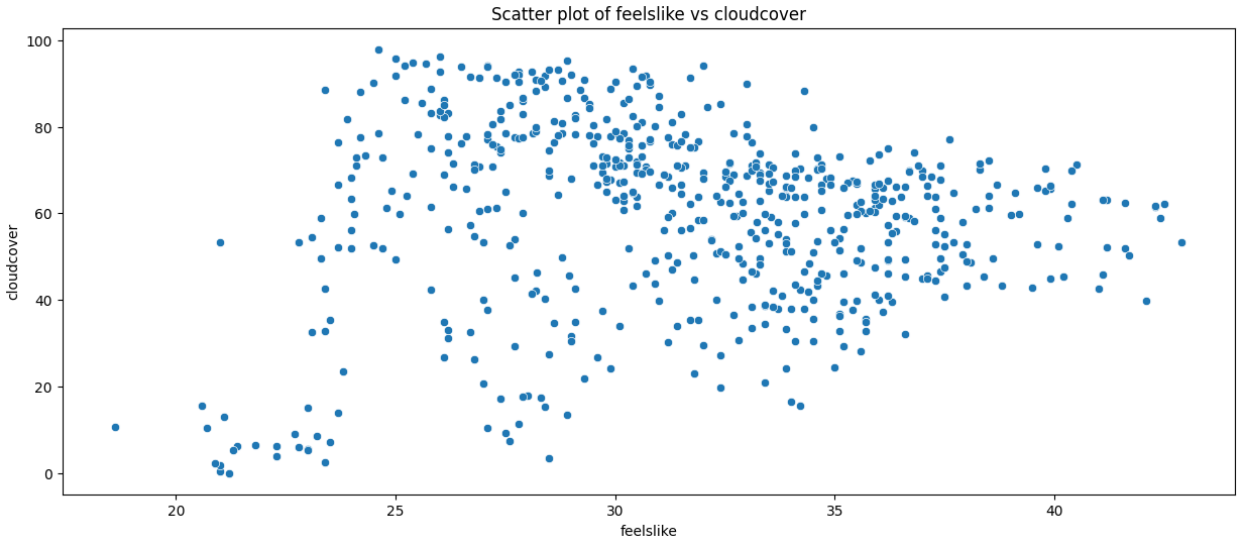
Scatter plot of feelslike vs cloudcover
cloudcover
feelslike
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30
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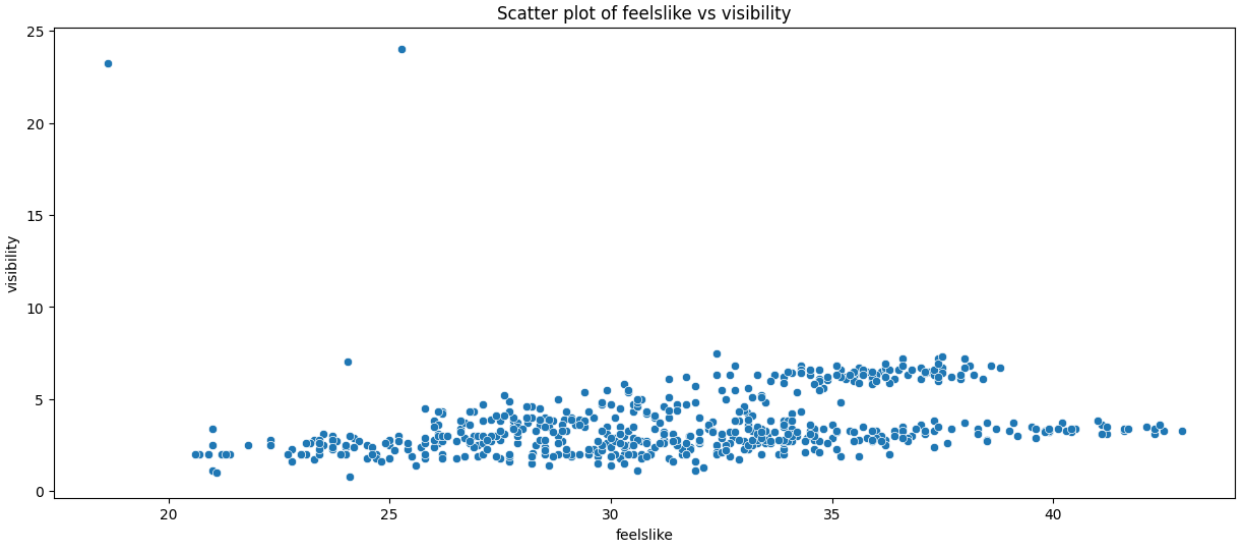
Scatter plot of feelslike vs visibility
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feelslike
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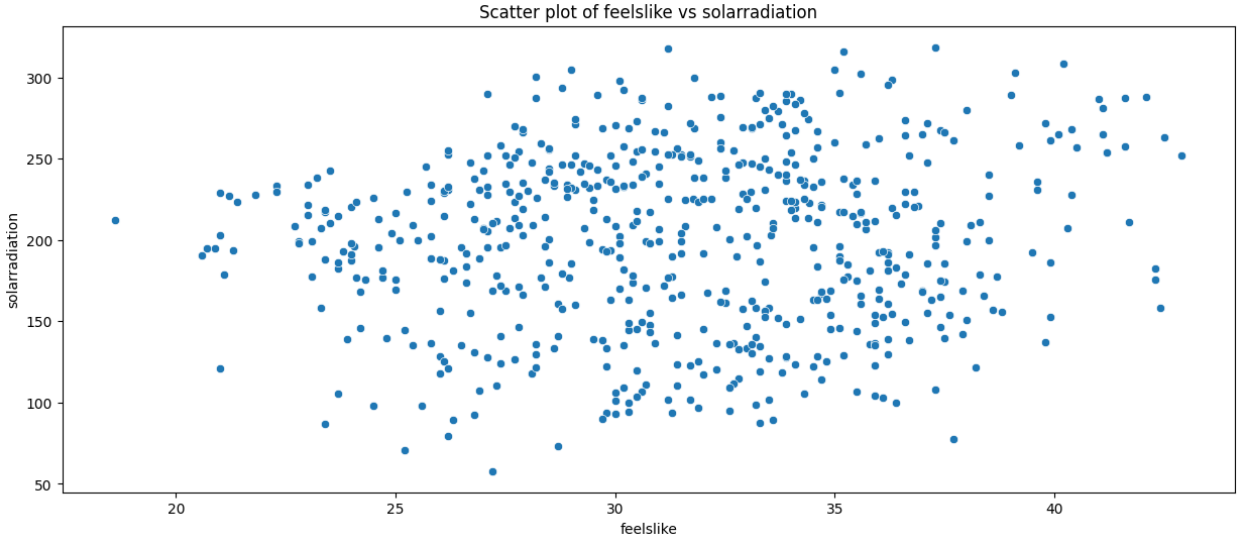
Scatter plot of feelslike vs solarradiation
solarradiation
feelslike
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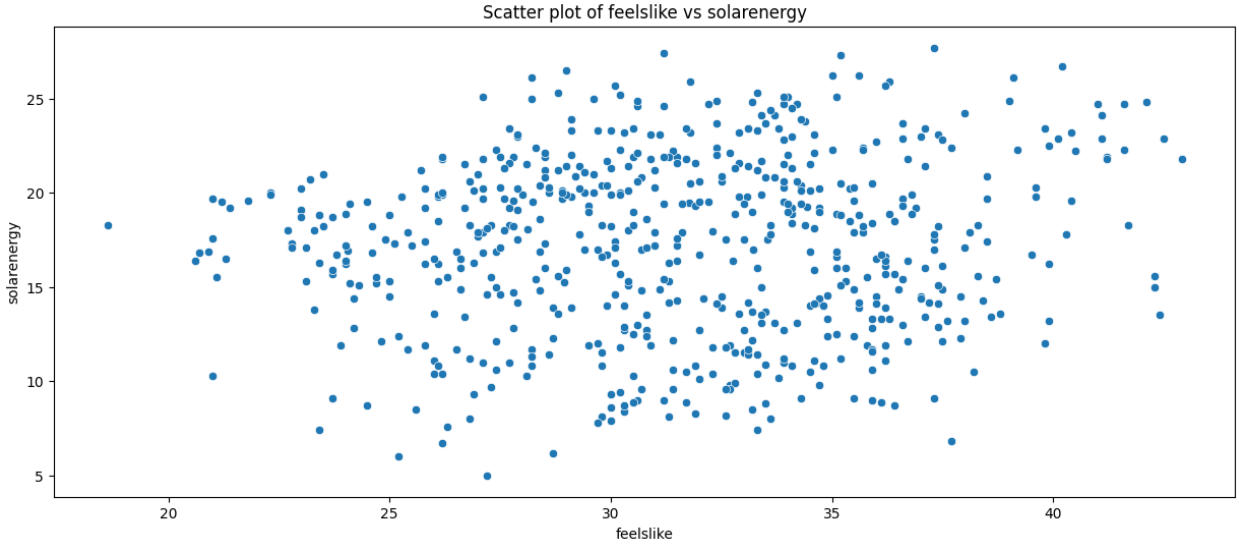
Scatter plot of feelslike vs solarenergy
solarenergy
feelslike
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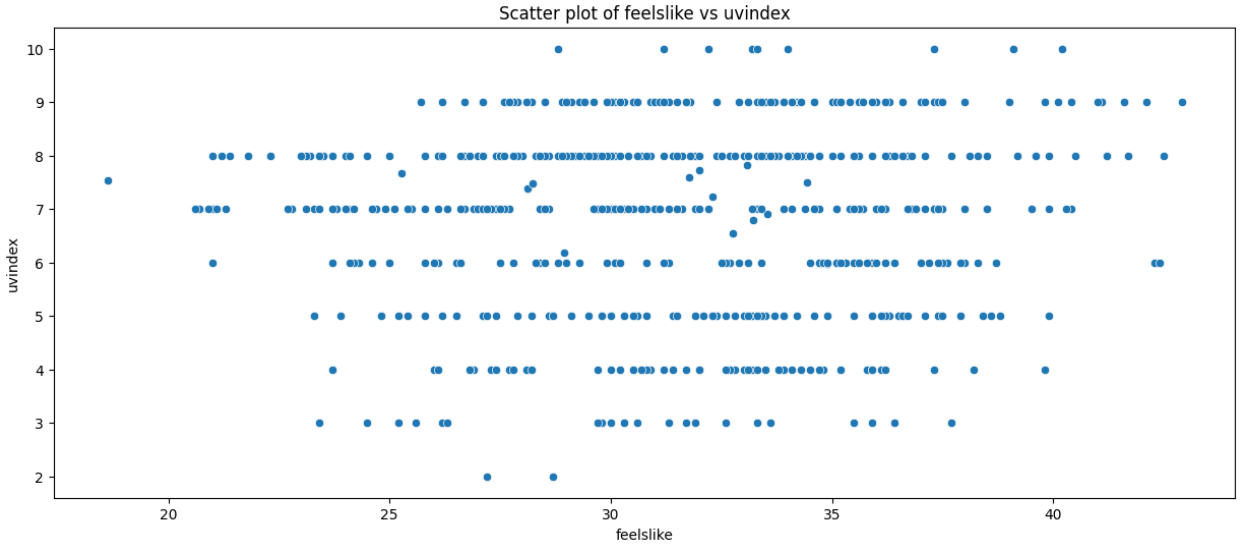
Scatter plot of feelslike vs uvindex
uvindex
feelslike
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4
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2
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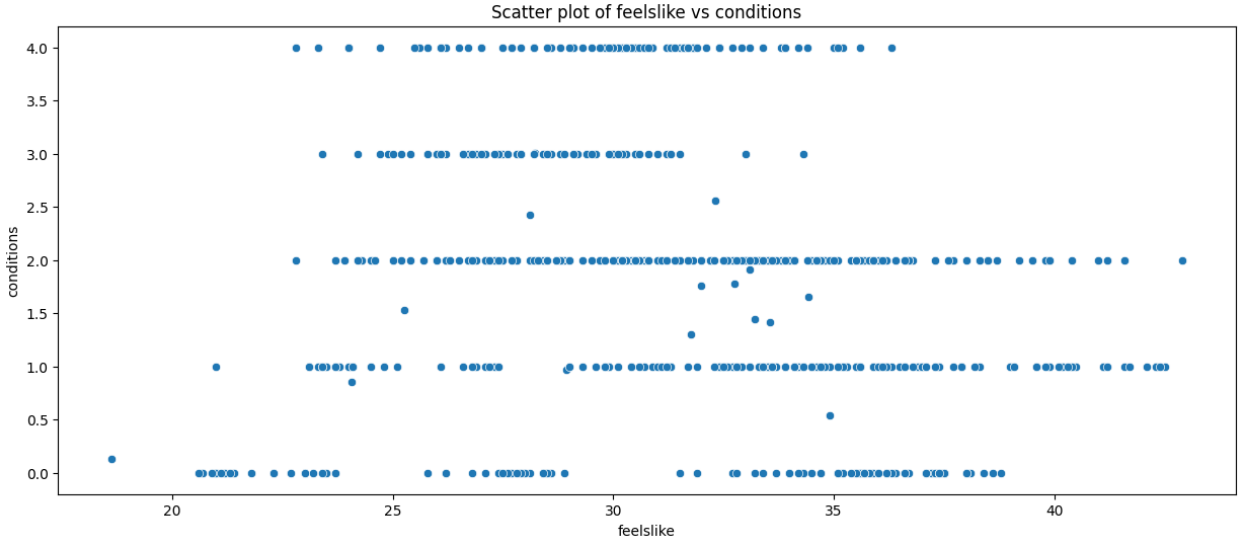
Scatter plot of feelslike vs conditions
conditions
feelslike
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3.0
2.5
2.0
1.5
1.0
0.5
0.0
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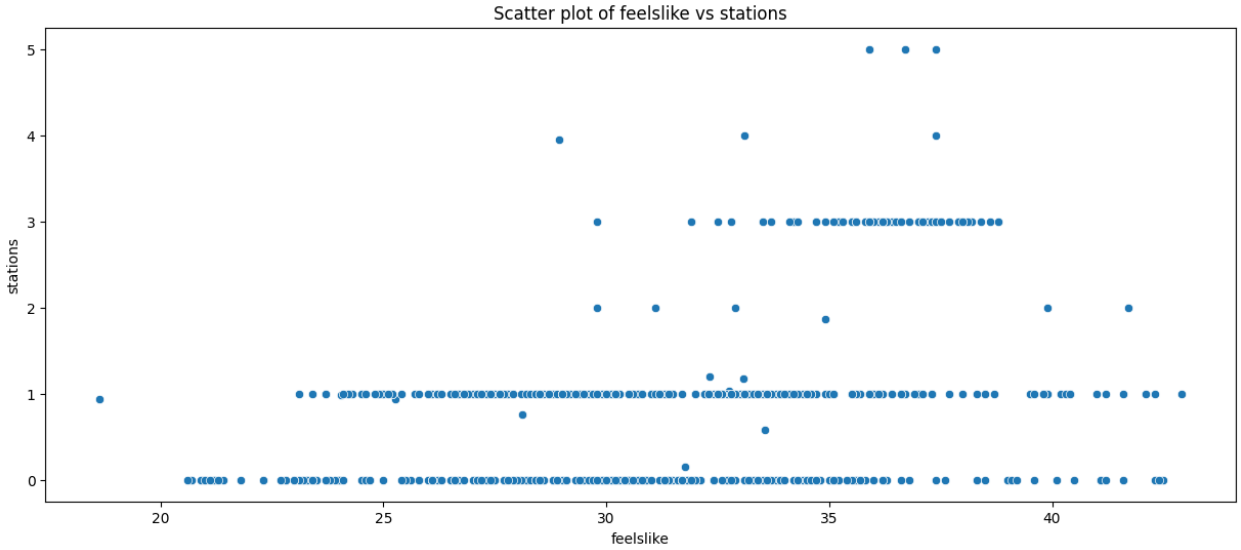
Scatter plot of feelslike vs stations
stations
feelslike
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35
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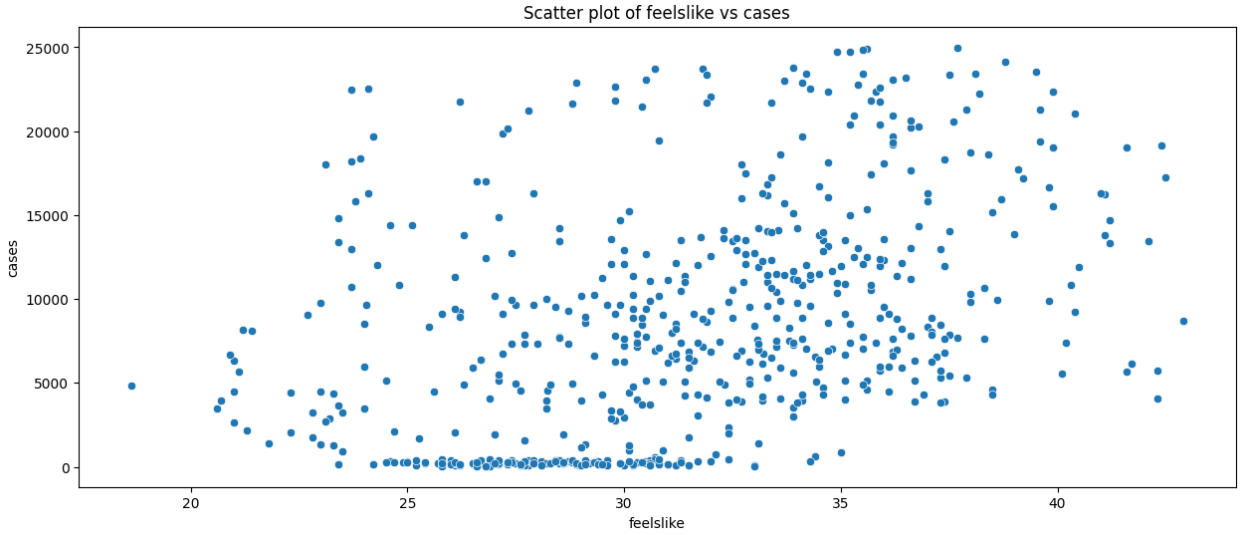
Scatter plot of feelslike vs cases
cases
feelslike
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20000
25000
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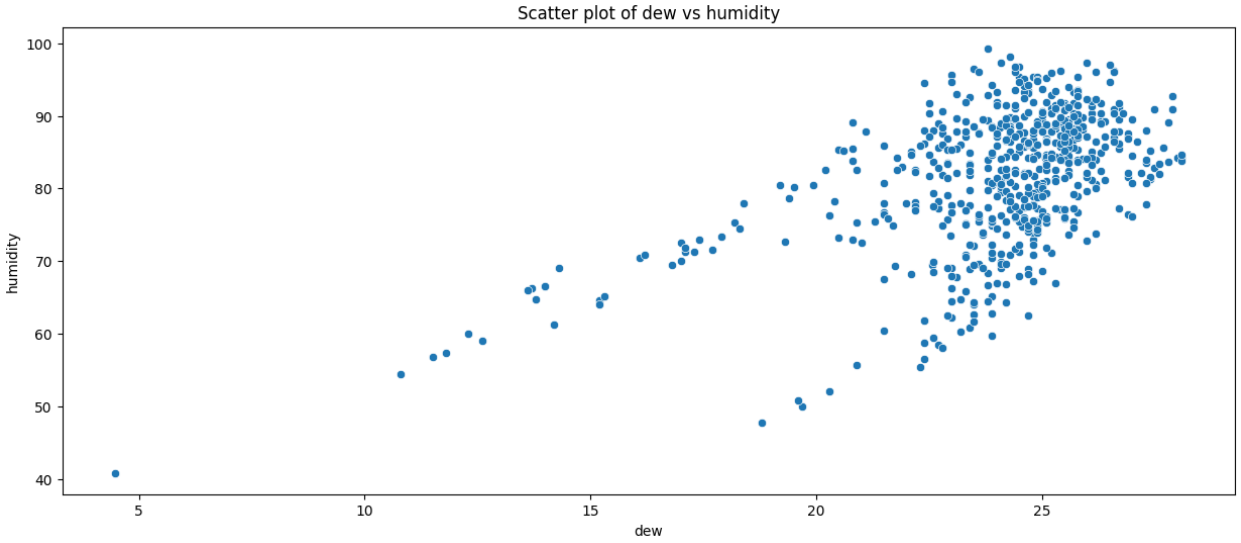
Scatter plot of dew vs humidity
humidity
dew
40
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100
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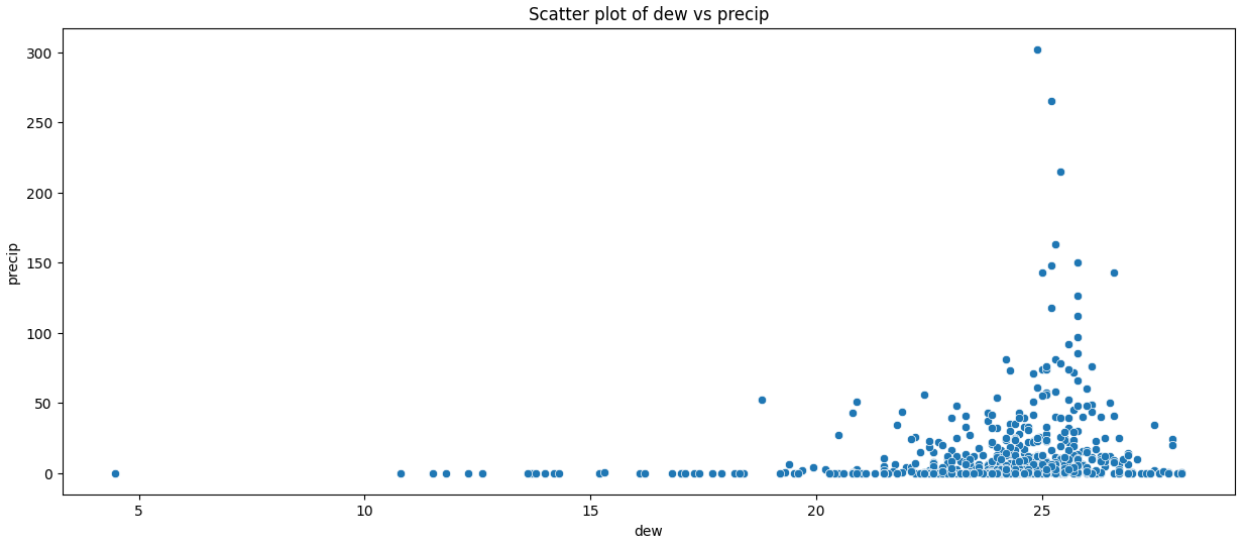
20
25


Scatter plot of dew vs precip
precip
dew
0
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250
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20
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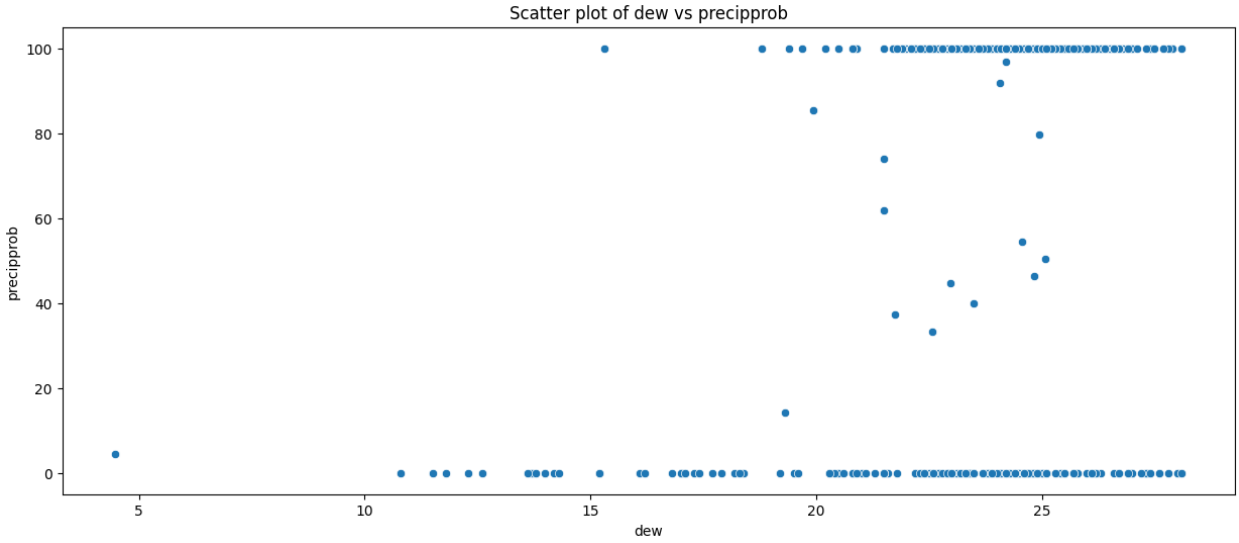
Scatter plot of dew vs precipprob
precipprob
dew
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20
40
60
80
100
5
10
15
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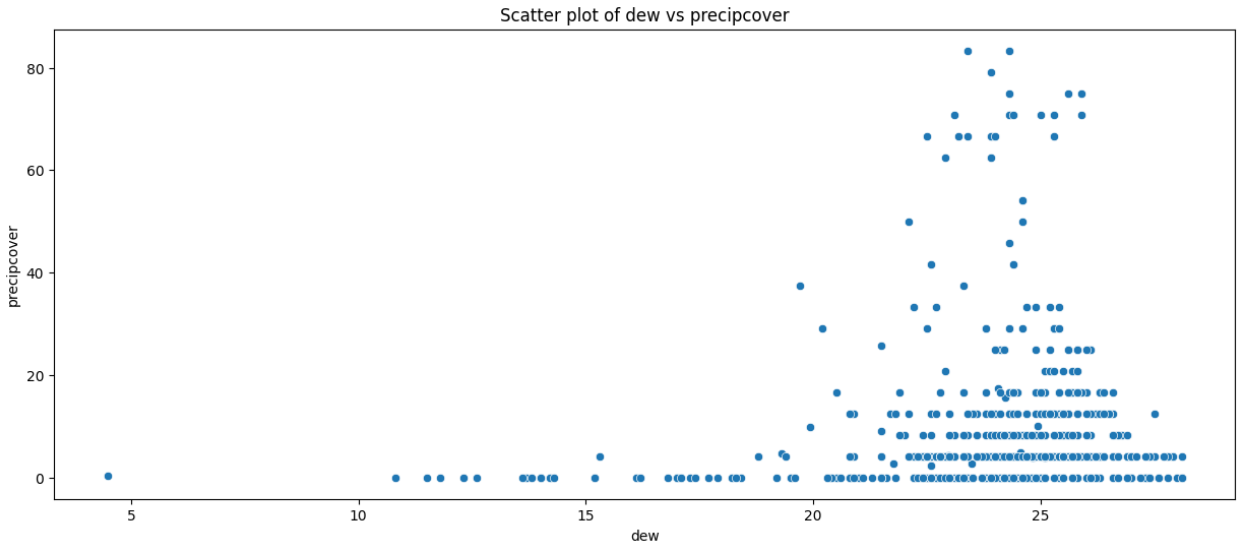
Scatter plot of dew vs precipcover
precipcover
dew
0
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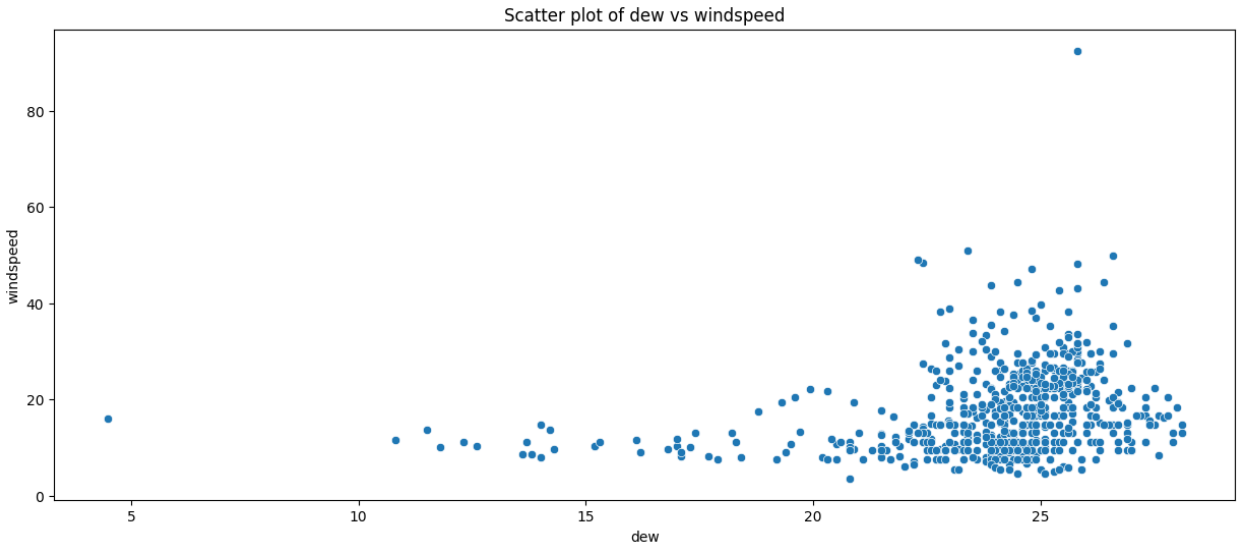
40
60
80
5
10
15
20
25


Scatter plot of dew vs windspeed
windspeed
dew
0
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60
80
5
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15
20
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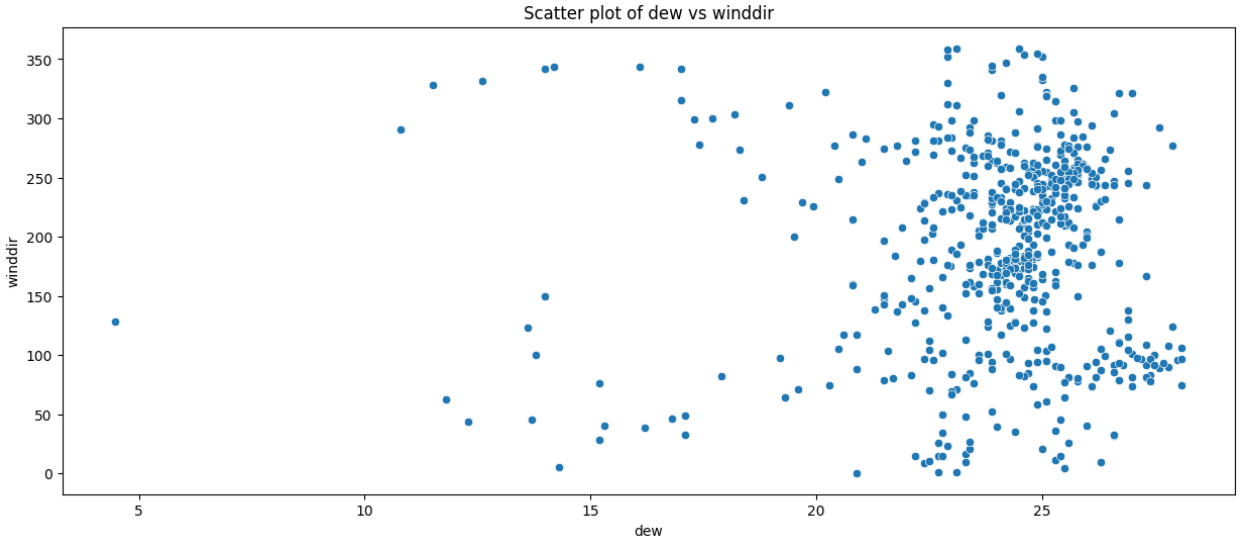
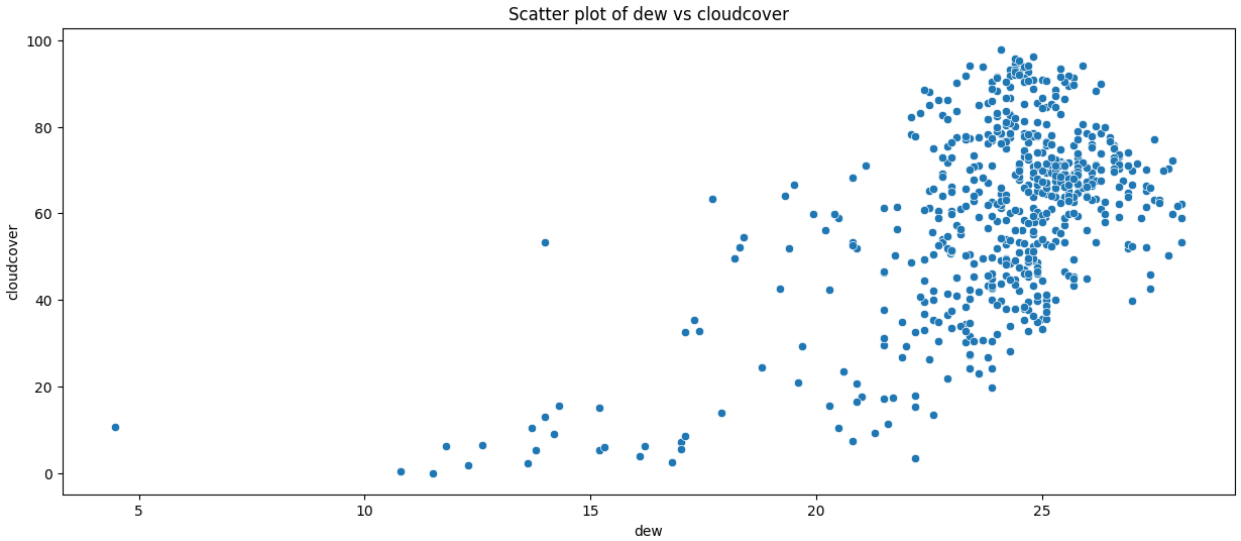

Scatter plot of dew vs winddir
winddir
dew
0
50
100
150
200
250
300
350
5
10
15
20
25


Scatter plot of dew vs sealevelpressure
sealevelpressure
dew
0
200
400
600
800
1000
5
10
15
20
25


Scatter plot of dew vs cloudcover
cloudcover
dew
0
20
40
60
80
100
5
10
15
20
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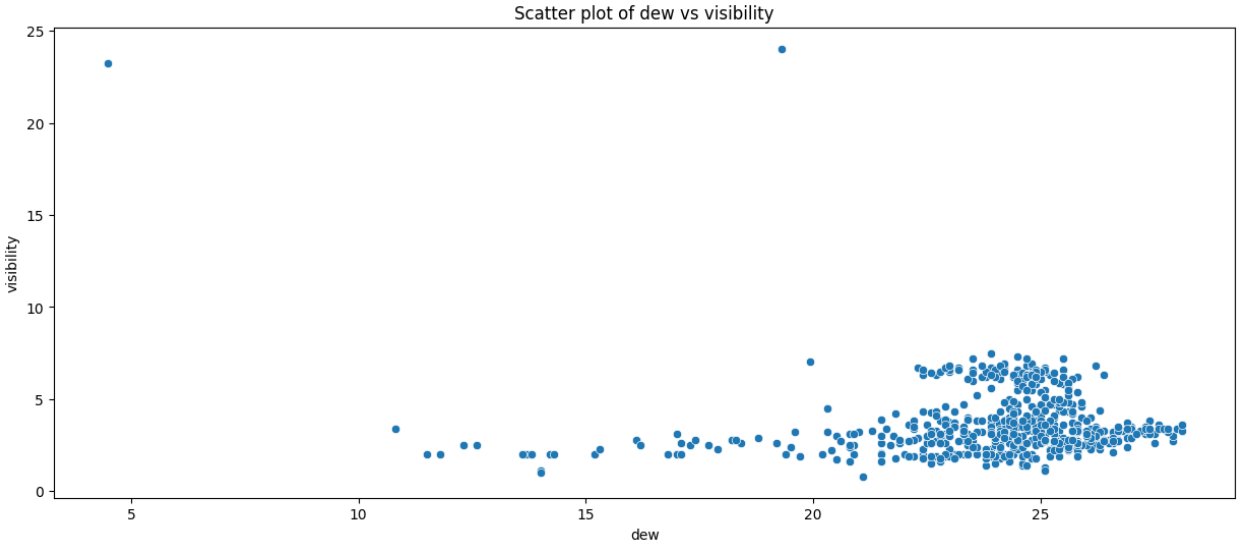
Scatter plot of dew vs visibility
visibility
dew
0
5
10
15
20
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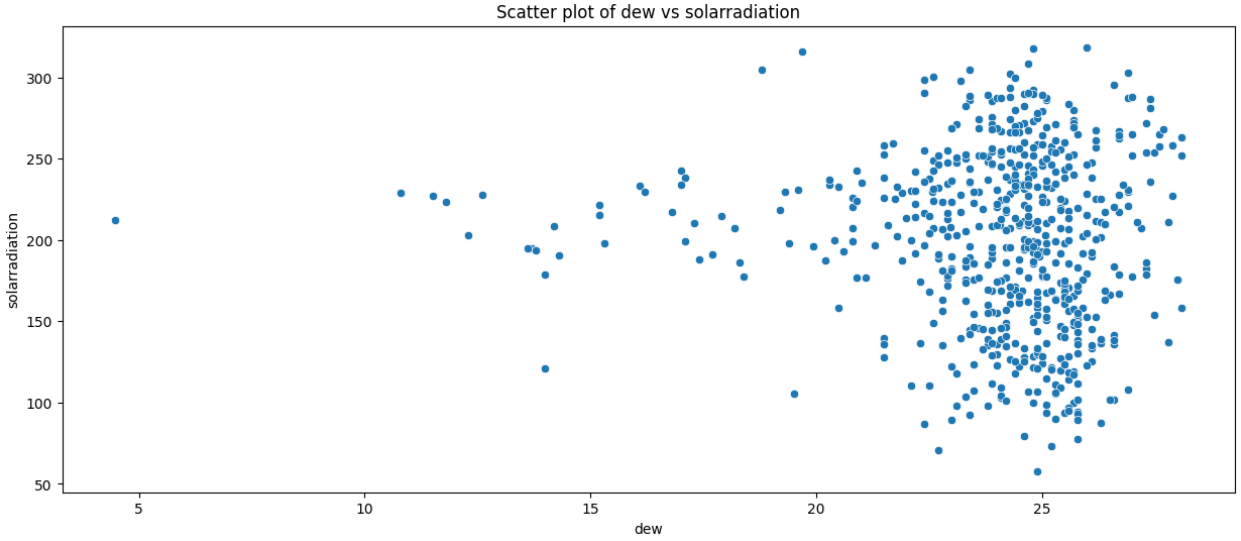
5
10
15
20
25


Scatter plot of dew vs solarradiation
solarradiation
dew
50
100
150
200
250
300
5
10
15
20
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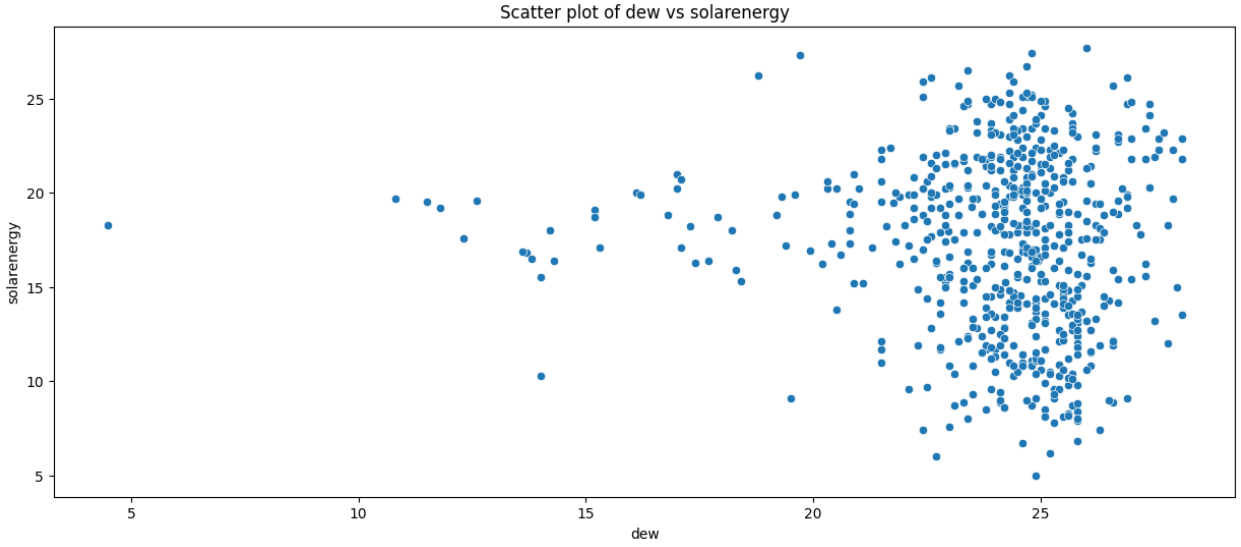
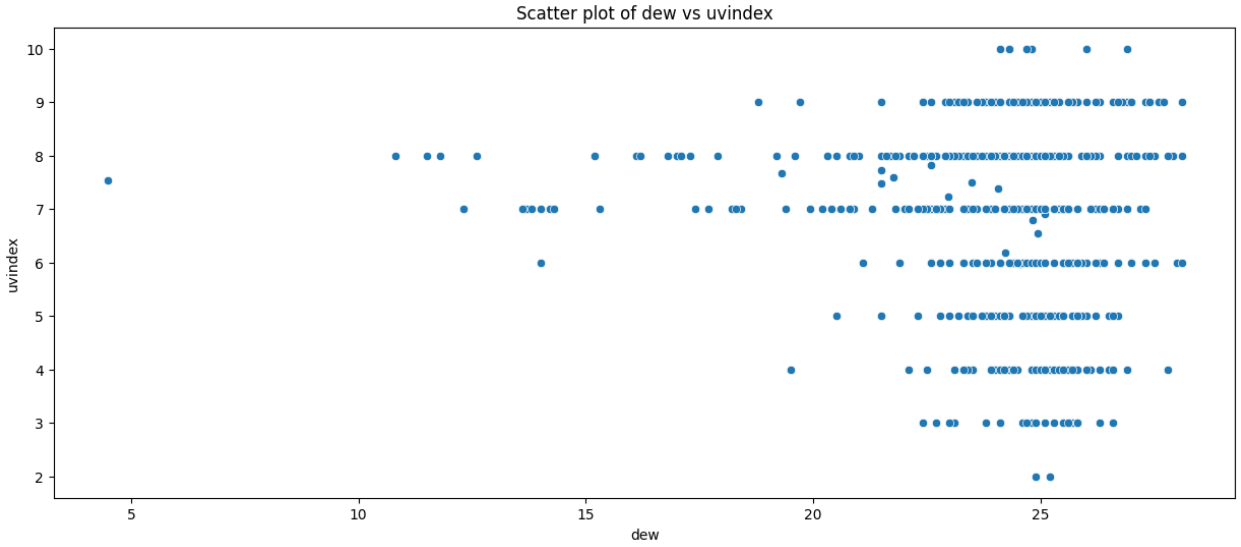
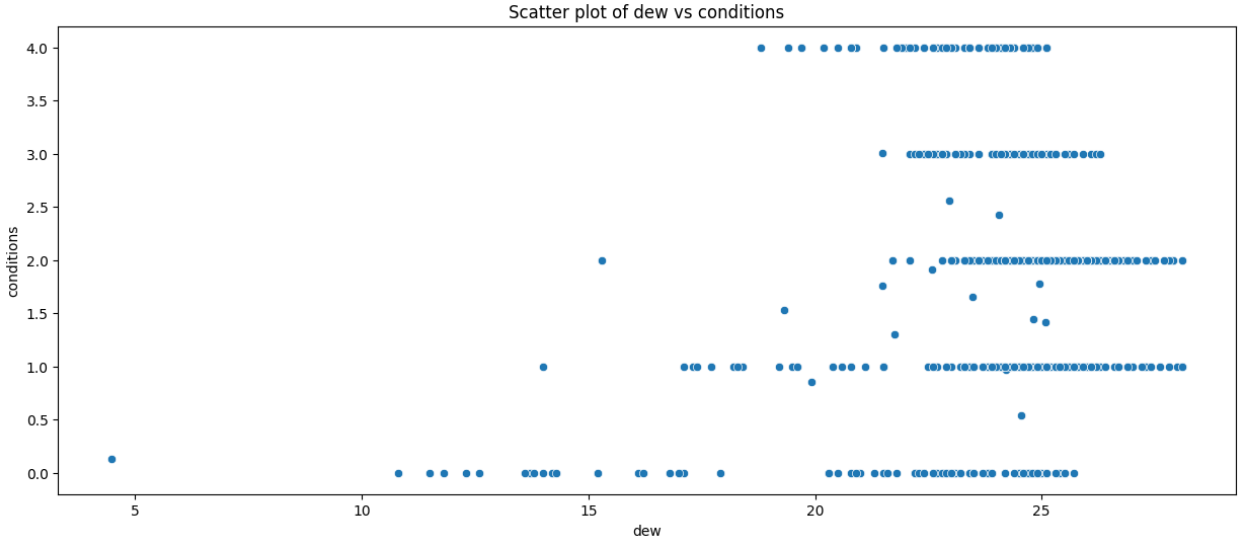
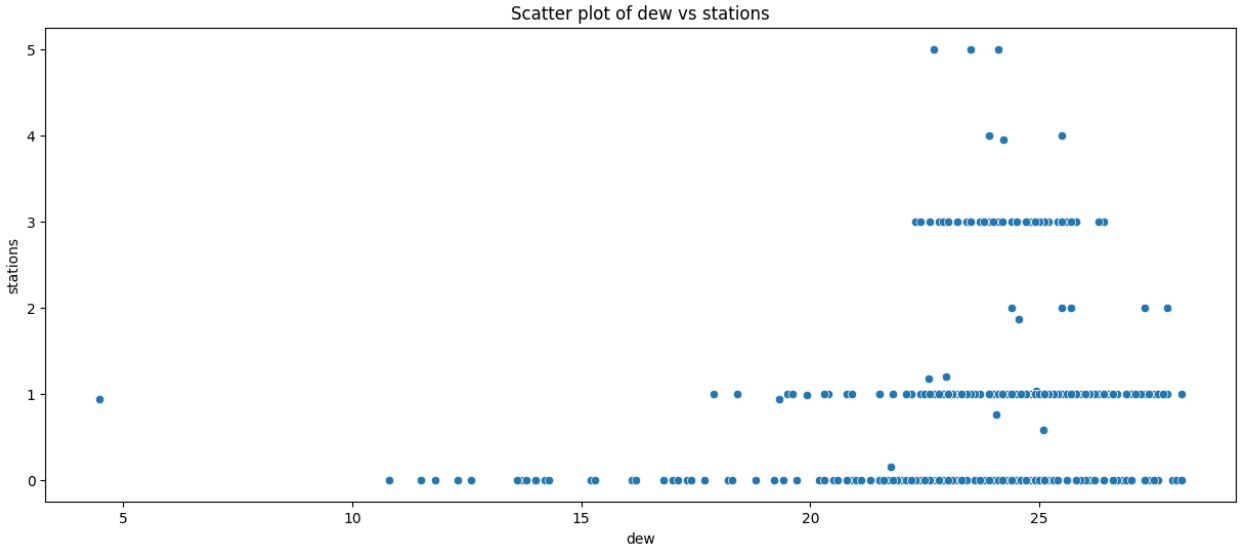
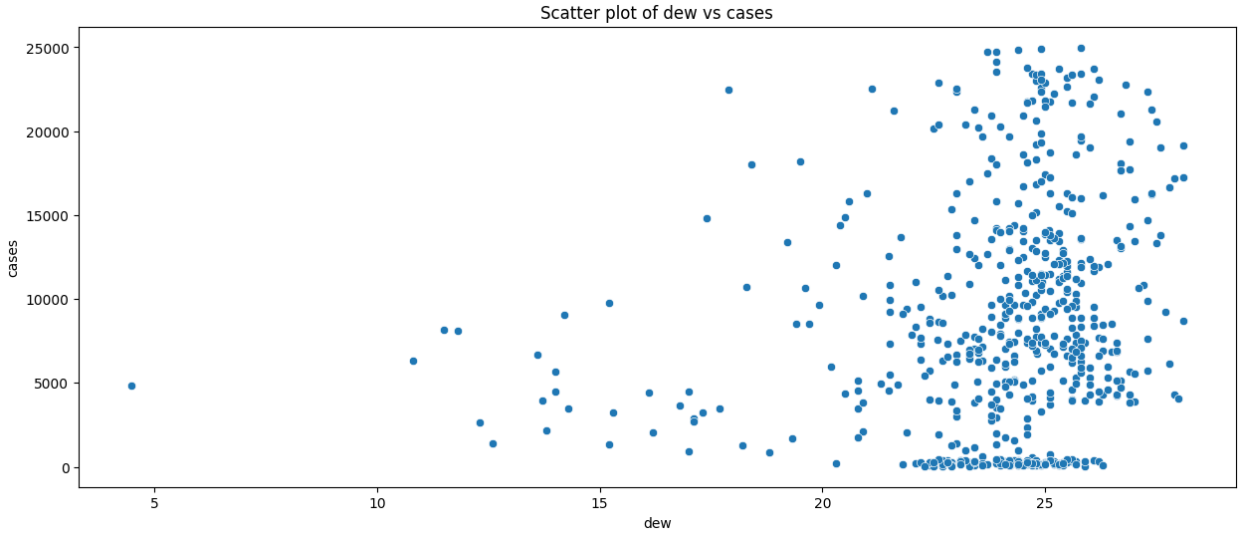
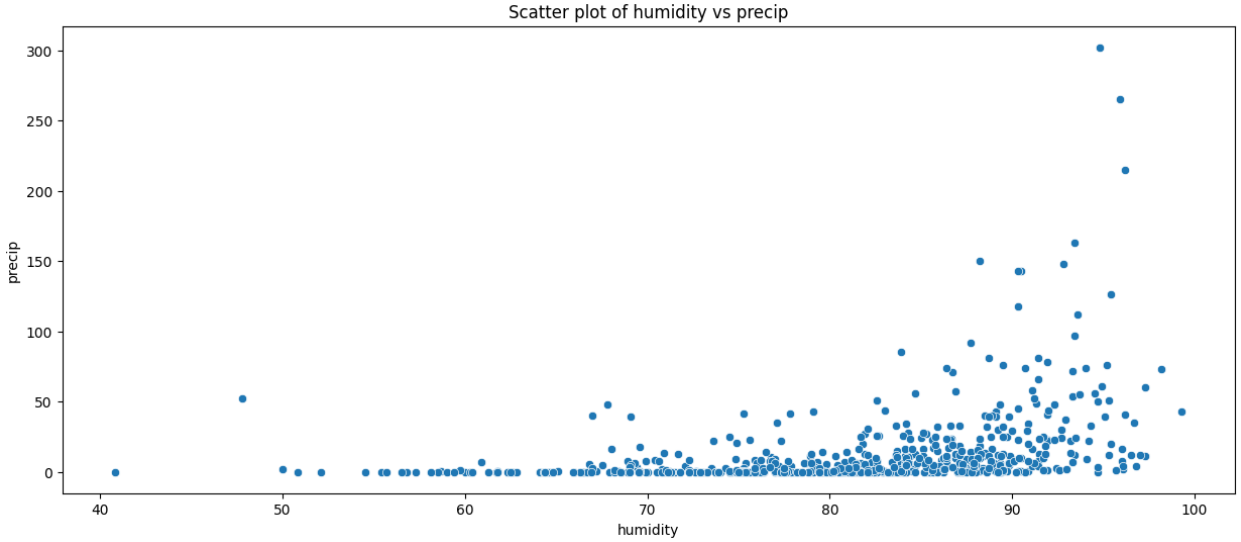

Scatter plot of dew vs solarenergy
solarenergy
dew
5
10
15
20
25
5
10
15
20
25

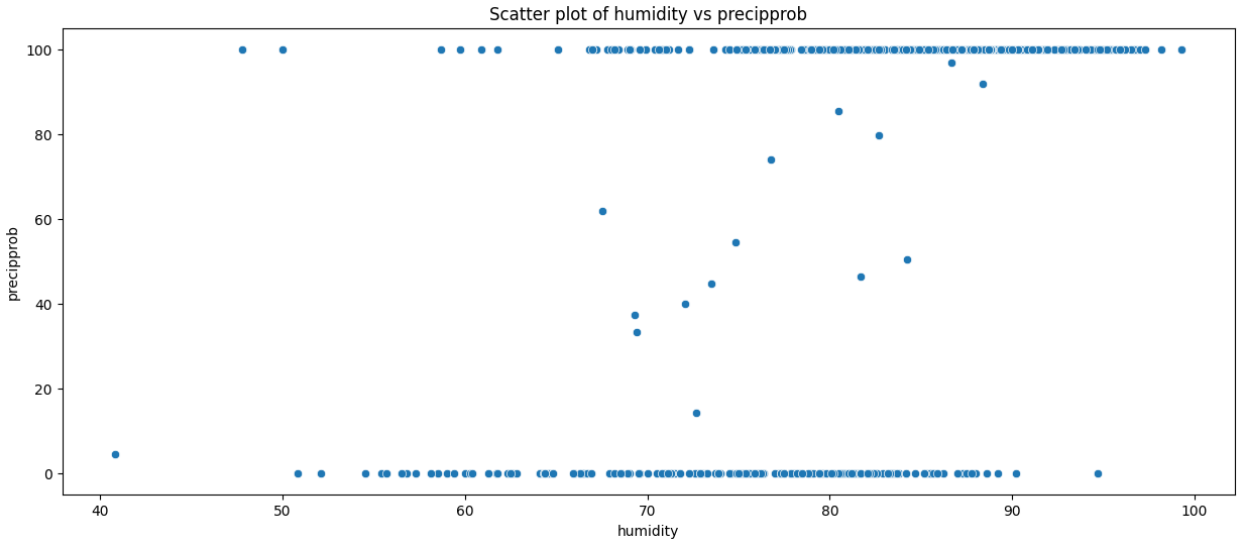

Scatter plot of dew vs uvindex
uvindex
dew
10
9
8
7
6
5
4
3
2
5
10
15
20
25

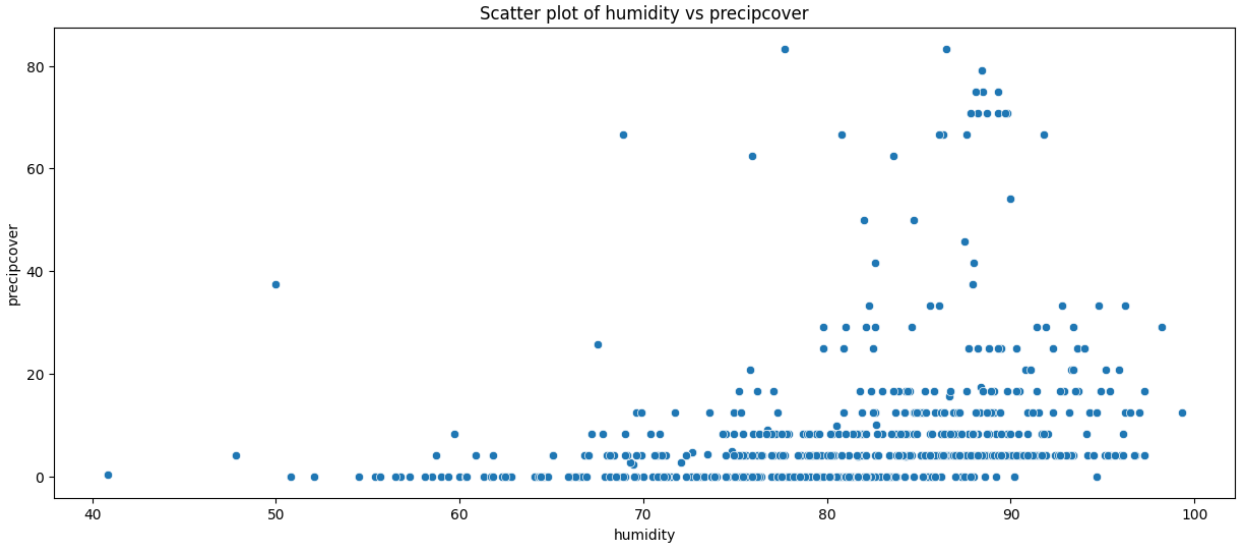

Scatter plot of dew vs conditions
conditions
dew
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
5
10
15
20
25

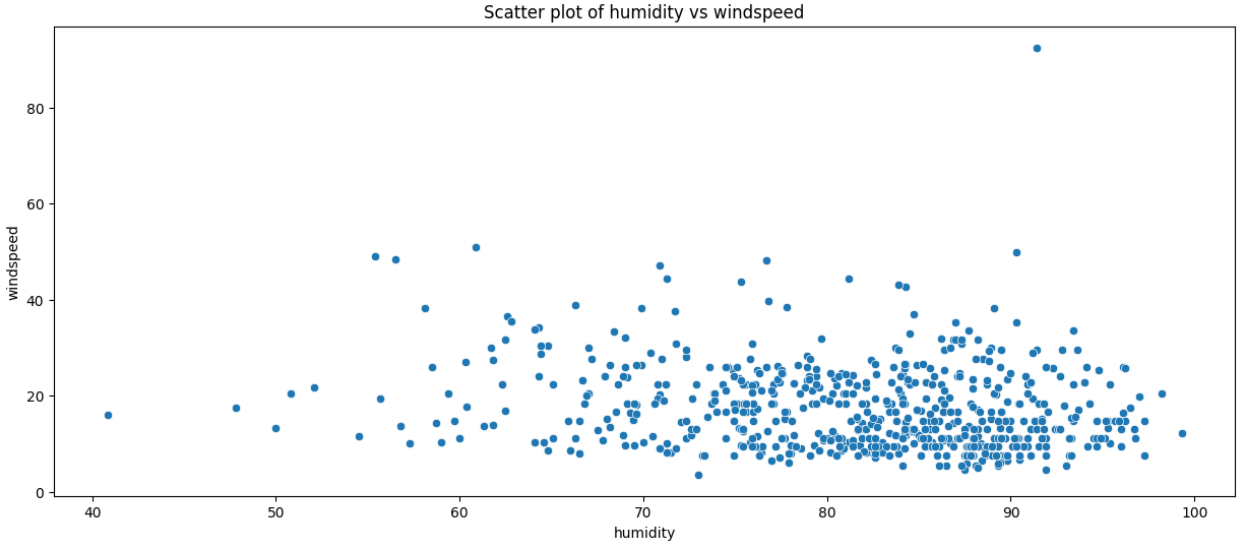

Scatter plot of dew vs stations
stations
dew
5
4
3
2
1
0
5
10
15
20
25

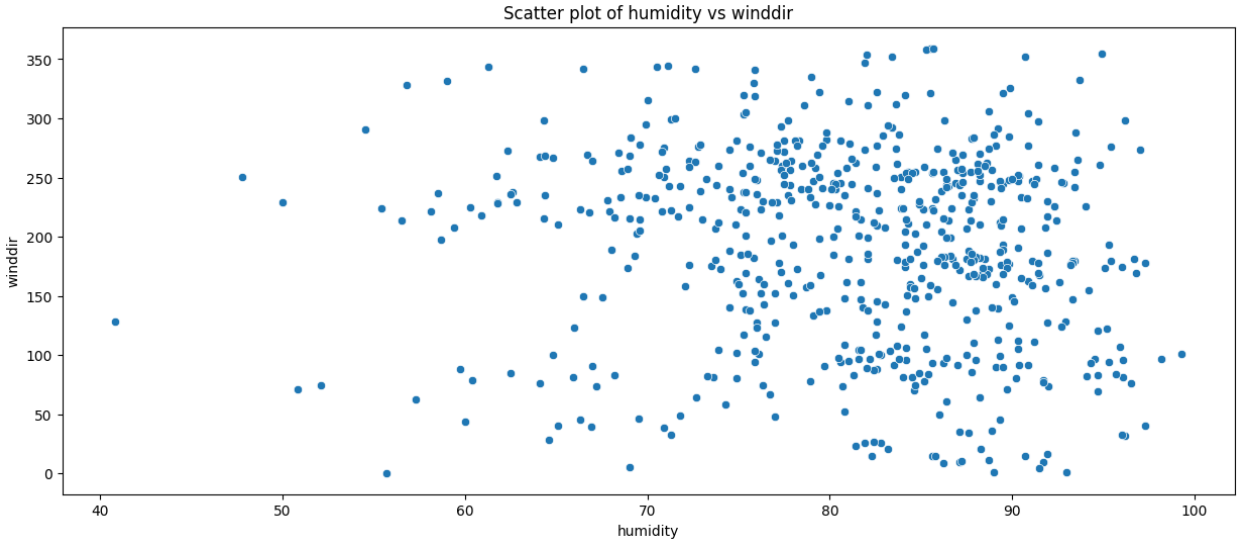

Scatter plot of dew vs cases
cases
dew
0
5000
10000
15000
20000
25000
5
10
15
20
25

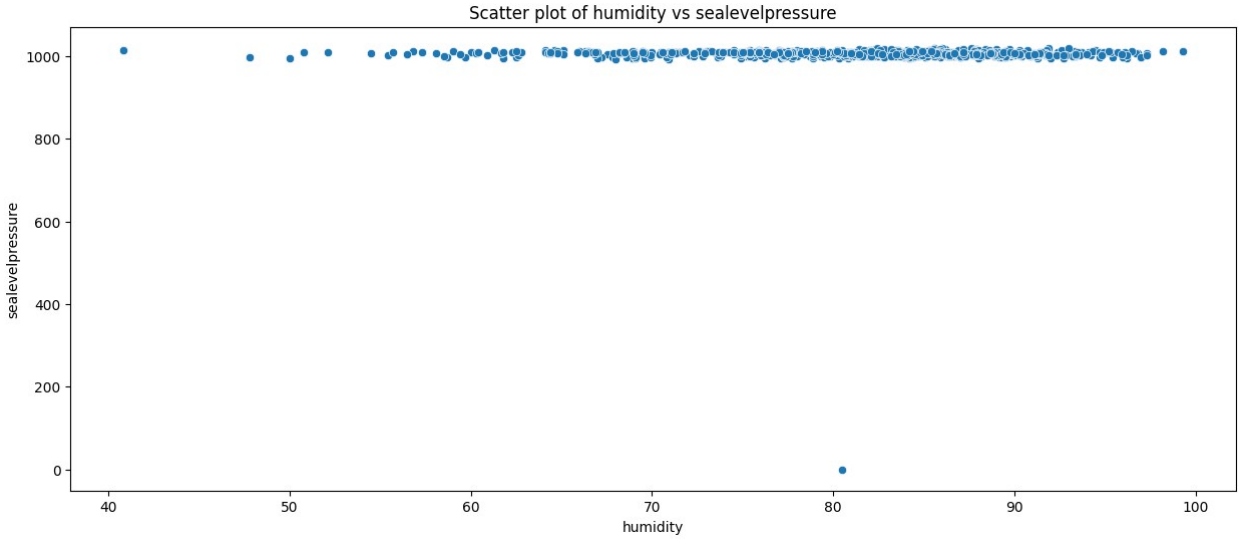

Scatter plot of humidity vs precip
precip
humidity
0
50
100
150
200
250
300
40
50
60
70
80
90
100

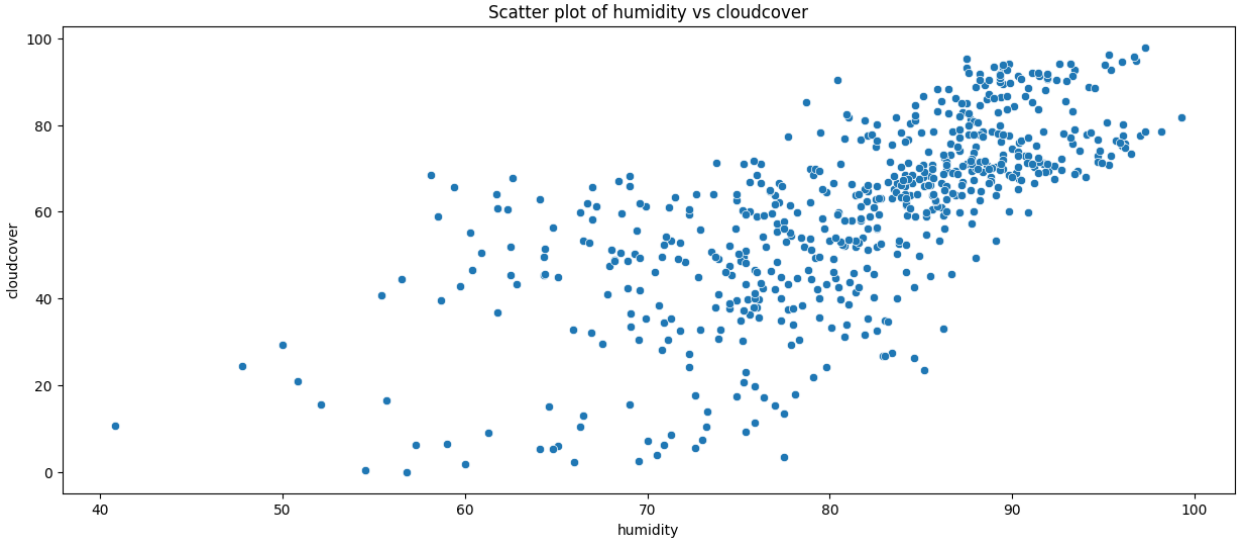

Scatter plot of humidity vs precipprob
precipprob
humidity
0
20
40
60
80
100
40
50
60
70
80
90
100

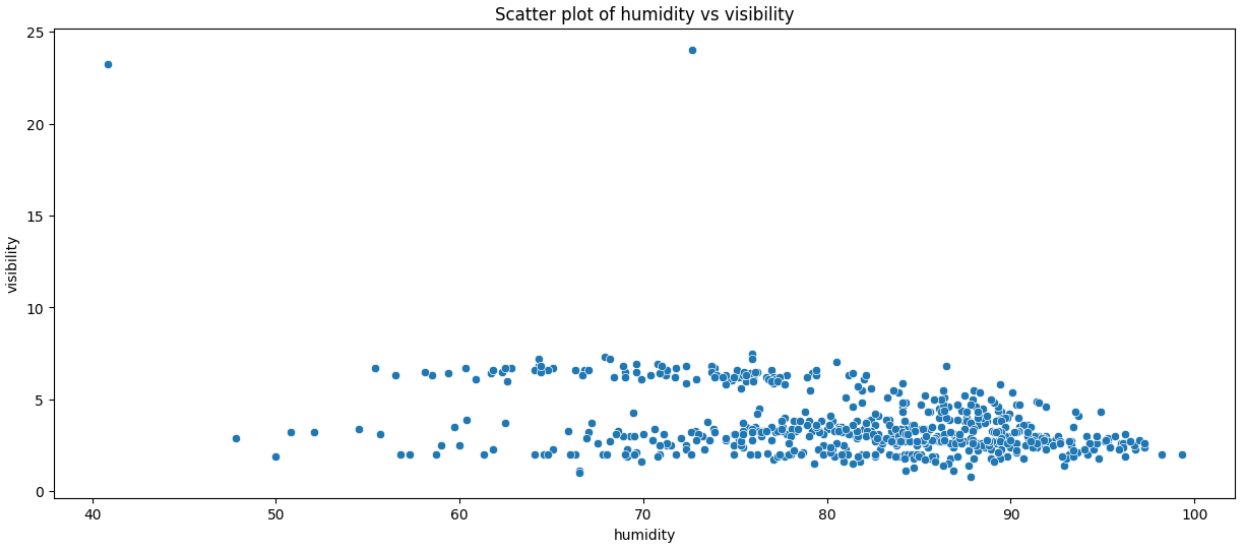

Scatter plot of humidity vs precipcover
precipcover
humidity
0
20
40
60
80
40
50
60
70
80
90
100

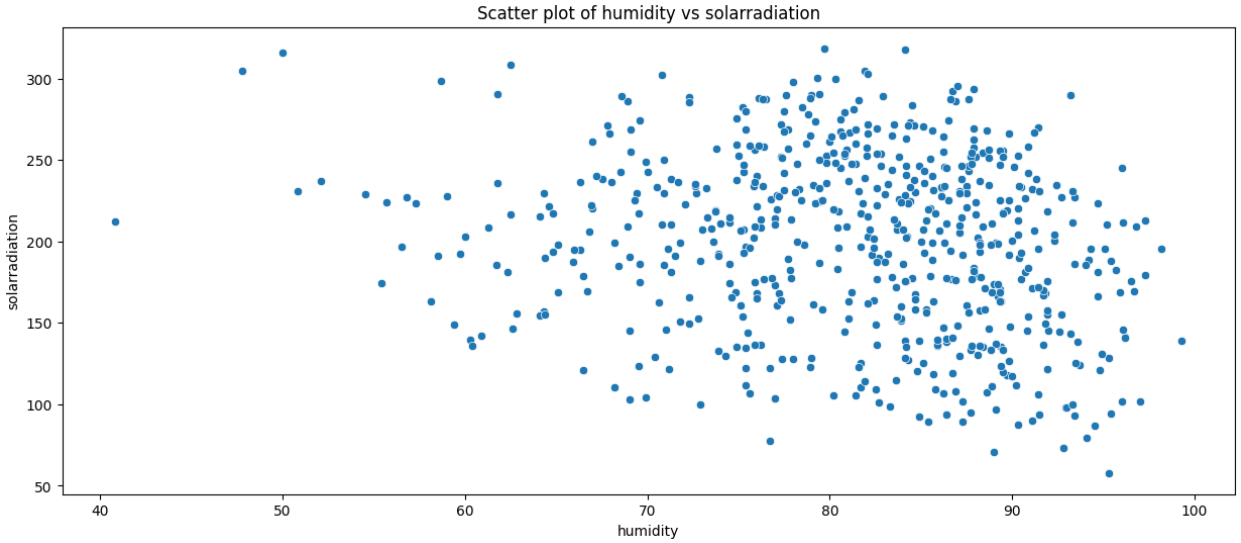

Scatter plot of humidity vs windspeed
windspeed
humidity
0
20
40
60
80
40
50
60
70
80
90
100

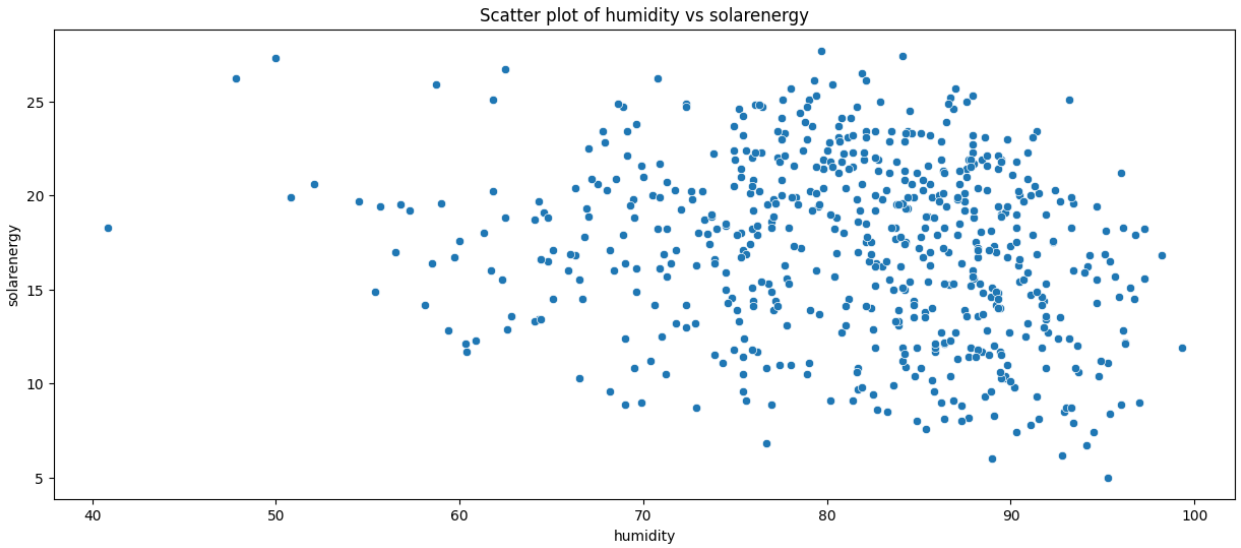

Scatter plot of humidity vs winddir
winddir
humidity
0
50
100
150
200
250
300
350
40
50
60
70
80
90
100

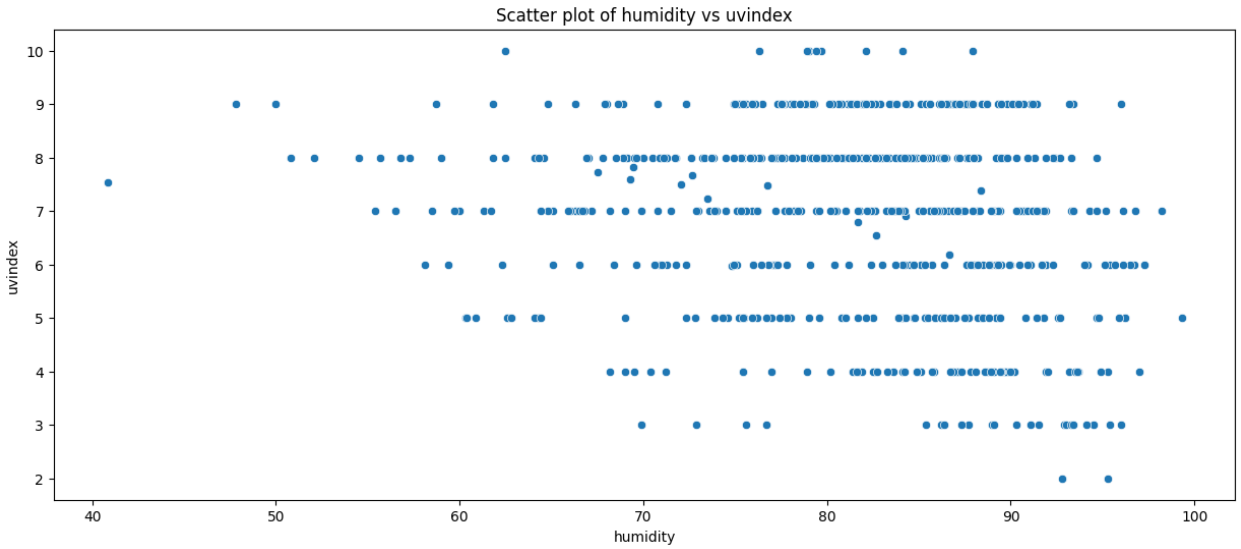

Scatter plot of humidity vs sealevelpressure
sealevelpressure
humidity
0
200
400
600
800
1000
40
50
60
70
80
90
100

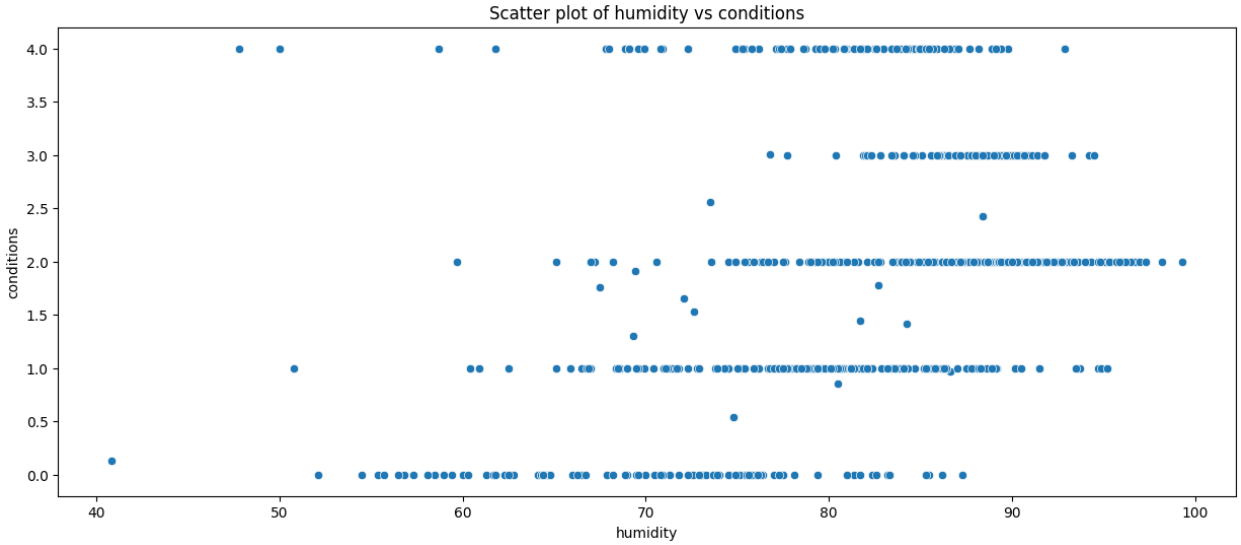

Scatter plot of humidity vs cloudcover
cloudcover
humidity
0
20
40
60
80
100
40
50
60
70
80
90
100

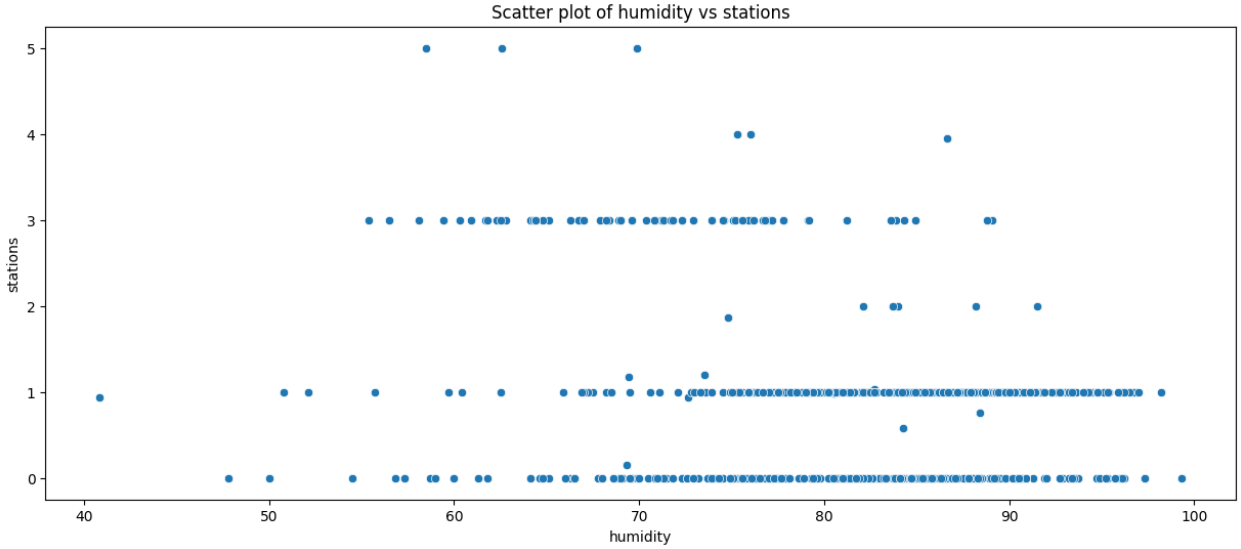

Scatter plot of humidity vs visibility
visibility
humidity
0
5
10
15
20
25
40
50
60
70
80
90
100

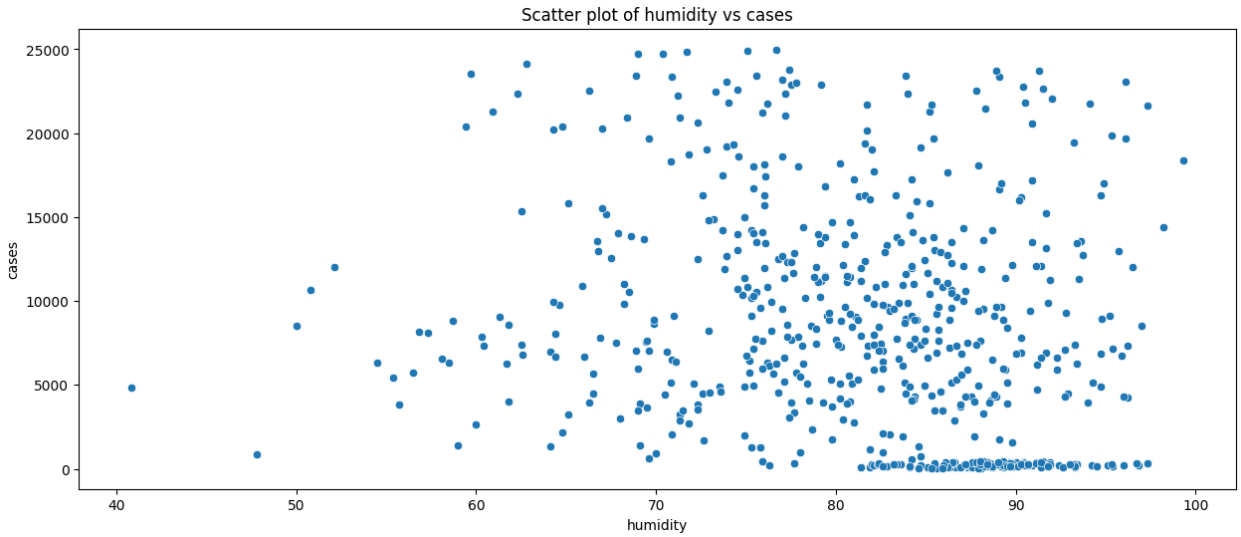

Scatter plot of humidity vs solarradiation
solarradiation
humidity
300
250
200
150
100
50
40
50
60
70
80
90
100

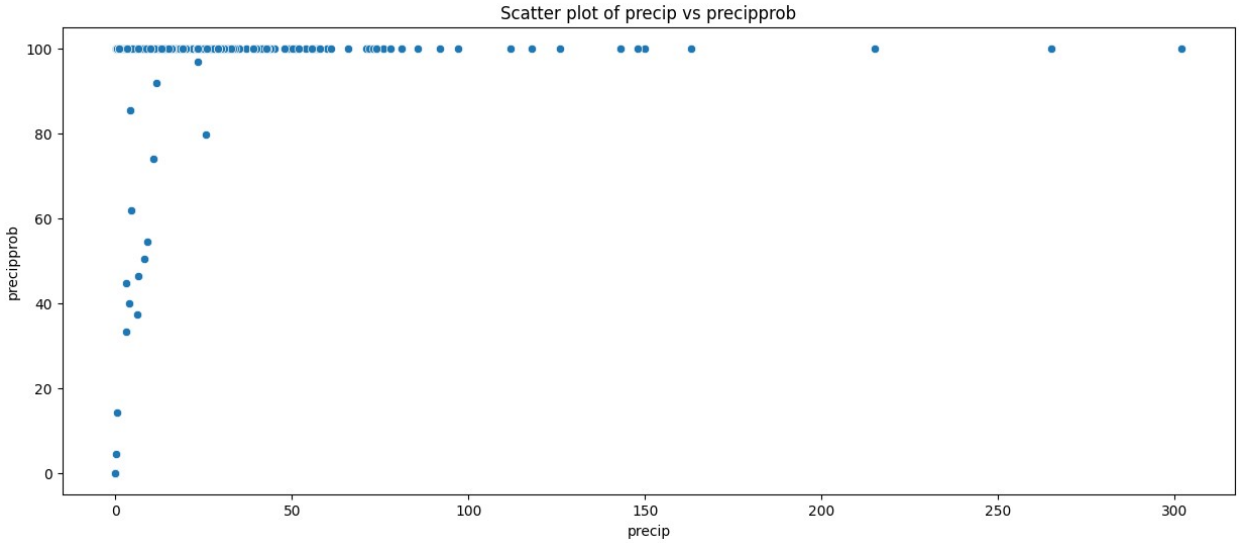

Scatter plot of humidity vs solarenergy
solarenergy
humidity
25
20
15
10
5
40
50
60
70
80
90
100


Scatter plot of humidity vs uvindex
uvindex
humidity
10
9
8
7
6
5
4
3
2
40
50
60
70
80
90
100


Scatter plot of humidity vs conditions
conditions
humidity
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
40
50
60
70
80
90
100


Scatter plot of humidity vs stations
stations
humidity
0
1
2
3
4
5
40
50
60
70
80
90
100


Scatter plot of humidity vs cases
cases
humidity
0
5000
10000
15000
20000
25000
40
50
60
70
80
90
100


Scatter plot of precip vs precipprob
precipprob
precip
0
20
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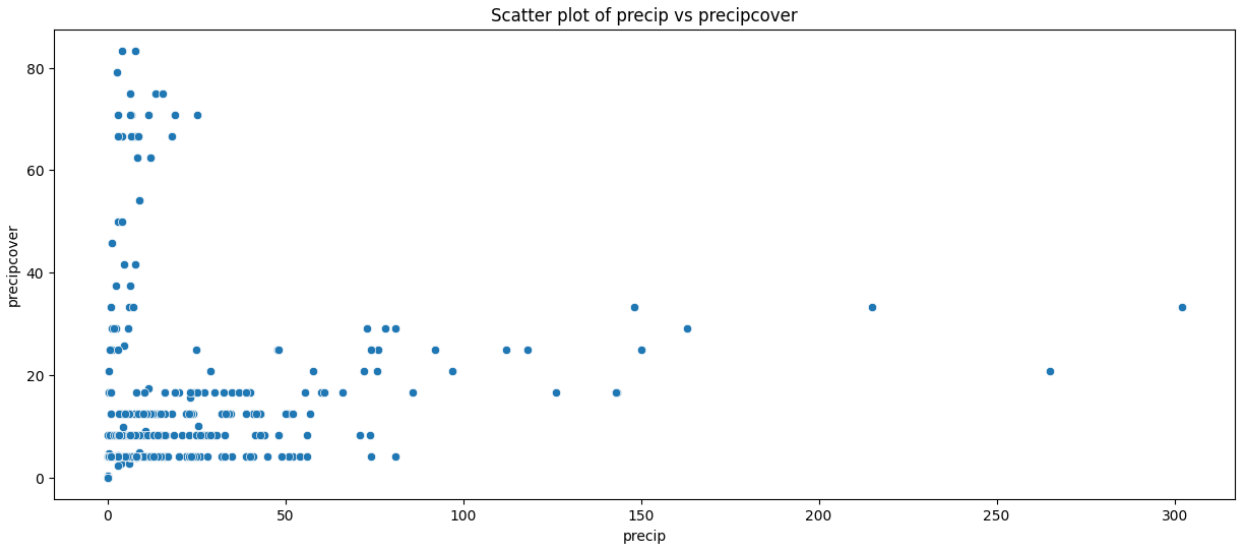
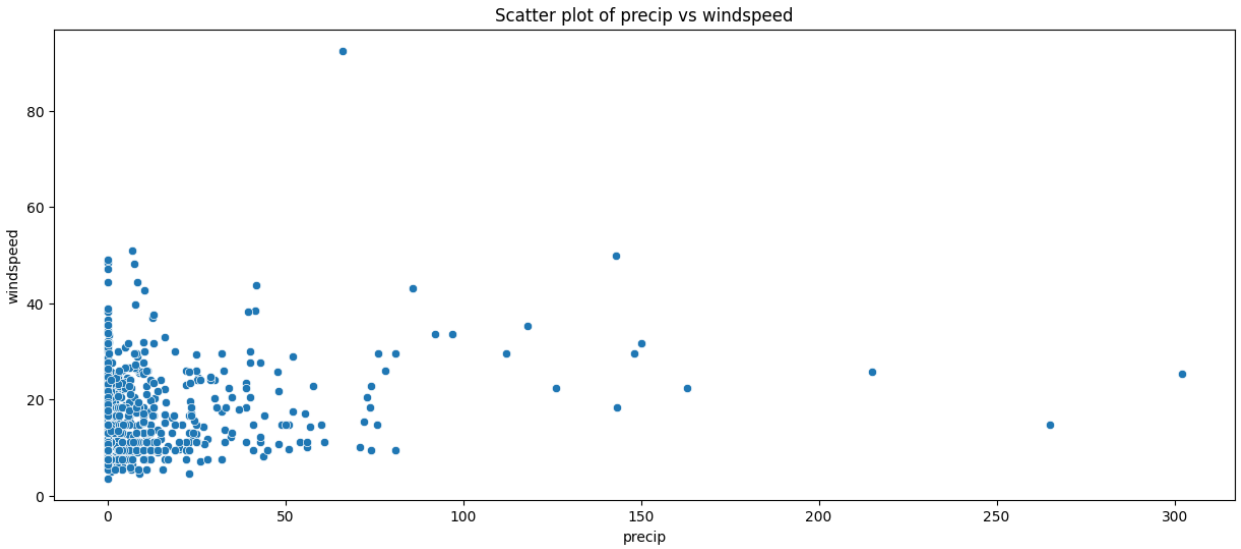
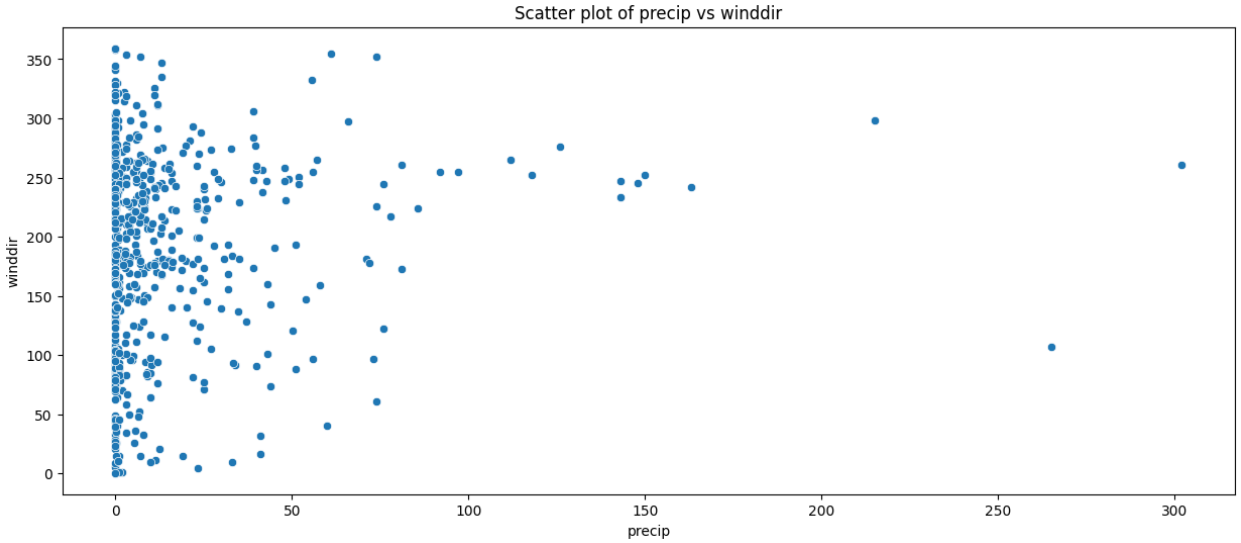
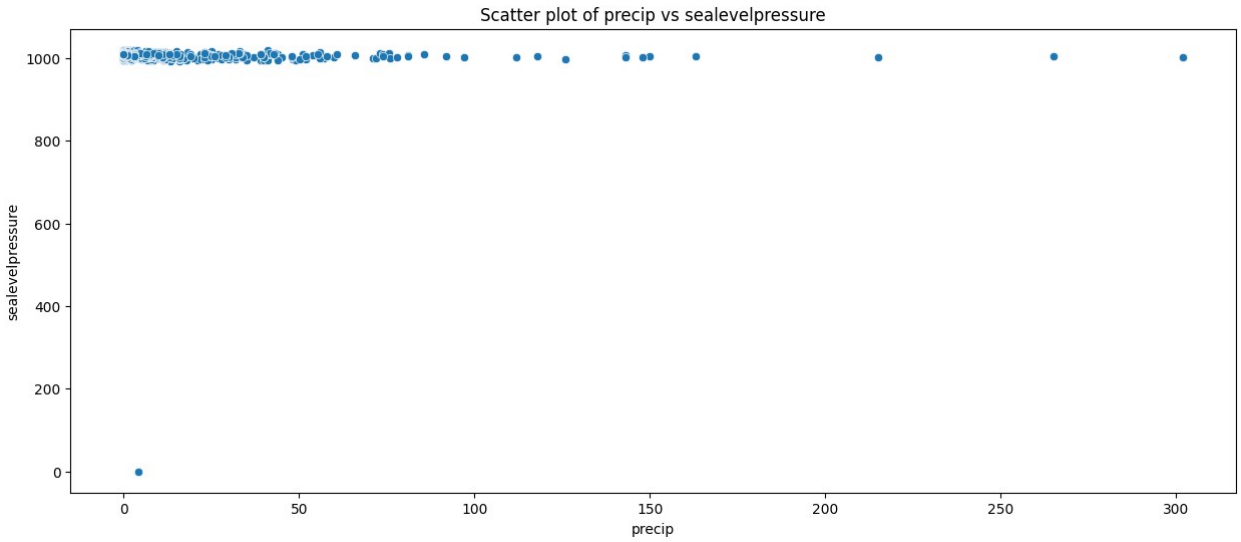
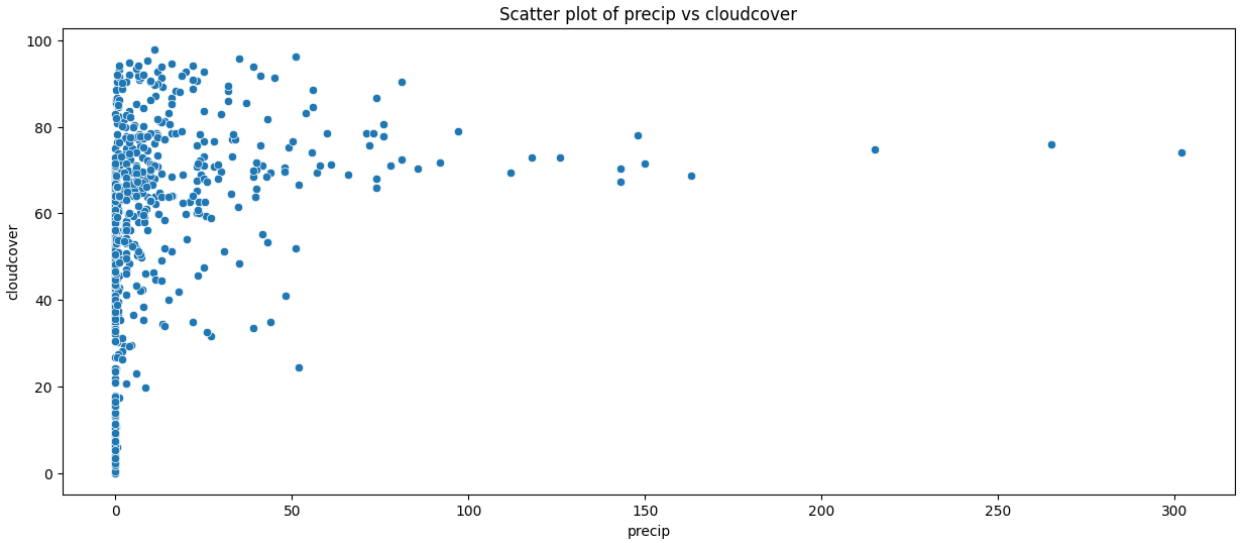
60
80
100
0
50
100
150
200
250
300

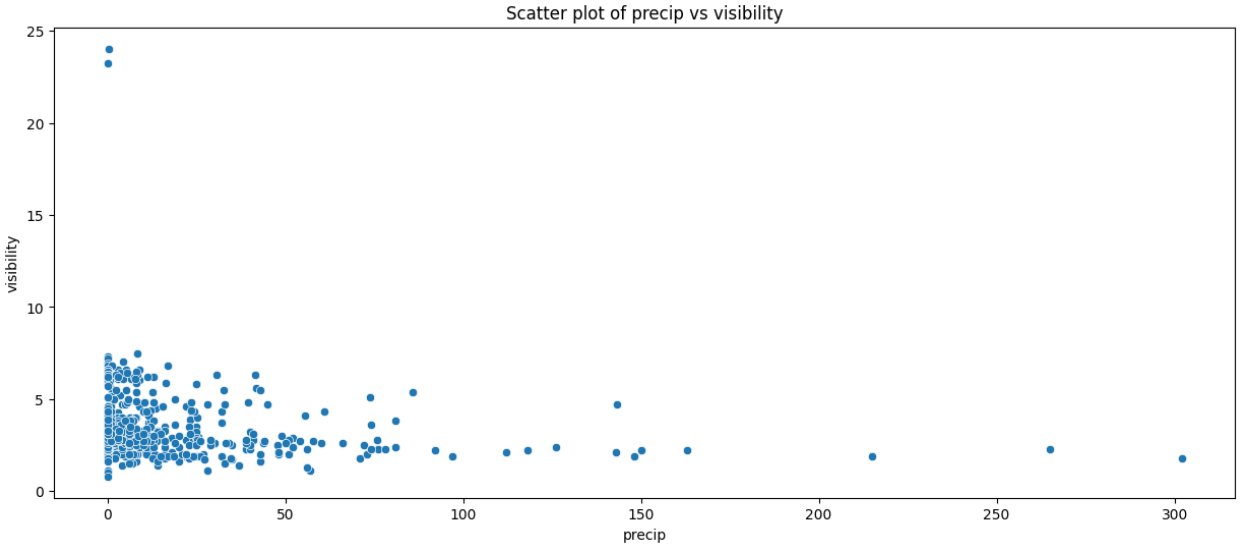

Scatter plot of precip vs precipcover
precipcover
precip
0
20
40
60
80
0
50
100
150
200
250
300

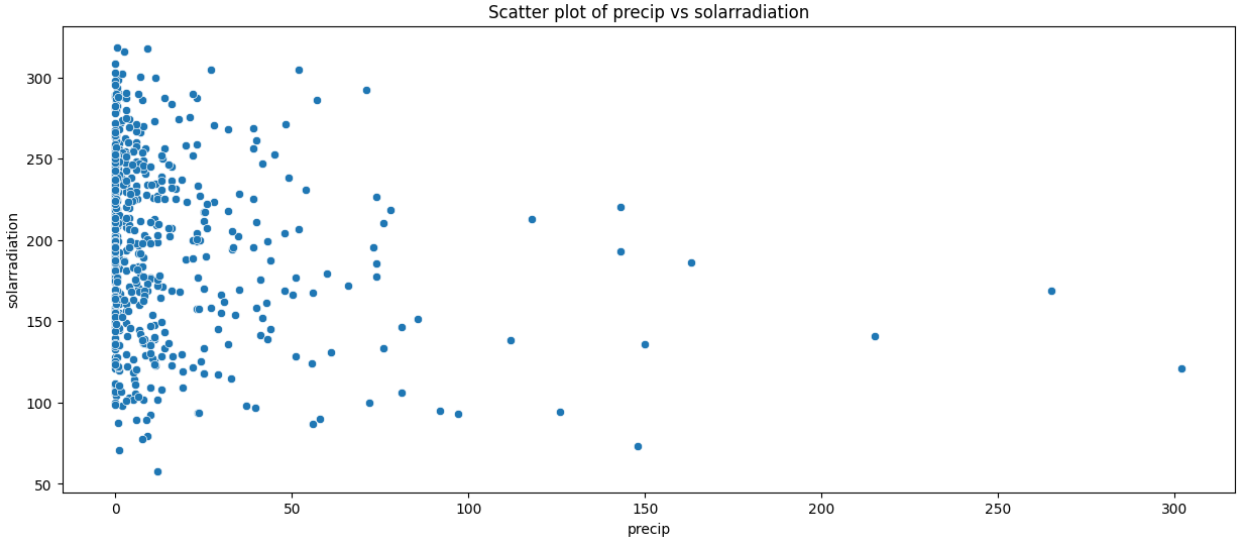

Scatter plot of precip vs windspeed
windspeed
precip
0
20
40
60
80
0
50
100
150
200
250
300

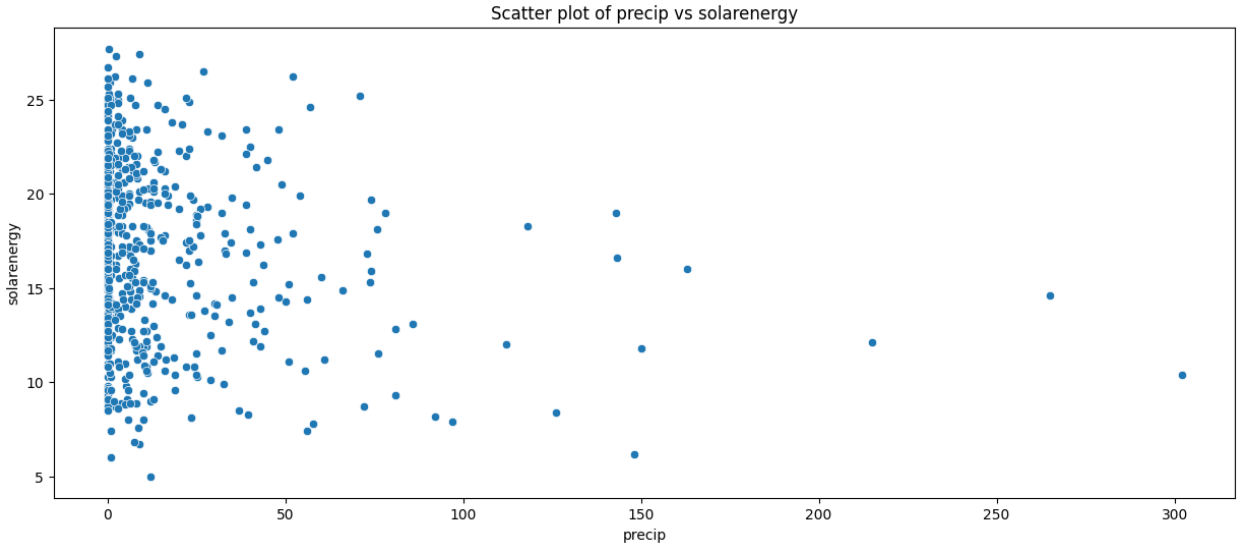

Scatter plot of precip vs winddir
winddir
precip
0
50
100
150
200
250
300
350


Scatter plot of precip vs sealevelpressure
sealevelpressure
precip
0
200
400
600
800
1000


Scatter plot of precip vs cloudcover
cloudcover
precip
0
20
40
60
80
100


Scatter plot of precip vs visibility
visibility
precip
0
5
10
15
20
25
0
50
100
150
200
250
300


Scatter plot of precip vs solarradiation
solarradiation
precip
50
100
150
200
250
300
0
50
100
150
200
250
300


Scatter plot of precip vs solarenergy
solarenergy
precip
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10
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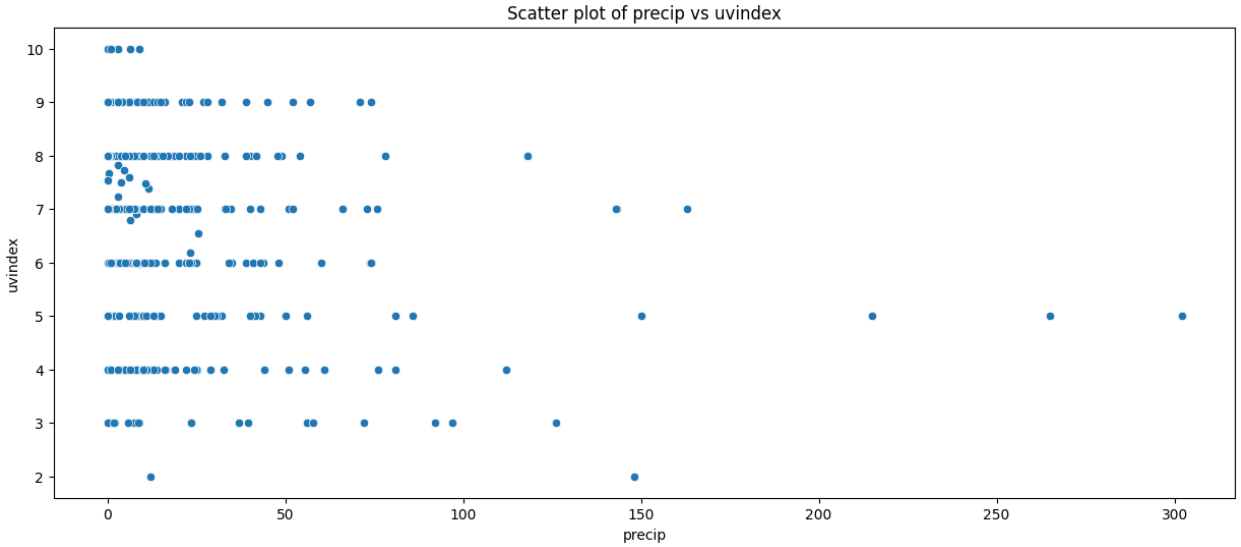
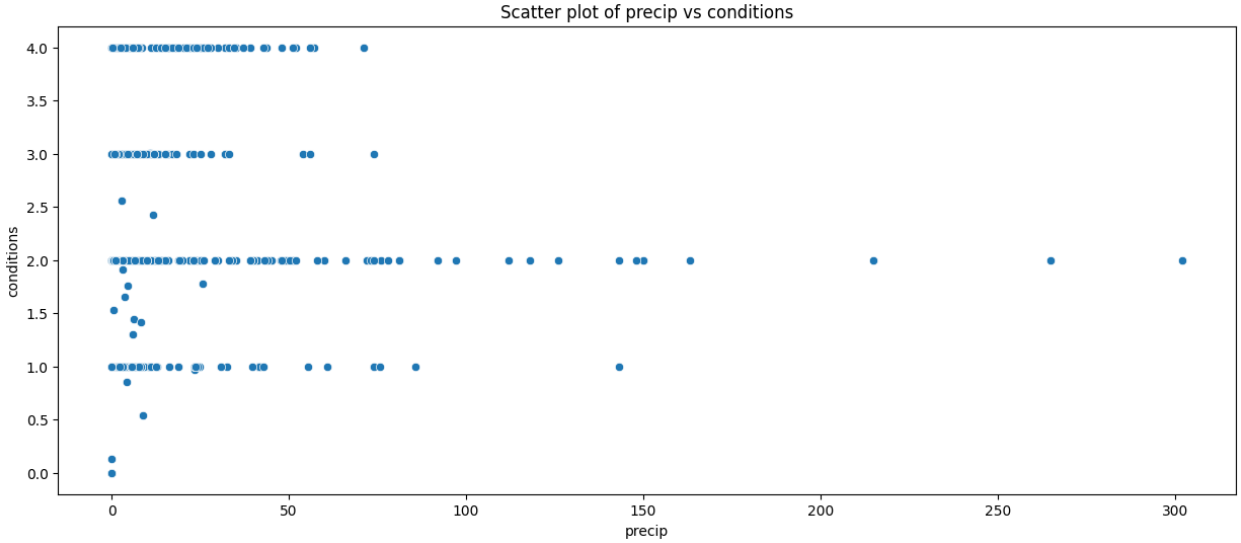
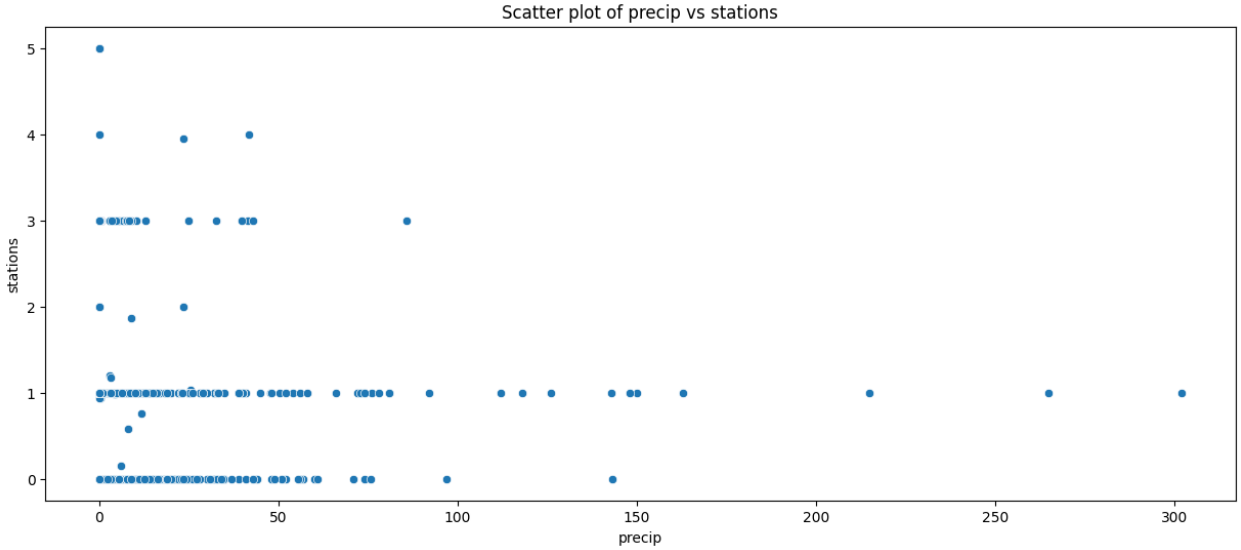
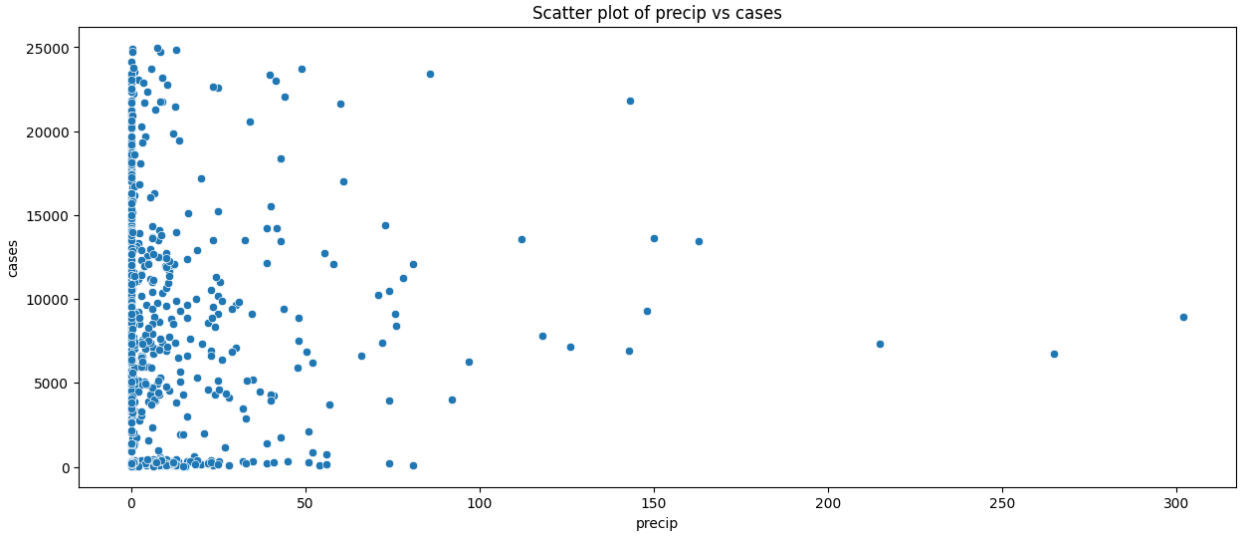
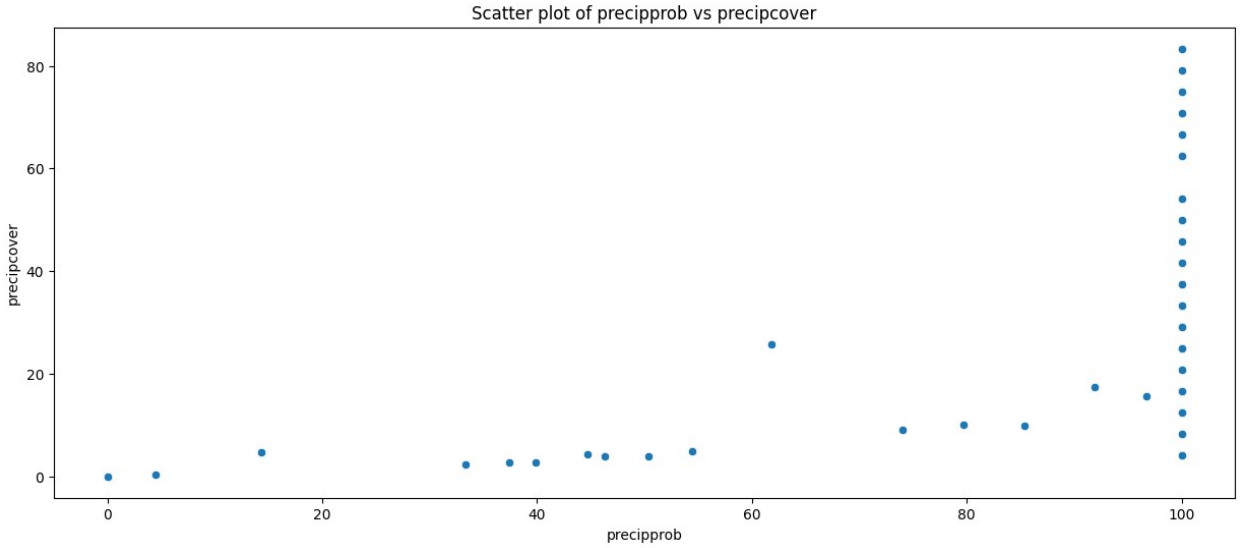
20
25
0
50
100
150
200
250
300

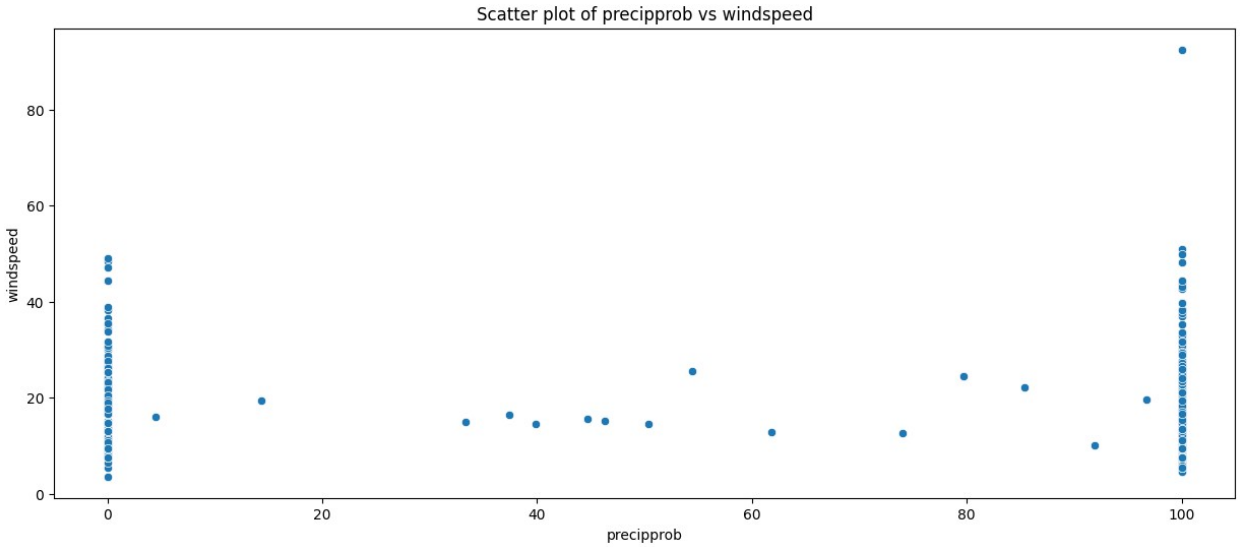

Scatter plot of precip vs uvindex
uvindex
precip
10
9
8
7
6
5
4
3
2
0
50
100
150
200
250
300


Scatter plot of precip vs conditions
conditions
precip
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
50
100
150
200
250
300


Scatter plot of precip vs stations
stations
precip
5
4
3
2
1
0
0
50
100
150
200
250
300


Scatter plot of precip vs cases
cases
precip
0
5000
10000
15000
20000
25000
0
50
100
150
200
250
300


Scatter plot of precipprob vs precipcover
precipcover
precipprob
0
20
40
60
80
0
20
40
60
80
100


Scatter plot of precipprob vs windspeed
windspeed
precipprob
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80
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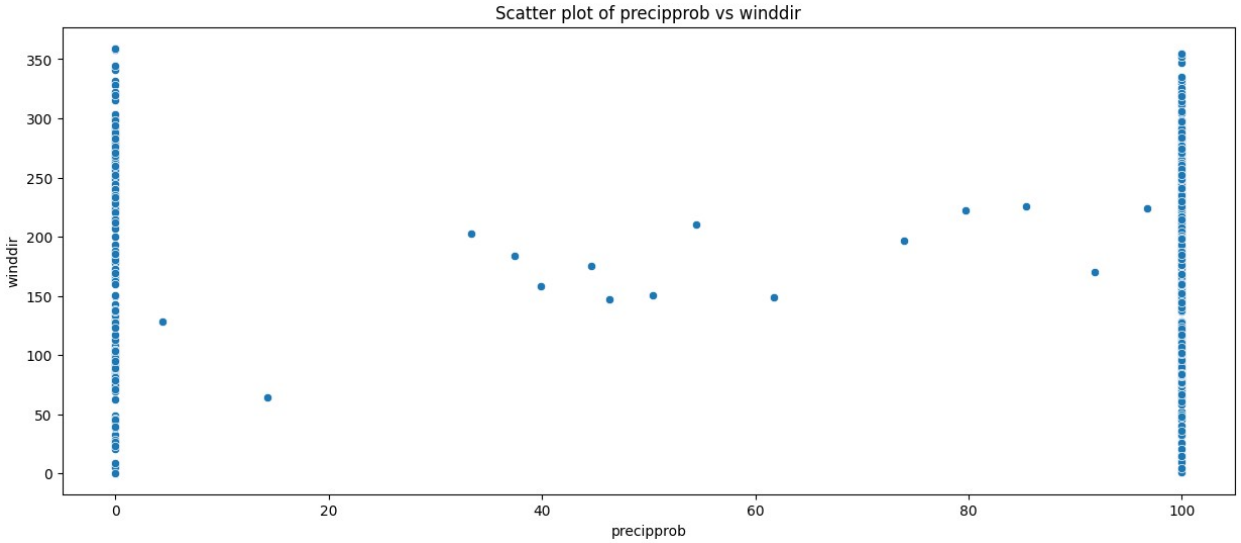
Scatter plot of precipprob vs winddir
winddir
precipprob
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300
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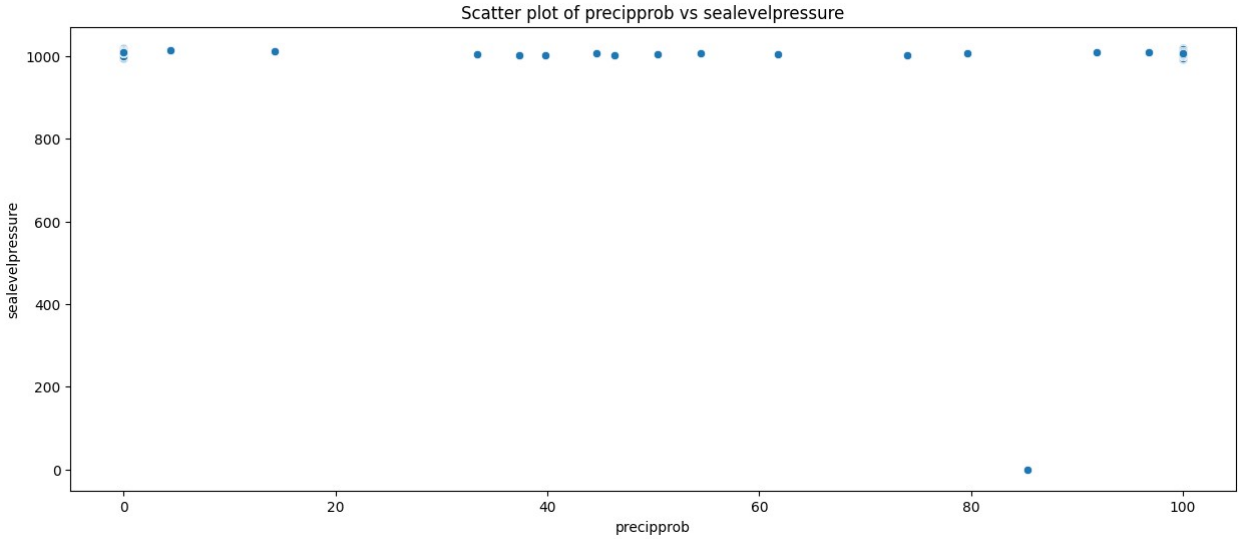
60
80
100


Scatter plot of precipprob vs sealevelpressure
sealevelpressure
precipprob
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800
1000
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40
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80
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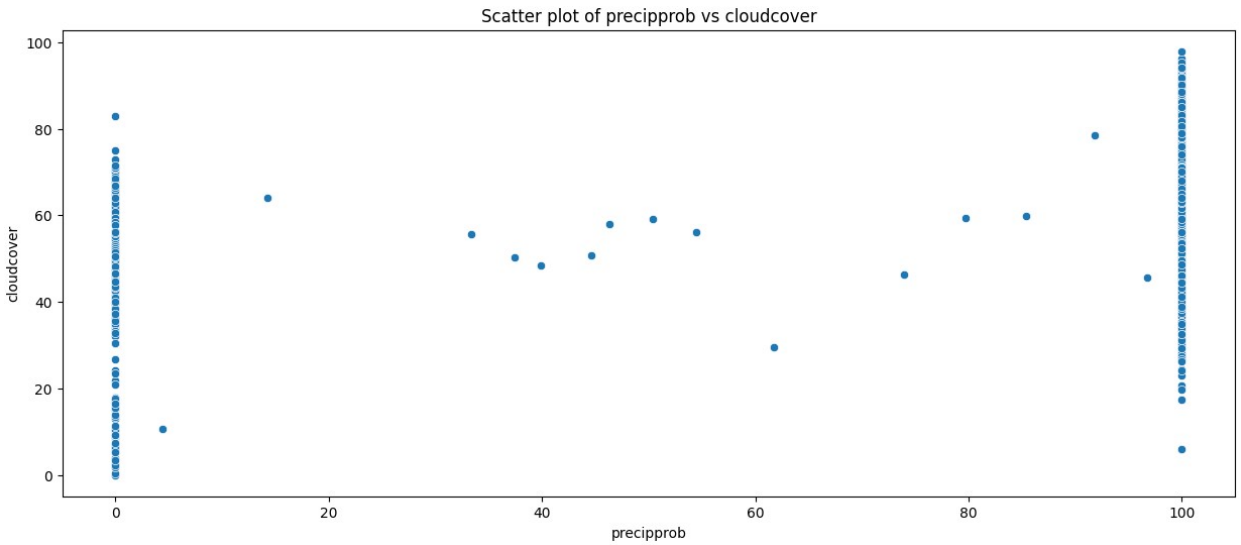
Scatter plot of precipprob vs cloudcover
cloudcover
precipprob
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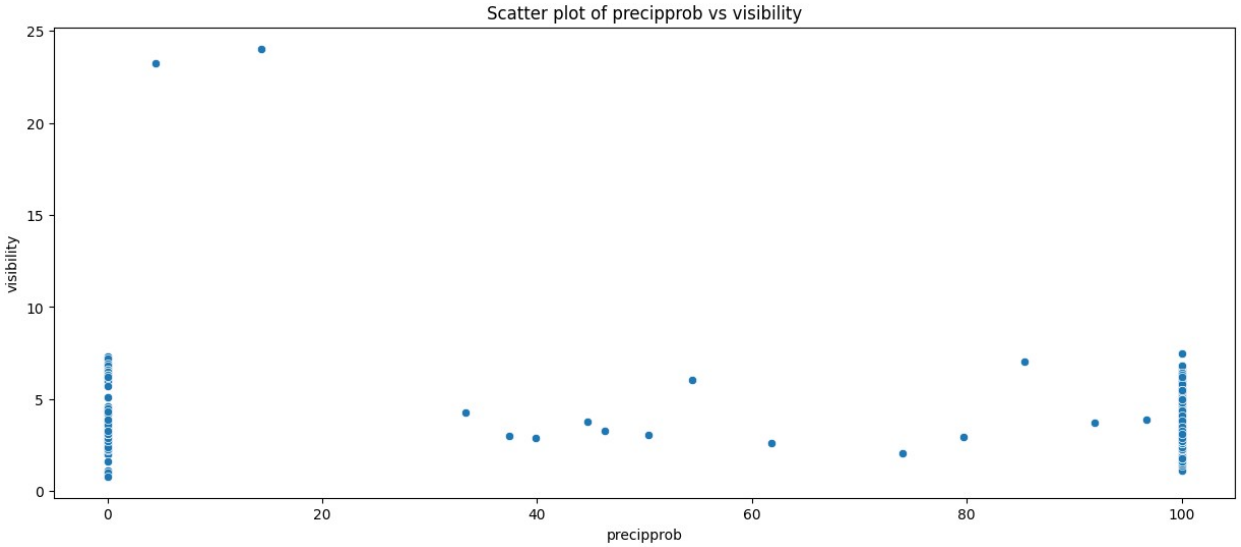
40
60
80
100
0
20
40
60
80
100


Scatter plot of precipprob vs visibility
visibility
precipprob
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20
25
0
20
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60
80
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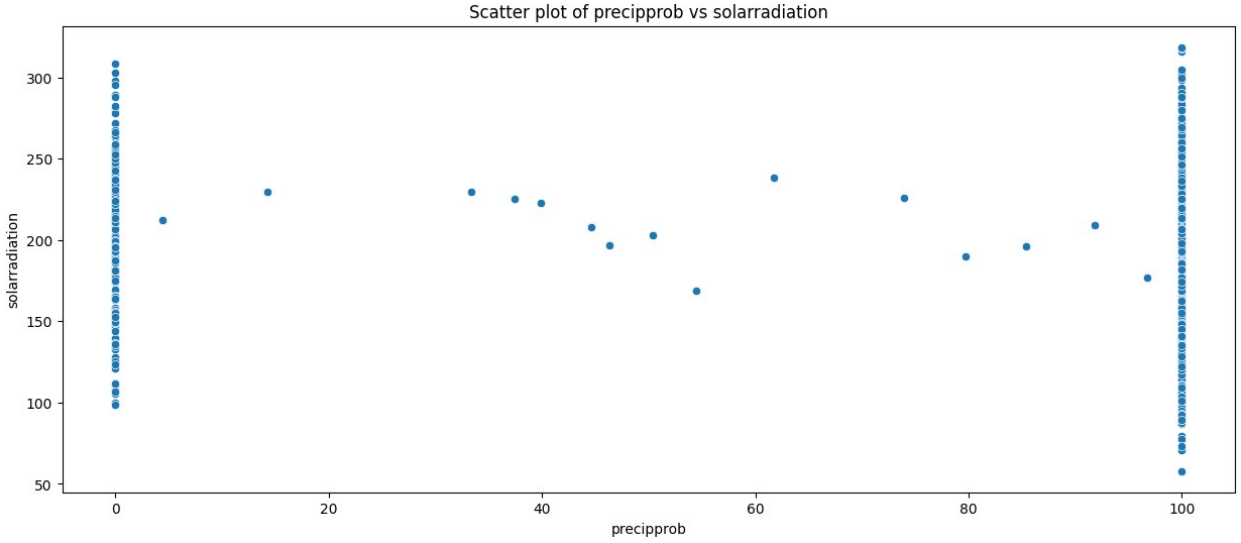
Scatter plot of precipprob vs solarradiation
solarradiation
precipprob
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100
150
200
250
300
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80
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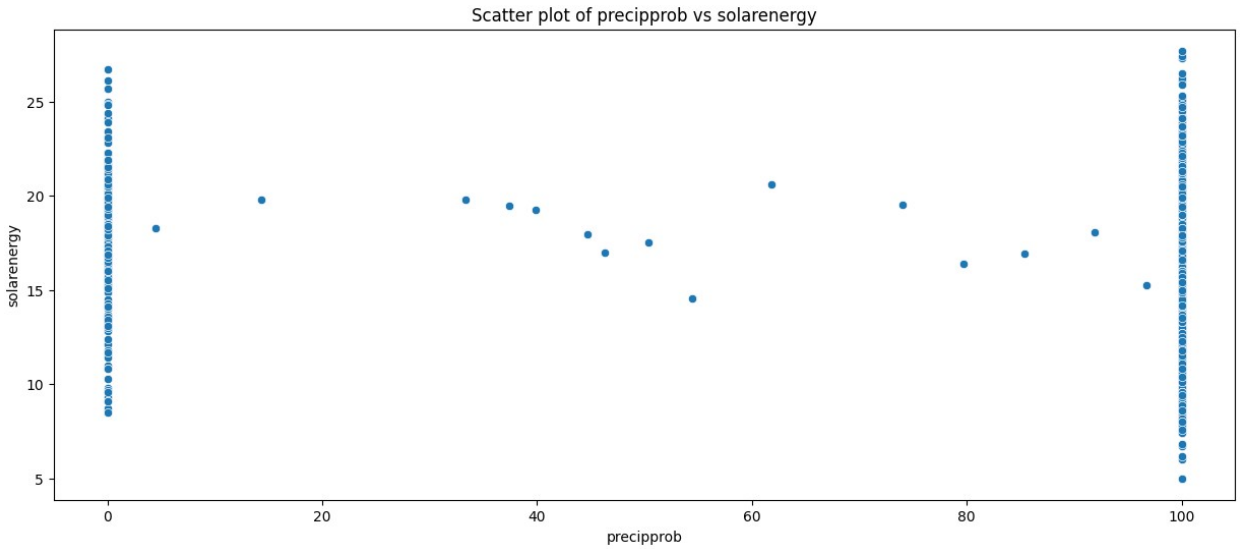
Scatter plot of precipprob vs solarenergy
solarenergy
precipprob
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10
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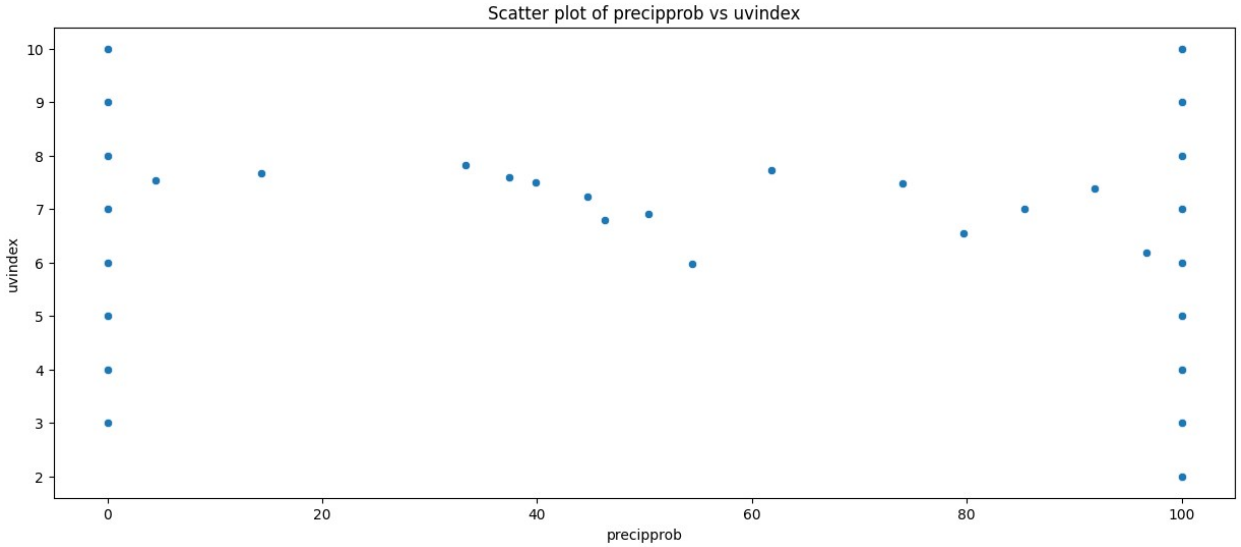
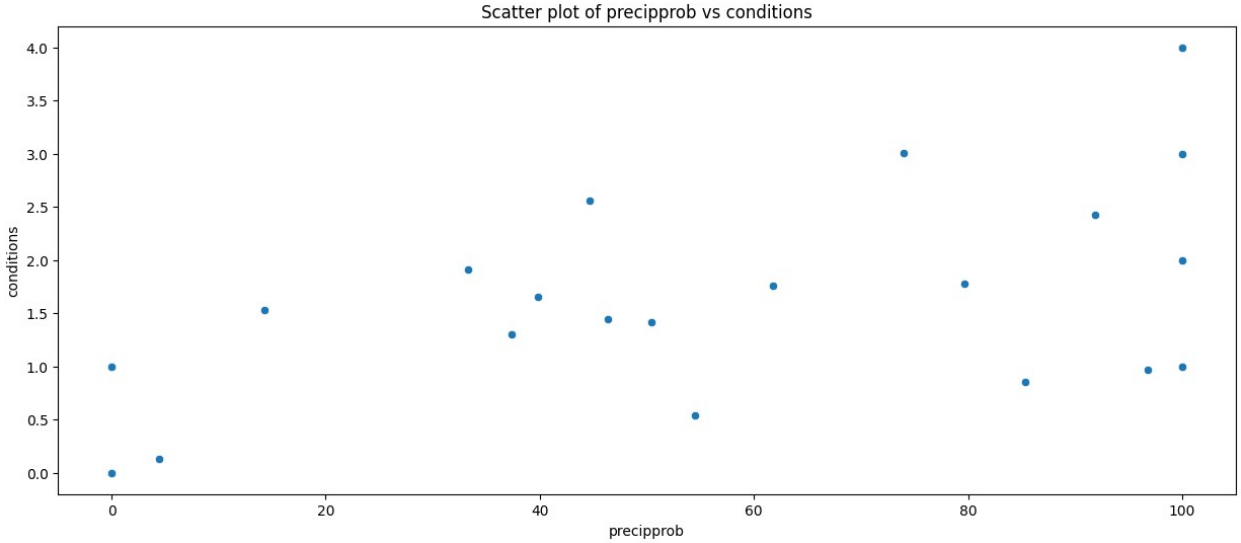
20
25
0
20
40
60
80
100


Scatter plot of precipprob vs uvindex
uvindex
precipprob
10
9
8
7
6
5
4
3
2
0
20
40
60
80
100


Scatter plot of precipprob vs conditions
conditions
precipprob
4.0
3.5
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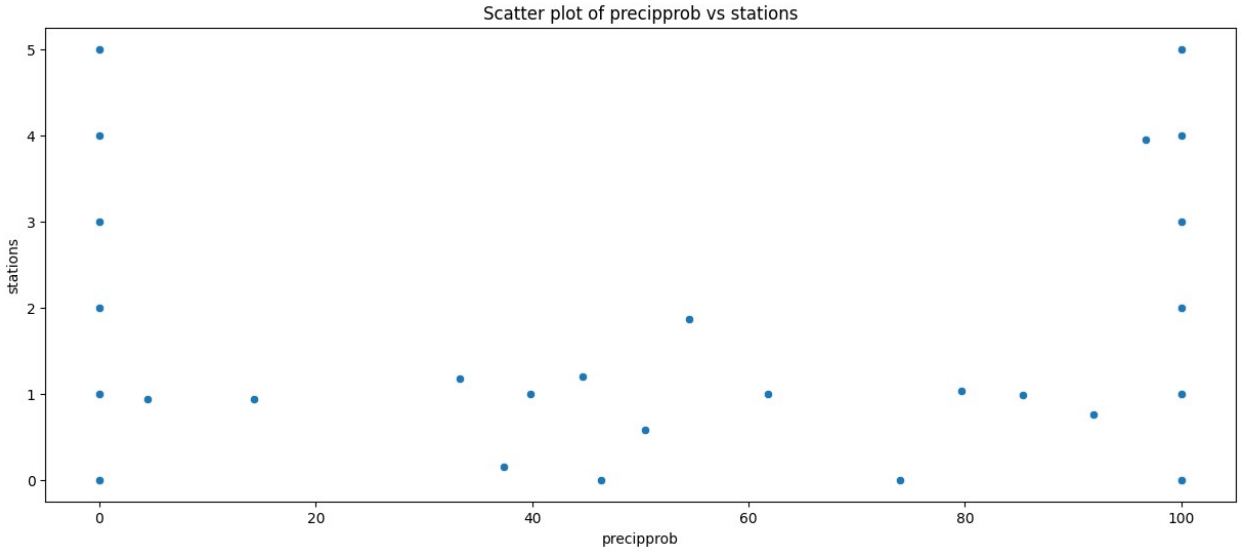
2.5
2.0
1.5
1.0
0.5
0.0
0
20
40
60
80
100


Scatter plot of precipprob vs stations
stations
precipprob
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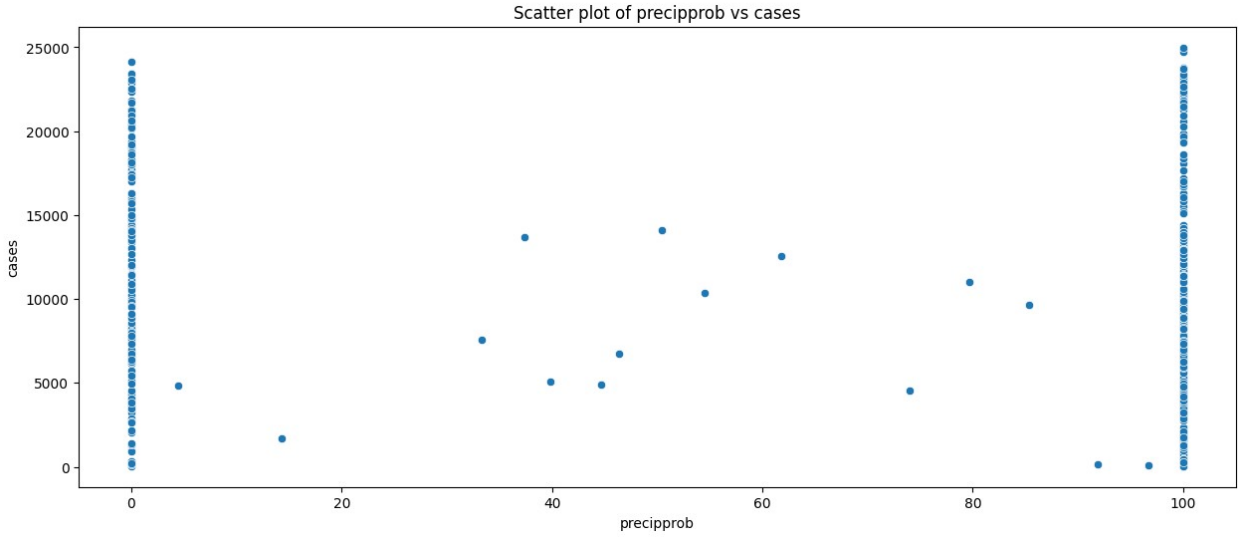
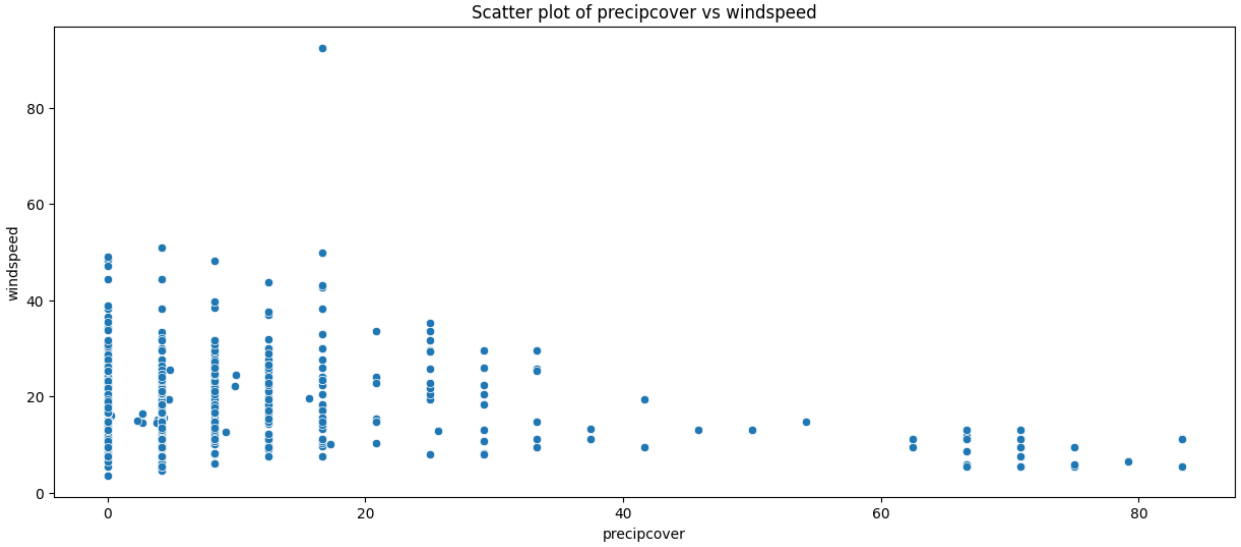
4
3
2
1
0
0
20
40
60
80
100


Scatter plot of precipprob vs cases
cases
precipprob
0
5000
10000
15000
20000
25000
0
20
40
60
80
100


Scatter plot of precipcover vs windspeed
windspeed
precipcover
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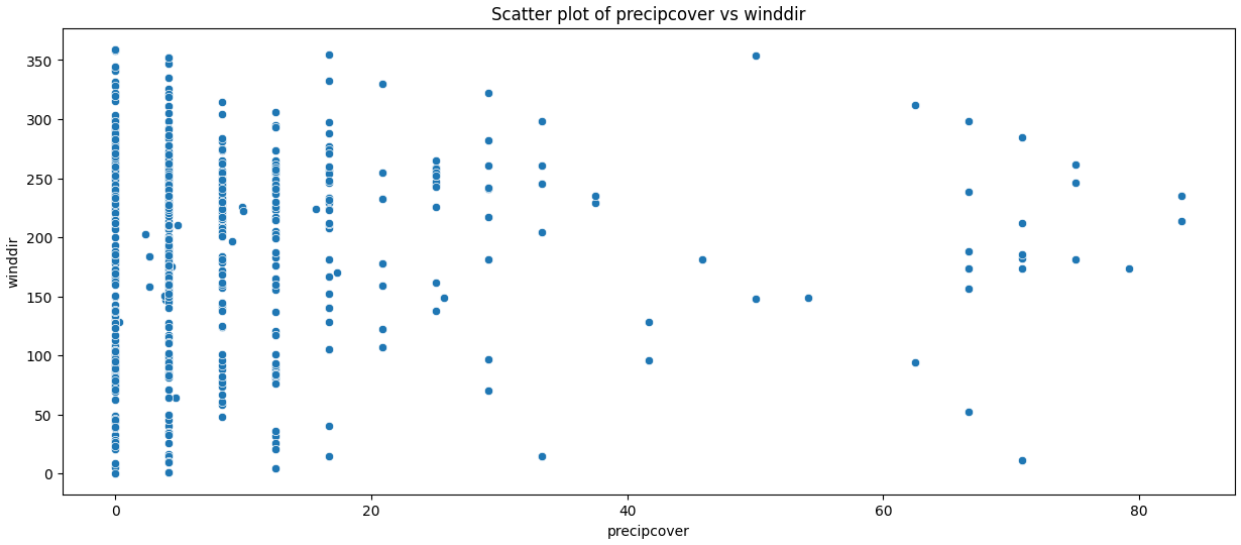
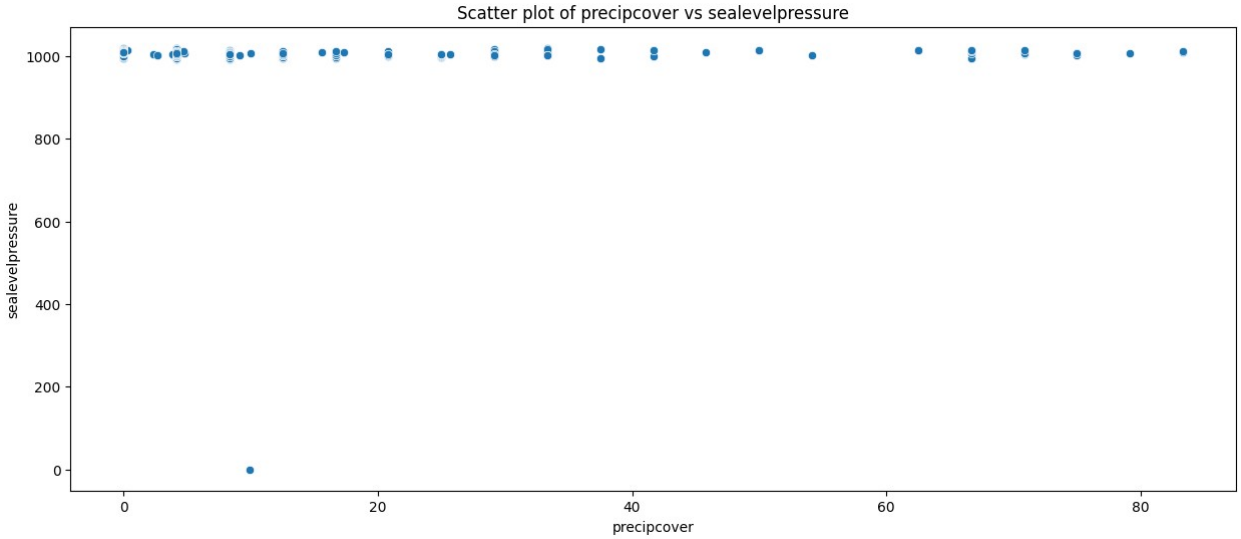
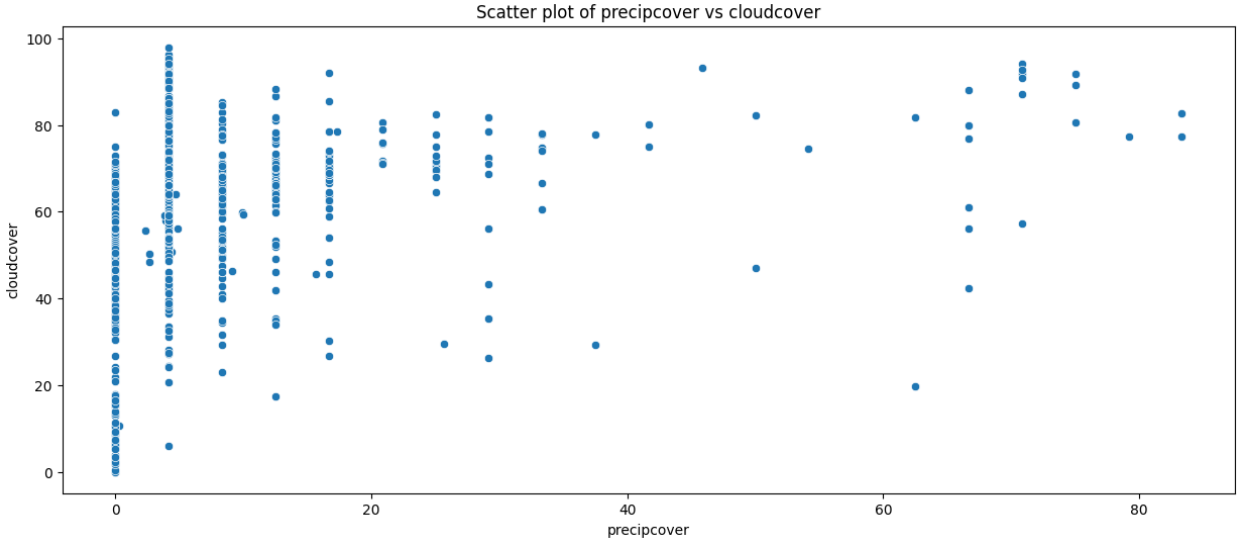
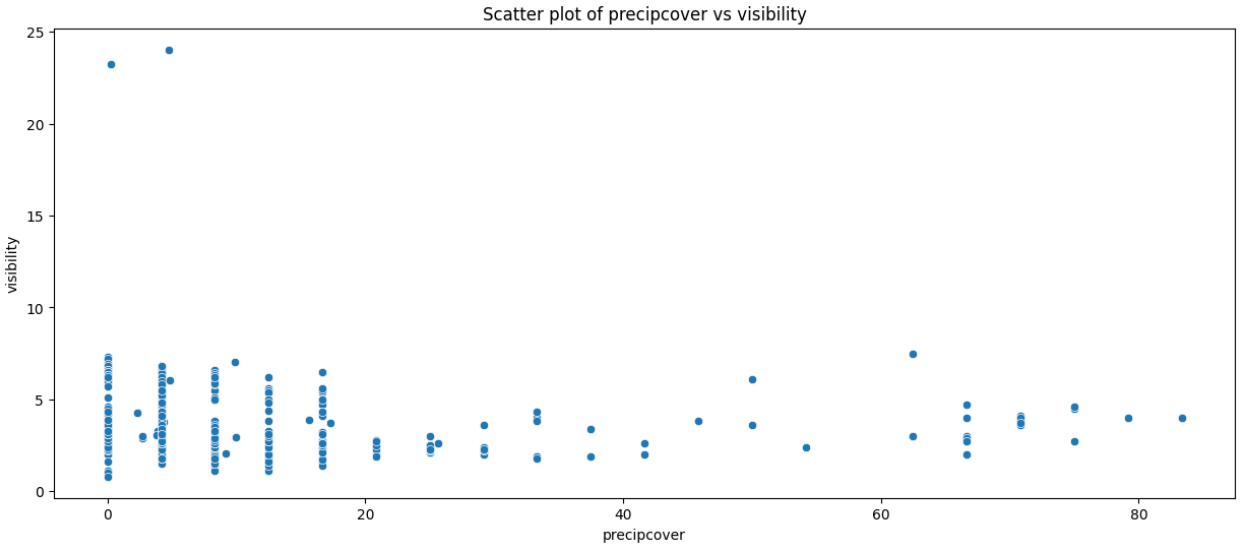
40
60
80
0
20
40
60
80


Scatter plot of precipcover vs winddir
winddir
precipcover
0
50
100
150
200
250
300
350
0
20
40
60
80


Scatter plot of precipcover vs sealevelpressure
sealevelpressure
precipcover
0
200
400
600
800
1000
0
20
40
60
80


Scatter plot of precipcover vs cloudcover
cloudcover
precipcover
0
20
40
60
80
100
0
20
40
60
80


Scatter plot of precipcover vs visibility
visibility
precipcover
0
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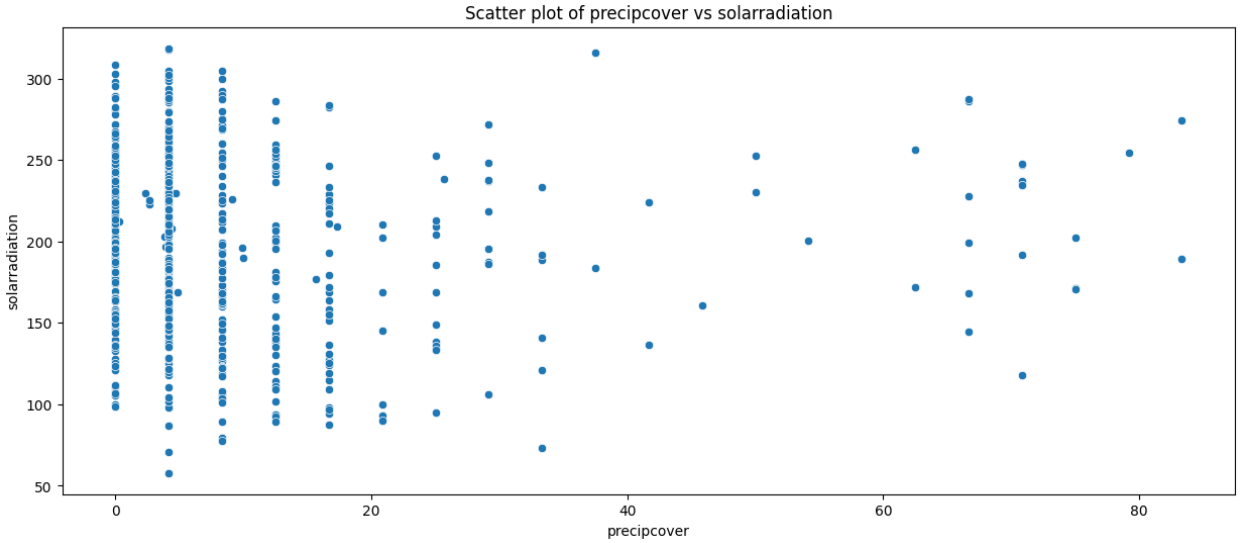
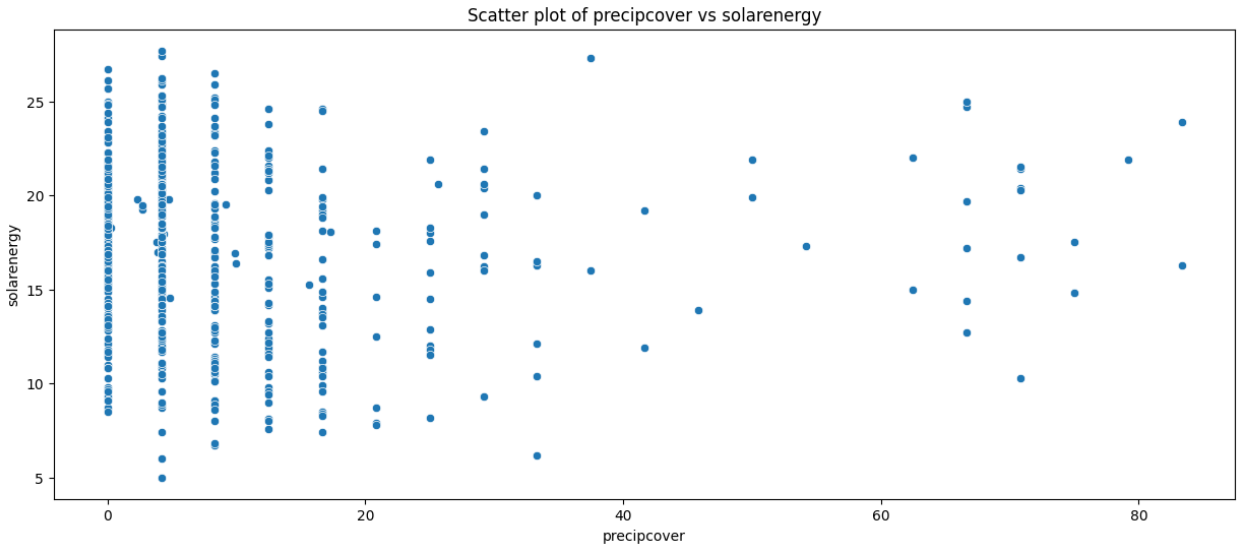
15
20
25
0
20
40
60
80


Scatter plot of precipcover vs solarradiation
solarradiation
precipcover
300
250
200
150
100
50
0
20
40
60
80


Scatter plot of precipcover vs solarenergy
solarenergy
precipcover
25
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15
10
5
0
20
40
60
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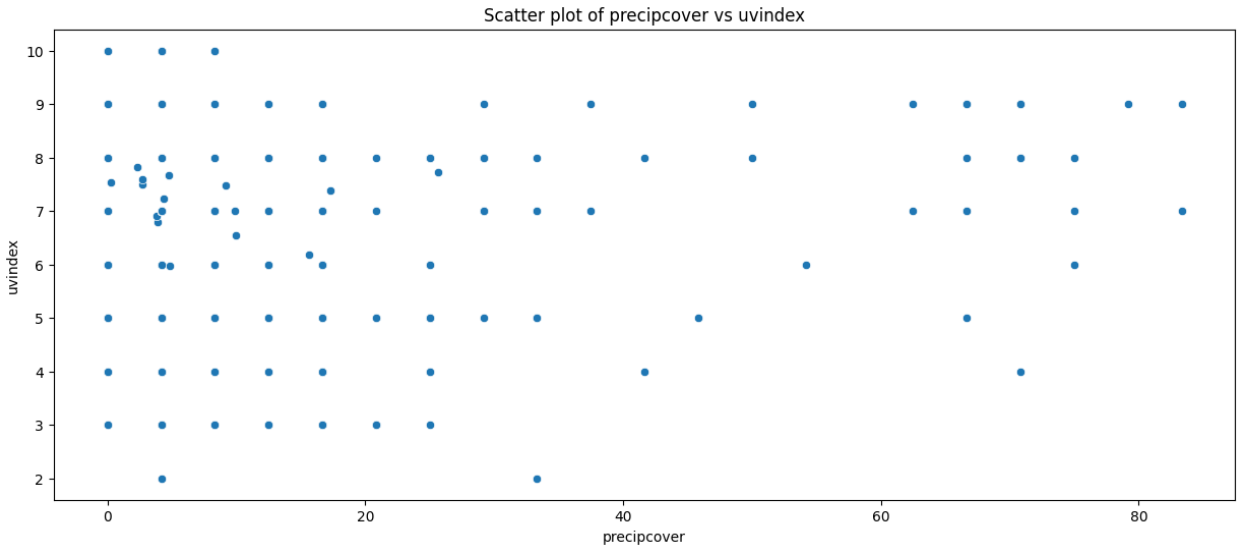
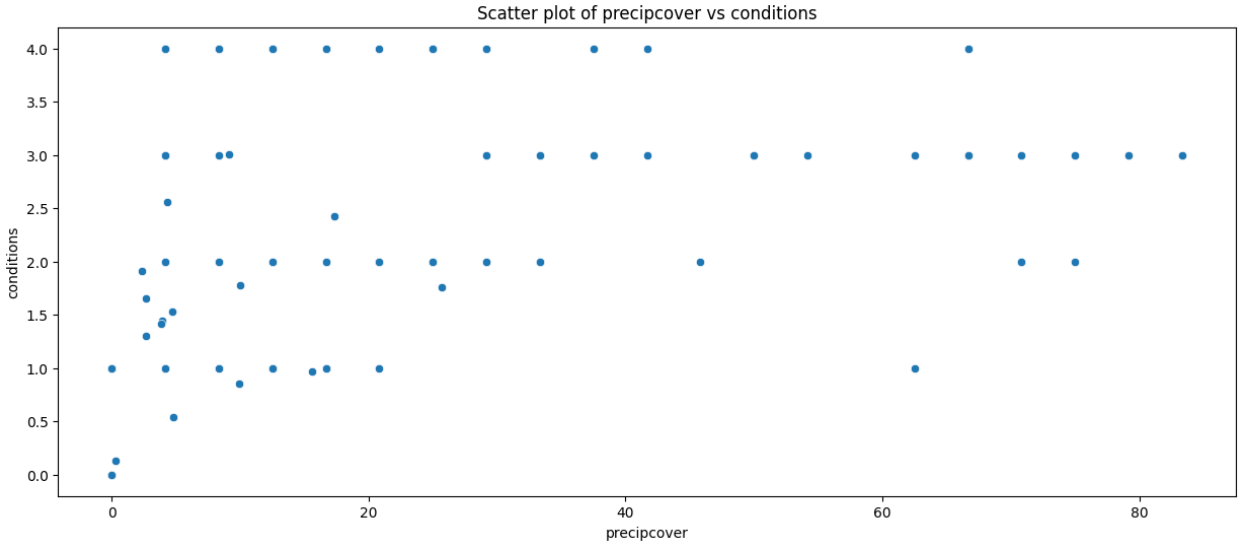

Scatter plot of precipcover vs uvindex
uvindex
precipcover
10
9
8
7
6
5
4
3
2
0
20
40
60
80


Scatter plot of precipcover vs conditions
conditions
precipcover
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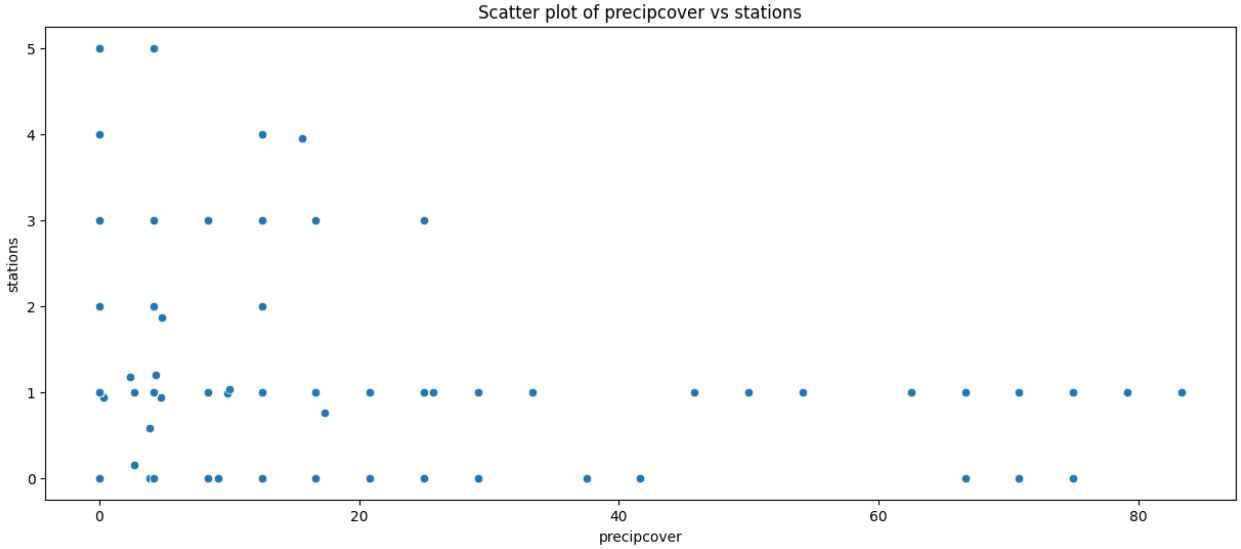
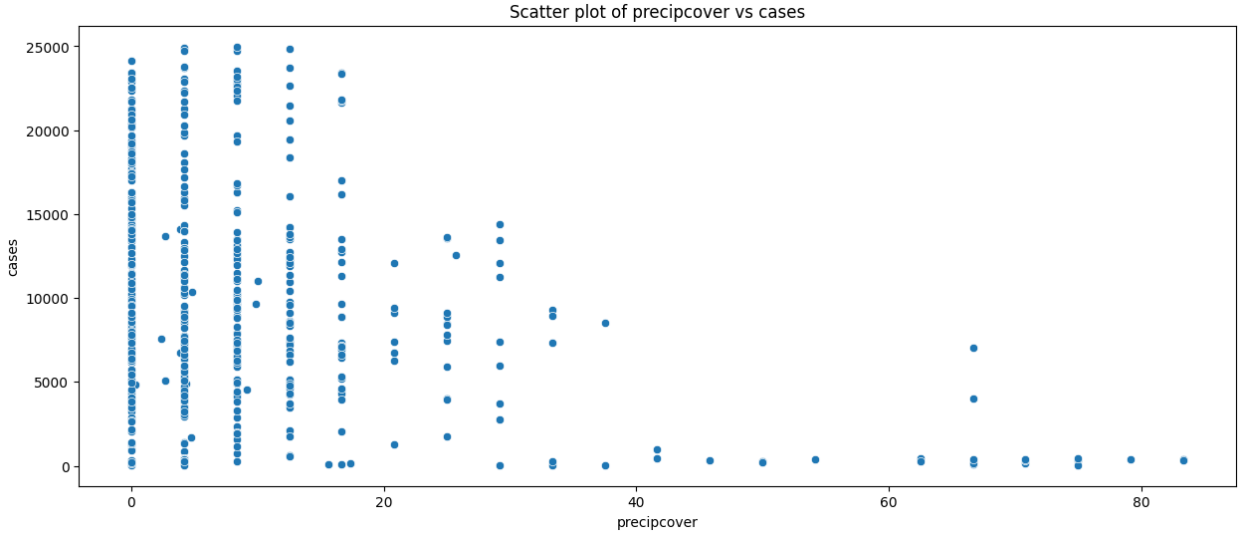
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
20
40
60
80


Scatter plot of precipcover vs stations
stations
precipcover
0
1
2
3
4
5
0
20
40
60
80


Scatter plot of precipcover vs cases
cases
precipcover
0
5000
10000
15000
20000
25000
0
20
40
60
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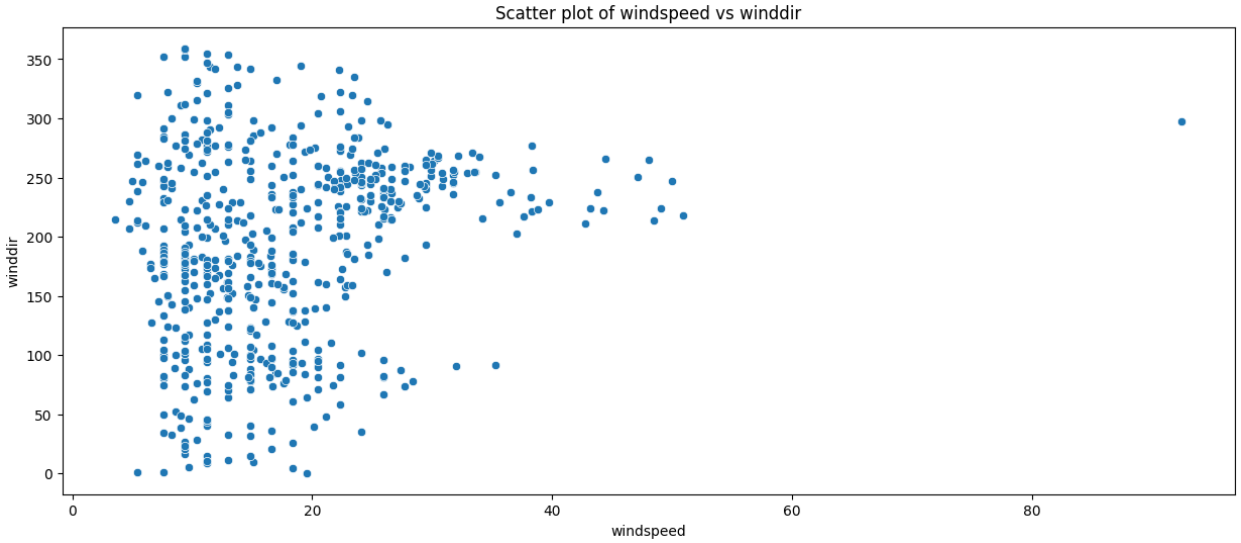
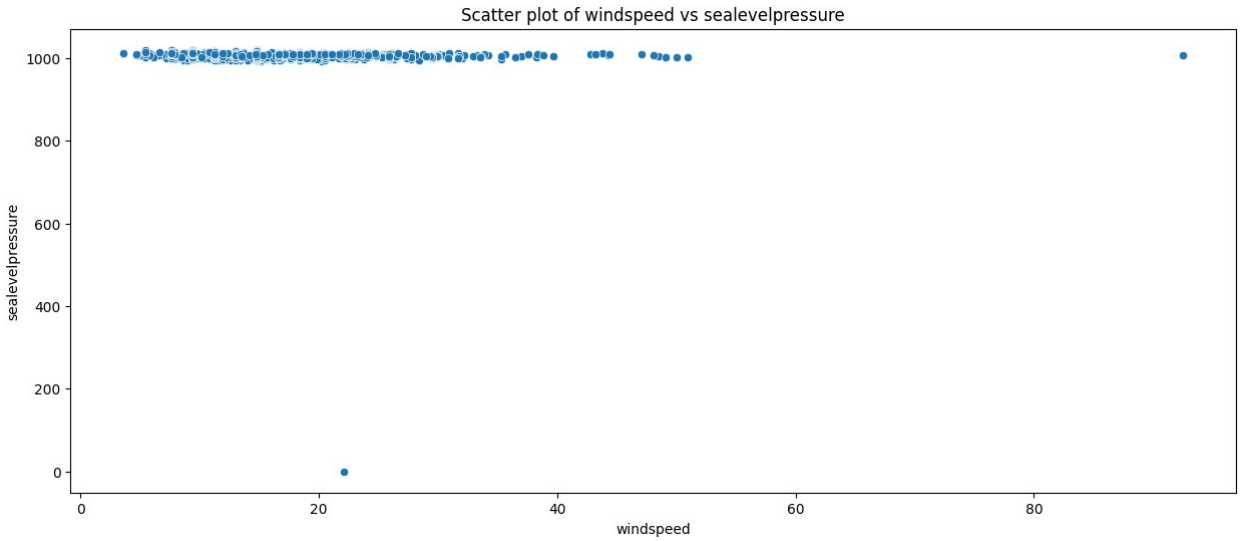
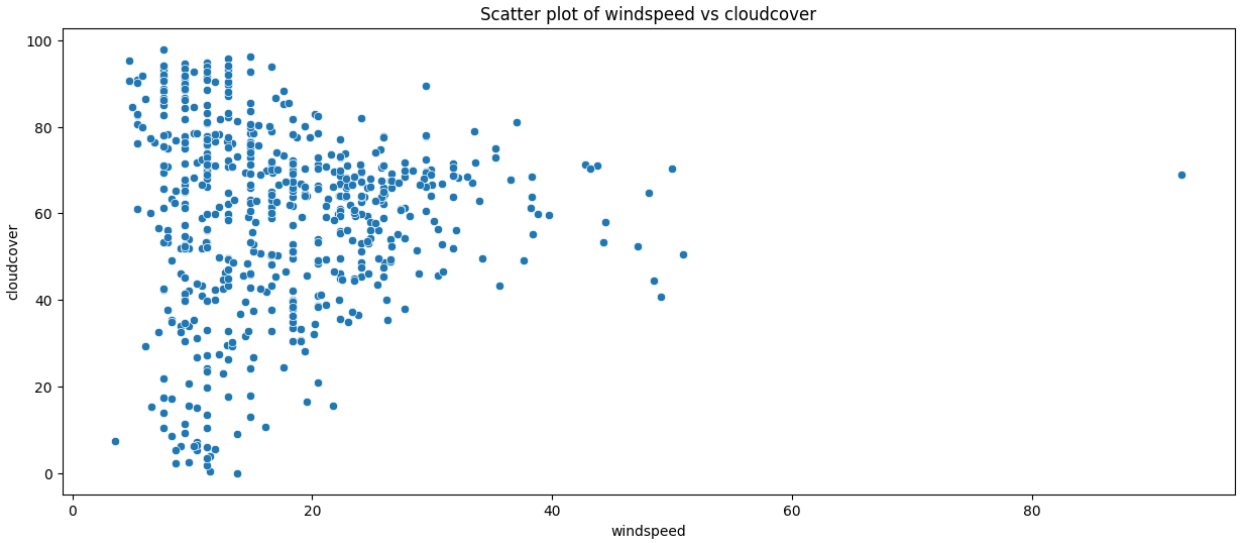
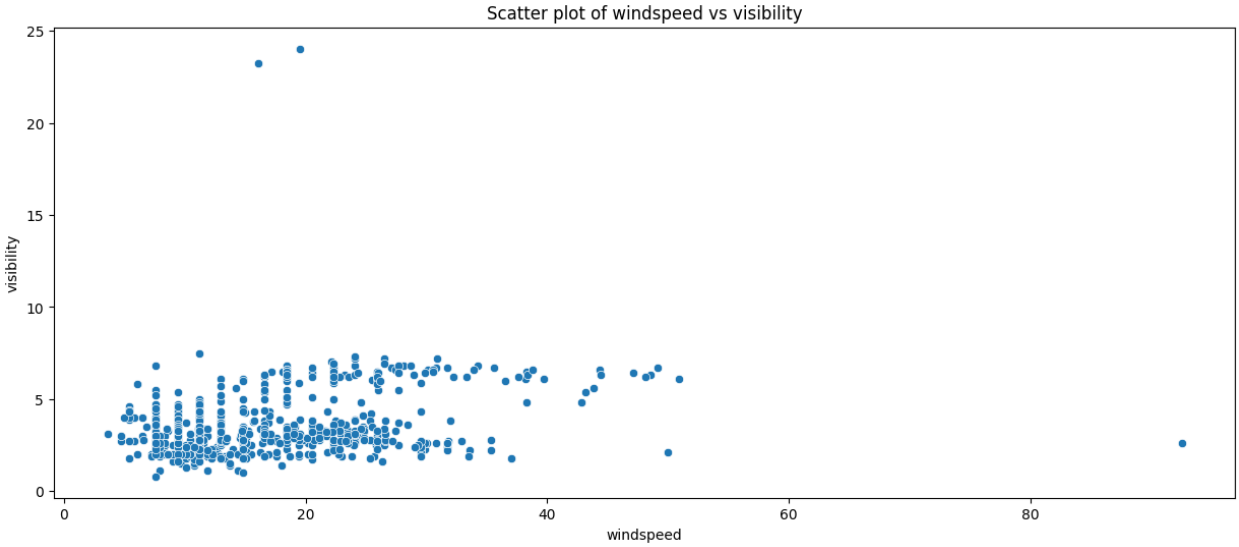
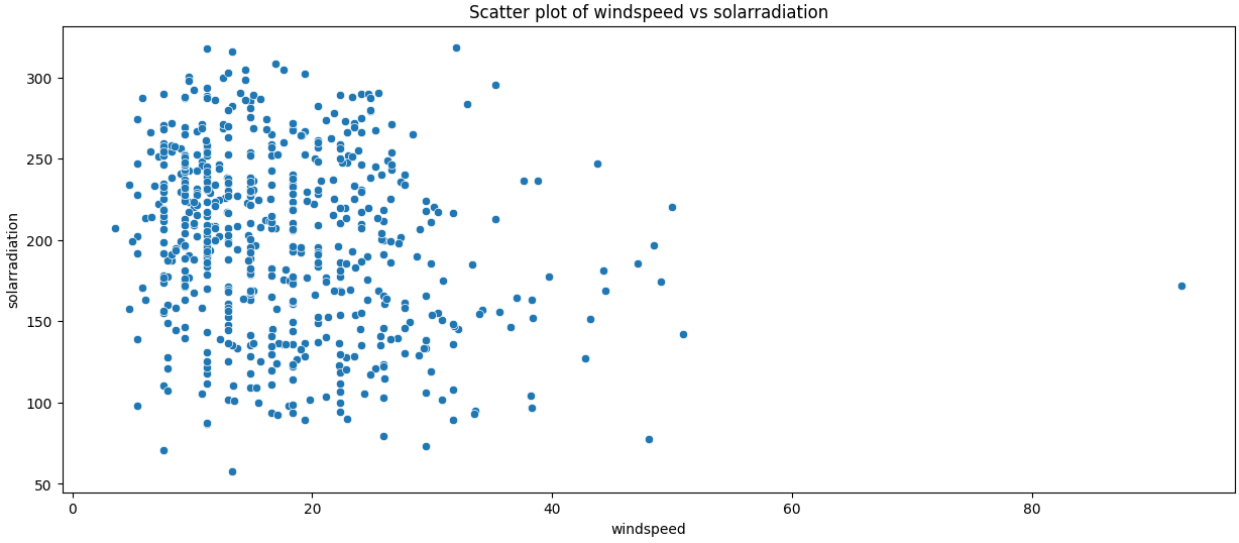
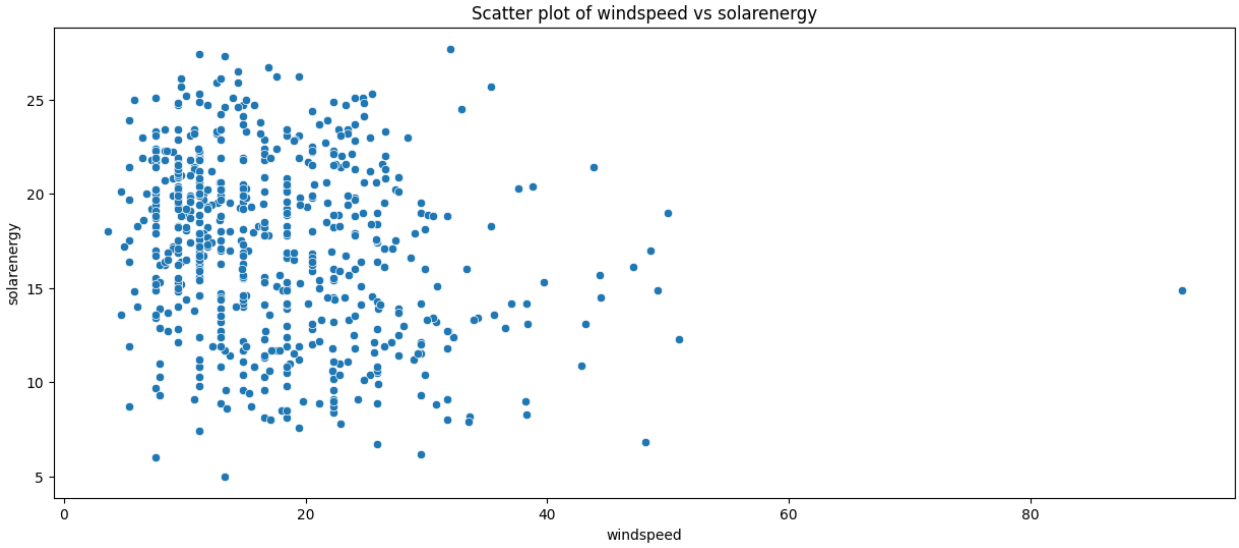

Scatter plot of windspeed vs winddir
winddir
windspeed
0
50
100
150
200
250
300
350
0
20
40
60
80

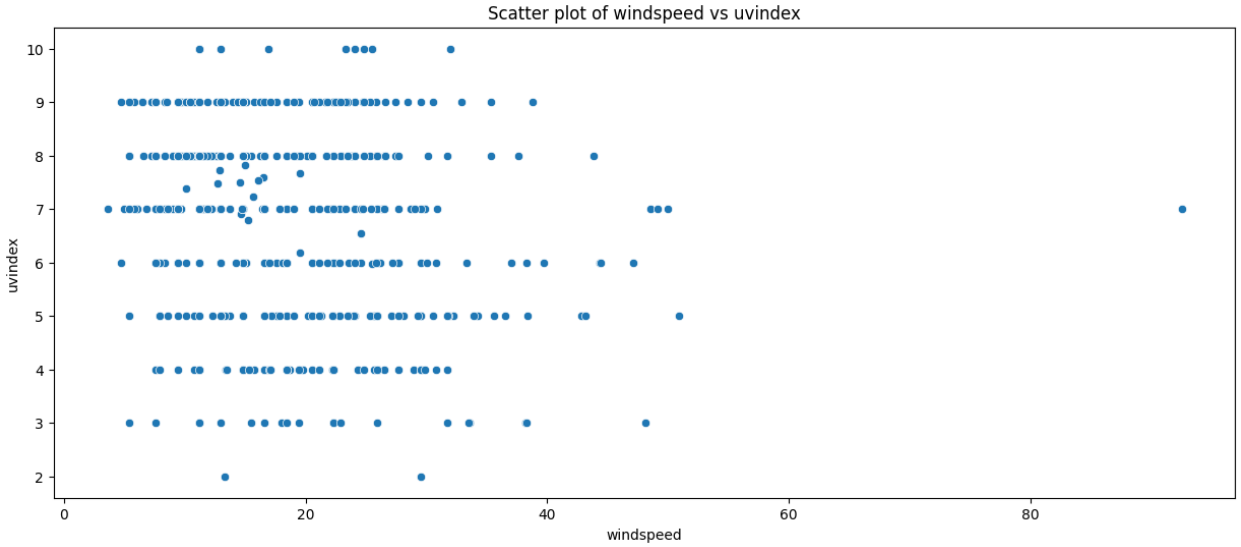

Scatter plot of windspeed vs sealevelpressure
sealevelpressure
windspeed
0
200
400
600
800
1000
0
20
40
60
80

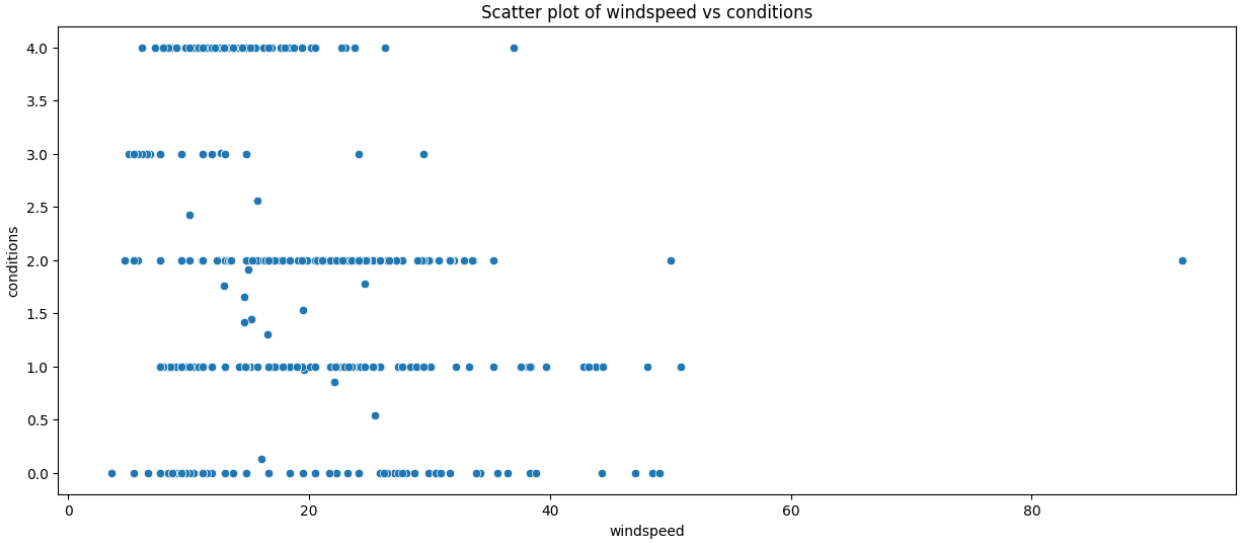

Scatter plot of windspeed vs cloudcover
cloudcover
windspeed
0
20
40
60
80
100
0
20
40
60
80

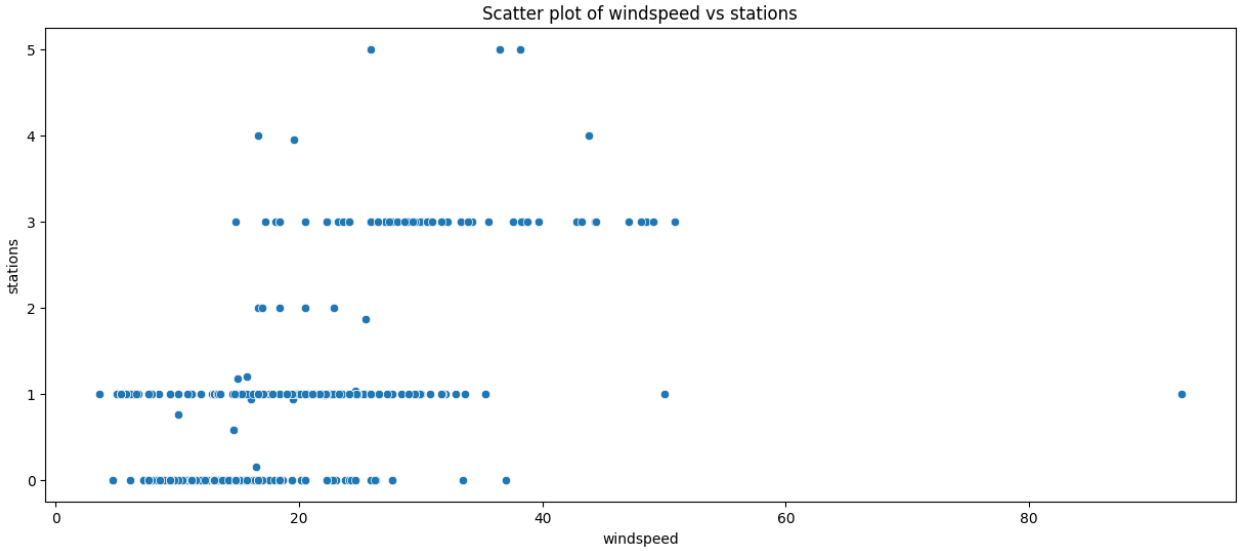

Scatter plot of windspeed vs visibility
visibility
windspeed
0
5
10
15
20
25
0
20
40
60
80

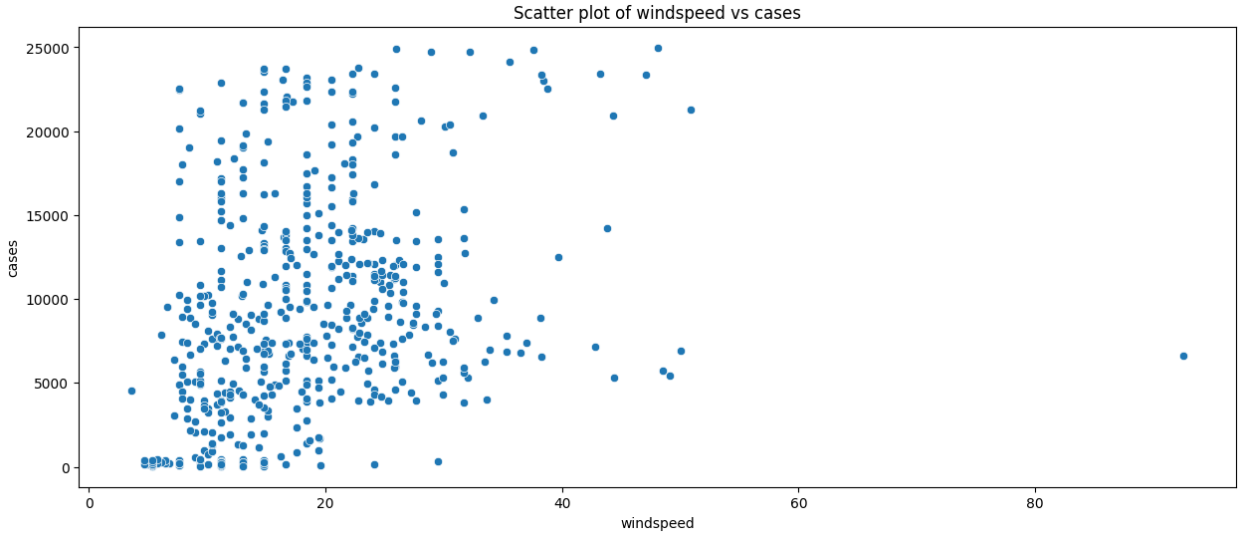

Scatter plot of windspeed vs solarradiation
solarradiation
windspeed
50
100
150
200
250
300
0
20
40
60
80


Scatter plot of windspeed vs solarenergy
solarenergy
windspeed
5
10
15
20
25
0
20
40
60
80


Scatter plot of windspeed vs uvindex
uvindex
windspeed
10
9
8
7
6
5
4
3
2
0
20
40
60
80


Scatter plot of windspeed vs conditions
conditions
windspeed
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
20
40
60
80


Scatter plot of windspeed vs stations
stations
windspeed
5
4
3
2
1
0
0
20
40
60
80


Scatter plot of windspeed vs cases
cases
windspeed
0
5000
10000
15000
20000
25000
0
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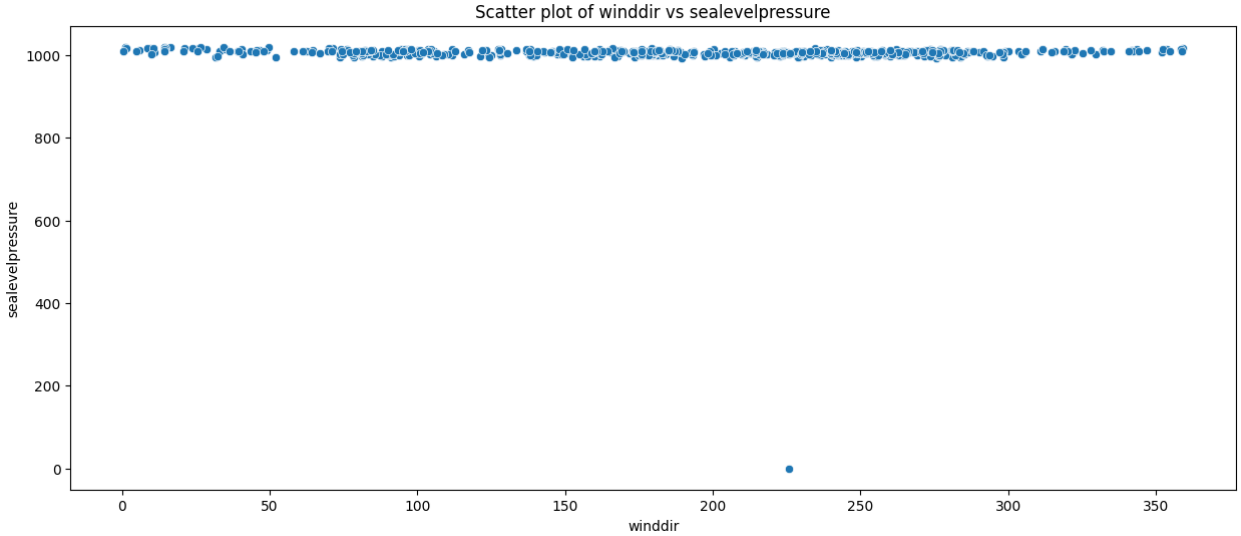
40
60
80


Scatter plot of winddir vs sealevelpressure
sealevelpressure
winddir
0
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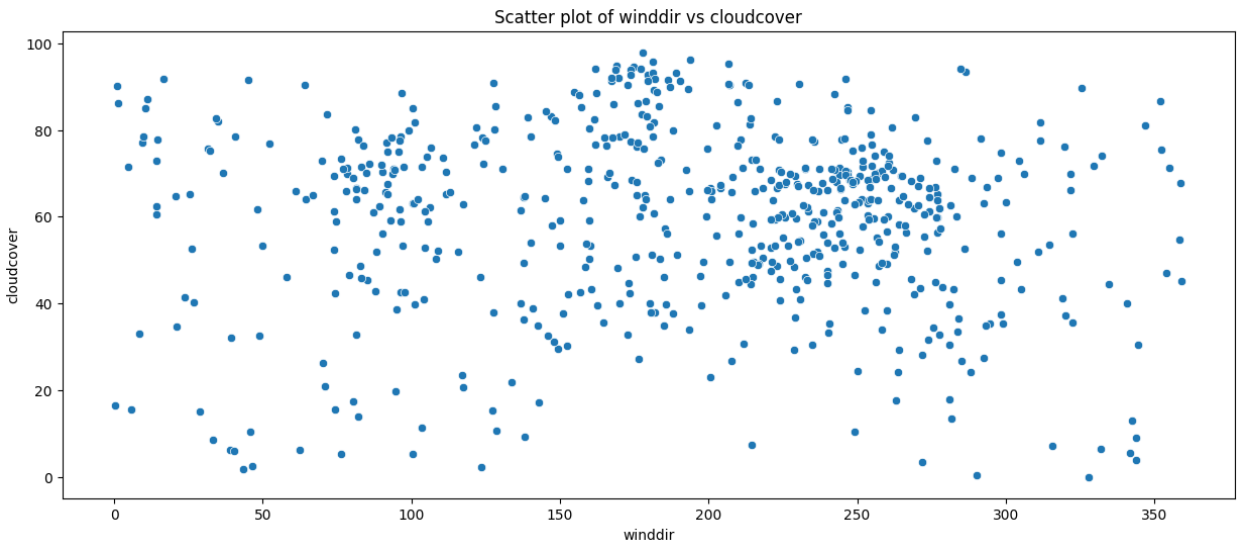
400
600
800
1000
0
50
100
150
200
250
300
350


Scatter plot of winddir vs cloudcover
cloudcover
winddir
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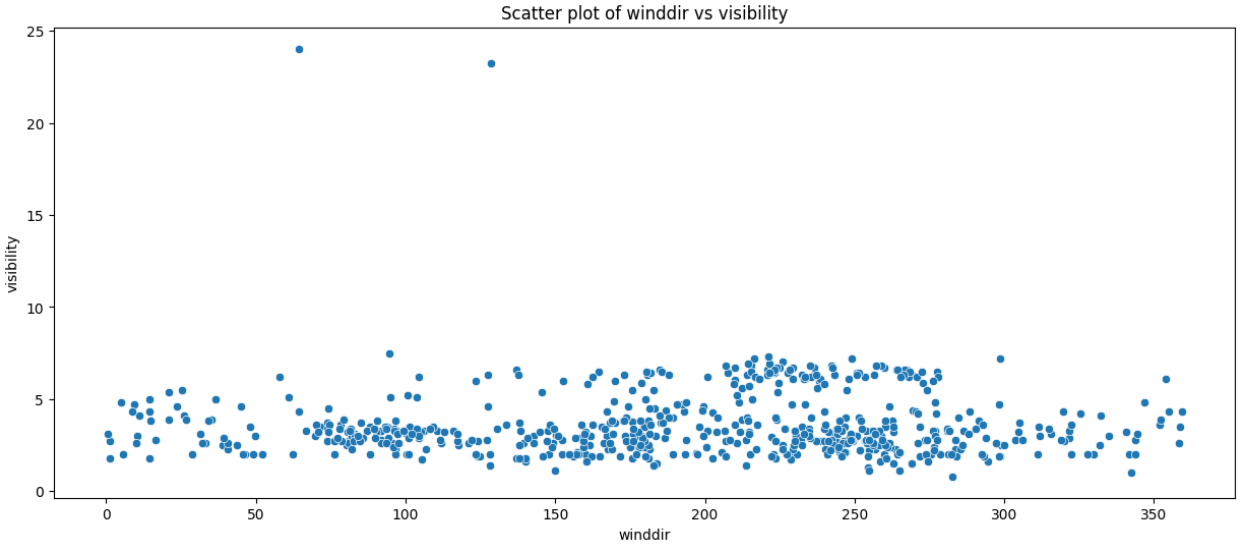
40
60
80
100
0
50
100
150
200
250
300
350


Scatter plot of winddir vs visibility
visibility
winddir
0
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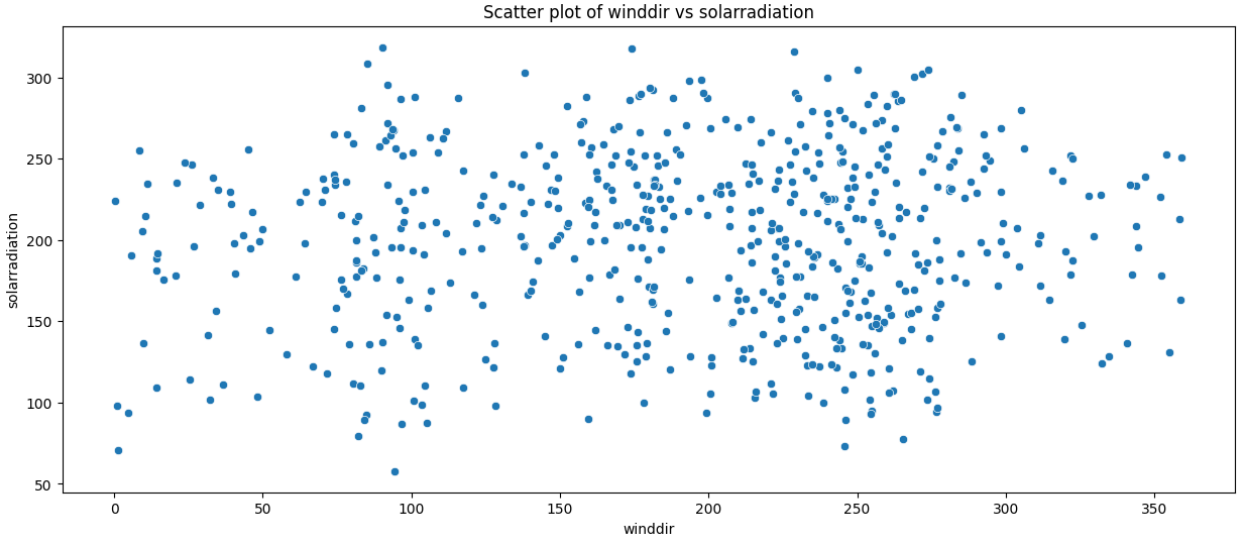
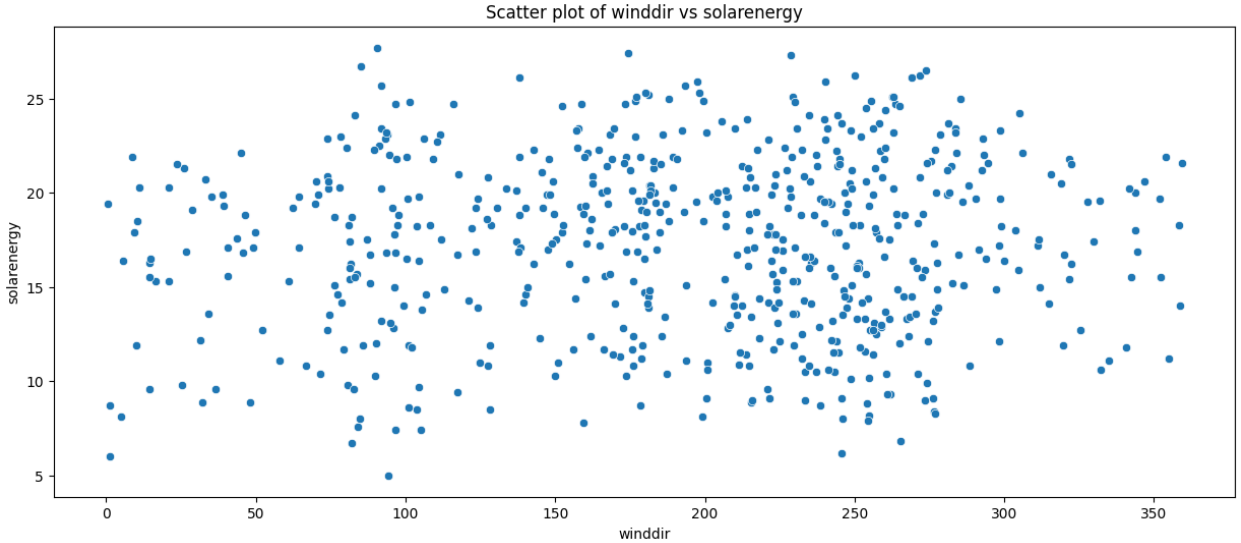
10
15
20
25
0
50
100
150
200
250
300
350


Scatter plot of winddir vs solarradiation
solarradiation
winddir
50
100
150
200
250
300
0
50
100
150
200
250
300
350


Scatter plot of winddir vs solarenergy
solarenergy
winddir
5
10
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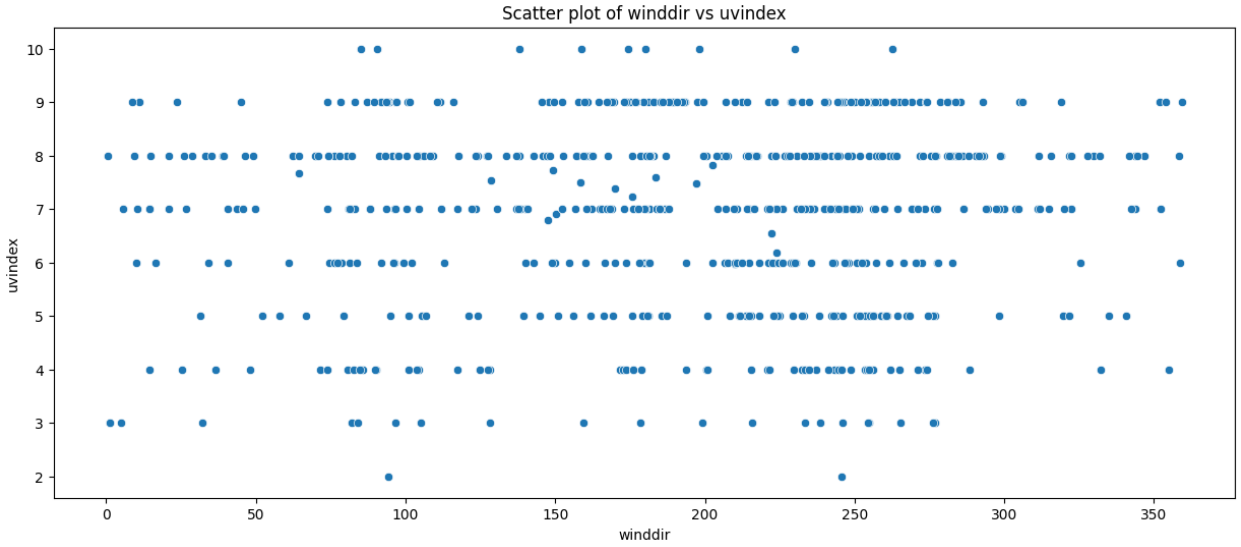
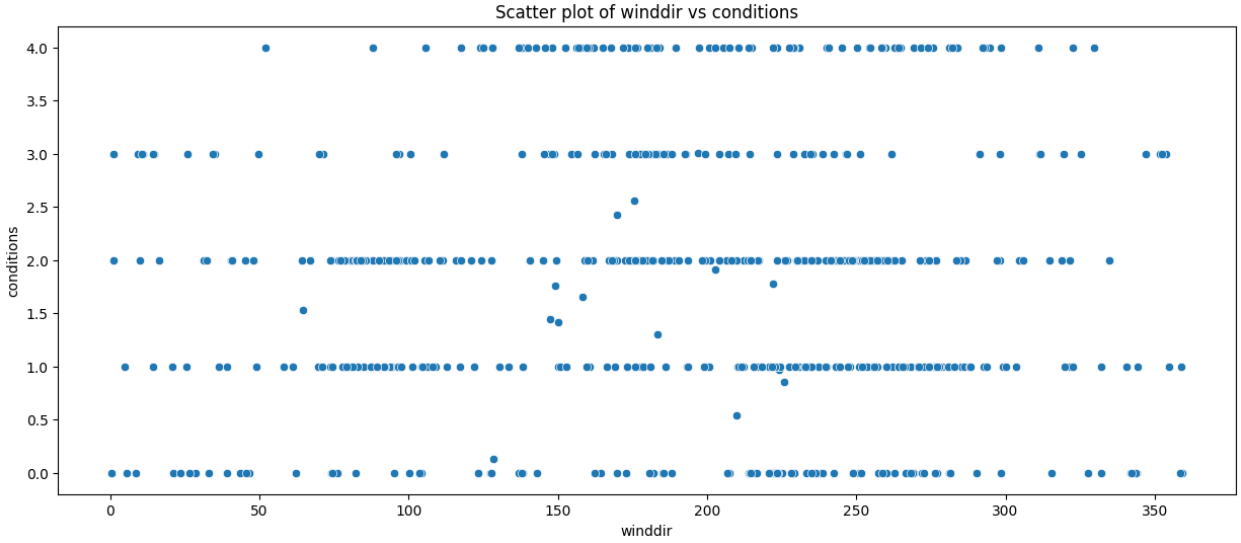
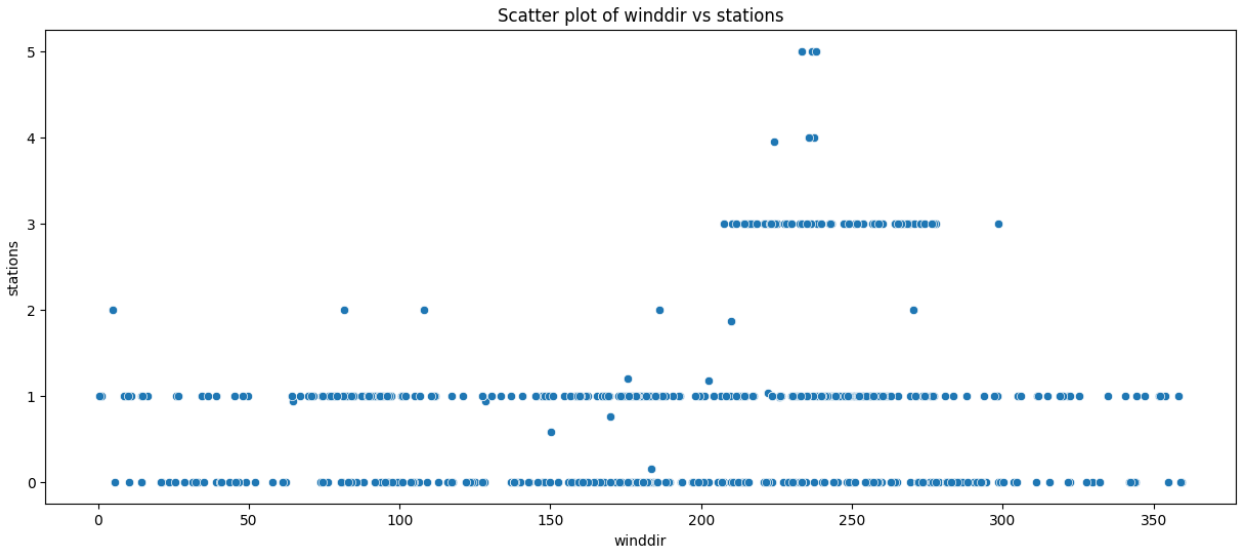
20
25
0
50
100
150
200
250
300
350


Scatter plot of winddir vs uvindex
uvindex
winddir
10
9
8
7
6
5
4
3
2
0
50
100
150
200
250
300
350


Scatter plot of winddir vs conditions
conditions
winddir
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
50
100
150
200
250
300
350


Scatter plot of winddir vs stations
stations
winddir
5
4
3
2
1
0
0
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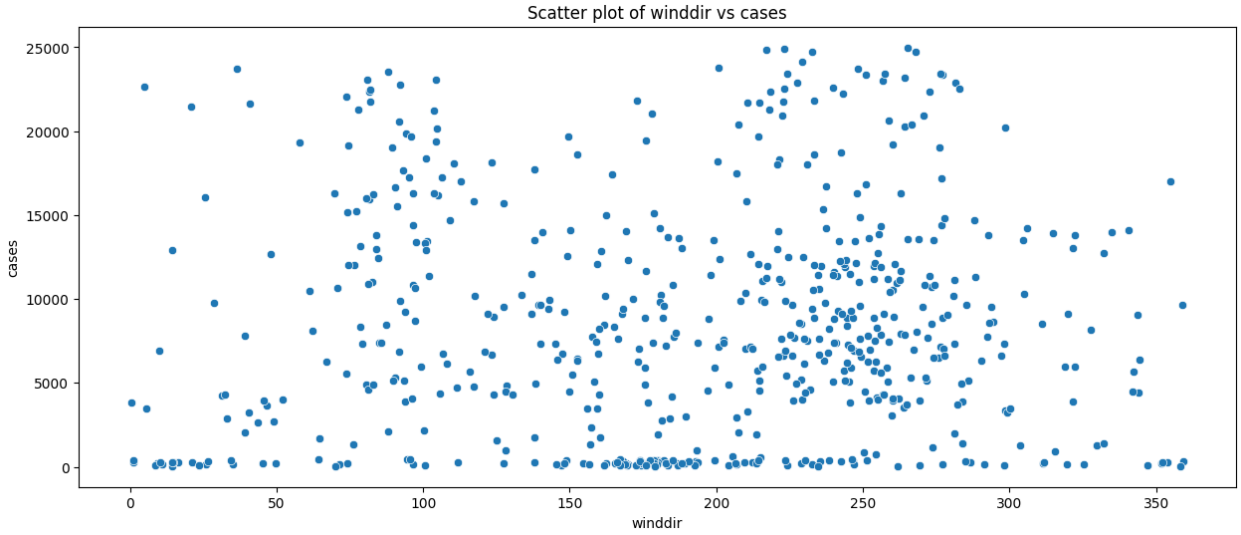
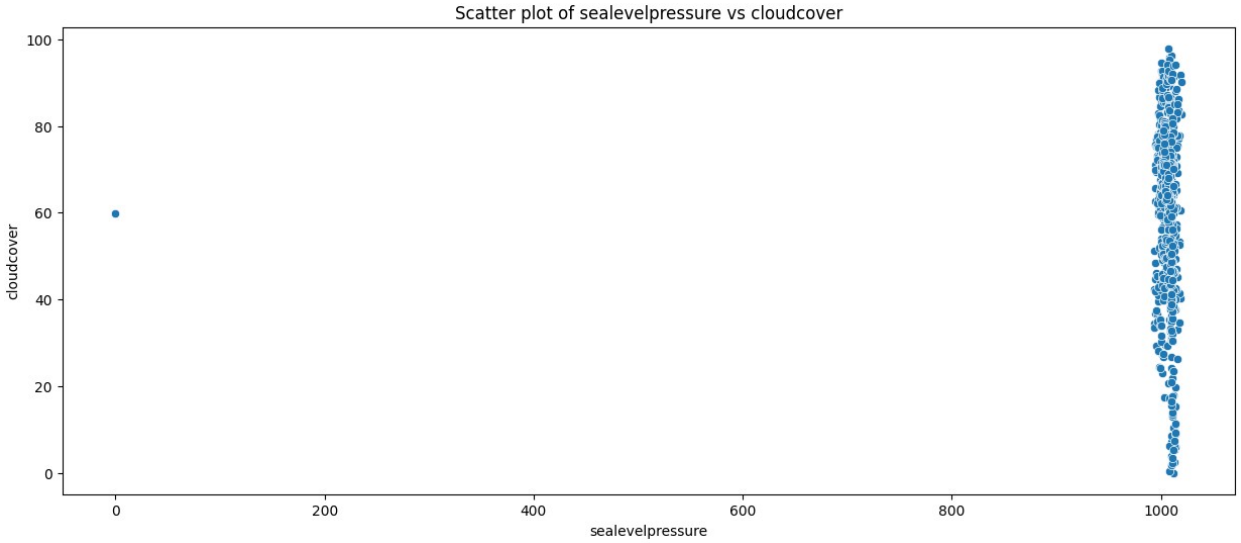
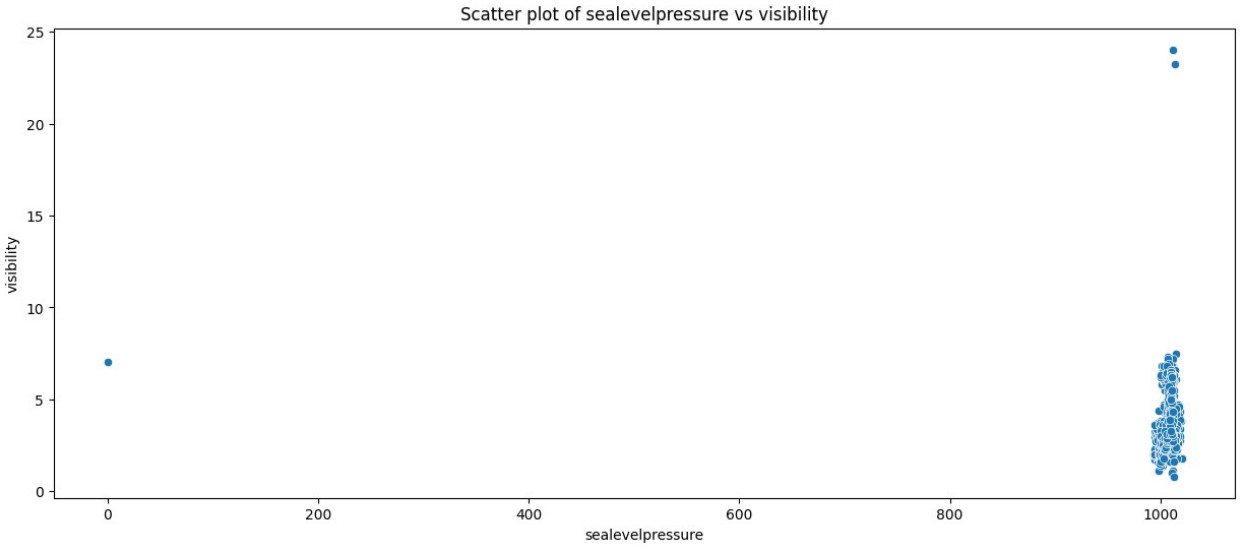
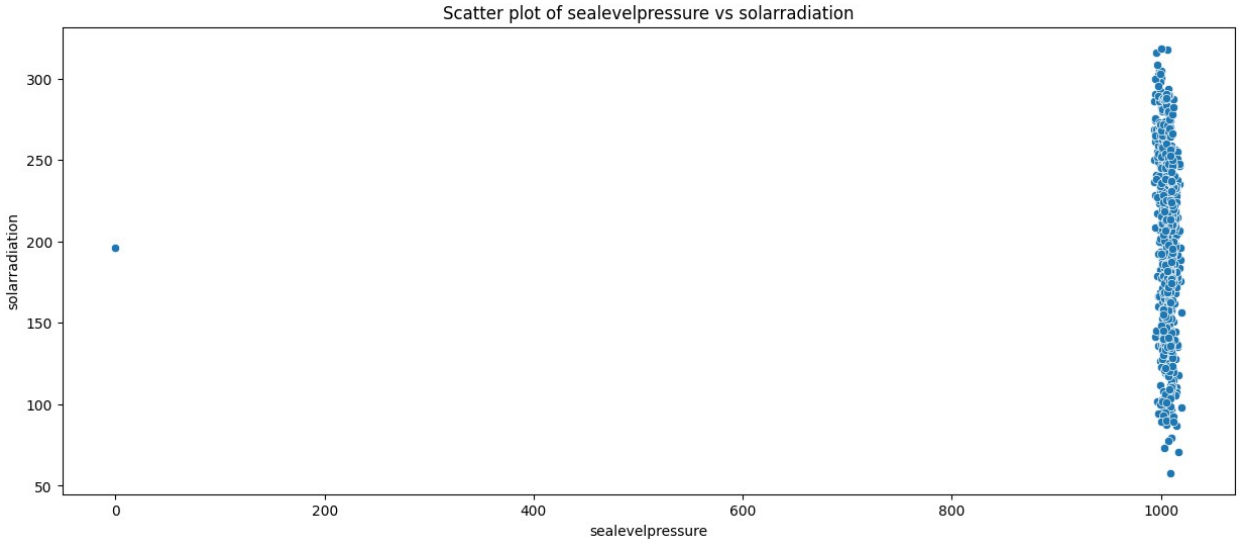
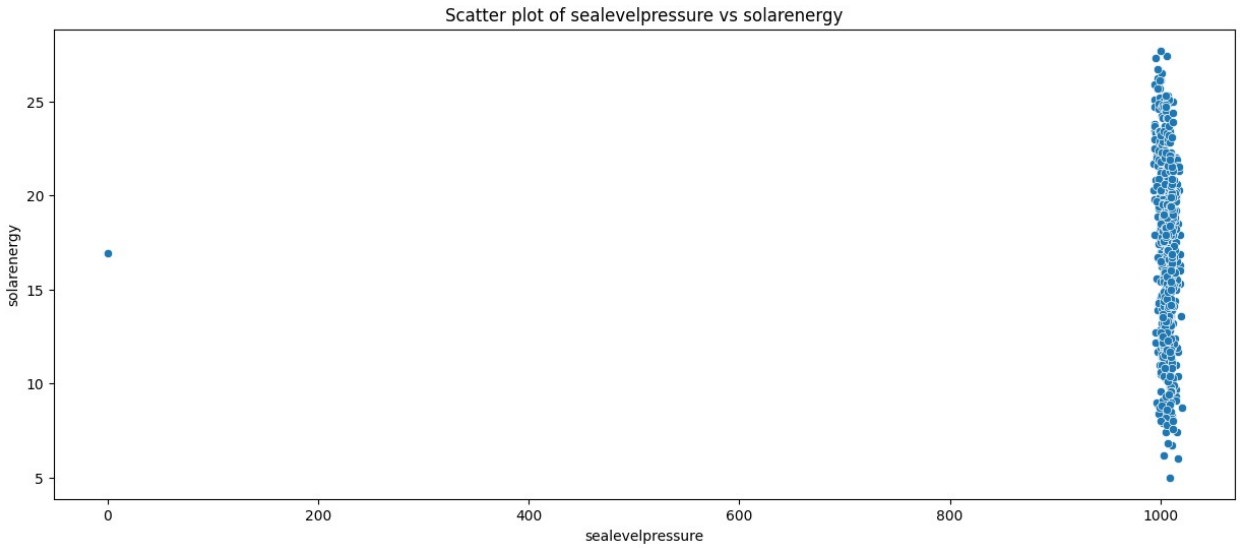
100
150
200
250
300
350

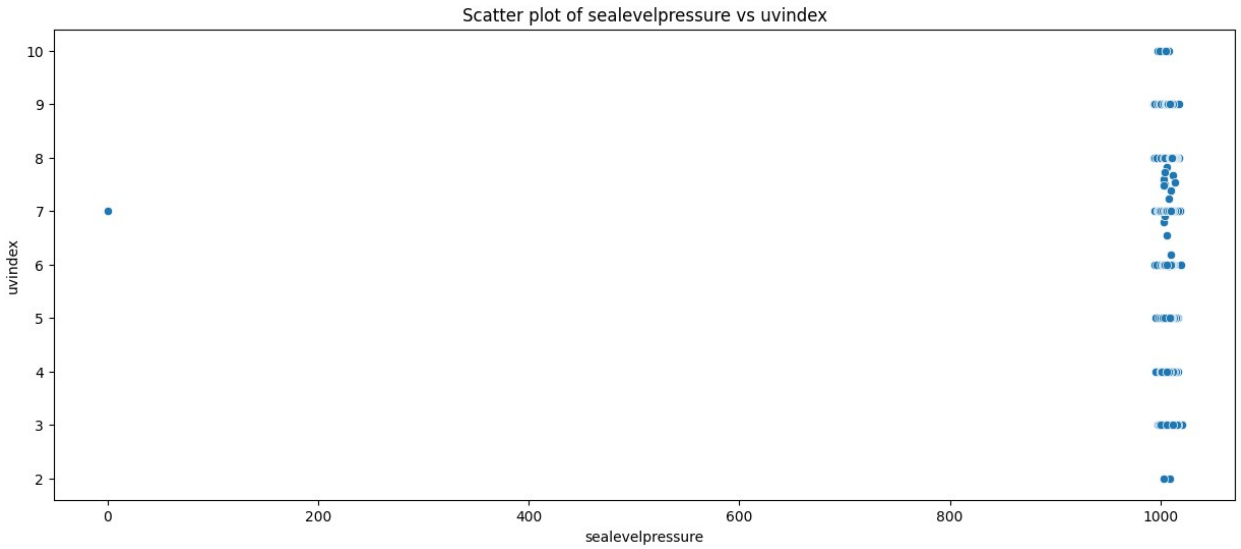

Scatter plot of winddir vs cases
cases
winddir
0
5000
10000
15000
20000
25000
0
50
100
150
200
250
300
350

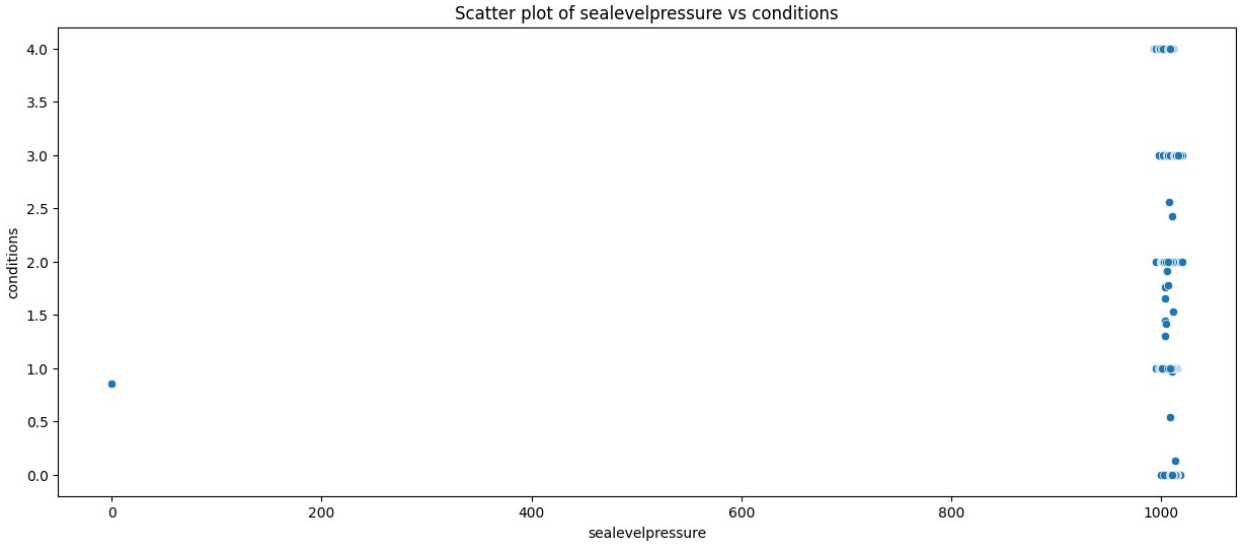

Scatter plot of sealevelpressure vs cloudcover
cloudcover
sealevelpressure
0
20
40
60
80
100
0
200
400
600
800
1000

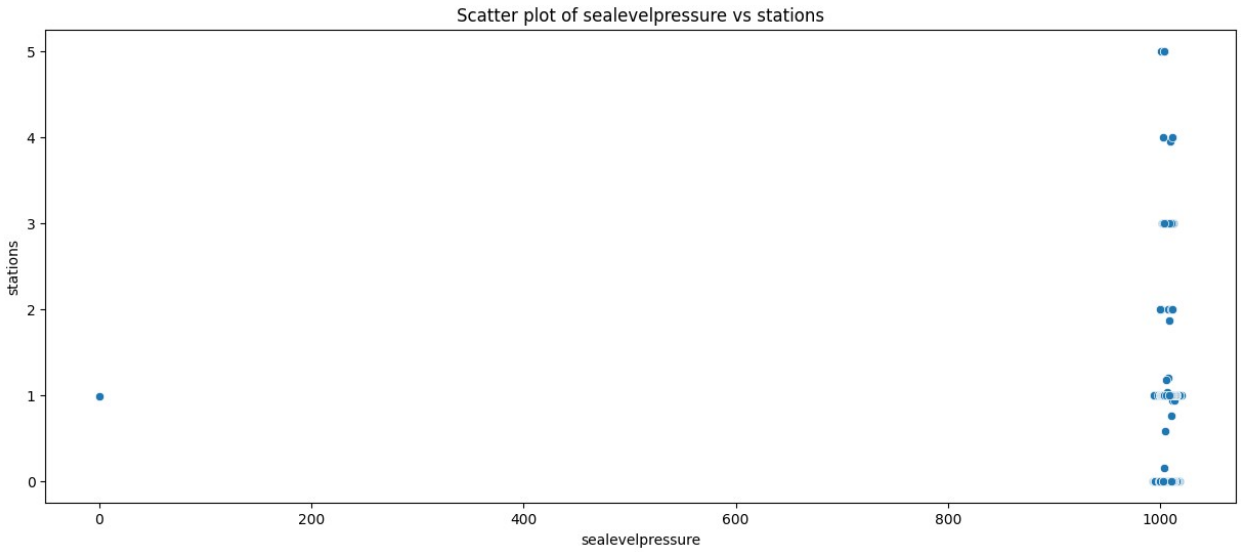

Scatter plot of sealevelpressure vs visibility
visibility
sealevelpressure
0
5
10
15
20
25
0
200
400
600
800
1000

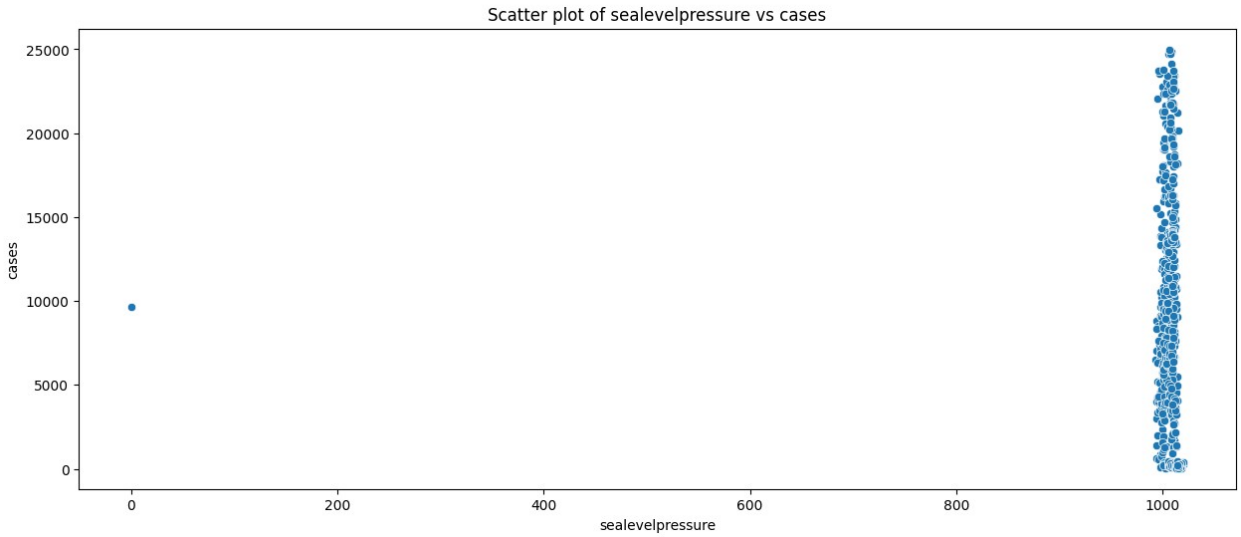

Scatter plot of sealevelpressure vs solarradiation
solarradiation
sealevelpressure
300
250
200
150
100
50
0
200
400
600
800
1000

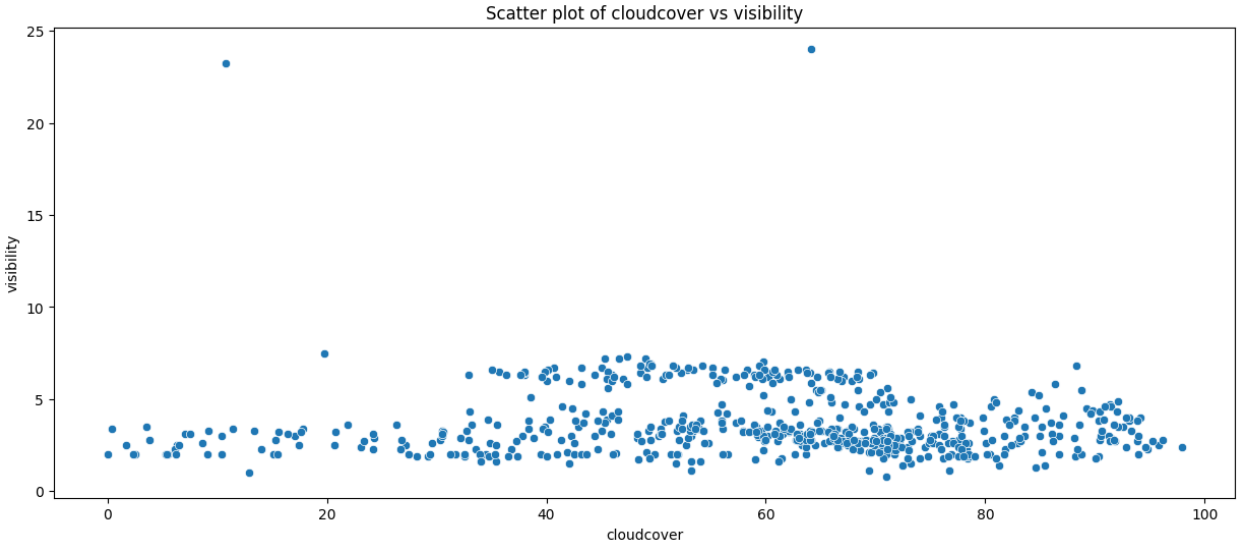

Scatter plot of sealevelpressure vs solarenergy
solarenergy
sealevelpressure
25
20
15
10
5
0
200
400
600
800
1000

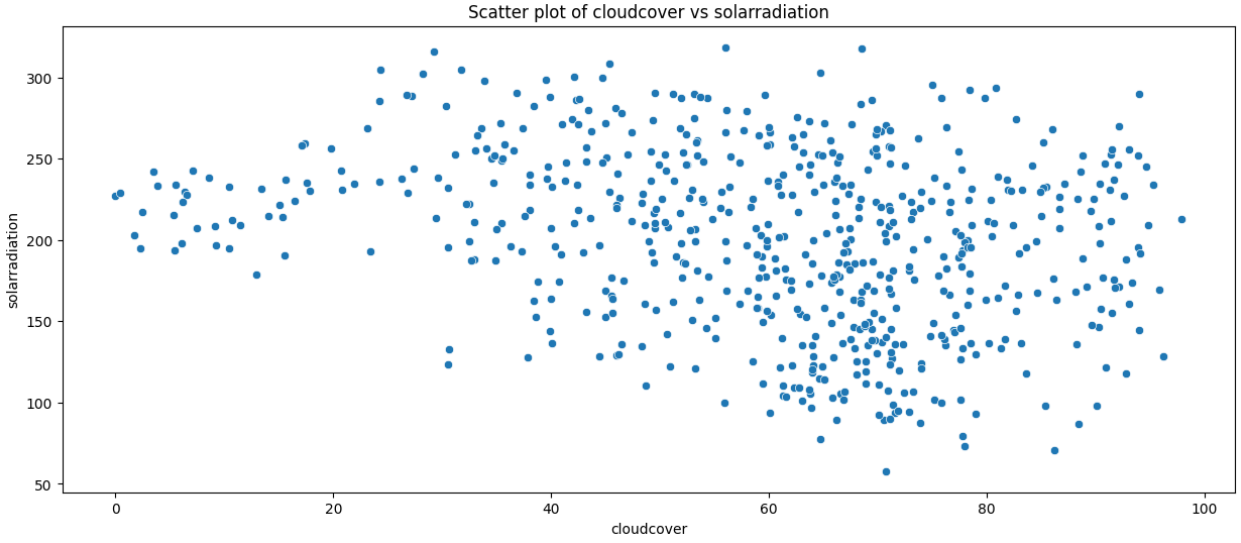

Scatter plot of sealevelpressure vs uvindex
uvindex
sealevelpressure
10
9
8
7
6
5
4
3
2
0
200
400
600
800
1000

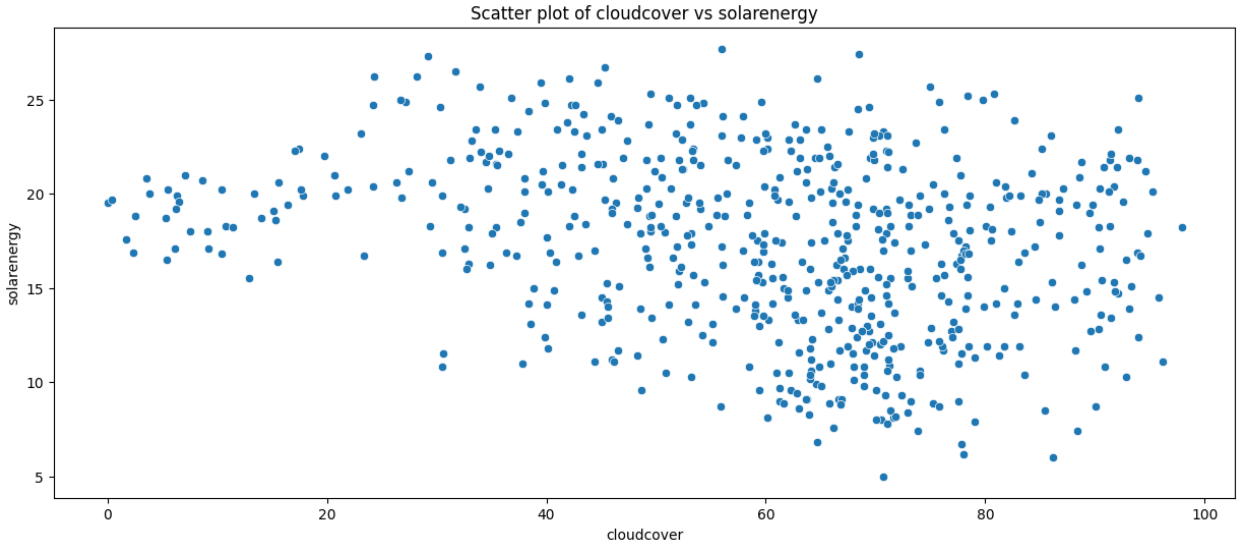

Scatter plot of sealevelpressure vs conditions
conditions
sealevelpressure
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
200
400
600
800
1000

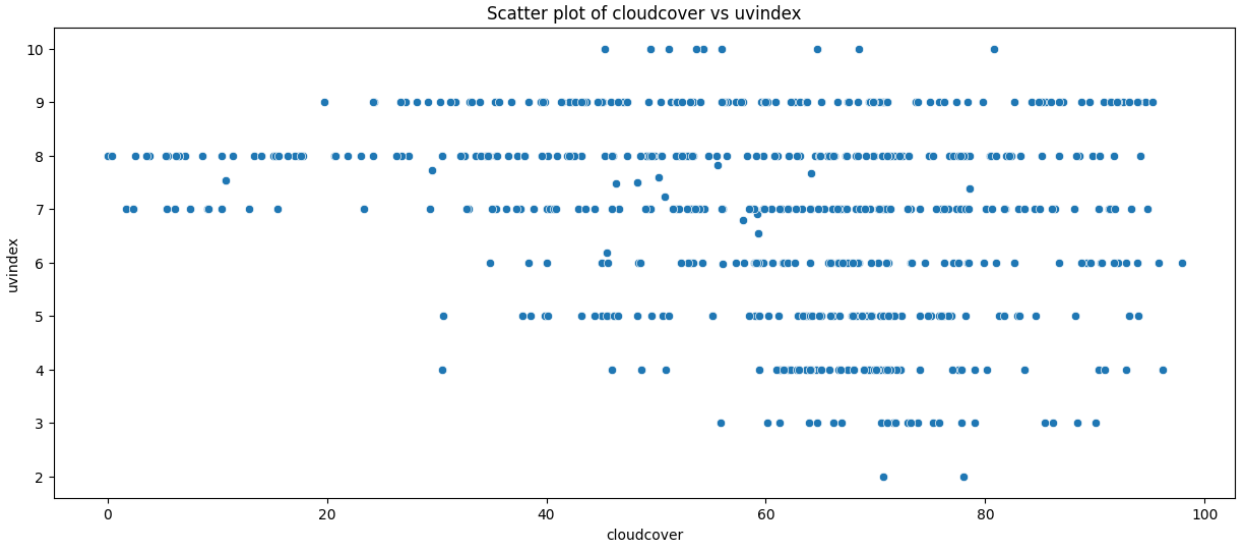

Scatter plot of sealevelpressure vs stations
stations
sealevelpressure
0
1
2
3
4
5
0
200
400
600
800
1000

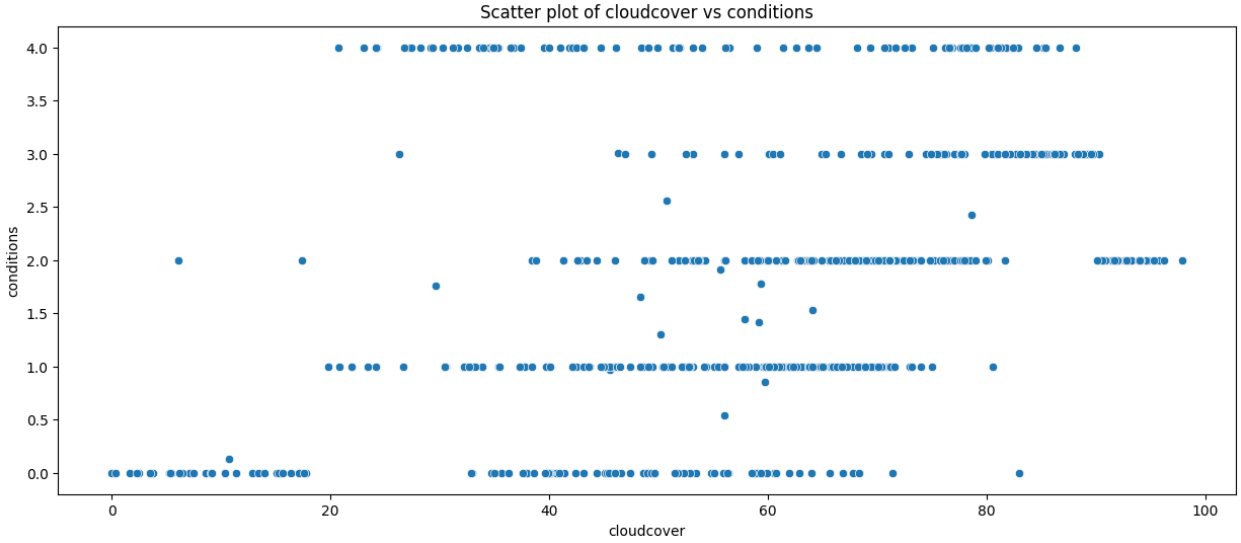

Scatter plot of sealevelpressure vs cases
cases
sealevelpressure
0
5000
10000
15000
20000
25000
0
200
400
600
800
1000


Scatter plot of cloudcover vs visibility
visibility
cloudcover
0
5
10
15
20
25
0
20
40
60
80
100


Scatter plot of cloudcover vs solarradiation
solarradiation
cloudcover
50
100
150
200
250
300
0
20
40
60
80
100


Scatter plot of cloudcover vs solarenergy
solarenergy
cloudcover
5
10
15
20
25
0
20
40
60
80
100


Scatter plot of cloudcover vs uvindex
uvindex
cloudcover
10
9
8
7
6
5
4
3
2
0
20
40
60
80
100


Scatter plot of cloudcover vs conditions
conditions
cloudcover
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
20
40
60
80
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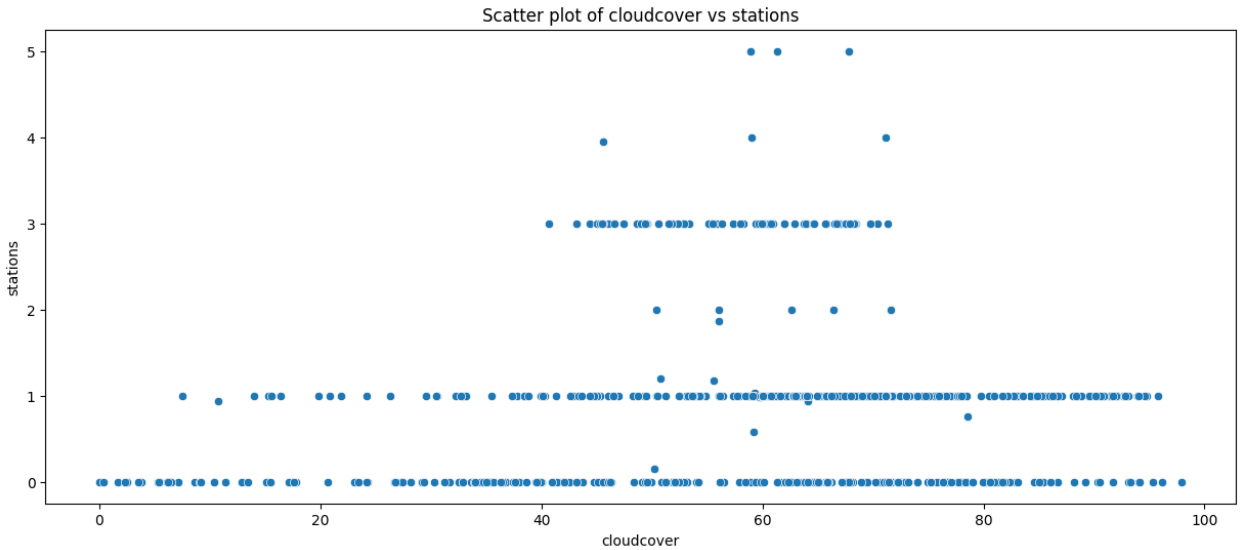
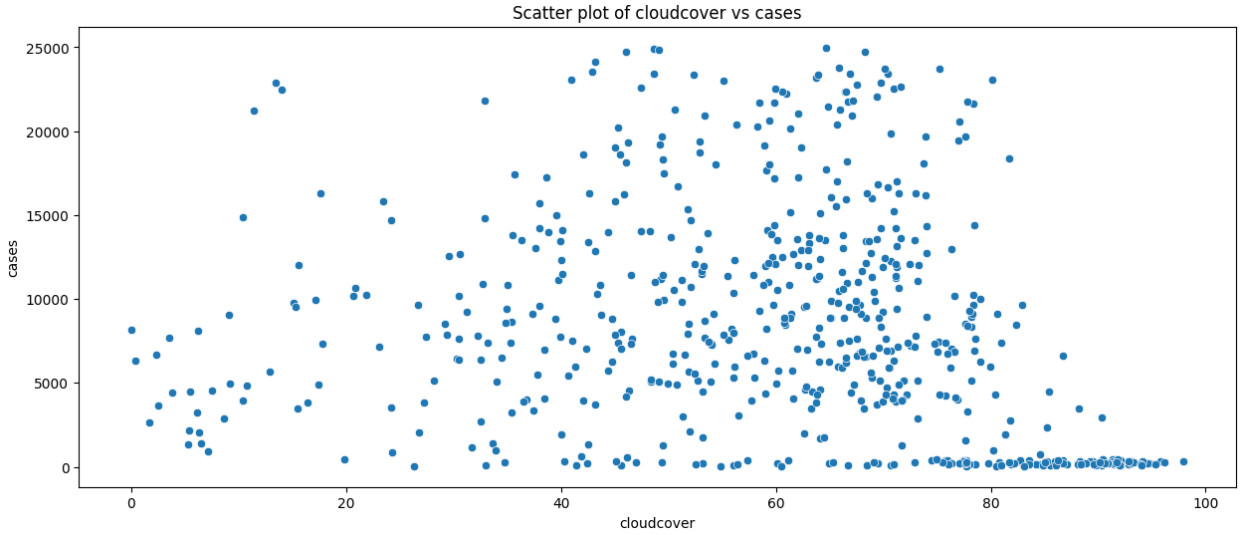
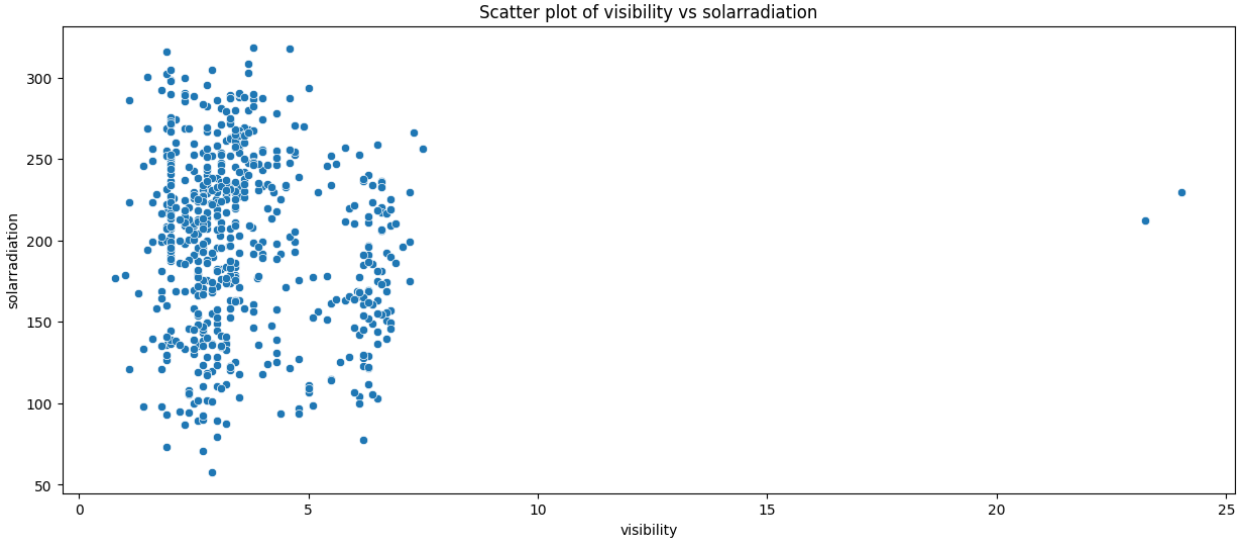
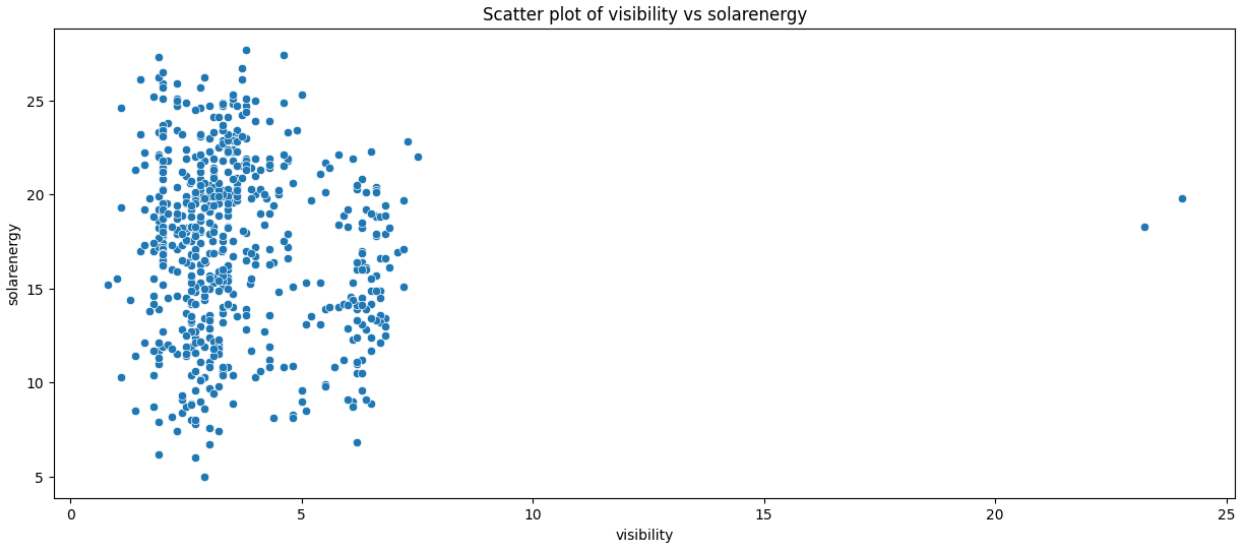
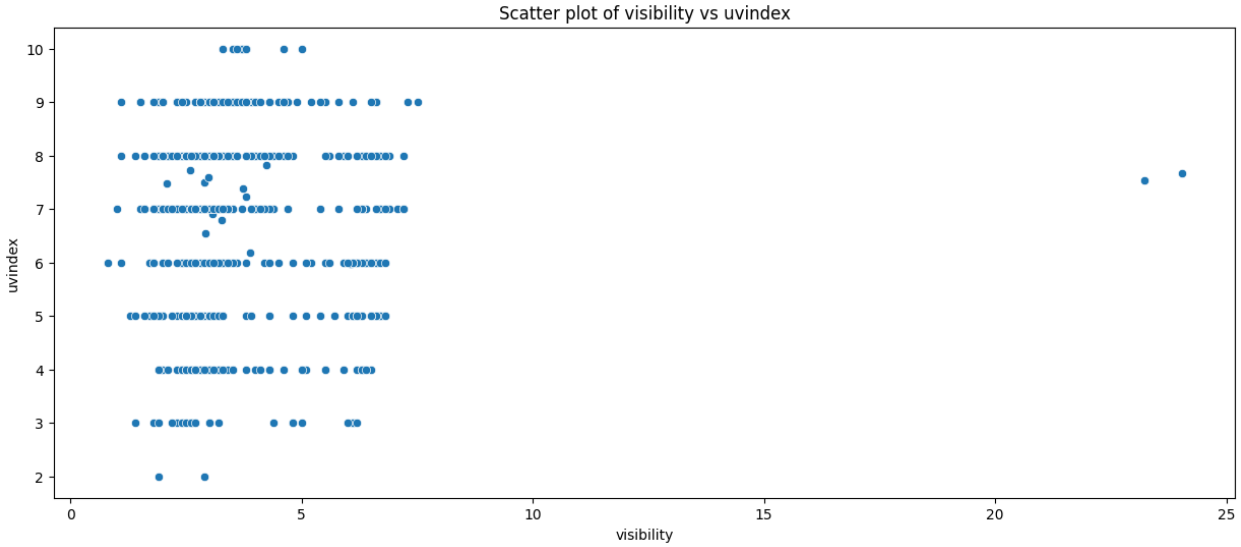
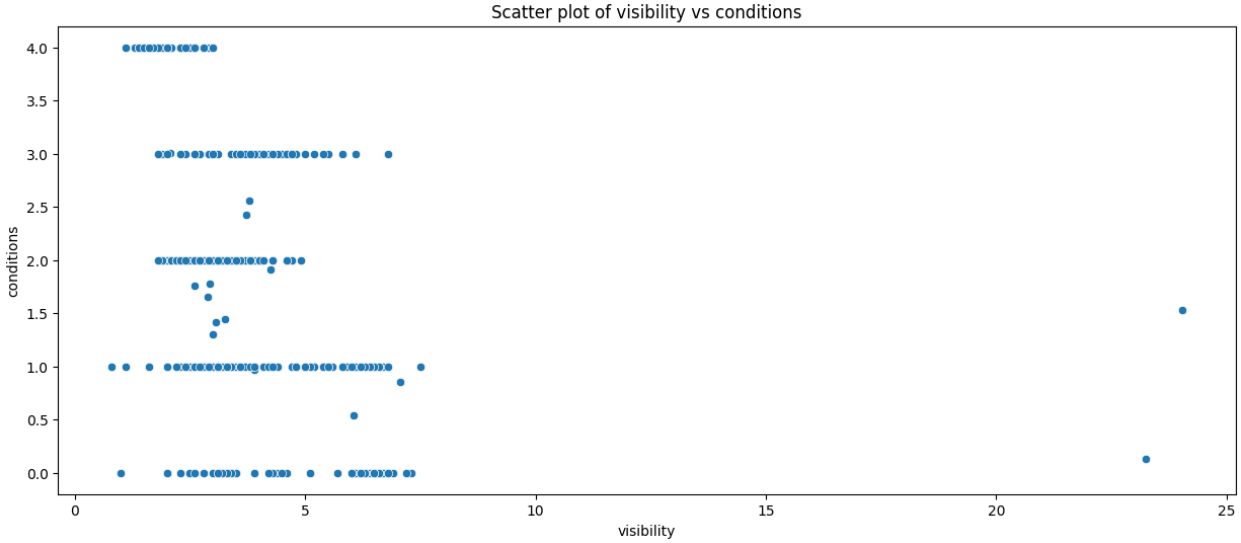

Scatter plot of cloudcover vs stations
stations
cloudcover
5
4
3
2
1
0
0
20
40
60
80
100

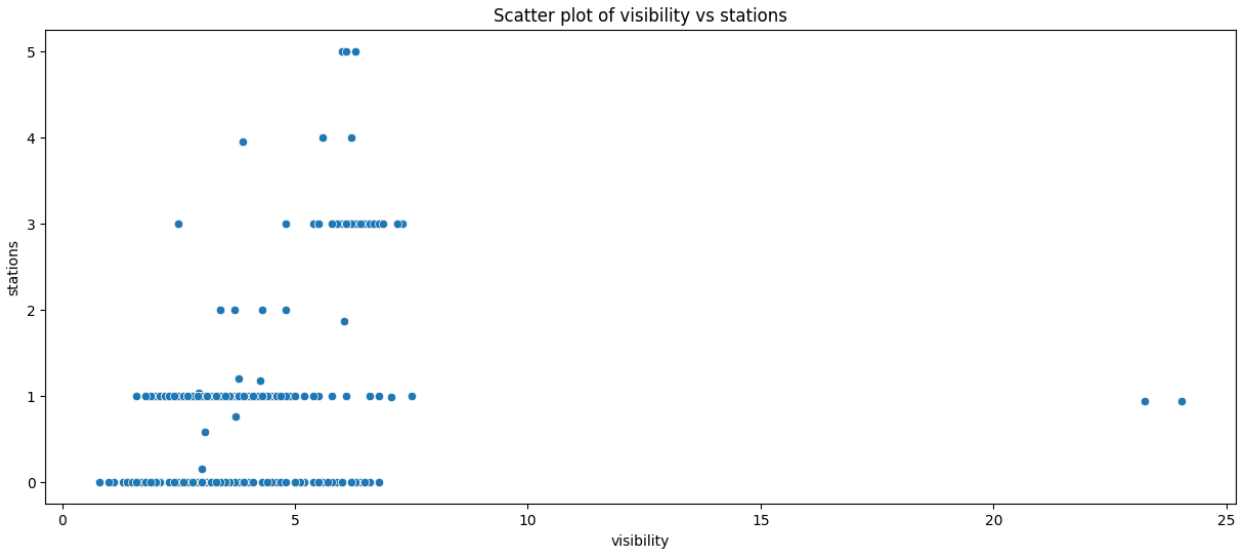

Scatter plot of cloudcover vs cases
cases
cloudcover
0
5000
10000
15000
20000
25000
0
20
40
60
80
100

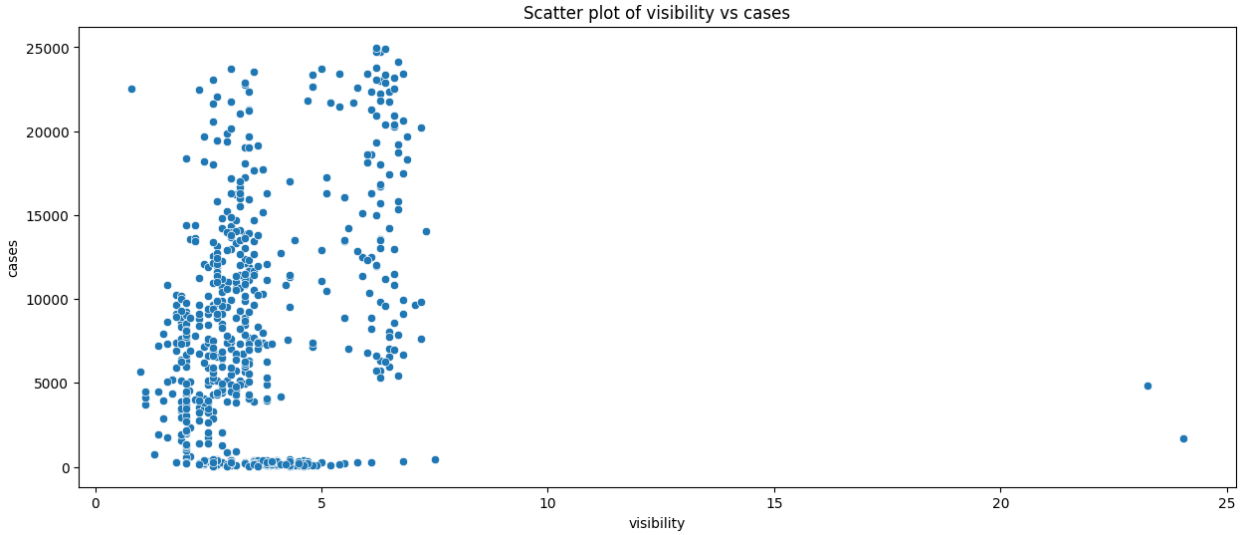

Scatter plot of visibility vs solarradiation
solarradiation
visibility
50
100
150
200
250
300
0
5
10
15
20
25

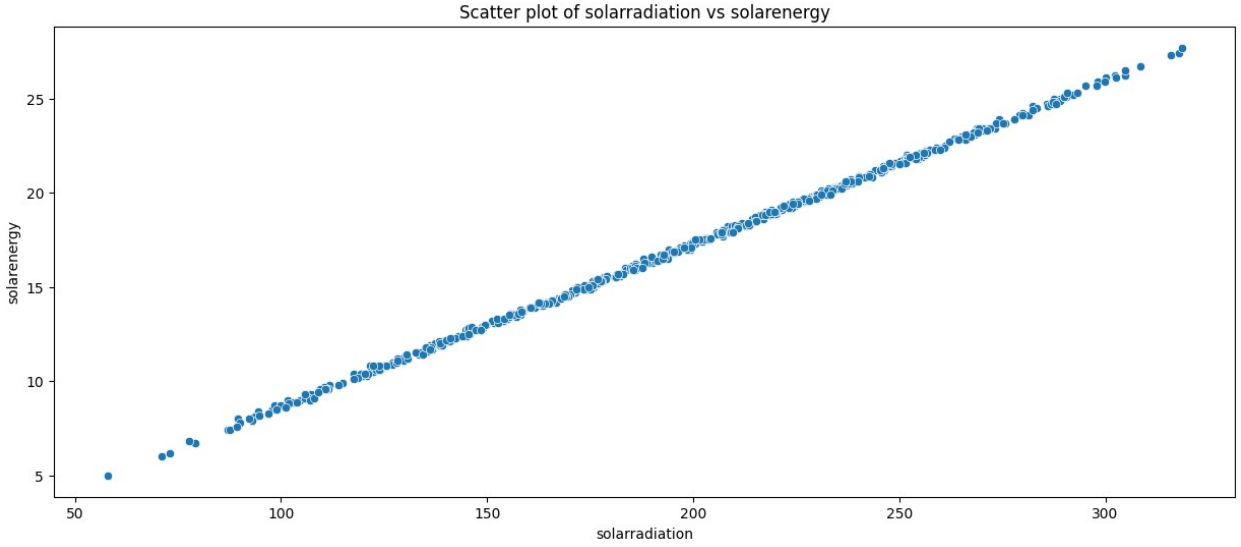

Scatter plot of visibility vs solarenergy
solarenergy
visibility
5
10
15
20
25
0
5
10
15
20
25


Scatter plot of visibility vs uvindex
uvindex
visibility
10
9
8
7
6
5
4
3
2
0
5
10
15
20
25


Scatter plot of visibility vs conditions
conditions
visibility
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
25


Scatter plot of visibility vs stations
stations
visibility
5
4
3
2
1
0
0
5
10
15
20
25


Scatter plot of visibility vs cases
cases
visibility
0
5000
10000
15000
20000
25000
0
5
10
15
20
25


Scatter plot of solarradiation vs solarenergy
solarenergy
solarradiation
5
10
15
20
25
50
100
150
200
250
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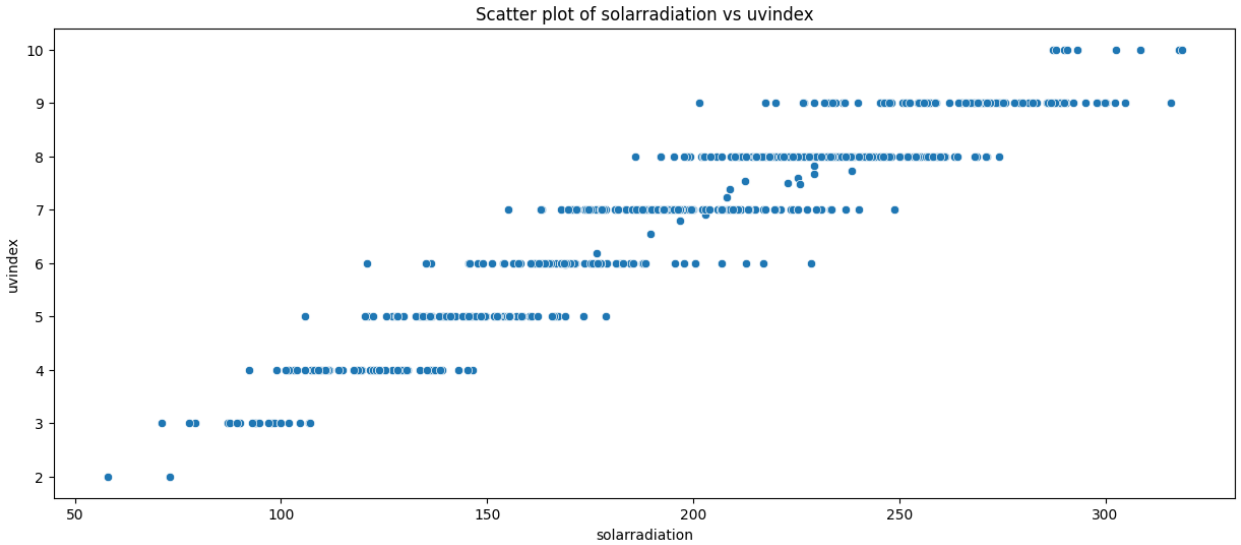
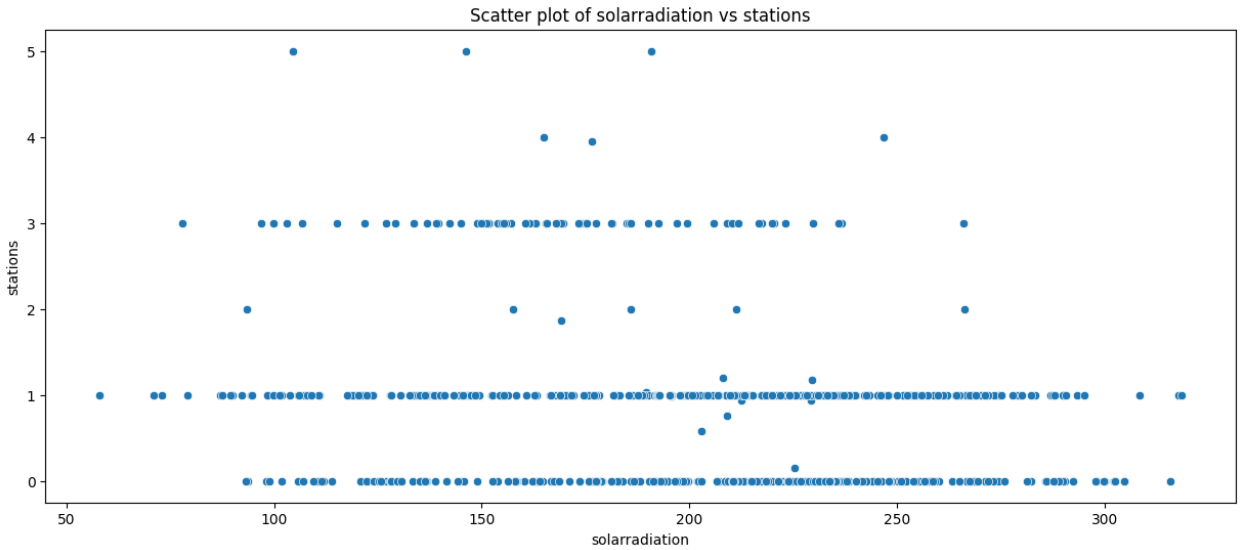

Scatter plot of solarradiation vs uvindex
uvindex
solarradiation
2
3
4
5
6
7
8
9
10
50
100
150
200
250
300


Scatter plot of solarradiation vs conditions
conditions
solarradiation
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
50
100
150
200
250
300


Scatter plot of solarradiation vs stations
stations
solarradiation
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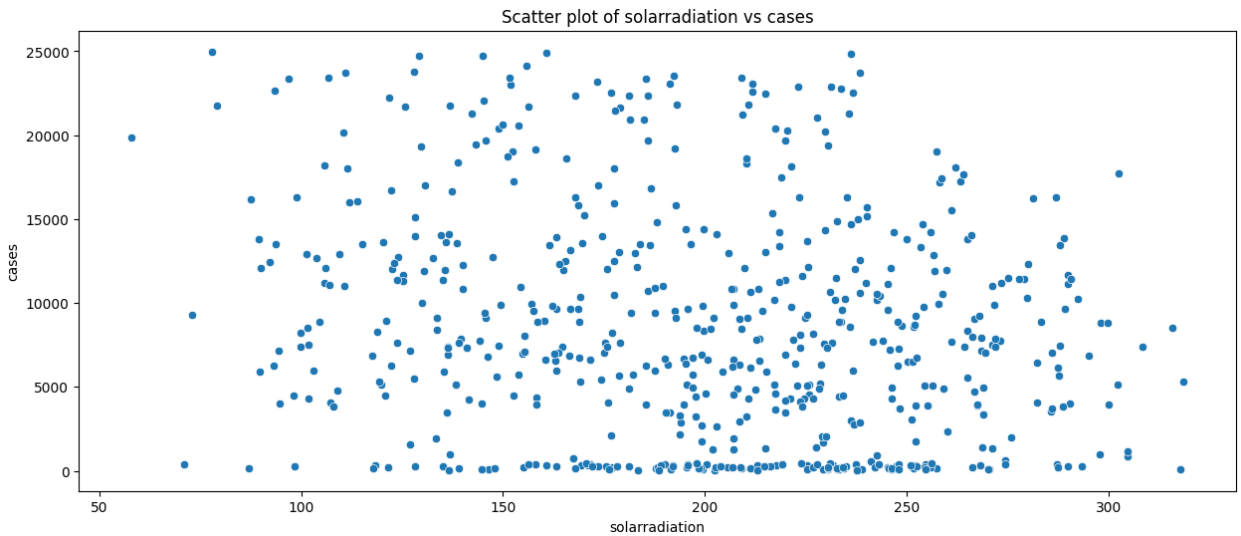
4
3
2
1
0
50
100
150
200
250
300


Scatter plot of solarradiation vs cases
cases
solarradiation
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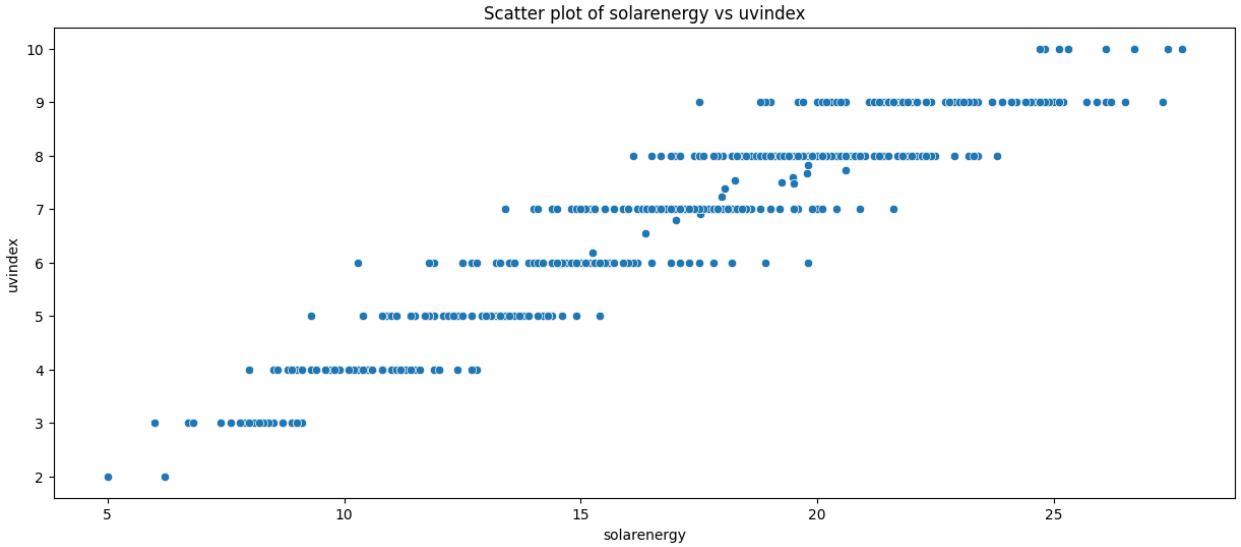
20000
15000
10000
5000
0
50
100
150
200
250
300


Scatter plot of solarenergy vs uvindex
uvindex
solarenergy
2
3
4
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8
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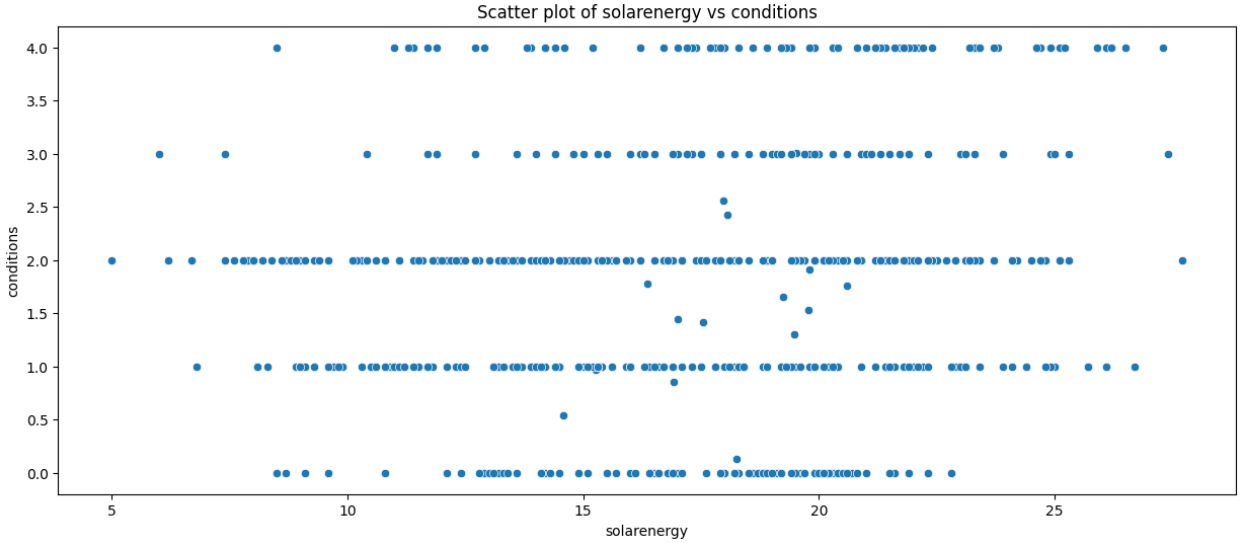
10
5
10
15
20
25


Scatter plot of solarenergy vs conditions
conditions
solarenergy
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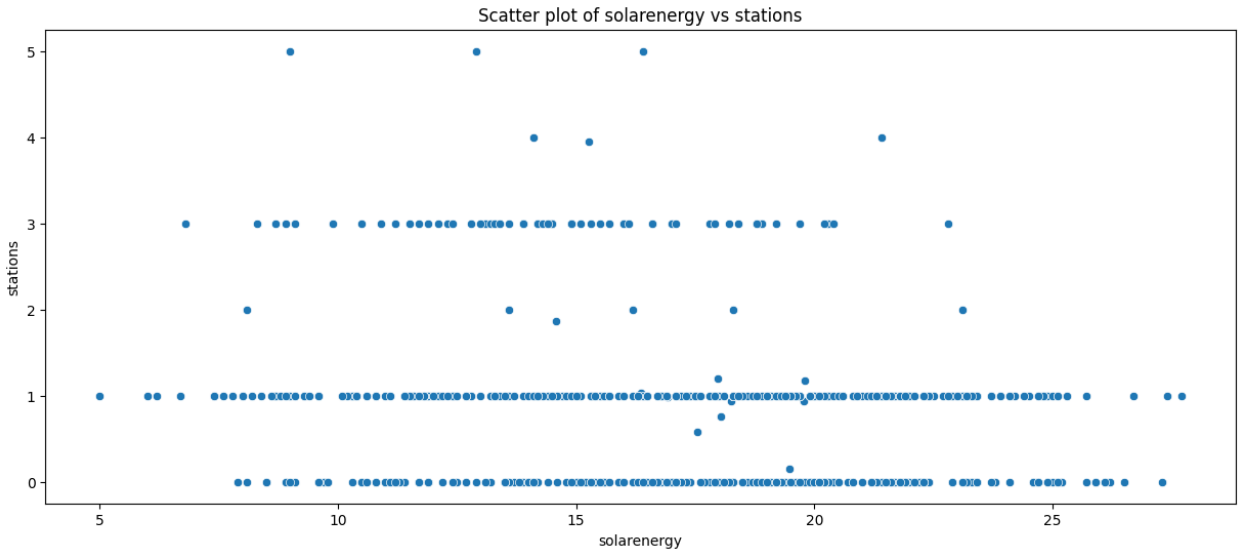
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5
10
15
20
25


Scatter plot of solarenergy vs stations
stations
solarenergy
0
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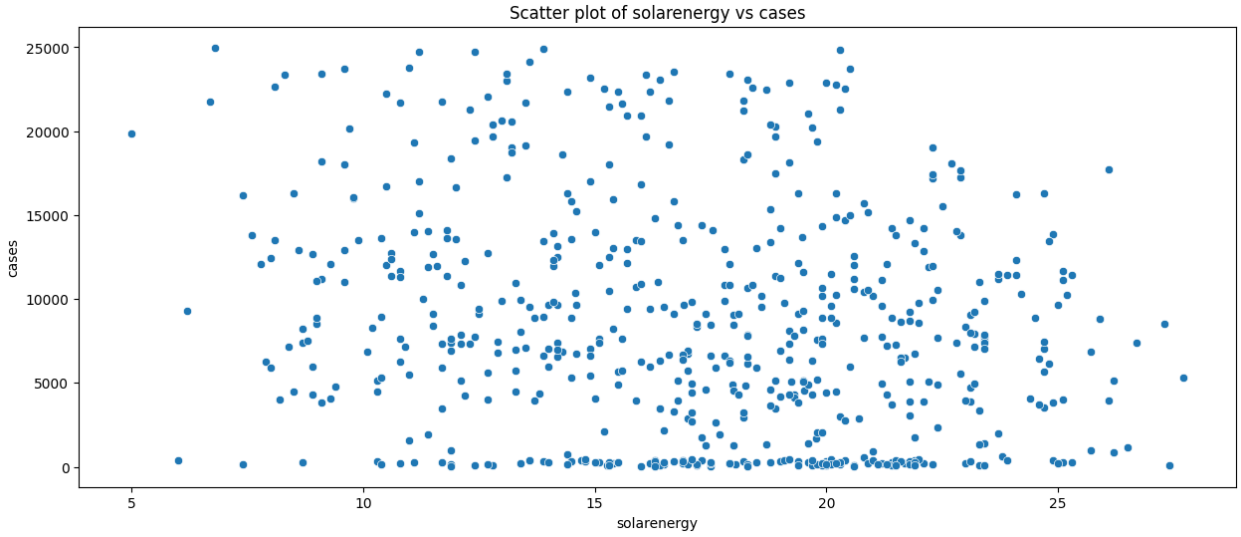
2
3
4
5
5
10
15
20
25


Scatter plot of solarenergy vs cases
cases
solarenergy
0
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10000
15000
20000
25000
5
10
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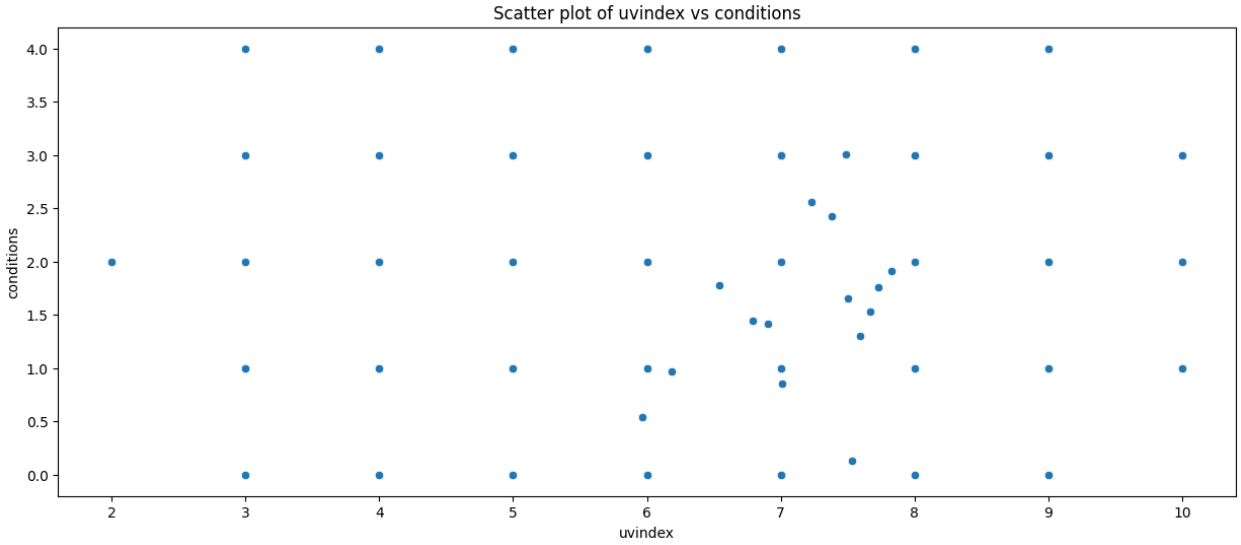
25


Scatter plot of uvindex vs conditions
conditions
uvindex
0.0
0.5
1.0
1.5
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2.5
3.0
3.5
4.0
2
3
4
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7
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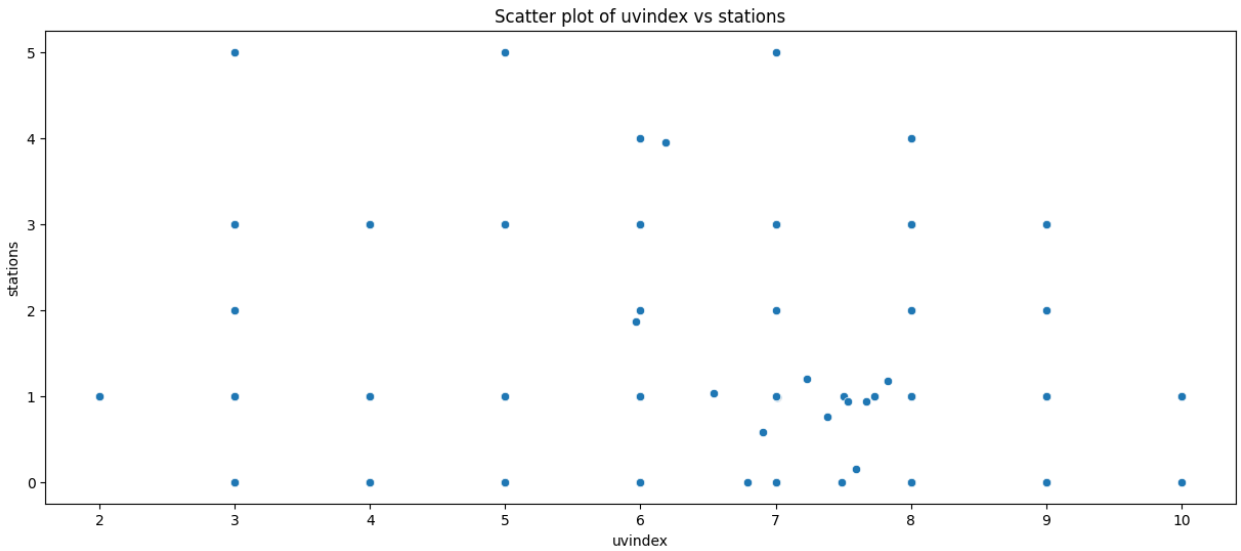
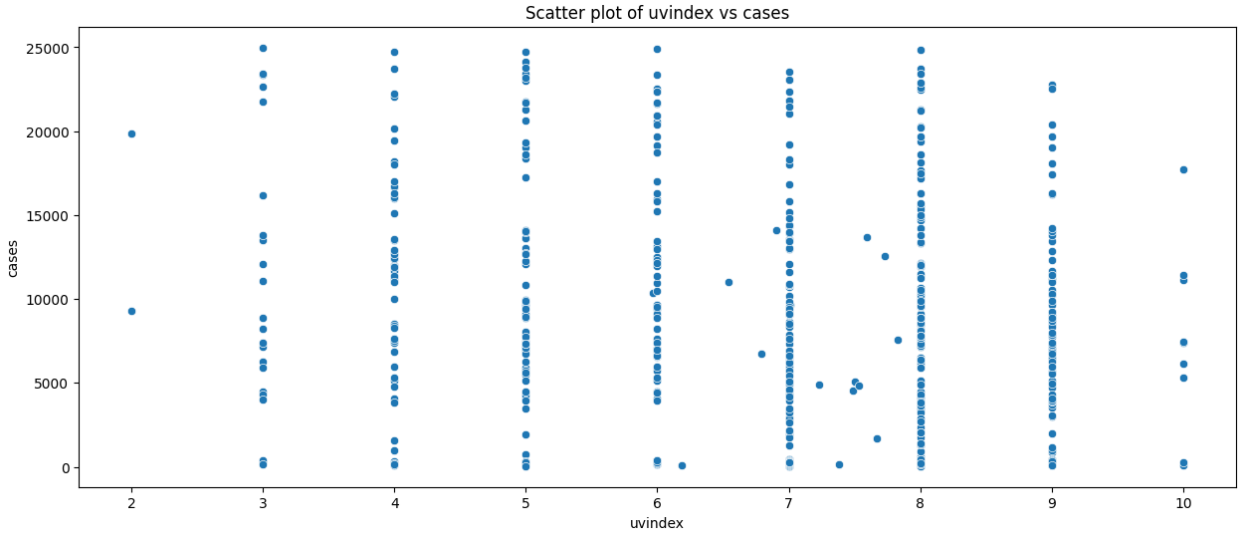
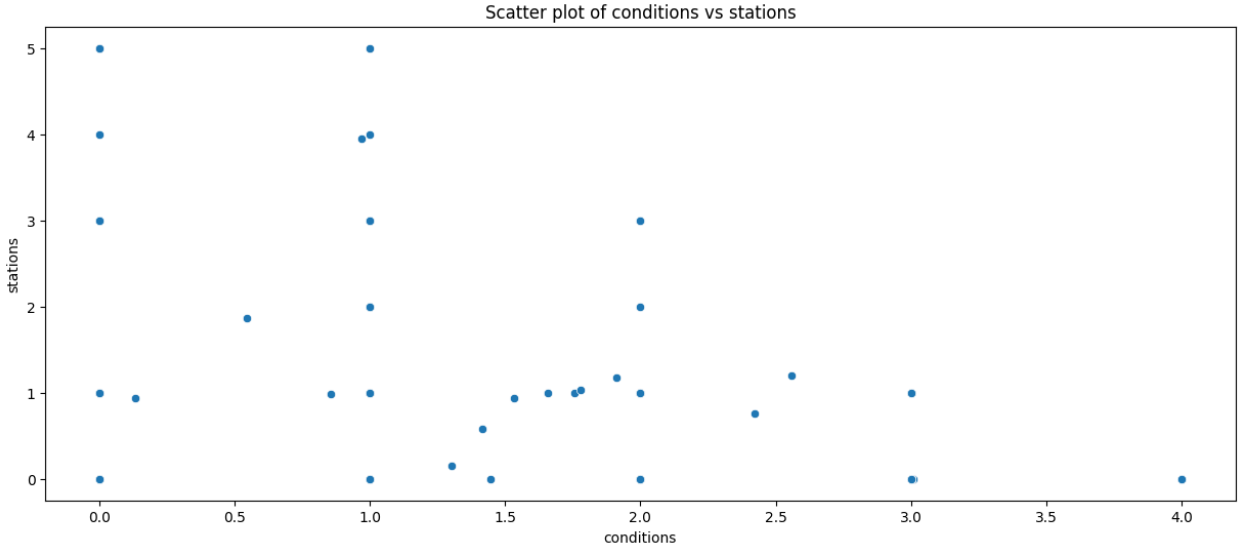
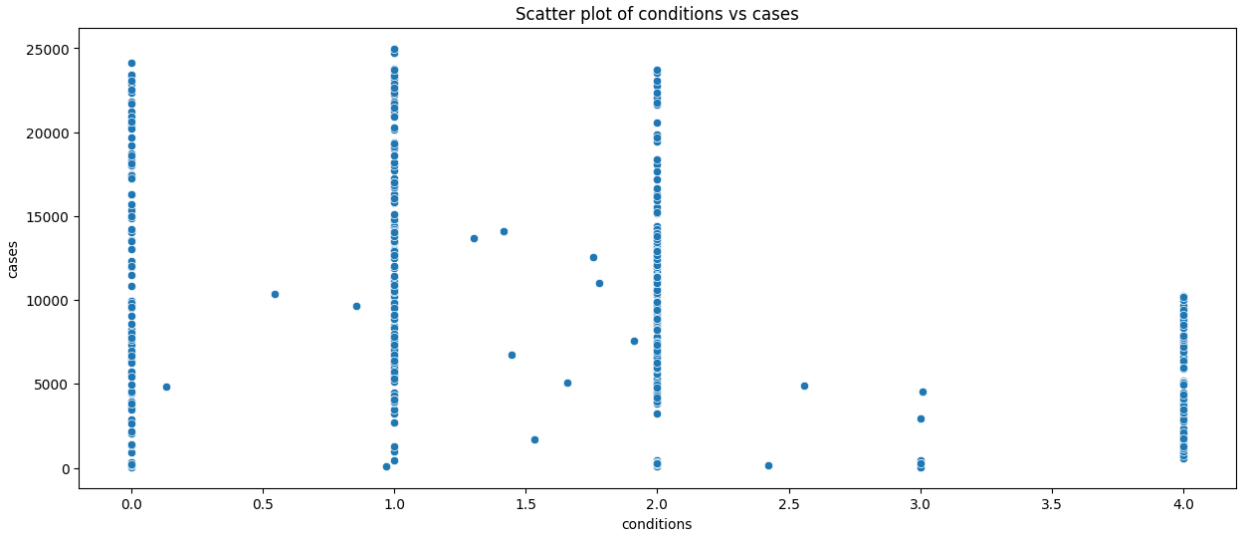
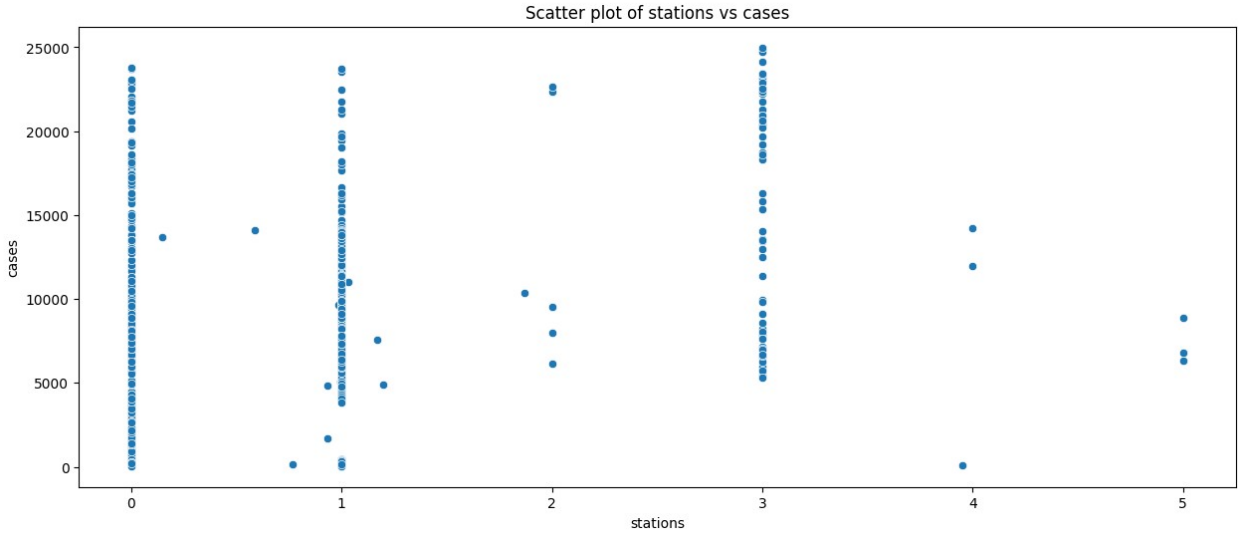
9
10


Scatter plot of uvindex vs stations
stations
uvindex
0
1
2
3
4
5
2
3
4
5
6
7
8
9
10


Scatter plot of uvindex vs cases
cases
uvindex
0
5000
10000
15000
20000
25000
2
3
4
5
6
7
8
9
10

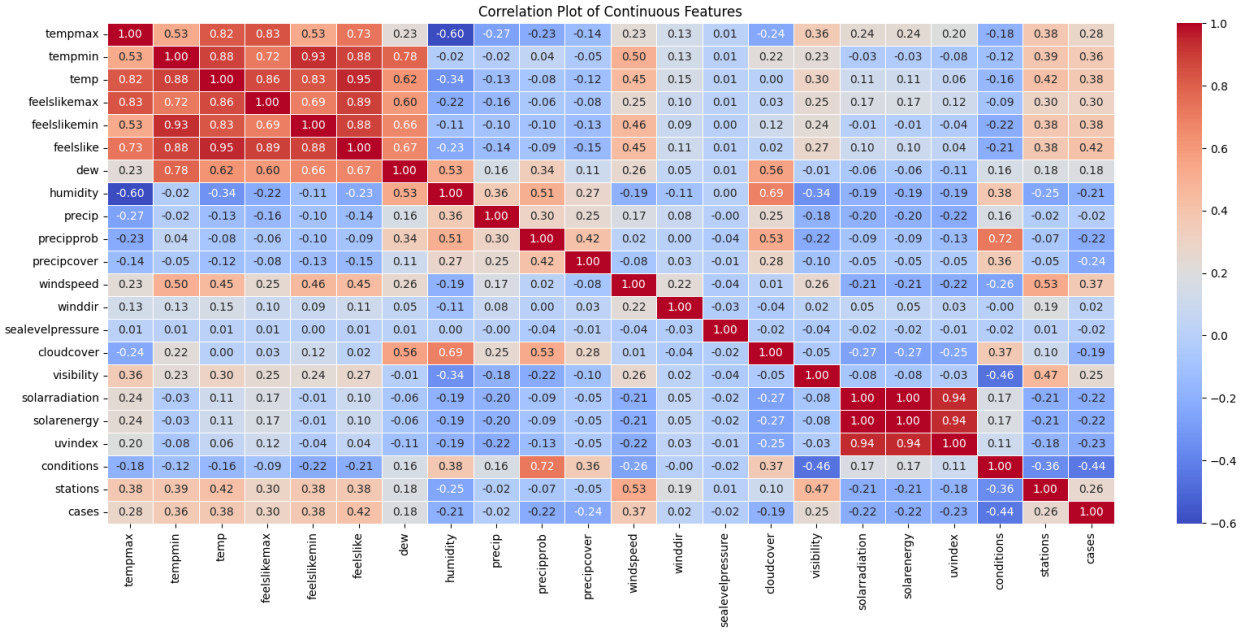

Scatter plot of conditions vs stations
stations
conditions
0
1
2
3
4
5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0


Scatter plot of conditions vs cases
cases
conditions
0
5000
10000
15000
20000
25000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0




```
corr_matrix = df[continuous].corr()

plt.figure(figsize=(20, 8))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f",
linewidths=0.5)
plt.title('Correlation Plot of Continuous Features')
plt.show()
```




```
corr_matrix
```

```
                  tempmax   tempmin      temp  feelslikemax
feelslikemin  \
tempmax          1.000000  0.527246  0.820941      0.832811
```

```
0.526838
tempmin           0.527246  1.000000  0.881988      0.716619
0.931412
temp              0.820941  0.881988  1.000000      0.863626
0.829122
feelslikemax      0.832811  0.716619  0.863626      1.000000
0.693604
feelslikemin      0.526838  0.931412  0.829122      0.693604
1.000000
feelslike         0.732782  0.883030  0.949866      0.891305
0.883670
dew               0.228436  0.784664  0.621103      0.596466
0.664503
humidity         -0.602729 -0.022102 -0.335037     -0.219550     -
0.112346
precip           -0.270202 -0.015915 -0.130827     -0.155520     -
0.099895
precipprob       -0.226290  0.043788 -0.077521     -0.061133     -
0.097888
precipcover      -0.139013 -0.047444 -0.118306     -0.083107     -
0.131179
windspeed         0.234752  0.502966  0.451224      0.254755
0.460448
winddir           0.131311  0.130978  0.151874      0.096730
0.087622
sealevelpressure  0.011288  0.007517  0.011662      0.011925
0.002738
cloudcover       -0.237572  0.223664  0.002212      0.034238
0.115816
visibility        0.358248  0.225410  0.299479      0.245154
0.235159
solarradiation    0.239410 -0.034087  0.114995      0.167350     -
0.007501
solarenergy       0.239365 -0.034765  0.114794      0.167075     -
0.008587
uvindex           0.198627 -0.075002  0.056545      0.115035     -
0.038326
conditions       -0.184010 -0.115677 -0.157189     -0.094710     -
0.218707
stations          0.381730  0.388823  0.421828      0.295325
0.382937
cases             0.284181  0.364691  0.378149      0.304087
0.376015

                  feelslike       dew  humidity    precip  precipprob
...  \
tempmax            0.732782  0.228436 -0.602729 -0.270202   -0.226290
...
tempmin            0.883030  0.784664 -0.022102 -0.015915    0.043788
```

```
...
temp                0.949866  0.621103 -0.335037 -0.130827   -0.077521
...
feelslikemax        0.891305  0.596466 -0.219550 -0.155520   -0.061133
...
feelslikemin        0.883670  0.664503 -0.112346 -0.099895   -0.097888
...
feelslike           1.000000  0.671107 -0.231987 -0.138739   -0.093543
...
dew                 0.671107  1.000000  0.525232  0.155076    0.337453
...
humidity           -0.231987  0.525232  1.000000  0.356233    0.509203
...
precip             -0.138739  0.155076  0.356233  1.000000    0.303664
...
precipprob         -0.093543  0.337453  0.509203  0.303664    1.000000
...
precipcover        -0.150176  0.108530  0.274410  0.250264    0.415925
...
windspeed           0.448998  0.255004 -0.190625  0.173585    0.016617
...
winddir             0.114765  0.053704 -0.107605  0.082522    0.002863
...
sealevelpressure    0.005758  0.010999  0.000054 -0.004838   -0.044212
...
cloudcover          0.021153  0.557726  0.687903  0.253131    0.525631
...
visibility          0.273086 -0.012443 -0.343741 -0.184097   -0.223092
...
solarradiation      0.096916 -0.060513 -0.193474 -0.195445   -0.092390
...
solarenergy         0.096444 -0.060210 -0.192809 -0.195339   -0.091298
...
uvindex             0.042182 -0.109187 -0.193512 -0.223844   -0.133590
...
conditions         -0.209585  0.159187  0.380631  0.164735    0.718616
...
stations            0.376258  0.175522 -0.246563 -0.022313   -0.070126
...
cases               0.415344  0.179926 -0.208195 -0.015551   -0.222055
...

                    winddir  sealevelpressure  cloudcover
visibility  \
tempmax            0.131311          0.011288   -0.237572    0.358248

tempmin            0.130978          0.007517    0.223664    0.225410

temp               0.151874          0.011662    0.002212    0.299479
```

```
feelslikemax      0.096730          0.011925    0.034238    0.245154
feelslikemin      0.087622          0.002738    0.115816    0.235159
feelslike         0.114765          0.005758    0.021153    0.273086
dew               0.053704          0.010999    0.557726   -0.012443
humidity         -0.107605          0.000054    0.687903   -0.343741
precip            0.082522         -0.004838    0.253131   -0.184097
precipprob        0.002863         -0.044212    0.525631   -0.223092
precipcover       0.031104         -0.006181    0.283195   -0.102843
windspeed         0.224133         -0.037342    0.011736    0.264327
winddir           1.000000         -0.032386   -0.039917    0.023257
sealevelpressure -0.032386          1.000000   -0.021107   -0.042915
cloudcover       -0.039917         -0.021107    1.000000   -0.053483
visibility        0.023257         -0.042915   -0.053483    1.000000
solarradiation    0.050350         -0.021577   -0.269381   -0.080439
solarenergy       0.048811         -0.021874   -0.269513   -0.082440
uvindex           0.033059         -0.012383   -0.248548   -0.034327
conditions       -0.004174         -0.016276    0.372210   -0.461897
stations          0.188875          0.010021    0.099885    0.465622
cases             0.023418         -0.016806   -0.189715    0.248532


                  solarradiation  solarenergy   uvindex  conditions
stations  \
tempmax                0.239410     0.239365  0.198627   -0.184010
0.381730
tempmin               -0.034087    -0.034765 -0.075002   -0.115677
0.388823
temp                   0.114995     0.114794  0.056545   -0.157189
0.421828
feelslikemax           0.167350     0.167075  0.115035   -0.094710
0.295325
feelslikemin          -0.007501    -0.008587 -0.038326   -0.218707
0.382937
```

```
feelslike               0.096916     0.096444  0.042182   -0.209585
0.376258
dew                    -0.060513    -0.060210 -0.109187    0.159187
0.175522
humidity               -0.193474    -0.192809 -0.193512    0.380631 -
0.246563
precip                 -0.195445    -0.195339 -0.223844    0.164735 -
0.022313
precipprob             -0.092390    -0.091298 -0.133590    0.718616 -
0.070126
precipcover            -0.052399    -0.051043 -0.045249    0.359712 -
0.050971
windspeed              -0.213579    -0.213214 -0.220380   -0.262165
0.527127
winddir                 0.050350     0.048811  0.033059   -0.004174
0.188875
sealevelpressure       -0.021577    -0.021874 -0.012383   -0.016276
0.010021
cloudcover             -0.269381    -0.269513 -0.248548    0.372210
0.099885
visibility             -0.080439    -0.082440 -0.034327   -0.461897
0.465622
solarradiation          1.000000     0.999770  0.943408    0.172593 -
0.211525
solarenergy             0.999770     1.000000  0.942740    0.174117 -
0.211956
uvindex                 0.943408     0.942740  1.000000    0.108675 -
0.177667
conditions              0.172593     0.174117  0.108675    1.000000 -
0.363679
stations               -0.211525    -0.211956 -0.177667   -0.363679
1.000000
cases                  -0.215879    -0.217348 -0.225515   -0.437434
0.261866

                     cases
tempmax           0.284181
tempmin           0.364691
temp              0.378149
feelslikemax      0.304087
feelslikemin      0.376015
feelslike         0.415344
dew               0.179926
humidity         -0.208195
precip           -0.015551
precipprob       -0.222055
precipcover      -0.236217
windspeed         0.372895
winddir           0.023418
```

```
sealevelpressure -0.016806
cloudcover       -0.189715
visibility        0.248532
solarradiation   -0.215879
solarenergy      -0.217348
uvindex          -0.225515
conditions       -0.437434
stations          0.261866
cases             1.000000

[22 rows x 22 columns]
```

```
threshold = 0.7
features_to_drop = []
for i in range(len(corr_matrix.columns)):
    for j in range(i):
        if abs(corr_matrix.iloc[i, j]) > threshold:
            colname = corr_matrix.columns[i]
            if colname not in features_to_drop:
                features_to_drop.append(colname)

features_to_drop
```

```
['temp',
 'feelslikemax',
 'feelslikemin',
 'feelslike',
 'dew',
 'solarenergy',
 'uvindex',
 'conditions']
```

```
df = df.drop(['temp',
 'feelslikemax',
 'feelslikemin',
 'feelslike',
 'dew',
 'solarenergy',
 'uvindex',
 'conditions'], axis = 1)

df = pd.get_dummies(df, columns=['labels'])

df
```

```
       tempmax    tempmin   humidity     precip  precipprob
precipcover  \
0    34.053151  24.478082  73.508219   2.921726   44.657534
4.360932
1    34.086179  25.694309  72.066667   3.783415   39.837398
2.676748
```

```
2    34.573984  25.417886  69.424390   3.065854   33.333333
2.337805
3    33.020325  25.080488  69.297561   6.025203   37.398374
2.676667
4    30.660976  24.230894  86.652033  23.336585   96.747967
15.616992
..         ...        ...        ...        ...         ...           .
..
597  32.300000  24.400000  75.000000   0.000000    0.000000
0.000000
598  32.700000  26.400000  68.500000   0.000000    0.000000
0.000000
599  33.000000  26.300000  71.100000   0.000000    0.000000
0.000000
600  35.100000  26.800000  65.900000   0.000000    0.000000
0.000000
601  34.000000  26.300000  60.400000   0.000000    0.000000
0.000000

     snow  snowdepth  windspeed     winddir  sealevelpressure
cloudcover  \
0       0          0  15.678356  175.595342       1007.911781
50.747945
1       0          0  14.574797  158.349593       1003.533333
48.313821
2       0          0  14.978049  202.621138       1005.731707
55.621138
3       0          0  16.504878  183.544715       1003.359350
50.208130
4       0          0  19.546341  224.030081       1009.995935
45.542276
..    ...        ...        ...         ...               ...
...
597     0          0  17.100000  159.800000       1008.900000
50.400000
598     0          0  16.600000  233.000000       1010.400000
50.500000
599     0          0  19.000000  344.400000       1010.800000
30.500000
600     0          0  14.700000   81.300000       1009.700000
32.700000
601     0          0  17.800000   79.200000       1008.700000
46.500000

     visibility  solarradiation  stations  cases  labels_normal
0      3.789863      208.097808  1.197260   4925           True
1      2.884553      222.926016  0.991870   5077           True
2      4.242276      229.413008  1.170732   7579           True
3      2.991057      225.421951  0.146341  13706           True
```

```
4      3.886992      176.598374  3.951220     82           True
..          ...             ...       ...    ...           ...
597    3.100000      252.500000  1.000000   6729           True
598    3.100000      242.700000  1.000000  10541           True
599    3.100000      195.300000  1.000000   6396           True
600    3.300000      187.600000  1.000000  10883           True
601    3.900000      136.200000  1.000000   7311           True

[602 rows x 17 columns]
```

```
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split

categorical, non_categorical, discrete, continuous =
classify_features(df)

scaler = StandardScaler()
df[continuous] = scaler.fit_transform(df[continuous])

X = df.drop(columns=['cases'])
y = df['cases']

X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

from sklearn.svm import SVR
from sklearn.metrics import mean_squared_error

svm_model = SVR()
svm_model.fit(X_train, y_train)
```

```
SVR()
```

```
y_pred_svm = svm_model.predict(X_test)
mse_svm = mean_squared_error(y_test, y_pred_svm)
print(f'SVM Mean Squared Error: {mse_svm}')
```

```
SVM Mean Squared Error: 0.5295336245622033
```

```
from sklearn.tree import DecisionTreeRegressor

dtr_model = DecisionTreeRegressor()
dtr_model.fit(X_train, y_train)
```

```
DecisionTreeRegressor()
```

```
y_pred_dtr = dtr_model.predict(X_test)
mse_dtr = mean_squared_error(y_test, y_pred_dtr)
print(f'Decision Tree Regressor Mean Squared Error: {mse_dtr}')
```

```
Decision Tree Regressor Mean Squared Error: 1.178208188390991
```

```
from sklearn.ensemble import RandomForestRegressor

rfr_model = RandomForestRegressor()
rfr_model.fit(X_train, y_train)
```

```
RandomForestRegressor()
```

```
y_pred_rfr = rfr_model.predict(X_test)
mse_rfr = mean_squared_error(y_test, y_pred_rfr)
print(f'Random Forest Regressor Mean Squared Error: {mse_rfr}')
```

```
Random Forest Regressor Mean Squared Error: 0.5295137972750776
```

```
import xgboost as xgb
from xgboost import XGBRegressor

xgboost_model = XGBRegressor()
xgboost_model.fit(X_train, y_train)
```

```
XGBRegressor(base_score=None, booster=None, callbacks=None,
             colsample_bylevel=None, colsample_bynode=None,
             colsample_bytree=None, device=None,
early_stopping_rounds=None,
             enable_categorical=False, eval_metric=None,
feature_types=None,
             gamma=None, grow_policy=None, importance_type=None,
             interaction_constraints=None, learning_rate=None,
max_bin=None,
             max_cat_threshold=None, max_cat_to_onehot=None,
             max_delta_step=None, max_depth=None, max_leaves=None,
             min_child_weight=None, missing=nan,
monotone_constraints=None,
             multi_strategy=None, n_estimators=None, n_jobs=None,
             num_parallel_tree=None, random_state=None, ...)
```

```
y_pred_xgb = xgboost_model.predict(X_test)
mse_xgb = mean_squared_error(y_test, y_pred_xgb)
print(f'XGBoost Regressor Mean Squared Error: {mse_xgb}')
```

```
XGBoost Regressor Mean Squared Error: 0.6388940809544029
```

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score

linear_model = LinearRegression()
linear_model.fit(X_train, y_train)
```

```
LinearRegression()
```

```
y_pred = linear_model.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)
```

```
print(f'Linear Regression Mean Squared Error: {mse}')
print(f'Linear Regression R^2 Score: {r2}')
```

```
Linear Regression Mean Squared Error: 0.6650722290587311
Linear Regression R^2 Score: 0.26539125471806235
```

Thanks !!!