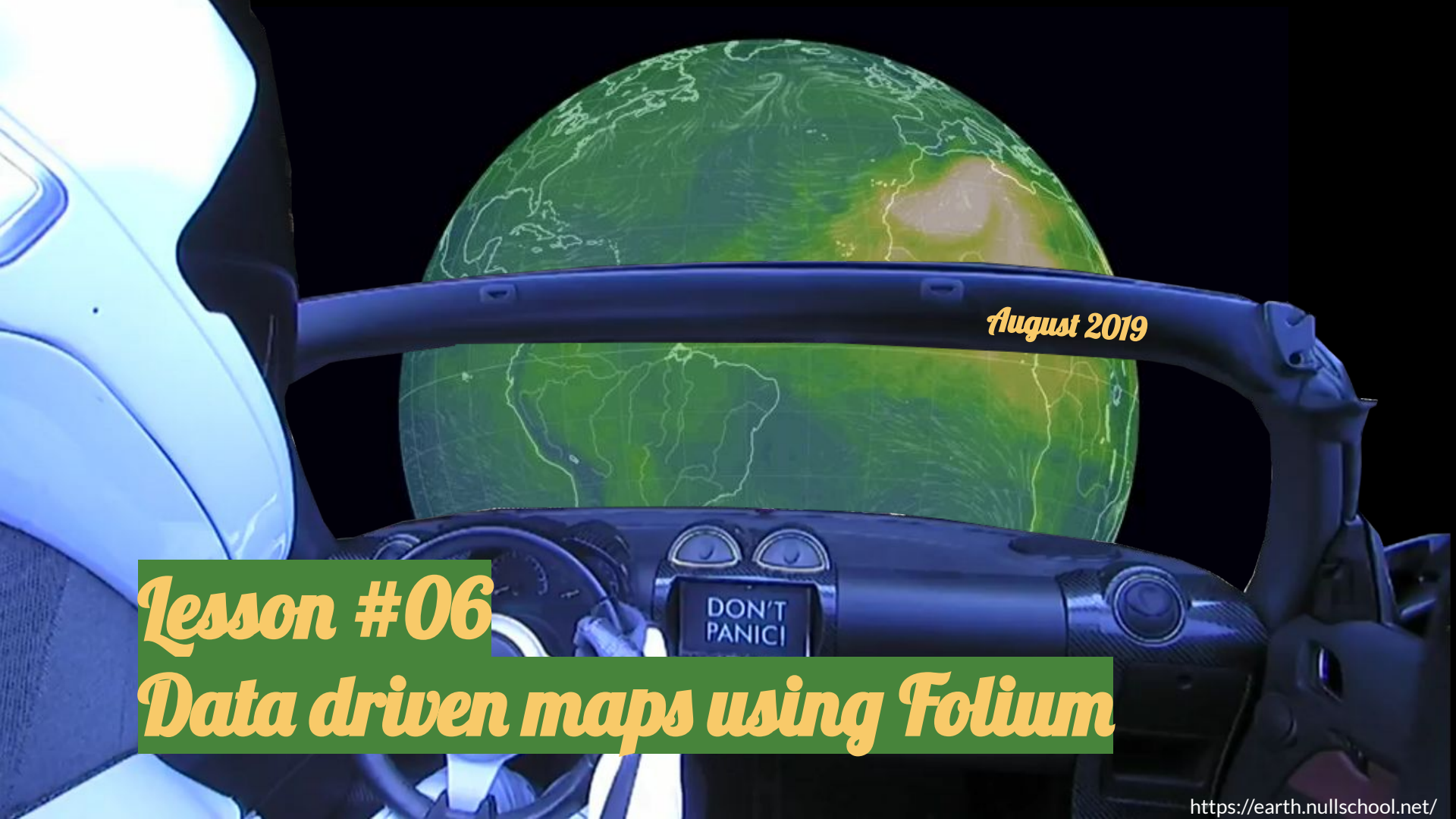


Lesson #06
Data driven maps using Folium

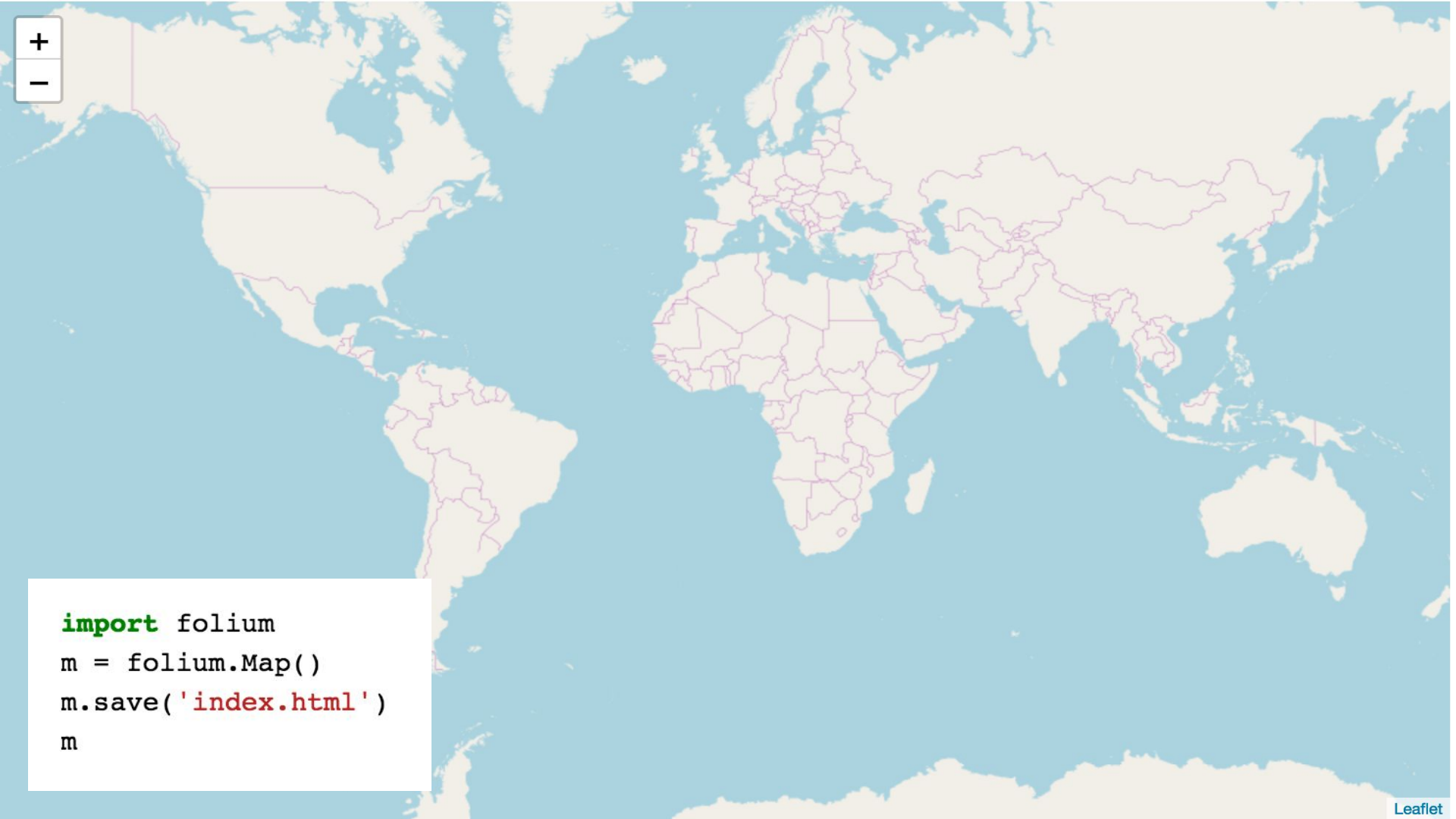
https://earth.nullschool.net/


Folium
Maps styles, markers, color and icon types
Marker clusters
Heatmap
Popups
LEARNING
TODAY

Folium

Manipulate your data in Python, then visualize it in on a Leaflet map via Folium.

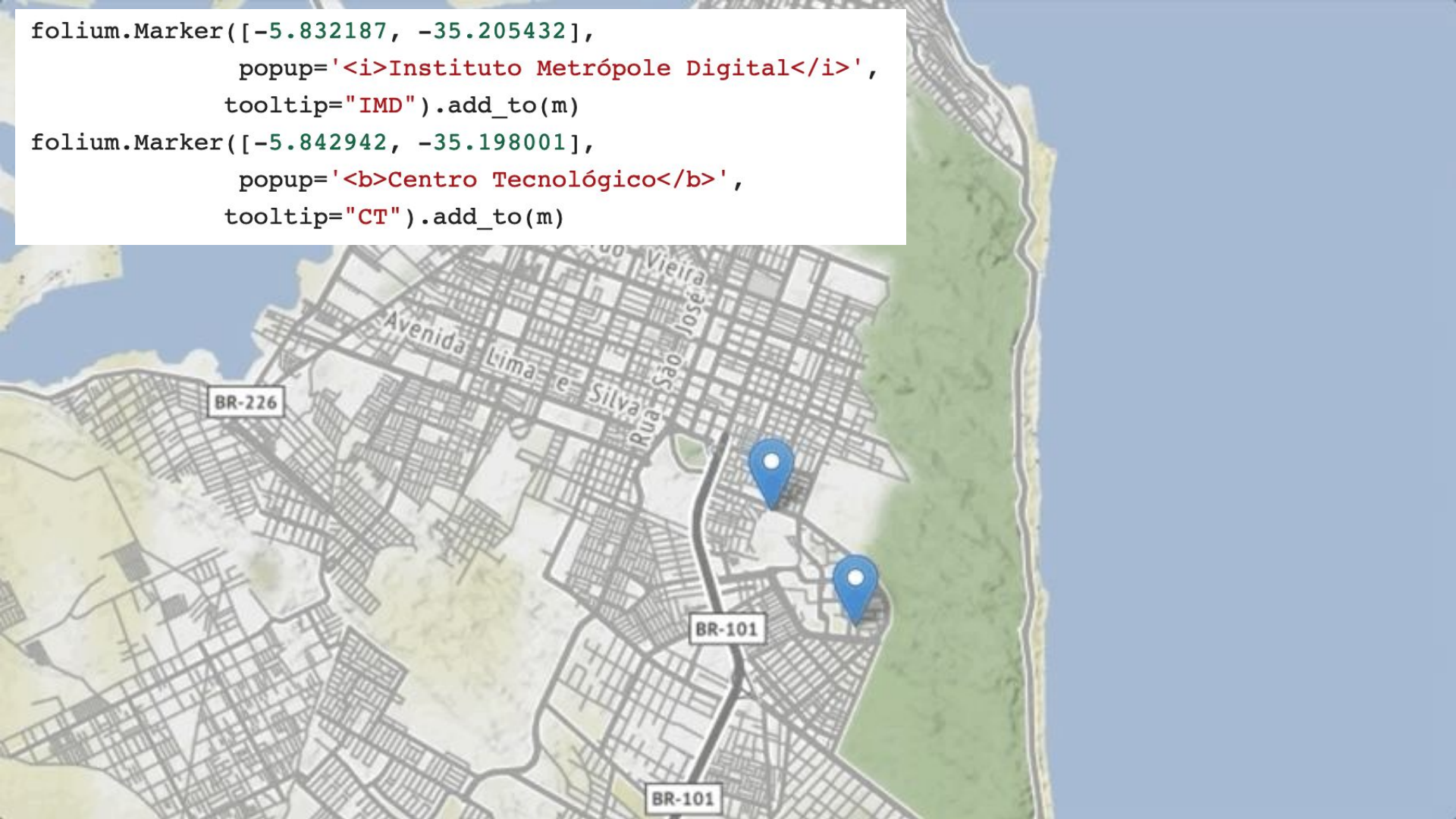
https://github.com/python-visualization/folium

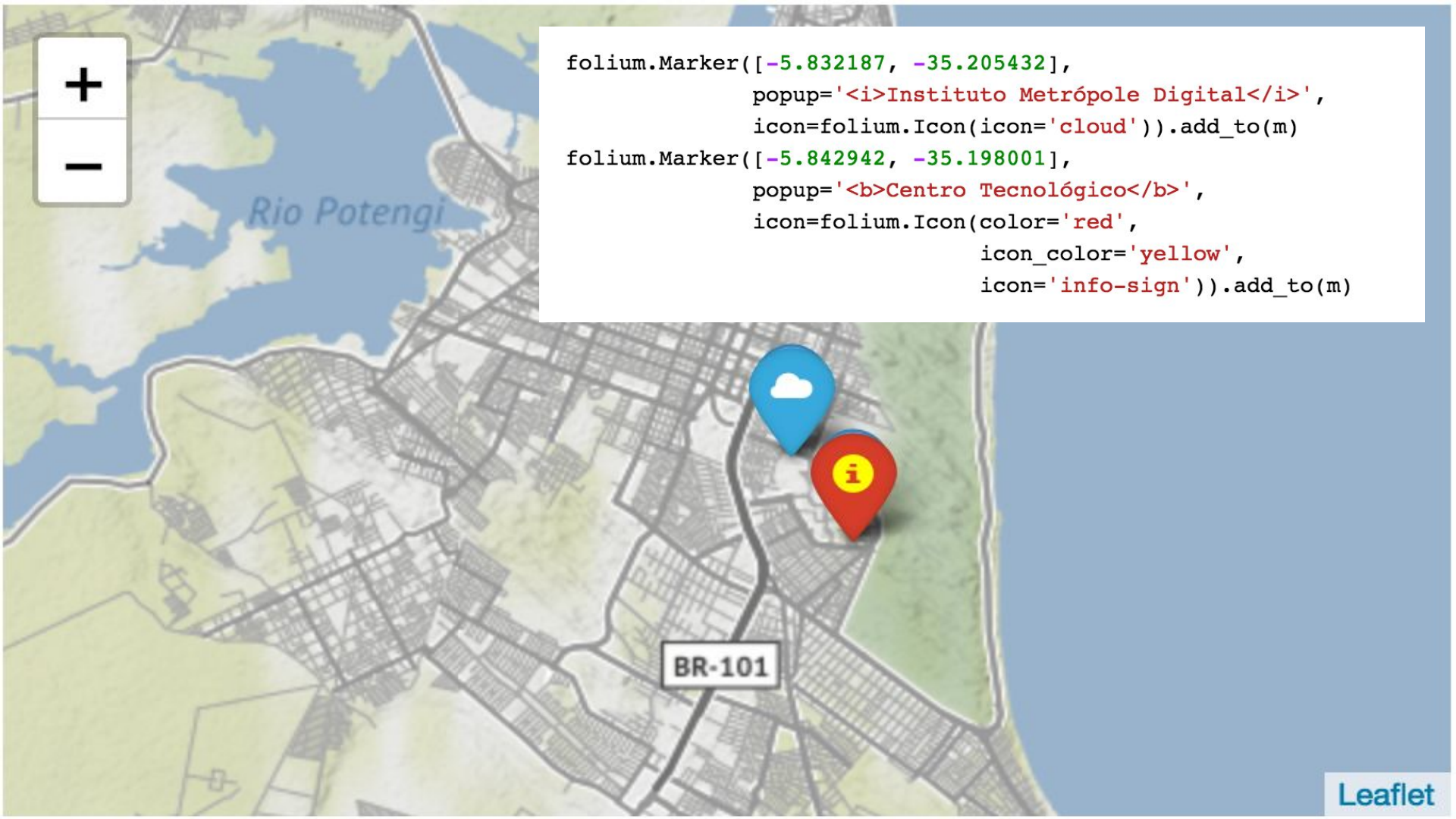

+
−
import folium
m = folium.Map()
m.save('index.html')
m
Leaflet


```
m = folium.Map(
    location=[-15.765379, -47.968776],
    zoom_start=4
)
```

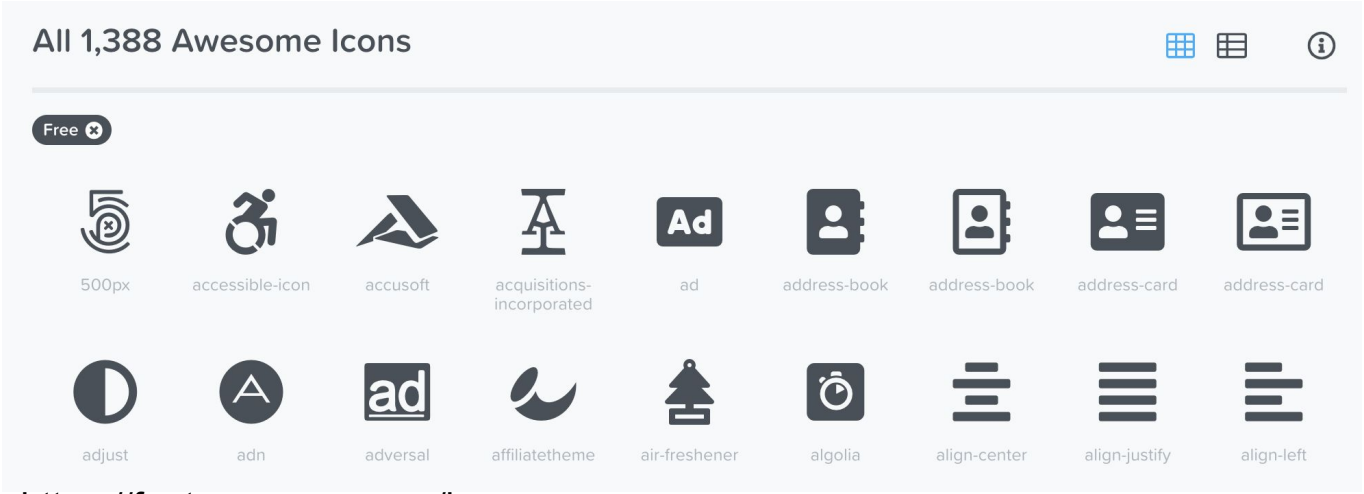

Bogota
COLOMBIA
FRENCH GUIANA
ECUADOR
PERU
BRAZIL
Lima
La Paz
Brasilia
BOLIVIA
CHILE
PARAGUAY
Asuncion
Sao Paulo
Rio de Ja
m = folium.Map(
location=[-15.765379, -47.968776],
tiles='Stamen Toner',
zoom_start=4
)

```
folium.Marker([-5.832187, -35.205432],
              popup='<i>Instituto Metrópole Digital</i>',
             tooltip="IMD").add_to(m)
folium.Marker([-5.842942, -35.198001],
              popup='<b>Centro Tecnológico</b>',
             tooltip="CT").add_to(m)
```



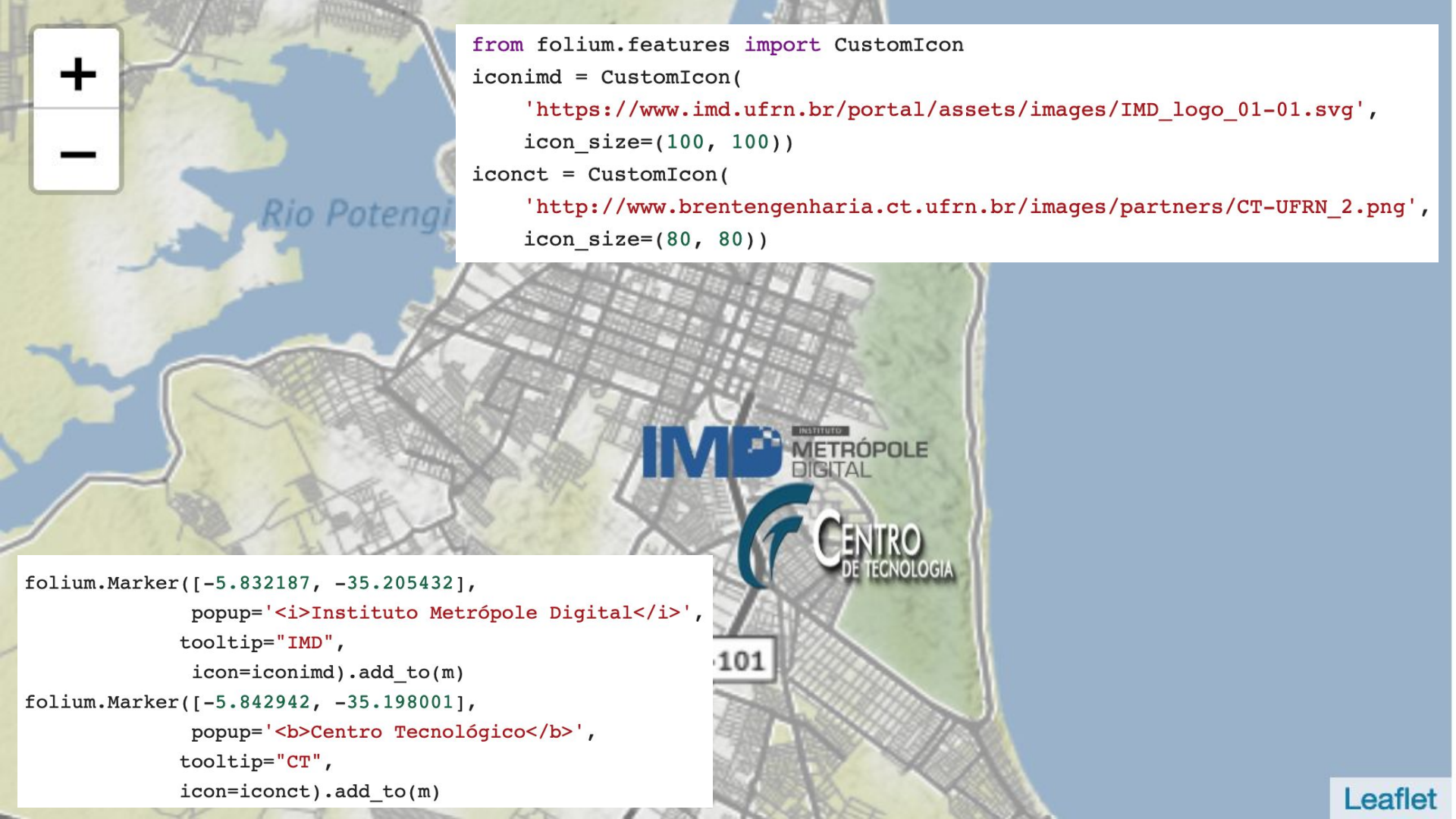

folium.Marker([-5.832187, -35.205432],
popup='Instituto Metrópole Digital',
icon=folium.Icon(icon='cloud')).add_to(m)
folium.Marker([-5.842942, -35.198001],
popup='Centro Tecnológico',
icon=folium.Icon(color='red',
icon_color='yellow',
icon='info-sign')).add_to(m)
Rio Potengi
BR-101
Leaflet

Customizing icons



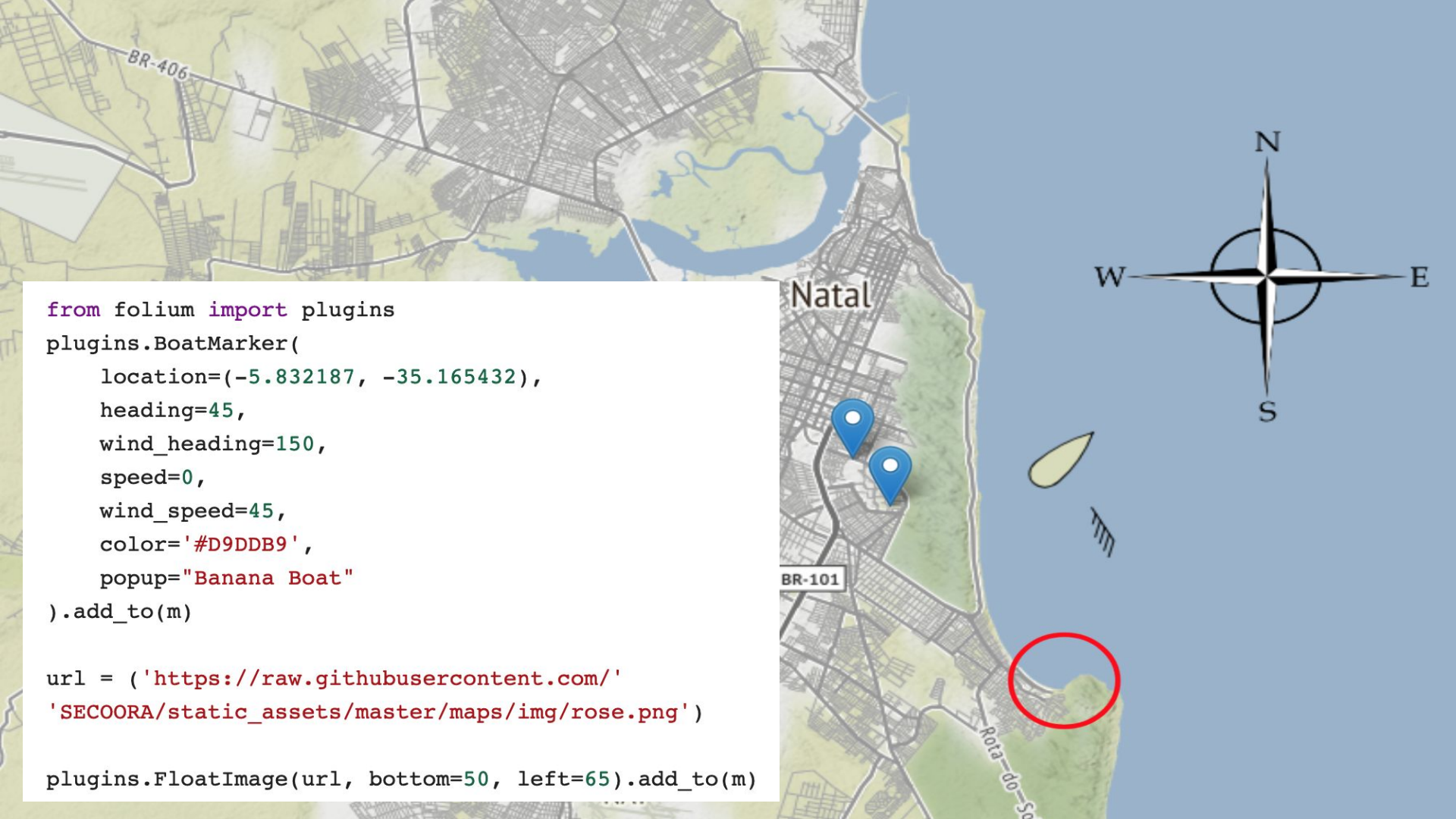
https://fontawesome.com/icons

```
...
    icon=folium.Icon(color='red',
                     icon_color='yellow',
                     icon='bicycle',
                     prefix='fa')).add_to(m)
```



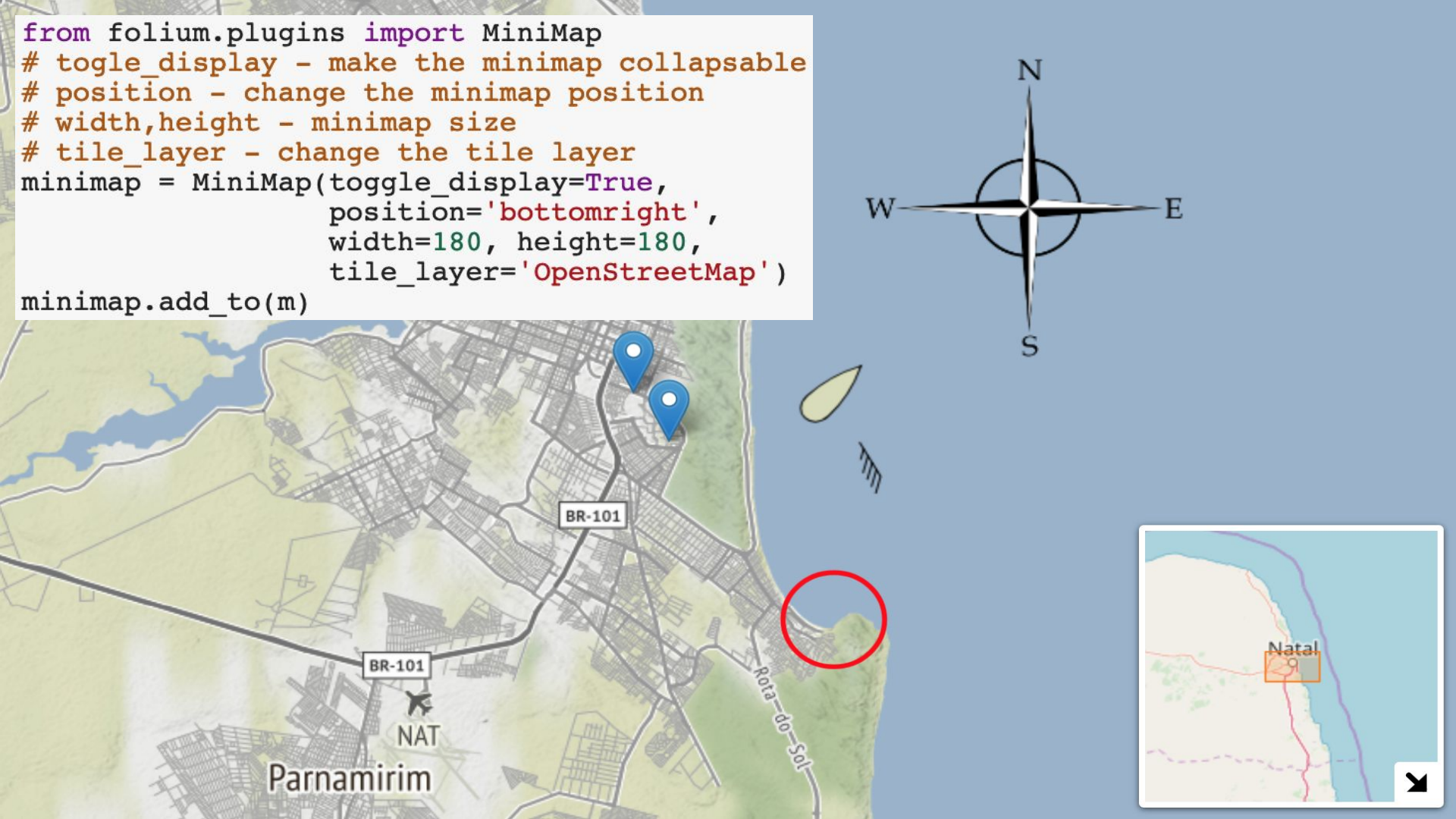

```
from folium.features import CustomIcon
iconimd = CustomIcon(
    'https://www.imd.ufrn.br/portal/assets/images/IMD_logo_01-01.svg',
    icon_size=(100, 100))
iconct = CustomIcon(
    'http://www.brentengenharia.ct.ufrn.br/images/partners/CT-UFRN_2.png',
    icon_size=(80, 80))
```

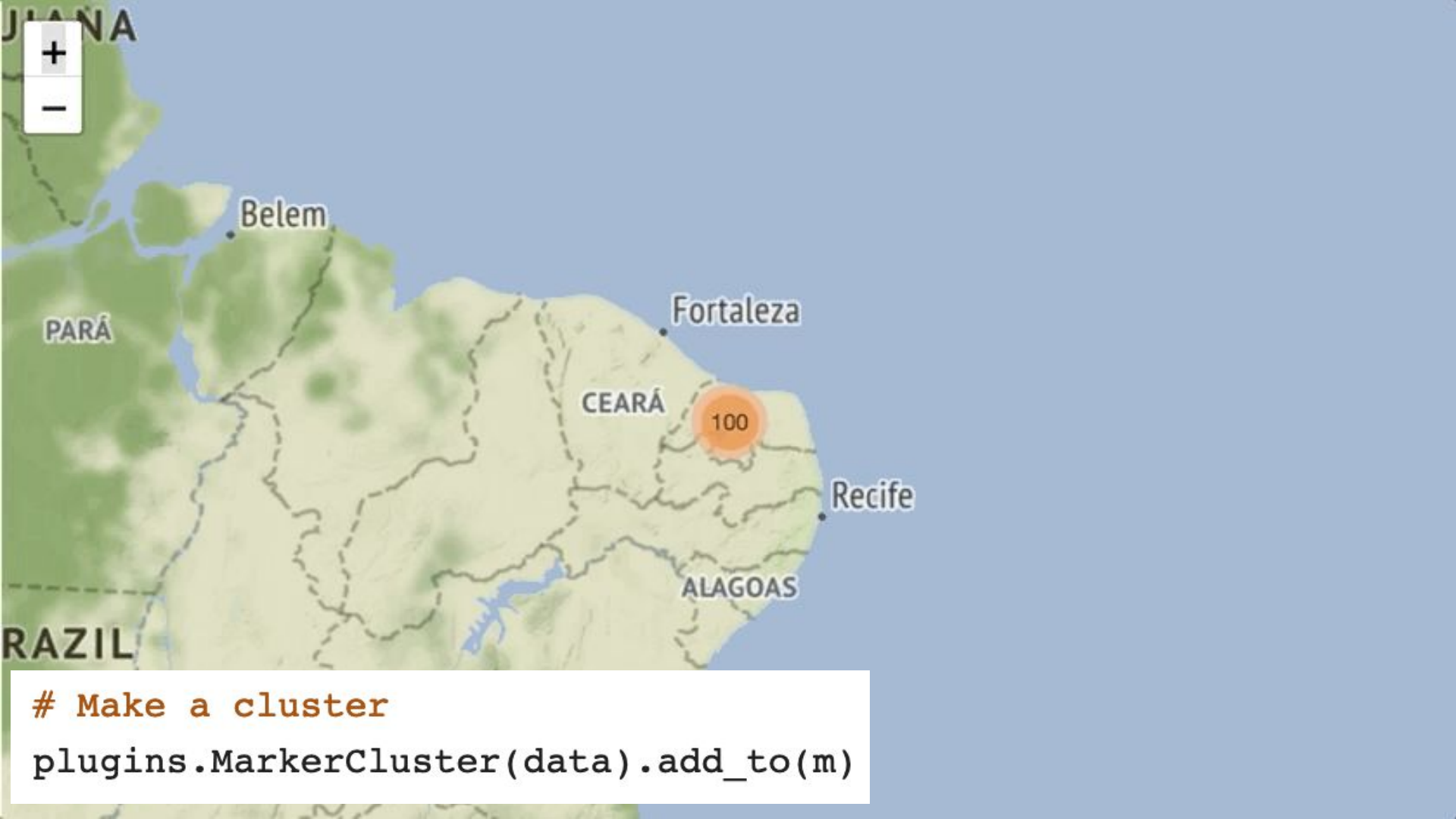
```
folium.Marker([-5.832187, -35.205432],
              popup='<i>Instituto Metrópole Digital</i>',
             tooltip="IMD",
              icon=iconimd).add_to(m)
folium.Marker([-5.842942, -35.198001],
              popup='<b>Centro Tecnológico</b>',
             tooltip="CT",
             icon=iconct).add_to(m)
```




```
from folium import plugins
plugins.BoatMarker(
    location=(-5.832187, -35.165432),
    heading=45,
    wind_heading=150,
    speed=0,
    wind_speed=45,
    color='#D9DDB9',
    popup="Banana Boat"
).add_to(m)

url = ('https://raw.githubusercontent.com/'
'SECOORA/static_assets/master/maps/img/rose.png')

plugins.FloatImage(url, bottom=50, left=65).add_to(m)
```

```python
from folium.plugins import MiniMap
# togle_display - make the minimap collapsable
# position - change the minimap position
# width,height - minimap size
# tile_layer - change the tile layer
minimap = MiniMap(toggle_display=True,
                  position='bottomright',
                  width=180, height=180,
                  tile_layer='OpenStreetMap')
minimap.add_to(m)
```



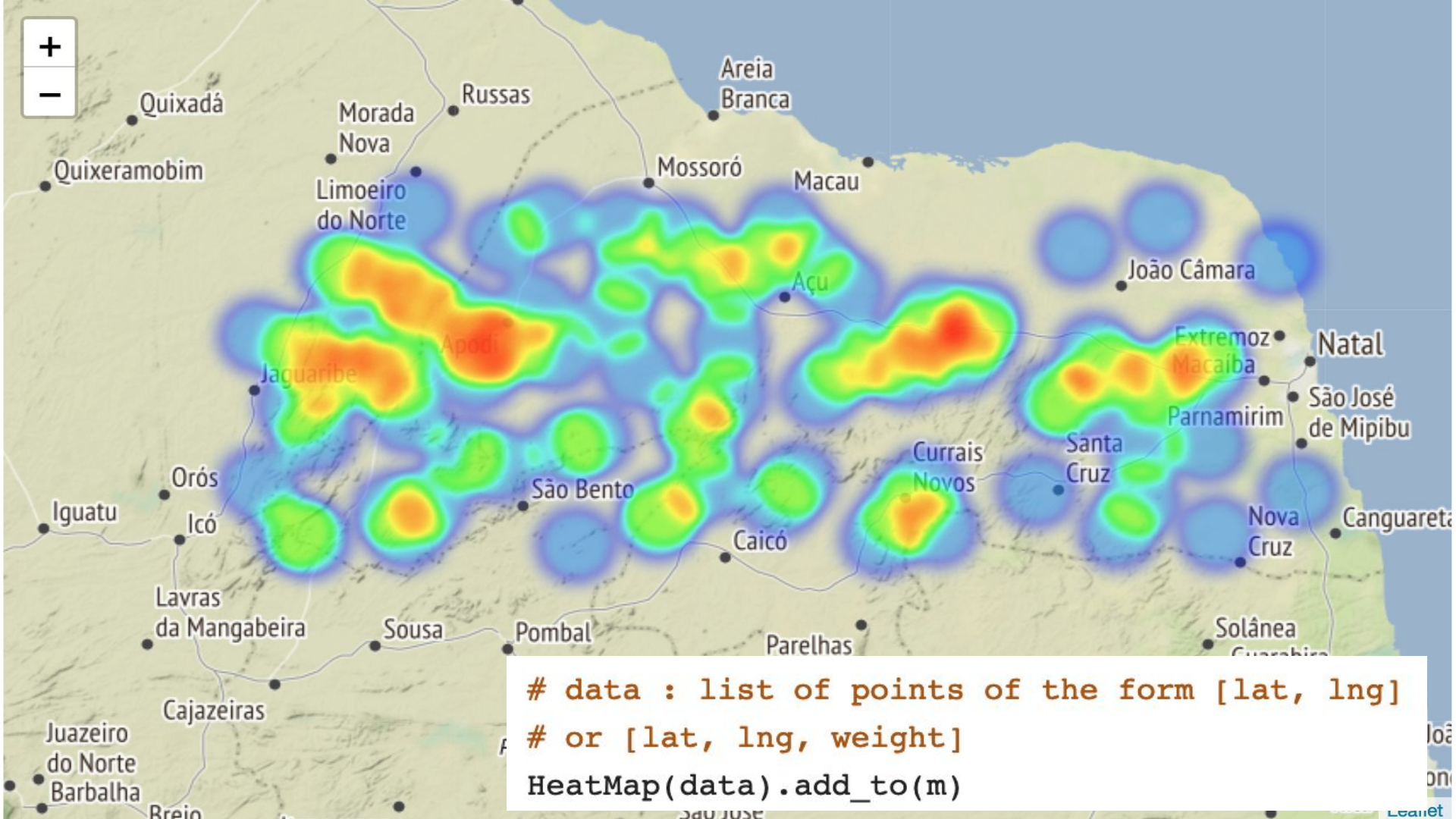



```
# Make a cluster
plugins.MarkerCluster(data).add_to(m)
```


stamenterrain
Oeste
Central
Agreste
Leste
2
Mossoró
RIO GRANDE
DO NORTE
2
Natal
8
5
Juazeiro
do Norte
Pico do Jabre
1197m
Campina
Grande
João Pessoa
Vitória
de Santo
Antão
Recife

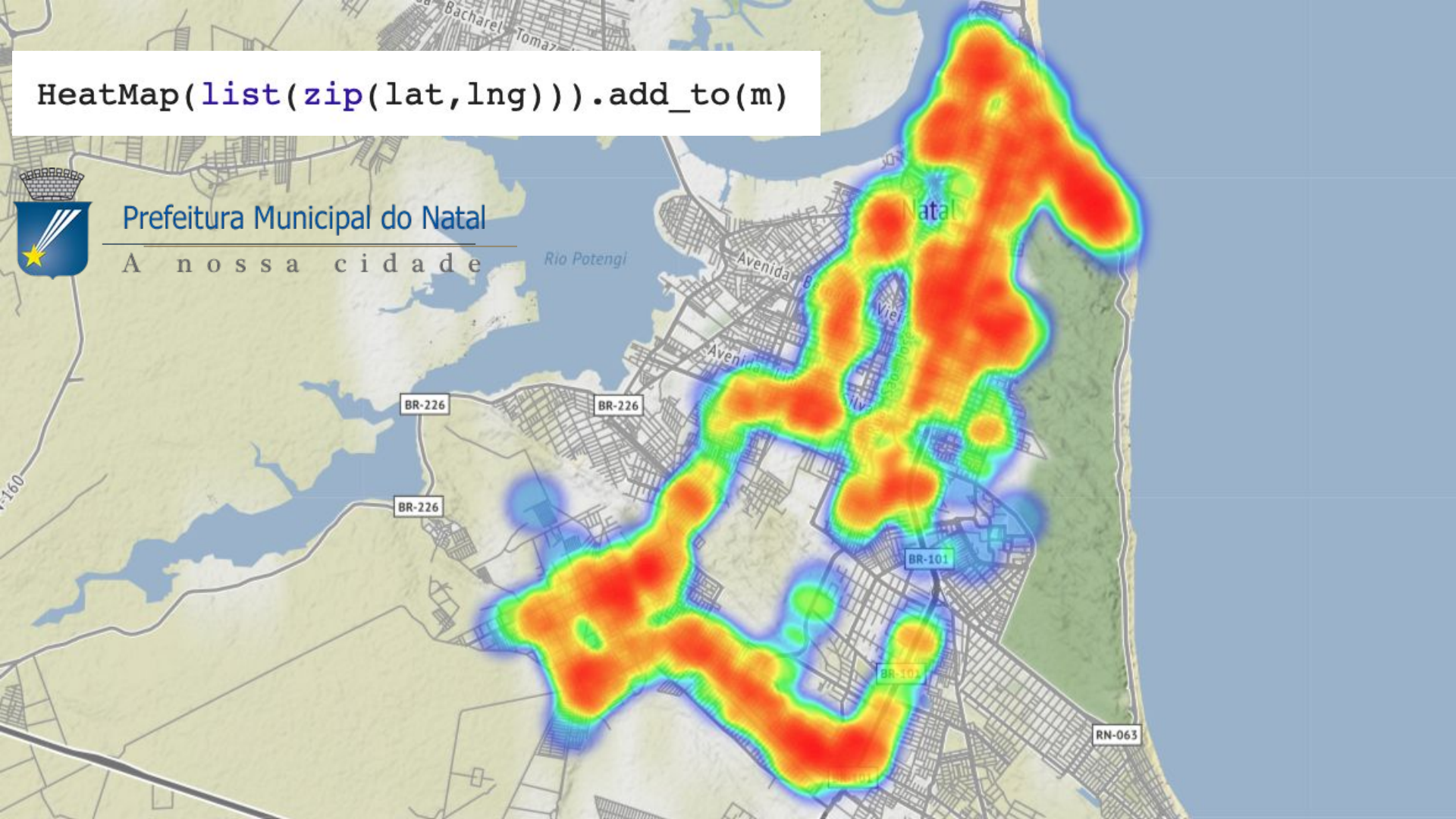
```
oeste_potiguar = ["Mossoró", "Areia Branca", "Pau dos Ferros", "Patu"]
central_potiguar = ["Currais Novos", "Acari", "Caico", "Cruzeta", "Equador"]
agreste_potiguar = ["Serra de São Bento", "Tangará", "Santa Cruz", "Sítio Novo"]
leste_potiguar = ["Natal", "Parnamirim", "Ceará-Mirim", "Baía Formosa"]

mesoregions = [oeste_potiguar,central_potiguar,agreste_potiguar,leste_potiguar]

# create a cluster
cluster = plugins.MarkerCluster(control=False).add_to(m)

# create intra-clusters
oeste = folium.plugins.FeatureGroupSubGroup(cluster, 'Oeste')
central = folium.plugins.FeatureGroupSubGroup(cluster, 'Central')
agreste = folium.plugins.FeatureGroupSubGroup(cluster, 'Agreste')
leste = folium.plugins.FeatureGroupSubGroup(cluster, 'Leste')

intra_clusters = [oeste,central,agreste,leste]

# add intra-cluster to map
m.add_child(oeste)
m.add_child(central)
m.add_child(agreste)
m.add_child(leste)
```


```
index = 0
for mesoregion in mesoregions:
  for city in mesoregion:
    # discovery the latitude and longiture for city
    g = geocoder.arcgis(city + " RN")
    folium.Marker(g.latlng,popup=city,tooltip=city).add_to(intra_clusters[index])
  index += 1

folium.LayerControl(collapsed=False).add_to(m)
```



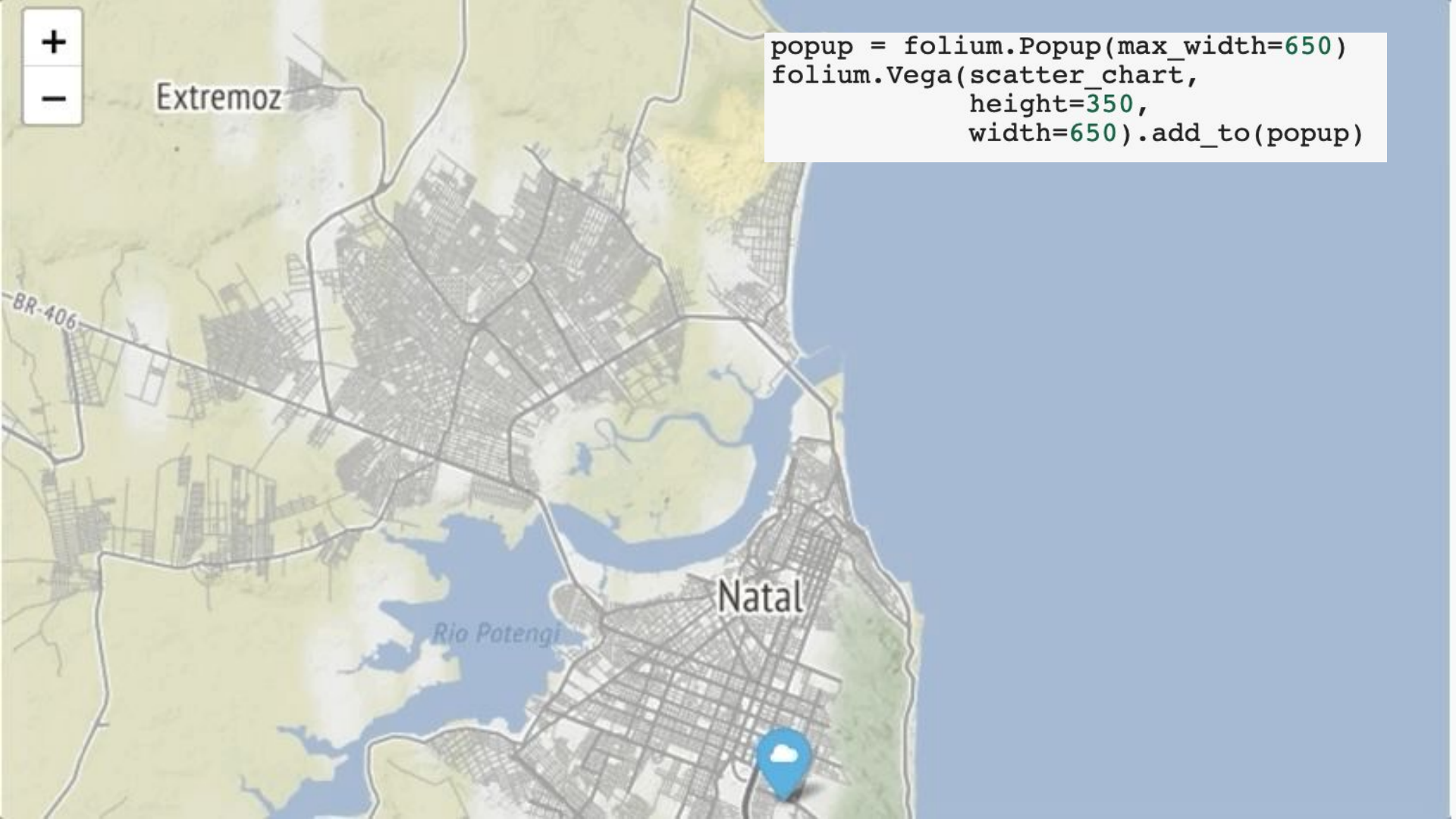

```
# data : list of points of the form [lat, lng]
# or [lat, lng, weight]
HeatMap(data).add_to(m)
```

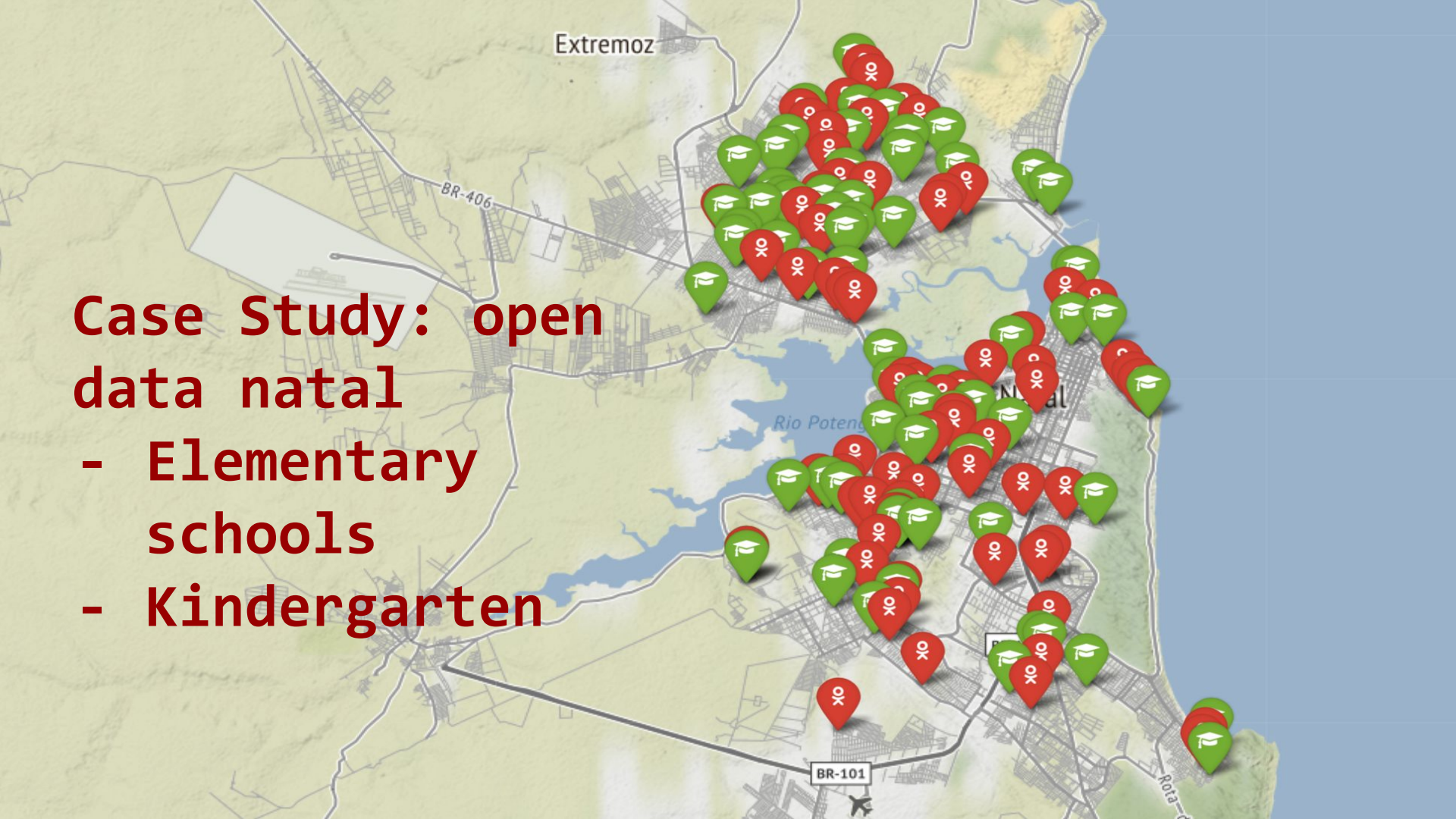
```
HeatMap(list(zip(lat,lng))).add_to(m)
```



Create popups

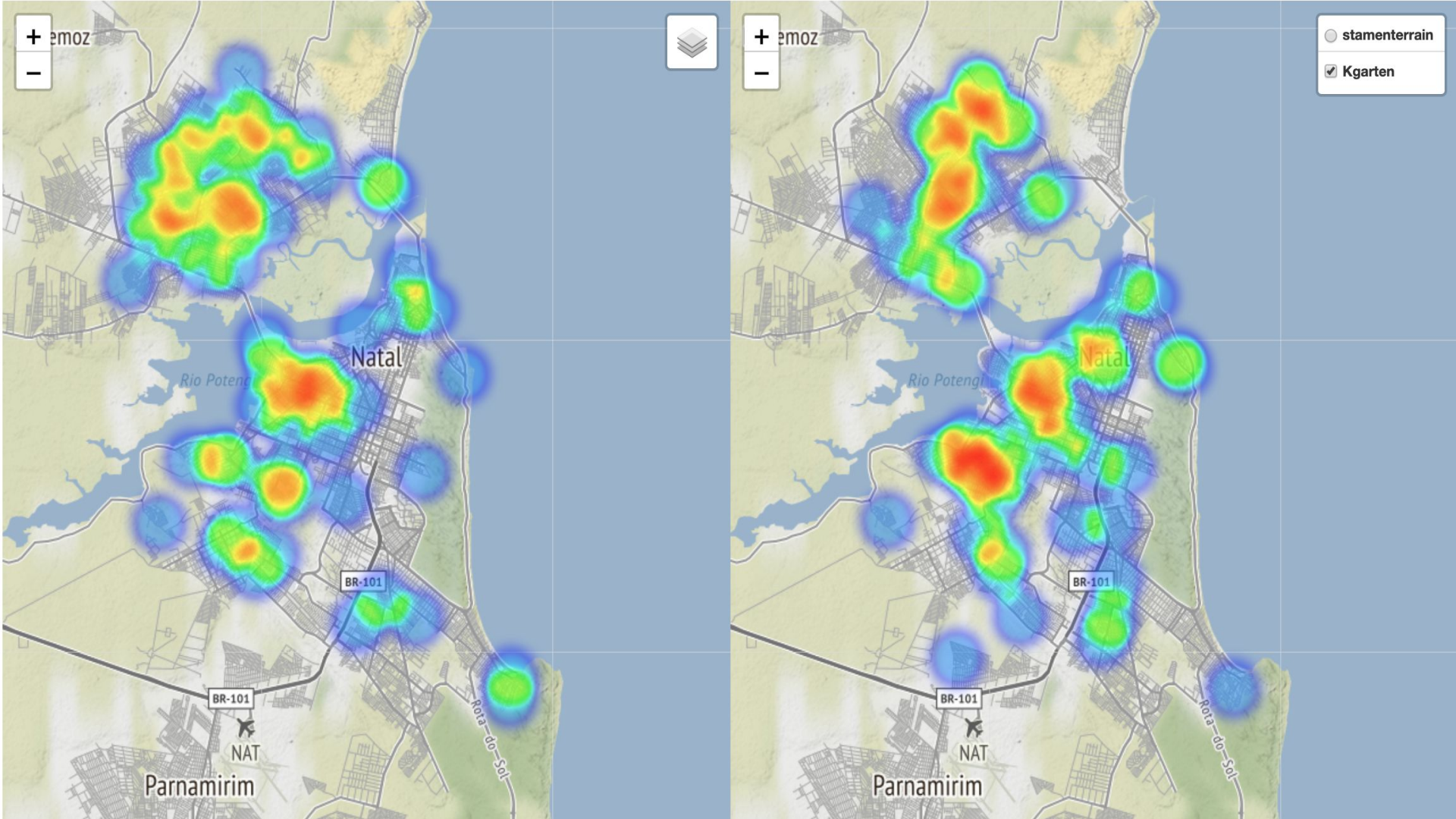
```
m.add_child(folium.LatLngPopup())
```


popup = folium.Popup(max_width=650)
folium.Vega(scatter_chart,
height=350,
width=650).add_to(popup)
Extremoz
BR-406
Natal
Rio Potengi



Case Study: open data natal

- Elementary schools
- Kindergarten


Natal
Rio Potengi
BR-101
NAT
Parnamirim
Rota do Sol
stamenterrain
Kgarten

Lesson #06 - Folium.ipynb