













```

import numpy as np
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline
from matplotlib import style
from statistics import mean
import seaborn as sns
from sklearn.linear_model import LinearRegression
from sklearn import metrics
from scipy import stats
from scipy.stats import linregress
import matplotlib.pylab as pylab
matplotlib.rcParams['figure.figsize'] = (12,8)
sns.set_palette(sns.color_palette("hls", 20))
sns.set_style("whitegrid")

obs_file = 'Station_Name.csv'
columns = ['DATE', 'X', 'Y']
obs = pd.read_csv(obs_file, header = None, skiprows = 1, names = columns)

obs['DATE'] = pd.to_datetime(obs['DATE'], format='%Y-%m-%d')
obs = obs.replace(np.inf, np.nan).replace(-np.inf, np.nan).dropna()

x = obs['X']
y = obs['Y']

def best_fit_slope(x,y):
    b = ((mean(x)*mean(y)) - mean(x*y)) /
        ((mean(x)**2) - mean(x**2)))
    return b
b = best_fit_slope(x,y)
a = mean(y) - b*mean(x)

def xyline(x, y):
    xypts = min(x.min(), y.min()), max(x.max(), y.max())
    return xypts, xypts

np.polyfit(obs['X'], obs['Y'], 1)
regression_line=np.polyfit(obs['X'], obs['Y'], 1)
plt.plot(*xyline(x, y), 'k--')
plt.plot(x,regression_line[1]+regression_line[0]*x)
plt.title('Station name', fontsize=25)
plt.xlabel('n/N',fontsize=25)
plt.ylabel('GHI/TOA',fontsize=25)
plt.plot(x, (a + b*x), label = 'y = {:.3f} + {:.3f}*x'.format(a, b))
plt.legend(loc='lower left',fontsize=25)
plt.scatter(x, y, c=x, cmap='jet')
plt.colorbar()
plt.savefig("Station_name")

```

**Figure 3.** A Python code or script that was written and used to calculate and plot regression coefficients  $a$  and  $b$  from  $X = \frac{n}{N}$  and  $Y = \frac{GHI}{GHI_{TOA}}$ .















32. CMP11 Pyranometer. Available online: <https://www.campbellsci.eu/cmp11> (accessed on 17 March 2020).
33. CMP11 Pyranometer. Available online: <https://www.kippzonen.com/Product/13/CMP11-Pyranometer#.X1UGh-fivIV> (accessed on 12 May 2020).

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