Project Excercise 3

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Exercise 3

<u>Goal of the project</u>: Get trends for entities at local places from a variety of model data sources and investigate trends over time

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- **Entities**
  - **Temperature**
- **Cities**
  - **Budapest**
- **Datasets**
  - **CMIP6**
    MPI-ESM1-2-HR
  - **CORDEX**
    CNRM-CERFACS-CNRM-CM5 (driving model)
    SMHI-RCA4
- **Deep Learning**
  - **RNN Long Short Term Memory (LSTM)**

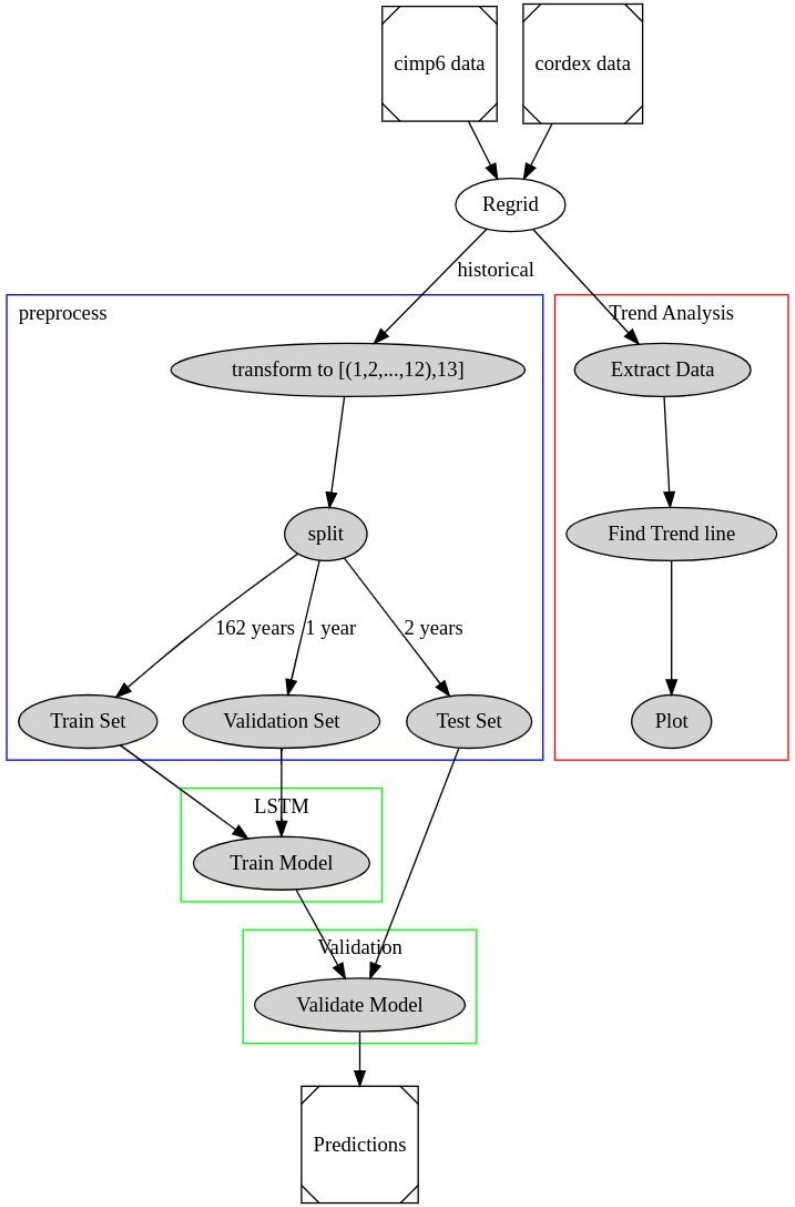
Exercise 3

Needed packages:

- Numpy;
- Pandas;
- Xarray;
- intake;
- ipywidgets;
- geopy.geocoders;
- folium;
- hvplot.pandas;
- IPython.core.interactiveshell;
- matplotlib.pyplot;
- Graphviz

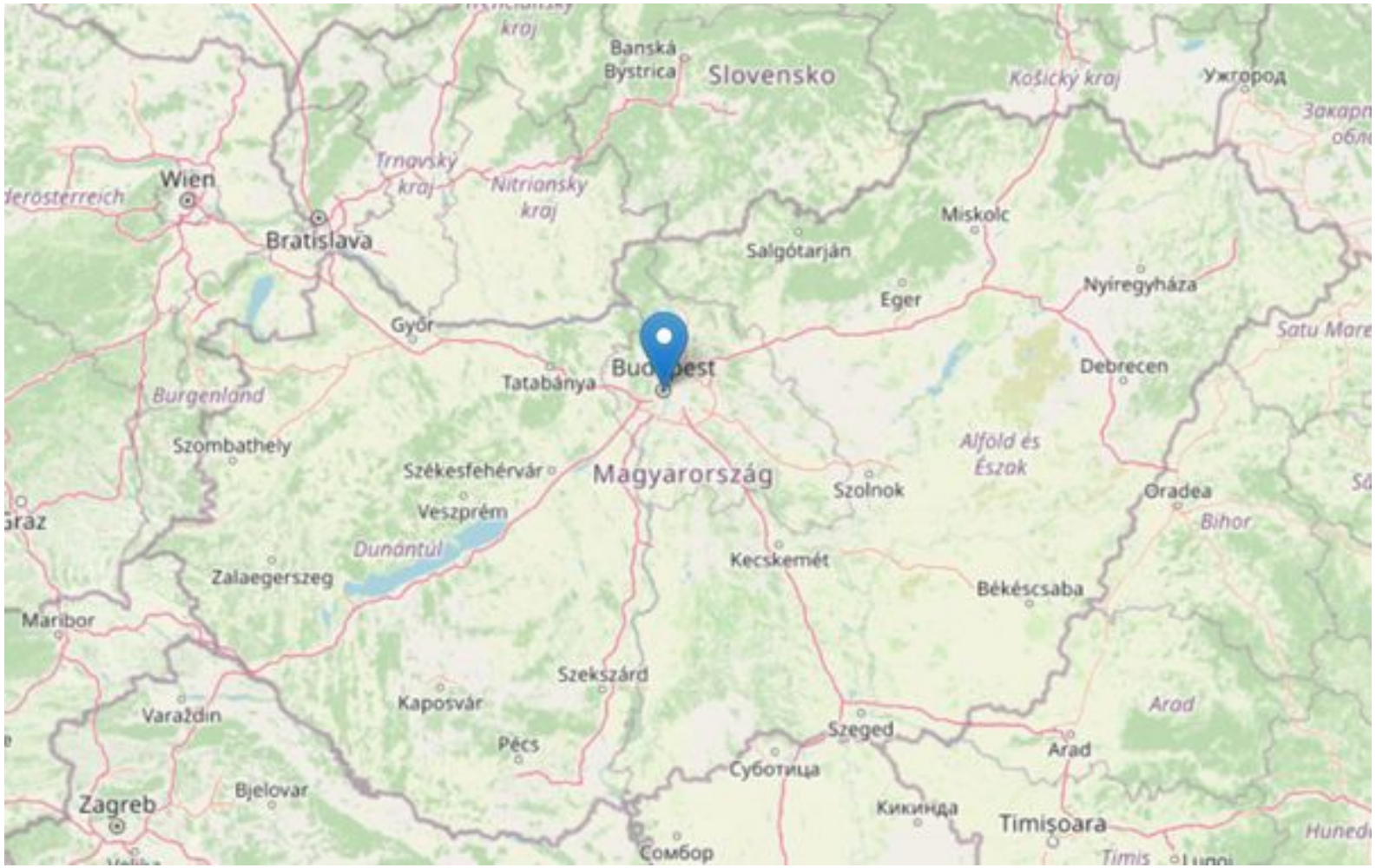
Exercise 3

Flow chart (Graphviz)

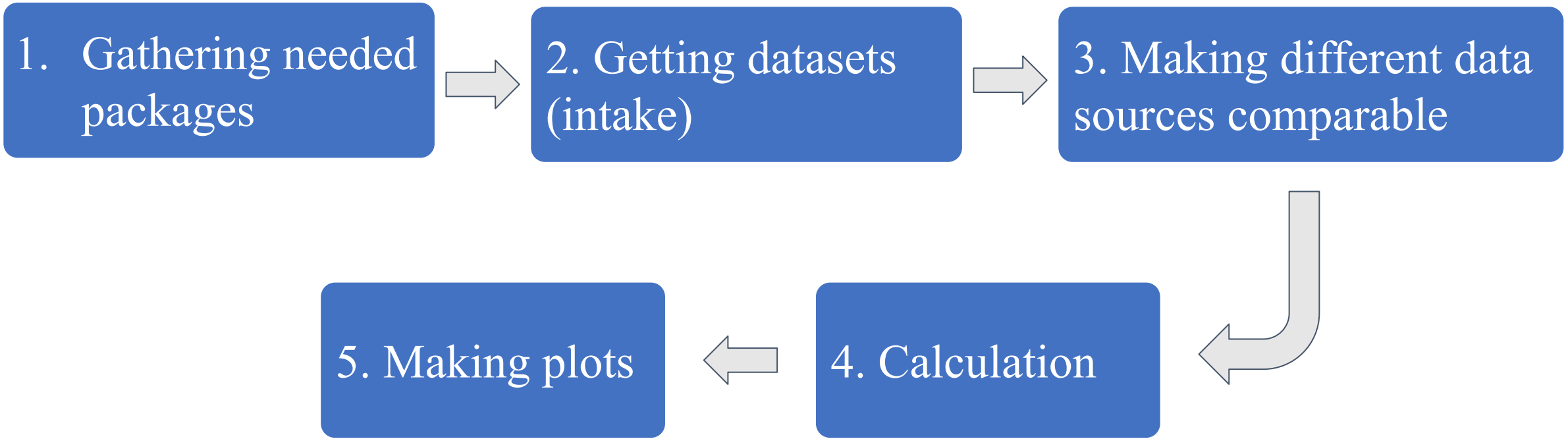


Exercise 3

Budapest (47° 29' 52.4868" N, 19° 2' 24.8496" E)

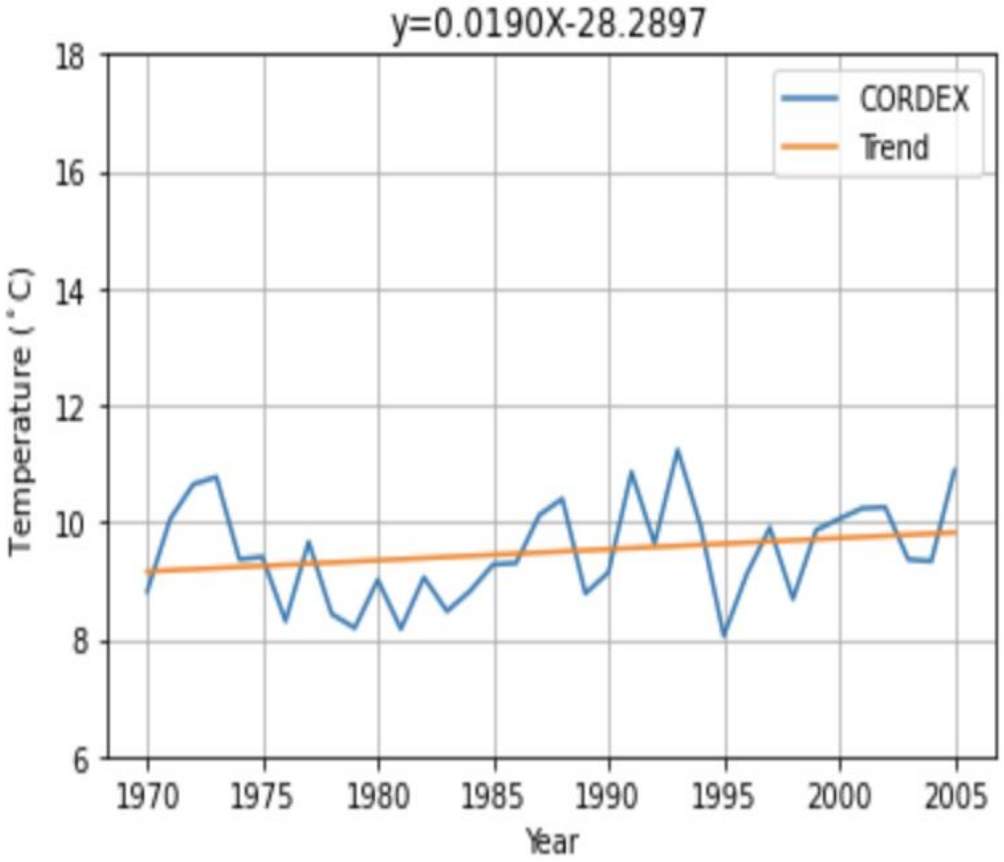


Methods in Python



Exercise 3

Historical data from Budapest



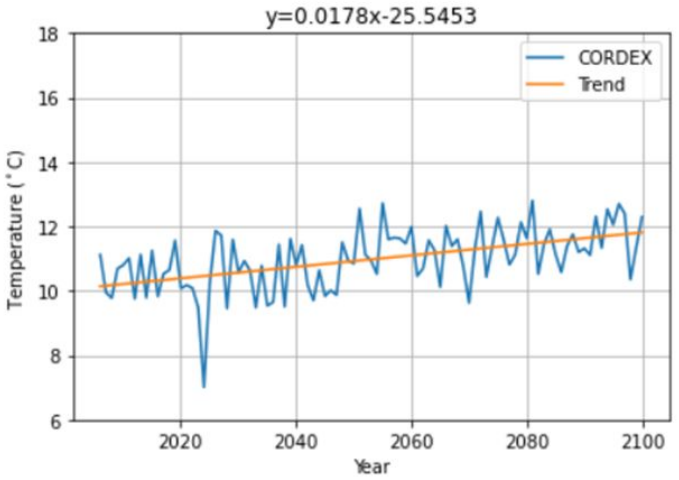
Exercise 3

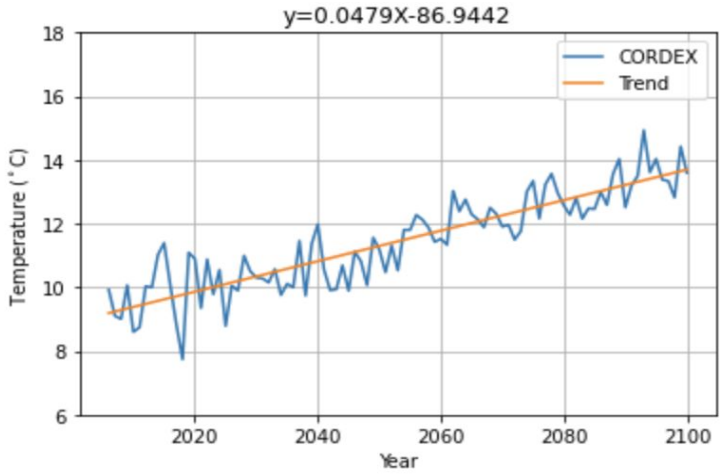
Budapest - future

RCP4.5

RCP8.5

Cordex



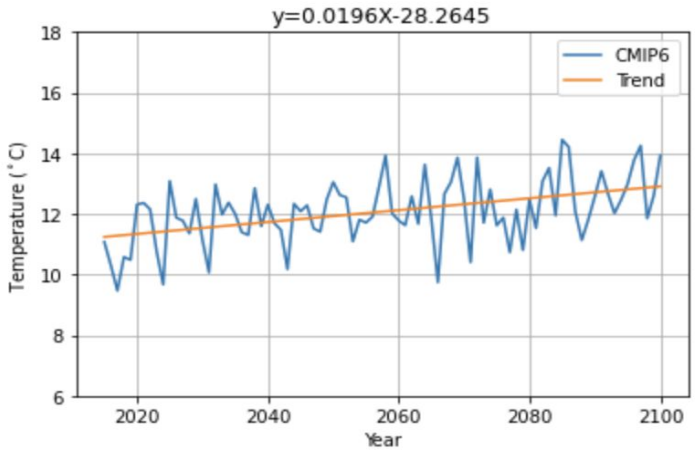


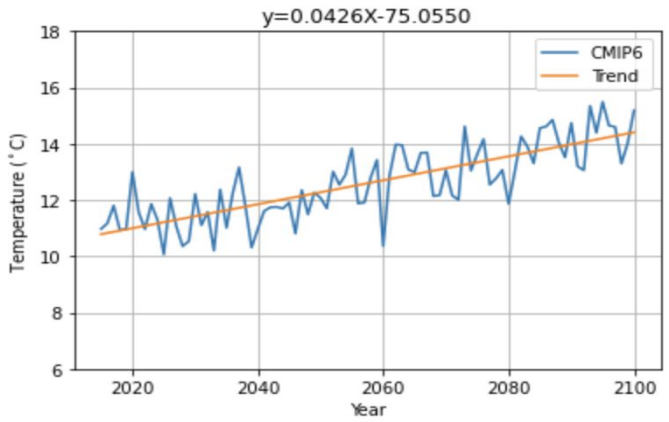
SSP245

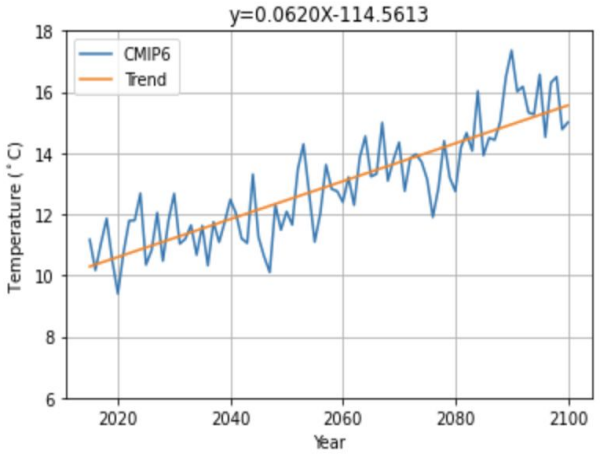
SSP370

SSP585

CMIP6





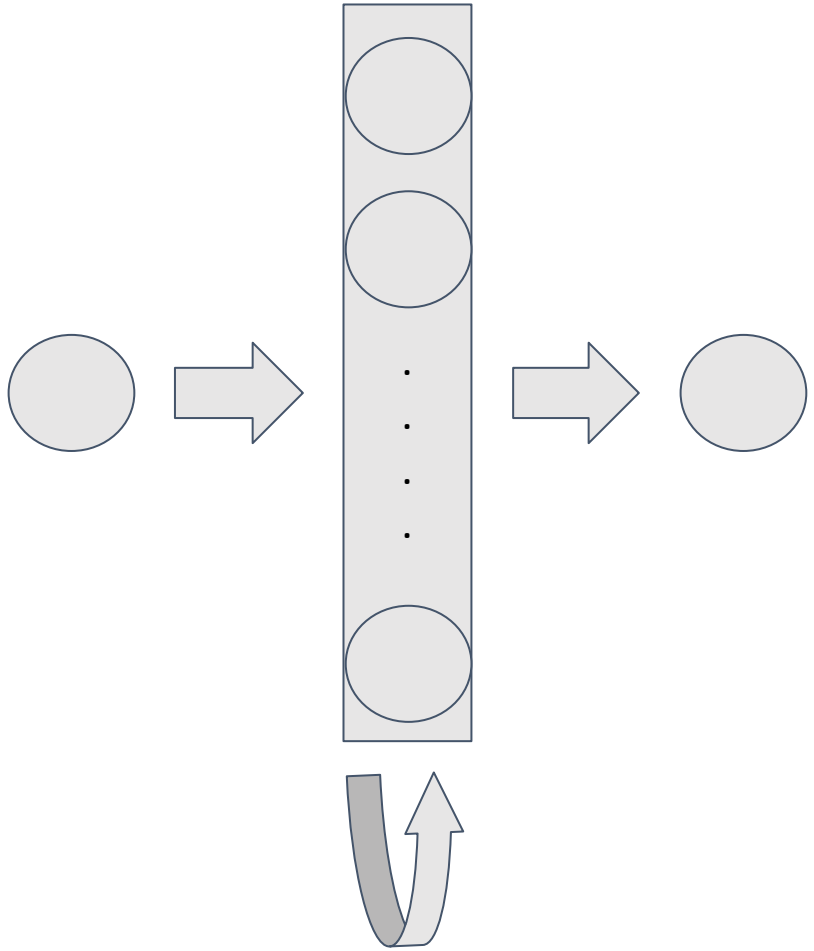


Exercise 3

Deep Learning technique

Exercise 3

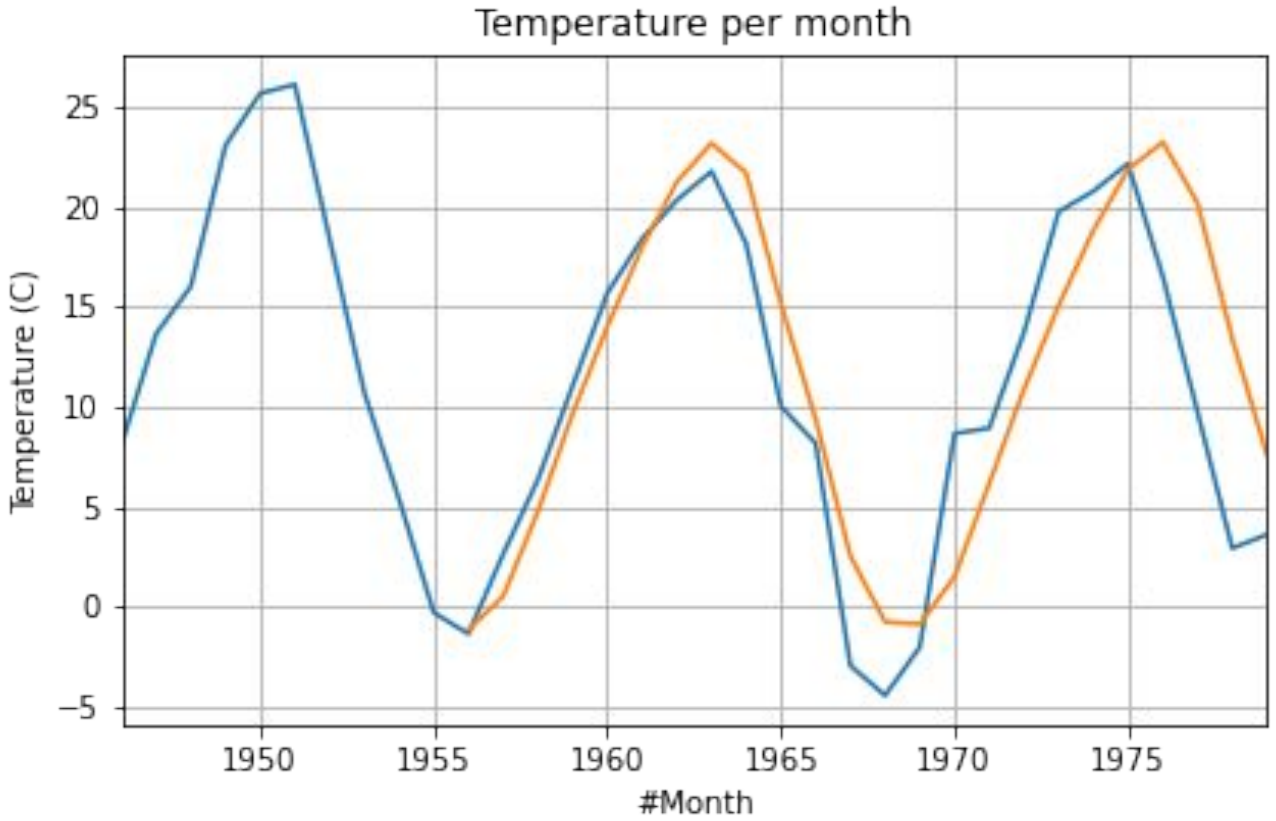
Deep Learning (Long Short Term Memory)



Parameters

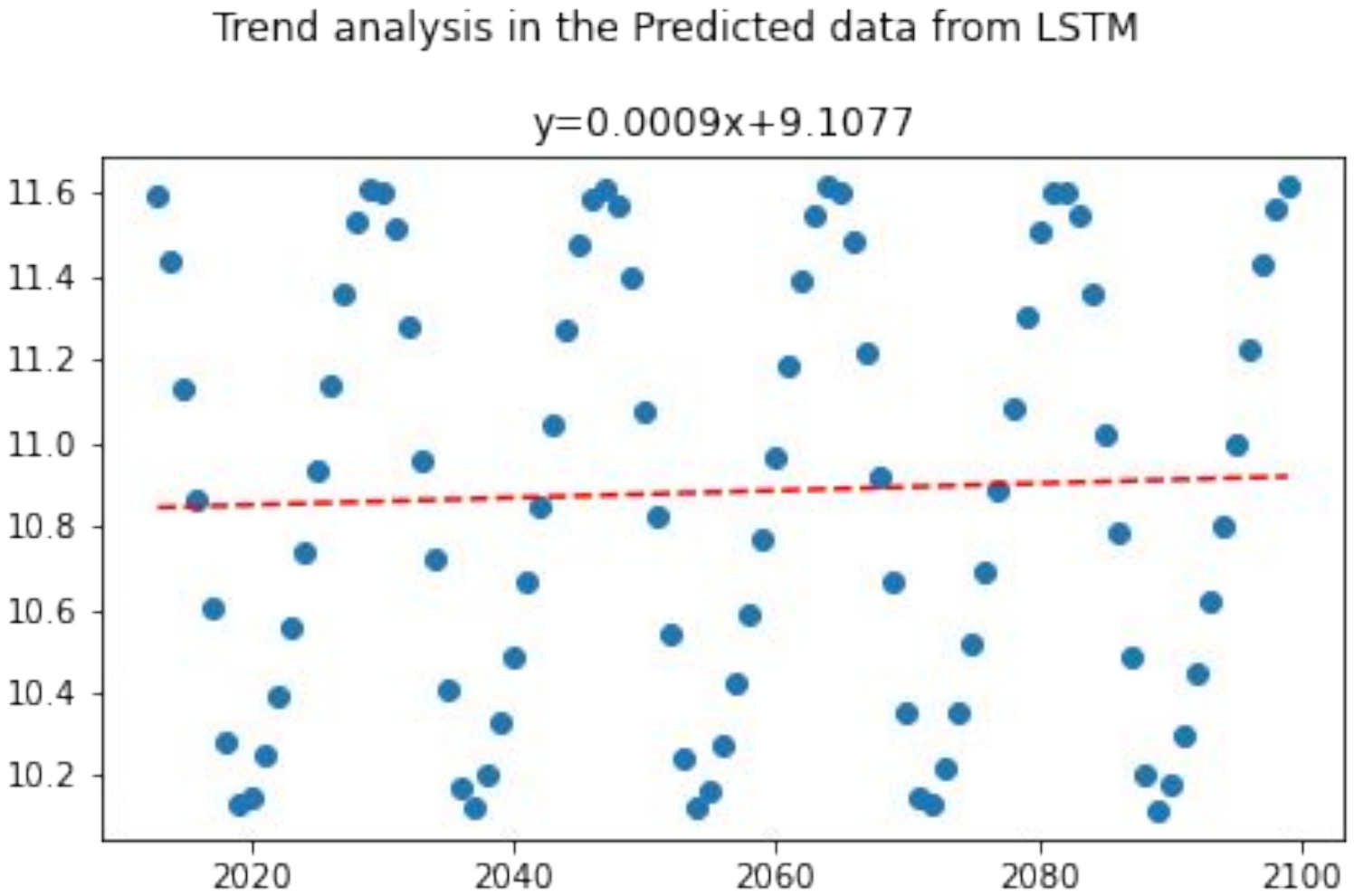
- 1 LSTM layer with 32 neurons
- Adam Optimizer
- learning rate 0.001
- 50 epoches

Test Model


Temperature per month
Temperature (C)
25
20
15
10
5
0
−5
1950
1955
1960
1965
1970
1975
#Month

Exercise 3

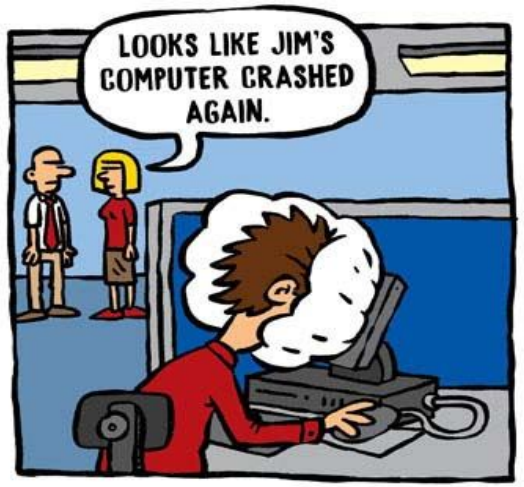
Predicted data



Exercise 3

Faced difficulties:

- Getting data
- Changing coordinate system & regridding
- Managing xarray.Dataset
- Time consuming running



Thank you

Köszi

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