Pandrosos_meteorological_station_02

October 3, 2017

1 Post-processing of the meteorological data

Here we look at the set of measurements obtained from the meteorological station of Pandrosos

Meteorological station's coordinates
in EGSA 87
in WGS 84
Height

```
In [1]: import pandas as pd
        %matplotlib inline
        data = pd.read_csv ('pandrosos.csv',
                            header=0,
                            decimal=',',
                            parse_dates={'Datetime': ['Day', 'Time']})
        pat = '(?P<day>\d{2})-(?P<month>\d{2})-(?P<year>\d{4}) (?P<hour>\d{1,2}):(?P<minute>\d
        data['Datetime'] = pd.to_datetime(data['Datetime'].str.extract(pat, expand=True))
        data = data.set_index('Datetime')
        data.head(n=10)
```

Out[1]:

Datetime	Ta	RH	Rain	LW	Tsoil	Bat.
2001-01-25 14:00:00	5.0	20.9	0.4	0	0	13.1
2001-01-25 15:00:00	6.0	52.9	24.4	0	0	13.4
2001-01-25 16:00:00	6.3	53.7	0.0	0	0	13.3
2001-01-25 17:00:00	6.0	52.7	0.0	0	0	13.0
2001-01-25 18:00:00	4.6	55.5	0.0	0	0	12.8
2001-01-25 19:00:00	4.2	51.0	0.0	0	0	12.7
2001-01-25 20:00:00	4.0	51.0	0.0	0	0	12.7
2001-01-25 21:00:00	3.9	52.4	0.0	0	0	12.7
2001-01-25 22:00:00	5.5	35.4	0.0	0	0	12.6
2001-01-25 23:00:00	4.3	45.8	0.0	0	0	12.6

1.0.1 Legend

Symbol	Explanation	Unit
Ta	Air Temperature	řC
RH	Relative Humidity	%
Rain	Height of rainfall	mm
LW	Leaf Wetness	Hours
Bat.	Battery	Volt

```
In [2]: # Count the number of measurements per year
        !grep -Po '20\d\d' pandrosos.csv | sort | uniq -c
```

```
   8169 2001
   3916 2002
   2962 2003
    793 2004
   1778 2005
   4069 2006
```

Year 2001 appears to have a complete time series of data. The distributions of data per year will be further processed.

1.0.2 Creation of 6 new dataset that considers the complete hydrological years per year (2001-2006)

```
In [3]: # Hydrological year 2001-2002
        data_2001_02 = pd.concat([data['2001-09-01':'2002-08-31']])
        data_2001_02.head()
```

Out[3]:

Datetime	Ta	RH	Rain	LW	Tsoil	Bat.
2001-09-01 00:00:00	22.9	25.4	0.0	0	32	12.8
2001-09-01 01:00:00	22.8	25.1	0.0	0	31	12.8
2001-09-01 02:00:00	22.9	23.8	0.0	0	30	12.8
2001-09-01 03:00:00	23.4	22.8	0.0	0	28	12.8
2001-09-01 04:00:00	22.9	25.2	0.0	0	28	12.7

```
In [4]: # Figure of all parameters on a daily basis for hydrological year 2001-2002
        data_2001_02.resample('D').mean().plot(subplots=True,figsize=(16,18))
```

```
Out[4]: array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f210cabac10>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20e2481a90>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20e1fde990>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20e1ef9350>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20e1e7d4d0>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20e1f0f890>], dtype=object)
```

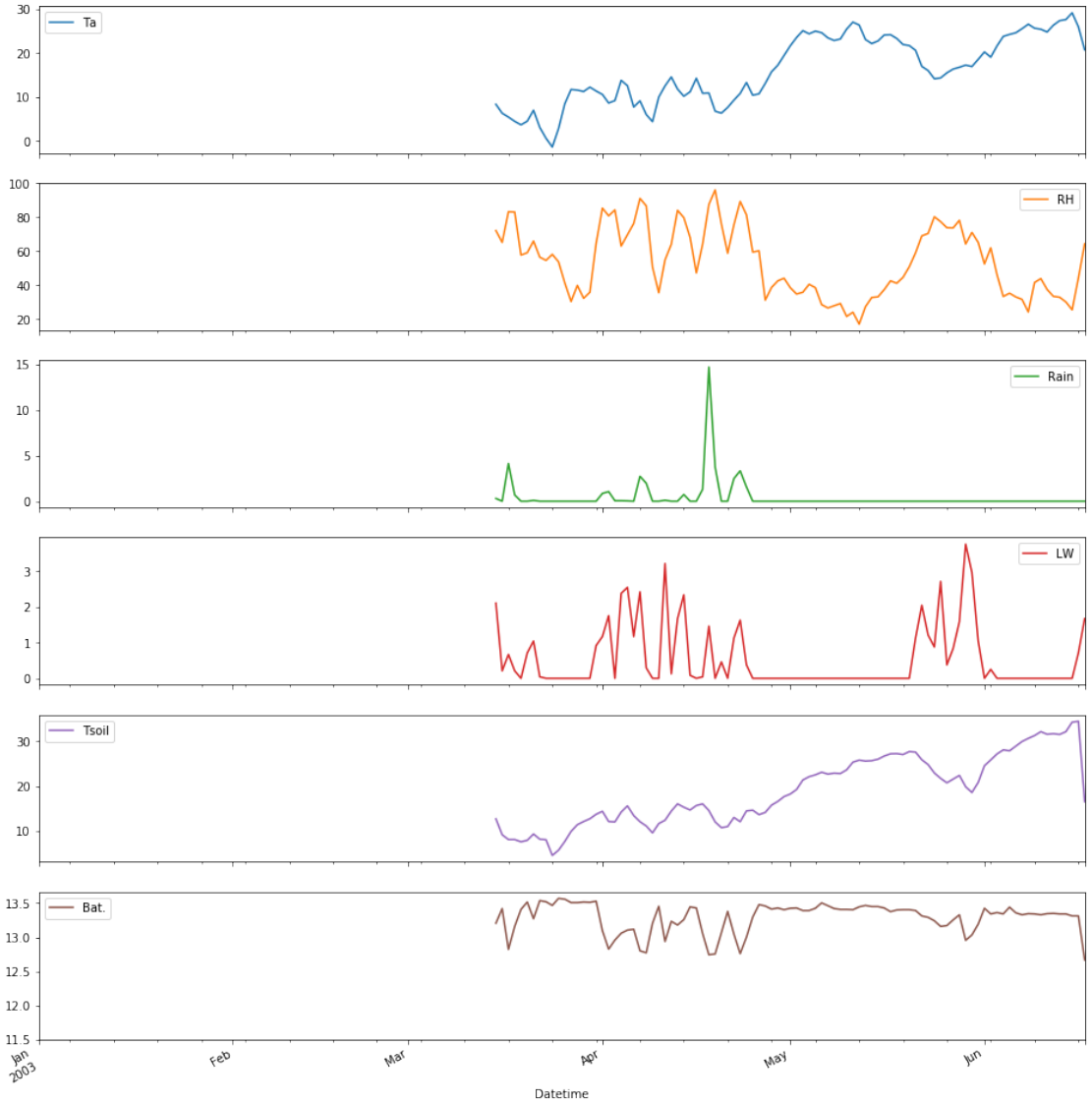
In [5]:
```
# Hydrological year 2002-2003
data_2002_03 = pd.concat([data['2002-09-01':'2003-08-31']])
data_2002_03.head()
```

Out[5]:

Datetime	Ta	RH	Rain	LW	Tsoil	Bat.
2003-01-01 00:00:00	10.4	87.6	0.0	0	11	11.6
2003-03-15 04:00:00	7.1	70.1	0.0	0	12	12.8
2003-03-15 05:00:00	6.7	74.4	0.0	0	12	12.8
2003-03-15 06:00:00	6.2	77.3	0.0	0	11	12.8
2003-03-15 07:00:00	6.3	77.1	0.0	0	11	12.8

In [6]:
```
# Figure of all parameters on a daily basis for hydrological year 2002-2003
data_2002_03.resample('D').mean().plot(subplots=True,figsize=(16,18))
```

```
Out[6]: array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f20df5d7810>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20ddca2110>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20ddc19fd0>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20ddc0bb50>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20ddb12a50>,
               <matplotlib.axes._subplots.AxesSubplot object at 0x7f20ddb08050>], dtype=object)
```



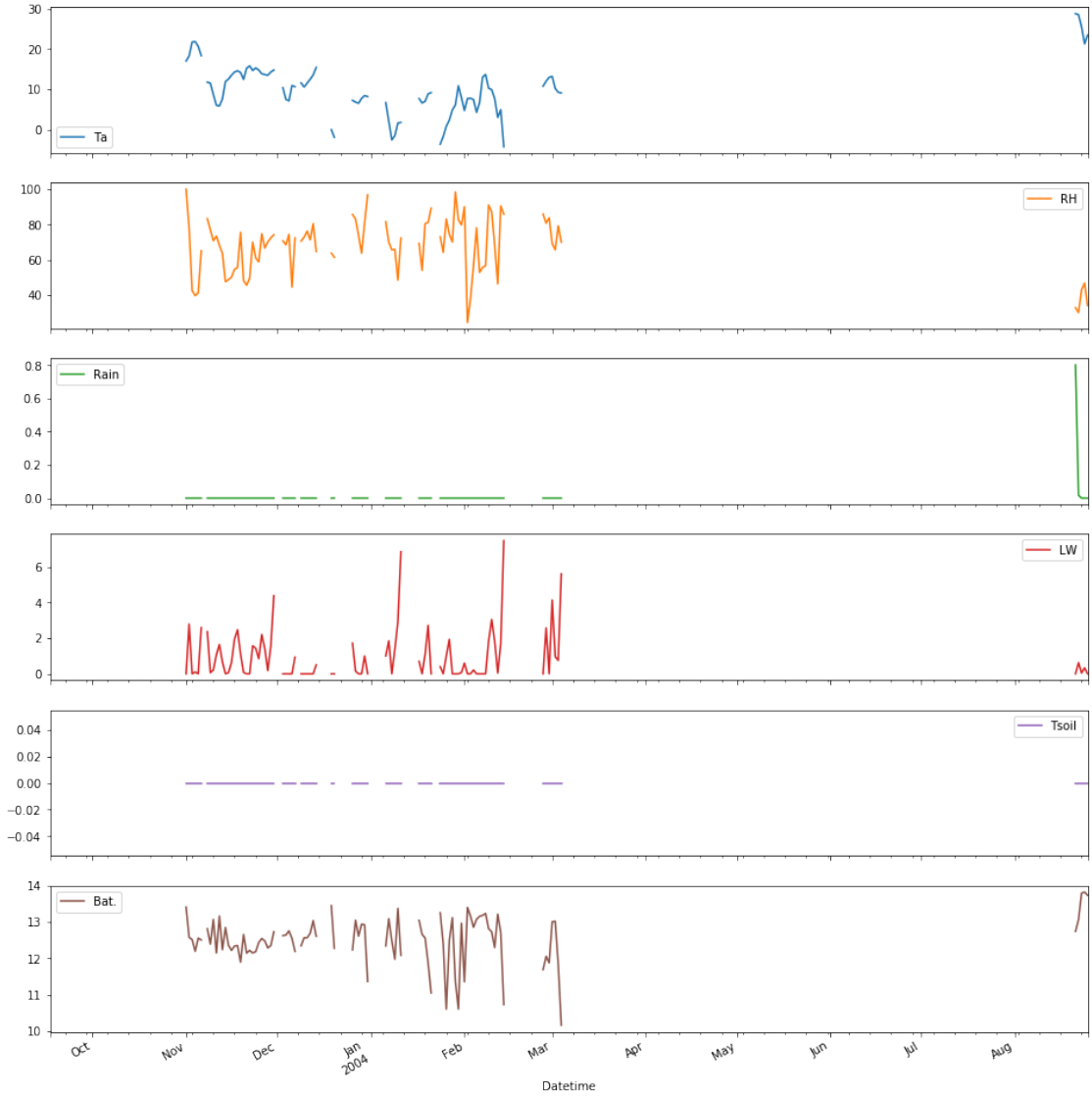

```
In [7]: # Hydrological year 2003-2004
        data_2003_04 = pd.concat([data['2003-09-01':'2004-08-31']])
        data_2003_04.head()
```

```
Out[7]:                      Ta    RH  Rain  LW  Tsoil  Bat.
        Datetime
```

```
2003-09-17 09:00:00  21.1  29.5   0.0   0      0  11.2
2003-09-17 11:00:00  20.8  31.5   0.0   0      0  13.1
2003-09-17 12:00:00  20.7  35.7   0.0   0      0  12.5
2003-09-17 13:00:00  21.2  38.8   0.0   0      0  12.8
2003-09-17 14:00:00  19.8  45.8   0.0   0      0  12.6
```

In [8]:
```
# Figure of all parameters on a daily basis for hydrological year 2003-2004
data_2003_04.resample('D').mean().plot(subplots=True,figsize=(16,18))
```

Out[8]:
```
array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f20dd70a090>,
       <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dd620750>,
       <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dd5a8490>,
       <matplotlib.axes._subplots.AxesSubplot object at 0x7f20ddab4810>,
       <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dd520e10>,
       <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dd494690>], dtype=object)
```



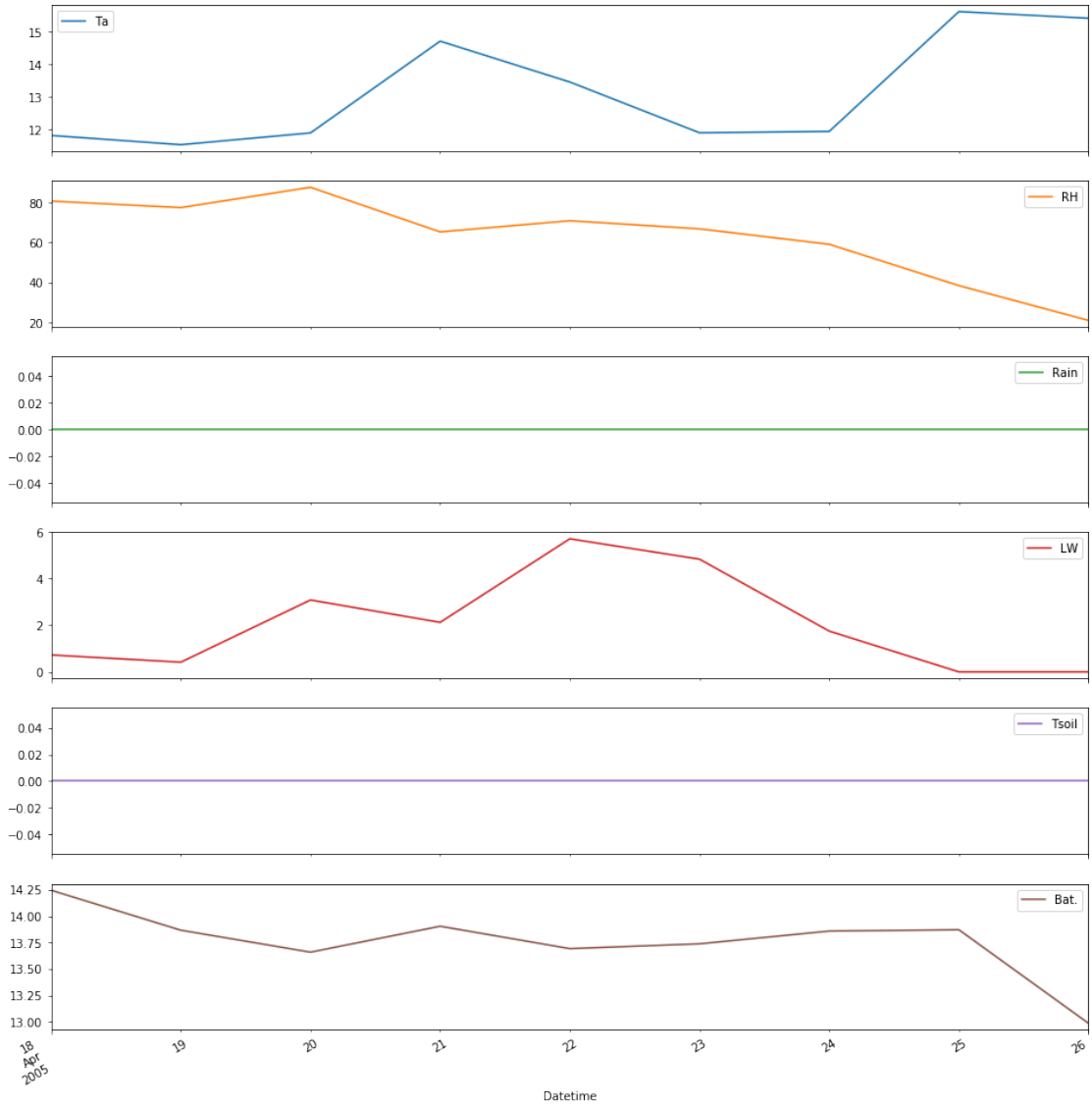
```
In [9]: # Hydrological year 2004-2005
        data_2004_05 = pd.concat([data['2004-09-01':'2005-08-31']])
        data_2004_05.head()
```

Out[9]:

Datetime	Ta	RH	Rain	LW	Tsoil	Bat.
2005-04-18 13:00:00	13.1	78.6	0.0	2	0	15.3
2005-04-18 14:00:00	13.4	73.7	0.0	0	0	15.4
2005-04-18 15:00:00	13.2	71.4	0.0	0	0	15.4
2005-04-18 16:00:00	13.1	73.0	0.0	0	0	15.3
2005-04-18 17:00:00	12.9	75.8	0.0	0	0	15.4

```
In [10]: # Figure of all parameters on a daily basis for hydrological year 2004-2005
         data_2004_05.resample('D').mean().plot(subplots=True,figsize=(16,18))
```

```
Out[10]: array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f20dccd2190>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dccad810>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dcc35490>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dcba6690>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dcb2d650>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dcedfb50>], dtype=objec
```



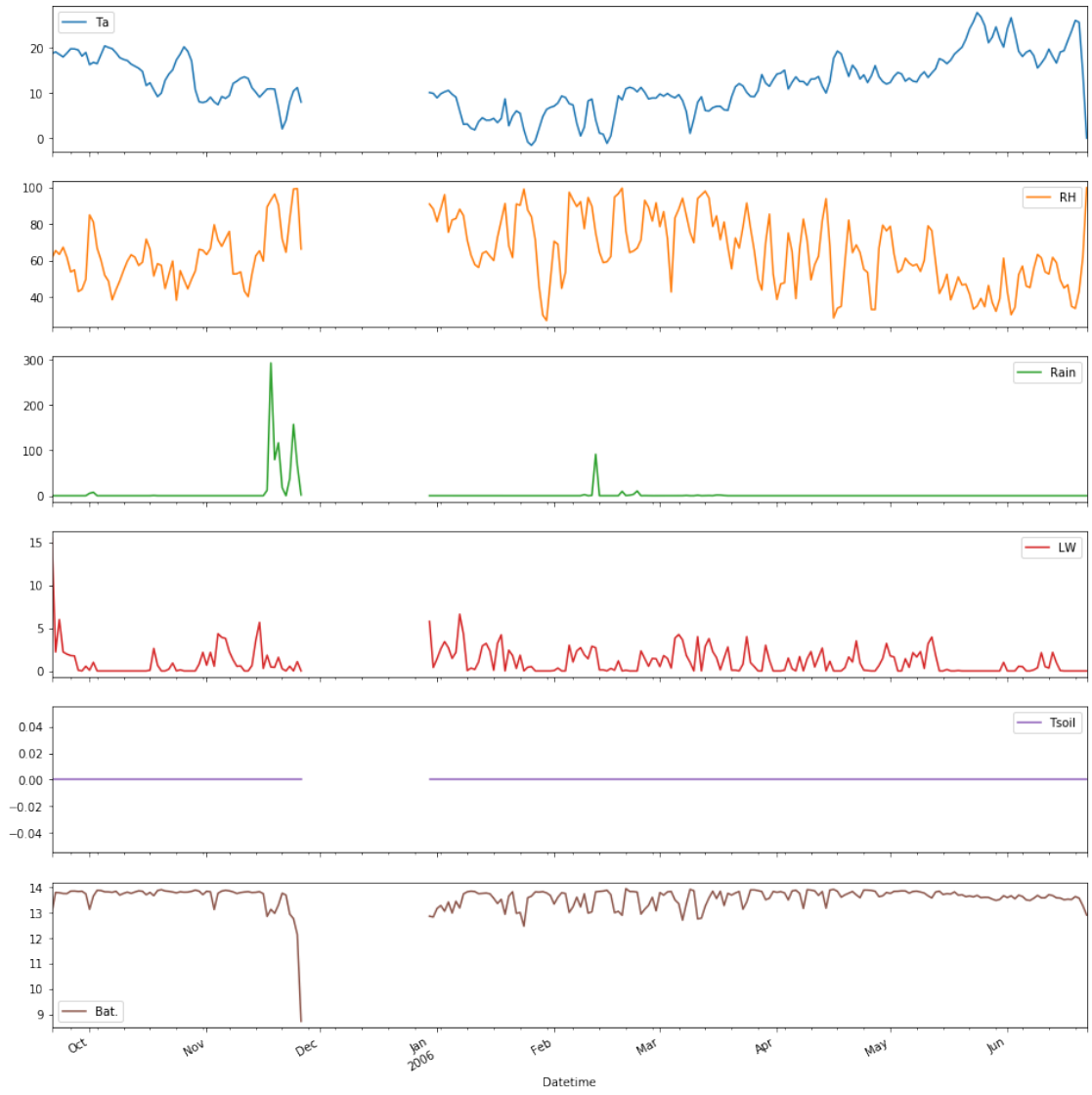
In [11]:
```
# Hydrological year 2005-2006
data_2005_06 = pd.concat([data['2005-09-01':'2006-08-31']])
data_2005_06.head()
```

Out[11]:

Datetime	Ta	RH	Rain	LW	Tsoil	Bat.
2005-09-21 22:00:00	18.5	63.9	0.0	24	0	13.0
2005-09-21 23:00:00	18.8	58.8	0.0	7	0	13.0
2005-09-22 00:00:00	18.6	58.6	0.0	7	0	13.0
2005-09-22 01:00:00	18.0	66.6	0.0	0	0	13.0
2005-09-22 02:00:00	17.4	73.9	0.0	0	0	13.0

In [12]:
```
# Figure of all parameters on a daily basis for hydrological year 2005-2006
data_2005_06.resample('D').mean().plot(subplots=True,figsize=(16,18))
```

```
Out[12]: array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f20dc9c3f50>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dc8fec90>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dc885b90>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dc7f7610>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dc77f510>,
                <matplotlib.axes._subplots.AxesSubplot object at 0x7f20dc6e6ad0>], dtype=object
```



1.0.3 Evaluation

This data set cannot be used for the purpose of this study, since there is no full dataset for any hydrological year.

```
In [ ]:
```