

In [2]:

```
# This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import geopandas as gpd # Geopandas for working with geospatial data
import matplotlib.pyplot as plt # matplotlib to make data visualization
import matplotlib.dates as mdates
from shapely.geometry import Point, Polygon # Polygon to draw shapes on the map
from datetime import datetime as dt

import folium # Interactive map framework
from folium import Choropleth, Circle, Marker
from folium.plugins import HeatMap, MarkerCluster

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all files
under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input/hackathon/data_dir'): # Folder that
contains data
    for filename in filenames:
        if 'csv' in filename:
            print(os.path.join(dirname, filename))

df = pd.read_csv('/kaggle/input/hackathon/data_dir/dataset.csv')
df.head()

# You can write up to 20GB to the current directory (/kaggle/working/) that gets preserve
d as output when you create a version using "Save & Run All"
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of
the current session
```

/kaggle/input/hackathon/data_dir/dataset.csv

Out[2]:

	datetime	app_id	dev_id	time	FixAge	Lat	Lon	SatInFix	TimeActive	altitude
0	2020-09-14 00:00:22.377	mijnomgeving	357518080163405	1600041622377	27.0	52.372940	4.916176	11.0	19837.0	8.0
1	2020-09-14 00:00:48.689	mijnomgeving	357518080497423	1600041648689	18.0	52.523019	5.590186	6.0	36035.0	-21.0
2	2020-09-14 00:01:21.423	mijnomgeving	357518080203151	1600041681423	2.0	52.420861	4.860095	5.0	4118456.0	6.0
3	2020-09-14 00:01:27.024	mijnomgeving	357518080328131	1600041687024	20.0	52.391188	4.935864	4.0	9031.0	-100.0
4	2020-09-14 00:01:34.856	mijnomgeving	357518080495195	1600041694856	15.0	52.301223	5.360437	7.0	53131.0	3.0

5 rows x 21 columns

Plot the points of 'Lon' and 'Lat' as heatmap on the map

In [33]:

```
nl_map = folium.Map(location=[52.2129919, 5.2793703], titles='openstreetmap', zoom_start=8)

df=df.dropna(subset=['Lon'])
df=df.dropna(subset=['Lat'])

HeatMap(data=df[['Lat', 'Lon']], radius=10).add_to(nl_map)
```



ebook

In [6]:

```
normalized_df = df.dropna(subset=['datetime', 'waterEC'])
normalized_df = normalized_df.sort_values(by = ['imei'], ascending=True)

datetimes = []

for row in normalized_df.itertuples(index=True, name='Pandas'):
    datetimes.append((dt.strptime(getattr(row, "datetime"), "%Y-%m-%d %H:%M:%S.%f"), get
    attr(row, "waterEC"), getattr(row, "imei")))
grouped = normalized_df.groupby(normalized_df['imei'])

unique_imeis = df.imei.unique()

imeis = {}

# Create dictionary with dataframes of all unique IMEIs
for i in range(len(unique_imeis)):
    imeis[i] = grouped.get_group(unique_imeis[i])
```

	0:	datetime	app_id	dev_id	time \
427	2020-09-14 02:44:52.047	mijnomgeving	357518080163405	1600051492047	
542	2020-09-14 03:30:02.897	mijnomgeving	357518080163405	1600054202897	
350	2020-09-14 02:14:52.352	mijnomgeving	357518080163405	1600049692352	
504	2020-09-14 03:15:07.302	mijnomgeving	357518080163405	1600053307302	
502	2020-09-14 02:44:50.052	mijnomgeving	357518080163405	1600055000052	

```

582 2020-09-14 03:44:59.053 mijnomgeving 357518080163405 1600055099053
...
3675 2020-09-14 23:46:22.385 mijnomgeving 357518080163405 1600127182385
3599 2020-09-14 23:16:16.439 mijnomgeving 357518080163405 1600125376439
78 2020-09-14 00:29:53.981 mijnomgeving 357518080163405 1600043393981
3636 2020-09-14 23:31:15.342 mijnomgeving 357518080163405 1600126275342
156 2020-09-14 00:59:56.083 mijnomgeving 357518080163405 1600045196083

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FixAge Lat Lon SatInFix TimeActive altitude ... \
427 1.0 52.373274 4.916510 6.0 29711.0 76.0 ...
542 3.0 52.372906 4.916124 5.0 32422.0 5.0 ...
350 2.0 52.372722 4.916207 5.0 27912.0 0.0 ...
504 3.0 52.373028 4.916277 4.0 31513.0 14.0 ...
582 8.0 52.373092 4.915996 4.0 33318.0 -16.0 ...
...
3675 10.0 52.373021 4.915525 4.0 35120.0 0.0 ...
3599 3.0 52.373068 4.915594 5.0 33313.0 -3.0 ...
78 2.0 52.372706 4.916491 10.0 21612.0 -77.0 ...
3636 3.0 52.373107 4.915754 5.0 34213.0 20.0 ...
156 3.0 52.372863 4.916156 5.0 23413.0 18.0 ...

```

```

boardTemperature course imei lastResetCause speed \
427 12.0 0.0 3.575181e+14 32.0 0.0
542 12.0 0.0 3.575181e+14 32.0 0.0
350 12.0 0.0 3.575181e+14 32.0 0.0
504 12.0 0.0 3.575181e+14 32.0 0.0
582 12.0 0.0 3.575181e+14 32.0 0.0
...
3675 16.0 238.0 3.575181e+14 32.0 1.0
3599 17.0 219.0 3.575181e+14 32.0 0.0
78 13.0 215.0 3.575181e+14 32.0 0.0
3636 16.0 0.0 3.575181e+14 32.0 0.0
156 12.0 37.0 3.575181e+14 32.0 0.0

```

```

timestamp waterEC waterTemperature pH \
427 1.600051e+09 32.0 19.32 NaN
542 1.600054e+09 36.0 19.41 NaN
350 1.600050e+09 34.0 19.32 NaN
504 1.600053e+09 36.0 19.32 NaN
582 1.600055e+09 39.0 19.32 NaN
...
3675 1.600127e+09 78.0 19.50 NaN
3599 1.600125e+09 72.0 19.50 NaN
78 1.600043e+09 36.0 19.41 NaN
3636 1.600126e+09 74.0 19.50 NaN
156 1.600045e+09 37.0 19.32 NaN

```

```

name
427 Error: certificate has expired : https://dev.s...
542 Error: certificate has expired : https://dev.s...
350 Error: certificate has expired : https://dev.s...
504 Error: certificate has expired : https://dev.s...
582 Error: certificate has expired : https://dev.s...
...
3675 EC 226
3599 EC 226
78 Error: certificate has expired : https://dev.s...
3636 EC 226
156 Error: certificate has expired : https://dev.s...

```

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[79 rows x 21 columns], 1:
time \
3583 2020-09-14 23:10:52.325 mijnomgeving 357518080497423 1600125052325
544 2020-09-14 03:30:44.367 mijnomgeving 357518080497423 1600054244367
1433 2020-09-14 09:15:32.296 mijnomgeving 357518080497423 1600074932296
3006 2020-09-14 19:25:33.310 mijnomgeving 357518080497423 1600111533310
1661 2020-09-14 10:45:29.532 mijnomgeving 357518080497423 1600080329532
...
780 2020-09-14 05:00:43.859 mijnomgeving 357518080497423 1600059643859
1013 2020-09-14 06:30:35.278 mijnomgeving 357518080497423 1600065035278
1736 2020-09-14 11:15:34.547 mijnomgeving 357518080497423 1600082134547
3621 2020-09-14 23:25:33.955 mijnomgeving 357518080497423 1600125933955
3255 2020-09-14 21:40:22.858 mijnomgeving 357518080497423 1600110622858

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3355 2020-09-14 21:40:33.858 mijnomgeving 357518080497423 1600119633838

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
3583	16.0	52.523139	5.590236	7.0	27033.0	7.0	...	
544	0.0	52.523083	5.590519	6.0	48617.0	-5.0	...	
1433	0.0	52.522983	5.590171	5.0	69318.0	-45.0	...	
3006	0.0	52.523005	5.590223	7.0	13517.0	-12.0	...	
1661	1.0	52.523040	5.590174	5.0	74718.0	-15.0	...	
...	
780	14.0	52.522974	5.590237	4.0	54031.0	-36.0	...	
1013	1.0	52.523004	5.590277	5.0	59418.0	-59.0	...	
1736	2.0	52.523405	5.590328	4.0	76519.0	-52.0	...	
3621	1.0	52.523035	5.590146	7.0	27918.0	21.0	...	
3355	1.0	52.522941	5.589976	6.0	21618.0	9.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
3583	14.0	8.0	3.575181e+14	32.0	0.0	
544	8.0	41.0	3.575181e+14	32.0	0.0	
1433	27.0	243.0	3.575181e+14	32.0	0.0	
3006	16.0	209.0	3.575181e+14	32.0	0.0	
1661	32.0	30.0	3.575181e+14	32.0	0.0	
...	
780	9.0	215.0	3.575181e+14	32.0	0.0	
1013	12.0	207.0	3.575181e+14	32.0	0.0	
1736	33.0	9.0	3.575181e+14	32.0	0.0	
3621	13.0	252.0	3.575181e+14	32.0	0.0	
3355	14.0	42.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
3583	1.600125e+09	3292.0	17.74	NaN	
544	1.600054e+09	3366.0	16.59	NaN	
1433	1.600075e+09	3367.0	16.50	NaN	
3006	1.600112e+09	3361.0	17.21	NaN	
1661	1.600080e+09	3368.0	16.68	NaN	
...	
780	1.600060e+09	3364.0	16.50	NaN	
1013	1.600065e+09	3361.0	16.42	NaN	
1736	1.600082e+09	3358.0	16.86	NaN	
3621	1.600126e+09	3279.0	17.74	NaN	
3355	1.600120e+09	3335.0	17.83	NaN	

	name
3583	EC 318
544	Error: certificate has expired : https://dev.s...
1433	Error: certificate has expired : https://dev.s...
3006	Error: certificate has expired : https://dev.s...
1661	Error: certificate has expired : https://dev.s...
...	...
780	Error: certificate has expired : https://dev.s...
1013	Error: certificate has expired : https://dev.s...
1736	Error: certificate has expired : https://dev.s...
3621	EC 318
3355	EC 318

[97 rows x 21 columns], 2:

	datetime	app_id	dev_id
time \			
1396	2020-09-14 09:01:38.857	mijnomgeving	357518080203151 1600074098857
278	2020-09-14 01:46:56.356	mijnomgeving	357518080203151 1600048016356
2362	2020-09-14 15:16:22.538	mijnomgeving	357518080203151 1600096582538
2601	2020-09-14 16:47:35.335	mijnomgeving	357518080203151 1600102055335
2480	2020-09-14 16:01:34.604	mijnomgeving	357518080203151 1600099294604
...
1055	2020-09-14 06:46:25.851	mijnomgeving	357518080203151 1600065985851
3293	2020-09-14 21:16:24.909	mijnomgeving	357518080203151 1600118184909
1211	2020-09-14 07:47:53.525	mijnomgeving	357518080203151 1600069673525
3218	2020-09-14 20:46:17.019	mijnomgeving	357518080203151 1600116377019
3637	2020-09-14 23:31:19.349	mijnomgeving	357518080203151 1600126279349

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1396	3.0	52.420896	4.860059	5.0	4150857.0	-5.0	...	
278	1.0	52.420924	4.860030	5.0	4124755.0	0.0	...	
2362	3.0	52.420825	4.860274	5.0	4173357.0	-30.0	...	
2601	1.0	52.420757	4.860180	4.0	4170760.0	10.0	...	

2601	13.0	52.420737	4.860189	4.0	4178768.0	10.0	...
2480	5.0	52.420790	4.860076	4.0	4176059.0	13.0	...
...
1055	2.0	52.420824	4.860034	6.0	4142756.0	1.0	...
3293	9.0	52.421087	4.859690	5.0	4194964.0	69.0	...
1211	21.0	52.420767	4.860141	6.0	4146376.0	11.0	...
3218	2.0	52.420968	4.859835	6.0	4193157.0	-11.0	...
3637	5.0	52.420909	4.860030	4.0	4203059.0	7.0	...

	boardTemperature	course	imei	lastResetCause	speed	\
1396	18.0	0.0	3.575181e+14	32.0	0.0	
278	13.0	0.0	3.575181e+14	32.0	0.0	
2362	32.0	0.0	3.575181e+14	32.0	0.0	
2601	24.0	7.0	3.575181e+14	32.0	0.0	
2480	24.0	0.0	3.575181e+14	32.0	0.0	
...	
1055	14.0	0.0	3.575181e+14	32.0	0.0	
3293	17.0	48.0	3.575181e+14	32.0	0.0	
1211	16.0	5.0	3.575181e+14	32.0	3.0	
3218	17.0	22.0	3.575181e+14	32.0	0.0	
3637	18.0	227.0	3.575181e+14	32.0	1.0	

	timestamp	waterEC	waterTemperature	pH	\
1396	1.600074e+09	0.0	0.0	NaN	
278	1.600048e+09	0.0	0.0	NaN	
2362	1.600097e+09	0.0	0.0	NaN	
2601	1.600102e+09	0.0	0.0	NaN	
2480	1.600099e+09	0.0	0.0	NaN	
...
1055	1.600066e+09	0.0	0.0	NaN	
3293	1.600118e+09	0.0	0.0	NaN	
1211	1.600070e+09	0.0	0.0	NaN	
3218	1.600116e+09	0.0	0.0	NaN	
3637	1.600126e+09	0.0	0.0	NaN	

	name
1396	Error: certificate has expired : https://dev.s...
278	Error: certificate has expired : https://dev.s...
2362	Error: certificate has expired : https://dev.s...
2601	Error: certificate has expired : https://dev.s...
2480	Error: certificate has expired : https://dev.s...
...	...
1055	Error: certificate has expired : https://dev.s...
3293	EC Prototype 001
1211	Error: certificate has expired : https://dev.s...
3218	EC Prototype 001
3637	EC Prototype 001

[96 rows x 21 columns], 3:			datetime	app_id	dev_id
time	\				
2633	2020-09-14 17:01:13.068	mijnomgeving	357518080328131	1600102873068	
2203	2020-09-14 14:16:25.415	mijnomgeving	357518080328131	1600092985415	
2595	2020-09-14 16:46:22.187	mijnomgeving	357518080328131	1600101982187	
158	2020-09-14 01:01:11.774	mijnomgeving	357518080328131	1600045271774	
1280	2020-09-14 08:16:12.770	mijnomgeving	357518080328131	1600071372770	
...
1357	2020-09-14 08:46:04.662	mijnomgeving	357518080328131	1600073164662	
3256	2020-09-14 21:01:18.678	mijnomgeving	357518080328131	1600117278678	
3100	2020-09-14 20:01:11.419	mijnomgeving	357518080328131	1600113671419	
1624	2020-09-14 10:31:09.820	mijnomgeving	357518080328131	1600079469820	
3409	2020-09-14 22:01:07.802	mijnomgeving	357518080328131	1600120867802	

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
2633	11.0	52.391840	4.936445	4.0	70221.0	-59.0	...	
2203	21.0	52.391703	4.936015	6.0	60331.0	2.0	...	
2595	6.0	52.391812	4.936353	4.0	69317.0	-21.0	...	
158	11.0	52.391522	4.936167	6.0	12621.0	-26.0	...	
1280	10.0	52.391628	4.935996	4.0	38720.0	-19.0	...	
...	
1357	5.0	52.391559	4.936002	5.0	40515.0	0.0	...	
3256	18.0	52.391863	4.936169	4.0	84629.0	-33.0	...	
3100	9.0	52.391780	4.936162	5.0	81019.0	3.0	...	
1624	7.0	52.391677	4.935760	6.0	46018.0	0.0	...	

1624	7.0	52.391677	4.935762	6.0	46818.0	-2.0	...
3409	4.0	52.391572	4.935924	4.0	88215.0	-46.0	...

	boardTemperature	course	imei	lastResetCause	speed	\
2633	21.0	219.0	3.575181e+14	32.0	1.0	
2203	24.0	0.0	3.575181e+14	32.0	0.0	
2595	21.0	0.0	3.575181e+14	32.0	0.0	
158	12.0	5.0	3.575181e+14	32.0	0.0	
1280	16.0	16.0	3.575181e+14	32.0	0.0	
...	
1357	16.0	254.0	3.575181e+14	32.0	0.0	
3256	17.0	25.0	3.575181e+14	32.0	0.0	
3100	17.0	0.0	3.575181e+14	32.0	0.0	
1624	19.0	46.0	3.575181e+14	32.0	0.0	
3409	16.0	0.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
2633	1.600103e+09	4957.0	20.56	NaN	
2203	1.600093e+09	5019.0	20.38	NaN	
2595	1.600102e+09	4935.0	20.73	NaN	
158	1.600045e+09	5189.0	18.44	NaN	
1280	1.600071e+09	5182.0	18.09	NaN	
...	
1357	1.600073e+09	5164.0	18.27	NaN	
3256	1.600117e+09	4989.0	20.03	NaN	
3100	1.600114e+09	5016.0	20.12	NaN	
1624	1.600079e+09	5092.0	18.80	NaN	
3409	1.600121e+09	5016.0	19.94	NaN	

	name
2633	Error: certificate has expired : https://dev.s...
2203	Error: certificate has expired : https://dev.s...
2595	Error: certificate has expired : https://dev.s...
158	Error: certificate has expired : https://dev.s...
1280	Error: certificate has expired : https://dev.s...
...	...
1357	Error: certificate has expired : https://dev.s...
3256	EC 230
3100	Error: certificate has expired : https://dev.s...
1624	Error: certificate has expired : https://dev.s...
3409	EC 230

[96 rows x 21 columns], 4:

	datetime	app_id	dev_id
time \			
119	2020-09-14 00:46:14.108	mijnomgeving	357518080495195 1600044374108
3113	2020-09-14 20:06:01.631	mijnomgeving	357518080495195 1600113961631
3649	2020-09-14 23:35:38.094	mijnomgeving	357518080495195 1600126538094
41	2020-09-14 00:16:17.008	mijnomgeving	357518080495195 1600042577008
81	2020-09-14 00:31:16.980	mijnomgeving	357518080495195 1600043476980
...
1327	2020-09-14 08:32:40.745	mijnomgeving	357518080495195 1600072360745
2134	2020-09-14 13:47:41.348	mijnomgeving	357518080495195 1600091261348
2485	2020-09-14 16:02:59.900	mijnomgeving	357518080495195 1600099379900
2564	2020-09-14 16:32:34.605	mijnomgeving	357518080495195 1600101154605
1632	2020-09-14 10:32:36.862	mijnomgeving	357518080495195 1600079556862

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
119	0.0	52.301074	5.360637	5.0	55818.0	-10.0	...	
3113	15.0	52.301227	5.360452	7.0	8132.0	-3.0	...	
3649	0.0	52.301179	5.360440	8.0	20718.0	-16.0	...	
41	1.0	52.301135	5.360476	6.0	54018.0	-5.0	...	
81	0.0	52.301164	5.360403	6.0	54918.0	-10.0	...	
...	
1327	0.0	52.301251	5.360340	6.0	16219.0	-8.0	...	
2134	0.0	52.301157	5.360468	9.0	35119.0	-11.0	...	
2485	17.0	52.301117	5.360448	10.0	43236.0	-19.0	...	
2564	0.0	52.301163	5.360482	9.0	45019.0	-10.0	...	
1632	1.0	52.301184	5.360387	9.0	23419.0	-9.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
119	10.0	228.0	3.575181e+14	32.0	0.0	
3113	16.0	228.0	3.575181e+14	32.0	0.0	
3649	14.0	5.0	3.575181e+14	32.0	0.0	

3649	14.0	5.0	3.575181e+14	32.0	0.0
41	10.0	232.0	3.575181e+14	32.0	0.0
81	9.0	239.0	3.575181e+14	32.0	0.0
...
1327	21.0	210.0	3.575181e+14	32.0	0.0
2134	35.0	253.0	3.575181e+14	32.0	0.0
2485	37.0	231.0	3.575181e+14	32.0	0.0
2564	35.0	217.0	3.575181e+14	32.0	0.0
1632	29.0	43.0	3.575181e+14	32.0	0.0

	timestamp	waterEC	waterTemperature	pH	\
119	1.600044e+09	1672.0	17.65	NaN	
3113	1.600114e+09	1743.0	19.24	NaN	
3649	1.600127e+09	1752.0	19.06	NaN	
41	1.600043e+09	1672.0	17.74	NaN	
81	1.600043e+09	1672.0	17.74	NaN	
...
1327	1.600072e+09	1723.0	17.56	NaN	
2134	1.600091e+09	1714.0	19.68	NaN	
2485	1.600099e+09	1729.0	18.88	NaN	
2564	1.600101e+09	1735.0	19.15	NaN	
1632	1.600080e+09	1731.0	18.35	NaN	

	name
119	Error: certificate has expired : https://dev.s...
3113	EC 301
3649	EC 301
41	Error: certificate has expired : https://dev.s...
81	Error: certificate has expired : https://dev.s...
...	...
1327	Error: certificate has expired : https://dev.s...
2134	Error: certificate has expired : https://dev.s...
2485	Error: certificate has expired : https://dev.s...
2564	Error: certificate has expired : https://dev.s...
1632	Error: certificate has expired : https://dev.s...

[97 rows x 21 columns], 5:

	time	\	datetime	app_id	dev_id
1245	2020-09-14	08:01:57.252	mijnomgeving	354444115138499	1600070517252
277	2020-09-14	01:46:55.160	mijnomgeving	354444115138499	1600048015160
1359	2020-09-14	08:46:39.915	mijnomgeving	354444115138499	1600073199915
1397	2020-09-14	09:01:49.155	mijnomgeving	354444115138499	1600074109155
123	2020-09-14	00:47:06.056	mijnomgeving	354444115138499	1600044426056
...
2010	2020-09-14	13:02:04.659	mijnomgeving	354444115138499	1600088524659
2284	2020-09-14	14:46:46.775	mijnomgeving	354444115138499	1600094806775
3677	2020-09-14	23:46:42.148	mijnomgeving	354444115138499	1600127202148
2716	2020-09-14	17:31:52.880	mijnomgeving	354444115138499	1600104712880
2167	2020-09-14	14:01:54.927	mijnomgeving	354444115138499	1600092114927

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1245	255.0	0.000025	0.000025	0.0	346653.0	0.0	...	
277	255.0	0.000025	0.000025	0.0	324147.0	0.0	...	
1359	255.0	0.000025	0.000025	0.0	349338.0	0.0	...	
1397	255.0	0.000025	0.000025	0.0	350238.0	0.0	...	
123	255.0	0.000025	0.000025	0.0	320547.0	0.0	...	
...
2010	255.0	0.000025	0.000025	0.0	364638.0	0.0	...	
2284	255.0	0.000025	0.000025	0.0	370938.0	0.0	...	
3677	255.0	0.000025	0.000025	0.0	403338.0	0.0	...	
2716	255.0	0.000025	0.000025	0.0	380847.0	0.0	...	
2167	255.0	0.000025	0.000025	0.0	368238.0	0.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
1245	24.0	0.0	3.544441e+14	64.0	0.0	
277	24.0	0.0	3.544441e+14	64.0	0.0	
1359	23.0	0.0	3.544441e+14	64.0	0.0	
1397	24.0	0.0	3.544441e+14	64.0	0.0	
123	24.0	0.0	3.544441e+14	64.0	0.0	
...
2010	24.0	0.0	3.544441e+14	64.0	0.0	
2284	24.0	0.0	3.544441e+14	64.0	0.0	
3677	24.0	0.0	3.544441e+14	64.0	0.0	

3677	24.0	0.0	3.544441e+14	64.0	0.0
2716	24.0	0.0	3.544441e+14	64.0	0.0
2167	24.0	0.0	3.544441e+14	64.0	0.0

	timestamp	waterEC	waterTemperature	pH	\
1245	1.600071e+09	0.0	22.41	NaN	
277	1.600048e+09	1.0	22.32	NaN	
1359	1.600073e+09	0.0	22.41	NaN	
1397	1.600074e+09	2.0	22.41	NaN	
123	1.600044e+09	1.0	22.41	NaN	
...	
2010	1.600088e+09	0.0	22.67	NaN	
2284	1.600095e+09	0.0	22.67	NaN	
3677	1.600127e+09	2.0	22.59	NaN	
2716	1.600105e+09	0.0	22.67	NaN	
2167	1.600092e+09	0.0	22.67	NaN	

	name
1245	Error: certificate has expired : https://dev.s...
277	Error: certificate has expired : https://dev.s...
1359	Error: certificate has expired : https://dev.s...
1397	Error: certificate has expired : https://dev.s...
123	Error: certificate has expired : https://dev.s...
...	...
2010	Error: certificate has expired : https://dev.s...
2284	Error: certificate has expired : https://dev.s...
3677	EC 401
2716	Error: certificate has expired : https://dev.s...
2167	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 6:

	datetime	app_id	dev_id
time \			
1323	2020-09-14 08:32:07.326	mijnomgeving	357518080495161
3295	2020-09-14 21:17:29.244	mijnomgeving	357518080495161
3065	2020-09-14 19:47:20.633	mijnomgeving	357518080495161
3104	2020-09-14 20:02:21.449	mijnomgeving	357518080495161
862	2020-09-14 05:32:12.446	mijnomgeving	357518080495161
...
824	2020-09-14 05:17:05.548	mijnomgeving	357518080495161
746	2020-09-14 04:47:04.420	mijnomgeving	357518080495161
666	2020-09-14 04:17:10.717	mijnomgeving	357518080495161
1704	2020-09-14 11:02:22.726	mijnomgeving	357518080495161
1853	2020-09-14 12:02:08.146	mijnomgeving	357518080495161

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1323	8.0	52.499728	5.452747	4.0	1464327.0	12.0	...	
3295	32.0	52.499665	5.452884	7.0	1510252.0	0.0	...	
3065	24.0	52.499800	5.452556	4.0	1504844.0	-29.0	...	
3104	22.0	52.499704	5.452912	6.0	1505742.0	-8.0	...	
862	13.0	52.499889	5.453105	5.0	1453533.0	47.0	...	
...	
824	5.0	52.499780	5.452708	5.0	1452625.0	-29.0	...	
746	5.0	52.499725	5.453032	4.0	1450825.0	-30.0	...	
666	3.0	52.499716	5.452892	4.0	1449023.0	30.0	...	
1704	25.0	52.499703	5.452874	4.0	1473345.0	-1.0	...	
1853	9.0	52.499546	5.452627	4.0	1476929.0	11.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
1323	29.0	253.0	3.575181e+14	32.0	0.0	
3295	17.0	24.0	3.575181e+14	32.0	0.0	
3065	18.0	227.0	3.575181e+14	32.0	0.0	
3104	18.0	4.0	3.575181e+14	32.0	0.0	
862	10.0	24.0	3.575181e+14	32.0	1.0	
...	
824	10.0	22.0	3.575181e+14	32.0	0.0	
746	10.0	59.0	3.575181e+14	32.0	0.0	
666	10.0	0.0	3.575181e+14	32.0	1.0	
1704	26.0	200.0	3.575181e+14	32.0	0.0	
1853	24.0	0.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
1323	1.600072e+09	639.0	15.53	NaN	
3295	1.600118e+09	655.0	15.60	NaN	

3295	1.600118e+09	655.0	15.62	NaN
3065	1.600113e+09	652.0	15.62	NaN
3104	1.600114e+09	652.0	15.62	NaN
862	1.600062e+09	657.0	15.53	NaN
...
824	1.600061e+09	655.0	15.53	NaN
746	1.600059e+09	650.0	15.53	NaN
666	1.600057e+09	644.0	15.53	NaN
1704	1.600081e+09	645.0	15.53	NaN
1853	1.600085e+09	647.0	15.53	NaN

	name
1323	Error: certificate has expired : https://dev.s...
3295	EC 315
3065	Error: certificate has expired : https://dev.s...
3104	EC 315
862	Error: certificate has expired : https://dev.s...
...	...
824	Error: certificate has expired : https://dev.s...
746	Error: certificate has expired : https://dev.s...
666	Error: certificate has expired : https://dev.s...
1704	Error: certificate has expired : https://dev.s...
1853	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 7:				datetime	app_id	dev_id
time \						
550	2020-09-14 03:32:19.018	mijnomgeving	357518080170889	1600054339018		
588	2020-09-14 03:46:59.944	mijnomgeving	357518080170889	1600055219944		
1777	2020-09-14 11:31:58.878	mijnomgeving	357518080170889	1600083118878		
1246	2020-09-14 08:02:18.171	mijnomgeving	357518080170889	1600070538171		
3328	2020-09-14 21:29:30.039	mijnomgeving	357518080170889	1600118970039		
...		
861	2020-09-14 05:31:59.798	mijnomgeving	357518080170889	1600061519798		
3671	2020-09-14 23:44:41.067	mijnomgeving	357518080170889	1600127081067		
83	2020-09-14 00:32:00.121	mijnomgeving	357518080170889	1600043520121		
474	2020-09-14 03:02:11.974	mijnomgeving	357518080170889	1600052531974		
1931	2020-09-14 12:31:57.889	mijnomgeving	357518080170889	1600086717889		

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
550	22.0	52.014604	4.295554	7.0	15402.0	-6.0	...	
588	3.0	52.014625	4.295619	7.0	16283.0	20.0	...	
1777	3.0	52.014182	4.295780	4.0	44184.0	-38.0	...	
1246	22.0	52.014628	4.295574	6.0	31602.0	-15.0	...	
3328	3.0	52.014683	4.295602	4.0	12682.0	13.0	...	
...	
861	3.0	52.014622	4.295664	4.0	22584.0	-10.0	...	
3671	14.0	52.014581	4.295816	4.0	20793.0	15.0	...	
83	3.0	52.014728	4.295722	5.0	4583.0	-17.0	...	
474	15.0	52.014601	4.295521	4.0	13595.0	-5.0	...	
1931	2.0	52.014845	4.295323	5.0	47783.0	35.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
550	11.0	0.0	3.575181e+14	32.0	0.0	
588	11.0	0.0	3.575181e+14	32.0	0.0	
1777	36.0	0.0	3.575181e+14	32.0	0.0	
1246	22.0	36.0	3.575181e+14	32.0	0.0	
3328	18.0	24.0	3.575181e+14	32.0	0.0	
...	
861	11.0	0.0	3.575181e+14	32.0	0.0	
3671	16.0	233.0	3.575181e+14	32.0	1.0	
83	11.0	230.0	3.575181e+14	32.0	2.0	
474	11.0	44.0	3.575181e+14	32.0	0.0	
1931	35.0	14.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
550	1.600054e+09	0.0	0.0	NaN	
588	1.600055e+09	0.0	0.0	NaN	
1777	1.600083e+09	0.0	0.0	NaN	
1246	1.600071e+09	0.0	0.0	NaN	
3328	1.600119e+09	0.0	0.0	NaN	
...	
861	1.600062e+09	0.0	0.0	NaN	
3671	1.600127e+09	0.0	0.0	NaN	

3671	1.600127e+09	0.0	0.0	NaN
83	1.600044e+09	0.0	0.0	NaN
474	1.600053e+09	0.0	0.0	NaN
1931	1.600087e+09	0.0	0.0	NaN

	name
550	Error: certificate has expired : https://dev.s...
588	Error: certificate has expired : https://dev.s...
1777	Error: certificate has expired : https://dev.s...
1246	Error: certificate has expired : https://dev.s...
3328	EC 236
...	...
861	Error: certificate has expired : https://dev.s...
3671	EC 236
83	Error: certificate has expired : https://dev.s...
474	Error: certificate has expired : https://dev.s...
1931	Error: certificate has expired : https://dev.s...

[97 rows x 21 columns], 8:			datetime	app_id	dev_id
time \					
2725	2020-09-14 17:34:19.530	mijnomgeving	357518080494776	1600104859530	
1668	2020-09-14 10:47:45.698	mijnomgeving	357518080494776	1600080465698	
1020	2020-09-14 06:33:00.739	mijnomgeving	357518080494776	1600065180739	
2528	2020-09-14 16:19:27.325	mijnomgeving	357518080494776	1600100367325	
2210	2020-09-14 14:17:40.204	mijnomgeving	357518080494776	1600093060204	
...
436	2020-09-14 02:47:48.797	mijnomgeving	357518080494776	1600051668797	
202	2020-09-14 01:17:34.181	mijnomgeving	357518080494776	1600046254181	
1209	2020-09-14 07:47:42.037	mijnomgeving	357518080494776	1600069662037	
3495	2020-09-14 22:35:03.818	mijnomgeving	357518080494776	1600122903818	
282	2020-09-14 01:47:32.796	mijnomgeving	357518080494776	1600048052796	

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
2725	0.0	52.388105	5.564569	6.0	6387.0	-49.0	...	
1668	6.0	52.388233	5.564618	5.0	141334.0	-17.0	...	
1020	20.0	52.388353	5.564600	7.0	126046.0	10.0	...	
2528	9.0	52.388319	5.564537	5.0	1895.0	5.0	...	
2210	1.0	52.388017	5.564507	7.0	153927.0	55.0	...	
...
436	19.0	52.388545	5.565537	6.0	112536.0	32.0	...	
202	1.0	52.388239	5.564412	6.0	107118.0	-14.0	...	
1209	2.0	52.388236	5.564583	4.0	130528.0	-44.0	...	
3495	0.0	52.388360	5.564489	6.0	1887.0	-12.0	...	
282	1.0	52.388148	5.564590	6.0	108918.0	-26.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
2725	21.0	15.0	3.575181e+14	32.0	0.0	
1668	39.0	5.0	3.575181e+14	32.0	0.0	
1020	12.0	0.0	3.575181e+14	32.0	0.0	
2528	32.0	0.0	3.575181e+14	32.0	0.0	
2210	40.0	17.0	3.575181e+14	32.0	3.0	
...
436	6.0	251.0	3.575181e+14	32.0	4.0	
202	6.0	16.0	3.575181e+14	32.0	0.0	
1209	22.0	43.0	3.575181e+14	32.0	0.0	
3495	13.0	4.0	3.575181e+14	32.0	2.0	
282	6.0	213.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
2725	1.600105e+09	0.0	0.00	NaN	
1668	1.600080e+09	0.0	0.00	NaN	
1020	1.600065e+09	0.0	0.00	NaN	
2528	1.600100e+09	0.0	0.00	NaN	
2210	1.600093e+09	0.0	0.00	NaN	
...
436	1.600052e+09	307.0	13.51	NaN	
202	1.600046e+09	309.0	13.77	NaN	
1209	1.600070e+09	0.0	0.00	NaN	
3495	1.600123e+09	0.0	0.00	NaN	
282	1.600048e+09	308.0	13.68	NaN	

	name
2725	Error: certificate has expired : https://dev.s...

```
2725 Error: certificate has expired : https://dev.s...
1668 Error: certificate has expired : https://dev.s...
1020 Error: certificate has expired : https://dev.s...
2528 Error: certificate has expired : https://dev.s...
2210 Error: certificate has expired : https://dev.s...
...
436 Error: certificate has expired : https://dev.s...
202 Error: certificate has expired : https://dev.s...
1209 Error: certificate has expired : https://dev.s...
3495 EC 330
282 Error: certificate has expired : https://dev.s...
```

```
[96 rows x 21 columns], 9:
time \
1173 2020-09-14 07:32:28.721 mijnomgeving 357518080497639 1600068748721
3567 2020-09-14 23:03:53.199 mijnomgeving 357518080497639 1600124633199
2056 2020-09-14 13:18:33.962 mijnomgeving 357518080497639 1600089513962
3493 2020-09-14 22:33:52.519 mijnomgeving 357518080497639 1600122832519
1362 2020-09-14 08:47:28.460 mijnomgeving 357518080497639 1600073248460
...
1781 2020-09-14 11:32:26.763 mijnomgeving 357518080497639 1600083146763
978 2020-09-14 06:17:29.974 mijnomgeving 357518080497639 1600064249974
3683 2020-09-14 23:48:52.234 mijnomgeving 357518080497639 1600127332234
2951 2020-09-14 19:03:08.671 mijnomgeving 357518080497639 1600110188671
3381 2020-09-14 21:49:11.498 mijnomgeving 357518080497639 1600120151498
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
1173 1.0 52.659343 5.660438 5.0 68418.0 -31.0 ...
3567 1.0 52.659153 5.660846 6.0 8118.0 -16.0 ...
2056 1.0 52.659182 5.660874 9.0 43.0 0.0 ...
3493 0.0 52.659176 5.660857 10.0 6318.0 -2.0 ...
1362 1.0 52.659175 5.660870 7.0 72918.0 -9.0 ...
...
1781 1.0 52.659127 5.660926 8.0 82818.0 -10.0 ...
978 1.0 52.659080 5.660695 5.0 63918.0 -4.0 ...
3683 0.0 52.659171 5.660907 6.0 10818.0 -15.0 ...
2951 1.0 52.659029 5.660690 5.0 20718.0 -6.0 ...
3381 19.0 52.659242 5.660830 9.0 3636.0 12.0 ...
```

```
boardTemperature course imei lastResetCause speed \
1173 21.0 235.0 3.575181e+14 32.0 0.0
3567 16.0 3.0 3.575181e+14 32.0 0.0
2056 33.0 243.0 3.575181e+14 32.0 0.0
3493 16.0 27.0 3.575181e+14 32.0 0.0
1362 29.0 220.0 3.575181e+14 32.0 0.0
...
1781 34.0 12.0 3.575181e+14 32.0 0.0
978 12.0 38.0 3.575181e+14 32.0 0.0
3683 15.0 8.0 3.575181e+14 32.0 0.0
2951 19.0 43.0 3.575181e+14 32.0 0.0
3381 16.0 201.0 3.575181e+14 32.0 0.0
```

```
timestamp waterEC waterTemperature pH \
1173 1.600069e+09 2447.0 16.94 NaN
3567 1.600125e+09 2433.0 19.06 NaN
2056 1.600090e+09 2410.0 19.15 NaN
3493 1.600123e+09 2367.0 19.15 NaN
1362 1.600073e+09 2403.0 17.30 NaN
...
1781 1.600083e+09 2408.0 18.53 NaN
978 1.600064e+09 2366.0 16.94 NaN
3683 1.600127e+09 2342.0 19.06 NaN
2951 1.600110e+09 2437.0 19.24 NaN
3381 1.600120e+09 2397.0 19.15 NaN
```

```
name
1173 Error: certificate has expired : https://dev.s...
3567 EC 308
2056 Error: certificate has expired : https://dev.s...
3493 EC 308
1362 Error: certificate has expired : https://dev.s...
...
1781 Error: certificate has expired : https://dev.s...
```

```
1781 Error: certificate has expired : https://dev.s...
978 Error: certificate has expired : https://dev.s...
3683 EC 308
2951 Error: certificate has expired : https://dev.s...
3381 EC 308
```

```
[96 rows x 21 columns], 10:
time \
203 2020-09-14 01:17:34.222 mijnomgeving 357518080494768 1600046254222
593 2020-09-14 03:48:07.898 mijnomgeving 357518080494768 1600055287898
1444 2020-09-14 09:18:22.878 mijnomgeving 357518080494768 1600075102878
3106 2020-09-14 20:02:46.486 mijnomgeving 357518080494768 1600113766486
2013 2020-09-14 13:02:29.010 mijnomgeving 357518080494768 1600088549010
...
3377 2020-09-14 21:48:09.483 mijnomgeving 357518080494768 1600120089483
1584 2020-09-14 10:15:11.414 mijnomgeving 357518080494768 1600078511414
1289 2020-09-14 08:17:42.002 mijnomgeving 357518080494768 1600071462002
669 2020-09-14 04:17:37.994 mijnomgeving 357518080494768 1600057057994
2643 2020-09-14 17:02:58.514 mijnomgeving 357518080494768 1600102978514
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
203 2.0 52.416162 5.228390 4.0 55819.0 49.0 ...
593 28.0 52.416581 5.226743 4.0 64844.0 4.0 ...
1444 1.0 52.416598 5.226663 4.0 84618.0 1.0 ...
3106 1.0 52.416504 5.226892 5.0 123318.0 -23.0 ...
2013 0.0 52.416749 5.226768 5.0 98117.0 3.0 ...
...
3377 1.0 52.416624 5.226657 5.0 5418.0 27.0 ...
1584 28.0 52.416653 5.226552 6.0 87362.0 -14.0 ...
1289 3.0 52.416444 5.227142 4.0 81020.0 -16.0 ...
669 8.0 52.416976 5.226306 4.0 66625.0 -71.0 ...
2643 6.0 52.416452 5.226301 6.0 112523.0 31.0 ...
```

```
boardTemperature course imei lastResetCause speed \
203 14.0 222.0 3.575181e+14 32.0 6.0
593 14.0 221.0 3.575181e+14 32.0 0.0
1444 28.0 230.0 3.575181e+14 32.0 0.0
3106 17.0 231.0 3.575181e+14 32.0 0.0
2013 37.0 242.0 3.575181e+14 32.0 0.0
...
3377 17.0 218.0 3.575181e+14 32.0 0.0
1584 35.0 246.0 3.575181e+14 32.0 0.0
1289 24.0 222.0 3.575181e+14 32.0 4.0
669 13.0 242.0 3.575181e+14 32.0 0.0
2643 24.0 41.0 3.575181e+14 32.0 2.0
```

```
timestamp waterEC waterTemperature pH \
203 1.600046e+09 1754.0 19.68 NaN
593 1.600055e+09 1845.0 19.41 NaN
1444 1.600075e+09 1741.0 19.50 NaN
3106 1.600114e+09 1770.0 20.21 NaN
2013 1.600089e+09 1786.0 20.21 NaN
...
3377 1.600120e+09 1761.0 20.21 NaN
1584 1.600078e+09 1737.0 19.50 NaN
1289 1.600071e+09 1781.0 19.24 NaN
669 1.600057e+09 1803.0 19.41 NaN
2643 1.600103e+09 1792.0 20.47 NaN
```

```
name
203 Error: certificate has expired : https://dev.s...
593 Error: certificate has expired : https://dev.s...
1444 Error: certificate has expired : https://dev.s...
3106 EC 305
2013 Error: certificate has expired : https://dev.s...
...
3377 EC 305
1584 Error: certificate has expired : https://dev.s...
1289 Error: certificate has expired : https://dev.s...
669 Error: certificate has expired : https://dev.s...
2643 Error: certificate has expired : https://dev.s...
```

```
[94 rows x 21 columns], 11:
time \
1709 2020-09-14 11:03:01.903 mijnomgeving 357518080495153 1600081381903
3326 2020-09-14 21:28:47.654 mijnomgeving 357518080495153 1600118927654
789 2020-09-14 05:03:03.567 mijnomgeving 357518080495153 1600059783567
2860 2020-09-14 18:29:11.756 mijnomgeving 357518080495153 1600108151756
670 2020-09-14 04:18:02.115 mijnomgeving 357518080495153 1600057082115
...
2054 2020-09-14 13:18:00.926 mijnomgeving 357518080495153 1600089480926
2706 2020-09-14 17:28:48.854 mijnomgeving 357518080495153 1600104528854
2489 2020-09-14 16:05:12.107 mijnomgeving 357518080495153 1600099512107
439 2020-09-14 02:48:02.844 mijnomgeving 357518080495153 1600051682844
554 2020-09-14 03:33:04.869 mijnomgeving 357518080495153 1600054384869
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
1709 1.0 52.579173 5.756730 5.0 42318.0 -41.0 ...
3326 1.0 52.578905 5.756866 4.0 18918.0 -7.0 ...
789 1.0 52.578966 5.756783 4.0 20718.0 -2.0 ...
2860 23.0 52.578936 5.756853 6.0 8140.0 -12.0 ...
670 0.0 52.578961 5.756859 5.0 18018.0 -21.0 ...
...
2054 0.0 52.578786 5.756805 5.0 50417.0 18.0 ...
2706 1.0 52.578974 5.756853 4.0 4518.0 -8.0 ...
2489 12.0 52.578792 5.756565 4.0 9929.0 79.0 ...
439 0.0 52.578466 5.757085 5.0 12617.0 -8.0 ...
554 0.0 52.578825 5.756850 4.0 15317.0 10.0 ...
```

```
boardTemperature course imei lastResetCause speed \
1709 39.0 236.0 3.575181e+14 32.0 0.0
3326 17.0 47.0 3.575181e+14 32.0 0.0
789 12.0 236.0 3.575181e+14 32.0 0.0
2860 20.0 44.0 3.575181e+14 32.0 0.0
670 12.0 244.0 3.575181e+14 32.0 0.0
...
2054 42.0 9.0 3.575181e+14 32.0 0.0
2706 24.0 252.0 3.575181e+14 32.0 0.0
2489 36.0 37.0 3.575181e+14 32.0 0.0
439 12.0 255.0 3.575181e+14 32.0 4.0
554 12.0 14.0 3.575181e+14 32.0 0.0
```

```
timestamp waterEC waterTemperature pH \
1709 1.600081e+09 2545.0 17.03 NaN
3326 1.600119e+09 2494.0 17.65 NaN
789 1.600060e+09 2520.0 16.94 NaN
2860 1.600108e+09 2427.0 17.56 NaN
670 1.600057e+09 2482.0 16.94 NaN
...
2054 1.600089e+09 2517.0 17.03 NaN
2706 1.600105e+09 2531.0 17.38 NaN
2489 1.600100e+09 2526.0 17.38 NaN
439 1.600052e+09 2437.0 17.03 NaN
554 1.600054e+09 2480.0 17.03 NaN
```

```
name
1709 Error: certificate has expired : https://dev.s...
3326 EC 313
789 Error: certificate has expired : https://dev.s...
2860 Error: certificate has expired : https://dev.s...
670 Error: certificate has expired : https://dev.s...
...
2054 Error: certificate has expired : https://dev.s...
2706 Error: certificate has expired : https://dev.s...
2489 Error: certificate has expired : https://dev.s...
439 Error: certificate has expired : https://dev.s...
554 Error: certificate has expired : https://dev.s...
```

```
[98 rows x 21 columns], 12:
time \
3202 2020-09-14 20:40:47.060 mijnomgeving 357518080163249 1600116047060
594 2020-09-14 03:48:15.715 mijnomgeving 357518080163249 1600055295715
2347 2020-09-14 15:10:40.660 mijnomgeving 357518080163249 1600096240660
1080 2020-09-14 06:55:42.429 mijnomgeving 357518080163249 1600066542429
1054 2020-09-14 12:40:40.712 mijnomgeving 357518080163249 1600087240712
```

```
1954 2020-09-14 12:40:40.713 mijnomgeving 357518080163249 1600087240713
...
1535 2020-09-14 09:55:45.665 mijnomgeving 357518080163249 1600077345665
3090 2020-09-14 19:56:25.918 mijnomgeving 357518080163249 1600113385918
3699 2020-09-14 23:55:43.750 mijnomgeving 357518080163249 1600127743750
3661 2020-09-14 23:40:39.212 mijnomgeving 357518080163249 1600126839212
1308 2020-09-14 08:25:42.020 mijnomgeving 357518080163249 1600071942020
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... boardTemperature \
3202 4.0 NaN NaN NaN 58514.0 NaN ... 19.0
594 4.0 NaN NaN NaN 91814.0 NaN ... 9.0
2347 3.0 NaN NaN NaN 38713.0 NaN ... 35.0
1080 4.0 NaN NaN NaN 9013.0 NaN ... 15.0
1954 3.0 NaN NaN NaN 29712.0 NaN ... 36.0
...
1535 7.0 NaN NaN NaN 19817.0 NaN ... 31.0
3090 7.0 NaN NaN NaN 55817.0 NaN ... 20.0
3699 6.0 NaN NaN NaN 70215.0 NaN ... 16.0
3661 3.0 NaN NaN NaN 69312.0 NaN ... 16.0
1308 2.0 NaN NaN NaN 14412.0 NaN ... 24.0
```

```
course imei lastResetCause speed timestamp waterEC \
3202 NaN 3.575181e+14 32.0 NaN 1.600116e+09 729.0
594 NaN 3.575181e+14 32.0 NaN 1.600055e+09 739.0
2347 NaN 3.575181e+14 32.0 NaN 1.600096e+09 730.0
1080 NaN 3.575181e+14 32.0 NaN 1.600067e+09 731.0
1954 NaN 3.575181e+14 32.0 NaN 1.600087e+09 727.0
...
1535 NaN 3.575181e+14 32.0 NaN 1.600077e+09 738.0
3090 NaN 3.575181e+14 32.0 NaN 1.600113e+09 728.0
3699 NaN 3.575181e+14 32.0 NaN 1.600128e+09 731.0
3661 NaN 3.575181e+14 32.0 NaN 1.600127e+09 727.0
1308 NaN 3.575181e+14 32.0 NaN 1.600072e+09 737.0
```

```
waterTemperature pH name
3202 18.35 NaN EC 212
594 16.94 NaN Error: certificate has expired : https://dev.s...
2347 18.00 NaN Error: certificate has expired : https://dev.s...
1080 16.59 NaN Error: certificate has expired : https://dev.s...
1954 17.47 NaN Error: certificate has expired : https://dev.s...
...
1535 16.68 NaN Error: certificate has expired : https://dev.s...
3090 18.35 NaN Error: certificate has expired : https://dev.s...
3699 18.44 NaN EC 212
3661 18.80 NaN EC 212
1308 16.42 NaN Error: certificate has expired : https://dev.s...
```

```
[96 rows x 21 columns], 13: datetime app_id dev_id
time \
3613 2020-09-14 23:22:40.633 mijnomgeving 357518080494875 1600125760633
752 2020-09-14 04:48:27.417 mijnomgeving 357518080494875 1600058907417
2139 2020-09-14 13:52:36.853 mijnomgeving 357518080494875 1600091556853
1377 2020-09-14 08:54:09.152 mijnomgeving 357518080494875 1600073649152
1140 2020-09-14 07:18:26.865 mijnomgeving 357518080494875 1600067906865
...
480 2020-09-14 03:03:25.164 mijnomgeving 357518080494875 1600052605164
3309 2020-09-14 21:22:54.604 mijnomgeving 357518080494875 1600118574604
2882 2020-09-14 18:37:50.276 mijnomgeving 357518080494875 1600108670276
1153 2020-09-14 07:24:34.765 mijnomgeving 357518080494875 1600068274765
2257 2020-09-14 14:37:37.537 mijnomgeving 357518080494875 1600094257537
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
3613 6.0 52.657218 5.613895 4.0 41423.0 36.0 ...
752 4.0 52.655321 5.616092 4.0 58522.0 163.0 ...
2139 1.0 52.657348 5.615093 4.0 7218.0 1.0 ...
1377 0.0 52.657649 5.614795 5.0 5418.0 16.0 ...
1140 0.0 52.657587 5.614655 4.0 67519.0 33.0 ...
...
480 0.0 52.657657 5.615909 5.0 52218.0 56.0 ...
3309 15.0 52.657439 5.614245 7.0 34232.0 -218.0 ...
2882 15.0 52.657389 5.615018 5.0 24332.0 37.0 ...
1153 0.0 52.657323 5.614886 4.0 43.0 115.0 ...
2257 1.0 52.658028 5.614850 4.0 8818.0 18.0 ...
```

2257 1.0 52.638028 5.614850 4.0 9919.0 -18.0 ...

	boardTemperature	course	imei	lastResetCause	speed	\
3613	18.0	37.0	3.575181e+14	32.0	2.0	
752	12.0	253.0	3.575181e+14	32.0	10.0	
2139	35.0	2.0	3.575181e+14	32.0	0.0	
1377	21.0	13.0	3.575181e+14	32.0	1.0	
1140	19.0	6.0	3.575181e+14	32.0	3.0	
...	
480	13.0	208.0	3.575181e+14	32.0	3.0	
3309	20.0	1.0	3.575181e+14	32.0	0.0	
2882	22.0	7.0	3.575181e+14	32.0	0.0	
1153	19.0	37.0	3.575181e+14	32.0	0.0	
2257	36.0	0.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
3613	1.600126e+09	2177.0	19.50	NaN	
752	1.600059e+09	2089.0	17.56	NaN	
2139	1.600092e+09	2166.0	19.59	NaN	
1377	1.600074e+09	2115.0	17.91	NaN	
1140	1.600068e+09	2105.0	17.56	NaN	
...	
480	1.600053e+09	2071.0	17.56	NaN	
3309	1.600119e+09	2171.0	19.59	NaN	
2882	1.600109e+09	2168.0	19.77	NaN	
1153	1.600068e+09	2105.0	17.65	NaN	
2257	1.600094e+09	2185.0	19.68	NaN	

	name
3613	EC 311
752	Error: certificate has expired : https://dev.s...
2139	Error: certificate has expired : https://dev.s...
1377	Error: certificate has expired : https://dev.s...
1140	Error: certificate has expired : https://dev.s...
...	...
480	Error: certificate has expired : https://dev.s...
3309	EC 311
2882	Error: certificate has expired : https://dev.s...
1153	Error: certificate has expired : https://dev.s...
2257	Error: certificate has expired : https://dev.s...

[97 rows x 21 columns], 14:

	datetime	app_id	dev_id
time \			
831	2020-09-14 05:19:07.837	mijnomgeving	357518080495187 1600060747837
1672	2020-09-14 10:49:19.268	mijnomgeving	357518080495187 1600080559268
92	2020-09-14 00:34:09.348	mijnomgeving	357518080495187 1600043649348
753	2020-09-14 04:49:16.471	mijnomgeving	357518080495187 1600058956471
3002	2020-09-14 19:23:28.091	mijnomgeving	357518080495187 1600111408091
...
481	2020-09-14 03:04:32.318	mijnomgeving	357518080495187 1600052672318
2961	2020-09-14 19:08:10.183	mijnomgeving	357518080495187 1600110490183
2416	2020-09-14 15:38:15.694	mijnomgeving	357518080495187 1600097895694
2018	2020-09-14 13:04:08.229	mijnomgeving	357518080495187 1600088648229
1178	2020-09-14 07:34:06.802	mijnomgeving	357518080495187 1600068846802

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
831	1.0	52.635309	5.823567	5.0	167418.0	-2.0	...	
1672	14.0	52.635268	5.823425	5.0	187230.0	63.0	...	
92	0.0	52.635207	5.823722	5.0	150317.0	-28.0	...	
753	10.0	52.635294	5.822460	4.0	165627.0	-27.0	...	
3002	24.0	52.635297	5.823697	5.0	16241.0	-12.0	...	
...	
481	25.0	52.635348	5.823464	7.0	159342.0	-16.0	...	
2961	5.0	52.635601	5.823538	5.0	15322.0	-21.0	...	
2416	9.0	52.635303	5.823514	5.0	2726.0	94.0	...	
2018	4.0	52.635539	5.822925	4.0	195321.0	11.0	...	
1178	0.0	52.635155	5.823829	5.0	175518.0	10.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
831	12.0	228.0	3.575181e+14	32.0	1.0	
1672	37.0	244.0	3.575181e+14	32.0	0.0	
92	12.0	233.0	3.575181e+14	32.0	2.0	
752	12.0	212.0	3.575181e+14	32.0	0.0	

1735	12.0	212.0	3.575181e+14	32.0	0.0
3002	21.0	250.0	3.575181e+14	32.0	1.0
...
481	12.0	251.0	3.575181e+14	32.0	0.0
2961	20.0	10.0	3.575181e+14	32.0	0.0
2416	32.0	225.0	3.575181e+14	32.0	1.0
2018	38.0	230.0	3.575181e+14	32.0	1.0
1178	16.0	245.0	3.575181e+14	32.0	1.0

	timestamp	waterEC	waterTemperature	pH	\
831	1.600061e+09	701.0	16.77	NaN	
1672	1.600081e+09	696.0	17.30	NaN	
92	1.600044e+09	698.0	17.12	NaN	
753	1.600059e+09	701.0	16.77	NaN	
3002	1.600111e+09	697.0	18.44	NaN	
...	
481	1.600053e+09	699.0	16.94	NaN	
2961	1.600110e+09	694.0	18.44	NaN	
2416	1.600098e+09	697.0	18.44	NaN	
2018	1.600089e+09	696.0	17.83	NaN	
1178	1.600069e+09	700.0	16.68	NaN	

	name
831	Error: certificate has expired : https://dev.s...
1672	Error: certificate has expired : https://dev.s...
92	Error: certificate has expired : https://dev.s...
753	Error: certificate has expired : https://dev.s...
3002	Error: certificate has expired : https://dev.s...
...	...
481	Error: certificate has expired : https://dev.s...
2961	Error: certificate has expired : https://dev.s...
2416	Error: certificate has expired : https://dev.s...
2018	Error: certificate has expired : https://dev.s...
1178	Error: certificate has expired : https://dev.s...

[97 rows x 21 columns], 15:

	time	\	datetime	app_id	dev_id
1370	2020-09-14	08:50:22.683	mijnomgeving	357518080166580	1600073422683
3071	2020-09-14	19:49:27.461	mijnomgeving	357518080166580	1600112967461
1105	2020-09-14	07:05:27.010	mijnomgeving	357518080166580	1600067127010
2915	2020-09-14	18:49:25.694	mijnomgeving	357518080166580	1600109365694
1636	2020-09-14	10:35:11.994	mijnomgeving	357518080166580	1600079711994
...
1735	2020-09-14	11:15:13.765	mijnomgeving	357518080166580	1600082113765
1773	2020-09-14	11:29:44.936	mijnomgeving	357518080166580	1600082984936
3419	2020-09-14	22:04:16.491	mijnomgeving	357518080166580	1600121056491
558	2020-09-14	03:35:19.645	mijnomgeving	357518080166580	1600054519645
2475	2020-09-14	15:59:43.906	mijnomgeving	357518080166580	1600099183906

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1370	18.0	52.360416	4.815520	5.0	150397.0	5.0	...	
3071	23.0	52.360286	4.815015	7.0	11803.0	28.0	...	
1105	22.0	52.360163	4.815354	5.0	144101.0	88.0	...	
2915	21.0	52.359969	4.816193	4.0	8201.0	-195.0	...	
1636	7.0	52.361098	4.816968	4.0	156686.0	-50.0	...	
...	
1735	34.0	52.360418	4.815230	7.0	1913.0	23.0	...	
1773	5.0	52.360415	4.815423	7.0	2784.0	24.0	...	
3419	13.0	52.359995	4.816519	6.0	19892.0	161.0	...	
558	14.0	52.360373	4.815422	4.0	131493.0	94.0	...	
2475	5.0	52.360381	4.815147	6.0	18984.0	48.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
1370	17.0	201.0	3.575181e+14	32.0	0.0	
3071	19.0	0.0	3.575181e+14	32.0	0.0	
1105	14.0	0.0	3.575181e+14	32.0	0.0	
2915	21.0	210.0	3.575181e+14	32.0	0.0	
1636	20.0	0.0	3.575181e+14	32.0	0.0	
...	
1735	21.0	216.0	3.575181e+14	32.0	0.0	
1773	22.0	0.0	3.575181e+14	32.0	0.0	
3419	18.0	226.0	3.575181e+14	32.0	0.0	
558	12.0	22.0	3.575181e+14	32.0	1.0	

558	13.0	22.0	3.575181e+14	32.0	1.0
2475	33.0	208.0	3.575181e+14	32.0	0.0

	timestamp	waterEC	waterTemperature	pH	\
1370	1.600073e+09	0.0	0.0	NaN	
3071	1.600113e+09	0.0	0.0	NaN	
1105	1.600067e+09	0.0	0.0	NaN	
2915	1.600109e+09	0.0	0.0	NaN	
1636	1.600080e+09	0.0	0.0	NaN	
...	
1735	1.600082e+09	0.0	0.0	NaN	
1773	1.600083e+09	0.0	0.0	NaN	
3419	1.600121e+09	0.0	0.0	NaN	
558	1.600055e+09	0.0	0.0	NaN	
2475	1.600099e+09	0.0	0.0	NaN	

	name
1370	Error: certificate has expired : https://dev.s...
3071	Error: certificate has expired : https://dev.s...
1105	Error: certificate has expired : https://dev.s...
2915	Error: certificate has expired : https://dev.s...
1636	Error: certificate has expired : https://dev.s...
...	...
1735	Error: certificate has expired : https://dev.s...
1773	Error: certificate has expired : https://dev.s...
3419	EC 224
558	Error: certificate has expired : https://dev.s...
2475	Error: certificate has expired : https://dev.s...

[97 rows x 21 columns], 16:

	datetime	app_id	dev_id
time \			
989	2020-09-14 06:20:21.783	mijnomgeving	357518080167778 1600064421783
2412	2020-09-14 15:35:39.348	mijnomgeving	357518080167778 1600097739348
2529	2020-09-14 16:20:18.501	mijnomgeving	357518080167778 1600100418501
951	2020-09-14 06:05:20.438	mijnomgeving	357518080167778 1600063520438
2450	2020-09-14 15:50:23.053	mijnomgeving	357518080167778 1600098623053
...
289	2020-09-14 01:50:20.426	mijnomgeving	357518080167778 1600048220426
559	2020-09-14 03:35:19.793	mijnomgeving	357518080167778 1600054519793
3571	2020-09-14 23:05:19.559	mijnomgeving	357518080167778 1600124719559
521	2020-09-14 03:20:19.330	mijnomgeving	357518080167778 1600053619330
3267	2020-09-14 21:05:40.331	mijnomgeving	357518080167778 1600117540331

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
989	5.0	52.331017	5.062541	5.0	265515.0	-19.0	...	
2412	24.0	52.330919	5.062520	7.0	298834.0	-2.0	...	
2529	3.0	52.330890	5.062421	5.0	301513.0	37.0	...	
951	3.0	52.330880	5.062524	5.0	264614.0	11.0	...	
2450	7.0	52.330966	5.062602	7.0	299717.0	-18.0	...	
...	
289	3.0	52.330959	5.062442	5.0	249314.0	1.0	...	
559	2.0	52.330848	5.062498	5.0	255613.0	20.0	...	
3571	5.0	52.331005	5.062537	5.0	325815.0	-3.0	...	
521	2.0	52.330937	5.062473	5.0	254713.0	-10.0	...	
3267	24.0	52.330783	5.062437	4.0	318635.0	-8.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
989	13.0	4.0	3.575181e+14	32.0	0.0	
2412	40.0	253.0	3.575181e+14	32.0	0.0	
2529	35.0	38.0	3.575181e+14	32.0	0.0	
951	12.0	0.0	3.575181e+14	32.0	0.0	
2450	38.0	30.0	3.575181e+14	32.0	0.0	
...	
289	12.0	0.0	3.575181e+14	32.0	0.0	
559	11.0	0.0	3.575181e+14	32.0	0.0	
3571	17.0	248.0	3.575181e+14	32.0	0.0	
521	11.0	0.0	3.575181e+14	32.0	0.0	
3267	18.0	47.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
989	1.600064e+09	50000.0	13.07	NaN	
2412	1.600098e+09	0.0	33.43	NaN	
2529	1.600100e+09	0.0	21.14	NaN	

2529	1.600100e+09	0.0	31.14	NaN
951	1.600064e+09	0.0	12.71	NaN
2450	1.600099e+09	0.0	32.81	NaN
...
289	1.600048e+09	50000.0	13.24	NaN
559	1.600055e+09	50000.0	12.80	NaN
3571	1.600125e+09	0.0	17.30	NaN
521	1.600054e+09	0.0	12.62	NaN
3267	1.600118e+09	0.0	18.53	NaN

	name
989	Error: certificate has expired : https://dev.s...
2412	Error: certificate has expired : https://dev.s...
2529	Error: certificate has expired : https://dev.s...
951	Error: certificate has expired : https://dev.s...
2450	Error: certificate has expired : https://dev.s...
...	...
289	Error: certificate has expired : https://dev.s...
559	Error: certificate has expired : https://dev.s...
3571	EC 222
521	Error: certificate has expired : https://dev.s...
3267	EC 222

[96 rows x 21 columns], 17:				datetime	app_id	dev_id
time \						
2326	2020-09-14 15:02:24.664	mijnomgeving	357518080495021	1600095744664		
762	2020-09-14 04:54:39.034	mijnomgeving	357518080495021	1600059279034		
1895	2020-09-14 12:17:29.330	mijnomgeving	357518080495021	1600085849330		
565	2020-09-14 03:39:18.125	mijnomgeving	357518080495021	1600054758125		
95	2020-09-14 00:37:03.653	mijnomgeving	357518080495021	1600043823653		
...
2015	2020-09-14 13:02:41.028	mijnomgeving	357518080495021	1600088561028		
3604	2020-09-14 23:18:09.294	mijnomgeving	357518080495021	1600125489294		
1021	2020-09-14 06:33:00.793	mijnomgeving	357518080495021	1600065180793		
724	2020-09-14 04:39:32.872	mijnomgeving	357518080495021	1600058372872		
2719	2020-09-14 17:32:31.431	mijnomgeving	357518080495021	1600104751431		

FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
2326	5.0	53.156425	7.021026	4.0	24322.0	-1.0	...
762	36.0	53.156246	7.021768	4.0	9053.0	33.0	...
1895	6.0	53.156422	7.021009	6.0	14423.0	13.0	...
565	9.0	53.156528	7.020952	4.0	4526.0	19.0	...
95	6.0	53.156390	7.020993	4.0	46823.0	9.0	...
...
2015	1.0	53.156427	7.020973	4.0	17118.0	-5.0	...
3604	48.0	53.156511	7.020881	5.0	54065.0	5.0	...
1021	3.0	53.156445	7.021095	5.0	2720.0	-20.0	...
724	9.0	53.156353	7.020875	4.0	8136.0	2.0	...
2719	6.0	53.156303	7.021126	4.0	33332.0	-7.0	...

boardTemperature	course	imei	lastResetCause	speed	\
2326	19.0	44.0	3.575181e+14	32.0	2.0
762	19.0	224.0	3.575181e+14	32.0	4.0
1895	18.0	13.0	3.575181e+14	32.0	3.0
565	18.0	255.0	3.575181e+14	32.0	2.0
95	18.0	21.0	3.575181e+14	32.0	0.0
...
2015	18.0	6.0	3.575181e+14	32.0	0.0
3604	20.0	0.0	3.575181e+14	32.0	0.0
1021	18.0	218.0	3.575181e+14	32.0	0.0
724	18.0	0.0	3.575181e+14	32.0	2.0
2719	19.0	251.0	3.575181e+14	32.0	8.0

timestamp	waterEC	waterTemperature	pH	\
2326	1.600096e+09	1.0	20.38	NaN
762	1.600059e+09	0.0	18.88	NaN
1895	1.600086e+09	0.0	19.24	NaN
565	1.600055e+09	0.0	18.97	NaN
95	1.600044e+09	0.0	19.15	NaN
...
2015	1.600089e+09	0.0	19.24	NaN
3604	1.600125e+09	0.0	20.47	NaN
1021	1.600065e+09	0.0	18.88	NaN

1021	1.600065e+09	0.0	18.80	NaN
724	1.600058e+09	1.0	18.88	NaN
2719	1.600105e+09	0.0	19.94	NaN

	name
2326	Error: certificate has expired : https://dev.s...
762	Error: certificate has expired : https://dev.s...
1895	Error: certificate has expired : https://dev.s...
565	Error: certificate has expired : https://dev.s...
95	Error: certificate has expired : https://dev.s...
...	...
2015	Error: certificate has expired : https://dev.s...
3604	EC 325
1021	Error: certificate has expired : https://dev.s...
724	Error: certificate has expired : https://dev.s...
2719	Error: certificate has expired : https://dev.s...

[97 rows x 21 columns], 18:				datetime	app_id	dev_id
time \						
952	2020-09-14 06:07:31.962	mijnomgeving	357518080495120	1600063651962		
561	2020-09-14 03:37:49.056	mijnomgeving	357518080495120	1600054669056		
3252	2020-09-14 20:59:52.610	mijnomgeving	357518080495120	1600117192610		
406	2020-09-14 02:37:30.300	mijnomgeving	357518080495120	1600051050300		
600	2020-09-14 03:52:32.905	mijnomgeving	357518080495120	1600055552905		
...
2239	2020-09-14 14:29:53.924	mijnomgeving	357518080495120	1600093793924		
252	2020-09-14 01:37:30.402	mijnomgeving	357518080495120	1600047450402		
717	2020-09-14 04:37:31.992	mijnomgeving	357518080495120	1600058251992		
1448	2020-09-14 09:22:31.317	mijnomgeving	357518080495120	1600075351317		
3522	2020-09-14 22:45:37.631	mijnomgeving	357518080495120	1600123537631		

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
952	1.0	52.333804	5.312745	5.0	71118.0	0.0	...	
561	18.0	52.333788	5.312826	4.0	62135.0	1.0	...	
3252	1.0	52.333804	5.312634	7.0	26118.0	-4.0	...	
406	1.0	52.333537	5.312782	5.0	58517.0	-44.0	...	
600	1.0	52.333700	5.312704	5.0	63017.0	0.0	...	
...	
2239	1.0	52.333716	5.312634	6.0	2718.0	10.0	...	
252	0.0	52.333732	5.312447	7.0	54917.0	9.0	...	
717	1.0	52.333764	5.312576	10.0	65718.0	-8.0	...	
1448	3.0	52.334120	5.312655	4.0	82819.0	49.0	...	
3522	0.0	52.333748	5.312596	6.0	918.0	5.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
952	8.0	58.0	3.575181e+14	32.0	0.0	
561	7.0	15.0	3.575181e+14	32.0	0.0	
3252	13.0	25.0	3.575181e+14	32.0	0.0	
406	6.0	199.0	3.575181e+14	32.0	0.0	
600	6.0	15.0	3.575181e+14	32.0	0.0	
...	
2239	40.0	0.0	3.575181e+14	32.0	0.0	
252	7.0	44.0	3.575181e+14	32.0	0.0	
717	6.0	34.0	3.575181e+14	32.0	0.0	
1448	24.0	8.0	3.575181e+14	32.0	0.0	
3522	12.0	42.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
952	1.600064e+09	1121.0	14.65	NaN	
561	1.600055e+09	1109.0	14.92	NaN	
3252	1.600117e+09	1086.0	16.42	NaN	
406	1.600051e+09	1111.0	15.00	NaN	
600	1.600056e+09	1109.0	14.83	NaN	
...	
2239	1.600094e+09	1121.0	16.86	NaN	
252	1.600047e+09	1114.0	15.18	NaN	
717	1.600058e+09	1108.0	14.74	NaN	
1448	1.600075e+09	1133.0	15.27	NaN	
3522	1.600124e+09	1084.0	16.15	NaN	

	name
952	Error: certificate has expired : https://dev.s...
561	Error: certificate has expired : https://dev.s...

```
361 Error: certificate has expired : https://dev.s...
3252 EC 303
406 Error: certificate has expired : https://dev.s...
600 Error: certificate has expired : https://dev.s...
...
2239 Error: certificate has expired : https://dev.s...
252 Error: certificate has expired : https://dev.s...
717 Error: certificate has expired : https://dev.s...
1448 Error: certificate has expired : https://dev.s...
3522 EC 303
```

```
[96 rows x 21 columns], 19:
time \
331 2020-09-14 02:08:17.744 mijnomgeving 357518080497662 1600049297744
2337 2020-09-14 15:08:03.985 mijnomgeving 357518080497662 1600096083985
215 2020-09-14 01:23:05.777 mijnomgeving 357518080497662 1600046585777
137 2020-09-14 00:53:06.716 mijnomgeving 357518080497662 1600044786716
98 2020-09-14 00:38:06.603 mijnomgeving 357518080497662 1600043886603
...
2769 2020-09-14 17:53:02.829 mijnomgeving 357518080497662 1600105982829
2023 2020-09-14 13:08:07.674 mijnomgeving 357518080497662 1600088887674
369 2020-09-14 02:23:10.585 mijnomgeving 357518080497662 1600050190585
1907 2020-09-14 12:23:20.434 mijnomgeving 357518080497662 1600086200434
2141 2020-09-14 13:53:08.752 mijnomgeving 357518080497662 1600091588752
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
331 13.0 59.764218 17.573096 4.0 342929.0 0.0 ...
2337 1.0 59.764241 17.573091 6.0 389718.0 -3.0 ...
215 0.0 59.764193 17.573271 4.0 340217.0 19.0 ...
137 1.0 59.764364 17.573317 4.0 338418.0 2.0 ...
98 1.0 59.764329 17.573307 4.0 337518.0 1.0 ...
...
2769 1.0 59.764360 17.573243 7.0 399618.0 10.0 ...
2023 1.0 59.764367 17.573200 6.0 382518.0 13.0 ...
369 6.0 59.764165 17.573622 4.0 343822.0 -31.0 ...
1907 18.0 59.764430 17.573242 5.0 379834.0 -25.0 ...
2141 5.0 59.764214 17.573158 4.0 385222.0 46.0 ...
```

```
boardTemperature course imei lastResetCause speed \
331 11.0 201.0 3.575181e+14 32.0 0.0
2337 18.0 28.0 3.575181e+14 32.0 0.0
215 9.0 28.0 3.575181e+14 32.0 1.0
137 9.0 35.0 3.575181e+14 32.0 0.0
98 9.0 246.0 3.575181e+14 32.0 0.0
...
2769 15.0 15.0 3.575181e+14 32.0 0.0
2023 19.0 22.0 3.575181e+14 32.0 0.0
369 11.0 230.0 3.575181e+14 32.0 0.0
1907 19.0 244.0 3.575181e+14 32.0 0.0
2141 19.0 253.0 3.575181e+14 32.0 2.0
```

```
timestamp waterEC waterTemperature pH \
331 1.600049e+09 472.0 14.65 NaN
2337 1.600096e+09 473.0 14.74 NaN
215 1.600047e+09 476.0 14.65 NaN
137 1.600045e+09 477.0 14.65 NaN
98 1.600044e+09 474.0 14.65 NaN
...
2769 1.600106e+09 473.0 15.18 NaN
2023 1.600089e+09 472.0 14.65 NaN
369 1.600050e+09 475.0 14.65 NaN
1907 1.600086e+09 473.0 14.56 NaN
2141 1.600092e+09 473.0 14.65 NaN
```

```
name
331 Error: certificate has expired : https://dev.s...
2337 Error: certificate has expired : https://dev.s...
215 Error: certificate has expired : https://dev.s...
137 Error: certificate has expired : https://dev.s...
98 Error: certificate has expired : https://dev.s...
...
2769 Error: certificate has expired : https://dev.s...
2023 Error: certificate has expired : https://dev.s...
```


time \						
2914	2020-09-14 18:48:27.747	mijnomgeving	357518080495112	1600109307747		
409	2020-09-14 02:38:35.395	mijnomgeving	357518080495112	1600051115395		
3261	2020-09-14 21:03:24.427	mijnomgeving	357518080495112	1600117404427		
2260	2020-09-14 14:38:33.614	mijnomgeving	357518080495112	1600094313614		
2612	2020-09-14 16:53:40.863	mijnomgeving	357518080495112	1600102420863		
...		
3454	2020-09-14 22:18:27.370	mijnomgeving	357518080495112	1600121907370		
138	2020-09-14 00:53:33.688	mijnomgeving	357518080495112	1600044813688		
1908	2020-09-14 12:23:30.771	mijnomgeving	357518080495112	1600086210771		
177	2020-09-14 01:08:48.465	mijnomgeving	357518080495112	1600045728465		
956	2020-09-14 06:08:31.581	mijnomgeving	357518080495112	1600063711581		

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
2914	1.0	52.837500	5.713855	5.0	4518.0	-20.0	...	
409	4.0	52.837446	5.713739	7.0	61221.0	-43.0	...	
3261	0.0	52.837468	5.713729	5.0	12617.0	-29.0	...	
2260	2.0	52.837117	5.714318	4.0	104419.0	23.0	...	
2612	12.0	52.837271	5.714058	4.0	112528.0	7.0	...	
...	
3454	1.0	52.837487	5.713830	5.0	17118.0	-16.0	...	
138	1.0	52.837469	5.712747	5.0	54918.0	-37.0	...	
1908	1.0	52.837493	5.714108	8.0	96317.0	-30.0	...	
177	16.0	52.837445	5.713686	6.0	55833.0	-20.0	...	
956	0.0	52.837462	5.713906	5.0	73817.0	-19.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
2914	19.0	210.0	3.575181e+14	32.0	0.0	
409	12.0	206.0	3.575181e+14	32.0	0.0	
3261	18.0	218.0	3.575181e+14	32.0	0.0	
2260	32.0	252.0	3.575181e+14	32.0	1.0	
2612	24.0	241.0	3.575181e+14	32.0	0.0	
...	
3454	17.0	213.0	3.575181e+14	32.0	0.0	
138	13.0	208.0	3.575181e+14	32.0	0.0	
1908	39.0	237.0	3.575181e+14	32.0	0.0	
177	13.0	198.0	3.575181e+14	32.0	1.0	
956	15.0	230.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
2914	1.600109e+09	1697.0	17.91	NaN	
409	1.600051e+09	1731.0	17.21	NaN	
3261	1.600117e+09	1686.0	17.91	NaN	
2260	1.600094e+09	1715.0	17.83	NaN	
2612	1.600102e+09	1693.0	18.09	NaN	
...	
3454	1.600122e+09	1670.0	17.83	NaN	
138	1.600045e+09	1630.0	17.21	NaN	
1908	1.600086e+09	1671.0	18.09	NaN	
177	1.600046e+09	1624.0	17.21	NaN	
956	1.600064e+09	1719.0	17.12	NaN	

	name
2914	Error: certificate has expired : https://dev.s...
409	Error: certificate has expired : https://dev.s...
3261	EC 306
2260	Error: certificate has expired : https://dev.s...
2612	Error: certificate has expired : https://dev.s...
...	...
3454	EC 306
138	Error: certificate has expired : https://dev.s...
1908	Error: certificate has expired : https://dev.s...
177	Error: certificate has expired : https://dev.s...
956	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 22:	datetime	app_id	dev_id	
time \				
2497	2020-09-14 16:09:07.617	mijnomgeving	357518080332265	1600099747617
1643	2020-09-14 10:39:03.538	mijnomgeving	357518080332265	1600079943538
3263	2020-09-14 21:03:58.299	mijnomgeving	357518080332265	1600117438299
2576	2020-09-14 16:39:00.126	mijnomgeving	357518080332265	1600101540126
1113	2020-09-14 07:09:30.713	mijnomgeving	357518080332265	1600067370713

```
...
3070 2020-09-14 19:48:30.302 mijnomgeving 357518080332265 1600112910302
1301 2020-09-14 08:24:01.062 mijnomgeving 357518080332265 1600071841062
1151 2020-09-14 07:24:16.087 mijnomgeving 357518080332265 1600068256087
1262 2020-09-14 08:09:02.522 mijnomgeving 357518080332265 1600070942522
682 2020-09-14 04:24:08.120 mijnomgeving 357518080332265 1600057448120
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
2497 9.0 52.392007 4.937225 5.0 127819.0 30.0 ...
1643 4.0 52.392162 4.937215 6.0 108014.0 -19.0 ...
3263 15.0 52.392021 4.937757 4.0 5424.0 43.0 ...
2576 3.0 52.392096 4.937249 6.0 129613.0 45.0 ...
1113 23.0 52.392588 4.938342 4.0 95433.0 -12.0 ...
...
3070 2.0 52.392142 4.937408 5.0 912.0 -5.0 ...
1301 2.0 52.391971 4.937372 6.0 99912.0 -13.0 ...
1151 14.0 52.391799 4.936625 4.0 96324.0 19.0 ...
1262 2.0 52.392033 4.937242 6.0 99012.0 16.0 ...
682 9.0 52.392215 4.937157 6.0 85519.0 59.0 ...
```

```
boardTemperature course imei lastResetCause speed \
2497 23.0 228.0 3.575181e+14 32.0 1.0
1643 22.0 242.0 3.575181e+14 32.0 0.0
3263 16.0 0.0 3.575181e+14 32.0 0.0
2576 22.0 0.0 3.575181e+14 32.0 0.0
1113 14.0 0.0 3.575181e+14 32.0 0.0
...
3070 16.0 0.0 3.575181e+14 32.0 0.0
1301 19.0 1.0 3.575181e+14 32.0 0.0
1151 16.0 26.0 3.575181e+14 32.0 0.0
1262 18.0 31.0 3.575181e+14 32.0 0.0
682 10.0 217.0 3.575181e+14 32.0 0.0
```

```
timestamp waterEC waterTemperature pH \
2497 1.600100e+09 432.0 19.77 NaN
1643 1.600080e+09 442.0 18.80 NaN
3263 1.600117e+09 437.0 19.41 NaN
2576 1.600102e+09 434.0 19.77 NaN
1113 1.600067e+09 462.0 18.44 NaN
...
3070 1.600113e+09 436.0 19.50 NaN
1301 1.600072e+09 451.0 18.62 NaN
1151 1.600068e+09 456.0 18.53 NaN
1262 1.600071e+09 454.0 18.53 NaN
682 1.600057e+09 460.0 18.53 NaN
```

```
name
2497 Error: certificate has expired : https://dev.s...
1643 Error: certificate has expired : https://dev.s...
3263 EC 221
2576 Error: certificate has expired : https://dev.s...
1113 Error: certificate has expired : https://dev.s...
...
3070 Error: certificate has expired : https://dev.s...
1301 Error: certificate has expired : https://dev.s...
1151 Error: certificate has expired : https://dev.s...
1262 Error: certificate has expired : https://dev.s...
682 Error: certificate has expired : https://dev.s...
```

```
[96 rows x 21 columns], 23: datetime app_id dev_id
time \
1264 2020-09-14 08:09:30.791 mijnomgeving 357518080164395 1600070970791
2303 2020-09-14 14:54:37.727 mijnomgeving 357518080164395 1600095277727
23 2020-09-14 00:09:25.635 mijnomgeving 357518080164395 1600042165635
453 2020-09-14 02:54:33.777 mijnomgeving 357518080164395 1600052073777
335 2020-09-14 02:09:39.442 mijnomgeving 357518080164395 1600049379442
...
296 2020-09-14 01:54:26.684 mijnomgeving 357518080164395 1600048466684
998 2020-09-14 06:24:34.310 mijnomgeving 357518080164395 1600064674310
2068 2020-09-14 13:24:25.043 mijnomgeving 357518080164395 1600089865043
3083 2020-09-14 19:54:22.395 mijnomgeving 357518080164395 1600113262395
648 2020-09-14 04:09:56.829 mijnomgeving 357518080164395 1600056596829
```

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1264	8.0	51.894191	4.421343	5.0	90018.0	116.0	...	
2303	7.0	51.898282	4.423356	4.0	114317.0	10.0	...	
23	4.0	51.898577	4.423319	4.0	61214.0	83.0	...	
453	5.0	51.898716	4.425089	9.0	71115.0	274.0	...	
335	17.0	51.898233	4.423332	4.0	68427.0	-1.0	...	
...	
296	5.0	51.899357	4.423044	5.0	67515.0	116.0	...	
998	5.0	51.898528	4.423272	5.0	83715.0	51.0	...	
2068	5.0	51.898219	4.423169	5.0	108915.0	-1.0	...	
3083	3.0	51.898345	4.423402	4.0	132313.0	9.0	...	
648	26.0	51.898270	4.423328	7.0	75636.0	2.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
1264	19.0	19.0	3.575181e+14	32.0	0.0	
2303	37.0	0.0	3.575181e+14	32.0	2.0	
23	14.0	0.0	3.575181e+14	32.0	0.0	
453	14.0	23.0	3.575181e+14	32.0	0.0	
335	14.0	0.0	3.575181e+14	32.0	0.0	
...	
296	13.0	11.0	3.575181e+14	32.0	0.0	
998	14.0	241.0	3.575181e+14	32.0	0.0	
2068	33.0	0.0	3.575181e+14	32.0	0.0	
3083	20.0	0.0	3.575181e+14	32.0	0.0	
648	13.0	0.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
1264	1.600071e+09	103.0	19.59	NaN	
2303	1.600095e+09	107.0	19.94	NaN	
23	1.600042e+09	105.0	19.68	NaN	
453	1.600052e+09	104.0	19.59	NaN	
335	1.600049e+09	105.0	19.59	NaN	
...	
296	1.600048e+09	105.0	19.59	NaN	
998	1.600065e+09	106.0	19.50	NaN	
2068	1.600090e+09	106.0	19.94	NaN	
3083	1.600113e+09	109.0	19.94	NaN	
648	1.600057e+09	104.0	19.59	NaN	

	name
1264	Error: certificate has expired : https://dev.s...
2303	Error: certificate has expired : https://dev.s...
23	Error: certificate has expired : https://dev.s...
453	Error: certificate has expired : https://dev.s...
335	Error: certificate has expired : https://dev.s...
...	...
296	Error: certificate has expired : https://dev.s...
998	Error: certificate has expired : https://dev.s...
2068	Error: certificate has expired : https://dev.s...
3083	Error: certificate has expired : https://dev.s...
648	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 24:	datetime	app_id	dev_id
time \			
1304	2020-09-14 08:24:32.210	mijnomgeving	357518080494859
1341	2020-09-14 08:39:23.134	mijnomgeving	357518080494859
2894	2020-09-14 18:40:59.590	mijnomgeving	357518080494859
2028	2020-09-14 13:09:21.651	mijnomgeving	357518080494859
1457	2020-09-14 09:24:33.806	mijnomgeving	357518080494859
...
451	2020-09-14 02:54:25.350	mijnomgeving	357518080494859
181	2020-09-14 01:09:25.508	mijnomgeving	357518080494859
2817	2020-09-14 18:12:05.026	mijnomgeving	357518080494859
2345	2020-09-14 15:10:28.271	mijnomgeving	357518080494859
1681	2020-09-14 10:54:21.556	mijnomgeving	357518080494859

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1304	1.0	52.540976	5.588826	6.0	196219.0	-3.0	...	
1341	0.0	52.541009	5.588770	6.0	197118.0	-5.0	...	
2894	1.0	52.540977	5.588827	10.0	3618.0	-5.0	...	
2028	0.0	52.540950	5.588731	4.0	213318.0	6.0	...	
1457	0.0	52.540990	5.588767	5.0	100010.0	0.0	...	

1457	0.0	52.540990	5.588767	5.0	199818.0	-6.0	...
...
451	1.0	52.540959	5.588826	5.0	176418.0	-9.0	...
181	0.0	52.541000	5.588739	8.0	170118.0	-10.0	...
2817	1.0	52.540976	5.588809	11.0	1818.0	-4.0	...
2345	15.0	52.540869	5.588883	7.0	6333.0	3.0	...
1681	1.0	52.541001	5.588836	9.0	205218.0	-3.0	...

	boardTemperature	course	imei	lastResetCause	speed	\
1304	29.0	226.0	3.575181e+14	32.0	0.0	
1341	27.0	216.0	3.575181e+14	32.0	0.0	
2894	17.0	0.0	3.575181e+14	32.0	0.0	
2028	34.0	51.0	3.575181e+14	32.0	0.0	
1457	27.0	206.0	3.575181e+14	32.0	0.0	
...
451	8.0	45.0	3.575181e+14	32.0	0.0	
181	9.0	216.0	3.575181e+14	32.0	0.0	
2817	19.0	47.0	3.575181e+14	32.0	0.0	
2345	31.0	43.0	3.575181e+14	32.0	0.0	
1681	30.0	0.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
1304	1.600072e+09	2915.0	16.42	NaN	
1341	1.600073e+09	2901.0	16.50	NaN	
2894	1.600109e+09	3104.0	18.62	NaN	
2028	1.600089e+09	2928.0	17.74	NaN	
1457	1.600075e+09	2933.0	16.50	NaN	
...
451	1.600052e+09	2915.0	16.59	NaN	
181	1.600046e+09	2909.0	16.77	NaN	
2817	1.600107e+09	3101.0	18.62	NaN	
2345	1.600096e+09	2933.0	18.44	NaN	
1681	1.600081e+09	2949.0	17.03	NaN	

	name
1304	Error: certificate has expired : https://dev.s...
1341	Error: certificate has expired : https://dev.s...
2894	Error: certificate has expired : https://dev.s...
2028	Error: certificate has expired : https://dev.s...
1457	Error: certificate has expired : https://dev.s...
...	...
451	Error: certificate has expired : https://dev.s...
181	Error: certificate has expired : https://dev.s...
2817	Error: certificate has expired : https://dev.s...
2345	Error: certificate has expired : https://dev.s...
1681	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 25:

	datetime	app_id	dev_id
time \			
1910	2020-09-14 12:24:17.096	mijnomgeving	357518080332257 1600086257096
489	2020-09-14 03:09:16.428	mijnomgeving	357518080332257 1600052956428
2775	2020-09-14 17:54:43.532	mijnomgeving	357518080332257 1600106083532
3467	2020-09-14 22:24:14.598	mijnomgeving	357518080332257 1600122254598
1870	2020-09-14 12:09:11.143	mijnomgeving	357518080332257 1600085351143
...
1948	2020-09-14 12:39:10.426	mijnomgeving	357518080332257 1600087150426
3505	2020-09-14 22:39:13.674	mijnomgeving	357518080332257 1600123153674
3619	2020-09-14 23:24:13.031	mijnomgeving	357518080332257 1600125853031
997	2020-09-14 06:24:34.216	mijnomgeving	357518080332257 1600064674216
926	2020-09-14 05:57:04.436	mijnomgeving	357518080332257 1600063024436

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1910	3.0	51.898271	4.423345	4.0	73813.0	-17.0	...	
489	2.0	51.898299	4.423326	7.0	40512.0	15.0	...	
2775	33.0	51.898261	4.423302	8.0	93643.0	2.0	...	
3467	4.0	51.898214	4.423347	5.0	109814.0	-8.0	...	
1870	3.0	51.898475	4.423569	6.0	72913.0	-19.0	...	
...
1948	2.0	51.898245	4.423162	5.0	74712.0	39.0	...	
3505	3.0	51.898098	4.423349	4.0	110713.0	-18.0	...	
3619	2.0	51.898469	4.423315	5.0	113412.0	23.0	...	
997	5.0	51.898274	4.423257	5.0	52215.0	-57.0	...	
926	2.0	51.898167	4.423320	5.0	50412.0	25.0	...	

	2.0	51.898167	4.423329	5.0	50412.0	25.0	...
	boardTemperature	course	imei	lastResetCause	speed	\	
1910	33.0	28.0	3.575181e+14	32.0	0.0		
489	13.0	39.0	3.575181e+14	32.0	0.0		
2775	24.0	0.0	3.575181e+14	32.0	0.0		
3467	16.0	220.0	3.575181e+14	32.0	0.0		
1870	32.0	0.0	3.575181e+14	32.0	0.0		
...		
1948	33.0	0.0	3.575181e+14	32.0	0.0		
3505	16.0	13.0	3.575181e+14	32.0	0.0		
3619	17.0	0.0	3.575181e+14	32.0	0.0		
997	15.0	0.0	3.575181e+14	32.0	0.0		
926	14.0	0.0	3.575181e+14	32.0	0.0		

	timestamp	waterEC	waterTemperature	pH	\	
1910	1.600086e+09	473.0	19.59	NaN		
489	1.600053e+09	445.0	19.41	NaN		
2775	1.600106e+09	474.0	19.77	NaN		
3467	1.600122e+09	489.0	19.68	NaN		
1870	1.600085e+09	471.0	19.59	NaN		
...		
1948	1.600087e+09	475.0	19.68	NaN		
3505	1.600123e+09	487.0	19.68	NaN		
3619	1.600126e+09	476.0	19.68	NaN		
997	1.600065e+09	442.0	19.32	NaN		
926	1.600063e+09	445.0	19.32	NaN		

	name	
1910	Error: certificate has expired : https://dev.s...	
489	Error: certificate has expired : https://dev.s...	
2775	Error: certificate has expired : https://dev.s...	
3467	EC 240	
1870	Error: certificate has expired : https://dev.s...	
...	...	
1948	Error: certificate has expired : https://dev.s...	
3505	EC 240	
3619	EC 240	
997	Error: certificate has expired : https://dev.s...	
926	Error: certificate has expired : https://dev.s...	

[96 rows x 21 columns], 26:				datetime	app_id	dev_id
time	\					
143	2020-09-14 00:54:51.870	mijnomgeving	357518080494818	1600044891870		
763	2020-09-14 04:54:50.011	mijnomgeving	357518080494818	1600059290011		
2851	2020-09-14 18:24:53.343	mijnomgeving	357518080494818	1600107893343		
377	2020-09-14 02:24:51.303	mijnomgeving	357518080494818	1600050291303		
2382	2020-09-14 15:24:48.297	mijnomgeving	357518080494818	1600097088297		
...		
1533	2020-09-14 09:54:49.780	mijnomgeving	357518080494818	1600077289780		
569	2020-09-14 03:40:13.213	mijnomgeving	357518080494818	1600054813213		
2500	2020-09-14 16:09:48.905	mijnomgeving	357518080494818	1600099788905		
3545	2020-09-14 22:55:31.119	mijnomgeving	357518080494818	1600124131119		
725	2020-09-14 04:39:49.857	mijnomgeving	357518080494818	1600058389857		

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
143	1.0	52.809206	5.745272	8.0	89118.0	6.0	...	
763	0.0	52.809204	5.745199	6.0	103517.0	-3.0	...	
2851	6.0	52.810368	5.744204	4.0	152123.0	52.0	...	
377	1.0	52.808427	5.745874	6.0	94518.0	2.0	...	
2382	1.0	52.808981	5.745198	5.0	141318.0	20.0	...	
...	
1533	0.0	52.809177	5.745118	4.0	121519.0	12.0	...	
569	21.0	52.809182	5.745221	9.0	99038.0	-8.0	...	
2500	1.0	52.809112	5.745267	4.0	144018.0	-13.0	...	
3545	1.0	52.809066	5.745525	6.0	15318.0	40.0	...	
725	0.0	52.809215	5.745265	7.0	102617.0	7.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
143	12.0	9.0	3.575181e+14	32.0	0.0	
763	11.0	5.0	3.575181e+14	32.0	0.0	
2851	18.0	254.0	3.575181e+14	32.0	0.0	
377	12.0	252.0	3.575181e+14	32.0	1.0	

377	12.0	255.0	3.575181e+14	32.0	1.0
2382	24.0	15.0	3.575181e+14	32.0	0.0
...
1533	28.0	215.0	3.575181e+14	32.0	0.0
569	12.0	58.0	3.575181e+14	32.0	0.0
2500	24.0	14.0	3.575181e+14	32.0	0.0
3545	15.0	222.0	3.575181e+14	32.0	0.0
725	11.0	0.0	3.575181e+14	32.0	0.0

	timestamp	waterEC	waterTemperature	pH	\
143	1.600045e+09	1749.0	17.47	NaN	
763	1.600059e+09	1708.0	17.21	NaN	
2851	1.600108e+09	1721.0	18.18	NaN	
377	1.600050e+09	1743.0	17.38	NaN	
2382	1.600097e+09	1722.0	18.18	NaN	
...
1533	1.600077e+09	1714.0	17.30	NaN	
569	1.600055e+09	1703.0	17.30	NaN	
2500	1.600100e+09	1727.0	18.09	NaN	
3545	1.600124e+09	1726.0	18.00	NaN	
725	1.600058e+09	1702.0	17.21	NaN	

	name
143	Error: certificate has expired : https://dev.s...
763	Error: certificate has expired : https://dev.s...
2851	Error: certificate has expired : https://dev.s...
377	Error: certificate has expired : https://dev.s...
2382	Error: certificate has expired : https://dev.s...
...	...
1533	Error: certificate has expired : https://dev.s...
569	Error: certificate has expired : https://dev.s...
2500	Error: certificate has expired : https://dev.s...
3545	EC 309
725	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 27:

	time	\	datetime	app_id	dev_id
1193	2020-09-14	07:41:05.462	mijnomgeving	357518080494982	1600069265462
2346	2020-09-14	15:10:35.323	mijnomgeving	357518080494982	1600096235323
3585	2020-09-14	23:11:02.279	mijnomgeving	357518080494982	1600125062279
963	2020-09-14	06:11:14.846	mijnomgeving	357518080494982	1600063874846
378	2020-09-14	02:25:32.255	mijnomgeving	357518080494982	1600050332255
...
261	2020-09-14	01:40:50.377	mijnomgeving	357518080494982	1600047650377
3394	2020-09-14	21:55:17.916	mijnomgeving	357518080494982	1600120517916
1801	2020-09-14	11:40:42.849	mijnomgeving	357518080494982	1600083642849
416	2020-09-14	02:40:38.197	mijnomgeving	357518080494982	1600051238197
2109	2020-09-14	13:40:14.820	mijnomgeving	357518080494982	1600090814820

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
1193	52.0	59.769450	17.566579	5.0	949595.0	52.0	...	
2346	25.0	59.769266	17.567052	5.0	976567.0	25.0	...	
3585	45.0	59.769516	17.566605	6.0	1005396.0	17.0	...	
963	61.0	59.769418	17.566598	4.0	944203.0	-11.0	...	
378	19.0	59.769232	17.567053	5.0	930661.0	38.0	...	
...	
261	28.0	59.769504	17.565627	4.0	927979.0	39.0	...	
3394	9.0	59.769222	17.567081	6.0	1000851.0	30.0	...	
1801	30.0	59.769276	17.567147	7.0	963972.0	40.0	...	
416	16.0	59.769222	17.567205	6.0	931567.0	75.0	...	
2109	3.0	59.769339	17.567049	5.0	971146.0	16.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
1193	21.0	231.0	3.575181e+14	16.0	6.0	
2346	22.0	207.0	3.575181e+14	16.0	2.0	
3585	22.0	211.0	3.575181e+14	16.0	2.0	
963	21.0	0.0	3.575181e+14	16.0	0.0	
378	21.0	0.0	3.575181e+14	16.0	0.0	
...	
261	21.0	49.0	3.575181e+14	16.0	3.0	
3394	21.0	245.0	3.575181e+14	16.0	1.0	
1801	21.0	201.0	3.575181e+14	16.0	0.0	
416	21.0	220.0	3.575181e+14	16.0	2.0	

416	21.0	229.0	3.575181e+14	16.0	2.0
2109	21.0	0.0	3.575181e+14	16.0	2.0

	timestamp	waterEC	waterTemperature	pH	\
1193	1.600069e+09	0.0	20.56	NaN	
2346	1.600096e+09	0.0	20.82	NaN	
3585	1.600125e+09	0.0	20.91	NaN	
963	1.600064e+09	0.0	20.47	NaN	
378	1.600050e+09	0.0	20.47	NaN	
...
261	1.600048e+09	0.0	20.47	NaN	
3394	1.600121e+09	0.0	20.91	NaN	
1801	1.600084e+09	0.0	20.73	NaN	
416	1.600051e+09	0.0	20.47	NaN	
2109	1.600091e+09	0.0	20.73	NaN	

	name
1193	Error: certificate has expired : https://dev.s...
2346	Error: certificate has expired : https://dev.s...
3585	EC 326
963	Error: certificate has expired : https://dev.s...
378	Error: certificate has expired : https://dev.s...
...	...
261	Error: certificate has expired : https://dev.s...
3394	EC 326
1801	Error: certificate has expired : https://dev.s...
416	Error: certificate has expired : https://dev.s...
2109	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 28:

	datetime	app_id	dev_id
time \			
2036	2020-09-14 13:11:14.974	mijnomgeving	357518080165335 1600089074974
3050	2020-09-14 19:41:10.003	mijnomgeving	357518080165335 1600112470003
456	2020-09-14 02:56:01.866	mijnomgeving	357518080165335 1600052161866
1309	2020-09-14 08:26:00.587	mijnomgeving	357518080165335 1600071960587
1347	2020-09-14 08:41:27.587	mijnomgeving	357518080165335 1600072887587
...
28	2020-09-14 00:11:13.144	mijnomgeving	357518080165335 1600042273144
847	2020-09-14 05:26:02.828	mijnomgeving	357518080165335 1600061162828
2152	2020-09-14 13:56:23.157	mijnomgeving	357518080165335 1600091783157
1119	2020-09-14 07:11:20.383	mijnomgeving	357518080165335 1600067480383
2661	2020-09-14 17:11:03.659	mijnomgeving	357518080165335 1600103463659

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
2036	4.0	51.898122	4.423510	4.0	1468814.0	19.0	...	
3050	17.0	51.897979	4.423295	4.0	1492227.0	-15.0	...	
456	2.0	51.898019	4.423310	5.0	1431912.0	22.0	...	
1309	3.0	51.898159	4.422966	4.0	1451713.0	47.0	...	
1347	32.0	51.898281	4.423233	6.0	1452642.0	6.0	...	
...	
28	4.0	51.898564	4.423364	4.0	1422014.0	-47.0	...	
847	4.0	51.898352	4.422739	5.0	1440914.0	4.0	...	
2152	25.0	51.898232	4.423112	6.0	1471535.0	20.0	...	
1119	24.0	51.898351	4.423315	4.0	1447234.0	6.0	...	
2661	3.0	51.898364	4.423266	5.0	1483213.0	-51.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
2036	33.0	0.0	3.575181e+14	1.0	0.0	
3050	23.0	5.0	3.575181e+14	1.0	0.0	
456	15.0	8.0	3.575181e+14	1.0	0.0	
1309	23.0	6.0	3.575181e+14	1.0	0.0	
1347	24.0	14.0	3.575181e+14	1.0	0.0	
...	
28	16.0	11.0	3.575181e+14	1.0	0.0	
847	15.0	209.0	3.575181e+14	1.0	0.0	
2152	34.0	225.0	3.575181e+14	1.0	0.0	
1119	19.0	0.0	3.575181e+14	1.0	0.0	
2661	29.0	249.0	3.575181e+14	1.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
2036	1.600089e+09	3582.0	19.50	NaN	
3050	1.600112e+09	3680.0	19.50	NaN	
456	1.600052e+09	2405.0	19.24	NaN	

456	1.600052e+09	3403.0	19.24	NaN
1309	1.600072e+09	3403.0	19.15	NaN
1347	1.600073e+09	3525.0	19.15	NaN
...
28	1.600042e+09	2973.0	19.24	NaN
847	1.600061e+09	3138.0	19.15	NaN
2152	1.600092e+09	3622.0	19.50	NaN
1119	1.600067e+09	3102.0	19.15	NaN
2661	1.600103e+09	3767.0	19.50	NaN

	name
2036	Error: certificate has expired : https://dev.s...
3050	Error: certificate has expired : https://dev.s...
456	Error: certificate has expired : https://dev.s...
1309	Error: certificate has expired : https://dev.s...
1347	Error: certificate has expired : https://dev.s...
...	...
28	Error: certificate has expired : https://dev.s...
847	Error: certificate has expired : https://dev.s...
2152	Error: certificate has expired : https://dev.s...
1119	Error: certificate has expired : https://dev.s...
2661	Error: certificate has expired : https://dev.s...

[95 rows x 21 columns], 29:				datetime	app_id	dev_id
time \						
533	2020-09-14 03:26:19.333	mijnomgeving	357518080165475	1600053979333		
1463	2020-09-14 09:26:17.704	mijnomgeving	357518080165475	1600075577704		
2310	2020-09-14 14:56:19.089	mijnomgeving	357518080165475	1600095379089		
848	2020-09-14 05:26:18.683	mijnomgeving	357518080165475	1600061178683		
184	2020-09-14 01:11:28.791	mijnomgeving	357518080165475	1600045888791		
...		
3166	2020-09-14 20:26:15.806	mijnomgeving	357518080165475	1600115175806		
3011	2020-09-14 19:26:15.800	mijnomgeving	357518080165475	1600111575800		
3664	2020-09-14 23:41:14.996	mijnomgeving	357518080165475	1600126874996		
1424	2020-09-14 09:11:18.344	mijnomgeving	357518080165475	1600074678344		
1949	2020-09-14 12:39:27.822	mijnomgeving	357518080165475	1600087167822		

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
533	255.0	0.000025	0.000025	0.0	633732.0	0.0	...	
1463	255.0	0.000025	0.000025	0.0	655331.0	0.0	...	
2310	255.0	0.000025	0.000025	0.0	675132.0	0.0	...	
848	255.0	0.000025	0.000025	0.0	640932.0	0.0	...	
184	255.0	0.000025	0.000025	0.0	625641.0	0.0	...	
...	
3166	255.0	0.000025	0.000025	0.0	694932.0	0.0	...	
3011	255.0	0.000025	0.000025	0.0	691332.0	0.0	...	
3664	255.0	0.000025	0.000025	0.0	706632.0	0.0	...	
1424	255.0	0.000025	0.000025	0.0	654432.0	0.0	...	
1949	3.0	52.373075	4.916499	4.0	666914.0	-3.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
533	21.0	0.0	3.575181e+14	16.0	0.0	
1463	20.0	0.0	3.575181e+14	16.0	0.0	
2310	24.0	0.0	3.575181e+14	16.0	0.0	
848	20.0	0.0	3.575181e+14	16.0	0.0	
184	21.0	0.0	3.575181e+14	16.0	0.0	
...	
3166	22.0	0.0	3.575181e+14	16.0	0.0	
3011	22.0	0.0	3.575181e+14	16.0	0.0	
3664	21.0	0.0	3.575181e+14	16.0	0.0	
1424	20.0	0.0	3.575181e+14	16.0	0.0	
1949	33.0	0.0	3.575181e+14	16.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
533	1.600054e+09	3.0	20.82	NaN	
1463	1.600076e+09	1.0	20.91	NaN	
2310	1.600095e+09	0.0	23.03	NaN	
848	1.600061e+09	1.0	20.82	NaN	
184	1.600046e+09	0.0	20.82	NaN	
...	
3166	1.600115e+09	0.0	21.62	NaN	
3011	1.600112e+09	0.0	21.79	NaN	
2664	1.600127e+09	1.0	21.44	NaN	

```
3664 1.600127e+09      1.0      21.44 NaN
1424 1.600075e+09      1.0      20.91 NaN
1949 1.600087e+09      0.0      32.55 NaN
```

```
                                     name
533  Error: certificate has expired : https://dev.s...
1463 Error: certificate has expired : https://dev.s...
2310 Error: certificate has expired : https://dev.s...
848  Error: certificate has expired : https://dev.s...
184  Error: certificate has expired : https://dev.s...
...
3166                                     EC 201
3011 Error: certificate has expired : https://dev.s...
3664                                     EC 201
1424 Error: certificate has expired : https://dev.s...
1949 Error: certificate has expired : https://dev.s...
```

```
[94 rows x 21 columns], 30:                                     datetime      app_id      dev_id
time \
3285 2020-09-14 21:13:40.932  mijnomgeving  357518080494826  1600118020932
2196 2020-09-14 14:13:57.708  mijnomgeving  357518080494826  1600092837708
69    2020-09-14 00:26:28.742  mijnomgeving  357518080494826  1600043188742
2744 2020-09-14 17:42:52.582  mijnomgeving  357518080494826  1600105372582
1963 2020-09-14 12:44:19.273  mijnomgeving  357518080494826  1600087459273
...
1692 2020-09-14 10:58:05.317  mijnomgeving  357518080494826  1600081085317
2820 2020-09-14 18:13:31.817  mijnomgeving  357518080494826  1600107211817
2433 2020-09-14 15:43:57.264  mijnomgeving  357518080494826  1600098237264
613   2020-09-14 03:56:29.736  mijnomgeving  357518080494826  1600055789736
2354 2020-09-14 15:14:09.264  mijnomgeving  357518080494826  1600096449264
```

```
      FixAge      Lat      Lon  SatInFix  TimeActive  altitude  ... \
3285      1.0  60.024758  17.815190      4.0      7218.0      86.0  ...
2196      0.0  60.024557  17.815225      6.0      6318.0      43.0  ...
69      1.0  60.024897  17.815896      4.0      36018.0     -41.0  ...
2744      0.0  60.024667  17.815338      6.0      2717.0      30.0  ...
1963      0.0  60.024639  17.815344     10.0      918.0      57.0  ...
...
1692      1.0  60.024451  17.816132      4.0      18919.0      40.0  ...
2820      1.0  60.024877  17.815549      5.0      4518.0      47.0  ...
2433      0.0  60.024754  17.815741      5.0      11718.0       2.0  ...
613      1.0  60.024701  17.815389      6.0      48618.0      35.0  ...
2354     13.0  60.024611  17.815278      5.0      9930.0      26.0  ...
```

```
      boardTemperature  course      imei  lastResetCause  speed \
3285          15.0      28.0  3.575181e+14          32.0      0.0
2196          20.0      42.0  3.575181e+14          32.0      1.0
69          10.0      45.0  3.575181e+14          32.0      0.0
2744          17.0      50.0  3.575181e+14          32.0      0.0
1963          21.0      53.0  3.575181e+14          32.0      0.0
...
1692          20.0     221.0  3.575181e+14          32.0      8.0
2820          16.0      11.0  3.575181e+14          32.0      0.0
2433          18.0      57.0  3.575181e+14          32.0      0.0
613          11.0      10.0  3.575181e+14          32.0      0.0
2354          18.0     207.0  3.575181e+14          32.0      0.0
```

```
      timestamp  waterEC  waterTemperature  pH \
3285  1.600118e+09      209.0          15.00 NaN
2196  1.600093e+09      206.0          15.27 NaN
69    1.600043e+09      211.0          14.21 NaN
2744  1.600105e+09      210.0          15.27 NaN
1963  1.600087e+09      208.0          15.71 NaN
...
1692  1.600081e+09      205.0          14.92 NaN
2820  1.600107e+09      212.0          15.18 NaN
2433  1.600098e+09      210.0          15.27 NaN
613   1.600056e+09      211.0          14.12 NaN
2354  1.600096e+09      208.0          15.27 NaN
```

```
                                     name
3285                                     EC 323
2196 Error: certificate has expired : https://dev.s...
```



```

time \
772 2020-09-14 04:57:50.590 mijnomgeving 357518080166663 1600059470590
2667 2020-09-14 17:13:10.288 mijnomgeving 357518080166663 1600103590288
305 2020-09-14 01:57:56.245 mijnomgeving 357518080166663 1600048676245
3514 2020-09-14 22:43:06.519 mijnomgeving 357518080166663 1600123386519
2117 2020-09-14 13:43:05.486 mijnomgeving 357518080166663 1600090985486
...
1388 2020-09-14 08:58:03.696 mijnomgeving 357518080166663 1600073883696
3476 2020-09-14 22:27:50.218 mijnomgeving 357518080166663 1600122470218
2936 2020-09-14 18:57:53.370 mijnomgeving 357518080166663 1600109873370
1805 2020-09-14 11:42:52.485 mijnomgeving 357518080166663 1600083772485
1547 2020-09-14 10:01:15.819 mijnomgeving 357518080166663 1600077675819

```

```

FixAge Lat Lon SatInFix TimeActive altitude ... \
772 2.0 51.898258 4.423390 6.0 84612.0 -10.0 ...
2667 24.0 51.898255 4.423294 8.0 128734.0 0.0 ...
305 2.0 51.898229 4.423278 4.0 73812.0 1.0 ...
3514 2.0 51.898205 4.423157 5.0 148512.0 13.0 ...
2117 15.0 51.897889 4.423452 4.0 116125.0 29.0 ...
...
1388 4.0 51.898174 4.423232 4.0 99014.0 7.0 ...
3476 2.0 51.898274 4.423377 5.0 147612.0 8.0 ...
2936 6.0 51.898066 4.423550 4.0 135016.0 -8.0 ...
1805 2.0 51.898212 4.423282 6.0 108912.0 0.0 ...
1547 4.0 51.898416 4.423171 4.0 102624.0 -38.0 ...

```

```

boardTemperature course imei lastResetCause speed \
772 13.0 48.0 3.575181e+14 32.0 0.0
2667 30.0 22.0 3.575181e+14 32.0 0.0
305 13.0 0.0 3.575181e+14 32.0 0.0
3514 17.0 21.0 3.575181e+14 32.0 0.0
2117 40.0 255.0 3.575181e+14 32.0 0.0
...
1388 24.0 0.0 3.575181e+14 32.0 0.0
3476 16.0 32.0 3.575181e+14 32.0 0.0
2936 22.0 234.0 3.575181e+14 32.0 0.0
1805 34.0 0.0 3.575181e+14 32.0 0.0
1547 26.0 0.0 3.575181e+14 32.0 0.0

```

```

timestamp waterEC waterTemperature pH \
772 1.600059e+09 24.0 19.32 NaN
2667 1.600104e+09 24.0 19.68 NaN
305 1.600049e+09 23.0 19.32 NaN
3514 1.600123e+09 25.0 19.68 NaN
2117 1.600091e+09 24.0 19.68 NaN
...
1388 1.600074e+09 23.0 19.32 NaN
3476 1.600122e+09 25.0 19.68 NaN
2936 1.600110e+09 24.0 19.68 NaN
1805 1.600084e+09 24.0 19.41 NaN
1547 1.600077e+09 24.0 19.50 NaN

```

```

name
772 Error: certificate has expired : https://dev.s...
2667 Error: certificate has expired : https://dev.s...
305 Error: certificate has expired : https://dev.s...
3514 EC 243
2117 Error: certificate has expired : https://dev.s...
...
1388 Error: certificate has expired : https://dev.s...
3476 EC 243
2936 Error: certificate has expired : https://dev.s...
1805 Error: certificate has expired : https://dev.s...
1547 Error: certificate has expired : https://dev.s...

```

```

[96 rows x 21 columns], 34:
datetime app_id dev_id
time \
657 2020-09-14 04:13:56.594 mijnomgeving 357518080167000 1600056836594
2977 2020-09-14 19:13:52.067 mijnomgeving 357518080167000 1600110832067
2471 2020-09-14 15:58:49.437 mijnomgeving 357518080167000 1600099129437
1846 2020-09-14 11:58:51.158 mijnomgeving 357518080167000 1600084731158
2510 2020-09-14 16:13:49.584 mijnomgeving 357518080167000 1600100029584

```

```
...
2119 2020-09-14 13:43:50.515 mijnomgeving 357518080167000 1600091030515
1238 2020-09-14 07:58:49.177 mijnomgeving 357518080167000 1600070329177
775 2020-09-14 04:58:51.614 mijnomgeving 357518080167000 1600059531614
890 2020-09-14 05:43:53.743 mijnomgeving 357518080167000 1600062233743
3094 2020-09-14 19:58:49.685 mijnomgeving 357518080167000 1600113529685
```

```
FixAge Lat Lon SatInFix TimeActive altitude ... \
657 30.0 52.173971 5.036005 6.0 65740.0 -7.0 ...
2977 28.0 52.173856 5.035958 5.0 119737.0 -19.0 ...
2471 25.0 52.174019 5.036050 6.0 108035.0 -4.0 ...
1846 25.0 52.173770 5.036056 6.0 93635.0 -37.0 ...
2510 25.0 52.174007 5.036147 5.0 108935.0 -17.0 ...
...
2119 26.0 52.173907 5.035955 5.0 99935.0 -7.0 ...
1238 23.0 52.173996 5.036117 4.0 79233.0 -17.0 ...
775 25.0 52.174283 5.037478 4.0 68435.0 -82.0 ...
890 27.0 52.173693 5.035287 5.0 71137.0 -42.0 ...
3094 25.0 52.173966 5.036020 5.0 122435.0 2.0 ...
```

```
boardTemperature course imei lastResetCause speed \
657 12.0 0.0 3.575181e+14 32.0 0.0
2977 18.0 0.0 3.575181e+14 32.0 0.0
2471 24.0 0.0 3.575181e+14 32.0 0.0
1846 22.0 0.0 3.575181e+14 32.0 0.0
2510 23.0 0.0 3.575181e+14 32.0 0.0
...
2119 24.0 14.0 3.575181e+14 32.0 0.0
1238 15.0 0.0 3.575181e+14 32.0 0.0
775 12.0 57.0 3.575181e+14 32.0 0.0
890 12.0 0.0 3.575181e+14 32.0 0.0
3094 17.0 0.0 3.575181e+14 32.0 0.0
```

```
timestamp waterEC waterTemperature pH \
657 1.600057e+09 796.0 18.18 NaN
2977 1.600111e+09 792.0 18.35 NaN
2471 1.600099e+09 791.0 18.27 NaN
1846 1.600085e+09 795.0 18.18 NaN
2510 1.600100e+09 793.0 18.27 NaN
...
2119 1.600091e+09 795.0 18.18 NaN
1238 1.600070e+09 796.0 18.18 NaN
775 1.600060e+09 795.0 18.18 NaN
890 1.600062e+09 797.0 18.18 NaN
3094 1.600114e+09 790.0 18.35 NaN
```

```
name
657 Error: certificate has expired : https://dev.s...
2977 Error: certificate has expired : https://dev.s...
2471 Error: certificate has expired : https://dev.s...
1846 Error: certificate has expired : https://dev.s...
2510 Error: certificate has expired : https://dev.s...
...
2119 Error: certificate has expired : https://dev.s...
1238 Error: certificate has expired : https://dev.s...
775 Error: certificate has expired : https://dev.s...
890 Error: certificate has expired : https://dev.s...
3094 Error: certificate has expired : https://dev.s...
```

```
[96 rows x 21 columns], 35:
datetime app_id dev_id
time \
3705 2020-09-14 23:58:27.611 mijnomgeving 357518080494834 1600127907611
701 2020-09-14 04:30:48.002 mijnomgeving 357518080494834 1600057848002
1423 2020-09-14 09:11:15.816 mijnomgeving 357518080494834 1600074675816
1285 2020-09-14 08:17:26.929 mijnomgeving 357518080494834 1600071446929
740 2020-09-14 04:45:20.047 mijnomgeving 357518080494834 1600058720047
...
1877 2020-09-14 12:11:28.017 mijnomgeving 357518080494834 1600085488017
114 2020-09-14 00:43:55.907 mijnomgeving 357518080494834 1600044235907
35 2020-09-14 00:13:55.824 mijnomgeving 357518080494834 1600042435824
2466 2020-09-14 15:56:15.373 mijnomgeving 357518080494834 1600098975373
3148 2020-09-14 20:19:08.178 mijnomgeving 357518080494834 1600114748178
```

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
3705	1.0	52.425718	5.420774	6.0	55037.0	-10.0	...	
701	25.0	52.425764	5.420778	7.0	64841.0	0.0	...	
1423	0.0	52.425733	5.420799	13.0	1818.0	-5.0	...	
1285	0.0	52.425715	5.420846	15.0	42.0	-3.0	...	
740	1.0	52.425739	5.420797	7.0	65718.0	-4.0	...	
...	
1877	18.0	52.425732	5.420770	7.0	12635.0	-10.0	...	
114	0.0	52.425773	5.420836	7.0	51318.0	-36.0	...	
35	14.0	52.425794	5.420807	8.0	49532.0	-9.0	...	
2466	19.0	52.425723	5.420790	10.0	26137.0	2.0	...	
3148	0.0	52.425816	5.420774	4.0	41418.0	-21.0	...	

	boardTemperature	course	imei	lastResetCause	speed	\
3705	21.0	2.0	3.575181e+14	32.0	1.0	
701	9.0	9.0	3.575181e+14	32.0	0.0	
1423	24.0	0.0	3.575181e+14	32.0	0.0	
1285	28.0	8.0	3.575181e+14	32.0	0.0	
740	8.0	15.0	3.575181e+14	32.0	0.0	
...	
1877	38.0	0.0	3.575181e+14	32.0	0.0	
114	10.0	21.0	3.575181e+14	32.0	0.0	
35	11.0	19.0	3.575181e+14	32.0	0.0	
2466	26.0	241.0	3.575181e+14	32.0	0.0	
3148	18.0	229.0	3.575181e+14	32.0	3.0	

	timestamp	waterEC	waterTemperature	pH	\
3705	1.600128e+09	1498.0	18.27	NaN	
701	1.600058e+09	1531.0	17.03	NaN	
1423	1.600075e+09	1458.0	16.77	NaN	
1285	1.600071e+09	1456.0	16.77	NaN	
740	1.600059e+09	1532.0	17.03	NaN	
...	
1877	1.600085e+09	1452.0	17.03	NaN	
114	1.600044e+09	1730.0	17.47	NaN	
35	1.600042e+09	1581.0	17.56	NaN	
2466	1.600099e+09	1451.0	17.47	NaN	
3148	1.600114e+09	1489.0	18.27	NaN	

	name
3705	EC 314
701	Error: certificate has expired : https://dev.s...
1423	Error: certificate has expired : https://dev.s...
1285	Error: certificate has expired : https://dev.s...
740	Error: certificate has expired : https://dev.s...
...	...
1877	Error: certificate has expired : https://dev.s...
114	Error: certificate has expired : https://dev.s...
35	Error: certificate has expired : https://dev.s...
2466	Error: certificate has expired : https://dev.s...
3148	EC 314

	datetime	app_id	dev_id
[75 rows x 21 columns], 36:			
time \			
578	2020-09-14 03:43:46.479	mijnomgeving	357518080495088 1600055026479
1576	2020-09-14 10:12:29.968	mijnomgeving	357518080495088 1600078349968
814	2020-09-14 05:13:57.029	mijnomgeving	357518080495088 1600060437029
3306	2020-09-14 21:21:48.519	mijnomgeving	357518080495088 1600118508519
269	2020-09-14 01:43:56.465	mijnomgeving	357518080495088 1600047836465
...
1879	2020-09-14 12:12:32.057	mijnomgeving	357518080495088 1600085552057
1425	2020-09-14 09:12:40.982	mijnomgeving	357518080495088 1600074760982
3460	2020-09-14 22:21:48.625	mijnomgeving	357518080495088 1600122108625
2389	2020-09-14 15:27:27.911	mijnomgeving	357518080495088 1600097247911
1087	2020-09-14 06:58:45.803	mijnomgeving	357518080495088 1600066725803

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
578	255.0	0.000025	0.000025	0.0	63023.0	0.0	...	
1576	255.0	0.000025	0.000025	0.0	10823.0	0.0	...	
814	255.0	0.000025	0.000025	0.0	68432.0	0.0	...	
3306	255.0	0.000025	0.000025	0.0	9023.0	0.0	...	
269	255.0	0.000025	0.000025	0.0	55037.0	0.0	...	

269	255.0	0.000025	0.000025	0.0	55832.0	0.0	...
...
1879	255.0	0.000025	0.000025	0.0	18023.0	0.0	...
1425	255.0	0.000025	0.000025	0.0	7223.0	0.0	...
3460	255.0	0.000025	0.000025	0.0	12623.0	0.0	...
2389	255.0	0.000025	0.000025	0.0	29723.0	0.0	...
1087	255.0	0.000025	0.000025	0.0	74723.0	0.0	...

	boardTemperature	course	imei	lastResetCause	speed	\
578	23.0	0.0	3.575181e+14	32.0	0.0	
1576	24.0	0.0	3.575181e+14	32.0	0.0	
814	23.0	0.0	3.575181e+14	32.0	0.0	
3306	24.0	0.0	3.575181e+14	32.0	0.0	
269	23.0	0.0	3.575181e+14	32.0	0.0	
...
1879	24.0	0.0	3.575181e+14	32.0	0.0	
1425	23.0	0.0	3.575181e+14	32.0	0.0	
3460	23.0	0.0	3.575181e+14	32.0	0.0	
2389	24.0	0.0	3.575181e+14	32.0	0.0	
1087	22.0	0.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
578	1.600055e+09	0.0	22.67	8.603	
1576	1.600079e+09	0.0	24.08	8.379	
814	1.600061e+09	0.0	22.59	8.224	
3306	1.600119e+09	1.0	23.64	8.499	
269	1.600048e+09	0.0	22.76	8.551	
...
1879	1.600086e+09	0.0	24.17	8.155	
1425	1.600075e+09	2.0	23.82	7.948	
3460	1.600122e+09	1.0	23.56	8.655	
2389	1.600097e+09	0.0	24.35	8.655	
1087	1.600067e+09	1.0	22.59	8.551	

	name
578	Error: certificate has expired : https://dev.s...
1576	Error: certificate has expired : https://dev.s...
814	Error: certificate has expired : https://dev.s...
3306	EC 321
269	Error: certificate has expired : https://dev.s...
...	...
1879	Error: certificate has expired : https://dev.s...
1425	Error: certificate has expired : https://dev.s...
3460	EC 321
2389	Error: certificate has expired : https://dev.s...
1087	Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 37:				datetime	app_id	dev_id
time	\					
2320	2020-09-14 15:00:38.621	mijnomgeving	357518080495534	1600095638621		
855	2020-09-14 05:30:02.969	mijnomgeving	357518080495534	1600061402969		
1697	2020-09-14 10:59:59.484	mijnomgeving	357518080495534	1600081199484		
3313	2020-09-14 21:23:13.622	mijnomgeving	357518080495534	1600118593622		
193	2020-09-14 01:14:18.883	mijnomgeving	357518080495534	1600046058883		
...
1317	2020-09-14 08:30:10.973	mijnomgeving	357518080495534	1600072210973		
2963	2020-09-14 19:08:19.225	mijnomgeving	357518080495534	1600110499225		
2556	2020-09-14 16:30:41.440	mijnomgeving	357518080495534	1600101041440		
3158	2020-09-14 20:23:12.974	mijnomgeving	357518080495534	1600114992974		
3120	2020-09-14 20:08:37.892	mijnomgeving	357518080495534	1600114117892		

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	\
2320	1.0	52.532770	5.593047	5.0	2718.0	-7.0	...	
855	1.0	52.532701	5.592985	6.0	8118.0	-8.0	...	
1697	0.0	52.532669	5.593096	5.0	27919.0	5.0	...	
3313	4.0	52.532618	5.593090	4.0	9921.0	-4.0	...	
193	1.0	52.532795	5.593086	6.0	14418.0	-1.0	...	
...
1317	12.0	52.532662	5.593066	4.0	18929.0	0.0	...	
2963	10.0	52.532825	5.593136	5.0	1827.0	15.0	...	
2556	1.0	52.532621	5.593084	8.0	8118.0	-14.0	...	
3158	1.0	52.532667	5.593107	7.0	6318.0	0.0	...	
3120	24.0	52.532600	5.593004	0.0	5441.0	1.0	...	

3120 24.0 32.332689 3.593094 8.0 3441.0 -1.0 ...

	boardTemperature	course	imei	lastResetCause	speed	\
2320	31.0	1.0	3.575181e+14	32.0	0.0	
855	10.0	239.0	3.575181e+14	32.0	0.0	
1697	27.0	8.0	3.575181e+14	32.0	0.0	
3313	17.0	10.0	3.575181e+14	32.0	1.0	
193	10.0	55.0	3.575181e+14	32.0	0.0	
...	
1317	24.0	27.0	3.575181e+14	32.0	0.0	
2963	18.0	0.0	3.575181e+14	32.0	0.0	
2556	29.0	0.0	3.575181e+14	32.0	0.0	
3158	16.0	208.0	3.575181e+14	32.0	0.0	
3120	18.0	205.0	3.575181e+14	32.0	0.0	

	timestamp	waterEC	waterTemperature	pH	\
2320	1.600096e+09	2501.0	17.56	NaN	
855	1.600061e+09	2782.0	15.36	NaN	
1697	1.600081e+09	3002.0	16.68	NaN	
3313	1.600119e+09	2077.0	17.83	NaN	
193	1.600046e+09	2751.0	16.06	NaN	
...	
1317	1.600072e+09	2801.0	15.36	NaN	
2963	1.600110e+09	1994.0	18.09	NaN	
2556	1.600101e+09	2138.0	17.74	NaN	
3158	1.600115e+09	2000.0	17.91	NaN	
3120	1.600114e+09	1996.0	18.00	NaN	

	name
2320	Error: certificate has expired : https://dev.s...
855	Error: certificate has expired : https://dev.s...
1697	Error: certificate has expired : https://dev.s...
3313	EC 307
193	Error: certificate has expired : https://dev.s...
...	...
1317	Error: certificate has expired : https://dev.s...
2963	Error: certificate has expired : https://dev.s...
2556	Error: certificate has expired : https://dev.s...
3158	EC 307
3120	EC 307

[97 rows x 21 columns], 38:

	datetime	app_id	dev_id
time \			
1544	2020-09-14 09:59:29.466	mijnomgeving	357518080169006 1600077569466
3288	2020-09-14 21:14:31.434	mijnomgeving	357518080169006 1600118071434
3174	2020-09-14 20:29:48.544	mijnomgeving	357518080169006 1600115388544
1088	2020-09-14 06:59:29.327	mijnomgeving	357518080169006 1600066769327
1733	2020-09-14 11:14:29.485	mijnomgeving	357518080169006 1600082069485
...
116	2020-09-14 00:44:29.503	mijnomgeving	357518080169006 1600044269503
2236	2020-09-14 14:29:31.617	mijnomgeving	357518080169006 1600093771617
1165	2020-09-14 07:29:29.427	mijnomgeving	357518080169006 1600068569427
1239	2020-09-14 07:59:29.685	mijnomgeving	357518080169006 1600070369685
1431	2020-09-14 09:14:29.557	mijnomgeving	357518080169006 1600074869557

	FixAge	Lat	Lon	SatInFix	TimeActive	altitude	...	boardTemperature	\
1544	12.0	NaN	NaN	NaN	199821.0	NaN	...	24.0	
3288	16.0	NaN	NaN	NaN	240326.0	NaN	...	15.0	
3174	33.0	NaN	NaN	NaN	237642.0	NaN	...	16.0	
1088	11.0	NaN	NaN	NaN	189021.0	NaN	...	12.0	
1733	12.0	NaN	NaN	NaN	204322.0	NaN	...	24.0	
...	
116	10.0	NaN	NaN	NaN	166520.0	NaN	...	9.0	
2236	15.0	NaN	NaN	NaN	216024.0	NaN	...	28.0	
1165	11.0	NaN	NaN	NaN	190821.0	NaN	...	13.0	
1239	11.0	NaN	NaN	NaN	192621.0	NaN	...	16.0	
1431	12.0	NaN	NaN	NaN	197121.0	NaN	...	21.0	

	course	imei	lastResetCause	speed	timestamp	waterEC	\
1544	NaN	3.575181e+14	32.0	NaN	1.600078e+09	770.0	
3288	NaN	3.575181e+14	32.0	NaN	1.600118e+09	762.0	
3174	NaN	3.575181e+14	32.0	NaN	1.600115e+09	759.0	
1088	NaN	3.575181e+14	32.0	NaN	1.600072e+09	770.0	

```

1088      NaN  3.575181e+14      32.0      NaN  1.600067e+09      770.0
1733      NaN  3.575181e+14      32.0      NaN  1.600082e+09      748.0
...      ...      ...      ...      ...      ...
116      NaN  3.575181e+14      32.0      NaN  1.600044e+09      782.0
2236      NaN  3.575181e+14      32.0      NaN  1.600094e+09      764.0
1165      NaN  3.575181e+14      32.0      NaN  1.600069e+09      767.0
1239      NaN  3.575181e+14      32.0      NaN  1.600070e+09      767.0
1431      NaN  3.575181e+14      32.0      NaN  1.600075e+09      772.0

      waterTemperature  pH      name
1544      17.91  NaN  Error: certificate has expired : https://dev.s...
3288      19.68  NaN      EC 213
3174      20.12  NaN      EC 213
1088      16.86  NaN  Error: certificate has expired : https://dev.s...
1733      18.71  NaN  Error: certificate has expired : https://dev.s...
...      ...  ..      ...
116      17.74  NaN  Error: certificate has expired : https://dev.s...
2236      20.65  NaN  Error: certificate has expired : https://dev.s...
1165      16.94  NaN  Error: certificate has expired : https://dev.s...
1239      17.12  NaN  Error: certificate has expired : https://dev.s...
1431      17.21  NaN  Error: certificate has expired : https://dev.s...

[96 rows x 21 columns], 39:      datetime      app_id      dev_id
time \
3092  2020-09-14 19:58:46.768  mijnomgeving  357518080168917  1600113526768
3207  2020-09-14 20:42:26.558  mijnomgeving  357518080168917  1600116146558

      FixAge      Lat      Lon  SatInFix  TimeActive  altitude  ... \
3092      30.0  52.340714  4.925578      5.0  37965653.0      -1.0  ...
3207      16.0  52.340700  4.925597      6.0  37967440.0      1.0  ...

      boardTemperature  course      imei  lastResetCause  speed \
3092      16.0      0.0  3.575181e+14      16.0      0.0
3207      16.0      0.0  3.575181e+14      16.0      0.0

      timestamp  waterEC  waterTemperature  pH \
3092  1.600114e+09  1068.0      19.50  NaN
3207  1.600115e+09  1063.0      19.41  NaN

      name
3092  Error: certificate has expired : https://dev.s...
3207      EC 209

[2 rows x 21 columns]}

```

We can now plot all the waterEC points with matplotlib and then find all the outlying changes in EC with

```
significant_change()
```

In [12]:

```

#Check if points are bigger than the mean to estimate the significance of a change
def significant_change(data):
    changes = []
    for idx in range(0, len(data)):
        if (data[idx] > np.mean(data)):
            changes.append(idx)
    return changes

for i in range(len(imeis)):
    dates_list = imeis[i].datetime.tolist()
    for date in dates_list:
        date = dt.strptime(date, "%Y-%m-%d %H:%M:%S.%f")
        plt.plot(dates_list, imeis[i].waterEC.tolist(), '-gD', markevery=significant_change(imeis[i].waterEC.tolist()))
    plt.xlabel("Time")
    plt.ylabel("Electrical Conductivity in water")
    s = str(unique_imeis[i])
    s += ".png"
    plt.savefig(s)
    plt.show()

```



















