MINKE

Metrology for Integrated marine maNagement and Knowledge-transfer nEtwork

INFRAIA-02-2020: Integrating Activities for Starting Communities

EUROPEAN COMMISSION

Project funded by the European Commission within the Horizon 2020 Programme (2014-2020)
Grant Agreement No. 101008724

Requirements

A computer

Access to the internet

Some data to analyse

Data Basics

Data Basics

HOW DO YOU WANT TO USE YOUR KIT?

Recommended

ONLINE (USING WI-FI)

OFFLINE (SD CARD)

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Data Basics

Two modes of operation

Network Mode

Data goes from the SCK to the Platform

You can get the data in many ways, in near realtime:

- The REST API (for everything) via the web, the dashboard, python scripts... or anything!
- Websockets (for real time updates)

Offline Mode

Data doesn't leave the SCK

You need to extract the SD card from the SCK and load it somewhere (a spreadsheet, a script)

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Offline Data (brief)

Offline mode (excerpt)

We will see how to concatenate the data using python in the next session

We will also see how to load the data in python or other software!

Data doesn't leave the SCK. It's only stored on the SD card

You need to extract the SD card from the SCK and load it somewhere (a spreadsheet, a script). One CSV file per day in the SD card:

One CSV file per day in the SD card!

TIME	TEMP	HUM	BATT	LIGHT	NOISE_A	PRESS	CCS811_VOCS	CCS811_ECO2	PM_1	PM_25	PM_10
ISO 8601	C	%	%	Lux	dBA	kPa	ppb	ppm	ug/m3	ug/m3	ug/m3
Time	Temperature	Humidity	Battery	Light	Noise dBA	Barometric pressure	VOC Gas CCS811	eCO2 Gas CCS811	PM 1.0	PM 2.5	PM 10.0
	55	56	10	14	53	58	113	112	89	87	88
2021-06-27T23:58:47Z	27.18	61.34	59	0	47.22	100.96	148.00	1372.00	null	null	null
2021-06-28T00:03:47Z	27.18	61.40	59	0	46.93	100.96	148.00	1372.00	null	null	null
2021-06-28T00:08:47Z	27.18	61.43	58	0	47.34	100.95	146.00	1360.00	null	null	null
2021-06-28T00:08:47Z	27.18	61.43	58	0	47.34	100.95	146.00	1360.00	null	null	null
2021-06-28T00:08:47Z	27.18	61.43	58	0	47.34	100.95	146.00	1360.00	null	null	null

PM_10
ug/m3
PM 10.0
88
null
null
null
null

PM_10
ug/m3
PM 10.0
88
null
null
null
null

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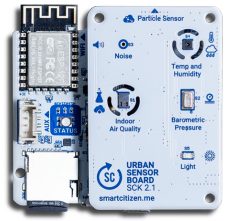
Online Data

Online data

Many ways to access the data, one API to rule them all

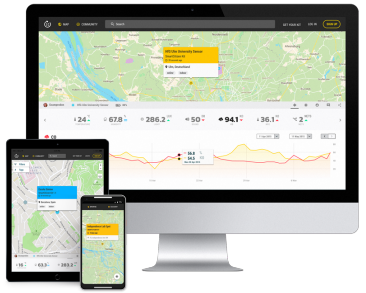


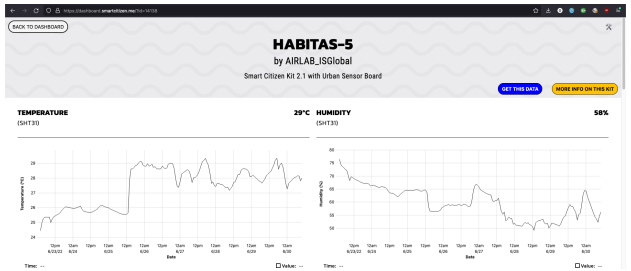
Data over **WiFi**

SC Platform

REST API

Web based visualisations





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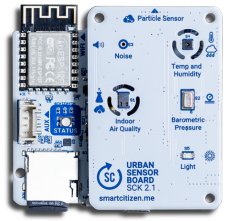
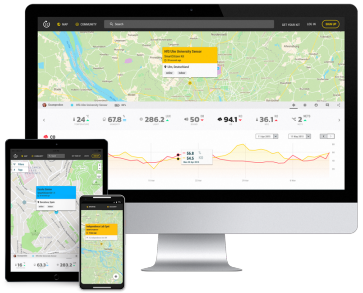


Data over **WiFi**

SC Platform

REST API

CSV Download



TIME	TEMP	HUM	BATT	LIGHT	NOISE_A	PRESS	CCS811_VOCS	CCS811_ECO2	PM_1	PM_25	PM_10
ISO 8601	C	%	%	Lux	dBA	kPa	ppb	ppm	ug/m3	ug/m3	ug/m3
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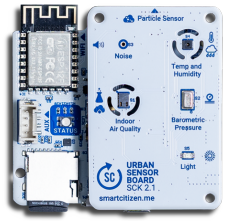


Data over **WiFi**

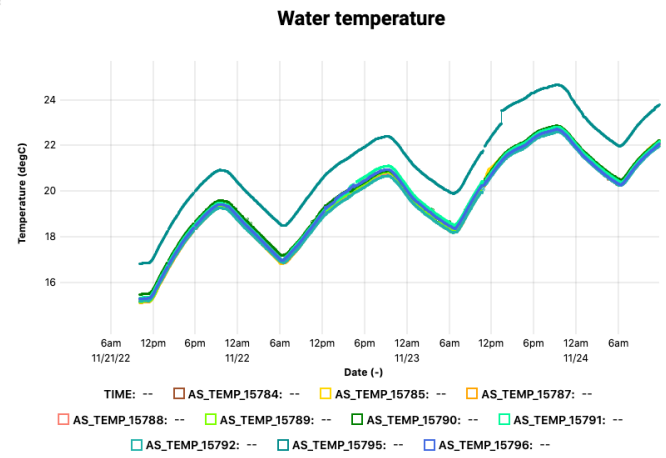
SC Platform

REST API

Scripts

```
[28]:
1  traces = {
2          "1": {"devices": "all",
3                "channel": ["AS_TEMP"],
4                "subplot": 1}
5      }
6
7  options= {'min_date': '2022-11-21'}
8  formatting = {'title': 'Water temperature', 'ylabel': {1: 'Temperature (degC)'}}
9  t.ts_uplot(traces=traces, options = options, formatting = formatting)
```

```
[28]:
```



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Online data

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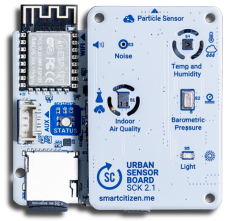

Data
over
WiFi

SC Platform

REST
API

Scripts
(already supported)

python

R

processing

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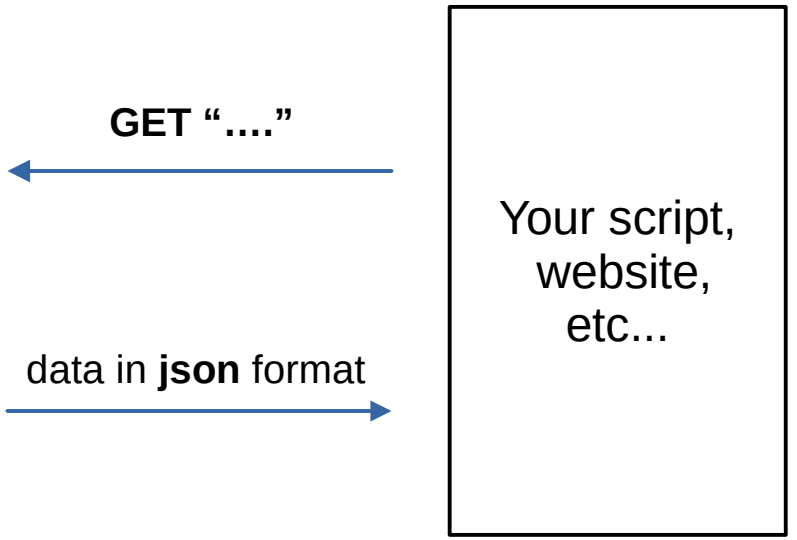
Understanding the API

Data you can get

REST API

https://api.smartcitizen.me/

- **documentation**: https://developer.smartcitizen.me
- **current_user**: https://api.smartcitizen.me/v0/me
- **components**: https://api.smartcitizen.me/v0/components
- **devices**: https://api.smartcitizen.me/v0/devices
- **kits**: https://api.smartcitizen.me/v0/kits
- **measurements**: https://api.smartcitizen.me/v0/measurements
- **sensors**: https://api.smartcitizen.me/v0/sensors
- **users**: https://api.smartcitizen.me/v0/users
- **tags**: https://api.smartcitizen.me/v0/tags
- **tags_sensors**: https://api.smartcitizen.me/v0/tag_sensors



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What can we actually do

Already working for you

Dashboard

- Visualise it
- Keep it local from the API
- Nice to show on a screen
- Cool to tinker

Easy but limited

Python/R

- Get data from any kit or kits (offline or online)
- Visualise it
- Keep it local from the API
- Calibrate sensors
- Compare to other sources
- Export it
- Generate reports and sites
- Send data to zenodo
- Send it to your API

Sometimes longer setup but very advanced

Visual programming

- Easy to setup
- Get data from any kit or kits (offline or online)
- Visualise data
- Keep it local from the API
- Talk about data for educational purposes
- Compare it to other sources

Only thing required:
Orange:
https://orangedatamining.com/

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The Dashboard

https://dashboard.smartcitizen.me/?id=14138

BACK TO DASHBOARD

HABITAS-5

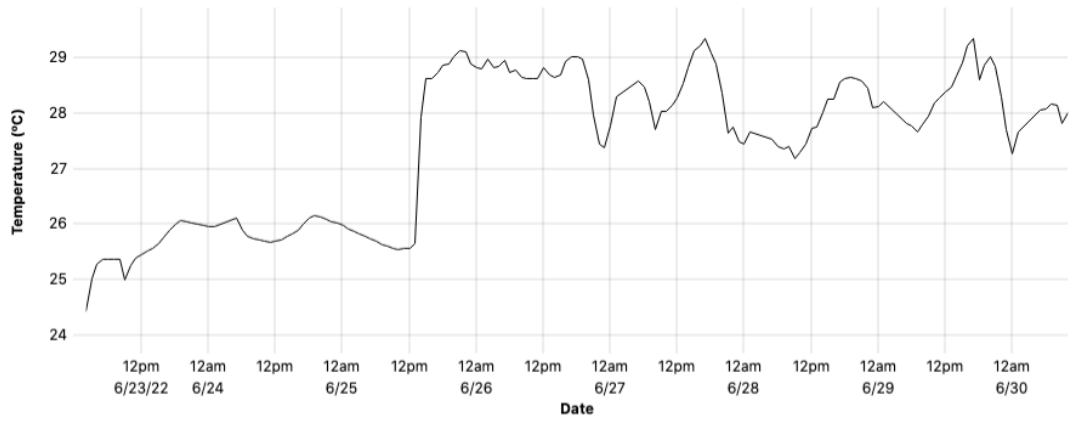
by AIRLAB_ISGlobal

Smart Citizen Kit 2.1 with Urban Sensor Board

GET THIS DATA | MORE INFO ON THIS KIT

TEMPERATURE **29°C**

(SHT31)

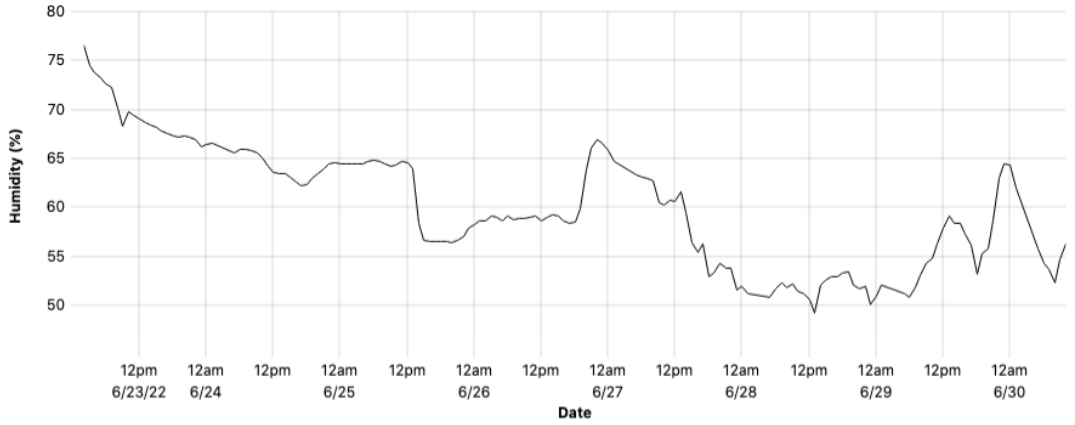


Time: --

Value: --

HUMIDITY **58%**

(SHT31)



Time: --

Value: --

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Real time demo

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Advanced data setup

What you get

If using Python

- Get data from any kit or kits (offline or online)
- Visualise it
- Keep it local from the API
- Calibrate sensors
- Compare to other sources
- Export it
- Generate reports and sites
- Send data to zenodo
- Send it to your API

If using R

- Get data from any kit or kits (offline or online)
- Visualise it
- Keep it local from the API

What you need

If using Python

- Python 3 setup (better 3.8)
- Jupyter lab
- Jupyter book
- Install scdata package

If using R

- Rstudio
- Download our contributed package

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Getting started in R

Get Rstudio
(or whatever IDE you like to use for R)

https://posit.co/products/open-source/rstudio/

Get our package from github

https://github.com/fablabbcn/smartcitizen-R-data

```
library(devtools)
install_github("fablabbcn/smartcitizen-R-data")
```

Check the example

https://github.com/fablabbcn/smartcitizen-R-data/blob/master/example.R

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Live demo

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Getting started in python

In order to do this, you should be relatively familiar with using the command line, or at least, want to learn.

Get python (3.8 recommended)

https://docs.smartcitizen.me/Guides/data/Install%20the%20framework/

Install Jupyter Lab

https://jupyterlab.readthedocs.io/en/stable/

Install scdata

```
pip  install  scdata
```

Install Jupyter Book (optional)

https://jupyterbook.org/en/stable/start/overview.html#install-jupyter-book

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More for the setup

In order to do this, you should be relatively familiar with using the command line, or at least, want to learn.

Installing python

- Better to follow the guide provided (do not install python.app in Windows or OSX)
- In Windows, use **`PowerShell`** as a terminal (with admin rights), **`chocolatey`** as a package manager, and install python with it, using python 3.9

Installing packages (`scdata`), `jupyter lab` and `jupyter book`

- Using **`pip`** is probably the easiest
- No need to use **`anaconda`**

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Live demo

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And on the next session...

And on the next session...

Advanced data setup

Digital presence and legacy