



time graphs at Meetjestad!

by Peter Demmer

Sun. 30 Jan. 2022 15:00

Introducing

- electronics hobbyist since age 10
- MSEE (ir. Elektrotechniek) T.U. Delft
 - Lab. for Electronic Instrumentation (sensors)
 - 8080 microprocessor controlled tester (1978)

Career

- Electronic circuit designer
- ICT: DevOps, UNIX systems programmer ++. telecom

Hobbies

- websites: filelengte.nl, filezwaarte.nl, sprekendeklok.nl
- electronics, sensors

Retired



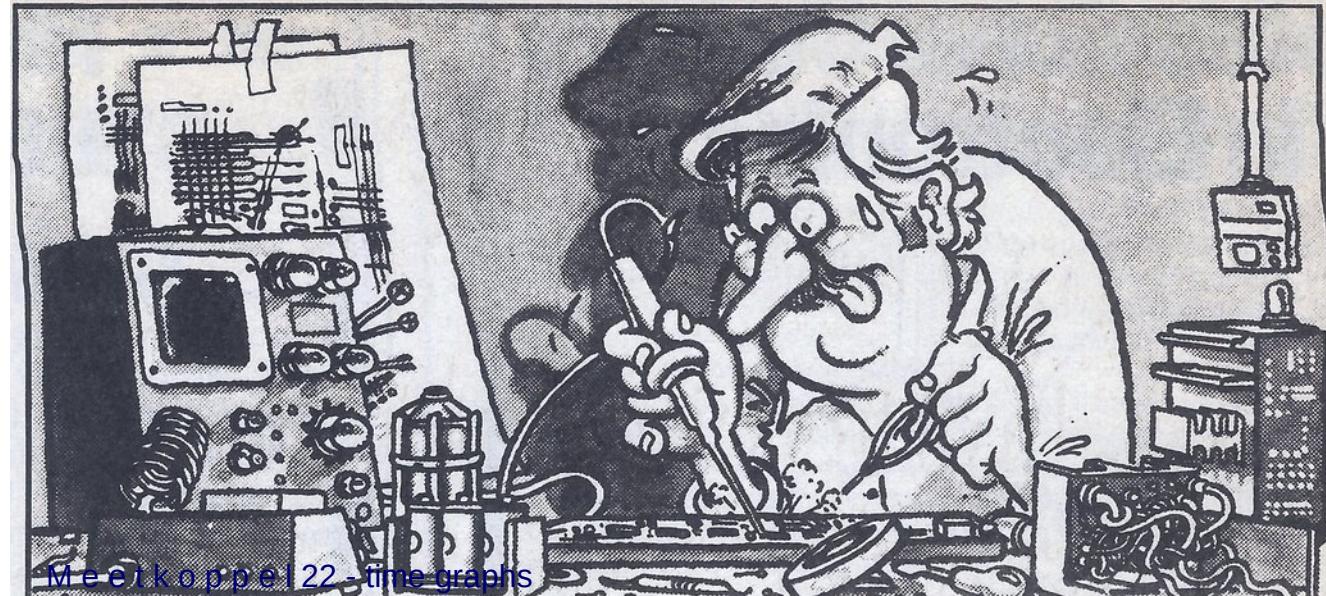
@ Meetjestad!



- create measurement graphs on website

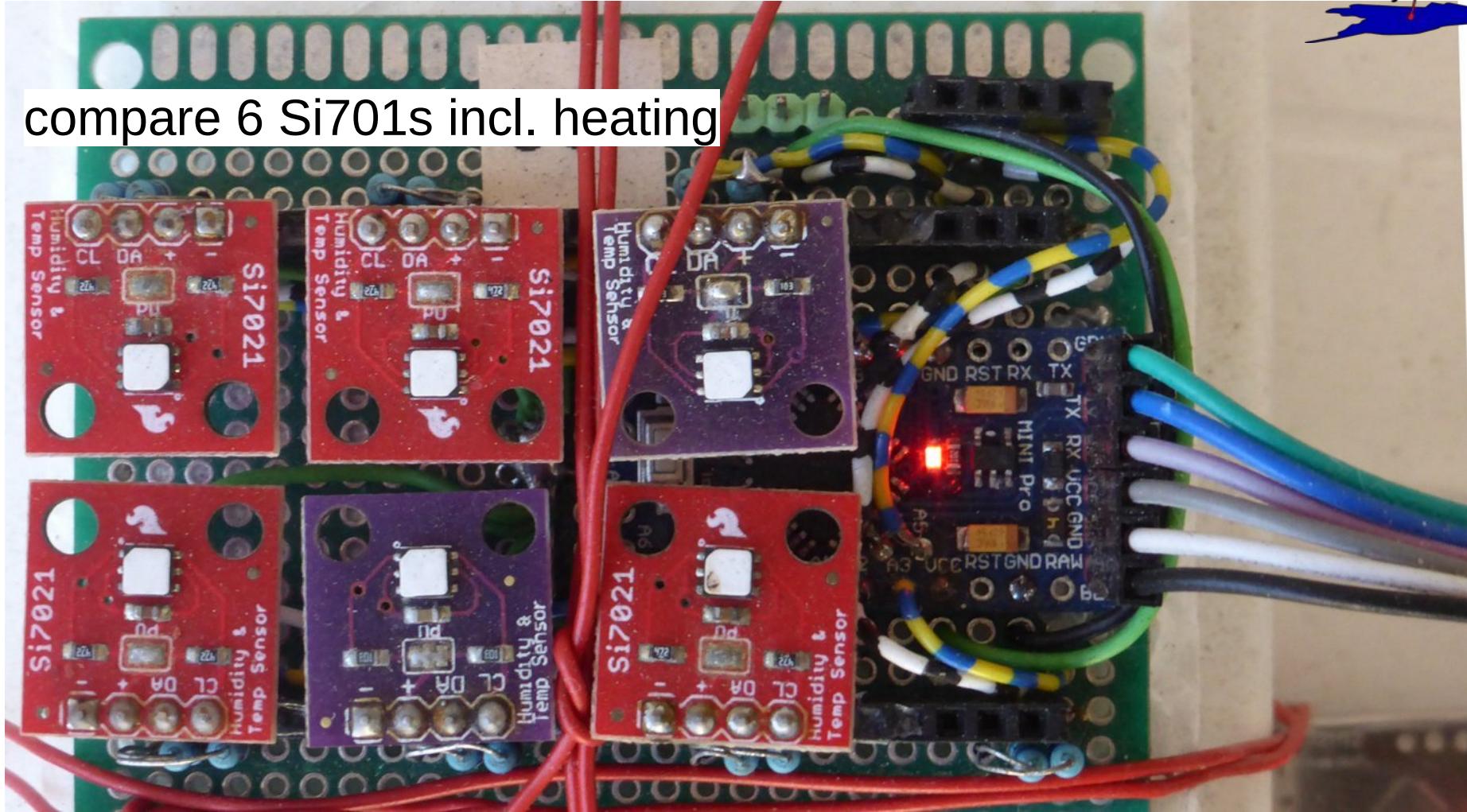
<https://meetjestad.net/static/graphs>

- add + test sensors
- contribute to firmware
- contribute to workgroups e.g. soil moisture, green roofs
- repair stations



Meetkoppeling - time graphs

compare 6 Si701s incl. heating





Measurement time graphs

1. temperature sensor
2. humidity sensor
3. PM (fijnstof) sensor
4. soil moisture sensor
5. green roof sensor
6. battery lifetime
7. station lifetime

Si7021 temperature sensor



15 x 15 mm

Temperature: OK

- supports serial number



Next:

https://meetjestad.net/static/graphs/mjs20/index_mjs20_2013.html

https://meetjestad.net/static/graphs/mjs20/index_mjs20_2014.html

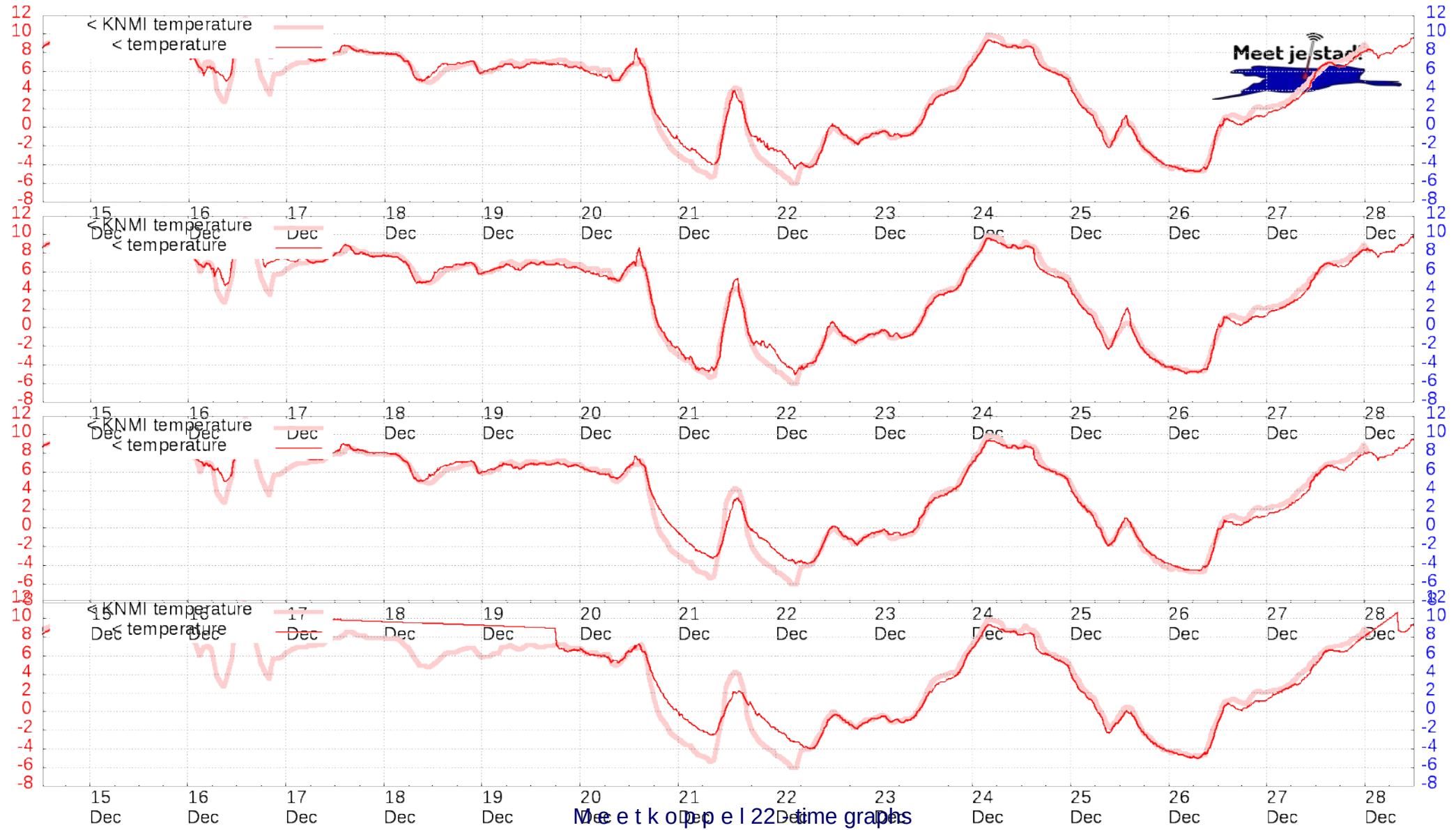
https://meetjestad.net/static/graphs/mjs20/index_mjs20_2015.html

https://meetjestad.net/static/graphs/mjs20/index_mjs20_2016.html

d.d. 28-12-2021

KNMI = National Weather Institute

RIVM = National Public Health Institute



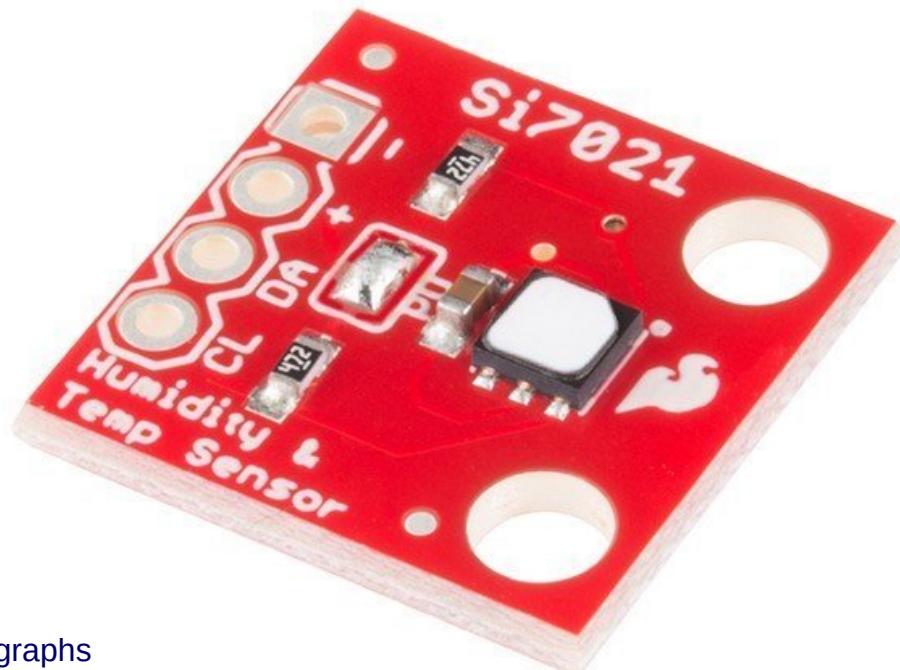
Si7021 humidity sensor

Issues:

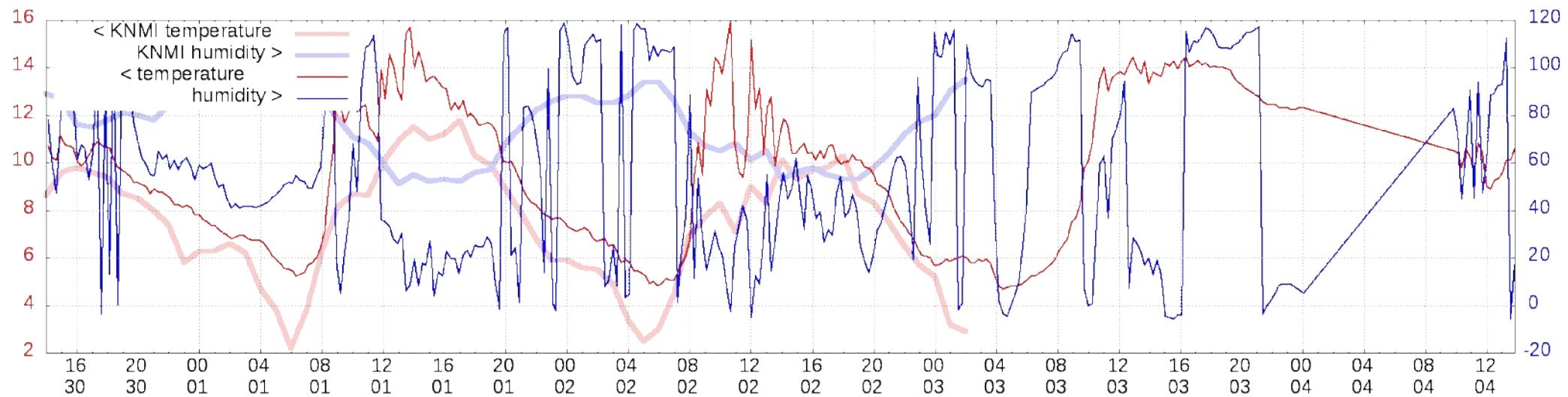
- @ Moisture saturated air + temperature decrease (condensation):
 - => Permanent moisture collection
 - => ever higher measurement values (over 6-8 weeks)
- AD-converter input range too small
 - => flip-over: 100 ... 119 ... -6 ... +-

Sensor heating possible, but not practical for battery use

I believe Si7021 humidity sensor is
only suited for non-condensing = indoors



Si7021 humidity sensor graph



Si7021 humidity measurement performance in long-term outdoors/condensing use

https://meetjestad.net/static/graphs/mjs20/index_mjs20_0567.html, 4 May 2021

PM (fijnstof) graphs



PM sensor part of Meetjestad! station since Nov. 2020 (v2)

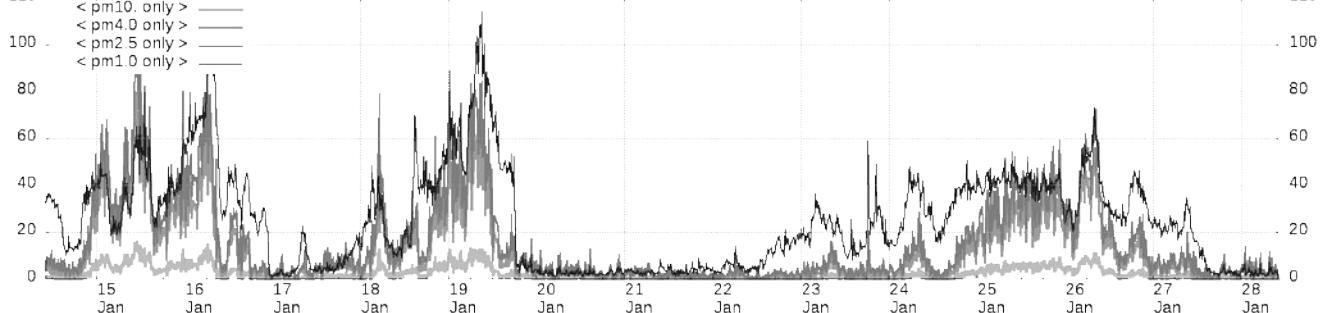
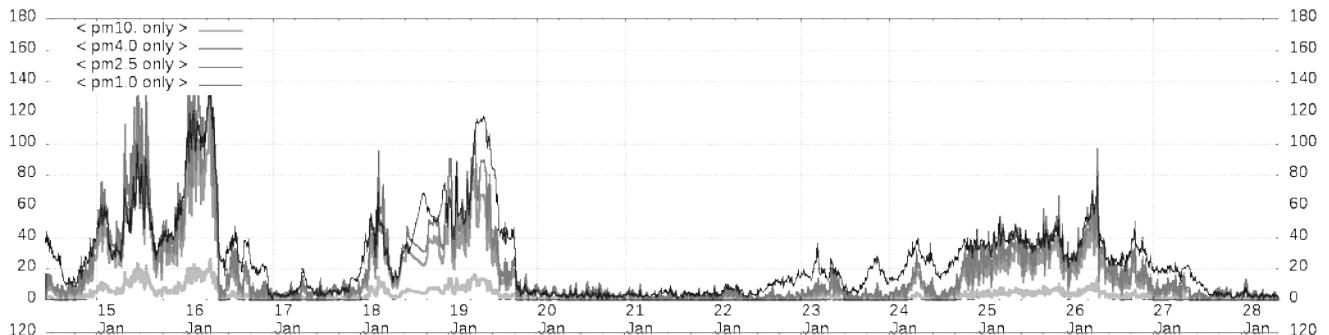
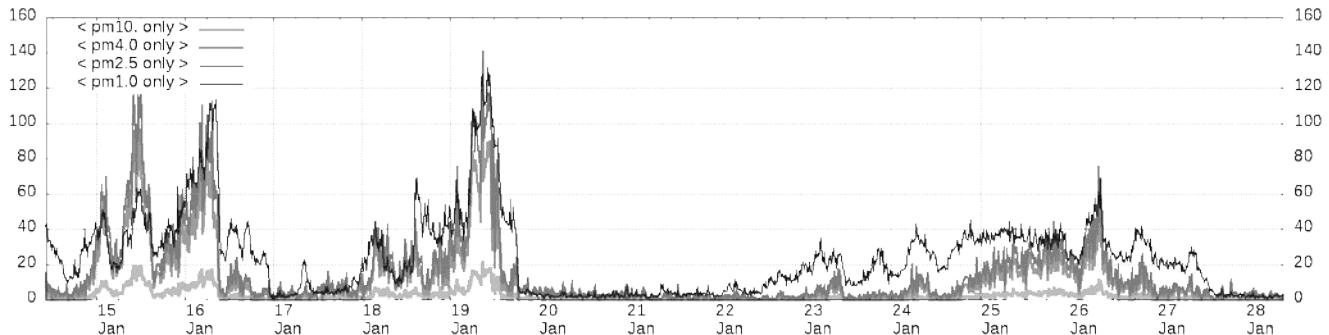
Issues

- fan power => shorter battery lifetime => solar panel
- sensitive for fog

<https://meetjestad.net/static/graphs/mjs20>, below: node 2013

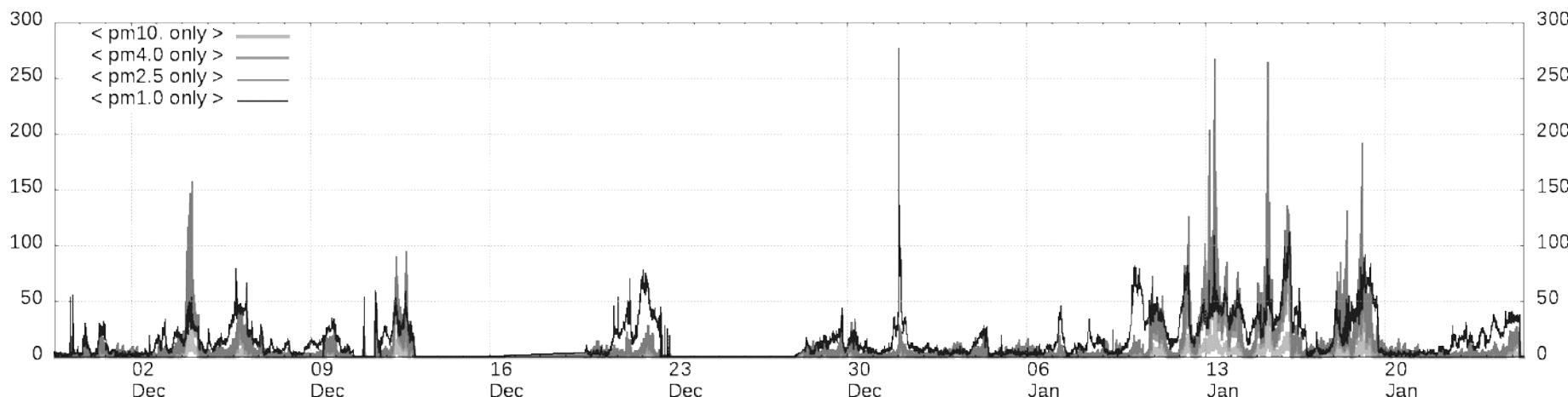
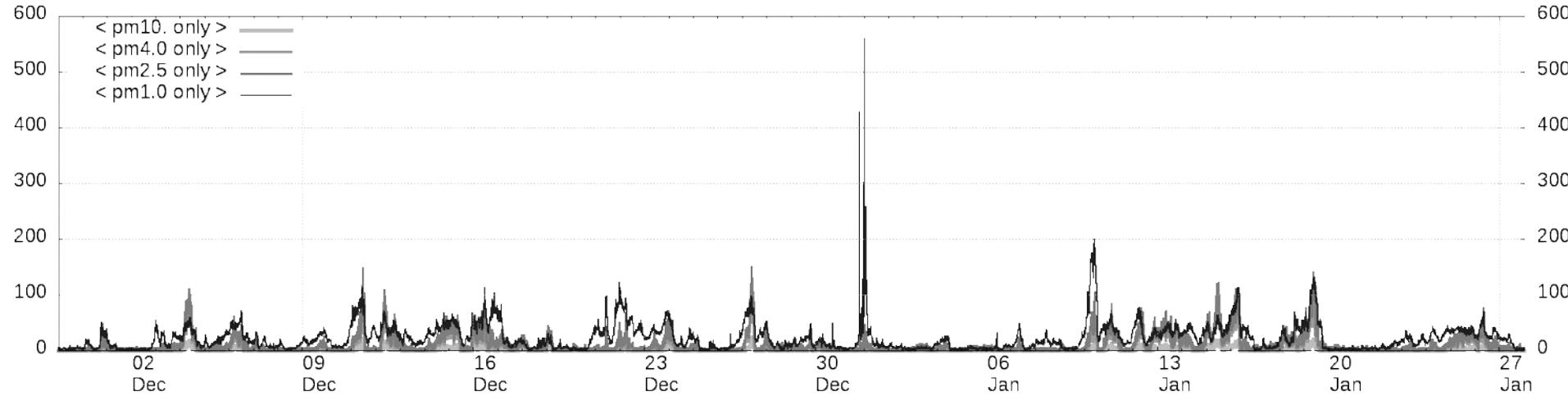
PM (fijnstof) graphs

(stations 2013, 2014, 2015)



PM (fijnstof) graphs

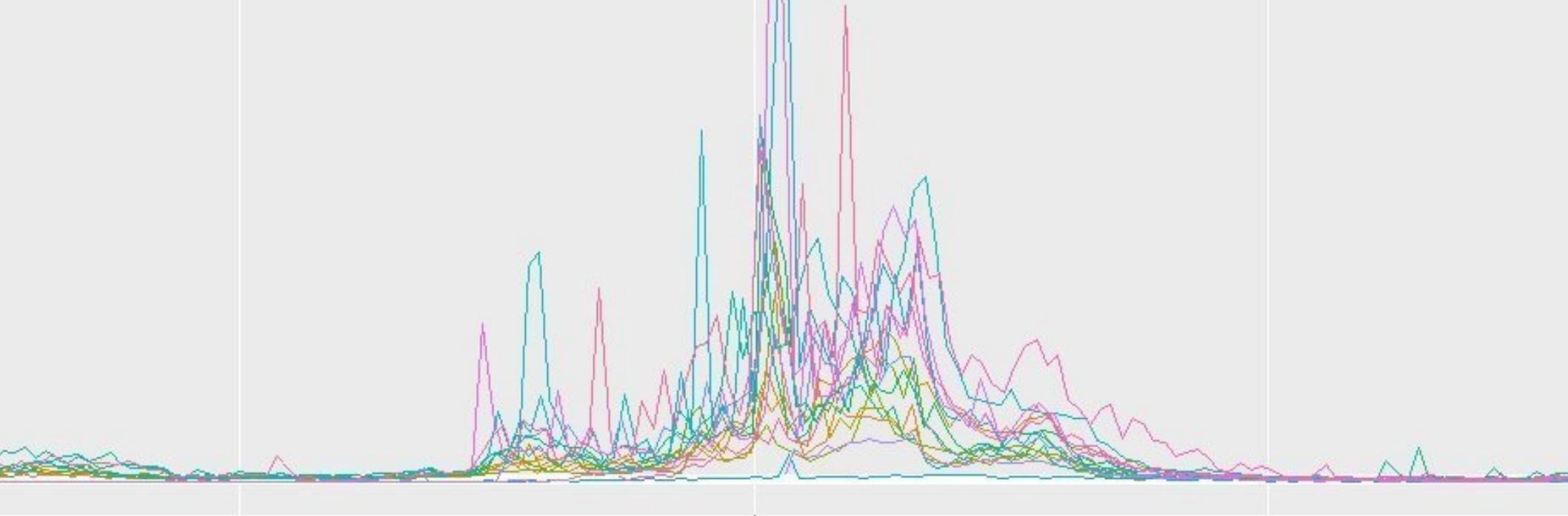
(stations 2013, 2016)



New Year 2021 PM (fijnstof)

graph by ladymarjolein

← *12 hours* →



01/01/2021-00:00

datum

Meetkope122 - time graphs

Soil moisture sensor

by Paul Brouwer

Design by Paul based on

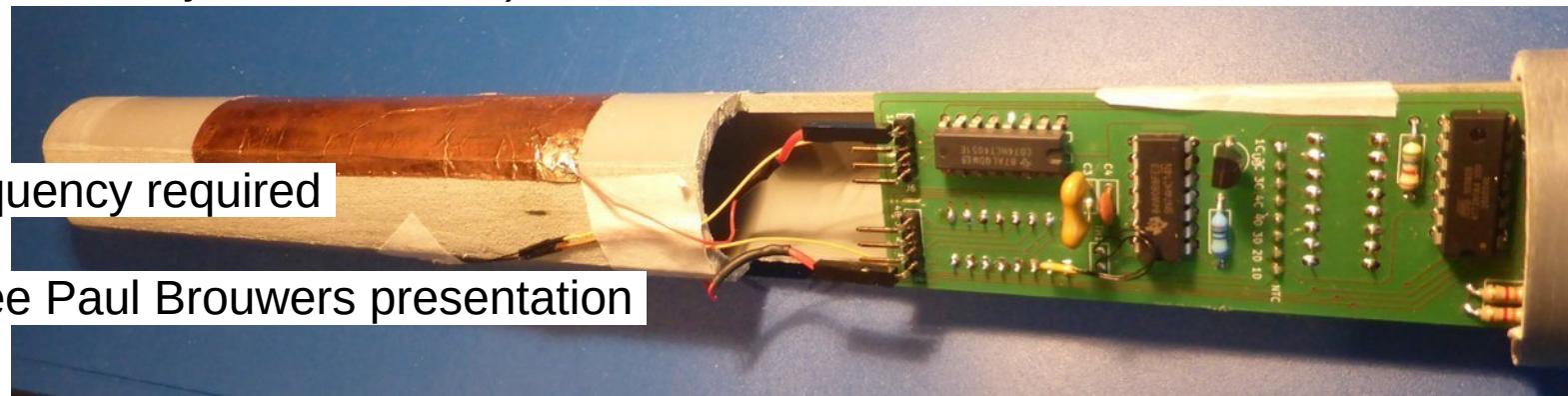
- vertical tube
- oscillator with 4 * 2 copper foil capacitors
- frequency measured varies with soil moisture
- 4 extra temperature sensors
- own controller
- Meetjestad! for telemetry, data storage and graphs
- citizen production (like Meetjestad! stations)

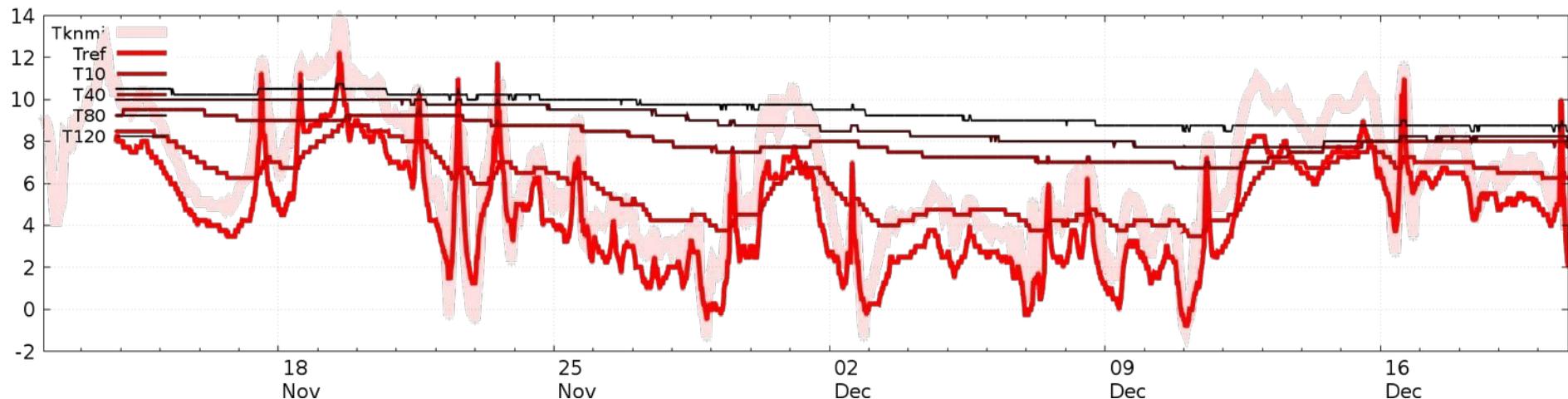
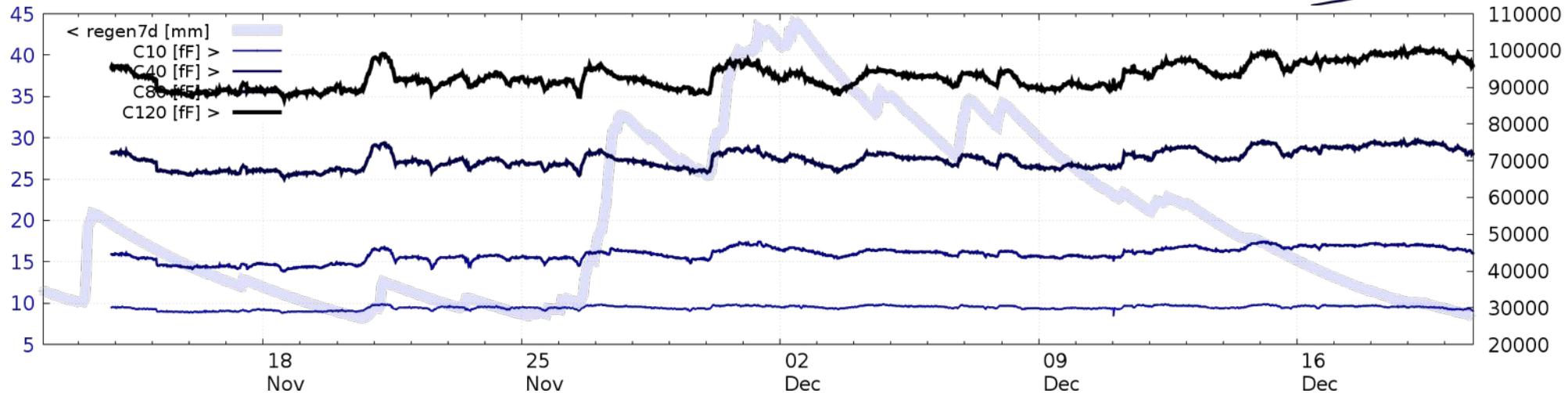
Issues:

- ~~vertical leak~~
- high measured frequency required

For details please see Paul Brouwers presentation

Sun. 30 Jan. 2022 11:00





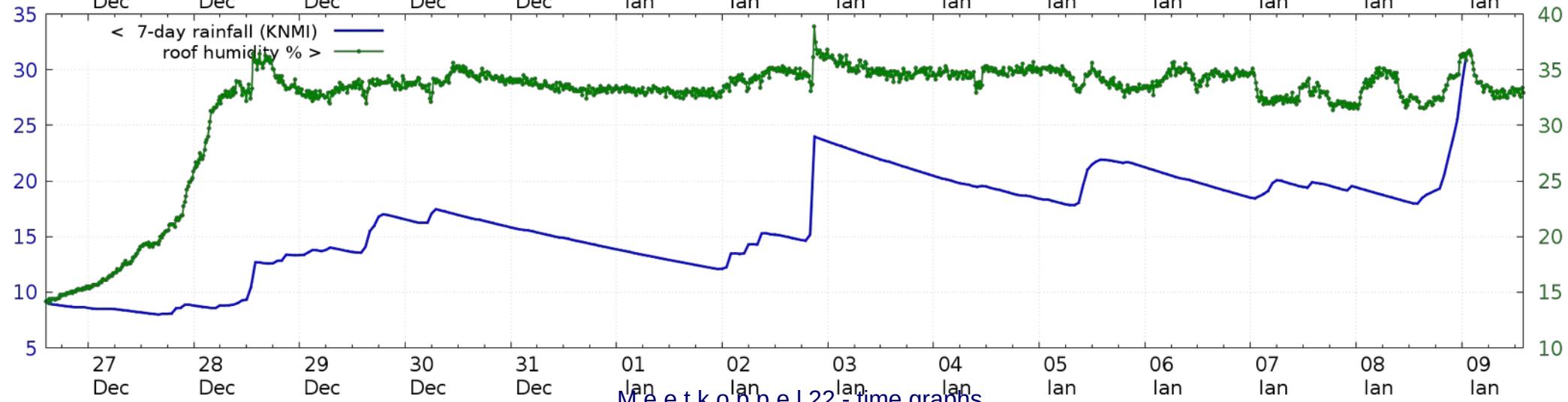
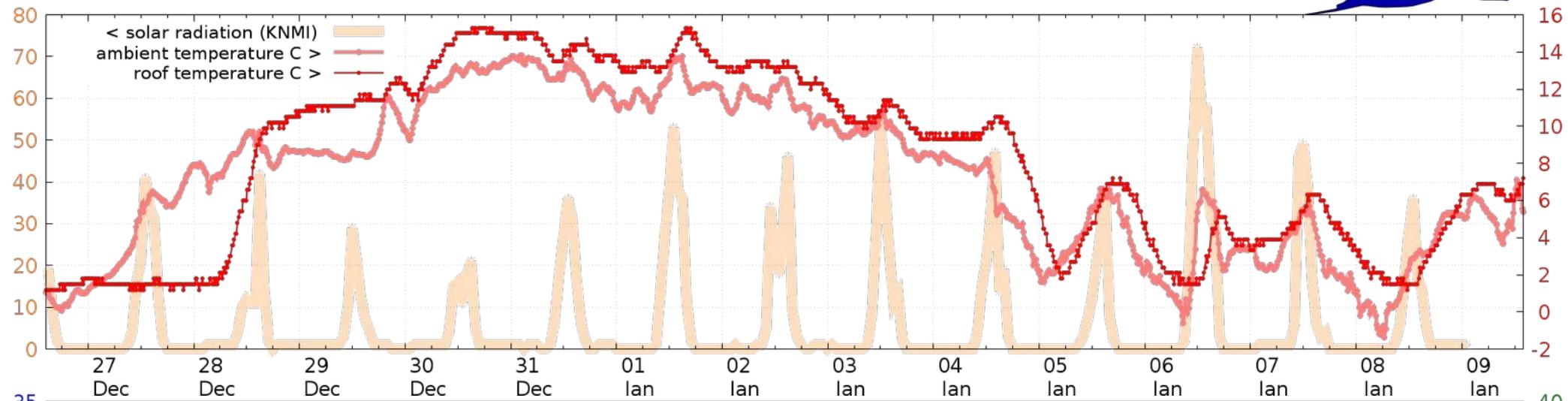
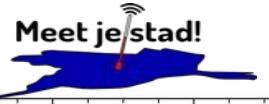
Meetkoppel 22 - time graphs

Greenroof sensor

by Paul Brouwer

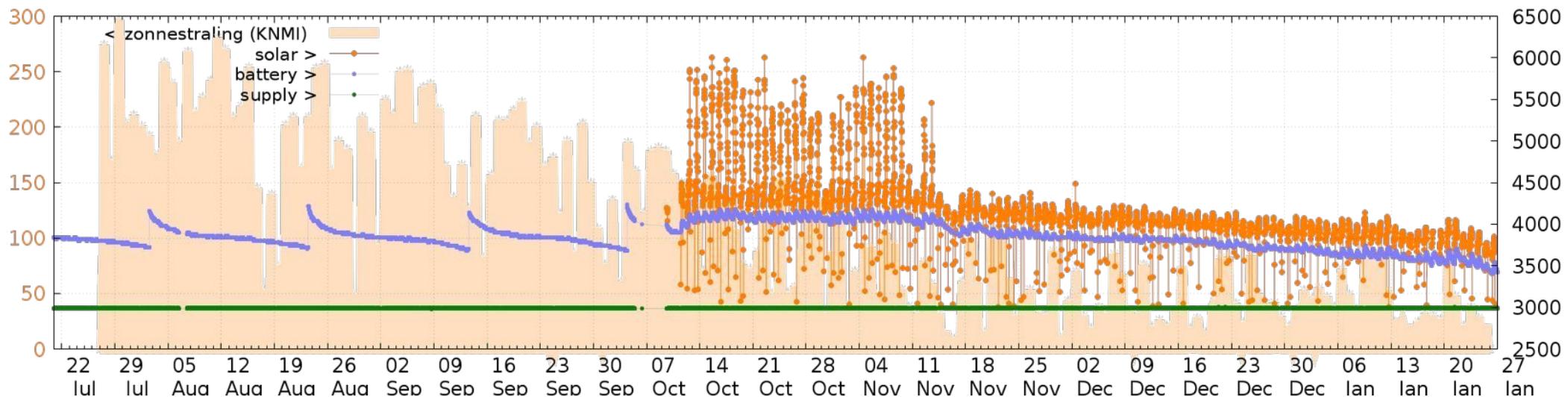
- Pino-Tech SoilWatch 10 + extra temperature sensor
- Meetjestad! for telemetry, data storage and graphs
- <https://meetjestad.net/static/graphs/greenroof>
- since Dec. 2021
- JSON for calibration
https://meetjestad.net/static/graphs/greenroof/cal_greenroof.json
- next: station 2054, 09-01-2022





Meetkoppeling 22-time graphs

Battery lifetime



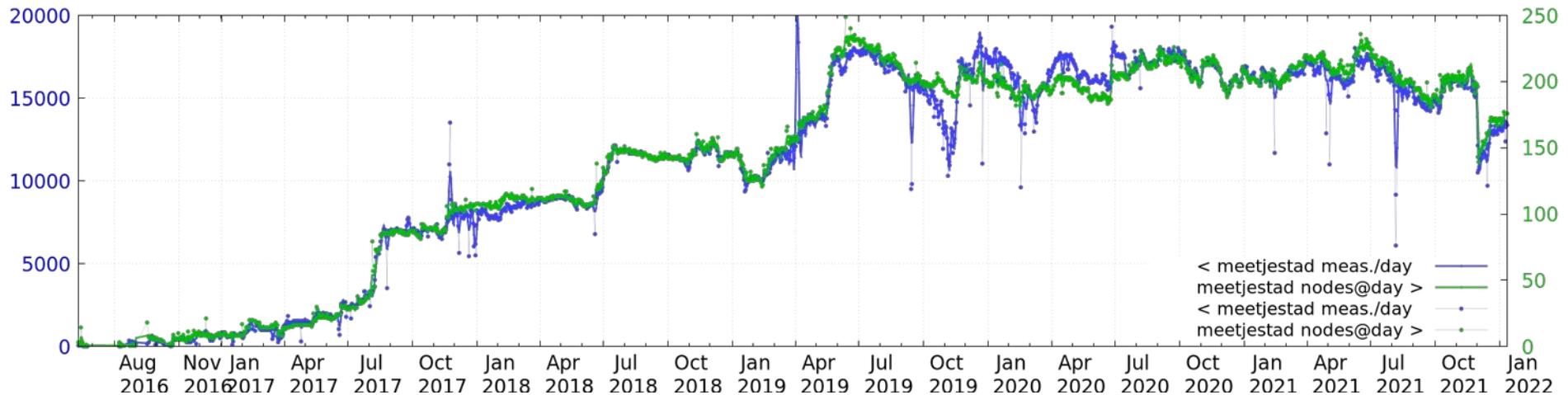
https://meetjestad.net/static/graphs/batt/index_batt_2014.html

...in progress ...



Station lifetime (MTBF)

TO DO





TO DO

- Interactive graphs
 - custom time endpoint
 - any station
- Rainfall measurement (near moisture sensors)



Meetkoppel 22 - time graphs