



HKD monitoring and ReOBS

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CCRES/CLU Training school, Munich, 2-5 Sept. 2025

Outline

Introduction

1. HKD monitoring

- a. Introduction
- b. How to access and use the grafana
- c. Explore your data

2. Data quality

- a. Introduction
- b. Explore REOBS files

3. Questions and feedbacks

HKD Monitoring with grafana

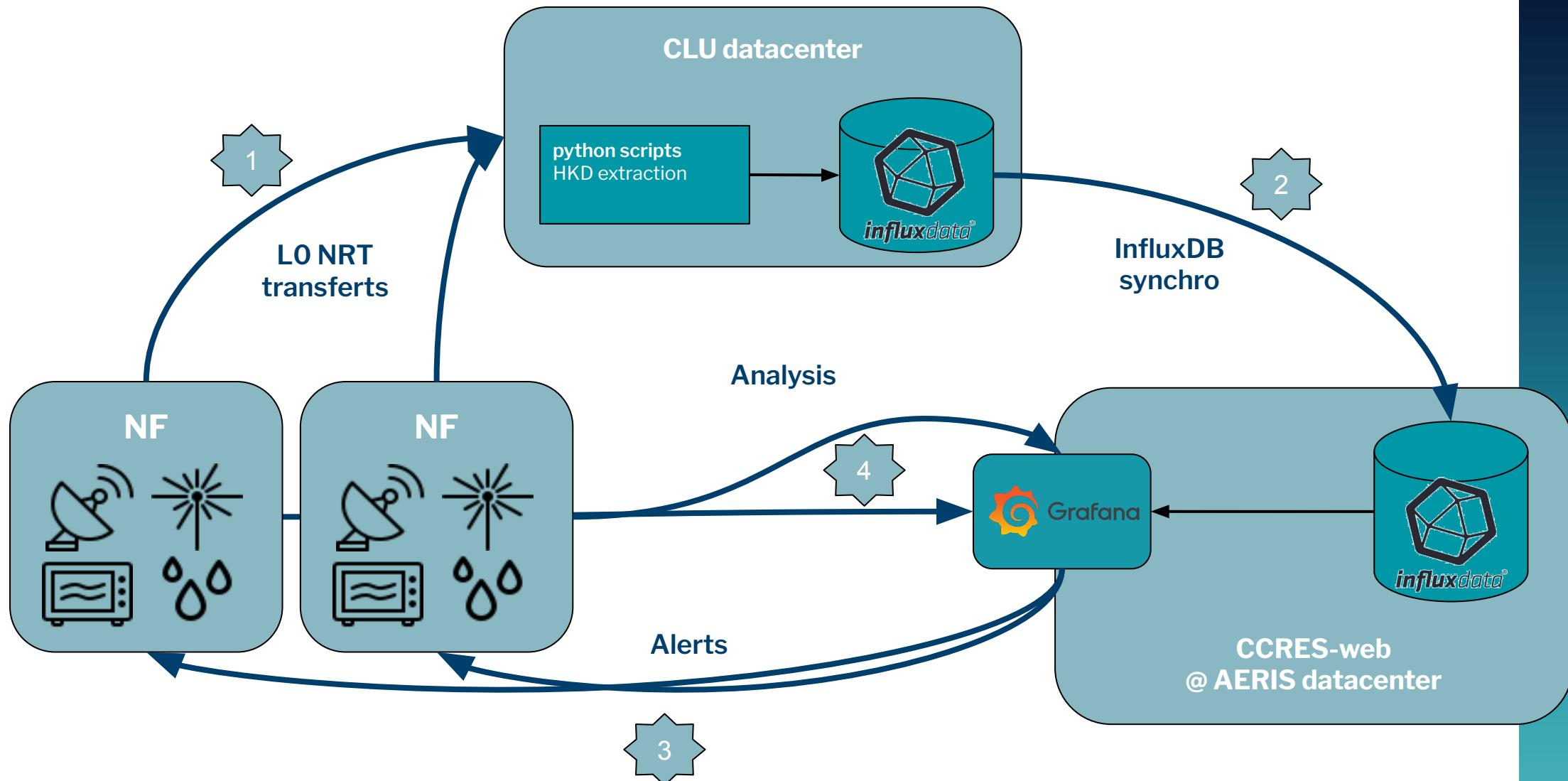
M-A Drouin (IPSL)

HouseKeeping Data : what and why ?

- Instrumental parameters
 - Provided in data files or in ancillary files
- Examples :
 - ALC : Laser energy, window transmission, status flags ...
 - DCR : Internal temperature, intensity, voltage ...
 - MWR: Ambient target stability, alarm/quality flags ...
 - DWL : internal temperature ...
 - DD : Instrument status ...
- Goals
 - Allowing more **efficient instrument failures detection**
 - Curative maintenance
 - Ensure **optimal performances** of sensors
 - Ensure **long term high quality** geophysical data

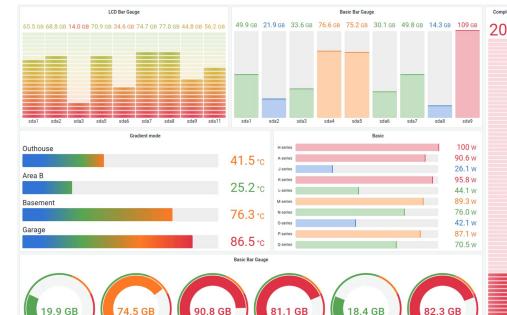
Analysis of HKD data will be done for NF labelling

HouseKeeping Data : architecture



Grafana (1/2)

- Grafana (<https://grafana.com/grafana>)
 - Web application for timeseries data
 - Querying
 - Visualisation
 - Alerting
 - Open Source and free
 - First release in 2014, now in version 12
 - Compatible with lot of data sources
 - Among them influxDB
- Visualisations
 - Creation of interactives dashboards
 - “Understand” units
 - Lots of plugins (+300)
 - Data sources and visualization



Grafana (2/2)

- Alerts management
 - Alert rules
 - What variable(s) to check
 - What period to check
 - How often to check
 - Preprocess data: min, max, mean, count, sum
 - Define severity of problem
 - Notifications
 - Different contact points can be defined per alert
 - Several channels : emails, slack ...
 - Can depend on severity level
 - Quicklooks are sent with notifications

Access to grafana

Access to grafana (1/3)

- All informations available on <https://ccres.ipsl.fr/docs/>
- Go to <https://ccres.ipsl.fr/grafana/>
 - **don't forget the ending “/”**
- click on “Sign in with AERIS-SSO”



Access to grafana (2/3)

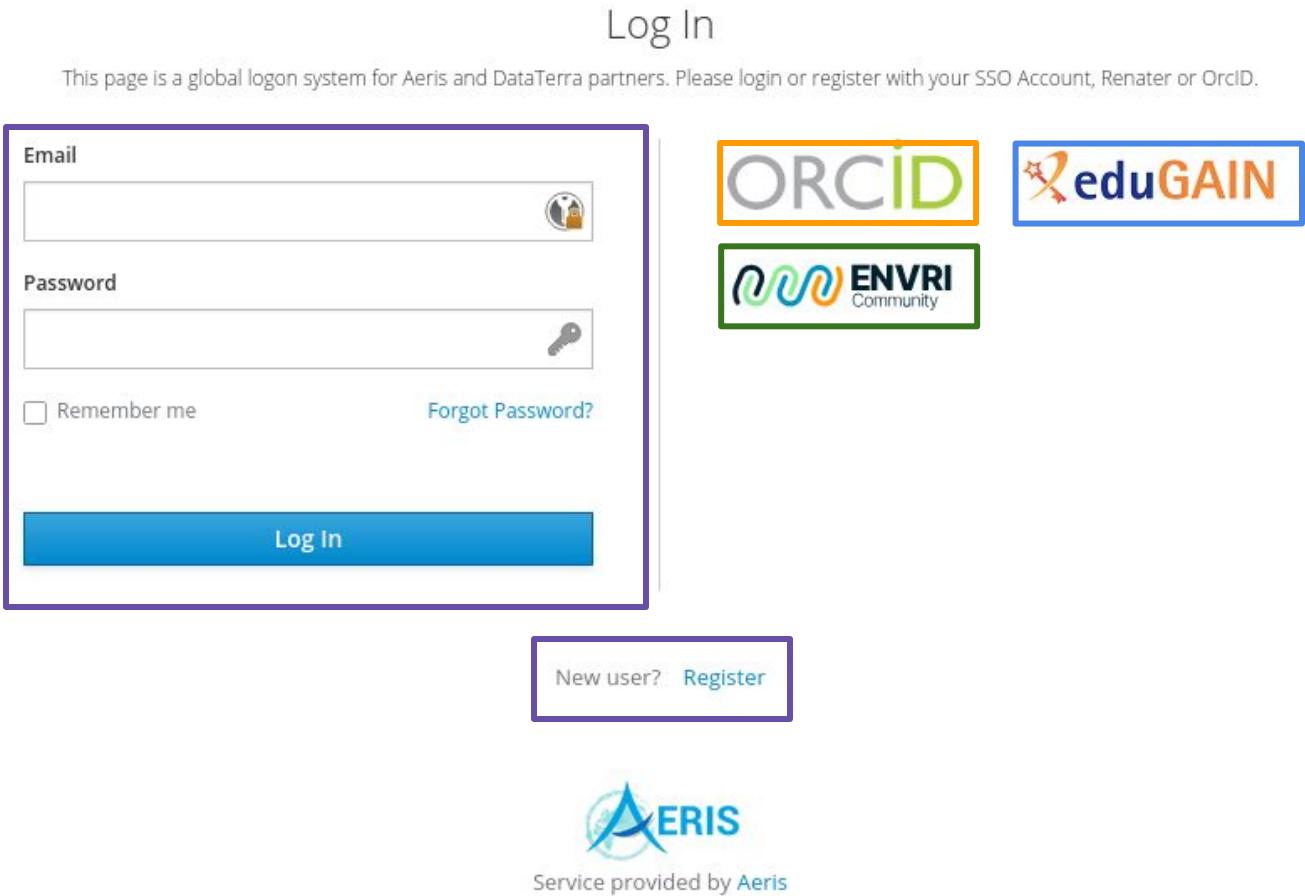
- 3 methods to log in (by recommendation order)

1. **ORCID**
2. **edugain (academic credentials)**
3. **ENVRI**
 - a. **ORCID**
 - b. **github**
 - c. **google**
4. **Account on AERIS**

- Always use the same method
 - if not it could create multiple accounts
 - grafana identify you by your email
- After your first login
 - send an email to ccres-dev@listes.ipsl.fr
 - to get access to NF organization

Log In

This page is a global logon system for Aeris and DataTerra partners. Please login or register with your SSO Account, Renater or OrcID.



Email

Password

Remember me [Forgot Password?](#)

[Log In](#)

ORCID **eduGAIN**

ENVRI Community

New user? [Register](#)

AERIS
Service provided by Aeris

Access to grafana (3/3)

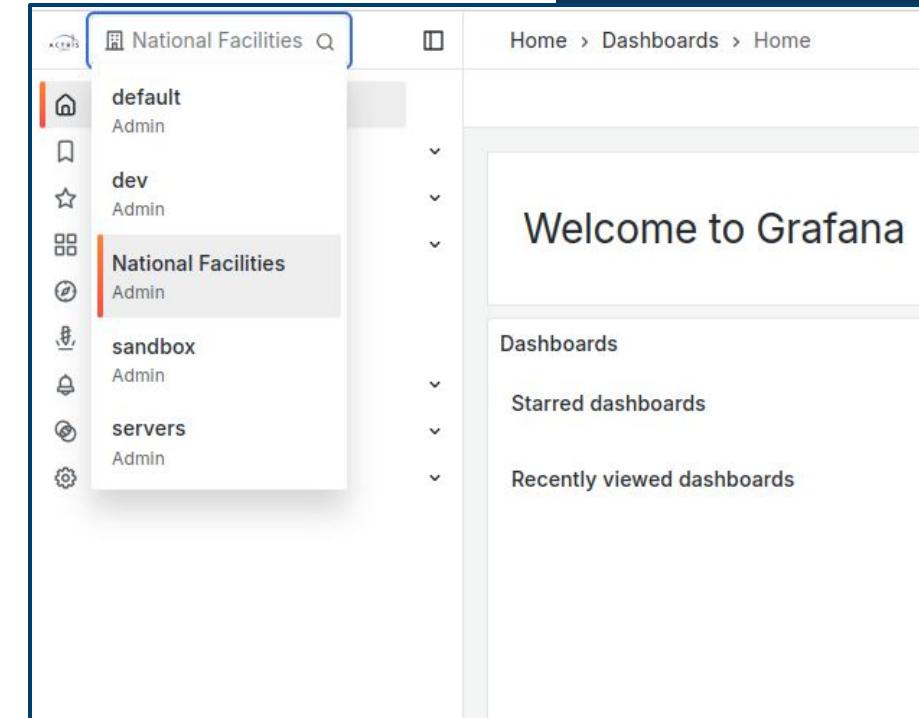
Some problems you may encounter

- AERIS may request email validation and you didn't receive the email
 - Check your SPAM box
 - The email can be blocked by IT security
 - Contact ccres-dev@listes.ipsl.fr and we will manually validate your account
 - Can require some time
- Error message : "**Forbidden. You don't have permission to access /grafana/ on this server.**" before accessing homepage
 - Try to remove the cookies from ipsl.fr
 - Use your browser in private mode

Using grafana

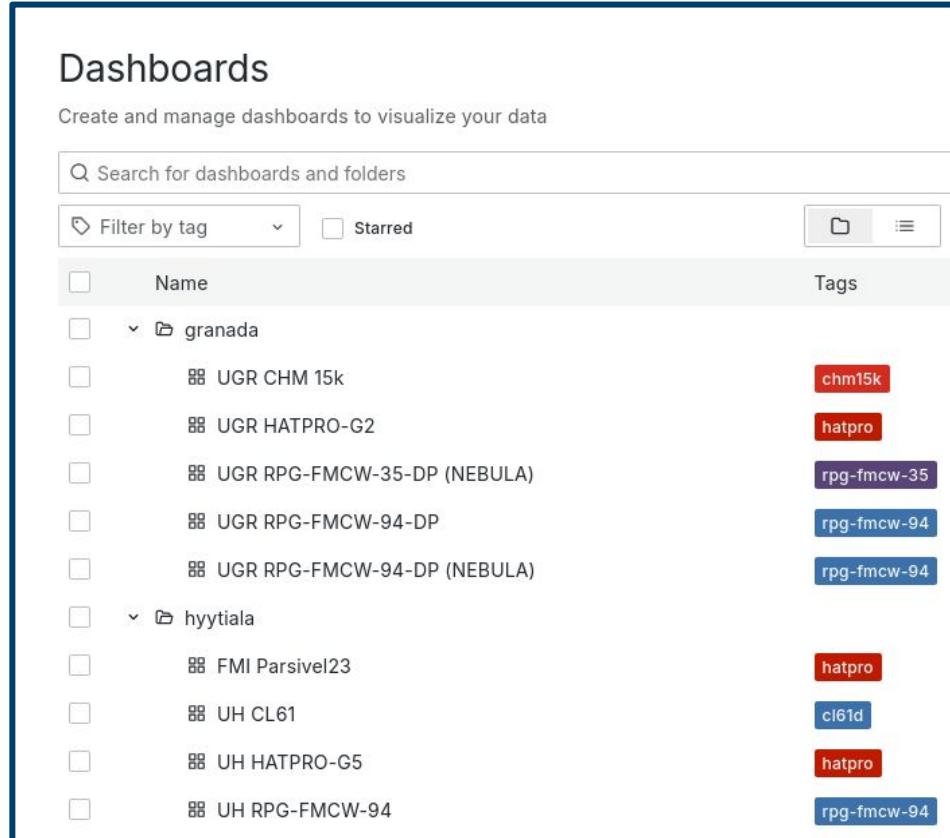
“National facilities” organization

- Organization in grafana
 - Mostly an entity grouping users, data sources and dashboards
 - Data sources and dashboards can't be shared between organizations
 - Several can exists
 - An user can belong to several
- In national facilities organization
 - User only have **viewer** access
 - **Can't** modify anything
- A **Dev** organization is available for CCRES unit members
 - Use to develop dashboards
 - Use to do tests
- Participants to this training have access to **sandbox** organization
 - User have **editor** right
 - Can **create** and **modify** dashboards



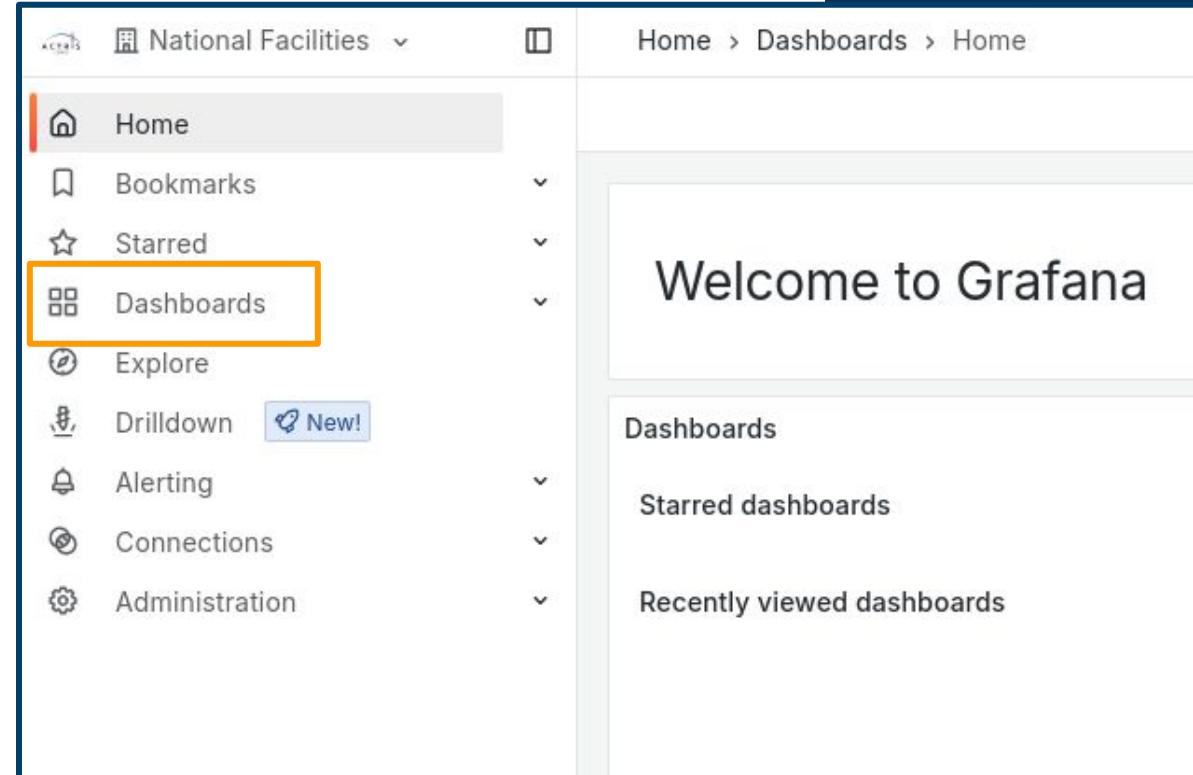
Main menu : dashboards (1/3)

- **Dashboards** menu
 - access to available dashboards sorted by NF
- A directory per NF containing available dashboards



The screenshot shows the Grafana interface for managing dashboards. The left sidebar has a search bar and filters for 'Name' and 'Starred'. The main list shows dashboards categorized by folder:

- granada
 - UGR CHM 15k (tag: chm15k)
 - UGR HATPRO-G2 (tag: hatpro)
 - UGR RPG-FMCW-35-DP (NEBULA) (tag: rpg-fmcw-35)
 - UGR RPG-FMCW-94-DP (tag: rpg-fmcw-94)
 - UGR RPG-FMCW-94-DP (NEBULA) (tag: rpg-fmcw-94)
- hyytiala
 - FMI Parsivel23 (tag: hatpro)
 - UH CL61 (tag: cl61d)
 - UH HATPRO-G5 (tag: hatpro)
 - UH RPG-FMCW-94 (tag: rpg-fmcw-94)

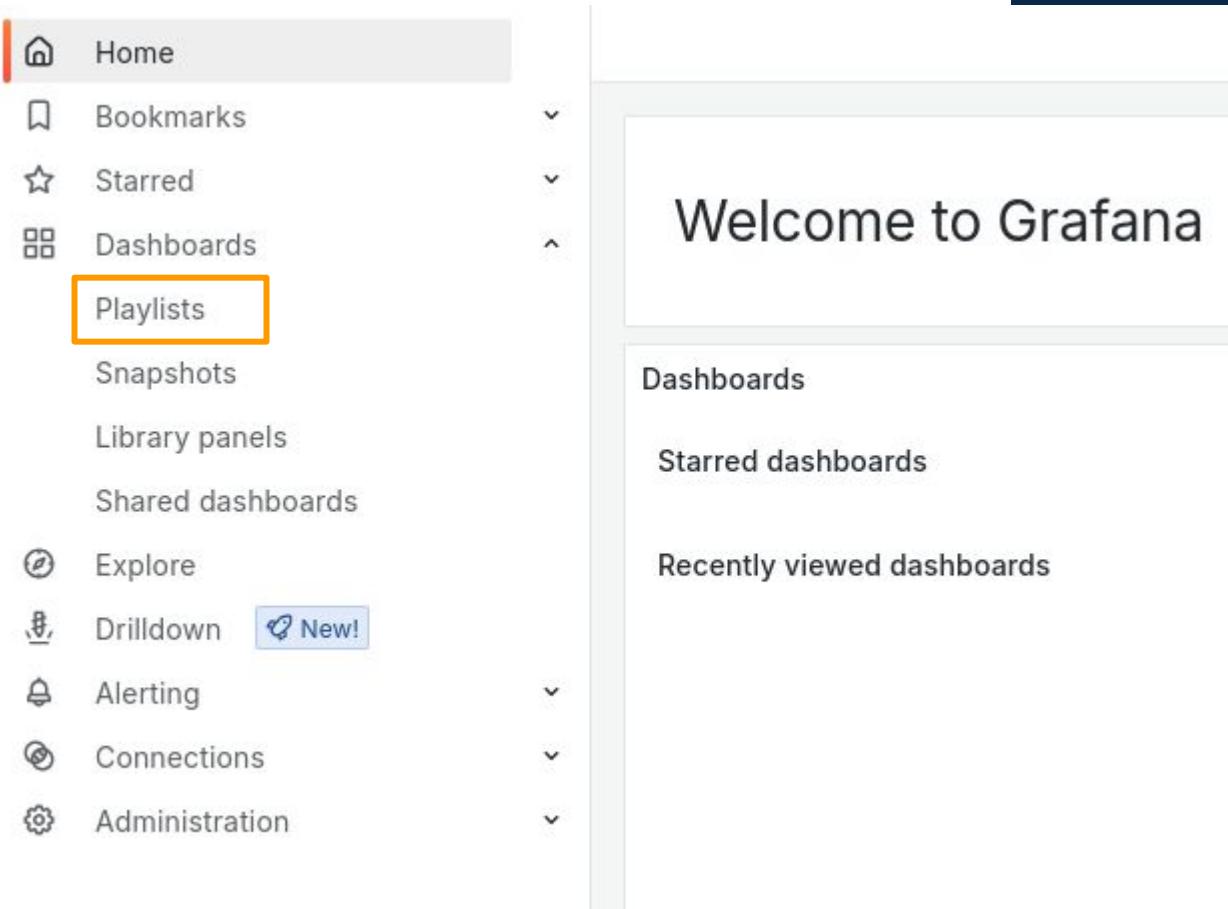


The screenshot shows the Grafana navigation menu. The 'Dashboards' item is highlighted with an orange box. The menu includes links for Home, Bookmarks, Starred, Explore, Drilldown, Alerting, Connections, and Administration. The right panel displays a 'Welcome to Grafana' message and sections for Dashboards, Starred dashboards, and Recently viewed dashboards.

Main menu : dashboards (2/3)

- **Playlists** Menu

- Allows to iterate between dashboards
- Change of dashboard every 30s
- Coming soon
 - one playlist per NF
 - one playlist per instrument type
- Example available
 - bucharest
 - palaiseau
 - CL61

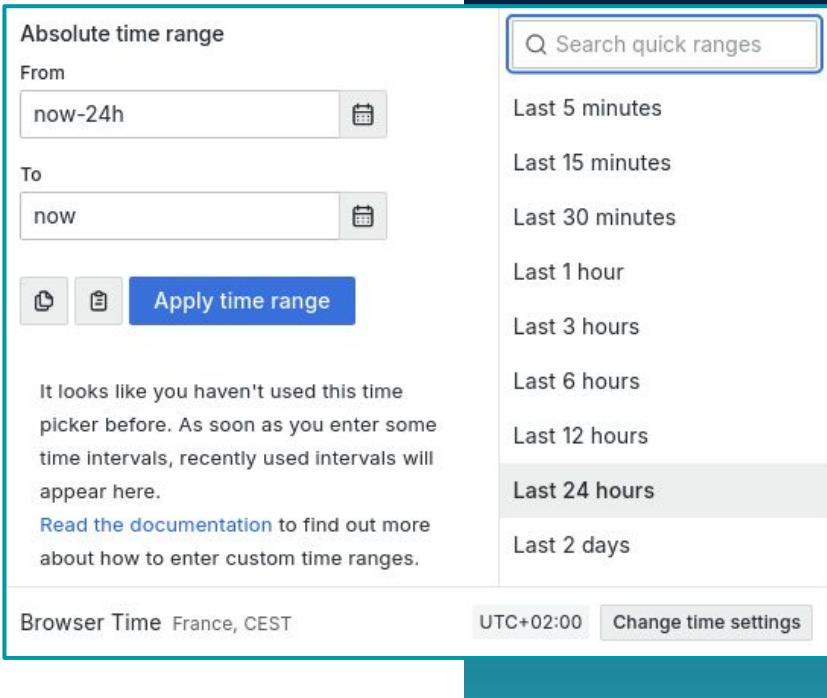


Main menu : dashboards (3/3)

- Dashboards for 10 models of instruments available at the moment
 - RADARs
 - basta
 - RPG FMCW 35 and 94 GHz
 - MWRs
 - RPG hatpro
 - ALCs
 - lufft chm15k
 - vaisala ct25k, cl31, cl51 and cl61
 - campbell scientific cs135
- At least one dashboard for 35 stations
- Based on templates
 - Automatically deployed based on metadata available in cloudnet
 - Script is run once a week to check for update on NFs status
 - New NF that started to send data
 - Data from new instrument is added
 - If you have several instrument of the same model sent to cloudnet
 - One dashboard per instrument
 - Identified by its PID
 - <https://github.com/ACTRIS-CCRES/HKD>

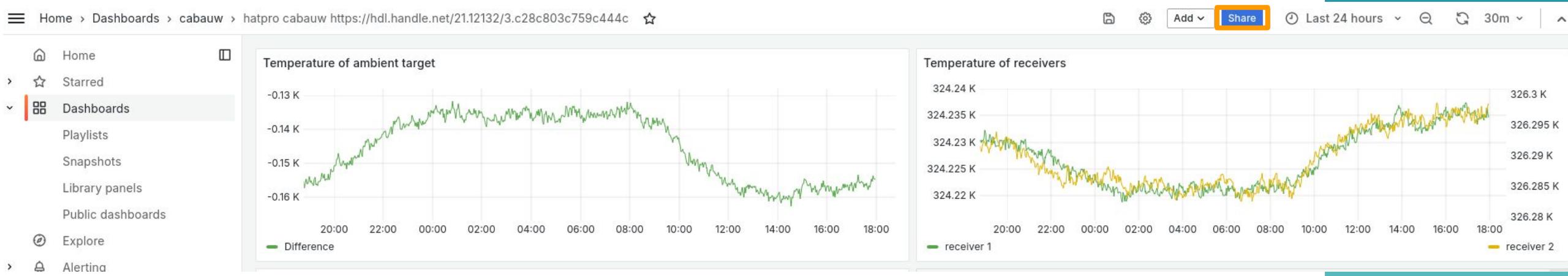
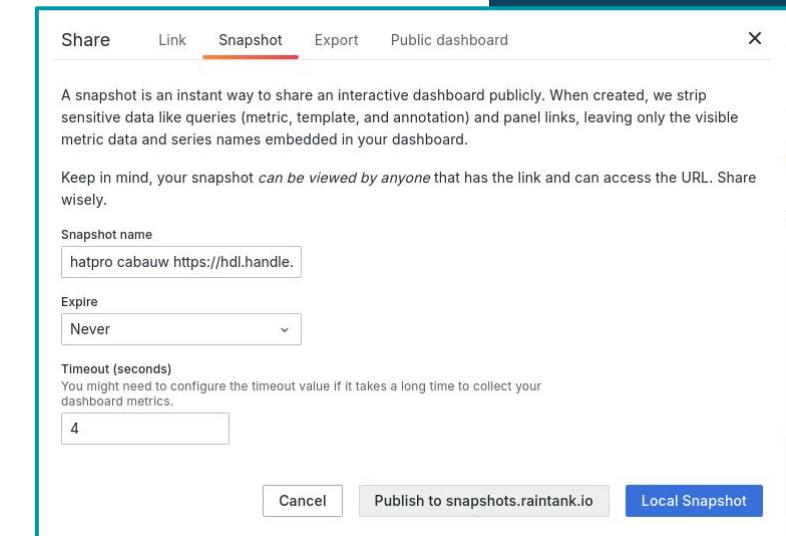
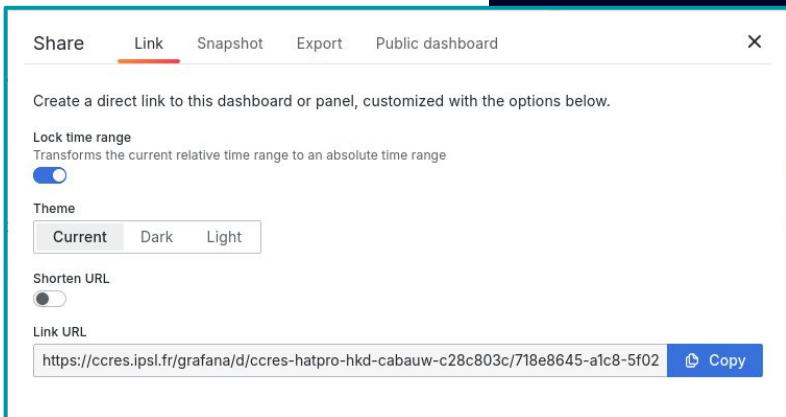
Using dashboards (1/3)

- In “national facilities” organization
 - You cannot modify the dashboards
- You can chose the period of data you want to visualize
 - Default last 24h
 - All the data you sent to clouinet should be available



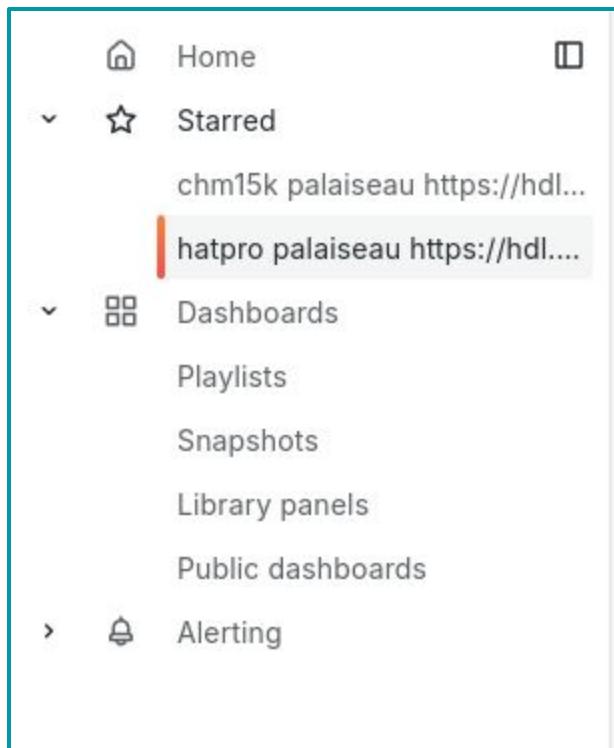
Using dashboards (2/3)

- **Share** menu
- **Link** submenu
 - Get direct link to dashboards
- **Snapshot** submenu
 - Take snapshots of the dashboards
- **Export** submenu
 - Get the json schema of the dashboard
- You are not allow to create public link to dashboards



Using dashboards (3/3)

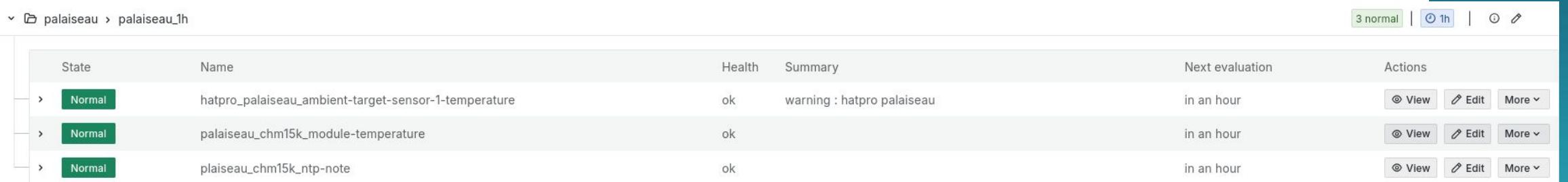
- **Favorite** menu
- Let you mark dashboards as favorite
- They will be a shortcut on your homepage



Demo

Next updates

- Next instruments
 - Halo (should already be available, data are available)
 - Priority to MIRA HKDs
 - Strategy is defined
 - Need to collect data and process them
- Continue work on automatic alerting



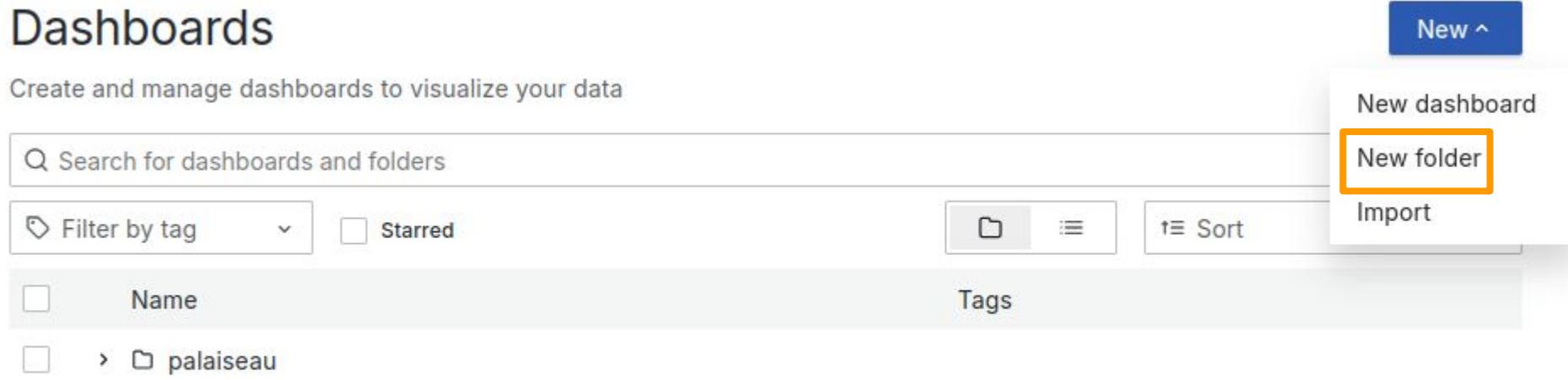
A screenshot of a monitoring interface showing a list of three items under the path "palaiseau > palaiseau_1h". The items are:

State	Name	Health	Summary	Next evaluation	Actions
Normal	hatpro_palaiseau_ambient-target-sensor-1-temperature	ok	warning : hatpro palaiseau	in an hour	View Edit More
Normal	palaiseau_chm15k_module-temperature	ok		in an hour	View Edit More
Normal	palaiseau_chm15k_ntp-note	ok		in an hour	View Edit More

Build your own dashboard

Build your own dashboards (2/7)

- Create a directory to put your dashboards

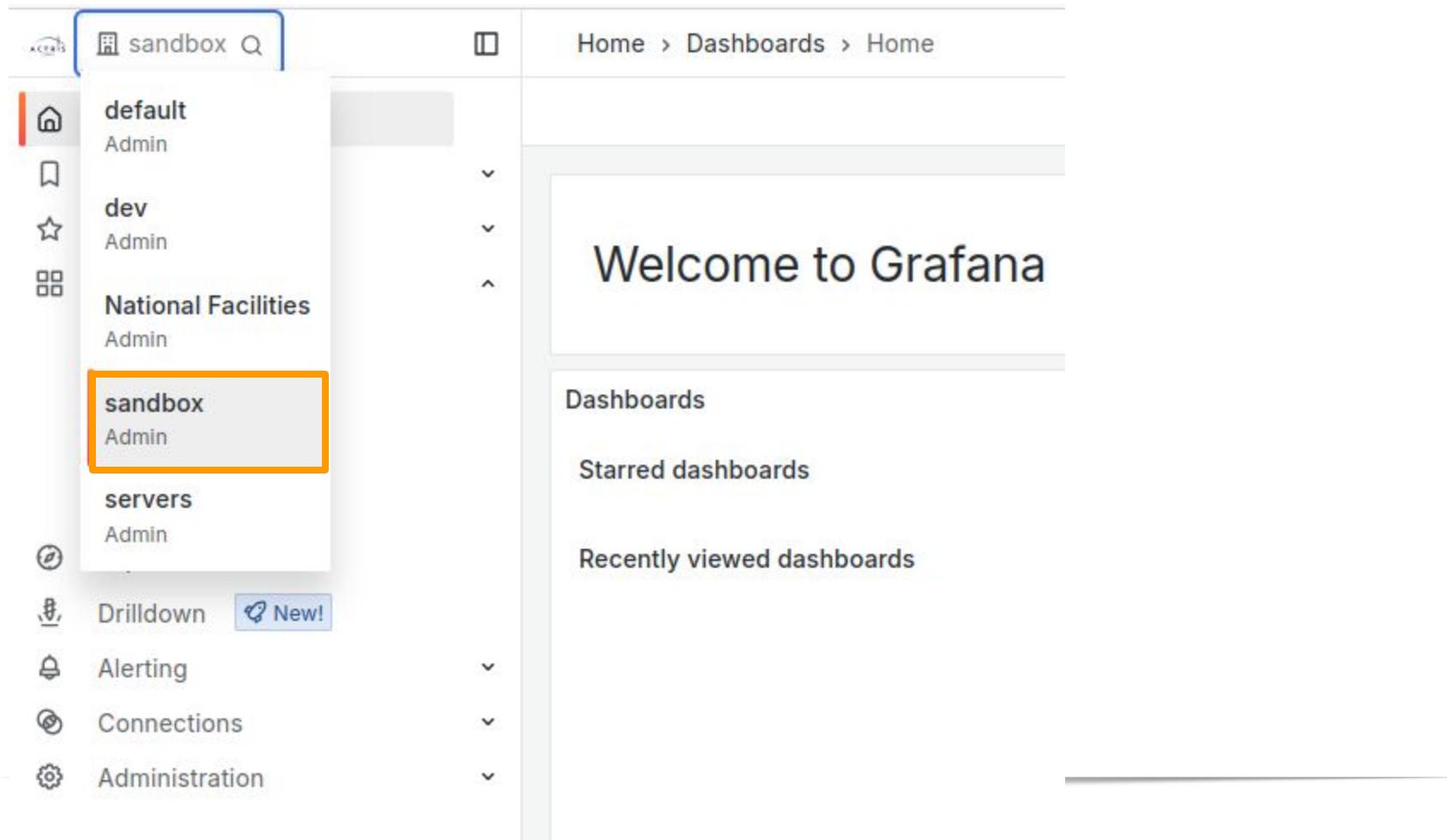


The screenshot shows a user interface for managing dashboards. At the top, there is a search bar labeled "Search for dashboards and folders" and a "New" button with a dropdown menu. The dropdown menu contains three options: "New dashboard", "New folder" (which is highlighted with an orange box), and "Import". Below the search bar, there are filters for "Filter by tag" and "Starred". The main area displays a list of dashboards. The first dashboard in the list is named "palaiseau".

Name	Tags
palaiseau	

Build your own dashboards (1/7)

- For this session, you have a **sandbox** organization available where you have **editor** rights
- Switch organization, got to dashboard menu

A screenshot of the Grafana dashboard menu. On the left, a sidebar shows a list of organizations: default (Admin), dev (Admin), National Facilities (Admin), and sandbox (Admin). The "sandbox" item is highlighted with an orange box. Below the sidebar, there are links for "Drilldown" and "New!". The main content area shows the "Welcome to Grafana" message and sections for "Dashboards", "Starred dashboards", and "Recently viewed dashboards".

Home > Dashboards > Home

Welcome to Grafana

Dashboards

Starred dashboards

Recently viewed dashboards

Drilldown New!

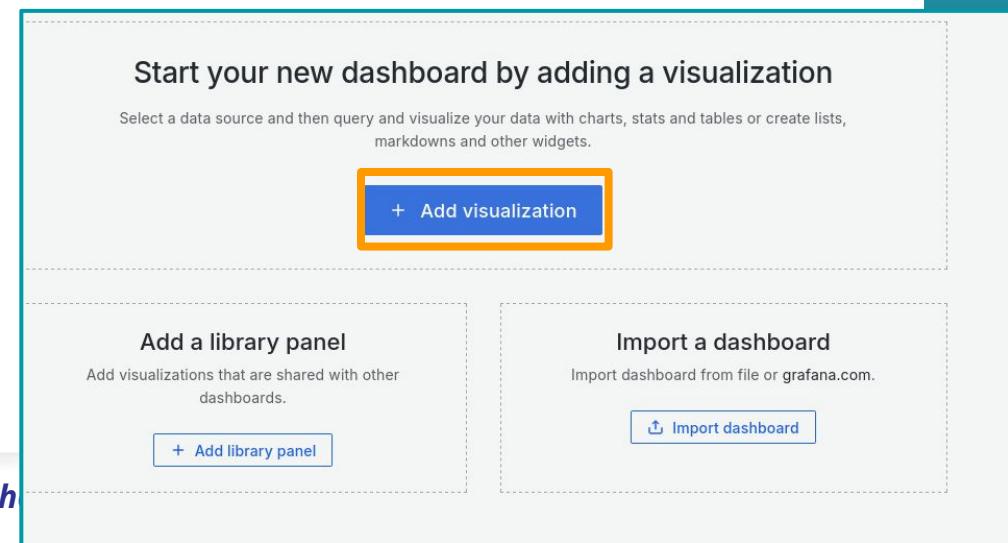
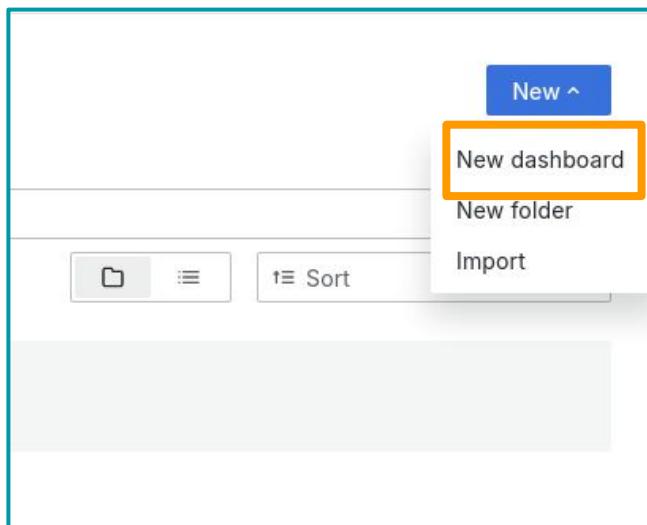
Alerting

Connections

Administration

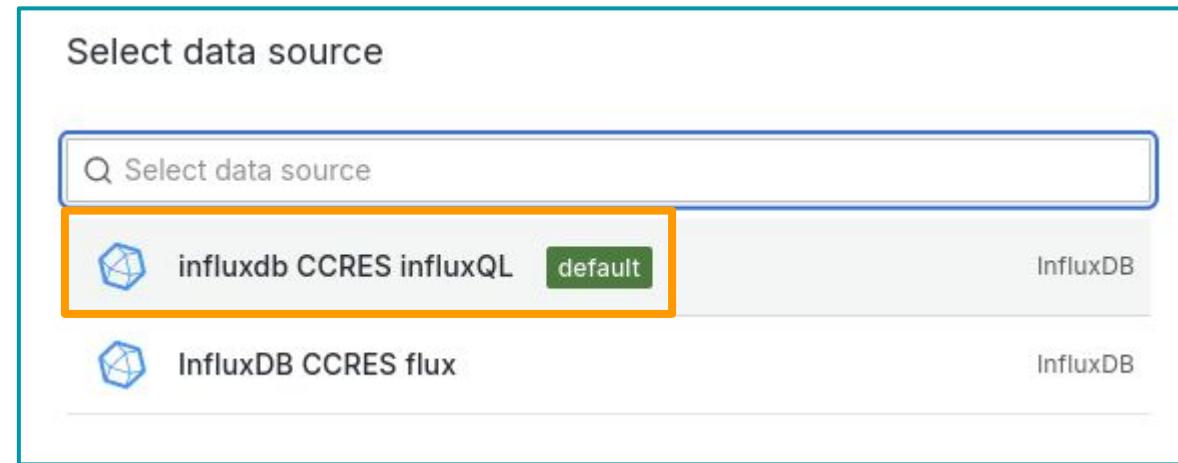
Build your own dashboards (3/7)

- 2 data sources available
 - influxdb CCRES influxQL
 - Default one
 - Easiest to use with grafana
 - influxdb CCRES flux
 - Only needed for special requests
 - for example the list of parameters available for one type of instruments
- To create a dashboard
 - Go to **dashboards** menu and click on **New** and **New dashboard**
 - Click on **Add visualization**



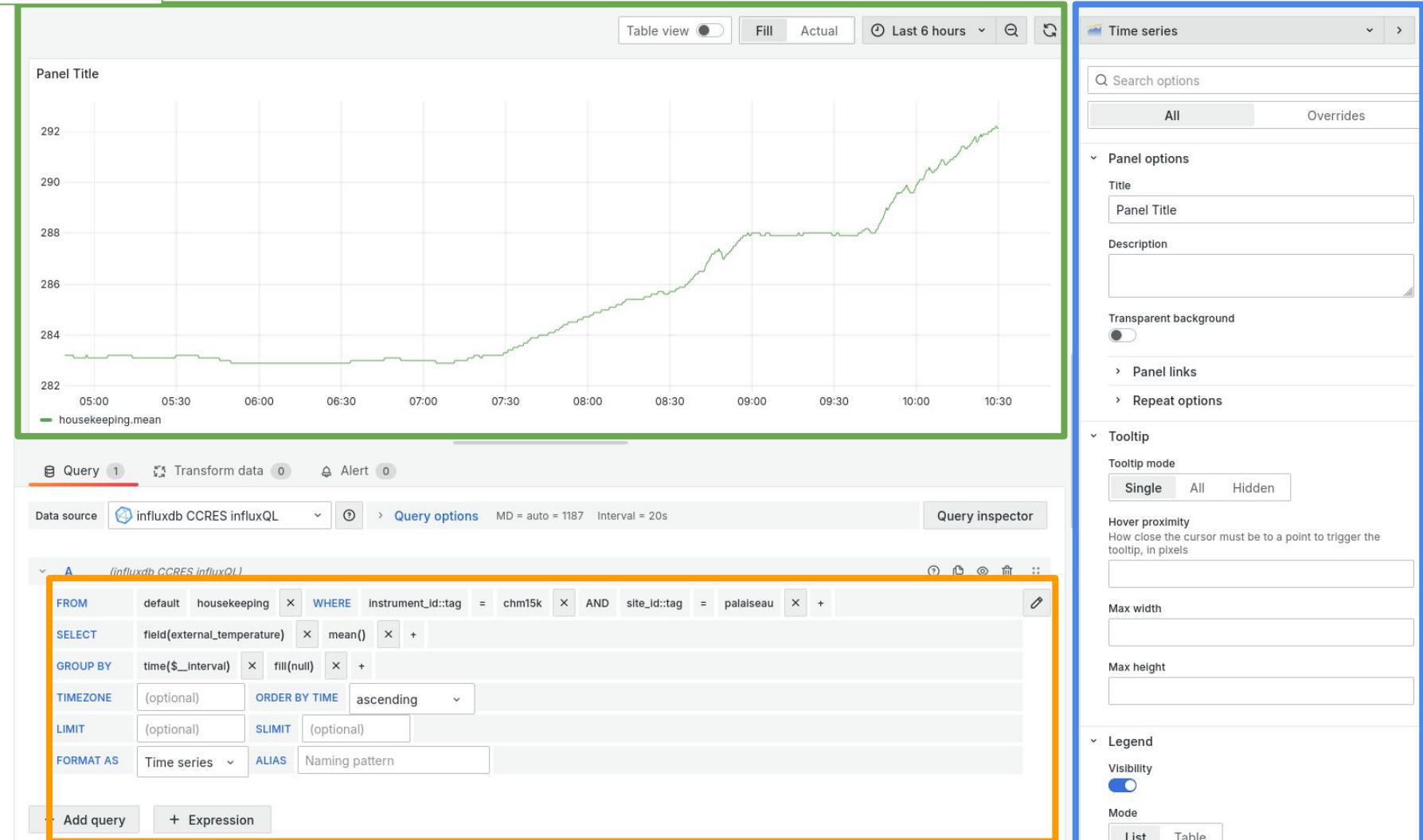
Build your own dashboards (4/7)

- Select **influxdb CCRES influxQL**



previsualization

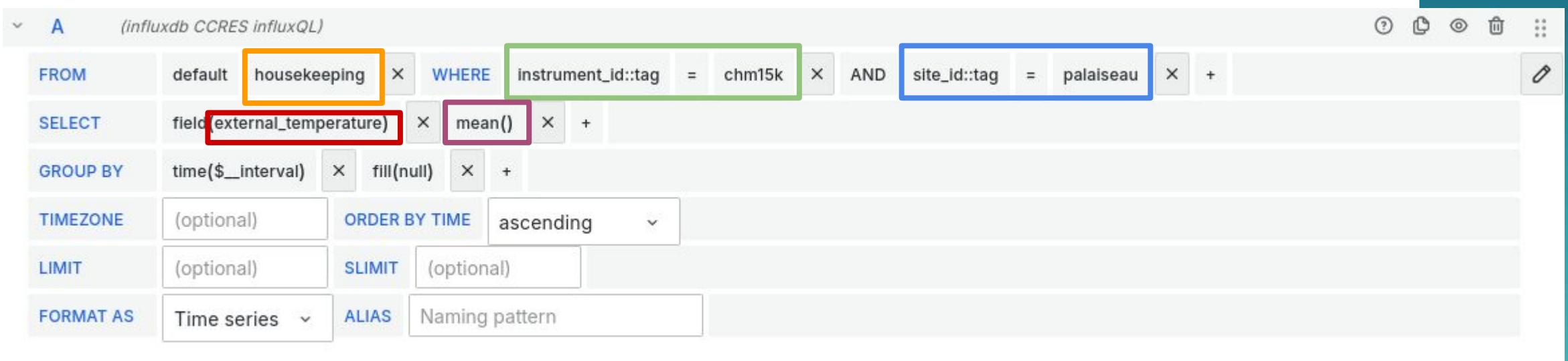
Build your own dashboards (5/7)



data request

Build your own dashboards (6/7)

- Grafana doesn't know how to filter variables based
 - *instrument_id*, *instrument_pid* or *site_id*
- Dashboard “List instrument variables” contains lists of variables available by type of instrument



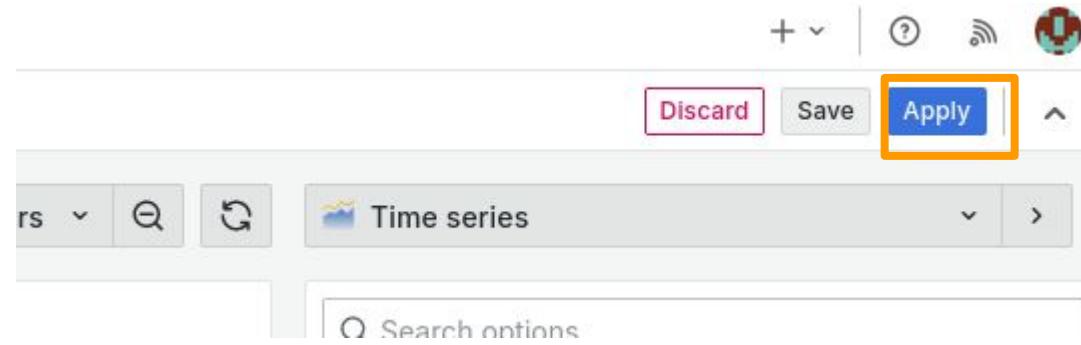
The screenshot shows the Grafana InfluxDB editor interface with the following query:

```
FROM default WHERE instrument_id::tag = chm15k AND site_id::tag = palaiseau
SELECT field(external_temperature) mean()
GROUP BY time($__interval) fill(null)
ORDER BY TIME ascending
FORMAT AS Time series
```

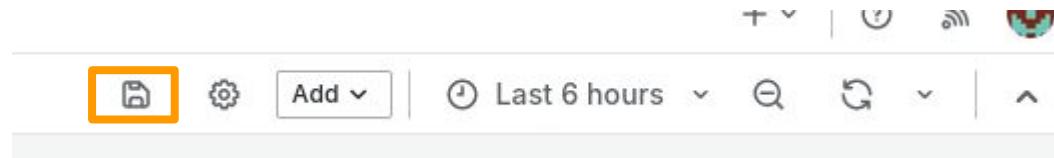
The query is for the 'housekeeping' dataset. It filters by instrument_id 'chm15k' and site_id 'palaiseau'. The SELECT clause retrieves the 'external_temperature' field and calculates its mean. The GROUP BY clause uses the time interval defined in the configuration. The ORDER BY clause is set to ascending. The FORMAT AS clause is set to Time series. The editor interface includes a toolbar with various icons for saving, deleting, and modifying the query.

Build your own dashboards (7/7)

- Click **Apply** when the plot is done



- Never forget to **save** your dashboards



Questions & Feedbacks



- Alerts in case no data are transmitted to cloudbase

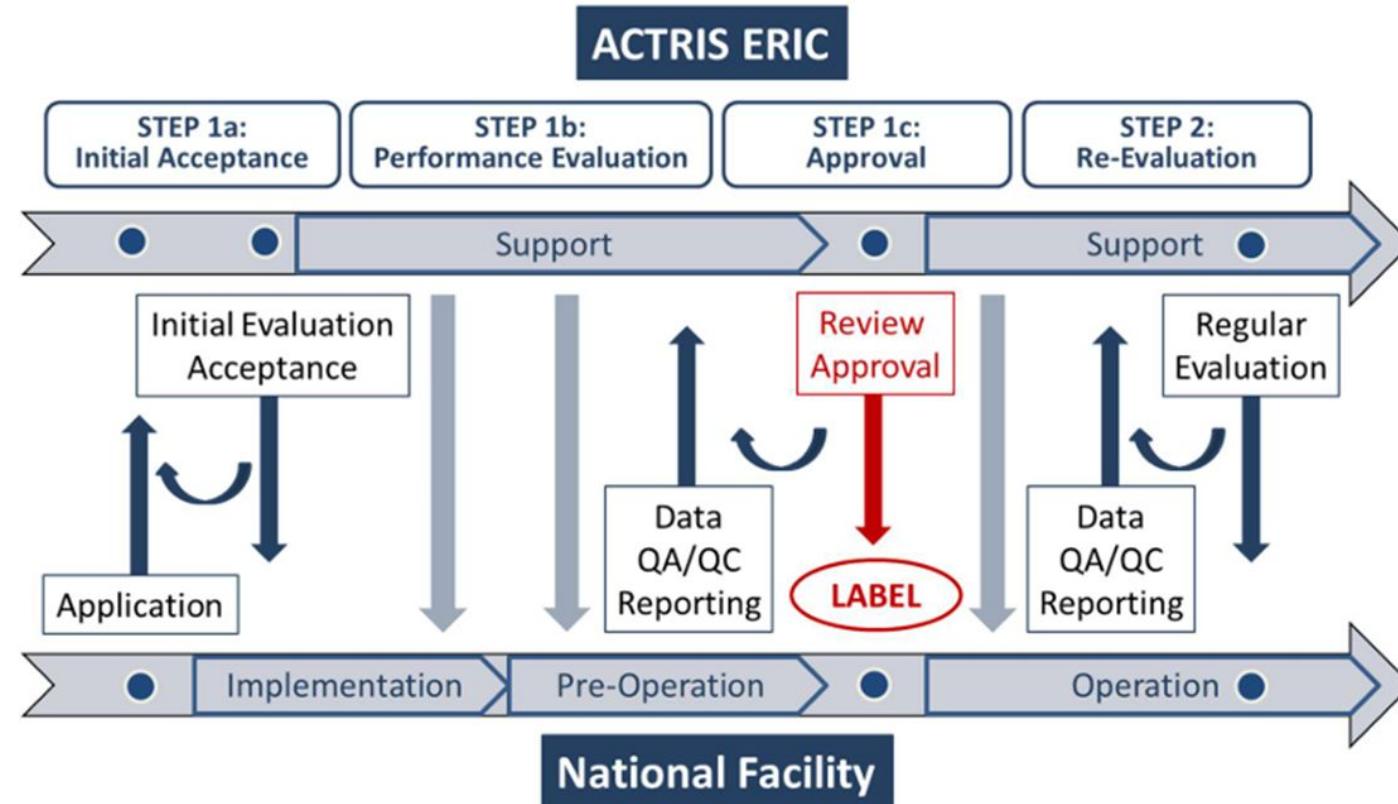
Data Quality (ReOBS)

J-F Ribaud (IPSL)

ACTRIS labelling process

A stepwise labelling process to monitor the progress of the National Facilities

→ long journey...



ACTRIS labelling process

- **Step 1a: Initial acceptance (duration: up to NFs)**
 - General feasibility check, collect of information on variables, instruments and personnel
 - Compliance with CCRES requirements
- **Step 1b: Performance evaluation (duration 2 years)**
 - Data flow and operation support schedule created
 - Tracking of NF data
 - Upgrade of the facility (if necessary → duration longer than 2 years)
 - Compliance with CCRES/CLU data requirements
- **Step 1c: Approval**
 - Full label is granted.
 - Signature of ERIC and NF agreement.
- **Step 2: Re-evaluation**

NF submit data, metadata, HKD data to CLU

- *CCRES and CLU are developing and implementing*
 - *Daily diagnostics and visualisation of HKD*
 - *Monthly reports of HKD*
 - *Quality control of metadata conformity*
 - *Quality tests and control of geophysical data*

How do we proceed ?

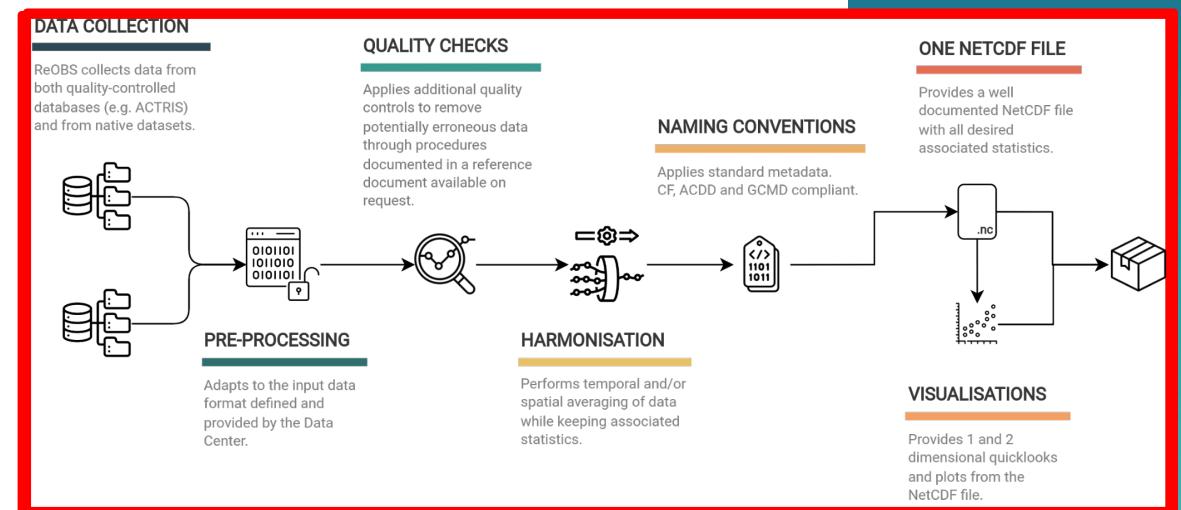
Starting point

- Use the the wealth of information & data available on Cloudnet

2 levels of assessment

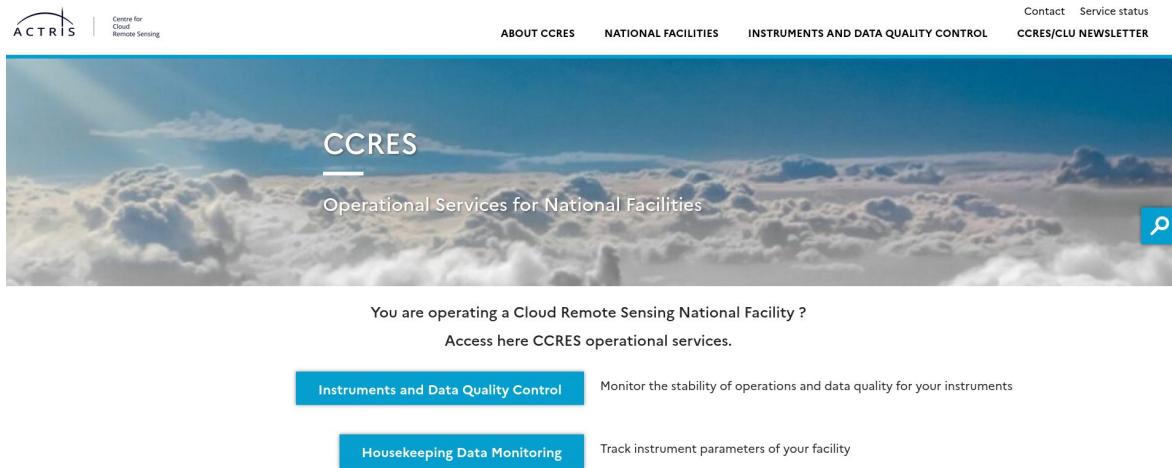
- **Data Availability**
 - NFs' files uploaded to Cloudnet
 - check if minimum of data coverage
 - Information provided by CLU (now available)
- **Data Quality**
 - **Use of ReOBS tool (Chiriaco et al., 2018) to synthesize all products into a single .nc with temporal resolution 1h and same vertical grid**
 - **Additional QCs are used (generally more restrictive flags/status associated with initial products)**

```
JSON Raw Data Headers
Save Copy Collapse All Expand All Filter JSON
uuid: "a871bac7-7c86-44ea-985c-4d3dd396f3a"
version: ""
pid: "https://hdl.handle.net/21.12132/1.a871bac77c8644ea"
dvasId: null
volatile: true
tombstoneReason: null
legacy: false
measurementDate: "2025-04-09"
checksum:
size: "8515893"
coverage: 0.85520834
format: "HDF5 (NetCDF4)"
errorLevel: "info"
createdAt: "2025-04-09T01:25:19.623Z"
updatedAt: "2025-04-10T04:57:55.413Z"
dvasUpdatedAt: null
startTime: "2025-04-09T00:00:15.000Z"
stopTime: "2025-04-09T23:59:44.000Z"
instrumentPid: null
site:
```



Monthly visualization

Before the notebook:



CCRES

Operational Services for National Facilities

You are operating a Cloud Remote Sensing National Facility ?
Access here CCRES operational services.

Instruments and Data Quality Control

Monitor the stability of operations and data quality for your instruments

Housekeeping Data Monitoring

Track instrument parameters of your facility

INSTRUMENTS AND DATA QUALITY CONTROL

Access to « DCR/DD Calibration and stability monitoring », « MWR stability monitoring » and « Monthly reports » for the different sites.

DCR/DD Calibration and Stability monitoring

MWR Stability

Monthly report for labelling step1b

<https://ccres.aeris-data.fr/en/data-visualization-monthly/>

Explore ReOBS file



Notebook



Thank you !