ACTRIS
CCRES

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 ?

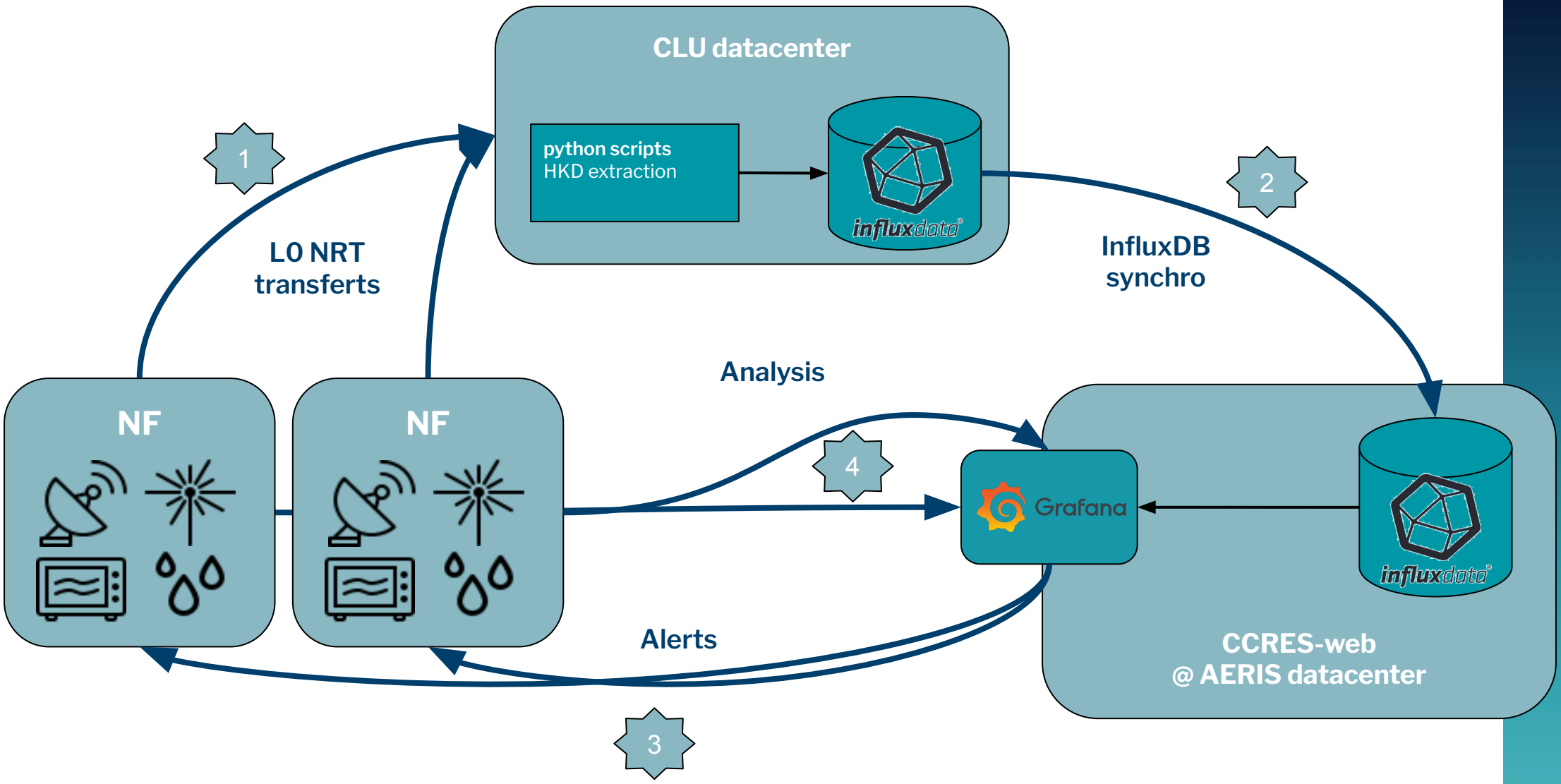
- Instrumental parameters
  - Provided in data files or in ancillary files

- 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**

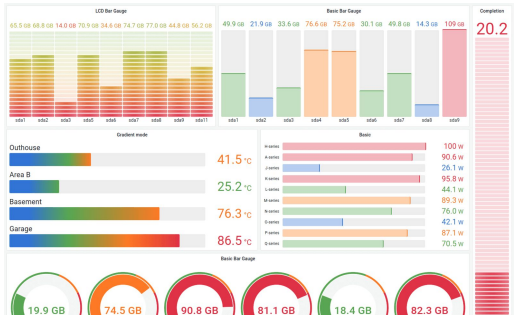
HouseKeeping Data : architecture



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



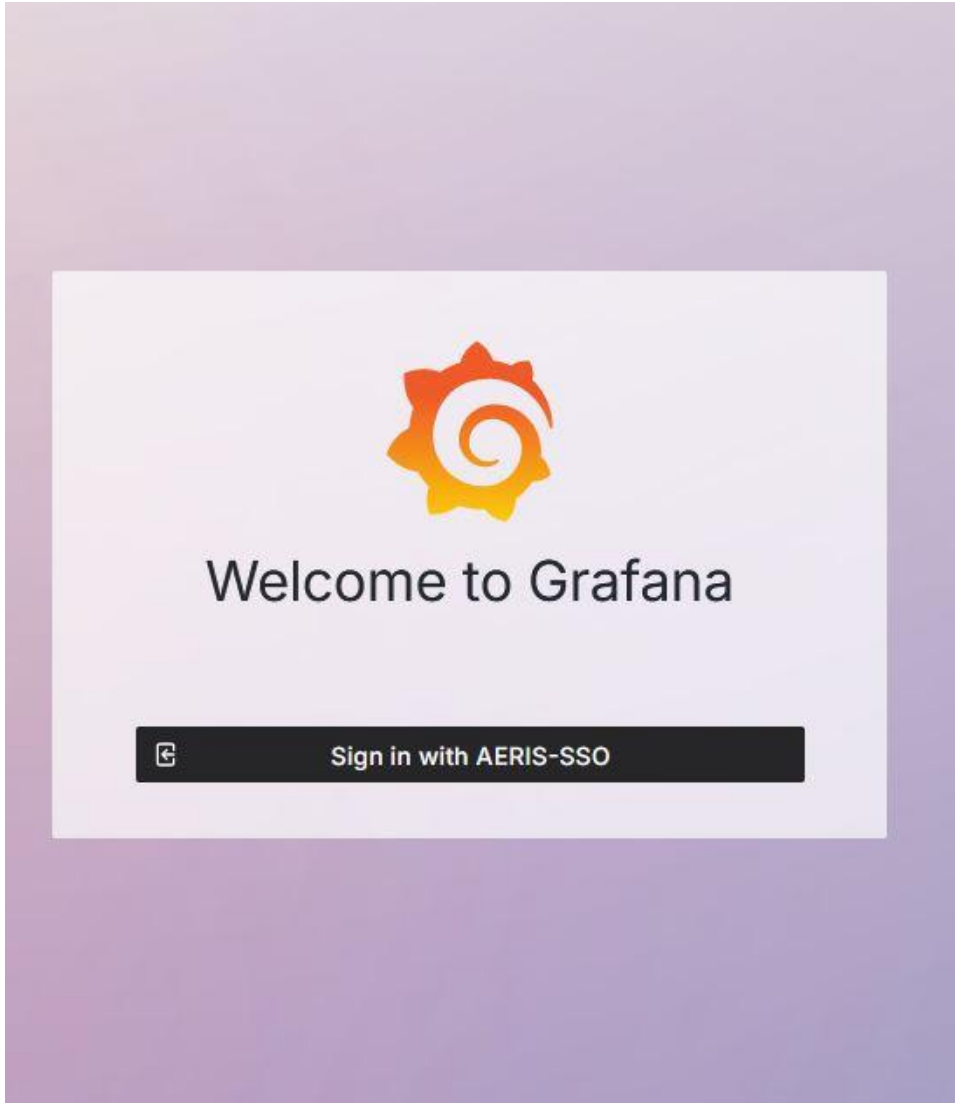
Grafana (2/2)

- 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)

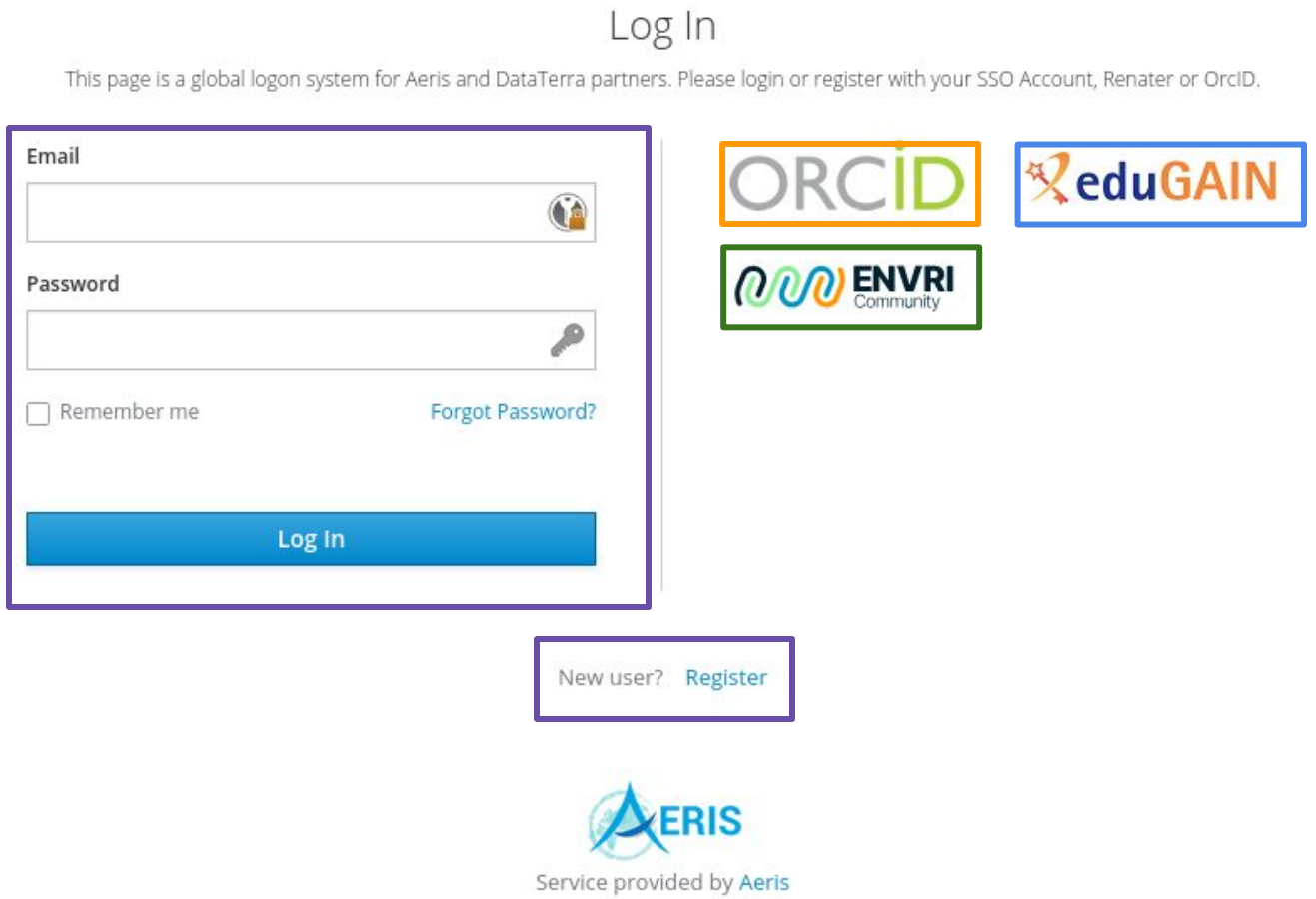
- All informations available on https://ccres.ipsl.fr/docs/
- Go to https://ccres.ipsl.fr/grafana/
  - **don't forget the ending "/"**
- click on "Sign in with AERIS-SSO"



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

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

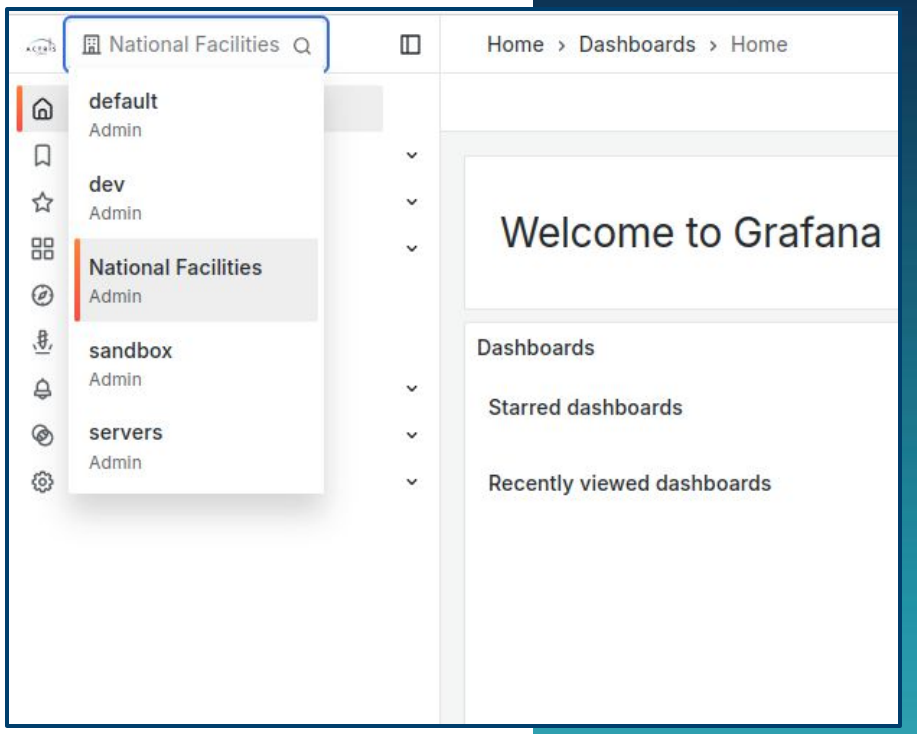
“National facilities” organization

- 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

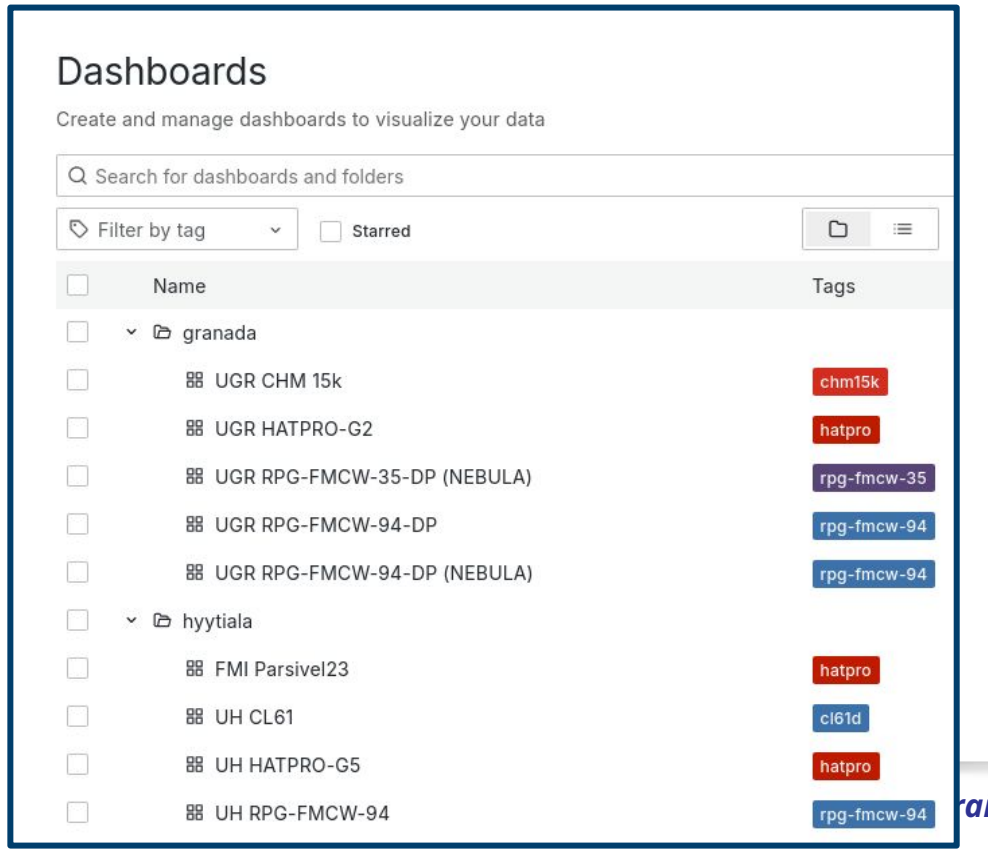
- Participants to this training have access to **sandbox** organization
  - User have **editor** right
  - Can **create** and **modify** dashboards

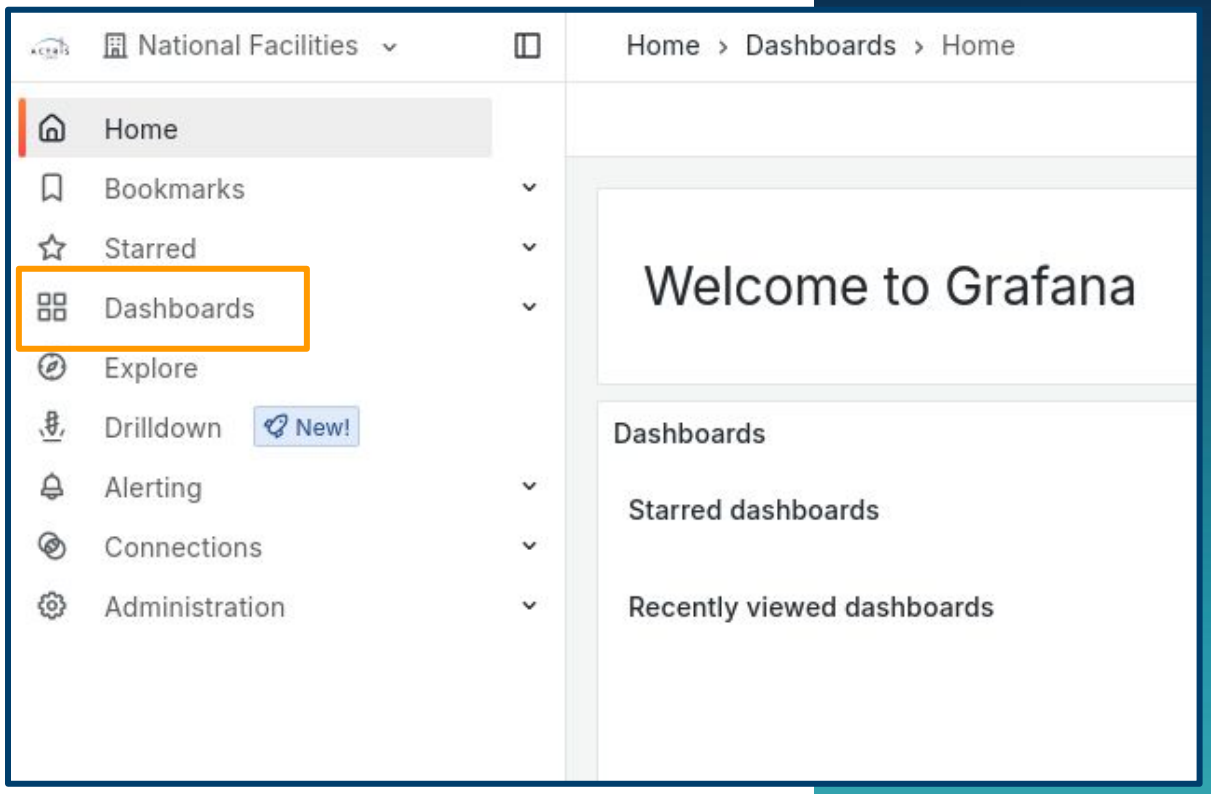


Main menu : dashboards (1/3)

- **Dashboards** menu
  - access to available dashboards sorted by NF

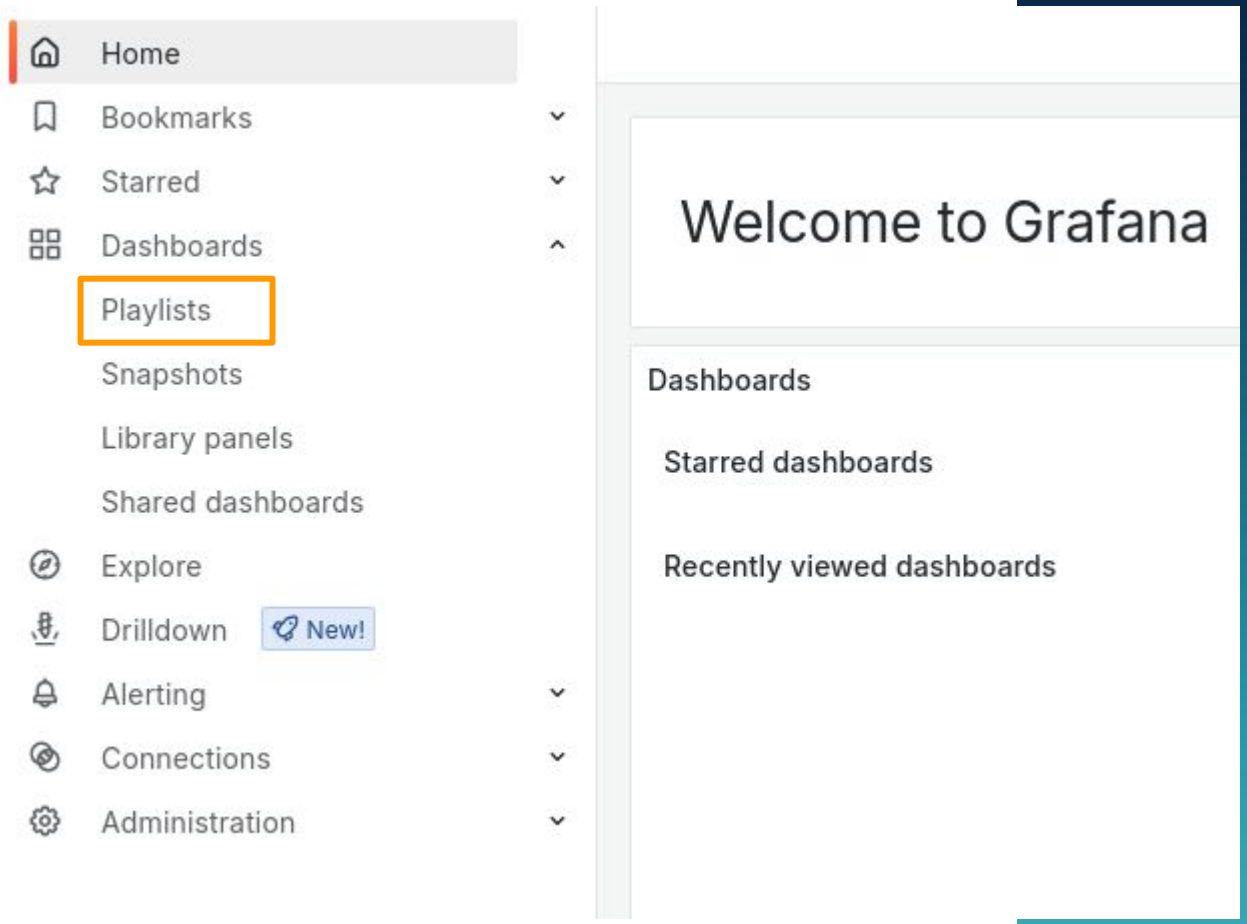
- A directory per NF containing available dashboards





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)

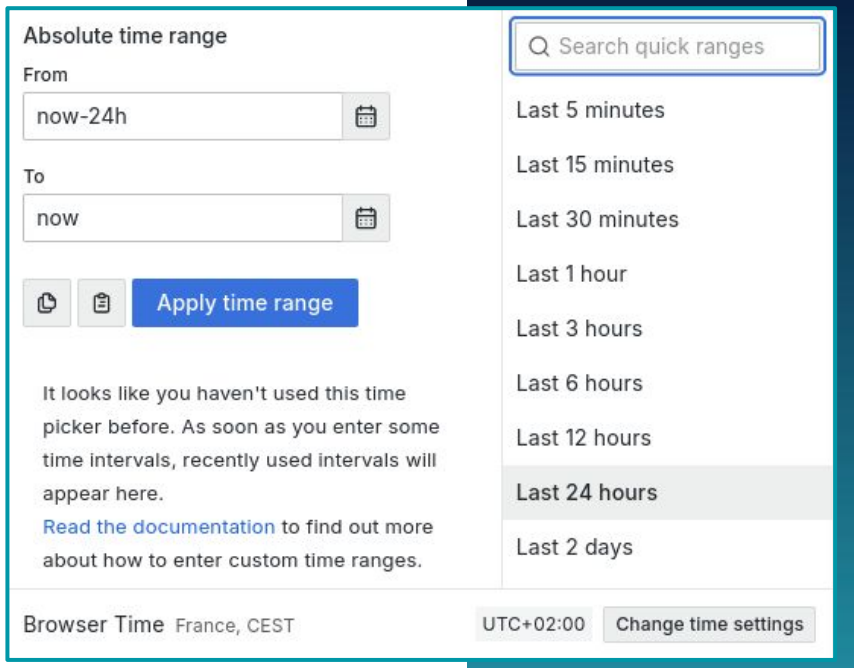
- Dashboards for 10 models of instruments available at the moment
  - RADARs
    - basta
    - RPG FMCW 35 and 94 GHz
  - MWRs
    - RPG hatpro
  - ALCs
    - lufft chm15k
    - vaisala ct25k, cl31, cl51 and cl61
    - campbell scientific cs135
- At least one dashboard for 35 stations

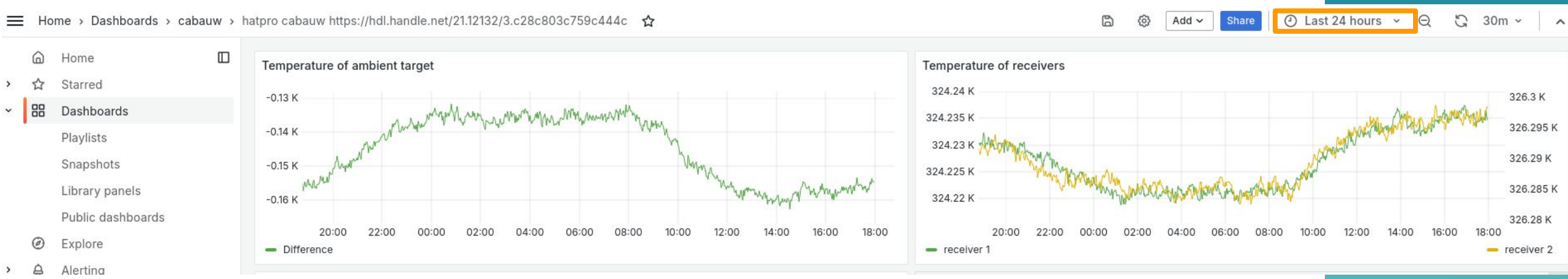
- Based on templates
  - Automatically deployed based on metadata available in cloudnet
  - Script is run once a week to check for update on NFs status
    - New NF that started to send data
    - Data from new instrument is added
  - If you have several instrument of the same model sent to cloudnet
    - 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 cloudnet should be available



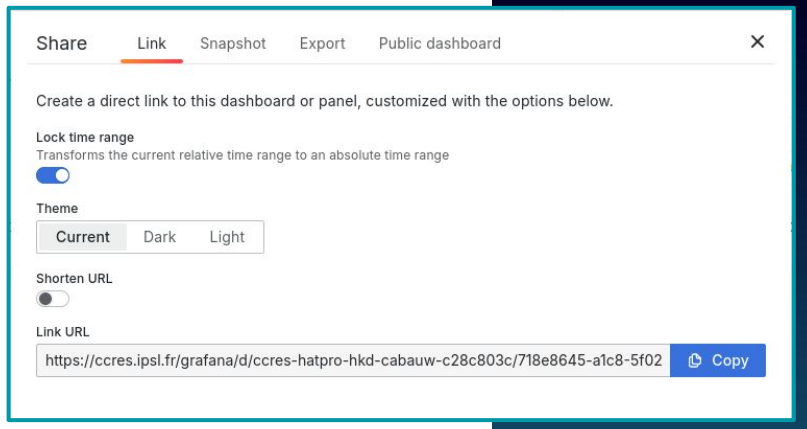


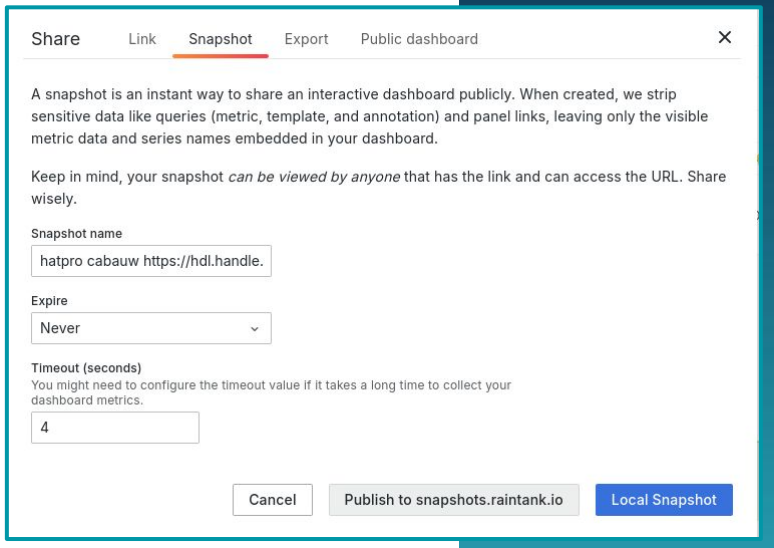
Using dashboards (2/3)

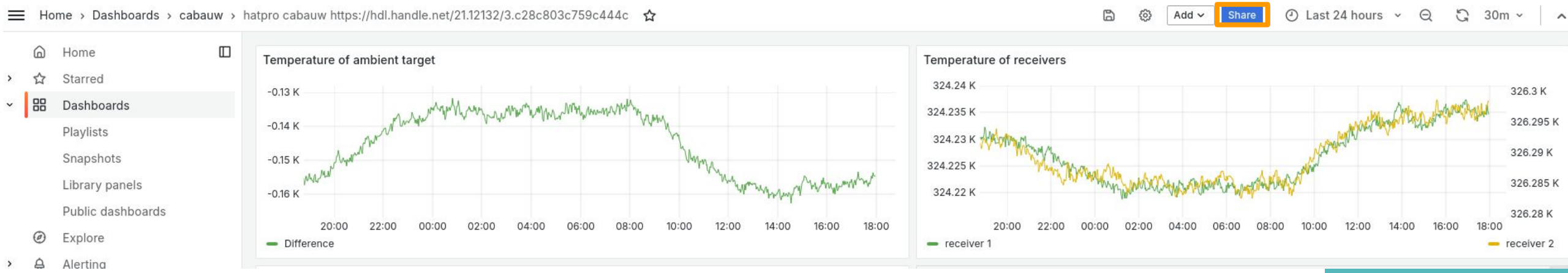
- **Share** menu

- **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



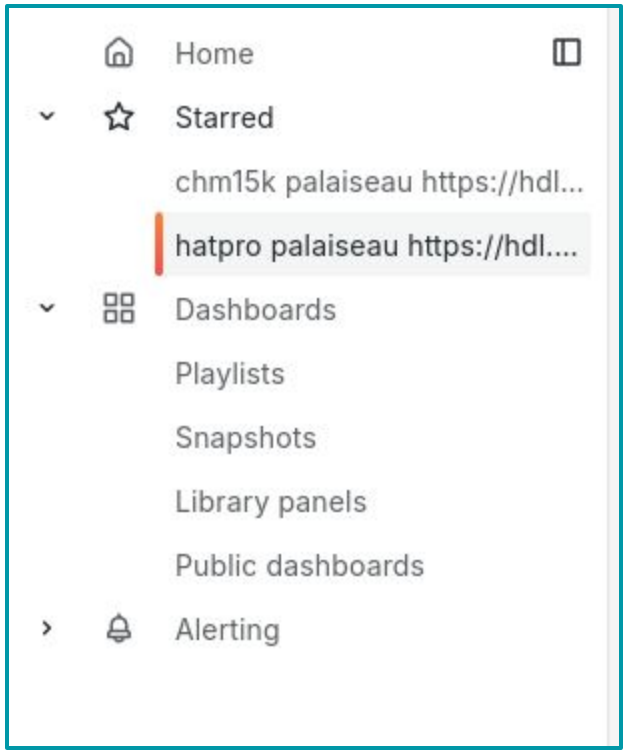




Using dashboards (3/3)

- **Favorite** menu

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

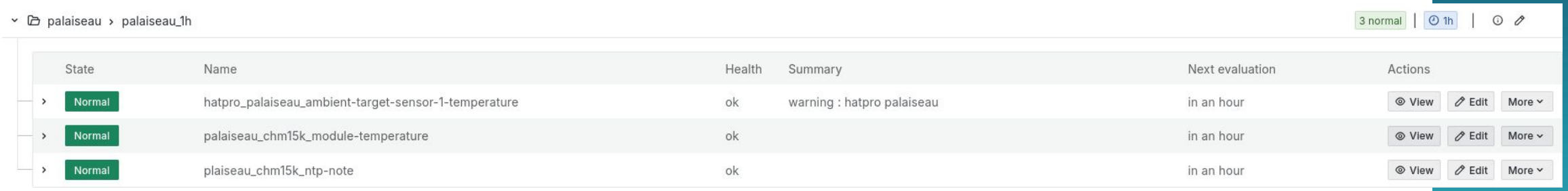


Demo

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

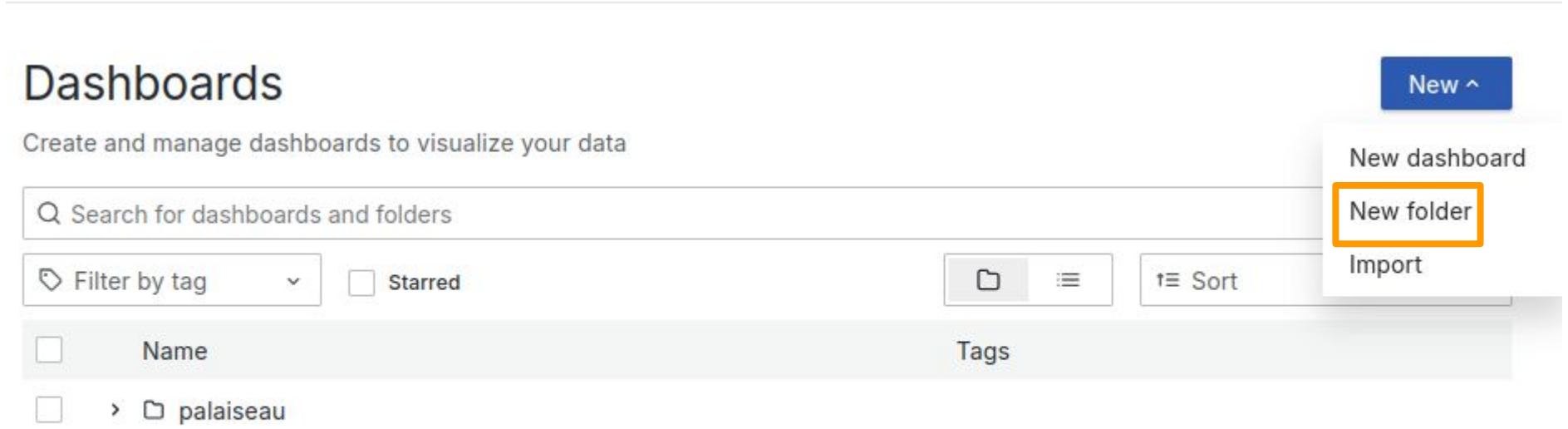
- Continue work on automatic alerting



Build your own dashboard

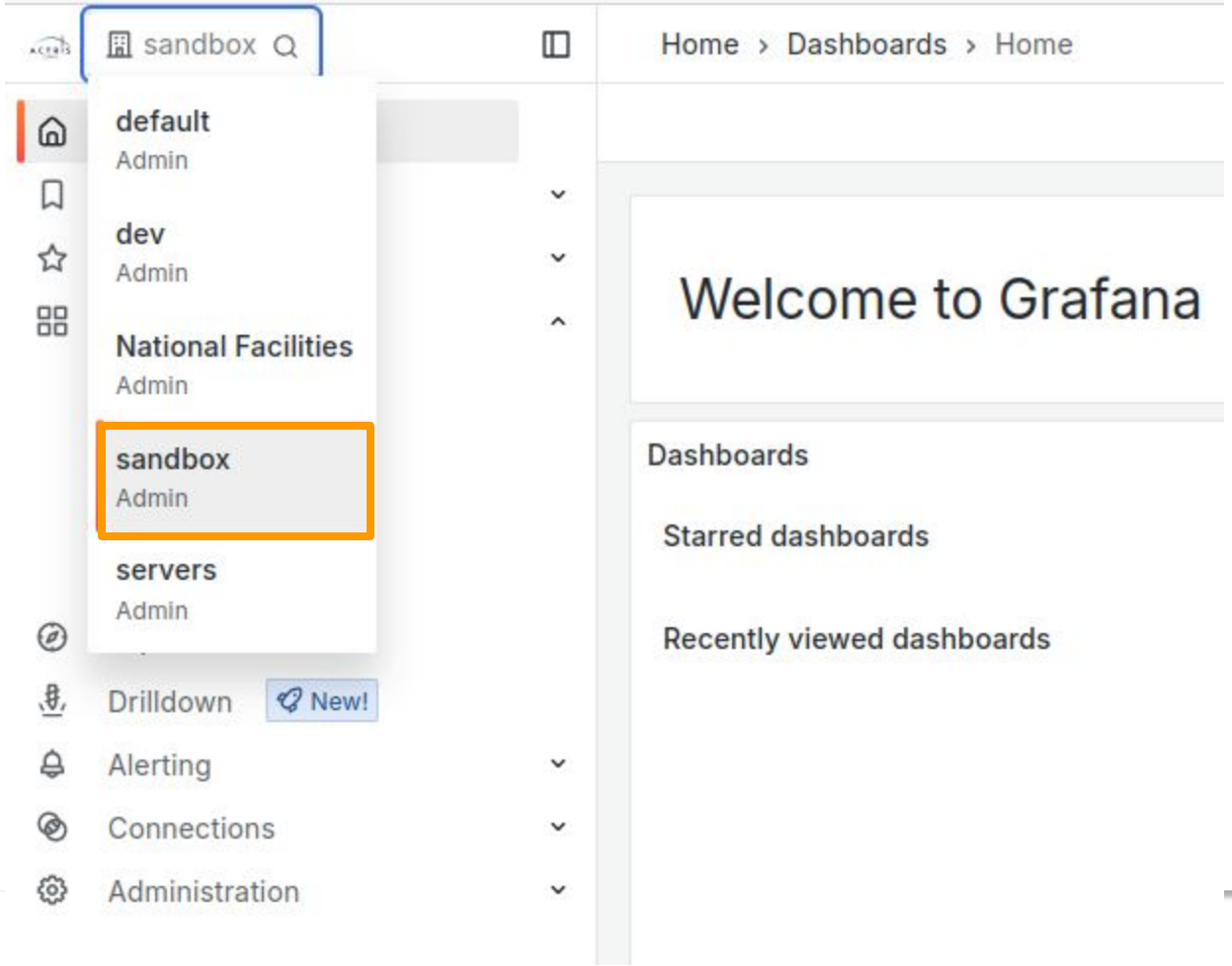
Build your own dashboards (2/7)

- Create a directory to put your dashboards



Build your own dashboards (1/7)

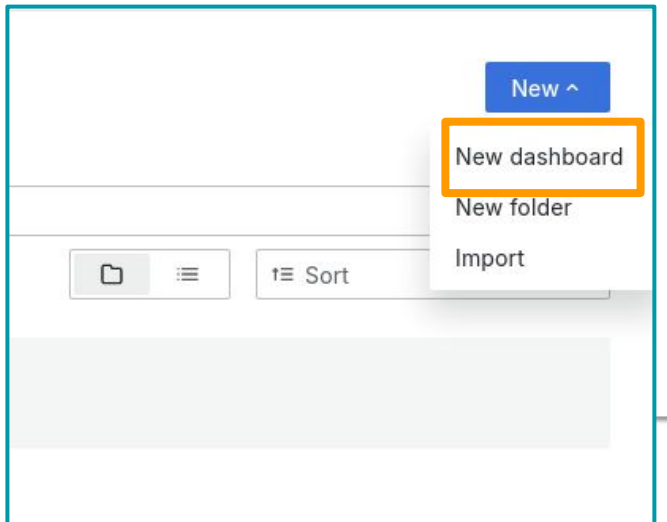
- For this session, you have a **sandbox** organization available where you have **editor** rights
- Switch organization, got to dashboard menu

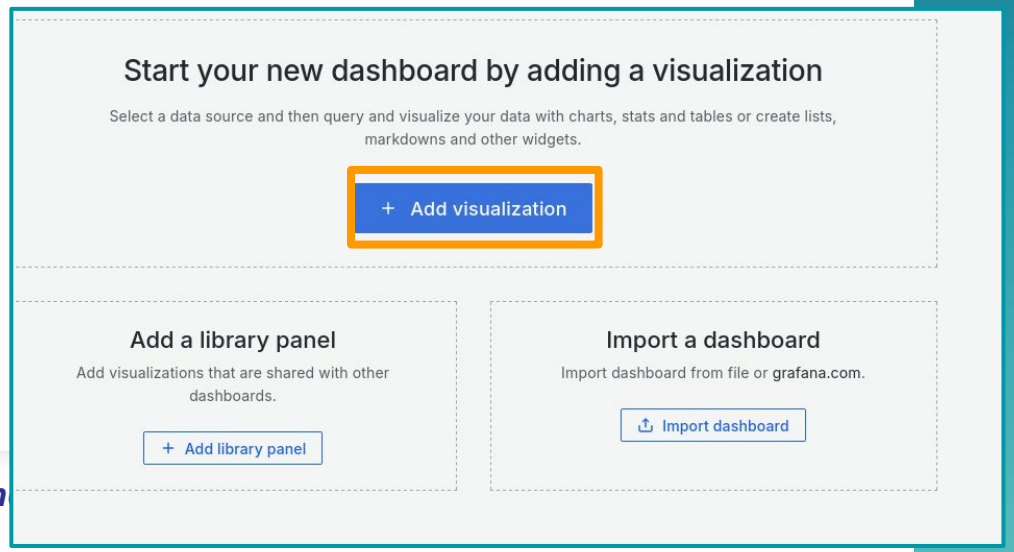


Build your own dashboards (3/7)

- 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

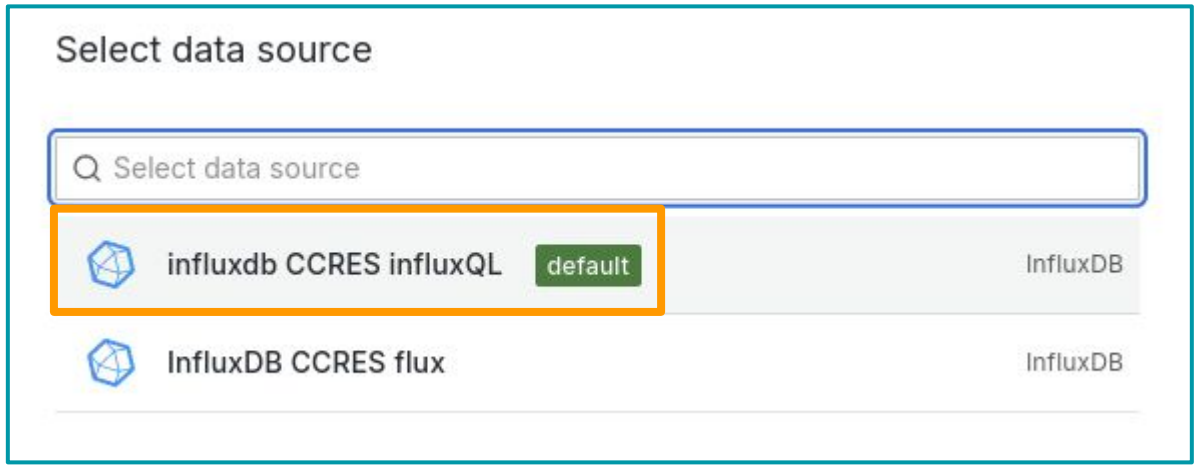
- To create a dashboard
  - Go to **dashboards** menu and click on **New** and **New dashboard**
  - Click on **Add visualization**





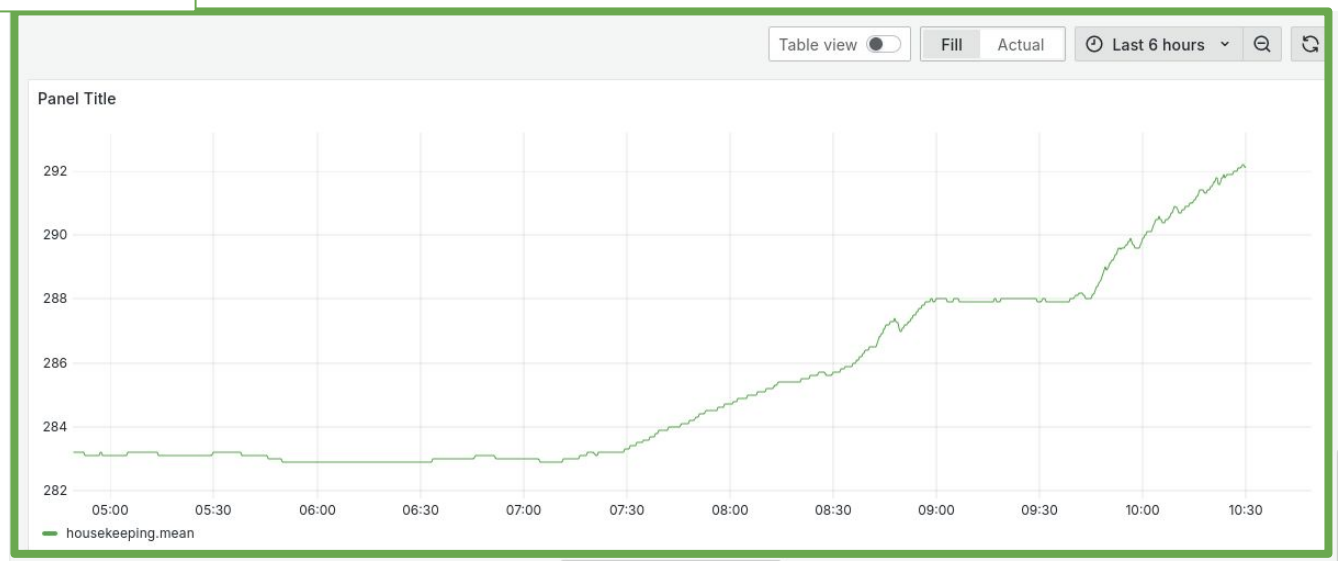
Build your own dashboards (4/7)

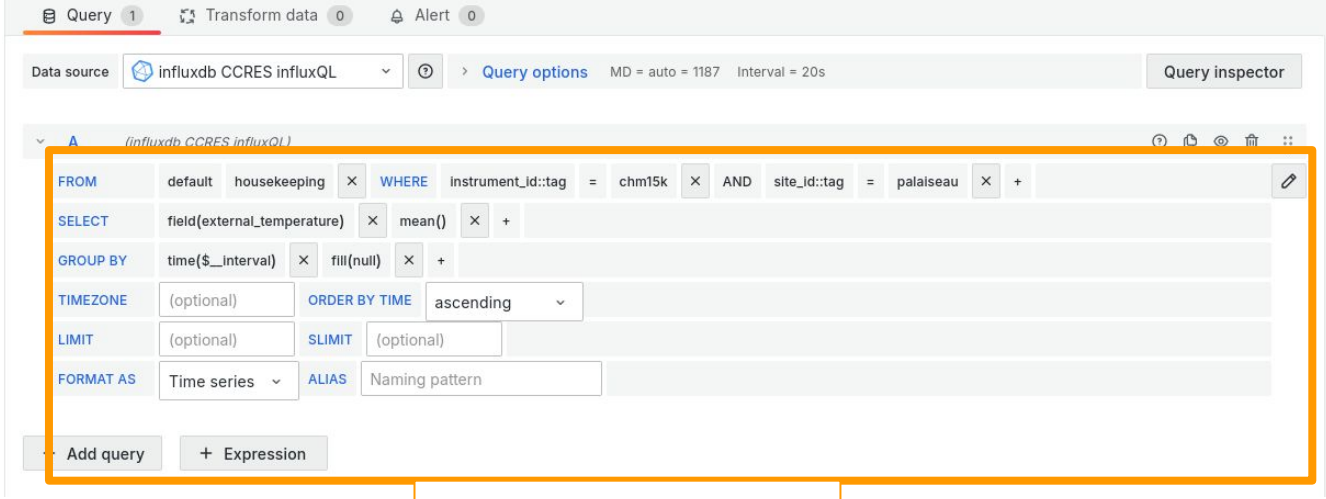
- Select **influxdb CCRES influxQL**



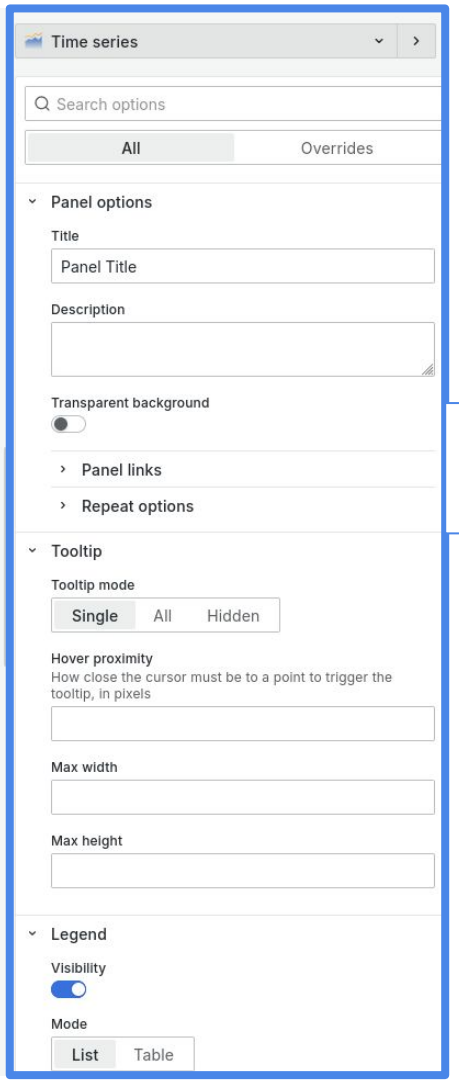
Build your own dashboards (5/7)

previsualization





data request



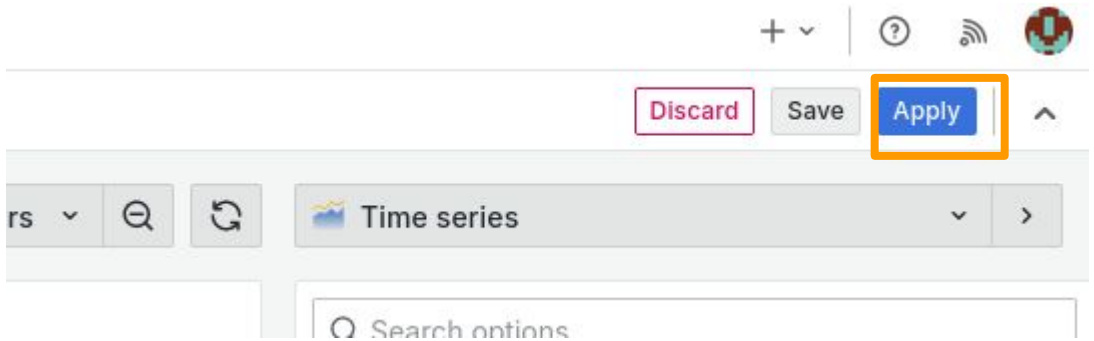
type of plot

Build your own dashboards (6/7)

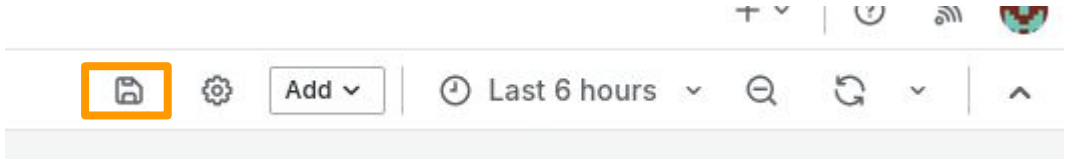
- Grafana doesn't know how to filter variables based
  - *instrument_id*, *instrument_pid* or *site_id*
- Dashboard "List instrument variables" contains lists of variables available by type of instrument

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 cloudnet

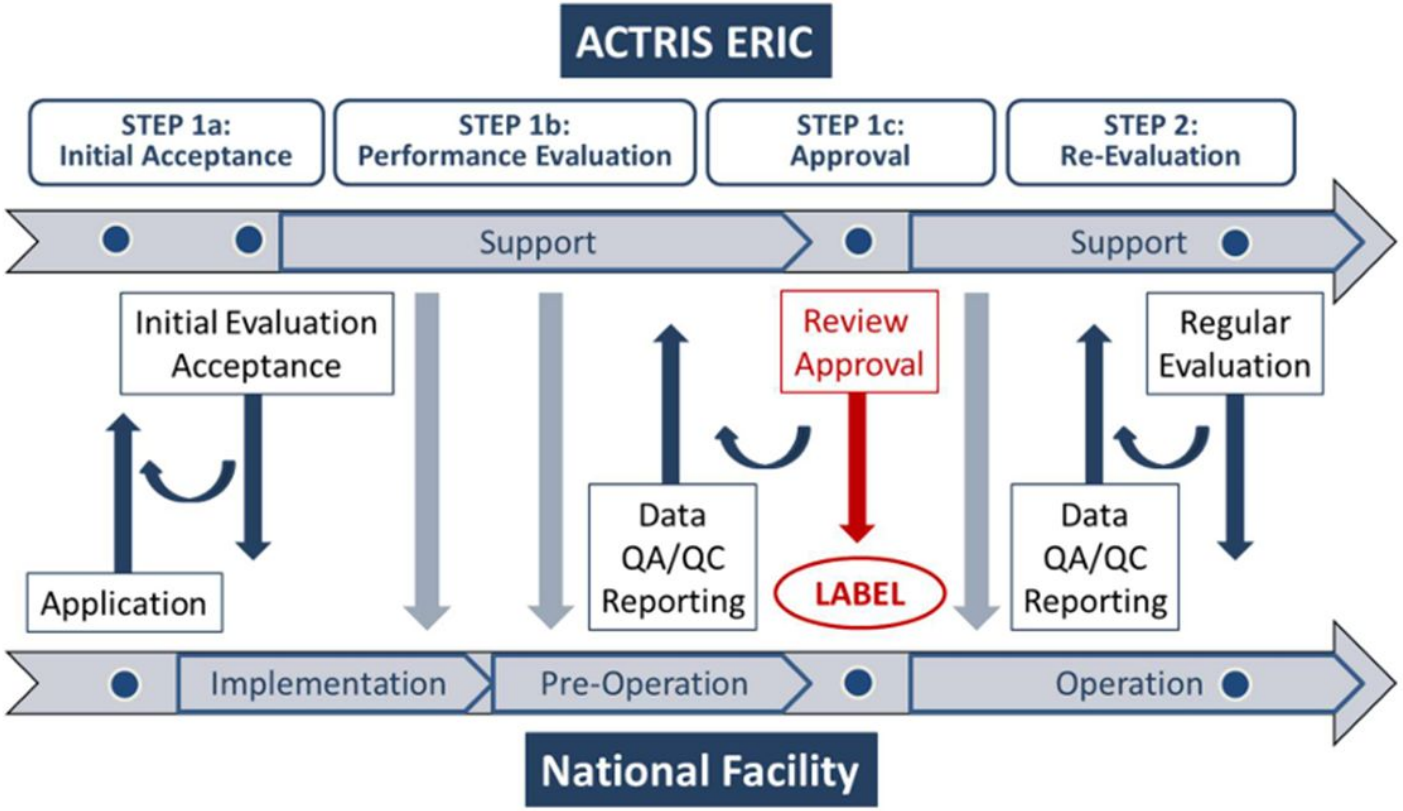
Data Quality (ReOBS)

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**

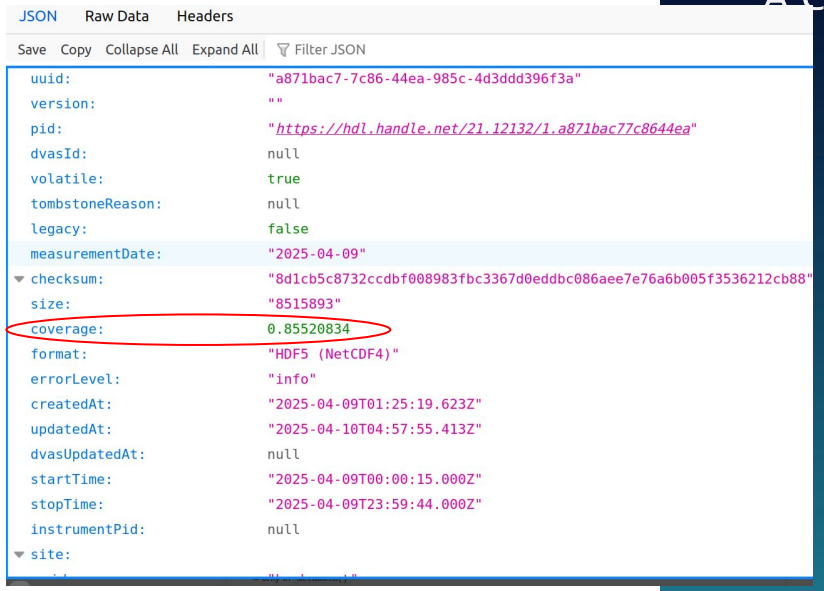
NF submit data, metadata, HKD data to CLU

• 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

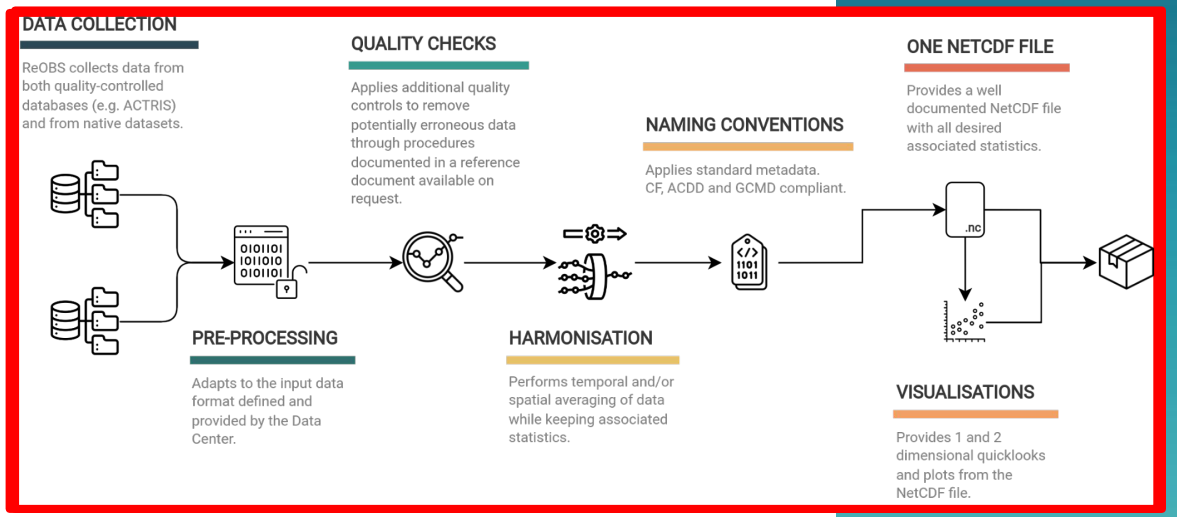
- Use the the wealth of information & data available on Cloudnet



2 levels of assessment

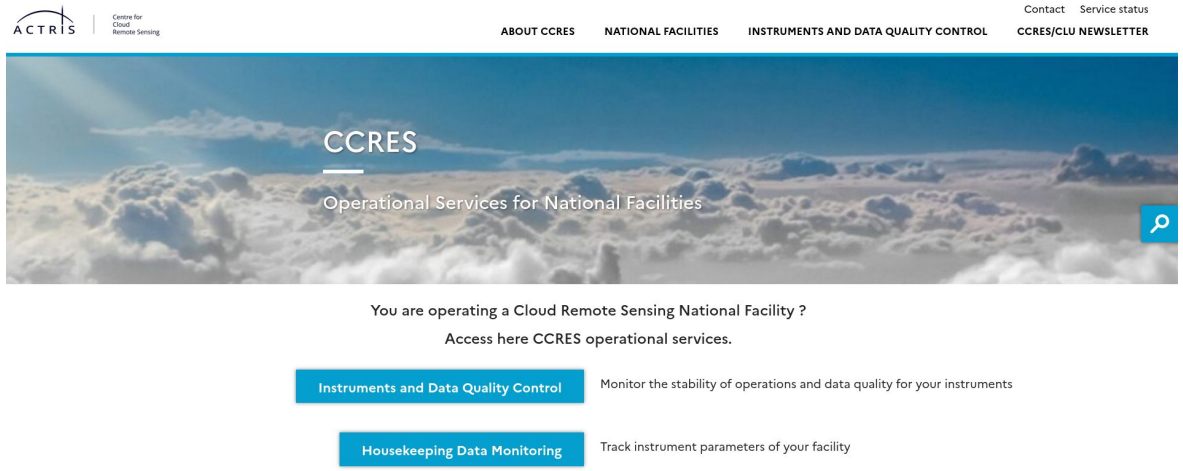
- **Data Availability**
  - NFs' files uploaded to Cloudnet
  - check if minimum of data coverage
  - Information provided by CLU (now available)

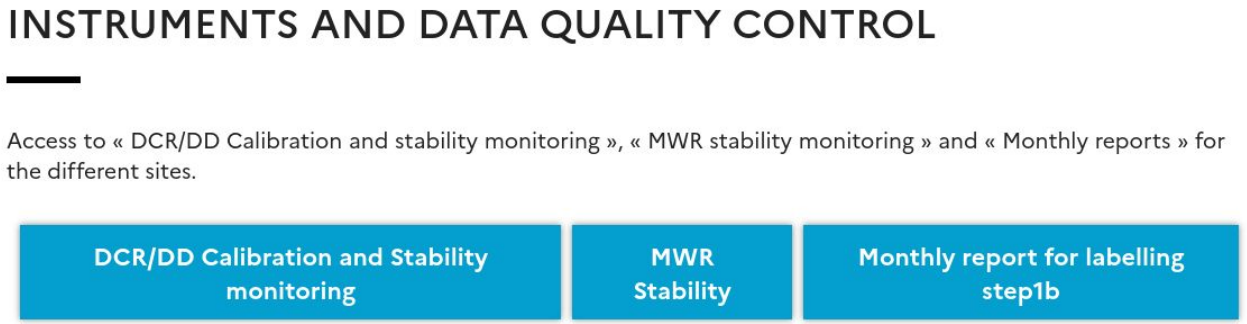
- **Data Quality**
  - **Use of ReOBS tool (Chiriaco et al., 2018) to synthetize all products into a single .nc with temporal resolution 1h and same vertical grid**
  - **Additional QCs are used (generally more restrictive flags/status associated with initial products)**



Monthly visualization

Before the notebook:





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

Explore ReOBS file

Notebook

ACTRIS
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Thank you !

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