Datamanagement

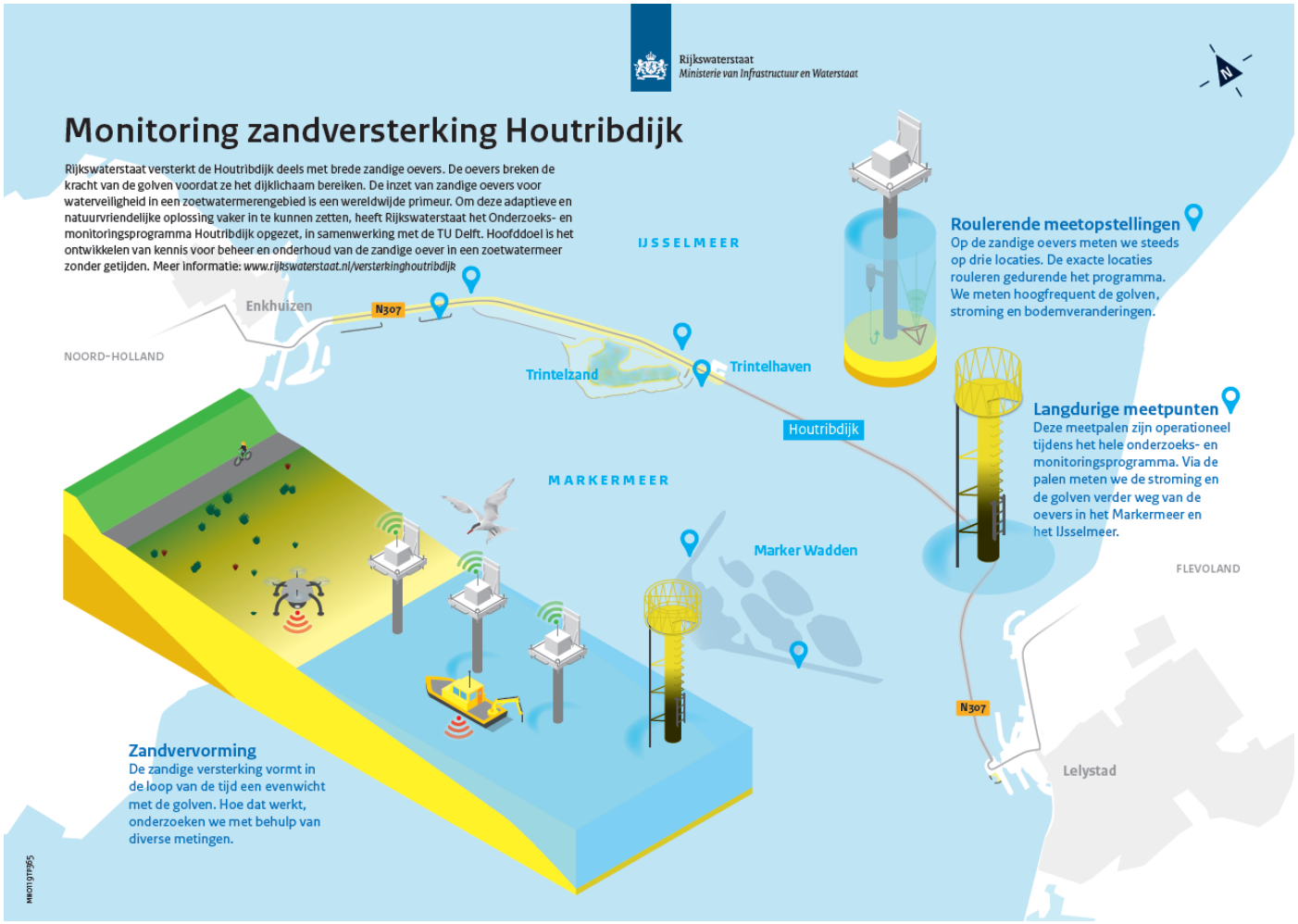
NCK Theme Day
Vincent Vuik, 11-04-2022

Application: Research & Monitoring Houtribdijk

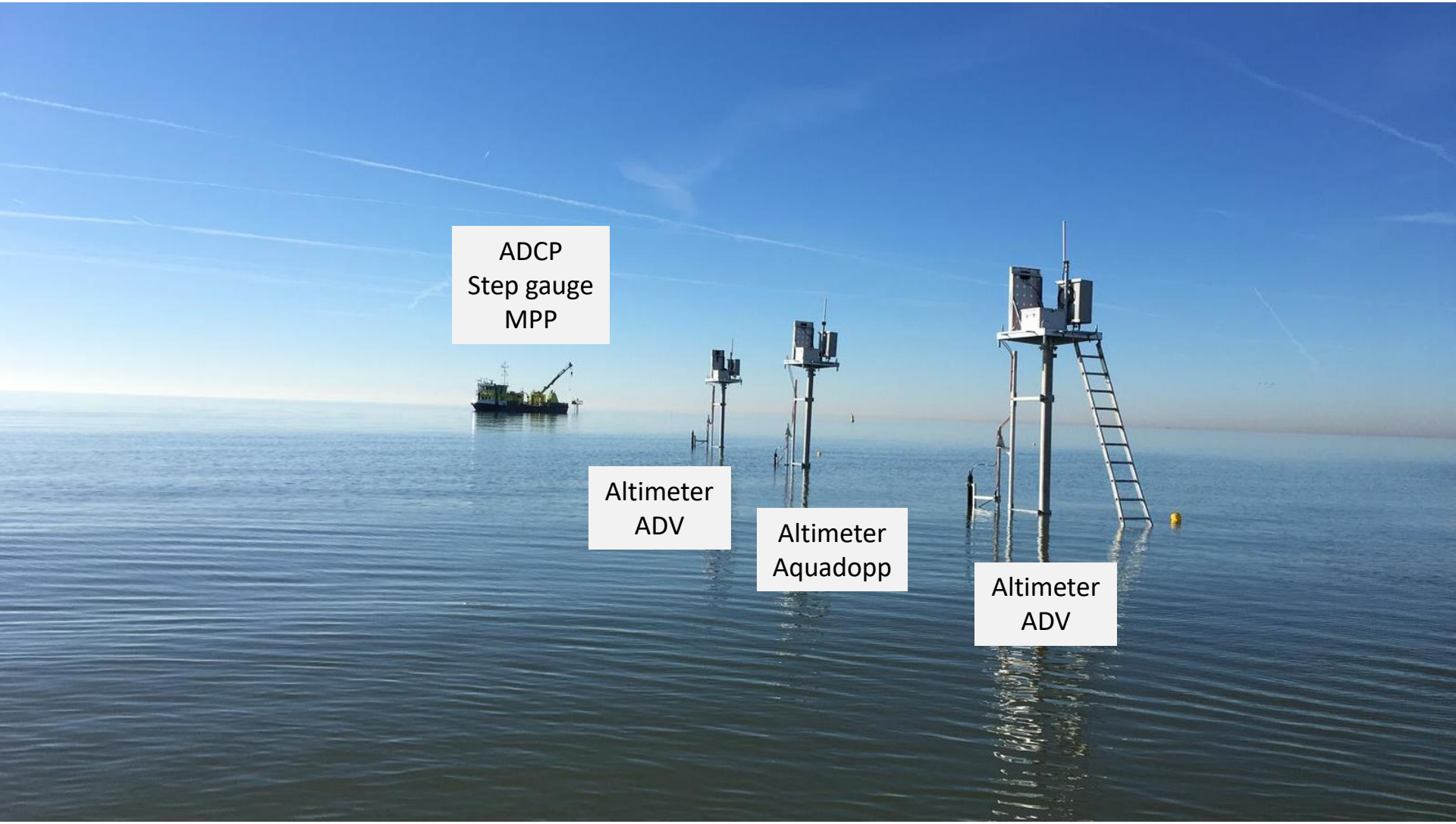
Sandy reinforcement of the Houtribdijk

After sand nourishment

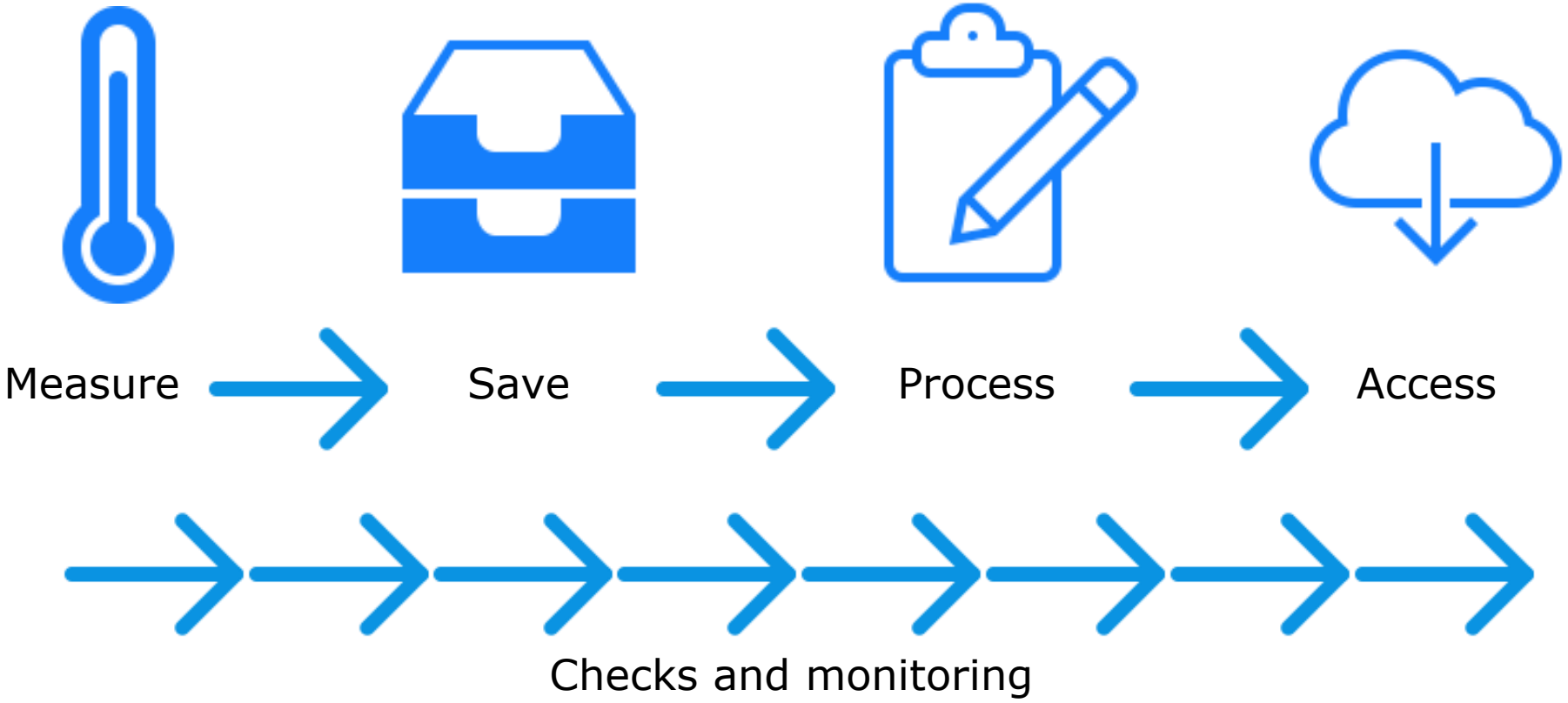
Research & monitoring program



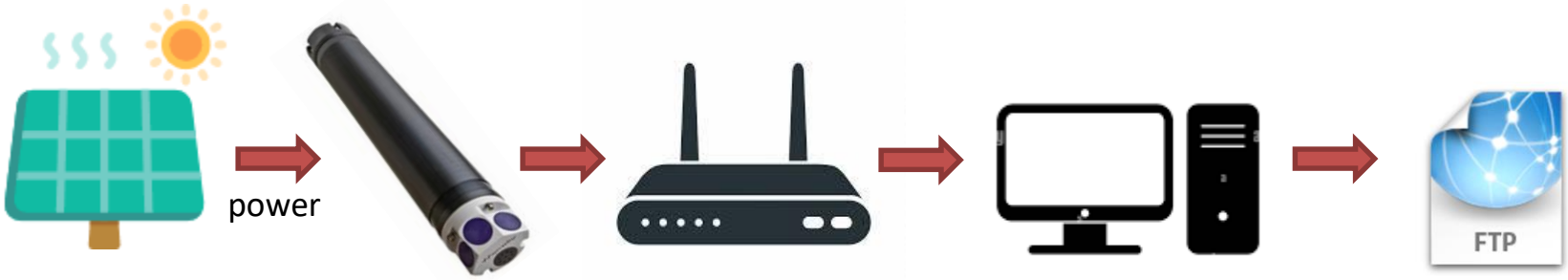
Measurements and instrumentation

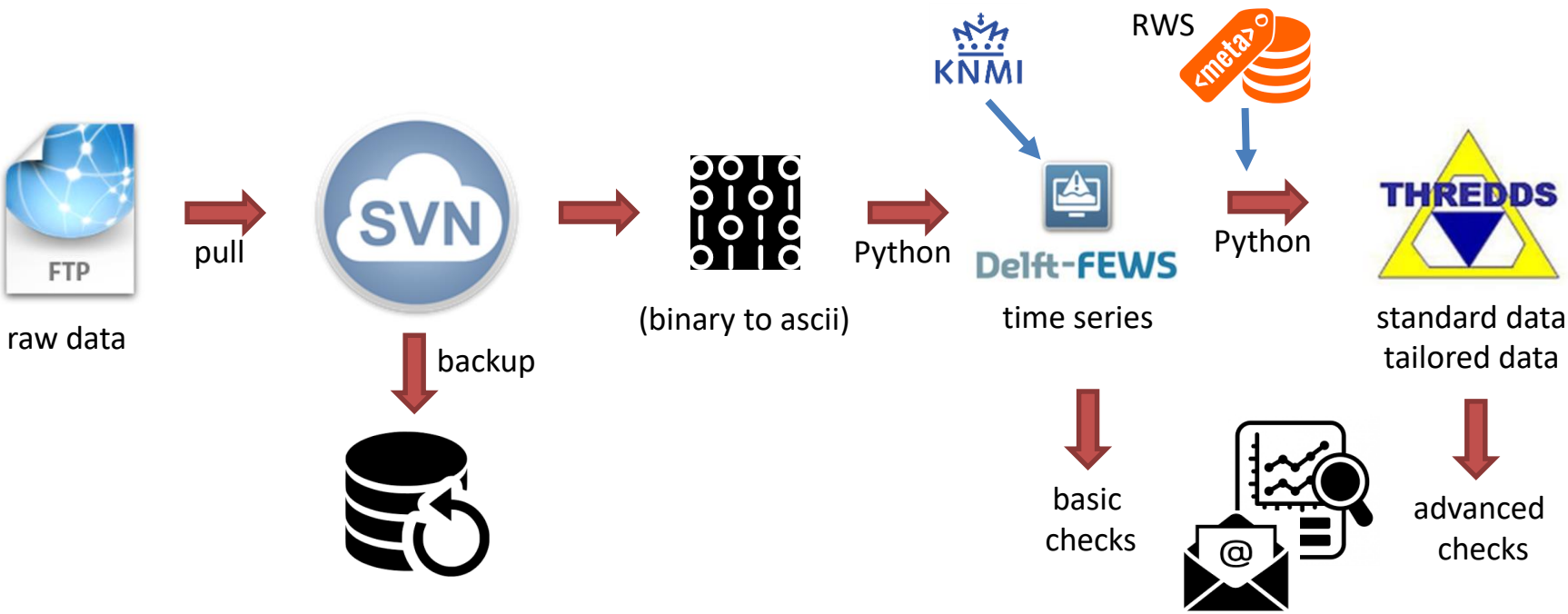


Data Management System



Data flow in more detail



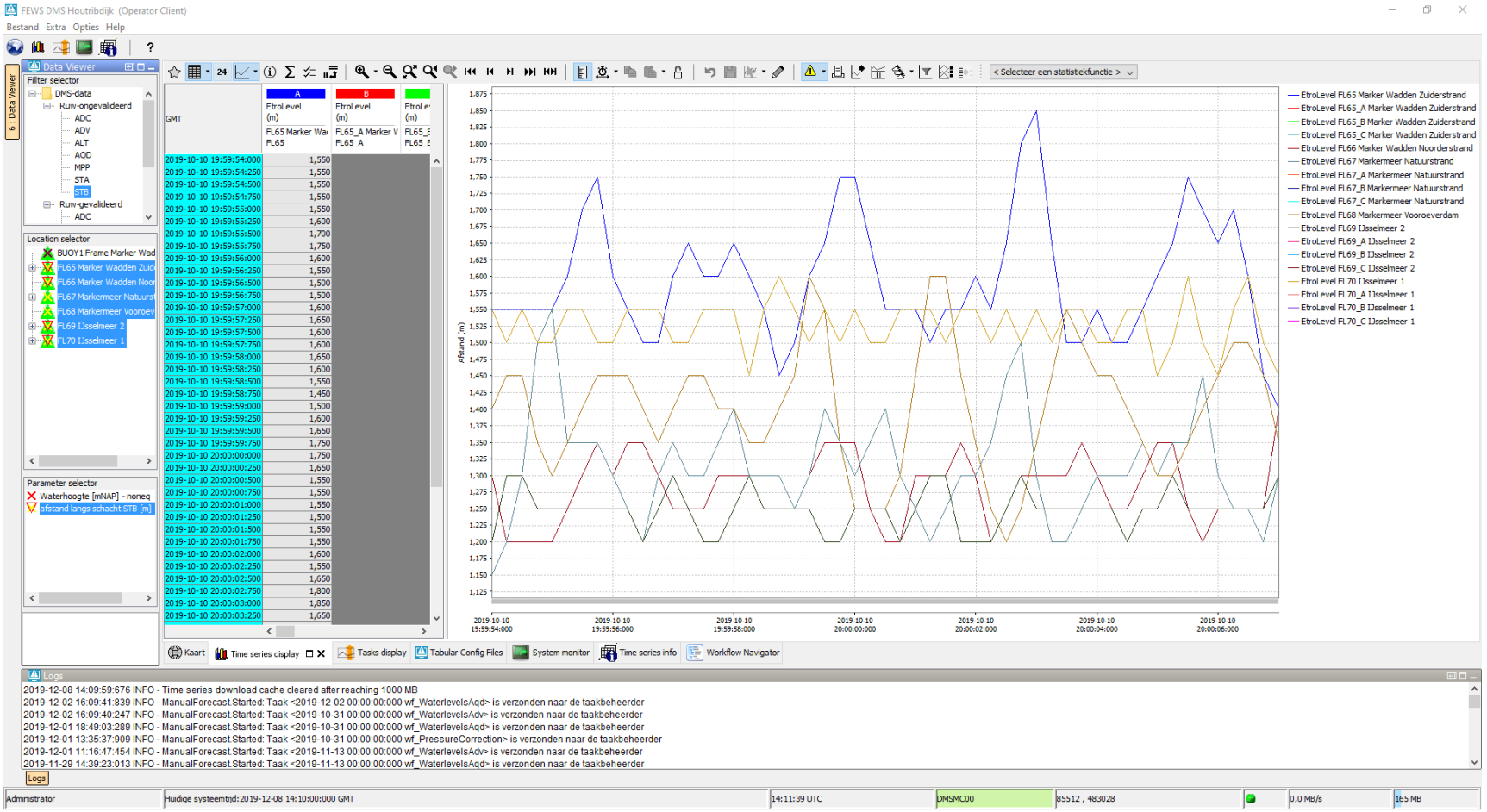


Objectives of a data management system

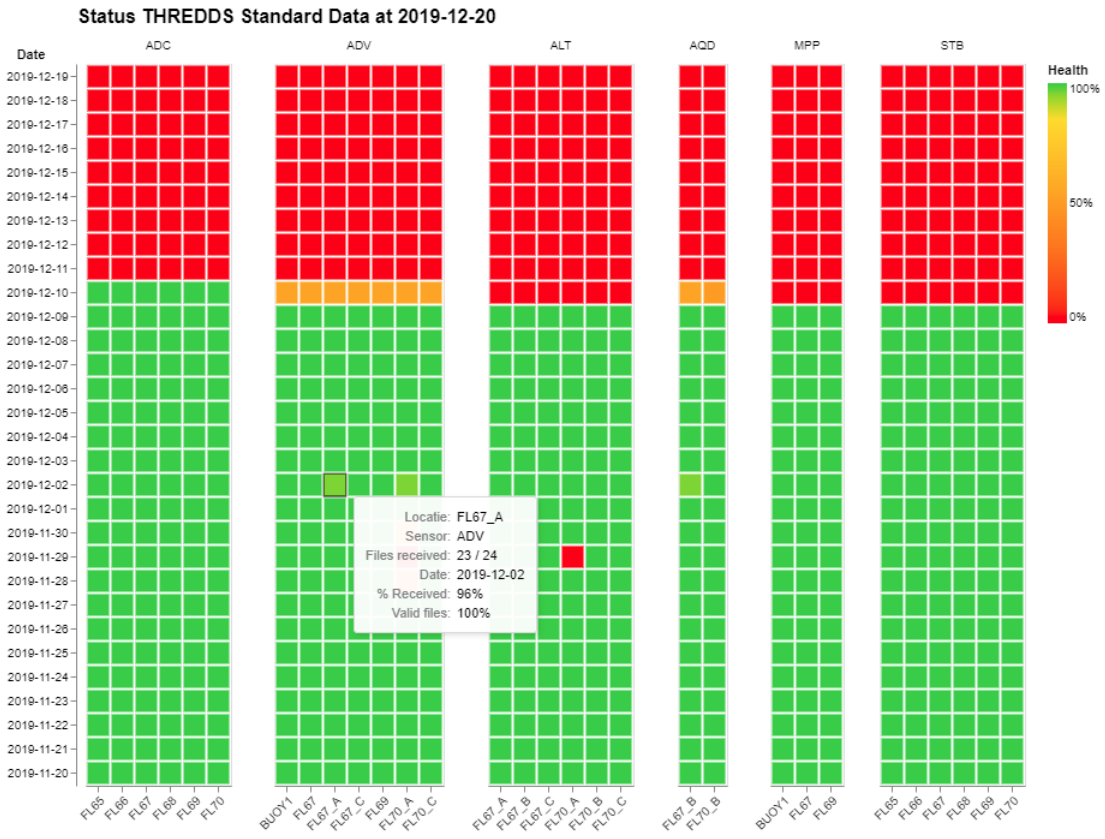
- Quality assurance: real-time monitoring of all instruments
- Validation: continuous data checks
- Standardization: automized and standardized processing
- Disclosure: near-instantaneous availability for data users
- Reproducibility and version control
- Data security
- Archiving

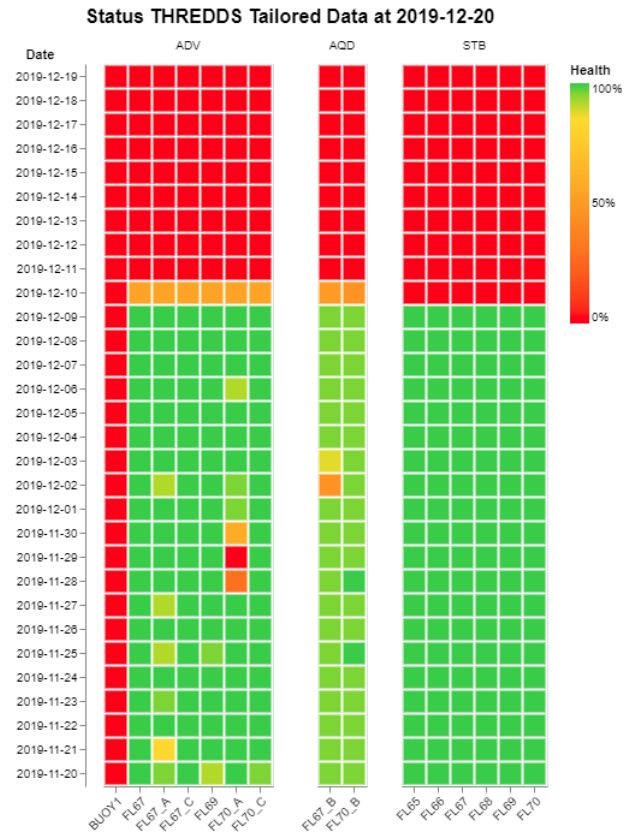
And… to save a lot of handwork for a 4-year campaign!

Aggregated time series in Delft-FEWS



Monitor for THREDDS server





FAIR principles

Data management follows the FAIR principles:

Data with rich metadata
Data in a searchable resource (structured THREDDS server)

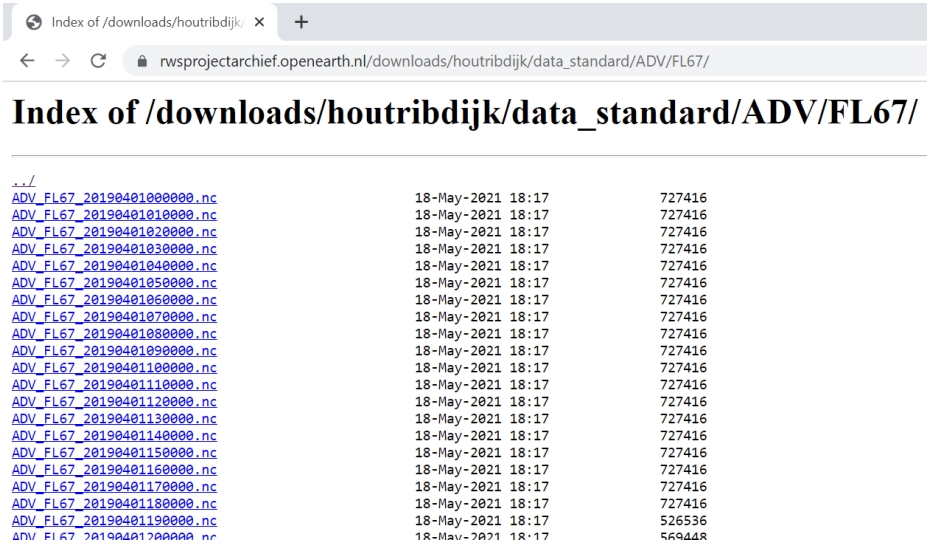
Open and free with optional authentication procedure
Data in standardized format (SI-units, NetCDF)

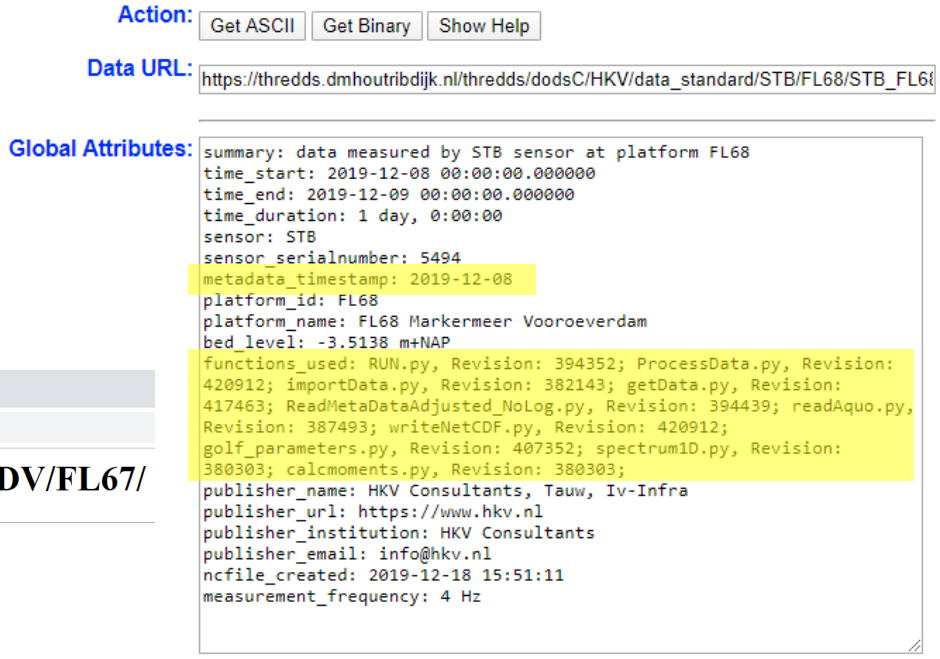
(Meta)data follow a broadly applicable standard (AQUO)

(Meta)data richly described with a plurality of accurate and relevant attributes

THREDDS server

- Structured database
- Standard data
- Tailored data
- NetCDF files

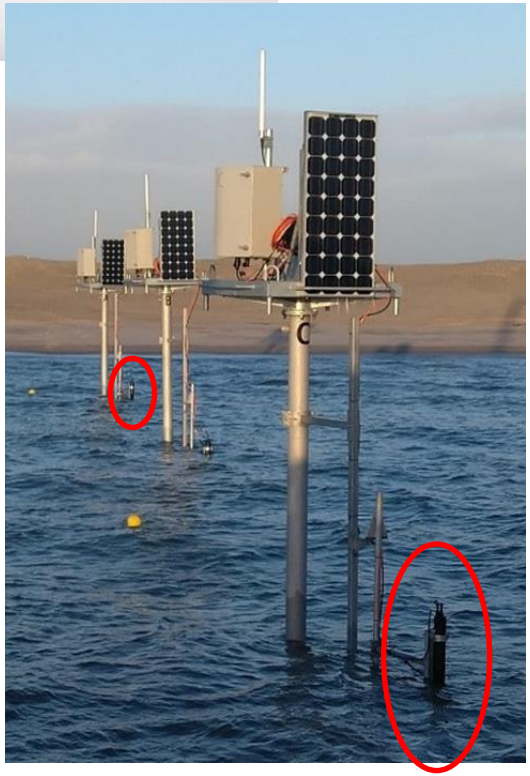




Revision numbers → SVN → Version scripts

Final products can be reproduced based on raw data and scripts

Example: ADV measurements



- Type: Nortek Vector ADV
- 6 ADV's in total
- 4 Hz continuously
- Main output parameters: pressure, velocity u,v,w
- Binary files
- 1 file per 30 minutes
- 223 kB/file
- 23 GB/year for 6 ADV's

Example: ADV measurements

Data flow:

1. Binary file on ftp server
2. Hourly pull to HKV server
3. Copy raw data files to back-up server
4. Conversion from Binary to ASCII file
5. Python: read ASCII file and write time series to FEWS database
6. FEWS: perform range checks & difference checks
7. FEWS: import air pressure from KNMI data server
8. Python: read and combine the following
   a) Measured pressure from FEWS
   b) Air pressure from FEWS
   c) Pressure offset and instrument height from metadata sheet

Delft-FEWS

KNMI

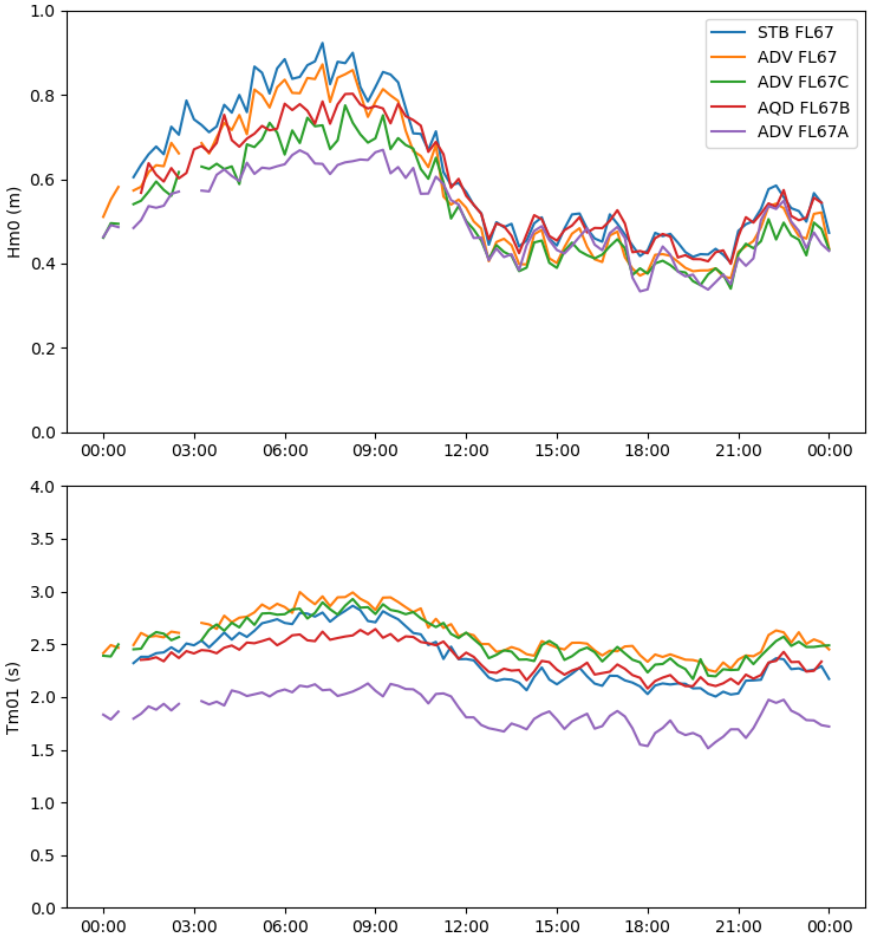
RWS

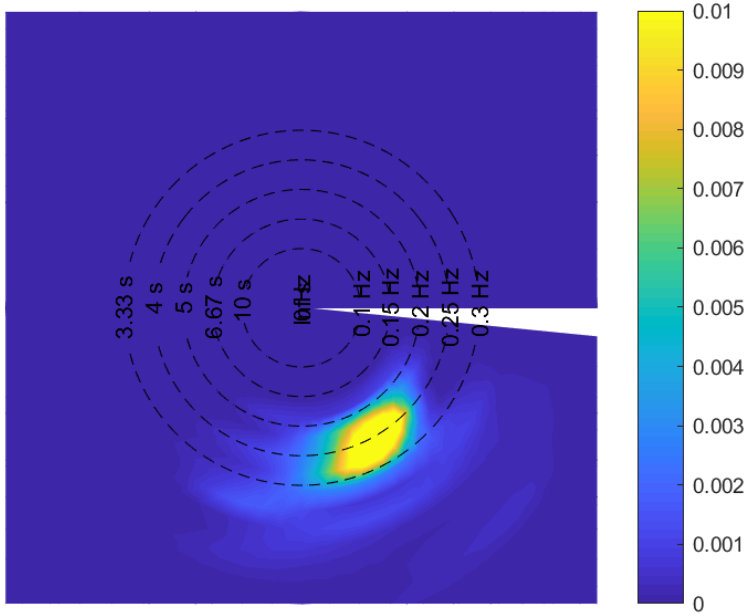
Example: ADV measurements

Data flow (continued):

9. Python: calculate time series water level and rotate velocities from u,v,w to x,y,z
10. Python: write standardized time series to NetCDF on THREDDS server (standard data)
11. Python: calculate 2D wave spectrum and wave parameters using the Maximum Entropy Method
12. Python: write wave spectra and wave parameters to NetCDF on THREDDS server (tailored data)
13. Python: perform range checks & difference checks on standard and tailored data
14. Send daily email with results of all checks and validations

Example: ADV measurements





Archiving

Archive: Waterinfo Extra (Rijkswaterstaat)
https://rwsprojectarchief.openearth.nl/downloads/houtribdijk/

Data report available on request:

Thank you

Initiator and client:

Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

Consortium for data management:

HKV LIJN IN WATER

Tauw

External users:

TU Delft

KIMA
Kennis- en Innovatieprogramma Marker Wadden

You?

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