WaterCoach

Hands-on at FEWS Anwendertreffen

Indra Marth

Gerben Boot

Maarten Smoorenburg

Simone de Kleermaeker

16-06-2023

Table of contents

- Why?

- What is a FEWS WaterCoach?

- Making a WaterCoach scenario
  - (Get a Stand Alone ready for WaterCoach)
  - Making a scenario + script
  - Making a localDataStore
  - Getting a configuration
  - Testing the scenario

- WaterCoach-on-the-fly

- Q & A

Deltares

Questions welcome – anything, any time

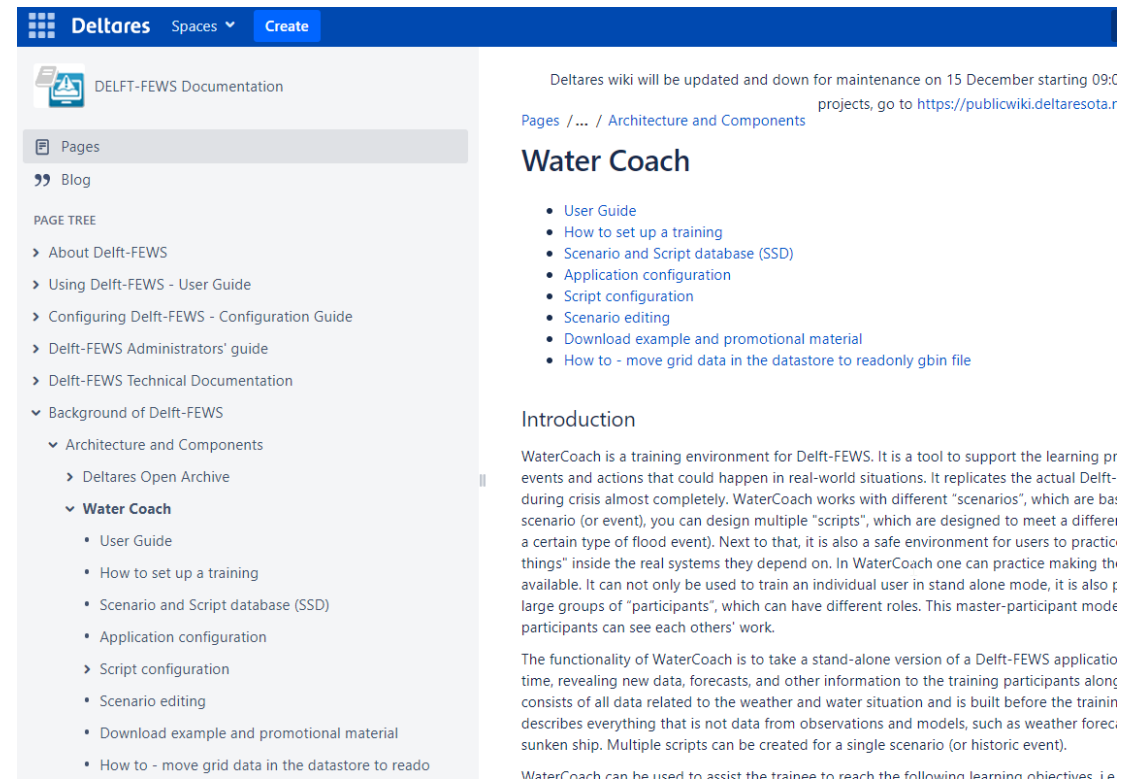# What will you <u>not</u> learn today?

What you will <u>not</u> learn today about WaterCoach

- How to set up participant mode (multiple users playing simultaneously)
- How to set up multi system mode (connecting WaterCoach sessions of multiple FEWS systems)
- Interactive scripts (call/messages/questions appearing as e.g. pop-ups)
- Adapt script to <u>learning objectives</u>
- Adapt scenario to <u>learning objectives</u> (e.g. by changing forecasts, observations or simulation results)
- Adding a <u>dictionary</u> that participants can look up words in
- Other features and use of the Open Archive
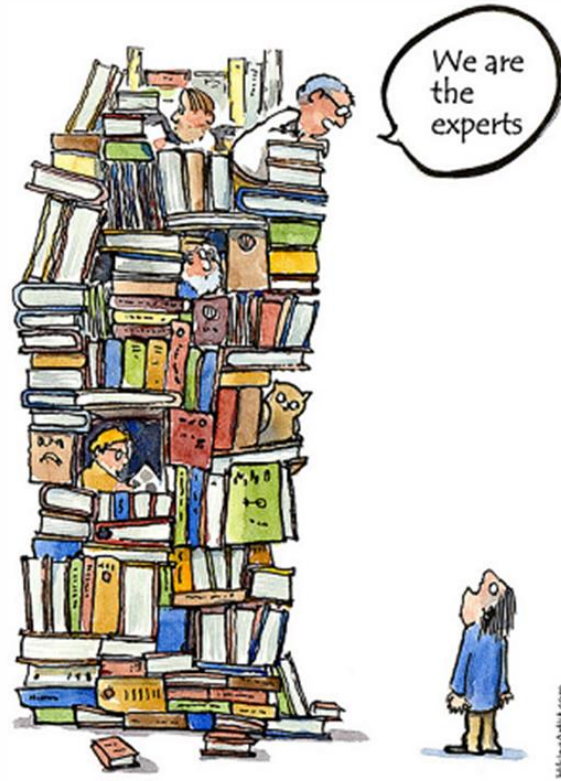
Deltares

Online references

1. Full documentation of all WaterCoach features

2. Conference papers on the WaterCoach

3. Description of WaterCoach used in a Dutch national exercise

4. Full 2 day training

[Water Coach - DELFT-FEWS Documentation - Deltares Public Wiki](...)

Deltares

WaterCoach - a FEWS serious game

WaterCoach - a FEWS serious game

Do I find it engaging, immersive, and fun?

Play

Serious Gaming

Can I use this in (or relate this to) the real world?

Do I retrieve any value from it?

Meaning

Reality
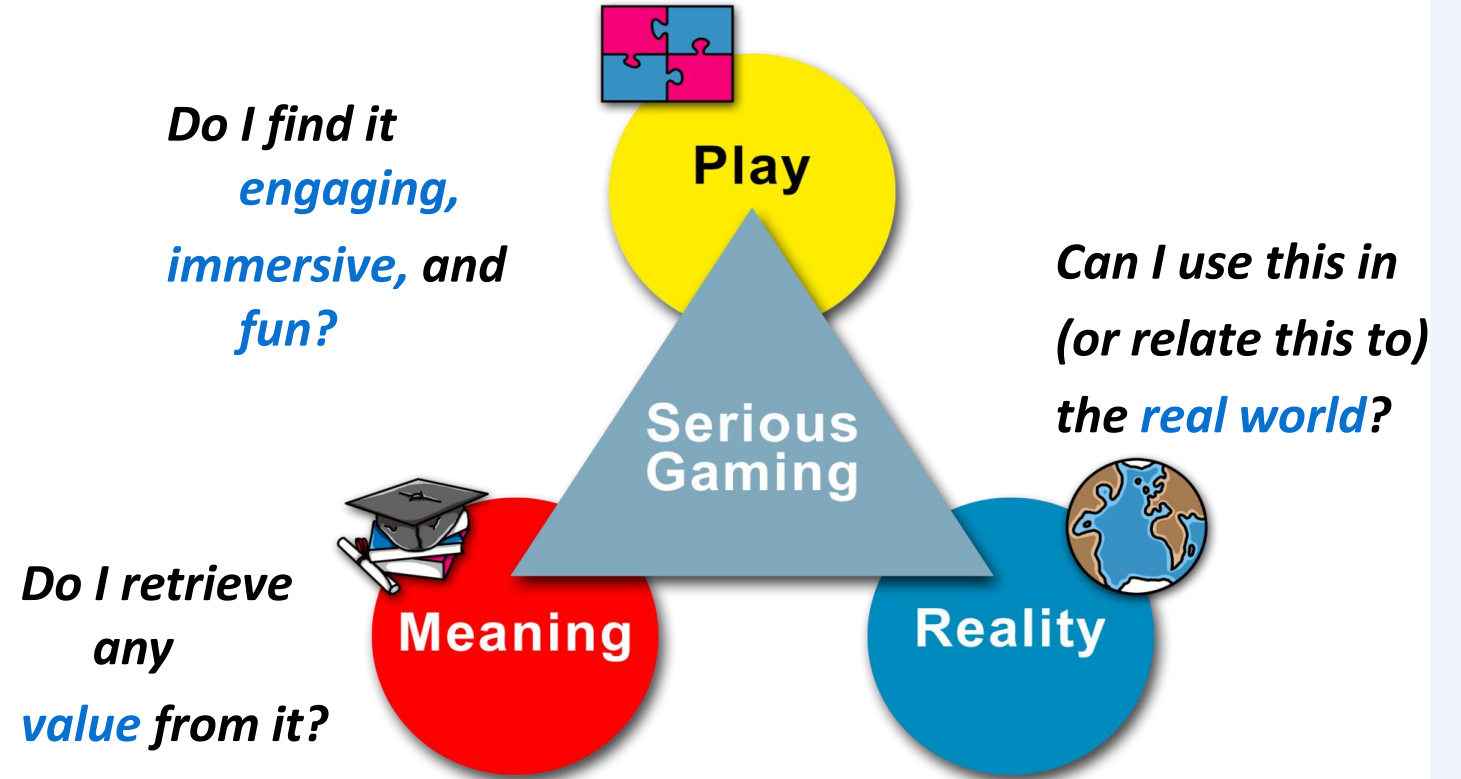
Detailed info and course material: https://publicwiki.deltares.nl/display/FEWSDOC/Water+Coach
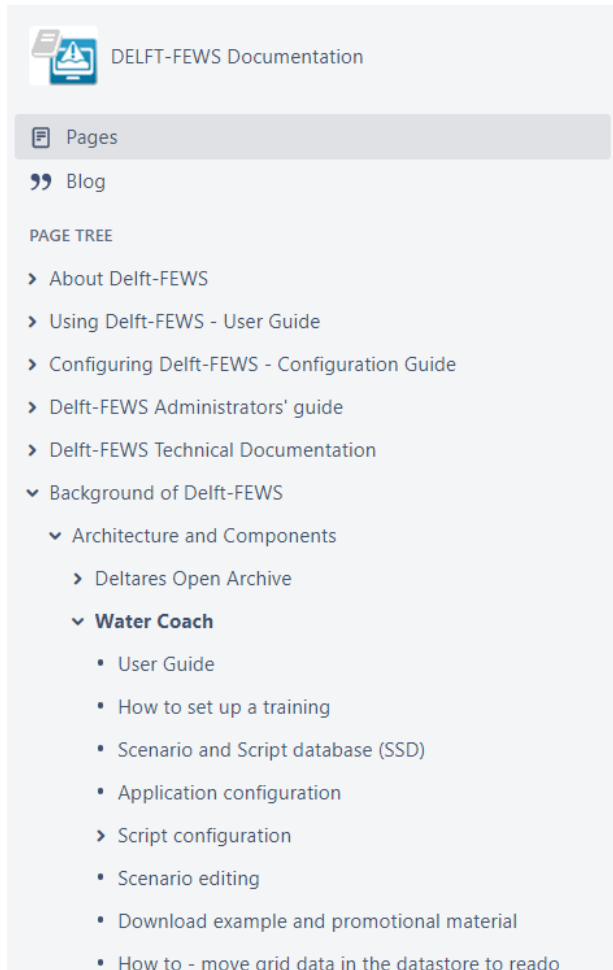
Deltares

WaterCoach – use cases

- **Train staff on using FEWS**
  (a.k.a. 'buttons course', as 1 person possible)

- **Practice forecasting in crisis situations**
  (flood events, follow procedures, discuss with others)

- **Event analysis**
  ('watch' an event to see what happened and learn from it)

Deltares

What is a WaterCoach?

Detailed on the FEWS wiki; https://publicwiki.deltares.nl/display/FEWSDOC/Water+Coach

WaterCoach standalone and participant mode

Standalone mode	Participant mode
Individual, indipendent parties	Dependent parties: master and participants
No general control	Changes in the master (e.g. next task) are automatically followed by participant
Forecasts are always only visible for the individual user	All forecasts made by the participants are visible to the master and vice versa
	All local runs (run from Forecasts -> Run segment Locally) are visible only to the participant, never to others.
Forecaster notes are always only visible for the individual user	All forecaster notes made by the participants are visible to the master and the other participants. Messages that are marked as read in one client will be marked as read in all clients.

Deltares

What is a WaterCoach?

Delft-FEWS and WaterCoach arranged side by side

Yellow border = Training Mode

System Time in dictated by WaterCoach

Observations in "the future" are hidden

WaterCoach sends messages to Forecaster Notes

•Water Coach 'clock' always on top
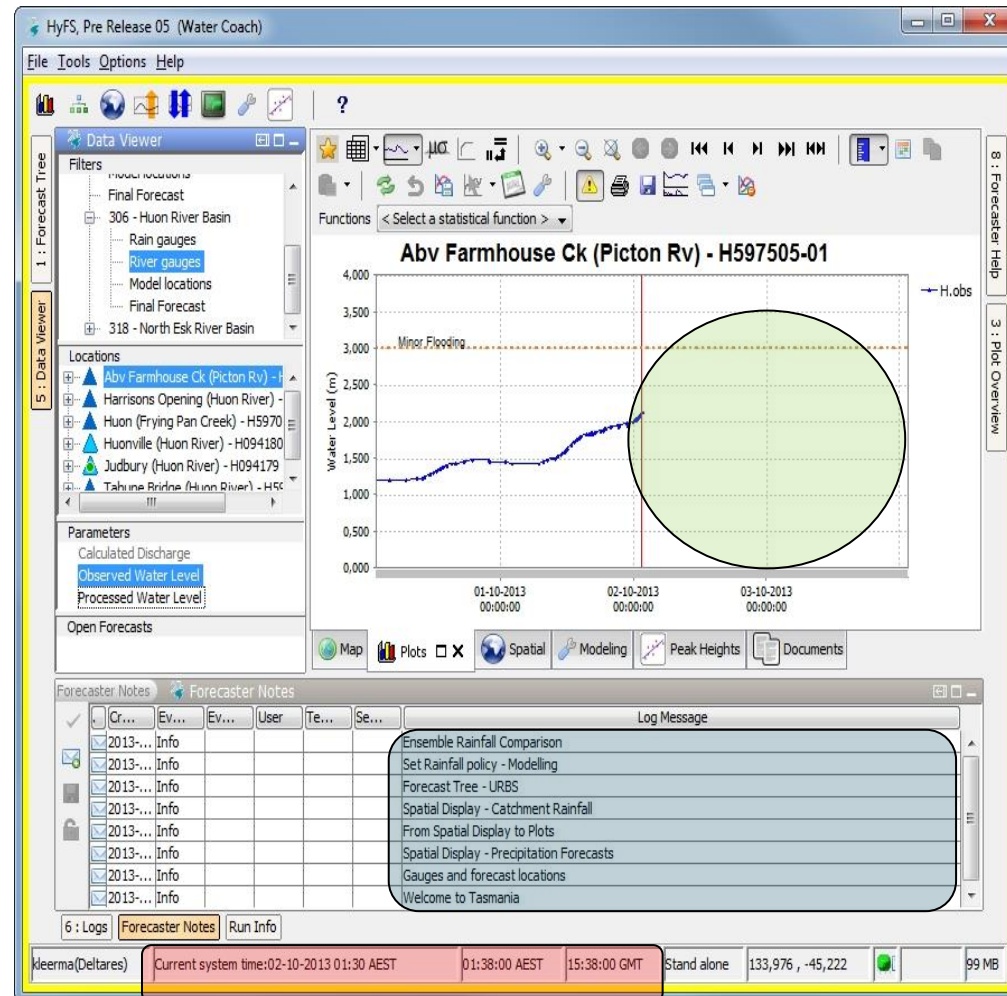
What is a WaterCoach?

WaterCoach consists of

- Scenario - weather and water
  - "Delft-FEWS localDataStore"
  - Change the weather? (requires dedicated tooling; not part of this course)

- Script - storyline that can be adjusted to aid the learning objective
  - Communication log
  - Published forecast
  - Interactive script? (not part of this course)

Deltares

Making a WaterCoach scenario + script

Details on wiki:
https://publicwiki.deltares.nl/display/FEWSDOC/How+to+set+up+a+training

1. Set up training environment folder (if not yet available); the so called Scenario and Script Database (SSD).

*"**The scenario/script database for the Water Coach is a directory containing an arbitrary number of scenarios/scripts.** A scenario consists of a FEWS database (the so-called local data store) that contains measurement data and model data, and **one or more script directories**. Each one of these script directories uses the same scenario (i.e. the local data store)."*

*"A **script is the story line and consists of all events that happen during the game**. Each subdirectory of the scenario directory that contains a file named script_config.xml is considered a script and will automatically appear in the list of scripts that can be selected by the user of the Water Coach."*

Deltares

Evaluation of exercise results

Learning will be based on feedback, not on a scoring system

Base feedback on

- comparison of player's forecast to
  - actual forecast
  - forecasts from previously or simultaneously played games
- choices made and conditions that were triggered
  - proper communication (via buttons)
  - no/proper use of reference manual
- All actions of the player within WaterCoach are logged!

Deltares

Evaluation of exercise results – Log messages

Log messages in <root_folder>\WaterCoach\WaterCoach_log\

```
22-06-09 14:35:02 GMT   2020-06-23 08:25:00 GMT   FEWS message: <html><b>Hint (Q2 - Precipitation accumulation):</b> Go to Worl
22-06-09 14:35:02 GMT   2020-06-23 08:25:00 GMT   FEWS message: <html><b>Answer (Q2 - Precipitation accumulation):</b> The loca
22-06-09 14:35:05 GMT   2020-06-23 08:25:00 GMT   Jumping to next event; setting simulation time to 2020-06-23 08:35:00 GMT
22-06-09 14:35:07 GMT   2020-06-23 08:35:00 GMT   Jumping to next event; setting simulation time to 2020-06-23 08:40:00 GMT
22-06-09 14:35:08 GMT   2020-06-23 08:40:00 GMT   Jumping to next event; setting simulation time to 2020-06-23 08:45:00 GMT
22-06-09 14:35:09 GMT   2020-06-23 08:45:00 GMT   Jumping to next event; setting simulation time to 2020-06-23 08:55:00 GMT
22-06-09 14:39:46 GMT   2020-06-23 08:55:00 GMT   Forecast frame activated.
22-06-09 14:40:40 GMT   2020-06-23 08:55:00 GMT   Forecast frame activated.
22-06-09 14:40:50 GMT   2020-06-23 08:55:00 GMT   Forecast column 'Answer' for row '3' published: yes.
22-06-09 14:40:50 GMT   2020-06-23 08:55:00 GMT   Forecast column 'Answer' for row '4' published: yes.
22-06-09 14:41:28 GMT   2020-06-23 08:55:00 GMT   Forecast frame activated.
22-06-09 14:41:45 GMT   2020-06-23 08:55:00 GMT   Forecast frame activated.
```

Deltares

Demo time!

Deltares

Make a WaterCoach

Stand Alone

Making a FEWS configuration – Augment with WaterCoach configuration

Full details are provided here: https://publicwiki.deltares.nl/display/FEWSDOC/Application+configuration

For a simple setup, the following steps are relevant.

1. **Required:** Adapt Explorer config in ..\config\SystemConfigFiles\Explorer.xml
   1. **Required:** Add WaterCoach panel to the explorerTasks:

```
<explorerTask name="WaterCoach">
 <displayConfigFileName>WaterCoachDisplay</displayConfigFileName>
 <toolbarTask>false</toolbarTask>
 <menubarTask>false</menubarTask>
 <allowMultipleInstances>false</allowMultipleInstances>
 <toolWindow>true</toolWindow>
 <loadAtStartup>true</loadAtStartup>
 <!- COMMENT: select true if configuration will only be used in
WaterCoach mode -->
</explorerTask>
```

Making a FEWS configuration – Augment with WaterCoach configuration

Full details are provided here: https://publicwiki.deltares.nl/display/FEWSDOC/Application+configuration

For a simple setup, the following steps are relevant.

1. **Required:** Adapt Explorer config in ..\config\SystemConfigFiles\Explorer.xml
   1. **Required:** Add WaterCoach panel to the explorerTasks

2. **Required:** add WaterCoachDisplay.xml to ..\Config\DisplayConfigFiles\ folder; example file on the wiki.
   1. **Required:** make sure that scenarioScriptDatabasePath has scenario's (e.g., %REGION_HOME%\WaterCoach\ScenarioScriptDatabase)
   2. **Optional:** Hide year from time information (but better is to shift time in the script_config.xml), e.g.:
      `<hideYear>true</hideYear>`
   3. **Optional:** amend `timeControl` buttons to liking
   4. **Optional:** define `experienceLevel` and possibility to change `level` during a session (`adjustLevel`)
   5. **Optional:** set `copyLocalDataStore` to *false* to allow faster testing of the scenario while developing; → default is *true*, such that upon starting a scenario, the localDataStore of the Scenario is copied to the localDataStore folder.

Deltares

Making a FEWS configuration – Augment with WaterCoach configuration

1. To test if WaterCoach is set up as desired, check if you have a WaterCoach panel on the top left.
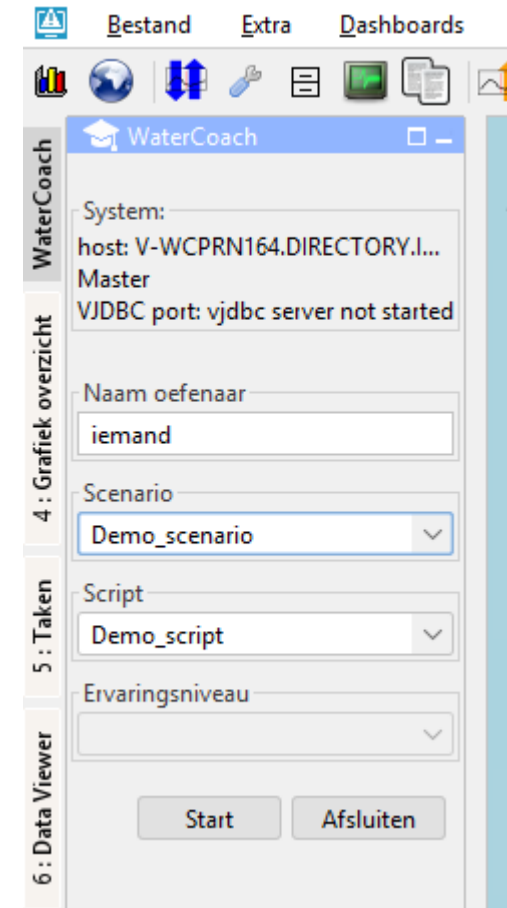

Deltares
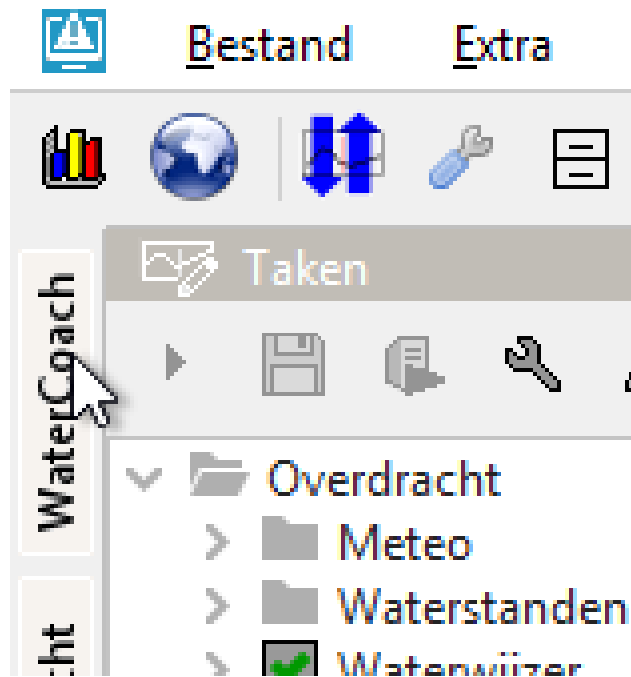
Making a FEWS configuration – Augment with WaterCoach configuration

1. To test if WaterCoach is set up as desired, check if you have a WaterCoach panel on the top left.

2. Click and see that a WaterCoach panel opens

Making a WaterCoach scenario + script

Details on wiki:
https://publicwiki.deltares.nl/display/FEWSDOC/How+to+set+up+a+training

1. Set up training environment folder (if not yet available); the so called Scenario and Script Database (SSD).

2. Add a folder for the scenario, e.g., 'Demo_scenario'

3. In this folder, add a script folder, e.g., 'Demo_script'

4. In the script folder, **add a script file called script_config.xml**

5. In the scenario folder, also add a localDataStore folder with the *local.fdb* file

```
ScenarioScriptDatabase
|-- storm surge March 10-13
|    |-- localDataStore
|    |    `-- local.fdb
|    |-- novice
|    |    |-- script_config.xml
|    |    |-- exercise1_EN.txt
|    |    |-- exercise1_NL.txt
|    |    |-- start_session_EN.txt
|    |    |-- start_session_NL.txt
|    |    |-- telephone_call_EN.txt
|    |    |-- telephone_call_NL.txt
|    |    |-- weather_map_March12_00hr.pdf
|    |    |-- weather_map_March12_12hr.pdf
|    |    `-- weather_map_March13_00hr.pdf
|    |-- advanced
|    |    |-- script_config.xml
|    |    |-- telephone_call.txt
|    |    `-- weather_map.pdf
`-- another storm surge
     |-- localDataStore
     |    `-- local.fdb
     `-- script1
          |-- script_config.xml
          |-- file1.pdf
          `-- file2.pdf
```

Deltares

Making a WaterCoach scenario + script

Details on wiki:
https://publicwiki.deltares.nl/display/FEWSDOC/How+to+set+up+a+training

1. Set up training environment folder (if not yet available); the so called <u>Scenario and Script Database</u> (SSD).

2. Add a folder for the scenario, e.g., 'Demo_scenario'

3. In this folder, add a script folder, e.g., 'Demo_script'

4. In the script folder, add a script file called script_config.xml

5. In the scenario folder, also add a localDataStore folder with the *local.fdb* file

6. **Optional:** add specific configuration (this course)

7. **Optional:** add other files needed for the script (not in course)

8. **Optional:** add specific modules as .zip files (not in course)

SSD including different (older) versions of the Config and Modules folder

```
ScenarioScriptDatabase
|-- scenario1
|    |-- localDataStore
|    |    `-- local.fdb
|    |-- script1
|    |    `-- script_config.xml
|    |-- Config.zip
|    |-- Modules.zip
`-- scenario2
     |-- localDataStore
     |    `-- local.fdb
     |-- script1
     |    `-- script_config.xml
     |-- Config.zip
     `-- Modules.zip
```
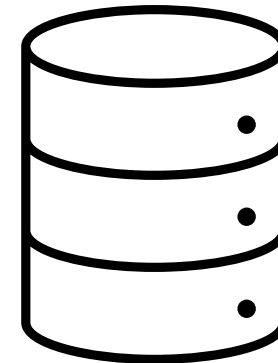
Deltares

Make a WaterCoach

Scenario

Scenario creation

How to fill the Delft-FEWS localDataSore?

- From archive
- Use saved LDS
- Run imports
- WaterCoach on the fly
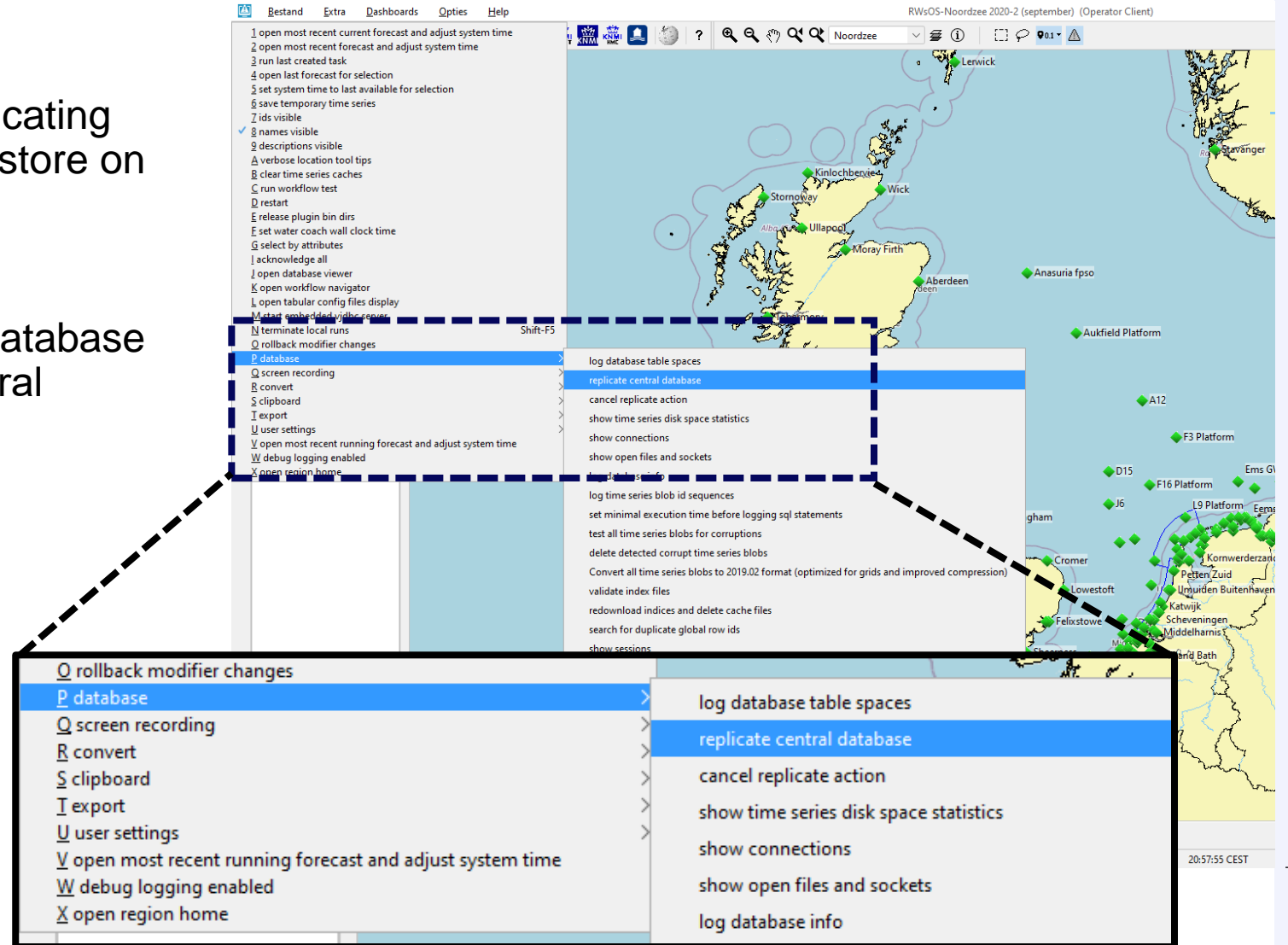
Scenario = localDataStore

Making a localDataStore – replicate from OC

A localDataStore can be made by replicating data from the central database to datastore on the local PC

Steps:

1. Open F12 menu, and navigate to database menu (P) and select 'replicate central database'

Making a localDataStore – replicate from OC

A localDataStore can be made by replicating data from the central database to datastore on the local PC

Steps:

1. Open F12 menu, and navigate to database menu (P) and select 'replicate central database'

2. Select data of interest (here mainly 12h of timeseries as there is no need to run models)

Deltares

Making a localDataStore – replicate from OC

A localDataStore can be made by replicating data from the central database to datastore on the local PC

Steps:

1. Open F12 menu, and navigate to database menu (P) and select 'replicate central database'

2. Select data of interest (here mainly 12h of timeseries as there is no need to run models)

3. Set place to save the datastore
   1. For most users, firebird is the preferred database type, so choose that
   2. store as local.fdb as that is the filename a FEWS StandAlone will look for.
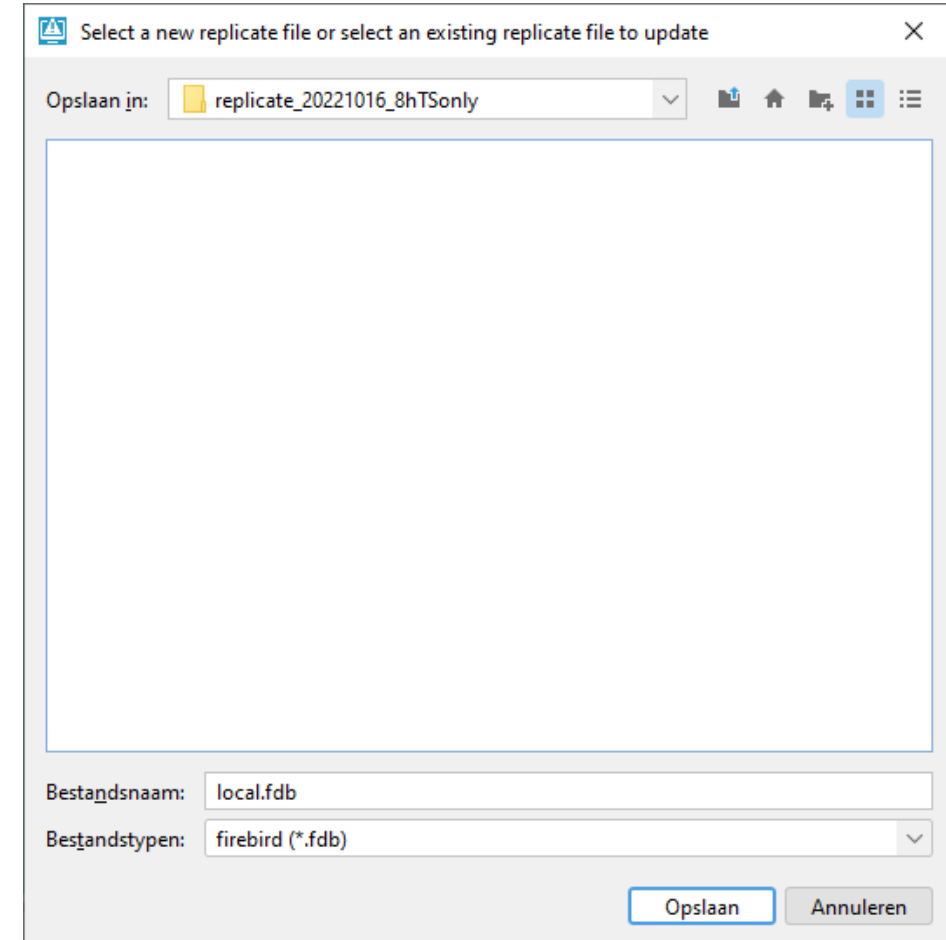
→ *For today, save to regionHome\WaterCoach\ScenarioScriptDatabase\Demo_scenario\localDataStore*

Select a new replicate file or select an existing replicate file to update

Opslaan in: replicate_20221016_8hTSonly

Bestandsnaam: local.fdb

Bestandstypen: firebird (*.fdb)

Opslaan   Annuleren

Deltares

Making a localDataStore – data from Open Archive

The Archive Catalogue Display can help to easily import data into an (empty) localDataStore in 2 ways:

1) Manual selection of relevant files in the 'search and download' tab
2) Importing data of a selected tagged event in the 'search and download events' tab

***From scratch, or appending to existing database?***

Starting FEWS Stand Alone with empty localDataStore folder to start with empty localDataStore

Start FEWS Stand Alone with localDataStore of interest to add data to that

Deltares

Making a localDataStore – data from Open Archive

Manual selection of relevant files in the 'search and download' tab

1) Open the Archive Catalogue

2) Go to 'search and download' tab

3) Use fields to narrow down the data of interest
   E.g.,
   1) Observations
   2) External forecasts
   3) Forecasts (simulation with, if archived, model states)

4) Press the magnifier glass to search

5) Use double-click on cells to filter even further

6) Select data of interest and press button to import the data into the localDataStore

Deltares
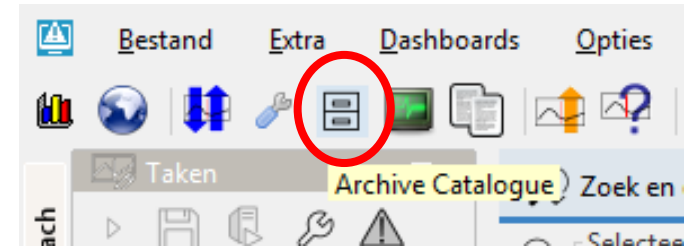
Making a localDataStore – data from Open Archive

Using event tagging

FEWS supports tagging events to group data for different use cases:

1. Easy downloading a group of data belonging to an event
2. Showing historical event observations in FEWS OC for reference
3. Preventing data from standaard archive clean-up actions

More details on event types can be found on the [wiki](#).

Typically, it is recommended to use the WaterCoach event type, which by default marks the following data types:
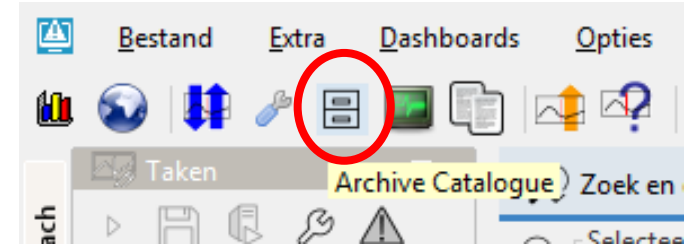
Observations
External forecasts (meteo + hydro)
Own simulations (if relevant: include modifiers and model states)
Forecaster notes
Reports / products

Deltares

Making a localDataStore – data from Open Archive

Marking an event (typically done in an OC, shortly after an event!)

Open the Archive Catalogue

1) Go to 'make new event tab'

2) Press the '+' sign on the left side of the panel

3) Choose area of interest

4) Choose event type 'WaterCoach Event'

5) Select start and stop period (after inspecting data in the OC)

6) Give it a name (and, optionally, a description)

7) Press save button

8) Press the upload arrow, and confirm this in upcoming dialogue (the event will not turn green)

Deltares

Making a localDataStore – data from Open Archive

Marking an event (typically done in an OC, shortly after an event!)

Open the Archive Catalogue
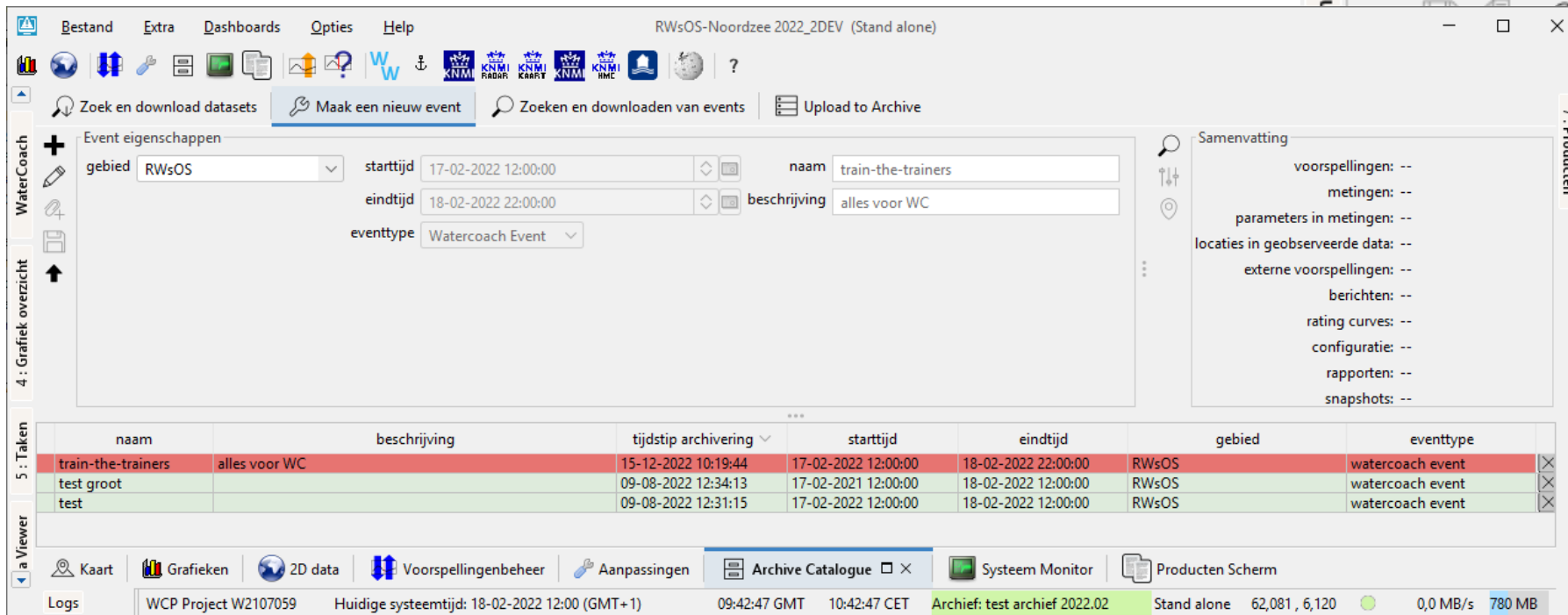
1) Go to 'make new event tab'

2)

3)

4)

5)

6)

7)

8)

Making a localDataStore – data from Open Archive

Marking an event (typically done in an OC, shortly after an event!)

Open the Archive Catalogue
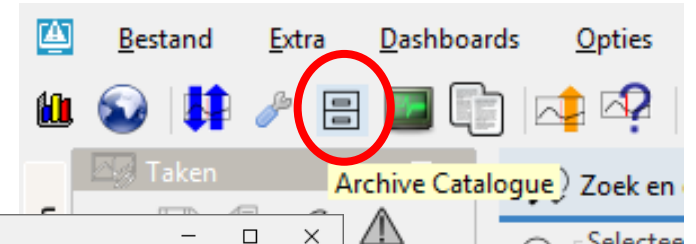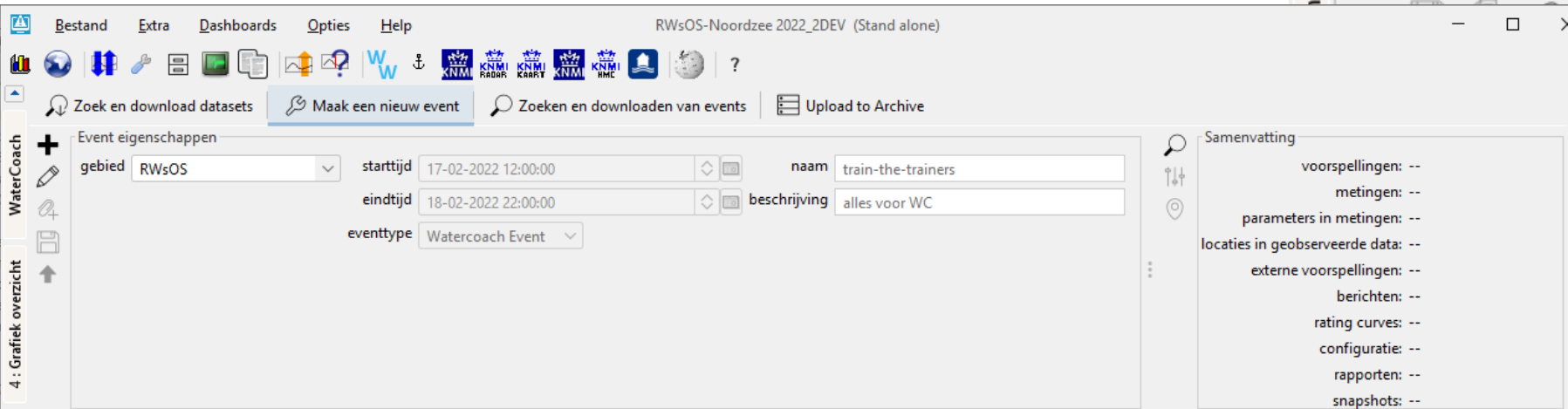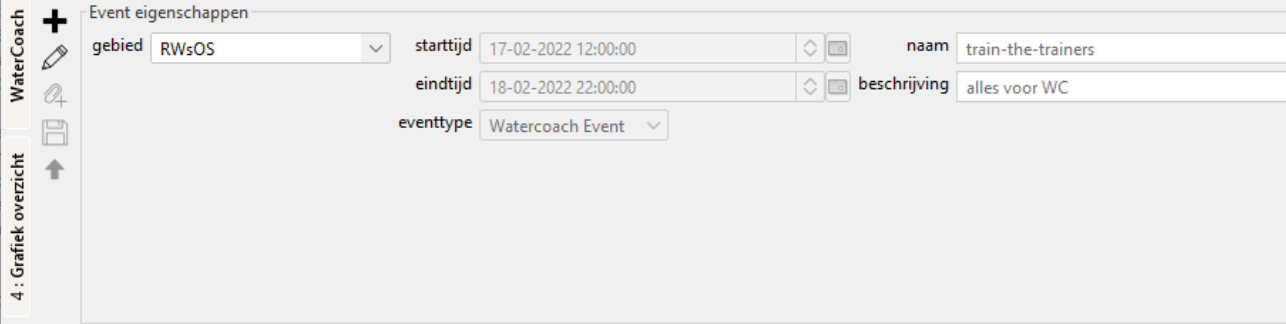
1) Go to 'make new event tab'

2)

3)

4)

4)

5)

6)

7)   green)

8) You can edit this event later by pressing the pencil. Requires, again saving & uploading.

Making a localDataStore – data from Open Archive

Marking an event (typically done in an OC, shortly after an event!)

Ope

1)

2)

3)

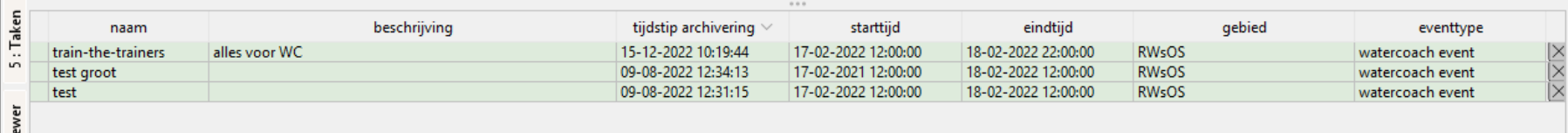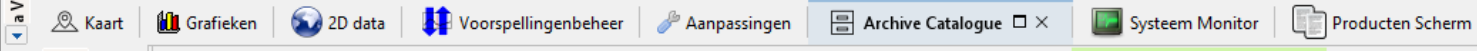4)

One can even add attachments to the event, like some report, or notes on why this period was marked as event

4)

5)

6)

7) Press the upload arrow, and confirm this in upcoming dialogue (the event will not turn green)

8) You can edit this event later by pressing the pencil. Requires, again saving & uploading.

Deltares

Making a localDataStore – data from Open Archive

Downloading and importing event data

1) STRONGLY RECOMMENDED:
   Make sure you have have (restarted) the FEWS Stand Alone with empty localDataStore
   → *To have a clean setup, and don't risk corrupting a database that is dear to you*

2) Go to 'search and download events' tab

3) Use the area drop-down menu and start/end times to filter out event(s) of interest,
   → press the magnifier glass to apply the settings

4) Select event

5) Two options:

Exact location is configured in
<regionHome>\config\DisplayConfigFiles\ArchiveModuleDisplay.xml,
with $$ tags resolved in the <regionHome>*_global.properties file

   1) Press 'download and import data' to get <u>all</u> event data in the localDataStore
   2) Press 'download data' button to download <u>all</u> event data to the ´ARCHIVE_DOWNLOAD_FOLDER´ for inspection/cleanup before running the import manually

→ Option 2 can be useful if part of the data is not of interest to you, like model states, large NWP grids, etc. Remove the files/folders that you don't need including the accompanying XML files.

Deltares

Making a localDataStore – data from Open Archive

Importing data downloaded for the event (option 2 previous slide)

1. Start the manual forecast display
2. Move cursor to task panel and press F12 to see more options
3. Choose option 3
4. Search or type 'Archive Import' and select
5. Choose T0, that is after the last date/time of the event
6. Press 'run'
7. FEWS will report when finished

N.B. The files are removed after the import!!!
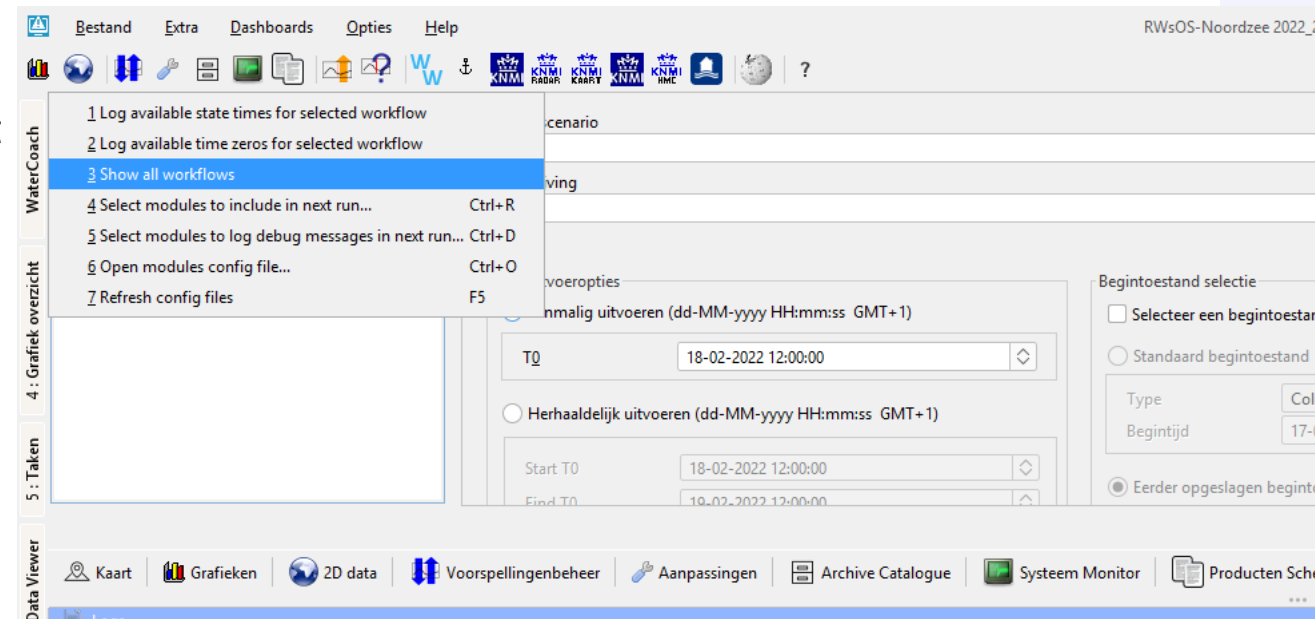
Making a localDataStore – data from Open Archive

Last steps

1. Close FEWS Stand Alone used for to make the localDataStore

2. Move/Copy the localDataStore to the Scenario folder in the ScenarioScript database dir, etc.

Deltares

Demonstration of the Script - Components

The story

- Tasks/actions → imports, reports etc.
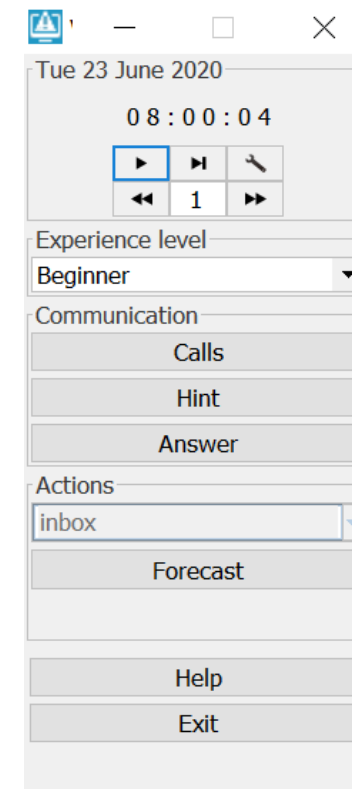
- Questions → test the tasks/actions
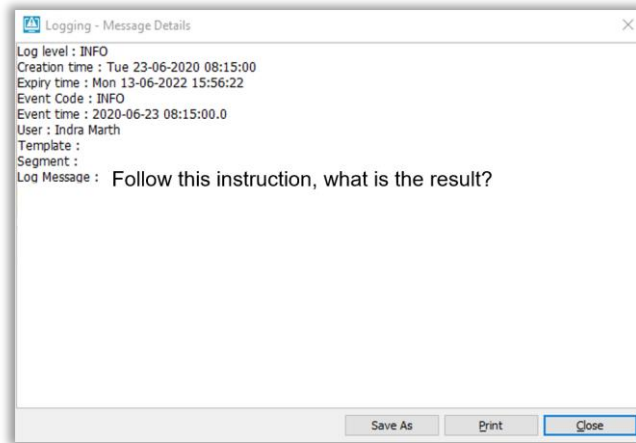
- Calls → mimic reality, additional information

The realization

- Hint → help with tasks/actions or questions

- Answer → gives a preconfigured answer
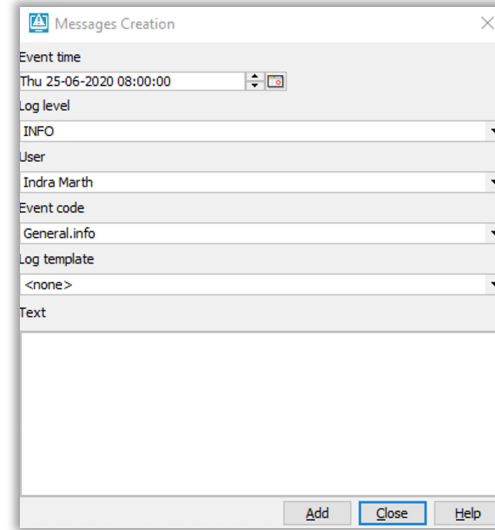
- Forecast → to fill in and publish answers

Deltares

Demonstration of the Script – Communication tools
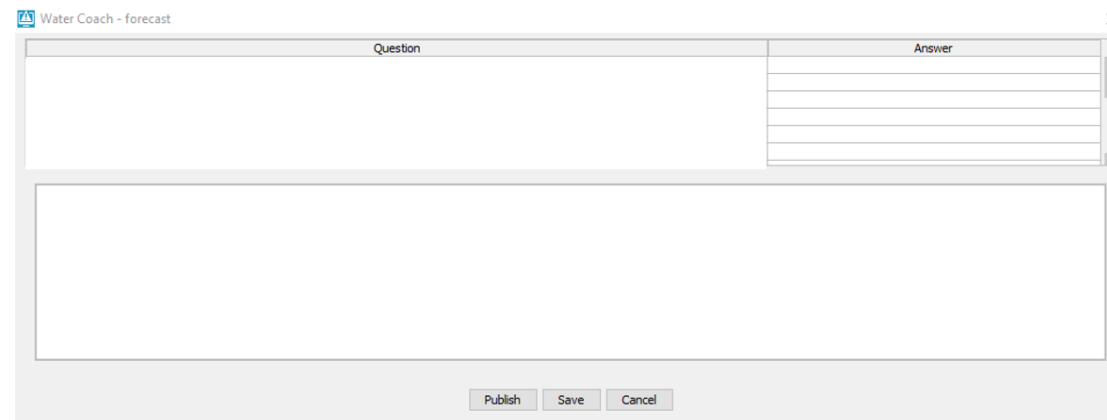
Messages (input)


```
Logging - Message Details                                    ×
Log level : INFO
Creation time : Tue 23-06-2020 08:15:00
Expiry time : Mon 13-06-2022 15:56:22
Event Code : INFO
Event time : 2020-06-23 08:15:00.0
User : Indra Marth
Template :
Segment :
Log Message :   Follow this instruction, what is the result?


                          Save As        Print        Close
```

Message creation (output)

```
Messages Creation                                            ×
Event time
Thu 25-06-2020 08:00:00
Log level
INFO                                                         ▼
User
Indra Marth                                                  ▼
Event code
General.info                                                 ▼
Log template
<none>                                                       ▼
Text


                              Add      Close      Help
```

Calls (input)

Your phone rings!
Please pick it up by pressing the "Calls" button!

Forecast (output)

```
Water Coach - forecast                                       ×
        Question                                Answer




                   Publish   Save   Cancel
```

My own scripts - Outline

The script is a story line.

Thus it is relatively easy to make several variations of a script.

The learning objectives should be leading in this process.

<u>Example</u>

- Meteorological forecaster communication can be based on ensemble members of the NWP.

- These can be pretty extreme and also quite different from the "observed" outcome.

- This is an easy way to modify the interaction in a realistic way.

Make it interactive!!

Deltares

My own scripts - Outline

Get started with your own script:

- What are the learning objectives? Tailor script for this.
    - Button course
    - Communication
    - Make a forecast
- How can you use the possibilities of the Water Coach script?

    - Stories / communication buttons

    - Experience levels

    - Forecast table

    - Conditions

Deltares

My own scripts - Content

- Messages used in scripts can be based on actual data.
- Define methods or procedures to save relevant data, such as:
  - E-mails,
  - Phone calls with meteorological forecasters,
  - Discussion within the team,
  - Forecasts,
  - Evaluation of the team afterwards,
  - After event analysis, including comments on model performance in the specific situation
 - Reports
- Single user or multi-user?

Deltares

Making a WaterCoach script

Details on wiki:
https://publicwiki.deltares.nl/display/FEWSDOC/Script+configuration

The example file on the wiki has many fields that are optional. These are here marked in blue.

Relevant option for many users: shift the scenario in time by setting the <u>display</u> start time, e.g.:

```
<displayStart date="2024-10-16"
time="15:00:00"/>
```
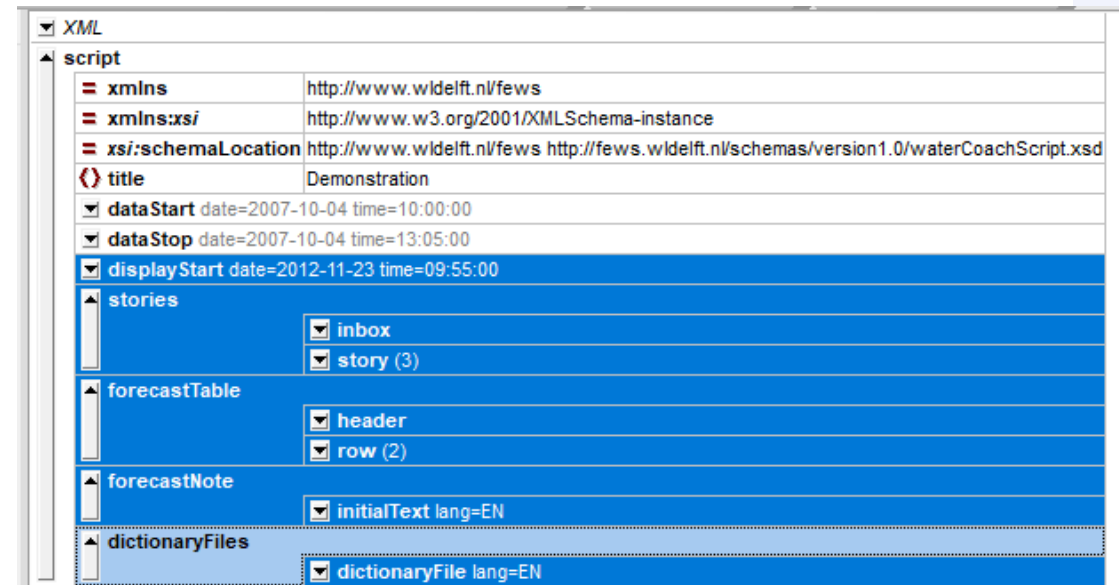
Getting a FEWS configuration

Step 1: Get a configuration

Options:

- Copy of current live system's configuration

- Download from Open Archive

- (get from repository; not part of this course)

Step 2: Augment with WaterCoach configuration

Deltares

Getting a FEWS configuration – export current configuration from OC

The current configuration can be exported from the OC and saved to a place on the PC

Steps:

1. F12 menu, Export (T), select 'default config as zip file.'

2. Choose place to save the file

N.B.: If it is not needed to <u>run</u> models, one can empty the subfolders 'ColdStateFiles' and 'ModuleDataSetFiles' later
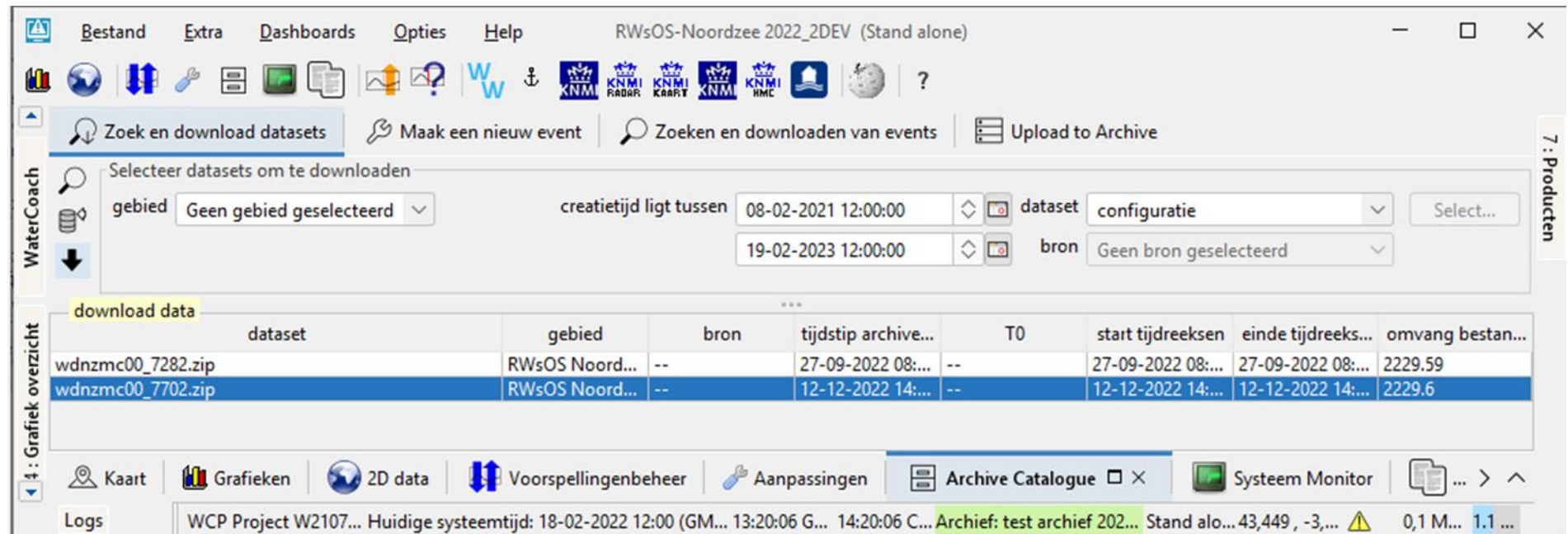
→ Move or copy as config.zip to the relevant folder in the ScenarioScriptDatabase ([see this slide](#))

Deltares
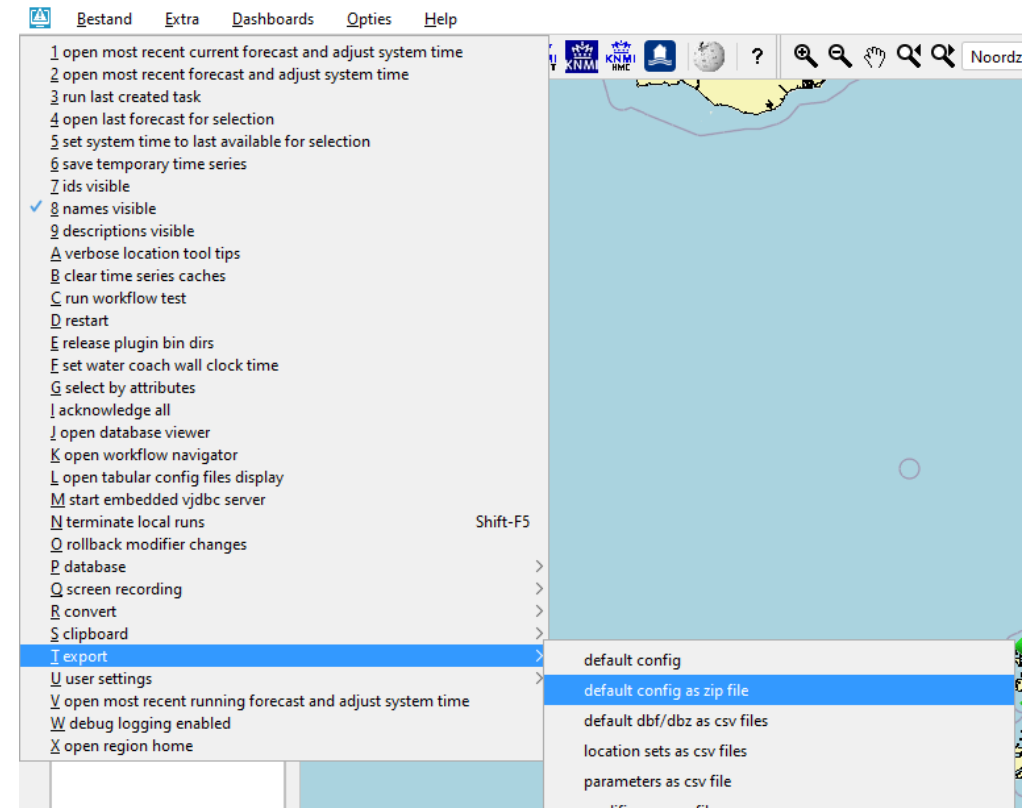
Getting a FEWS configuration – download from Open Archive

At Rijkswaterstaat, a daily routine will be scheduled at night, to check if the FEWS configuration was changed, and export the configuration as a zip file to the Open Archive.

These configurations can be downloaded through the FEWS **Archive Catalogue** in your Stand Alone.

Getting a FEWS configuration – download from Open Archive

To get the data:

1) Open the search and download tab

2) Adapt area, time span

3) Set dataset type to 'archive'

4) Search

5) Select

6) Download

!

If button 'download and import' it used, a new FEWS instance is started in c:\fews\<archive_download folder>\configuration\tempRegionHomes\

!

Getting a FEWS configuration – download from Open Archive

To get the data:

1) Open the search and download tab

2) Adapt area, time span

3) Set dataset type to 'archive'

4) Search

5) Select

6) Download

Download results in a .zip like this :
c:\fews\<archive_download_folder>\configuration\config\rwsos.noordzee\20221014\
wdnzmc00_7702\wdnzmc00_7702.zip
(with accompanying metadata.xml that the archive catalogue needs for indexing;
this file is not needed for making a WaterCoach)

7) Copy as config.zip to the relevant folder in the ScenarioScriptDatabase (see this slide)

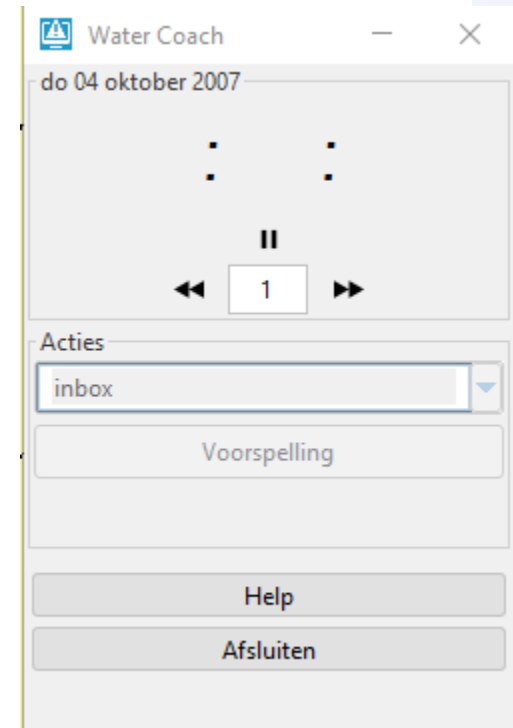**Deltares**

Testing the scenario

1. Open the WaterCoach panel

2. Test the scenario by adding a name for the participant and press '*start*'
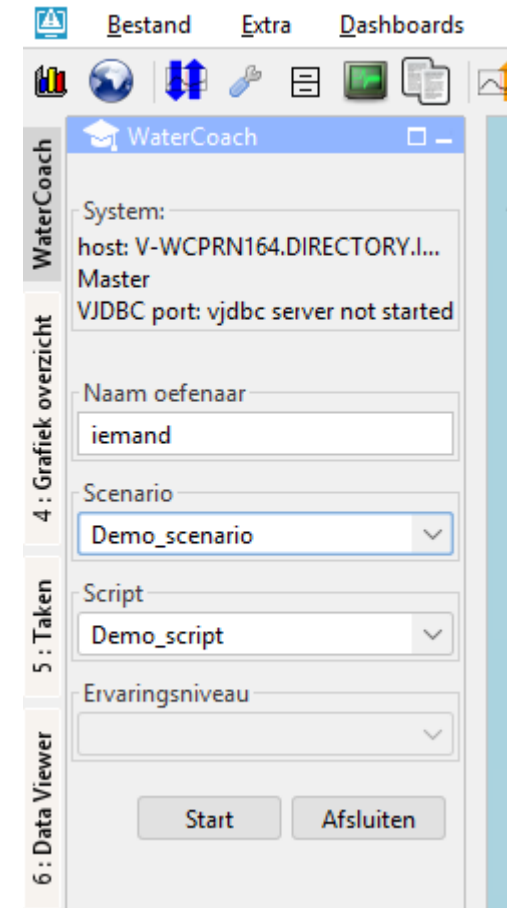
Making a FEWS configuration – Augment with WaterCoach configuration

1. Open the WaterCoach panel

2. Test the scenario by adding a name for the participant and press '*start*'

3. While you wait for FEWS to prepare the session the WaterCoach clock is empty
   a. Particularly if a large localDataStore needs to be copied, this may take a while

Making a FEWS configuration – Augment with WaterCoach configuration

1. To test if WaterCoach is set up as desired, check if you have a WaterCoach panel on the top left.

2. Click and see that a WaterCoach panel opens

3. Test the scenario by adding a name for the participant and press '*start*'

4. While you wait for FEWS to prepare the session the WaterCoach clock is empty

    a. *Particularly if a large localDataStore needs to be copied, this may take a while*

5. When fully started, a yellow border appears, and time starts to progress

Deltares
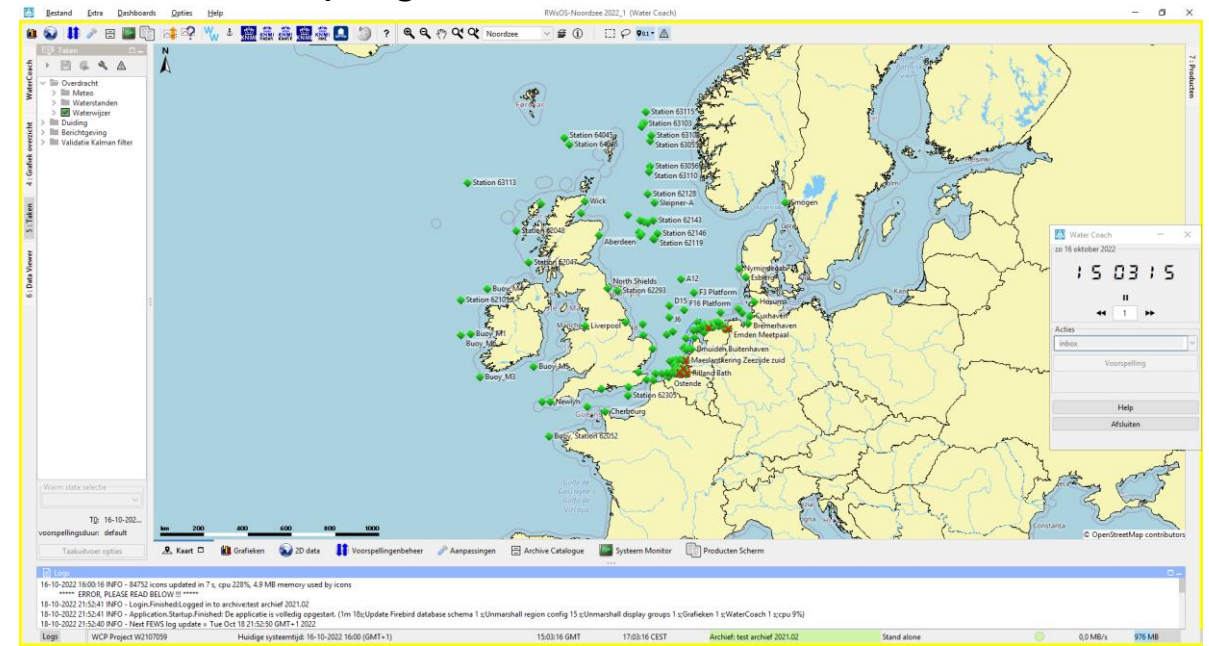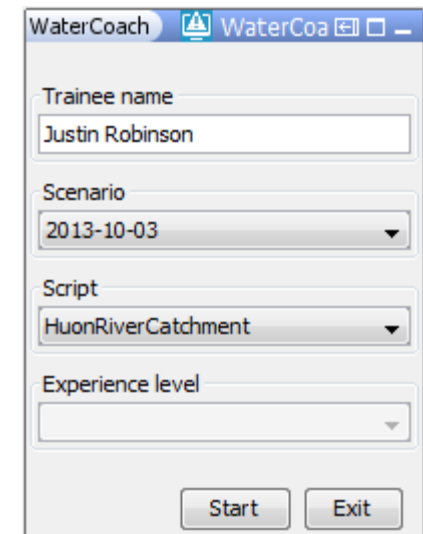
WaterCoach on the Fly – What is it?

A **scenario** consists of data, preferably **realistic** data

The FEWS Archive Catalogue Displays can be helpful here; steps:

1. **Tag an event** in the OC; relevant data is marked in the catalogue
2. Open an **SA with empty localDataStore**
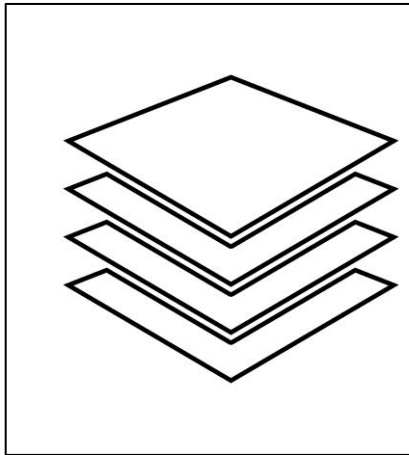3. **Select** the **event** and **import the data**

Next steps:

4. Make a **script** (XML); can be just exercise title, start and end time
5. **Store** script with configuration and localDataStore in dedicated **folder structure**
6. Open WaterCoach panel and select the script of interest

Deltares

WaterCoach on the Fly - What is it?

A **scenario** co...sists of data, ...referabl... **realistic** data

The FEWS Ar... ...an be helpful here; steps:

...logue

4. Make a **s**... ...ercise title, start and end time

5. **Store** scri... ...ocalDataStore in dedicated **fold...**

6. Open Wat... ...the script of interest

Deltares

Q&A,
feedback,
closure

Contact

🏠 www.deltares.nl 🐦 @deltares in linkedin.com/company/deltares

✉ info@deltares.nl 📷 @deltares f facebook.com/deltaresNL

Deltares

The Open Archive – How?

Summary of FEWS' Open Archive solutions

Deltares