


Delft-FEWS Basic Configuration Course

7 July – 11 July 2014
Deltares, Delft

Time schedule, day 1

09:30	<i>Coffee</i>	
10.00	<i>Introduction to Delft-FEWS</i> <ul style="list-style-type: none"> • Forecasting (systems) • Delft-FEWS concepts and components 	Simone
11:15	<i>Overview and basic configuration</i> <ul style="list-style-type: none"> • Configuration and XML files • Basic configuration files • Static configuratiion files • Tools 	Simone
12:30	<i>Lunch</i>	
13:30	<i>Overview and basic configuration (continued)</i>	Lora



Time schedule, day 2

09:00	Coffee	
09.30	<i>Live systems</i> <i>How to run a model in FEWS</i> <ul style="list-style-type: none"> • Importing data • TimeSeriesSets • Thresholds • Presentation of data in FEWS • Importing gridded data 	Simone
12:30	Lunch	
13:30	<i>How to run a model in FEWS (continued)</i> <ul style="list-style-type: none"> • Processing data 	Lora



Time schedule, day 3, 4, 5

09:00	Coffee	
09.30	<i>Coupling external models with FEWS</i> <ul style="list-style-type: none"> • FEWS External Modules/Models • Using Module Configuration Templates • Extracting series from Gridded Data • Issues when using Grid data • Risc-kit example configuration • Build your own model 	Lora, Simone
12:30	Lunch	
13:30	<i>Risc-kit configuration</i> <ul style="list-style-type: none"> • Build your own model (continued) 	Lora, Simone



Intrductions

- Lecturers:

- Simone De Kleermaeker
- Lora Buckman



Simone



Lora

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Introduction to Delft-FEWS

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Deltares & (flood) forecasting

- . Floods, droughts & operational management
- . Water quality (incl. spills) and ecology (e.g. algae blooms)
- . Peat fire
- . Levee strength
- . Groundwater modelling
- . → lead time

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Forecasting... discharge at Lobith (Rhine)

Monitoring
- precipitation
- waterlevels

Detection → **Forecasting** → **Warning** → **Response**

Forecasting receives input from:

- data acquisition
- data validation (errors/gaps)
- running scenarios (manipulating input)
- comparing output runs (graphs/tables)
- approving a forecast
- quality stamp
- warning & dissemination

Forecasting also receives input from:

- water to river: Precipitation + rainfall-runoff model(s) + snow melt
- water in river: Hydrodynamic model (river itself + tributaries)

Warning receives input from:

- collect 'model' data
- run model(s)

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Forecasting...

- . Aspects
 - many individual steps/operations
 - use different tools/techniques/software (telemetry, meteo, models)
 - time-consuming
 - availability of an 'operator'
- . Results
 - (early) information and data about natural behaviour / events
 - action(s): warning/evacuation

To enable all this: Delft-FEWS



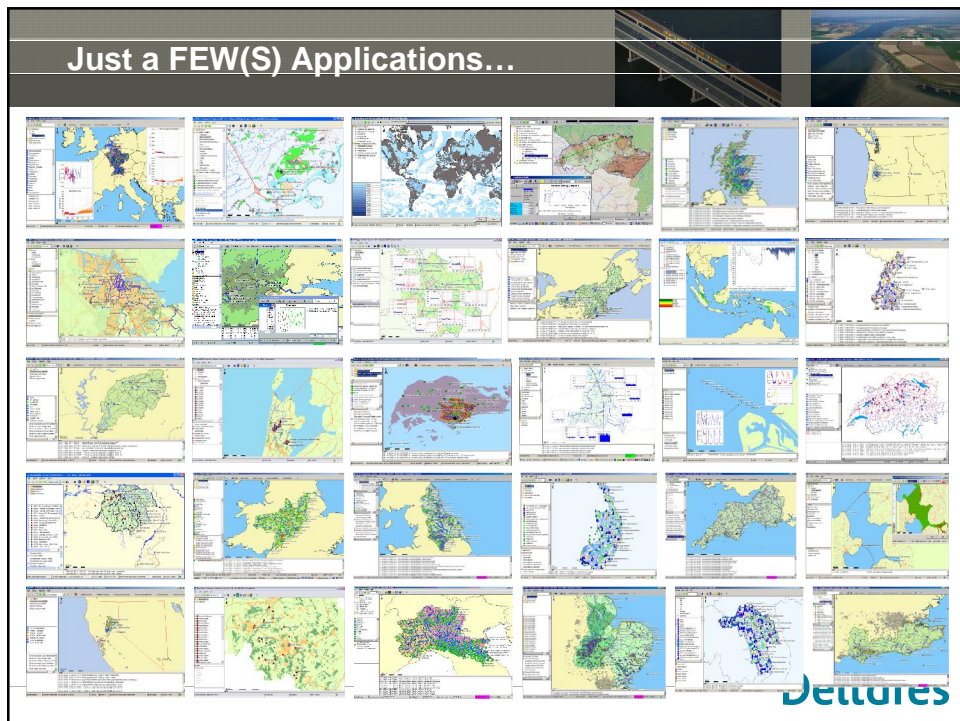
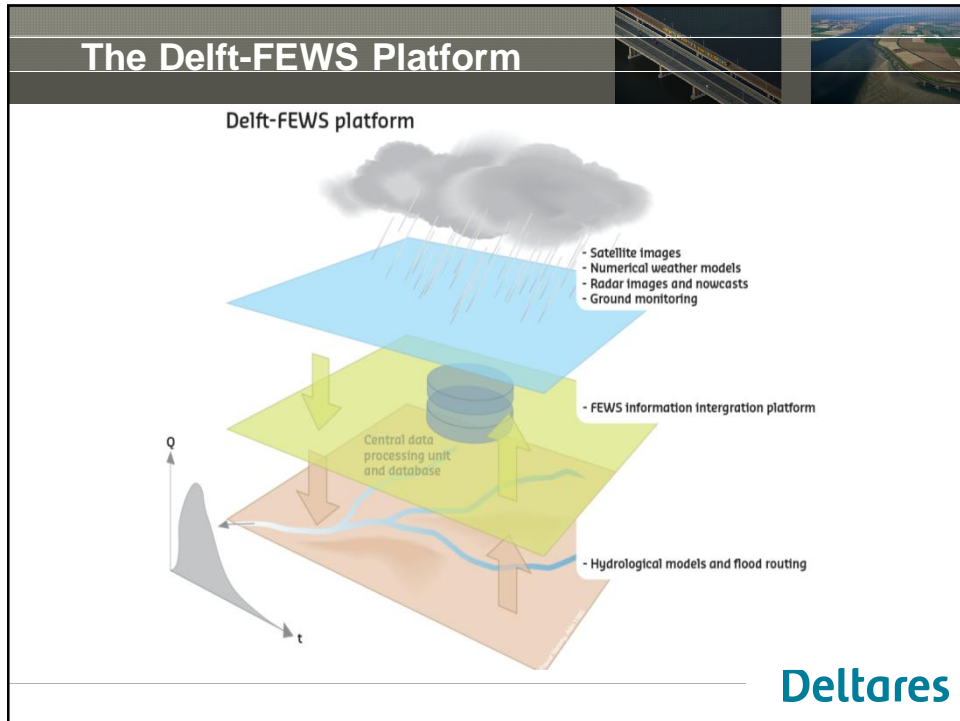
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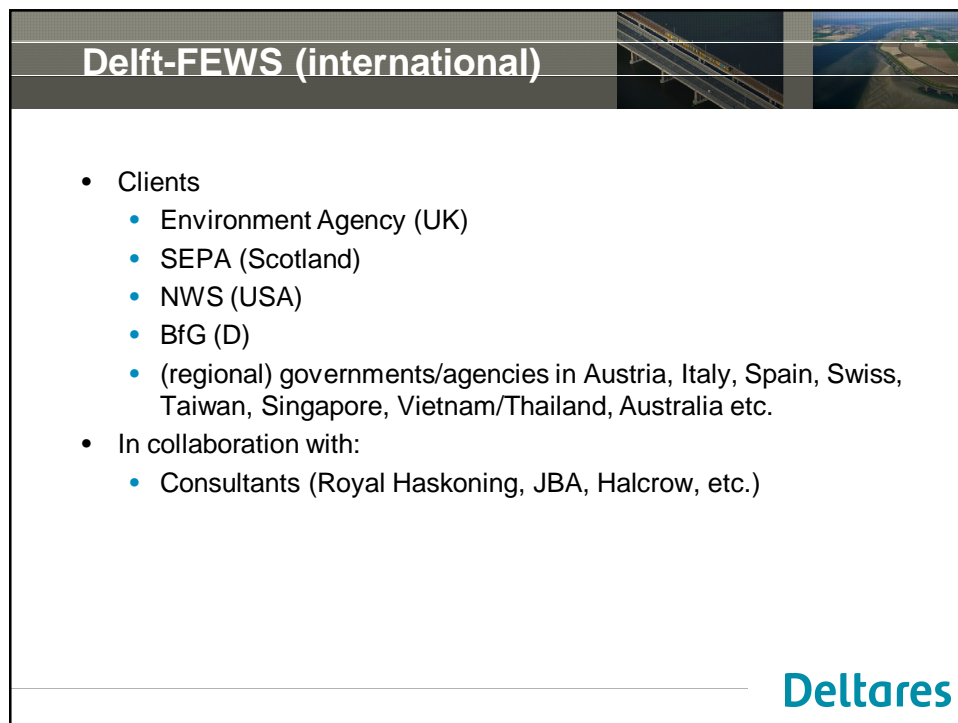
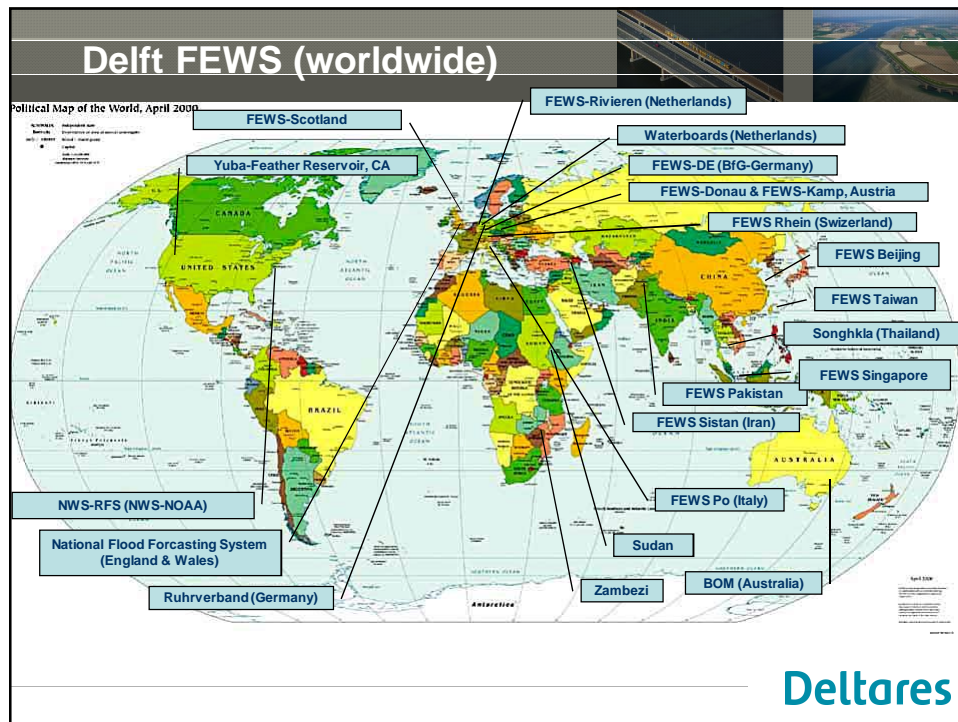
Not only forecasting...

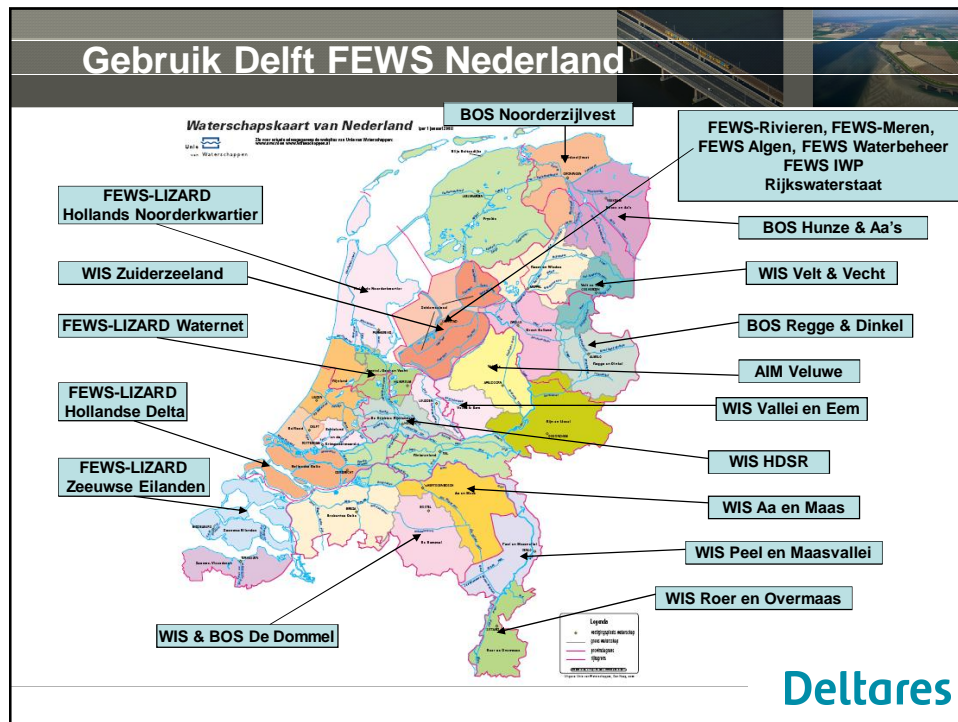
Delft-FEWS also suitable as a:

- Platform for (long term) storage of Water Information (WIS)
 - Waterboards systems
- Platform for Optimization and Real Time Control
 - ISA HW (WSHD, NL)
 - BPA (Portland, USA)
 - Tam Tam (Almere)
- Platform for running (long term) models/scenarios
 - Deltamodel
- Platform for Automatic Data Conversion
 - DCM module

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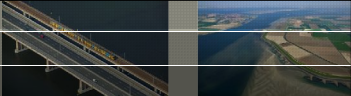


Delft-FEWS (NL)


- Clients
 - Municipalities
 - Waterboards
 - Ministry of PW & Watermanagement (Waterdienst)
- In collaboration with:
 - NL Consultants (HKV, Nelen & Schuurmans, Hydrologic, DHV, ...)
 - IBM (Flood Control 2015)
 - ...

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Delft-FEWS User Community




- USA (NWS)
- Canada
- UK
- Netherlands
- Germany
- Suisse
- Italy
- Austria
- Spain
- Singapore
- Taiwan
- Mekong River Commission
- Australia
- Sudan
- Georgia
- Azerbaijan
- Zambezi



○ operational service
○ operational, status unknown
○ in development

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Relation with Delft-FEWS User Community...



- Longterm relation & commitment
- Looking for the added value (science based development & consultancy)

Delft FEWS Policy...

- Focus on implementation & development of forecasting systems → taking responsibility in this process!
- Software is carrier of knowledge (free but no freeware) → high quality software required
- Guarantee longterm support commitment
- Financing further science & software development by user community (ad-hoc alliances initiated by Deltares) & own R&D

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NL: Waterdienst applications

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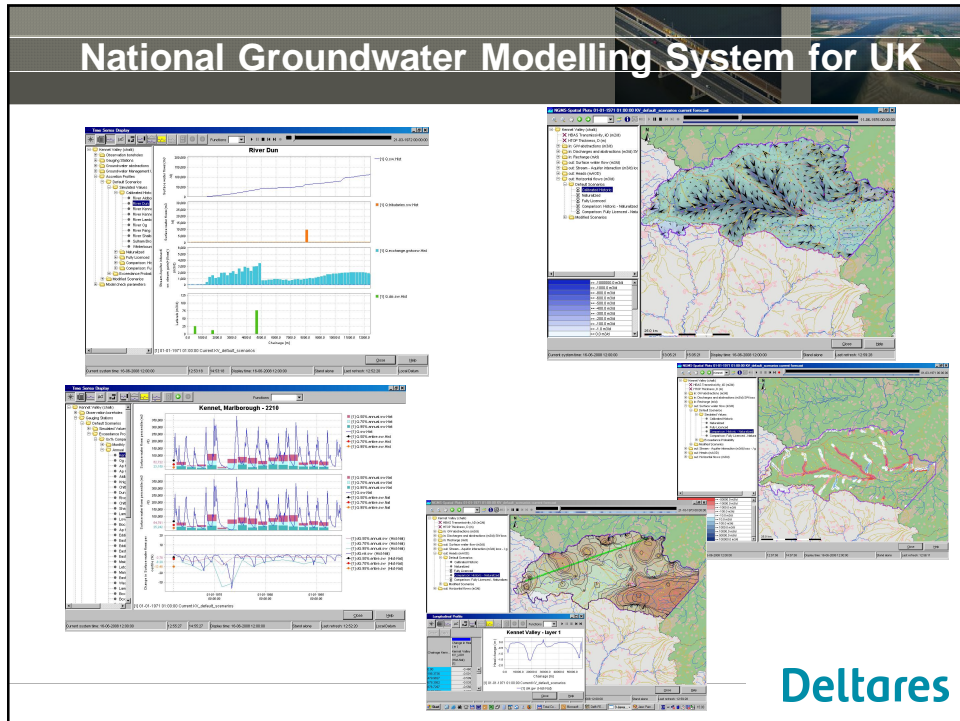
Community Hydrologic Prediction System (CHPS)

National River Forecasting System for...

- National Oceanic & Atmospheric Administration (NOAA)
- National Weather Service (NWS / OHD)
- 13 River Forecast Centers (RFC)
 - Currently: 7 RFC operational using FEWS

Click RFC area for local information

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Delft-FEWS Philosophy

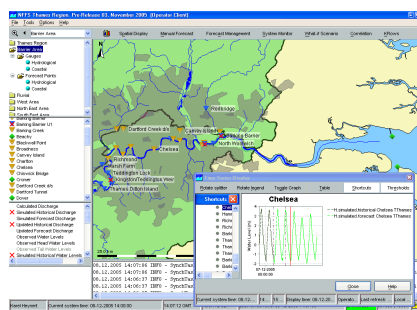
Generic information platform for data processing for flood and environmental forecasting systems

- Links to all kinds of **meteorological and observed data** sources, such as
 - ground station monitoring devices, weather radar,
 - numerical weather models and
 - satellite images
- Facilities to process such data in required formats
- Links to a wide range of **hydrological and hydraulic modelling** systems
- Easy to connect models and data sources, **irrespective of their producers** in order to avoid capital destruction of earlier investments by clients
- **Resilient** system

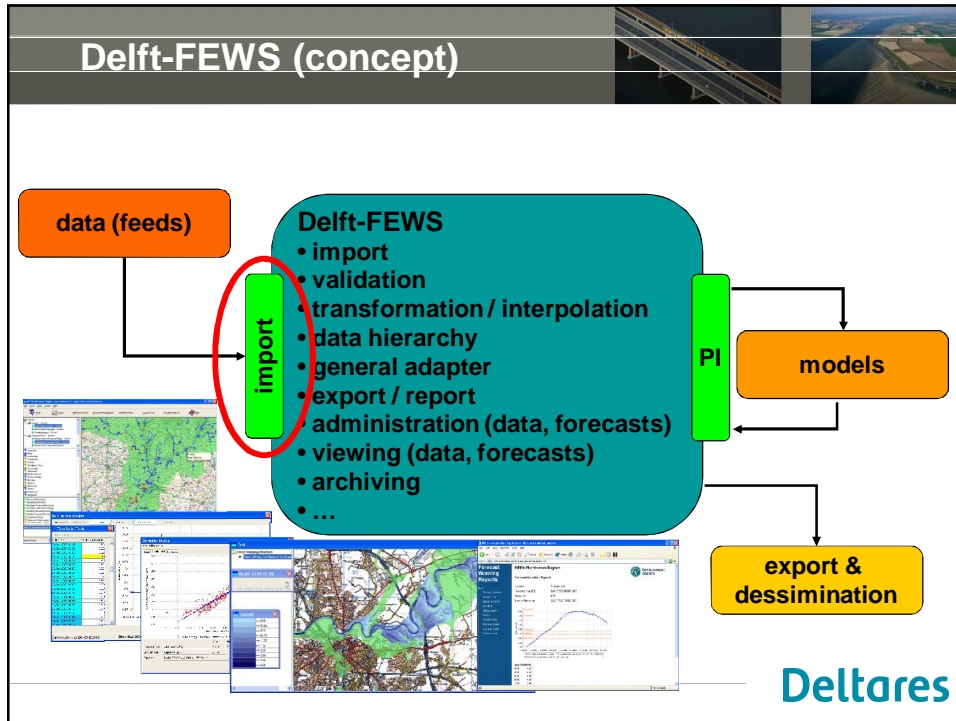
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Delft-FEWS Philosophy

- Toolbox for development of forecasting systems
- Binding dataflows + models
- Fully 'configurable' by user
- Real-Time
- Rapid implementation, scalable & flexible
- High resilient & automatic / manual & stand alone



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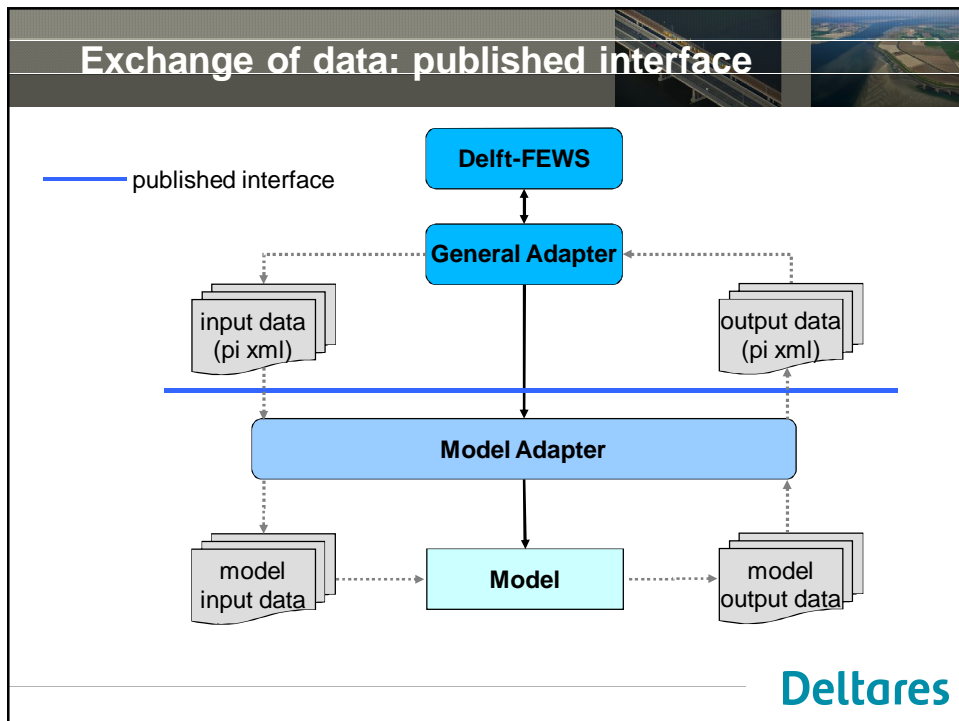
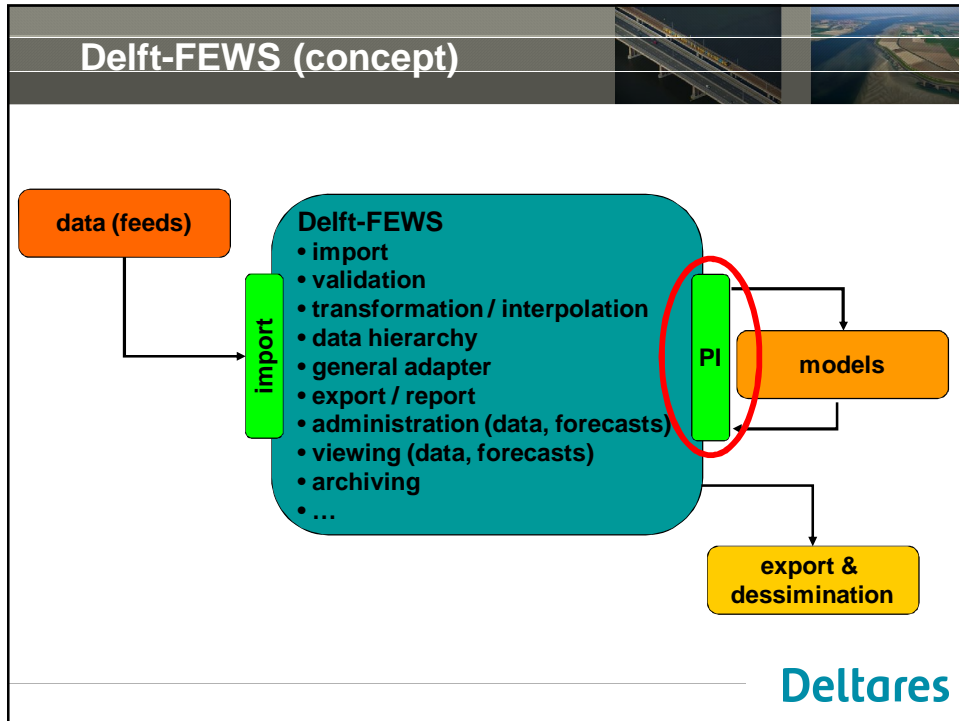


Delft-FEWS Data (import formats)

Scalar AHD ArcWatDBF BC2000 BFG CSV DINO DiverMon EA EKSW EKSW2005 EVN Era15 FOC FewsDatabase hdf4 Hims Hydris HYMOSASCII HYMOS KNMI KNMICSV KNMIEPS KNMIIRIS KNMISYNOPS Mosaic	Scalar (continued) Msw Mosm NOOS NTURAIN Import NTUQUARTER Import PI PMDSynoptic PMDTelemetric RijnlandRTD SSE SHD SHEF SMA SMAecmf Synop Tmx TmxCSV TTRR LUBW WapdaTelemetric Wiski WSCCcsv Wsd DSS	Grid formats ArcInfoAscii BIL BUFR COSMO7_COR DWD-LM DWD-LM2 DWD-GME GHD GRIB GRIB2 GRIBBASIC GRIBCOSMO hdfSoilMoisture KNMI-HDF5 Landsat-HDF5 MATROOS NetCDF NetCDF Nimrod NimrodMultipleDir SwissRadar GrayscaleImage
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<https://publicwiki.deltares.nl/display/FEWSDOC/Available+data+types>

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Delft-FEWS External Models – Model Adapters

- CEH Adapters (SNOWP, SNOW, PDM, KW, ARMA, TCM, HEC, GRID2GRID)
- HR (ISIS)
- PlanB Adapters (TRITON & PRTF)
- DHI Adapters (Mike11, NAM)
- Midlands Region (DODO, MCRM)
- Southern Region (STF)
- Northwest Region (NW TF – Common Adapter)
- Wales (SW Overtopping module - Common Adapter)
- SouthWest (Bruton/Holbeam Dam module – Common Adapter)
- Deltares (RTC Tools, Delft3D, SOBEK, RIBASIM, HYMOS, Sacramento, SSARR)
- SMHI (HBV)
- University of Karlsruhe (PRMS)
- JRC (Lisflood - PCRaster)
- NWS (SNOW 17, SAC-SMA, UNIT-HG, LAG/K, SARRROUTE, SSARRESV, RESSNGL, BASEFLOW, CHANLOSS, APICONT, CONSUSE, GLACIER, LAYCOEF, MUSKROUT, RSNELEV, SACSMA-HT, TATUM)
- USACE (HEC-RAS, HEC-ResSim)

<http://public.wldelft.nl/display/FEWSDOC/Models+hinked+to+Delft-Fews>

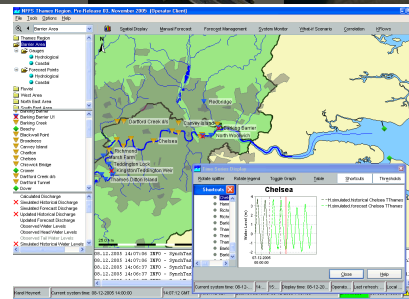
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Delft-FEWS Software

- Service Oriented Architecture
 - operating (business) aspects
 - system / platform 'independent'
- Java, XML & JMS
- Oracle, PostgreSQL, MS SQLServer

Open Systems Approach...

- Can be extended using plug-ins (Modules, Displays)
- Transparent configuration using XML file format
- External modules can be integrated using XML as exchange format
- Provides access to time-dependent data via JDBC, WebServices



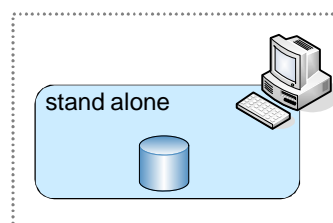
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Delft-FEWS settings

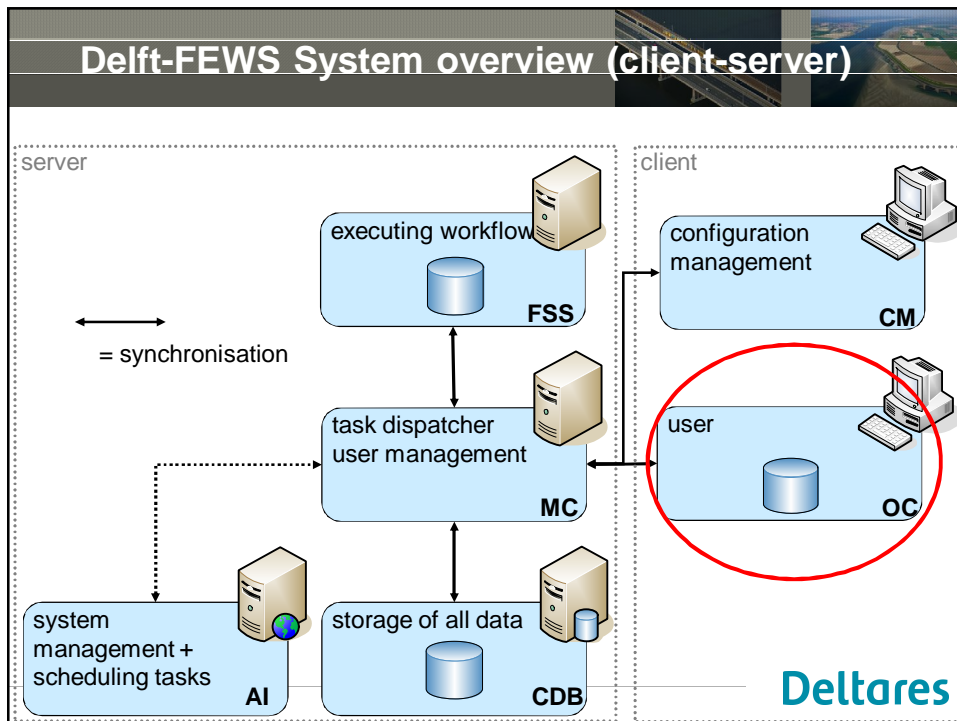
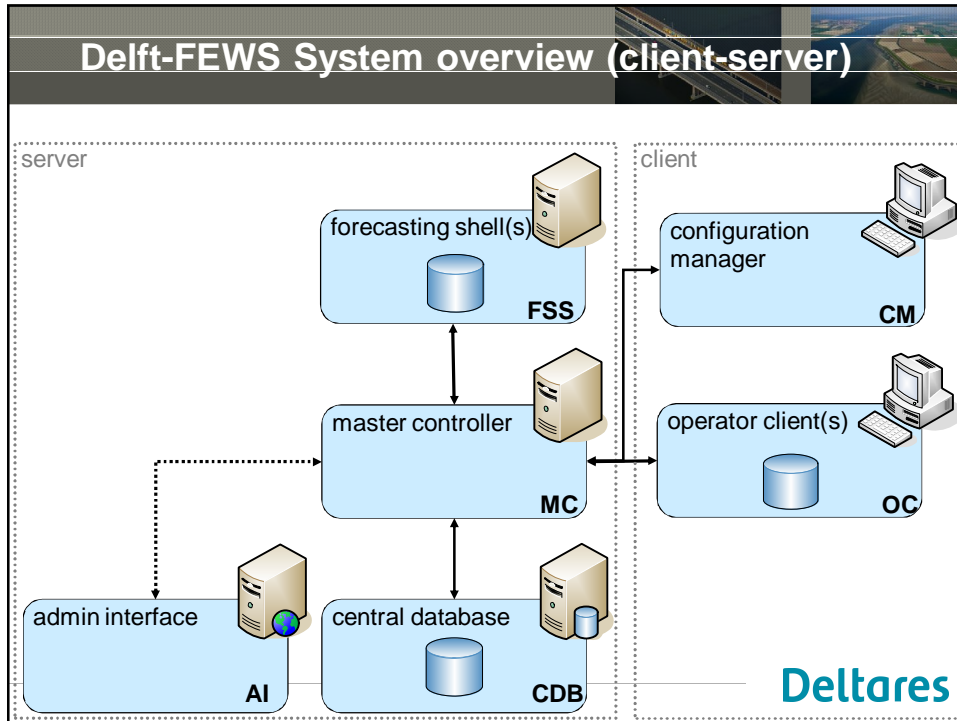
- Stand alone
 - all activities are done on (your) local machine (desktop/laptop)
- Client-Server
 - clients log on to 'central backend'
 - > calculations are done on designated machines/servers
 - > data 'downloaded' to local machine (laptop/desktop)
 - > activities scheduled with fixed intervals (import, forecasts)
 - > manually invoked activities from clients → queue

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Delft-FEWS system overview (stand-alone)

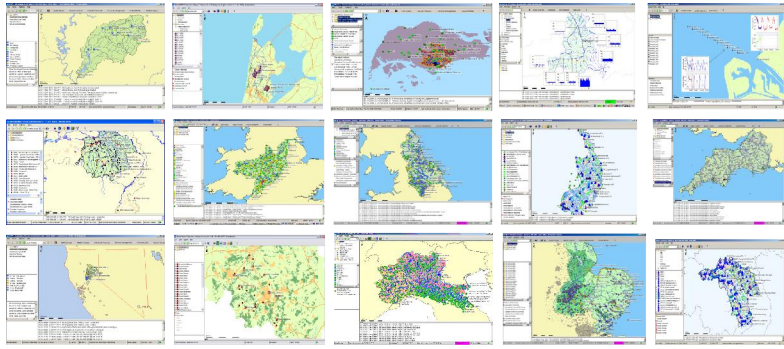


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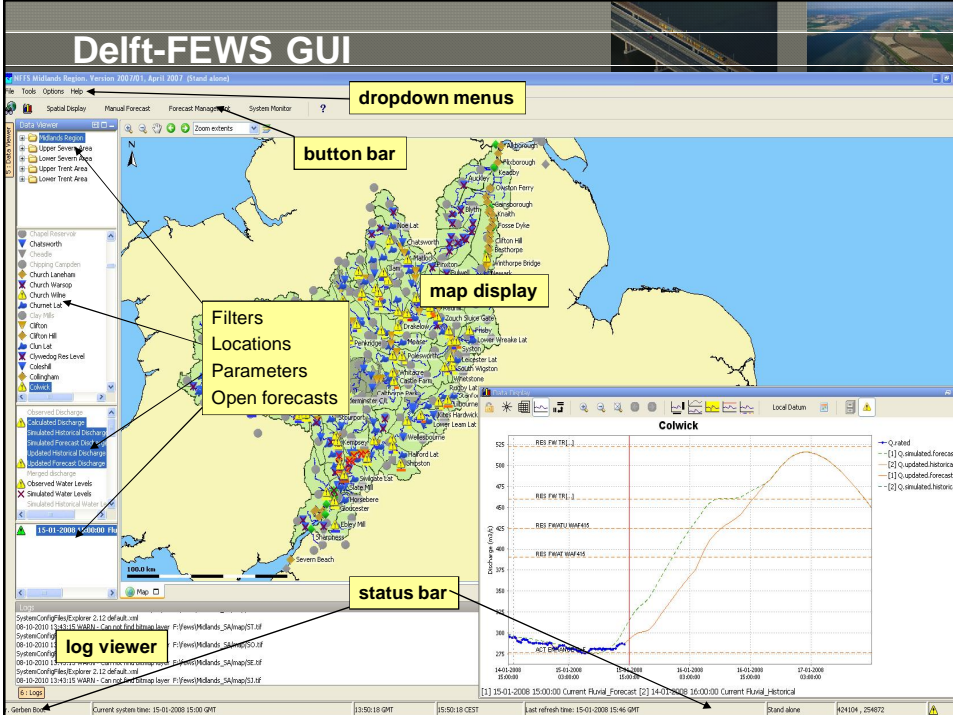
Demonstration

- Operator Client: FEWS Noordzee (FEWS-NL) – live/current data



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Delft-FEWS GUI



The screenshot shows the Delft-FEWS GUI interface with several key components labeled:

- dropdown menus:** Located at the top of the interface, including 'Manual Forecast', 'Forecast Monitoring', and 'System Monitor'.
- button bar:** A horizontal bar below the dropdown menus containing various control buttons.
- map display:** The central area showing a geographical map of the North Sea region with various data points and overlays.
- Filters, Locations, Parameters, Open forecasts:** A vertical sidebar on the left side of the map, used for configuring the data displayed on the map.
- status bar:** Located at the bottom of the map area, providing real-time system information.
- log viewer:** A window at the bottom left showing system logs and error messages.

In the bottom right corner, there is a detailed line graph titled "Colwick" showing discharge (m³/s) over time. The graph includes data for "Q-rated", "Q-simulated-forecast", "Q-updated-historical", "Q-updated-forecast", and "Q-simulated-historical". The x-axis represents time from 15-01-2008 to 15-01-2009, and the y-axis represents discharge in m³/s, ranging from 275 to 525.