

# Deltares

Enabling Delta Life





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**Delft-FEWS Basic Training**

For NERC-CCCC

Date: 28 September 2022



# Training Overview

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- Objective
  - Detailed system introduction of FEWS-Gulf of Guinea
  - System user training
  - System support & maintenance training
  - Simple system configuration training
- Required software:
  - FEWS-GoG Stand Alone system deployed on the participants` local machine with proper internet connection.
  - Optional: Altova XMLSpy should be installed for editing and validating xml files. One can also editing xml files with any other text editor (e.g. Notepad++), however there are several drawbacks compare to an official xml editor.
  - Optional: Total commander, strongly advised for working with FEWS configuration.



# Training Overview

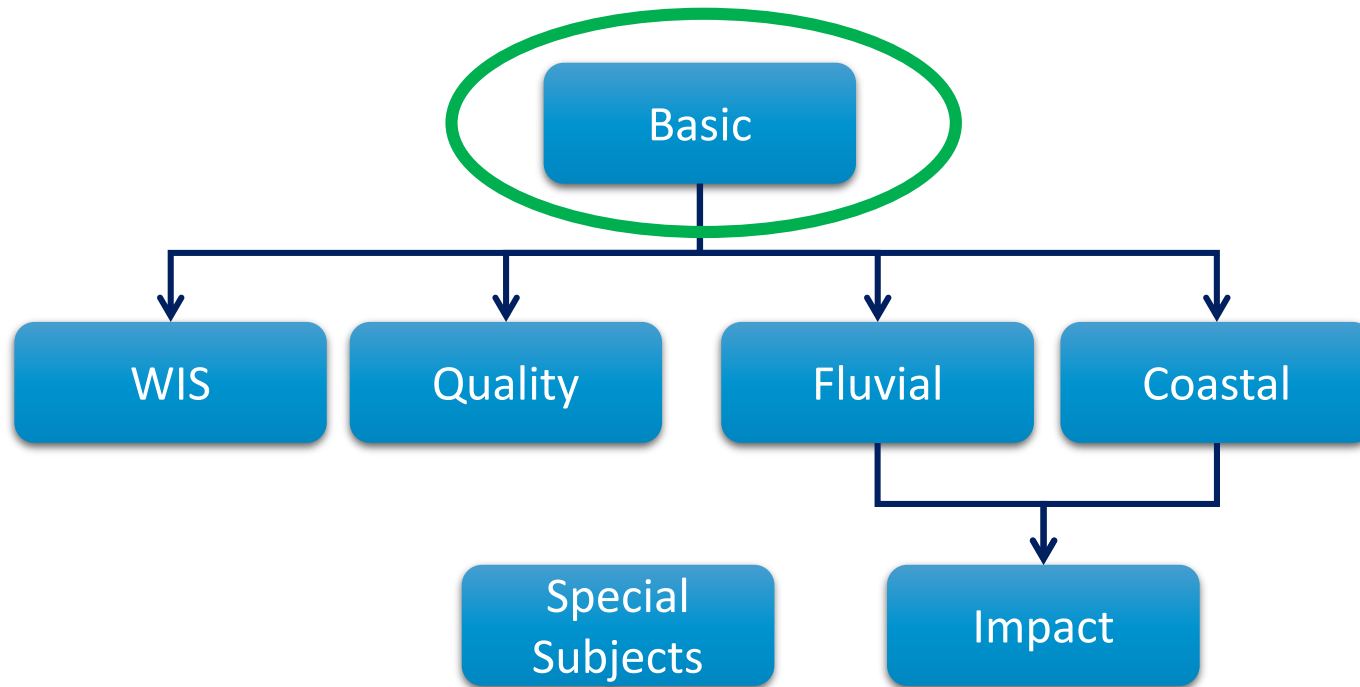
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- Prerequisite knowledge
  - FEWS-GoG system architecture and forecast data flow, no knowledge of Delft-FEWS configuration is required.
- Agenda: Day 1 & 2
  - The concept of forecasting and early warning
  - Delft-FEWS basics: navigate the system
  - Exercise

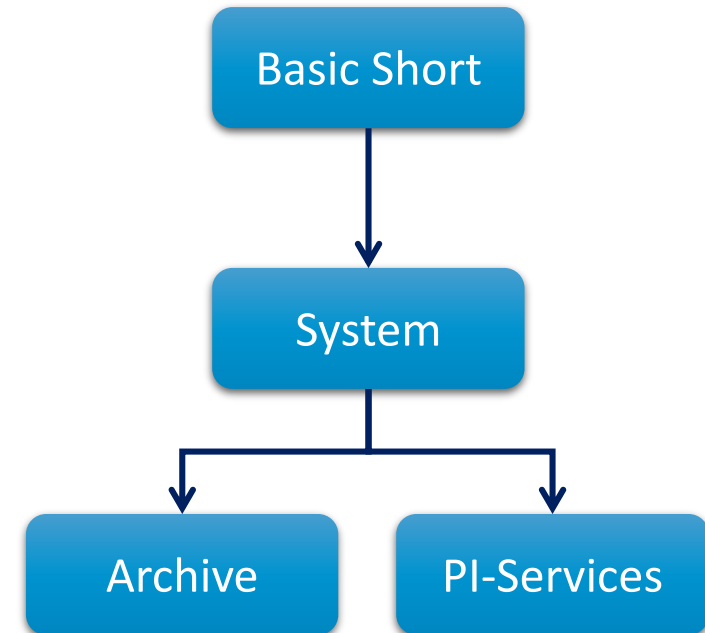


# Delft-FEWS Courses

## Content Expert



## ICT Expert



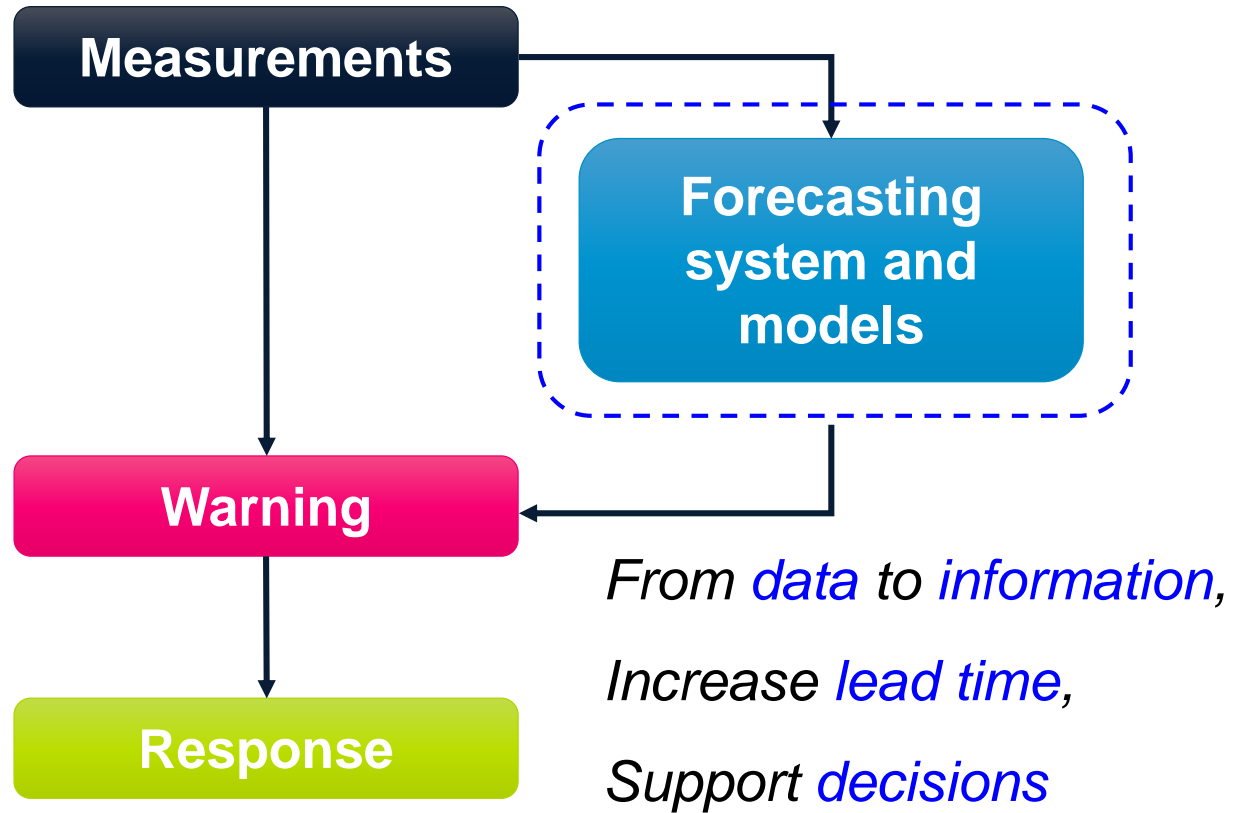


# Module 1b

## Introduction to Delft-FEWS



# Operational Forecasting

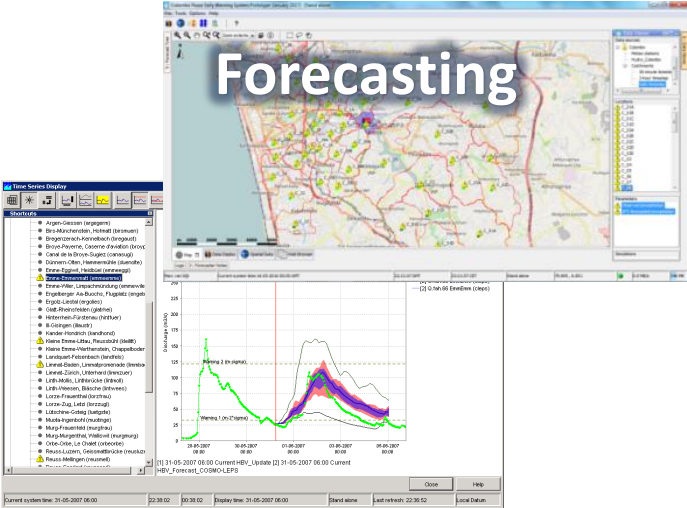
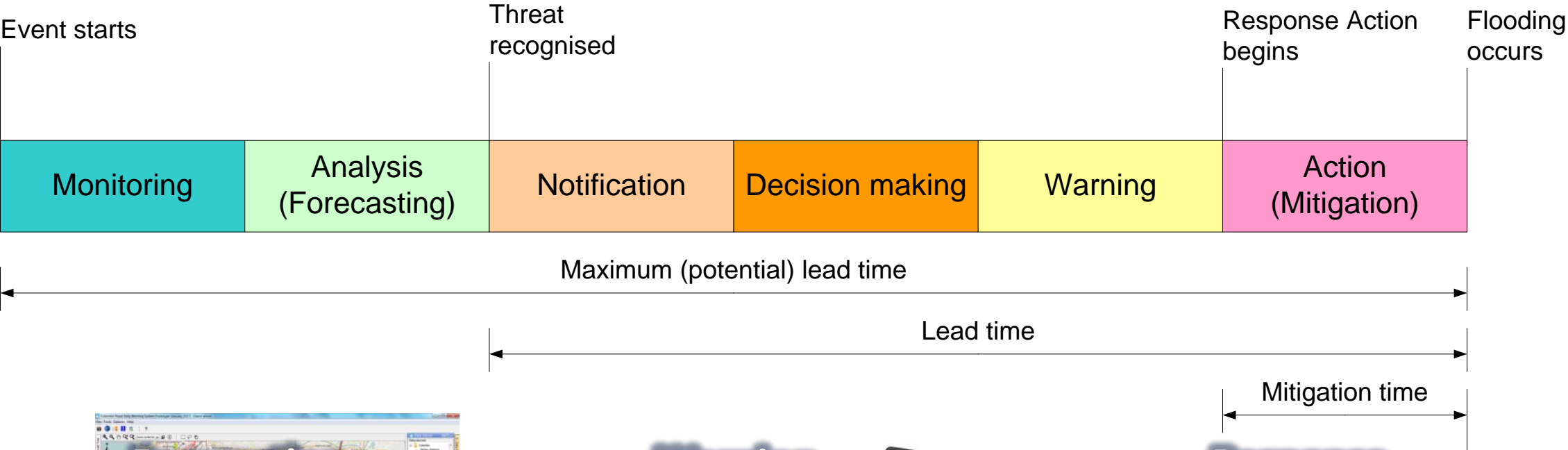


***Response required***



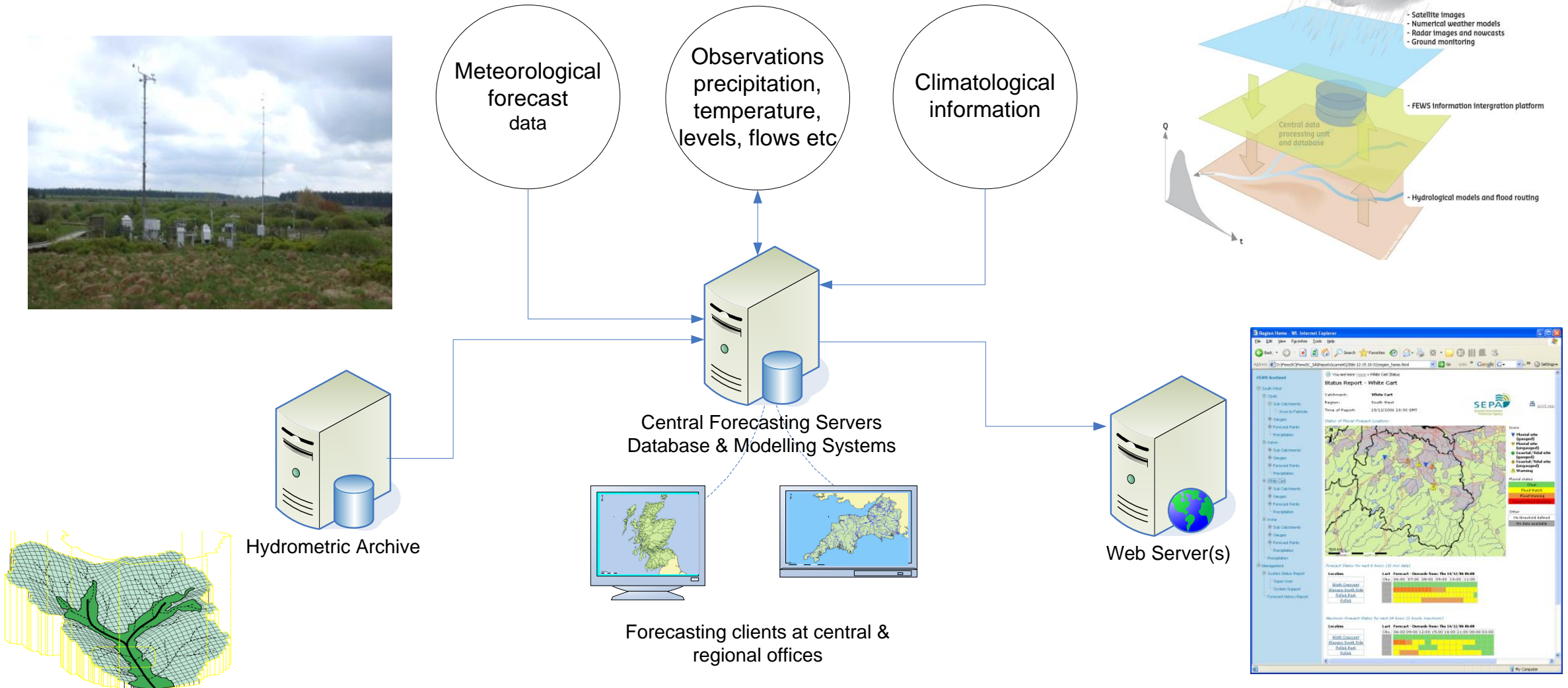


# Flood Forecasting, Warning & Response





# Put the components into the operational domain





# Role of observation data in a Delft-FEWS application

- In operational forecasting it is essential to have reliable, real time data
- Typical examples of observation data in a Delft-FEWS application:
  - Hydrological data: water level data and/or discharge
  - Meteorological data: rainfall, temperature, wind
  - Coastal data: astronomical tides, surge
  - Structures: weir operation and reservoir operation

Meteorological station



River gauging station

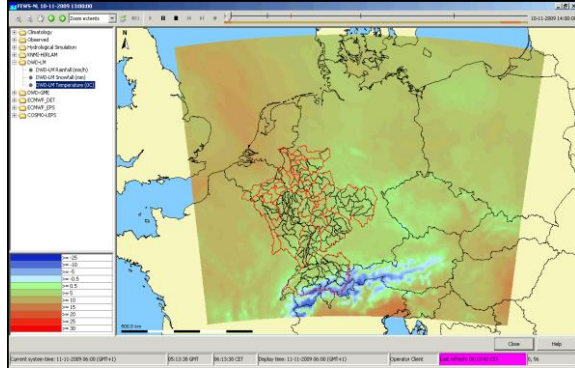


Satellite imaging

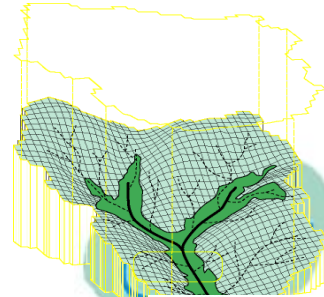




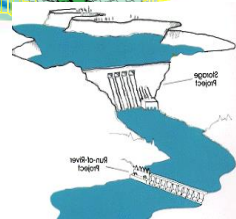
# Using models to predict floods



Numerical Weather  
Prediction models

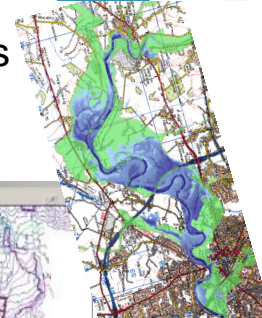


Rainfall-runoff modeling  
& snow modeling



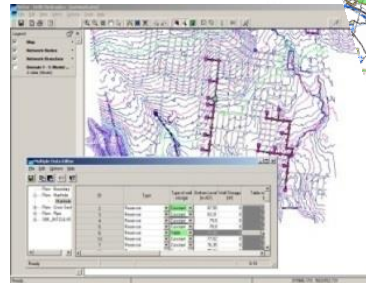
*Reservoir Models*

Routing models  
Hydrodynamic models



*Flood inundation models*

Urban drainage models



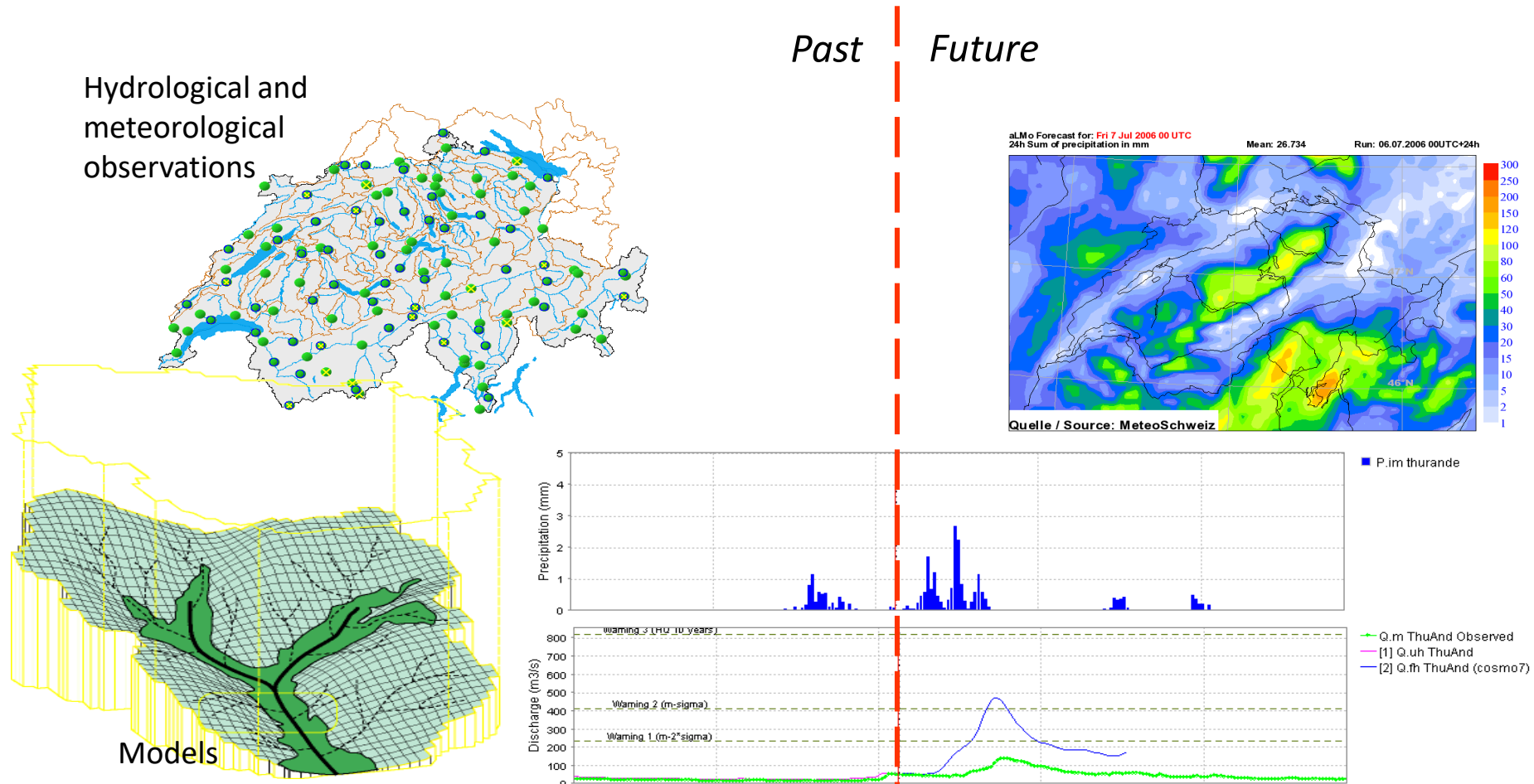
Coastal shelf models  
(2D Hydrodynamic)





# Purpose of Forecasting

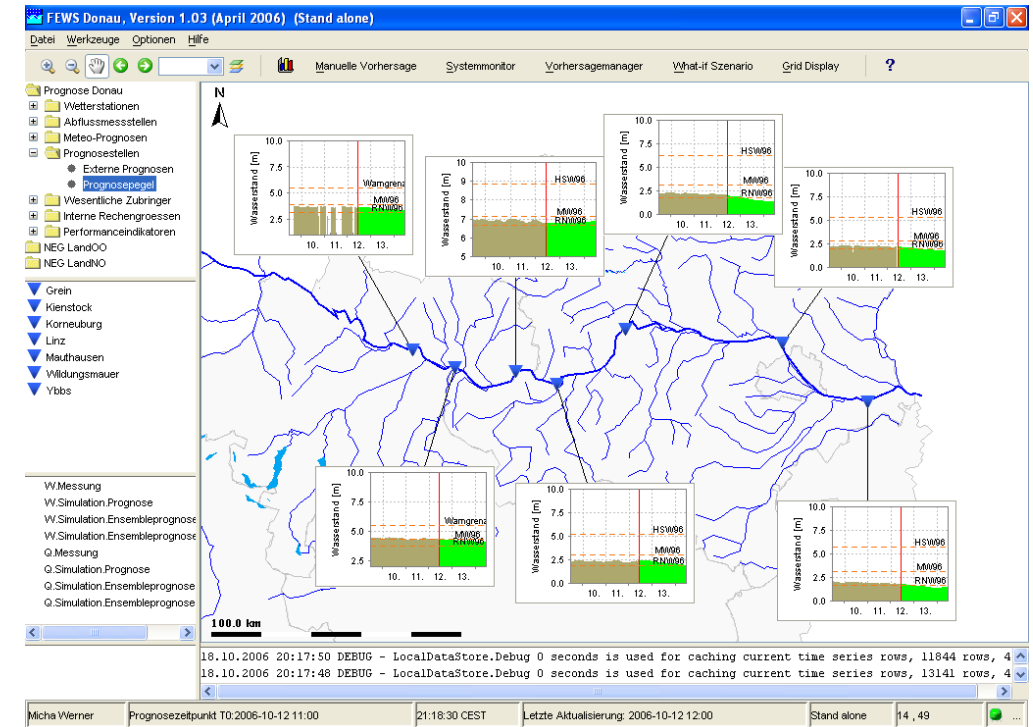
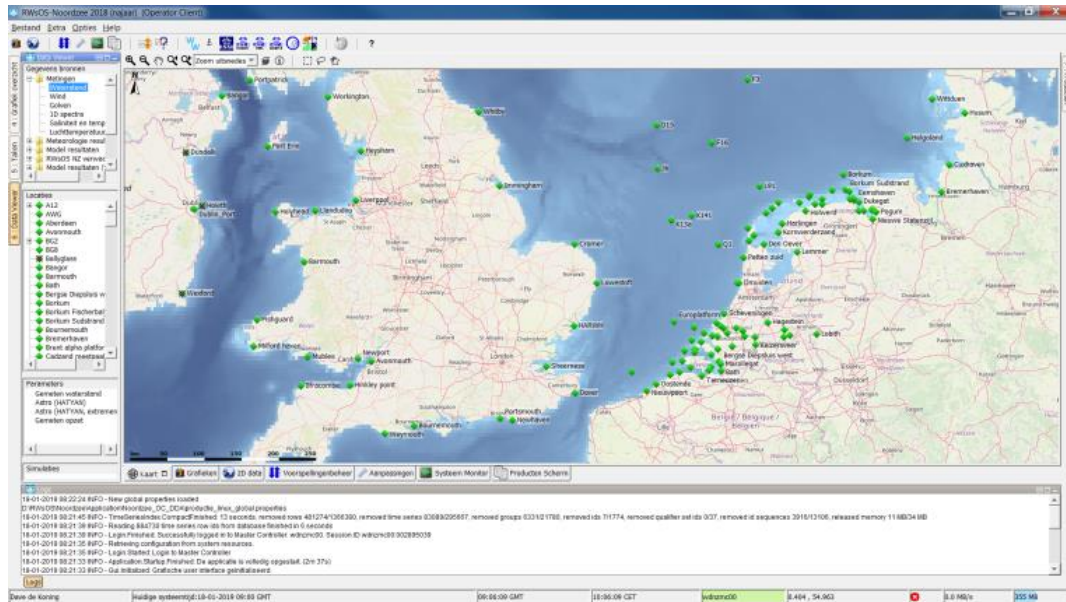
Forecast levels / flows by combining data and models well in advance





# Flood Forecasting System

- Provides the forecaster a framework and an interface to data and models
- Time is critical!
- Organize the forecasting process
- Run models efficiently
- Provide clear information
- Overview of data & status



FEWS Donau (Austria) – Graphs at key stations

RWsOS Noordzee – Coastal FEWS system for the Dutch government



# Delft-FEWS – Open Shell Forecasting System

- Generic information platform for data processing for flood and environmental forecasting systems
- Data centric forecasting system
- Organizing data process from input to forecast to dissemination
- Open approach to integrating models
- Operating system independent, very scalable
- Fully configurable by (super)users
- Software free of charge, with central role for user community

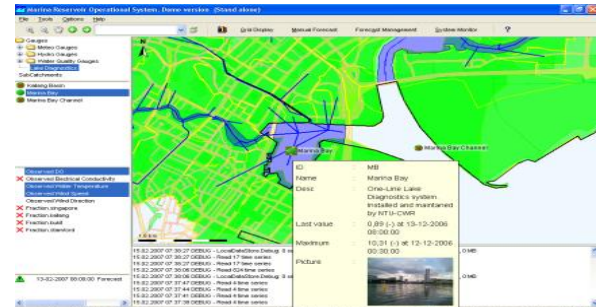
<http://oss.deltares.nl/web/delft-fews>

<http://publicwiki.deltares.nl/display/FEWSDOC/Home>



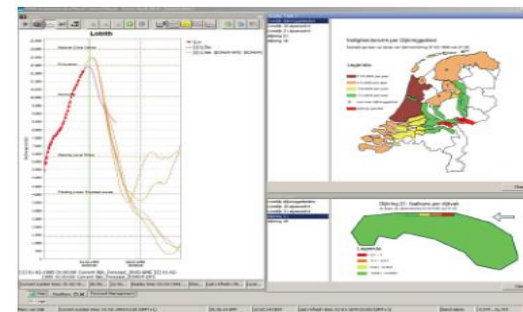
# Delft-FEWS is more than forecasting...

Water quality

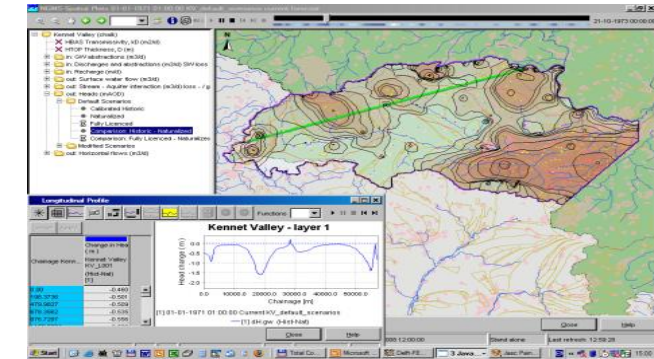


Drought

Dike/Dam strength



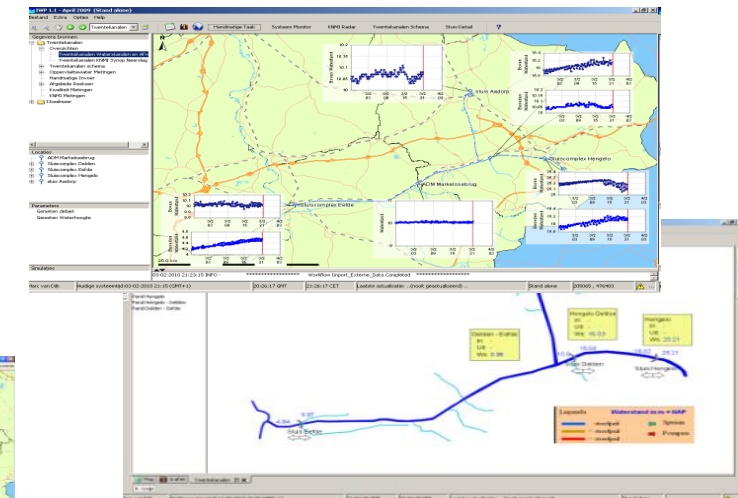
Groundwater



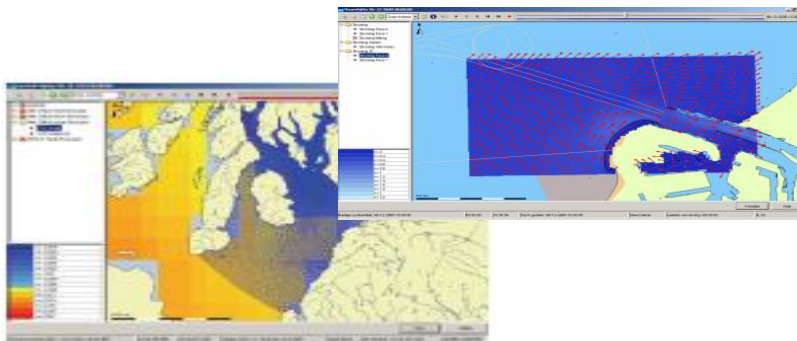
River basin



Optimization



Storm surge



Lake and reservoir



Deltares



# Delft-FEWS Community





## Module 2

# Basic Configuration Course Application

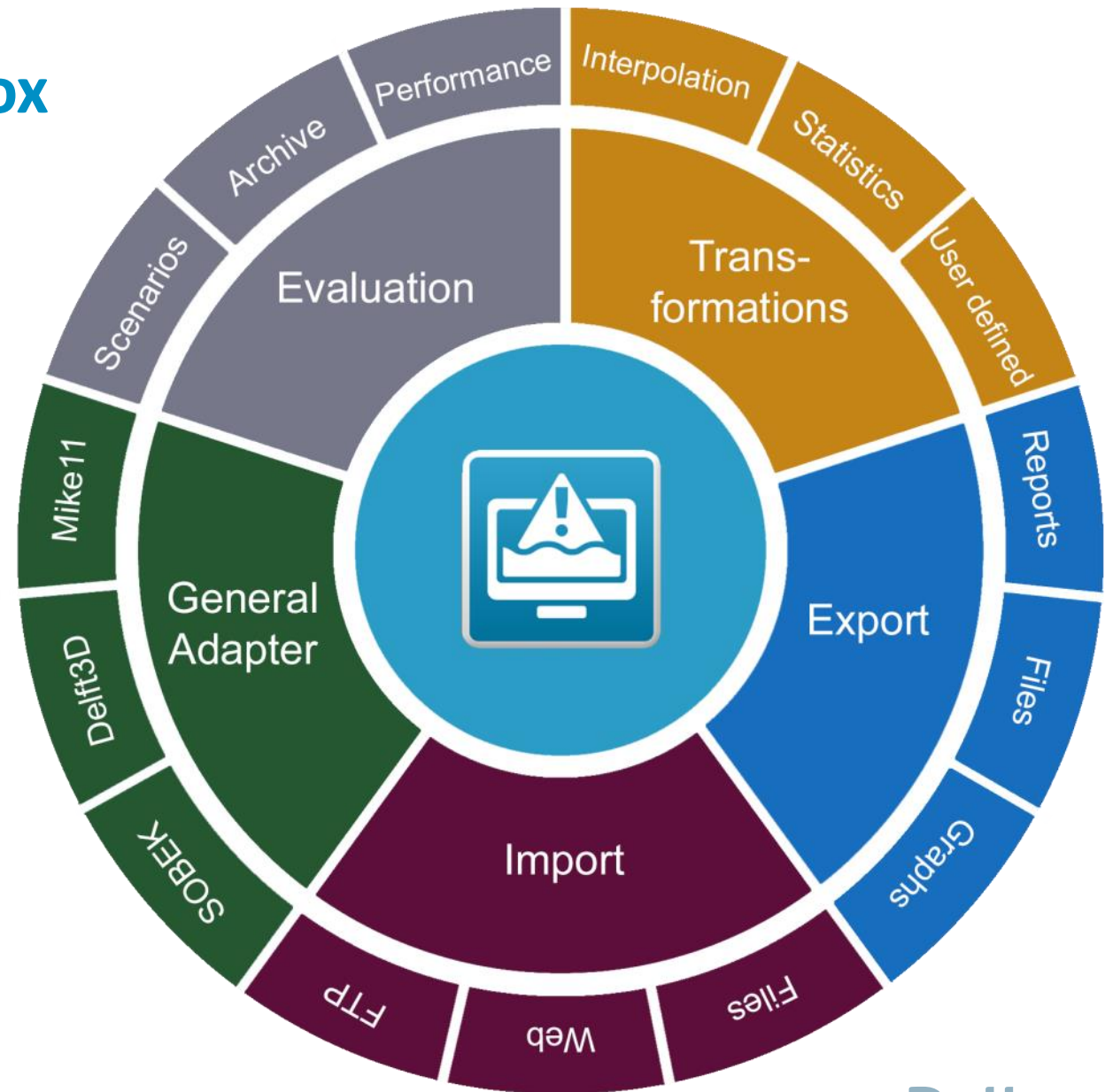


# Delft-FEWS: A Modular Toolbox

Delft-FEWS provides generic functionality (modules) which can easily be configured and organized for specific applications (processing data, running models, ...).

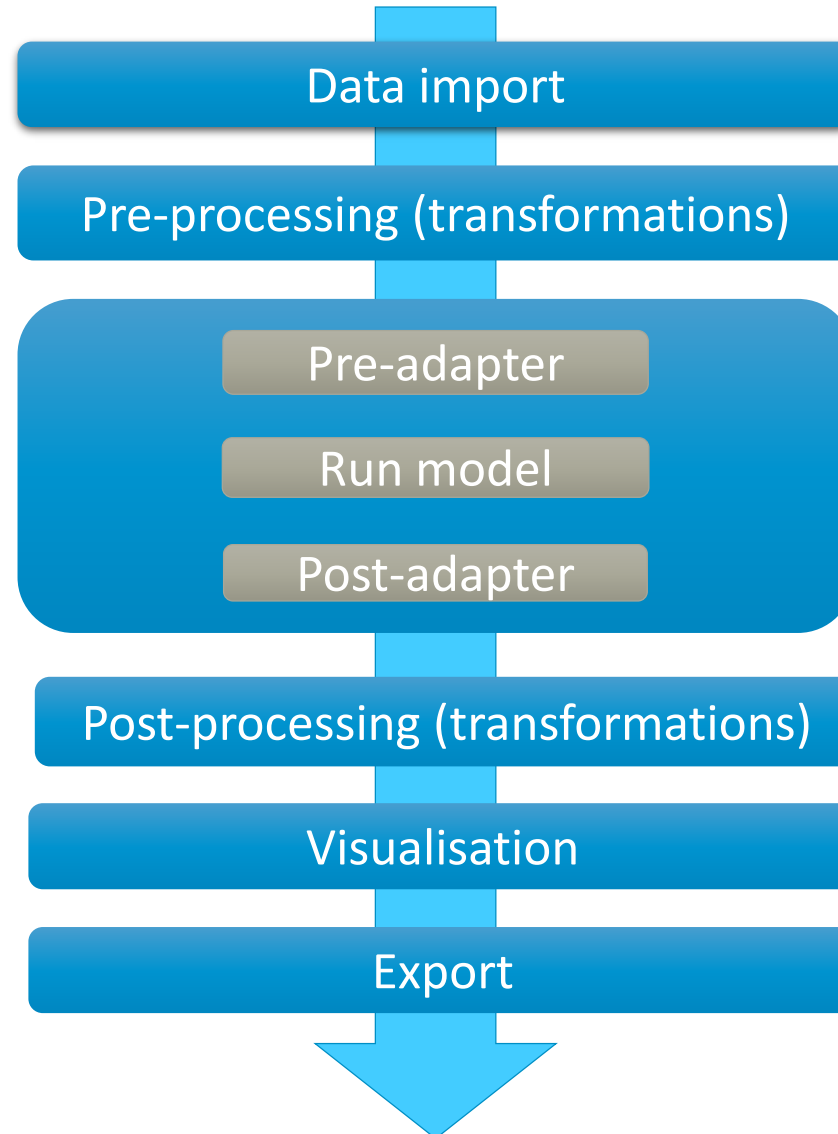
In this course we focus on:

- general configuration
- importing scalar and gridded data
- displaying data in the Delft-FEWS GUI
- data transformation



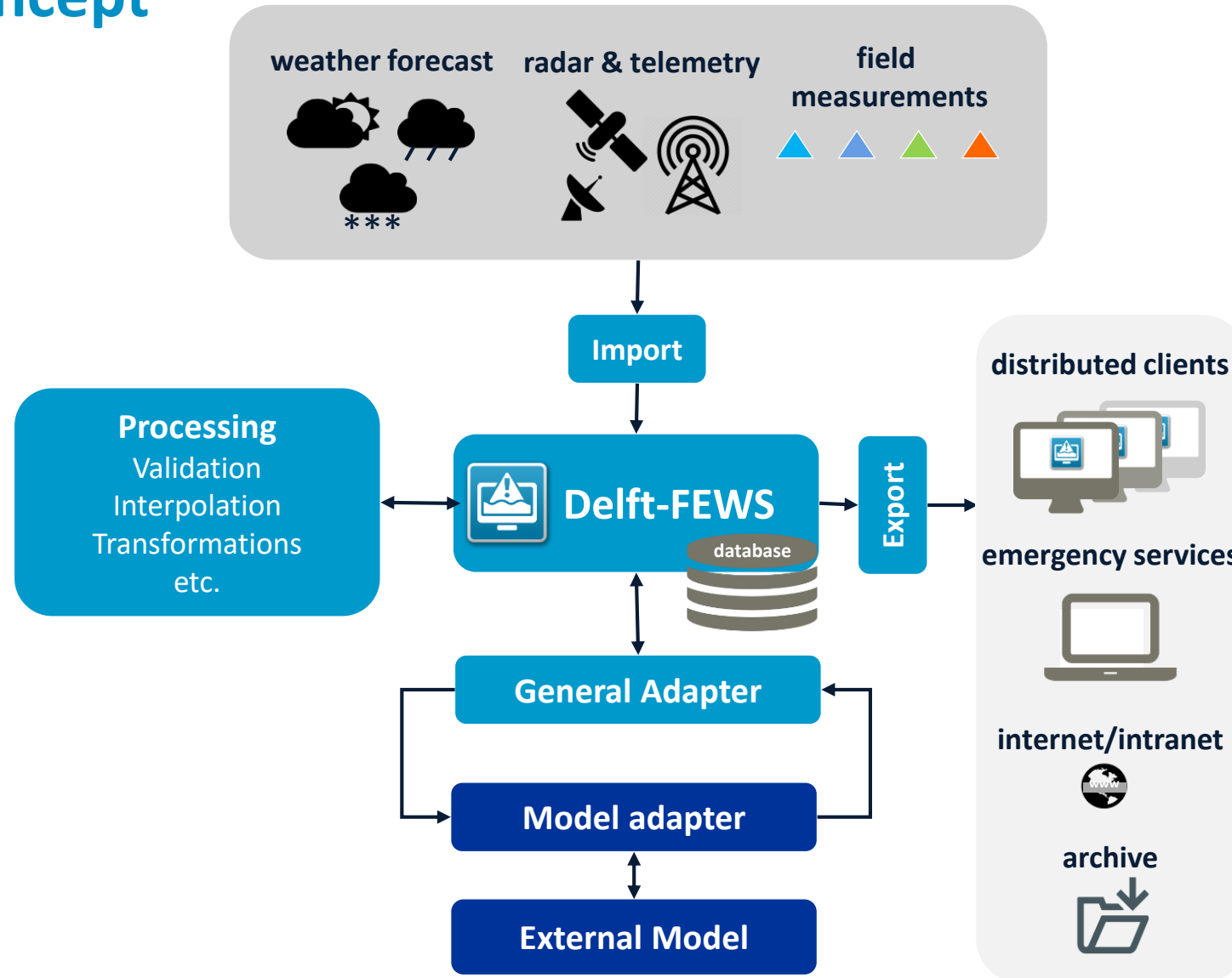


# Delft-FEWS Generic Workflow



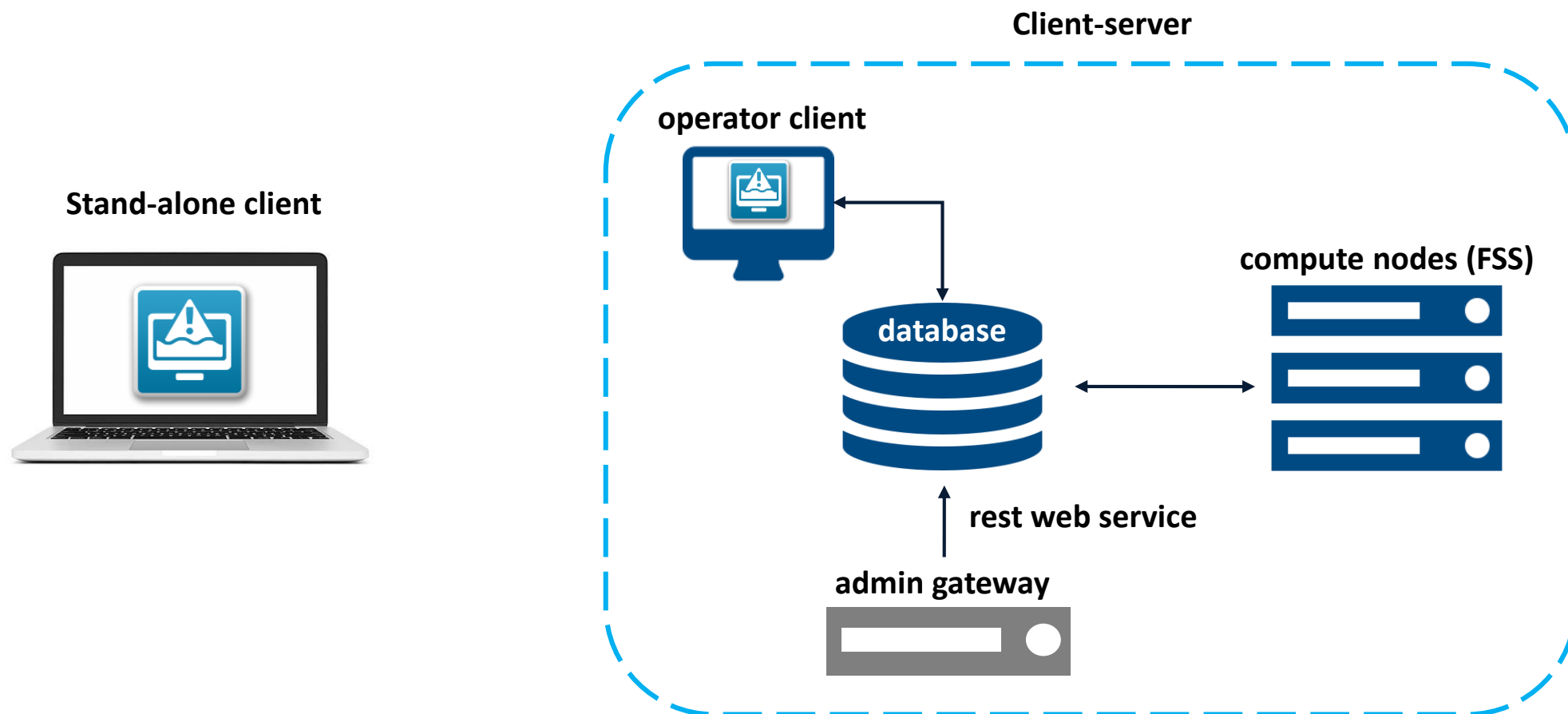


# Delft-FEWS Concept





# Delft-FEWS, application flavors





## Module 3

# **Delft-FEWS Displays**



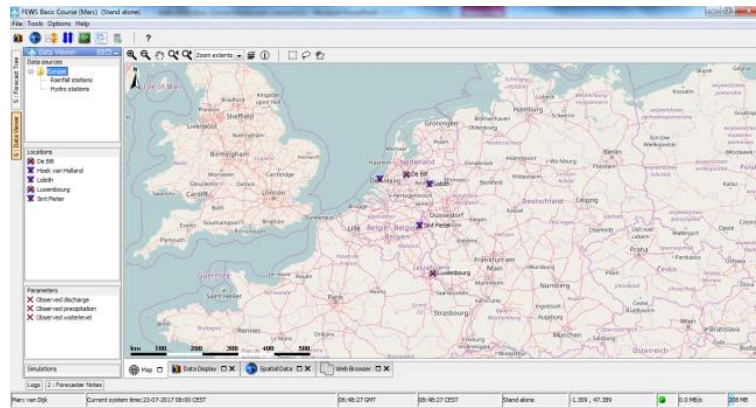
# Delft-FEWS: Data Displays

Delft-FEWS has several displays to show time series and other information

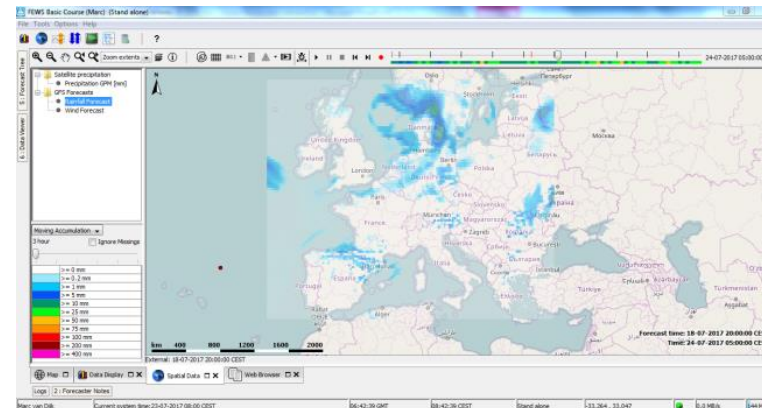
Key displays:

- Map Display: Main display where location icons and maps are presented
- Spatial Display: Shows spatial time series (scalar, gridded and longitudinal)
- Time Series Display: Display where scalar and longitudinal time series are presented

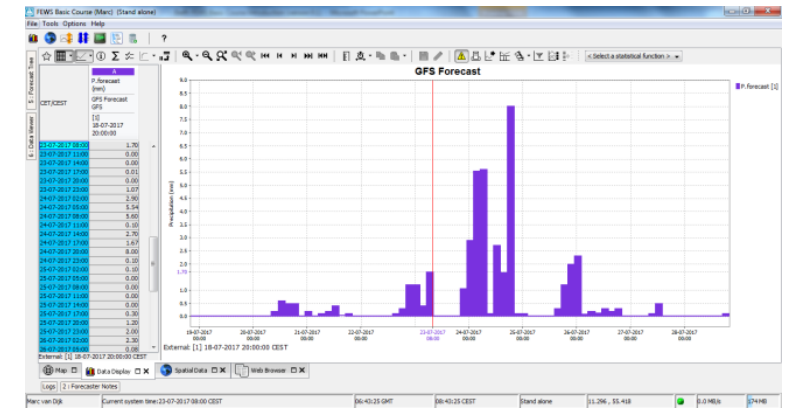
Map Display



Spatial Display



Time Series Display

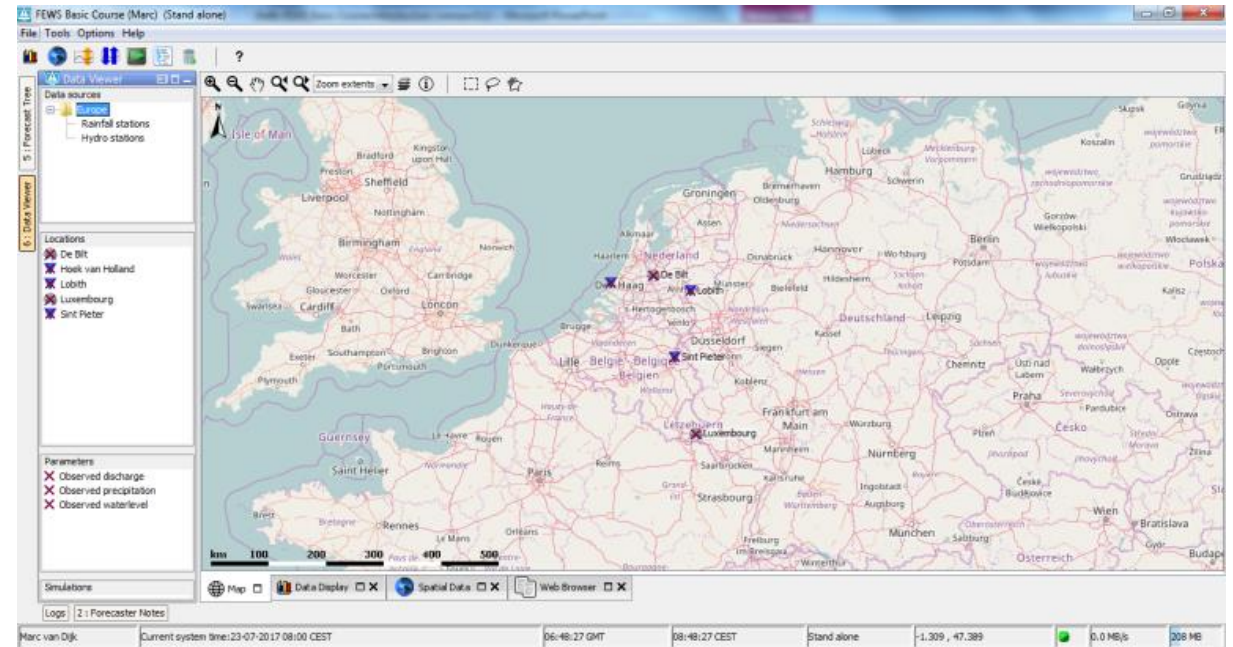




# Delft-FEWS: Map Display

The Delft-FEWS Map Display contains a GIS-like mapping component to show:

- Map layers and location icons
- ArcGIS shapefiles
- OpenStreetMap, Google Earth, Virtual earth
- WMS-layers

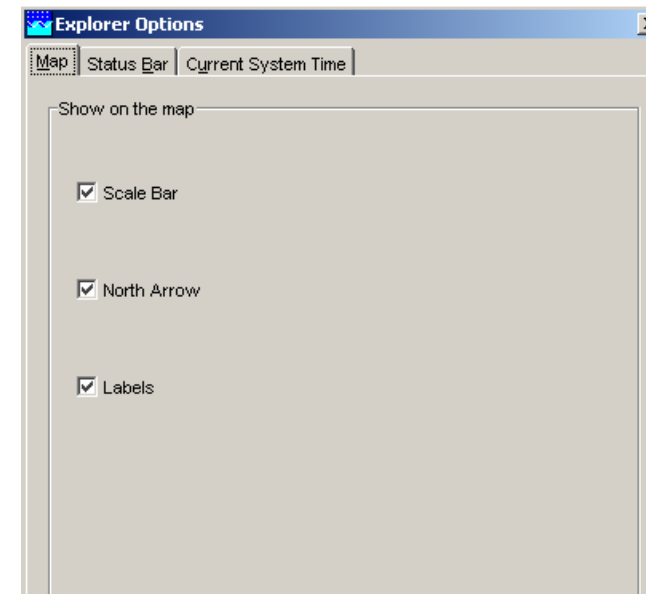


Layers are saved in the “\MapLayerFiles” folder

WMS stored in Cache folder in the root

Configuration through file:  
\\SystemConfigFiles\\Explorer.xml

Scale bar, etc. can be switched off via menu:





# Delft-FEWS: “Map” Component

Used in both Map Display and Spatial Display and has many configuration options:

- Geodatum
- Projection
- View extents
- Visibility of map elements
- Map Layers
  - Open Street Map
  - WMS / WCS
  - Esri Shape Layer
  - Esri Server

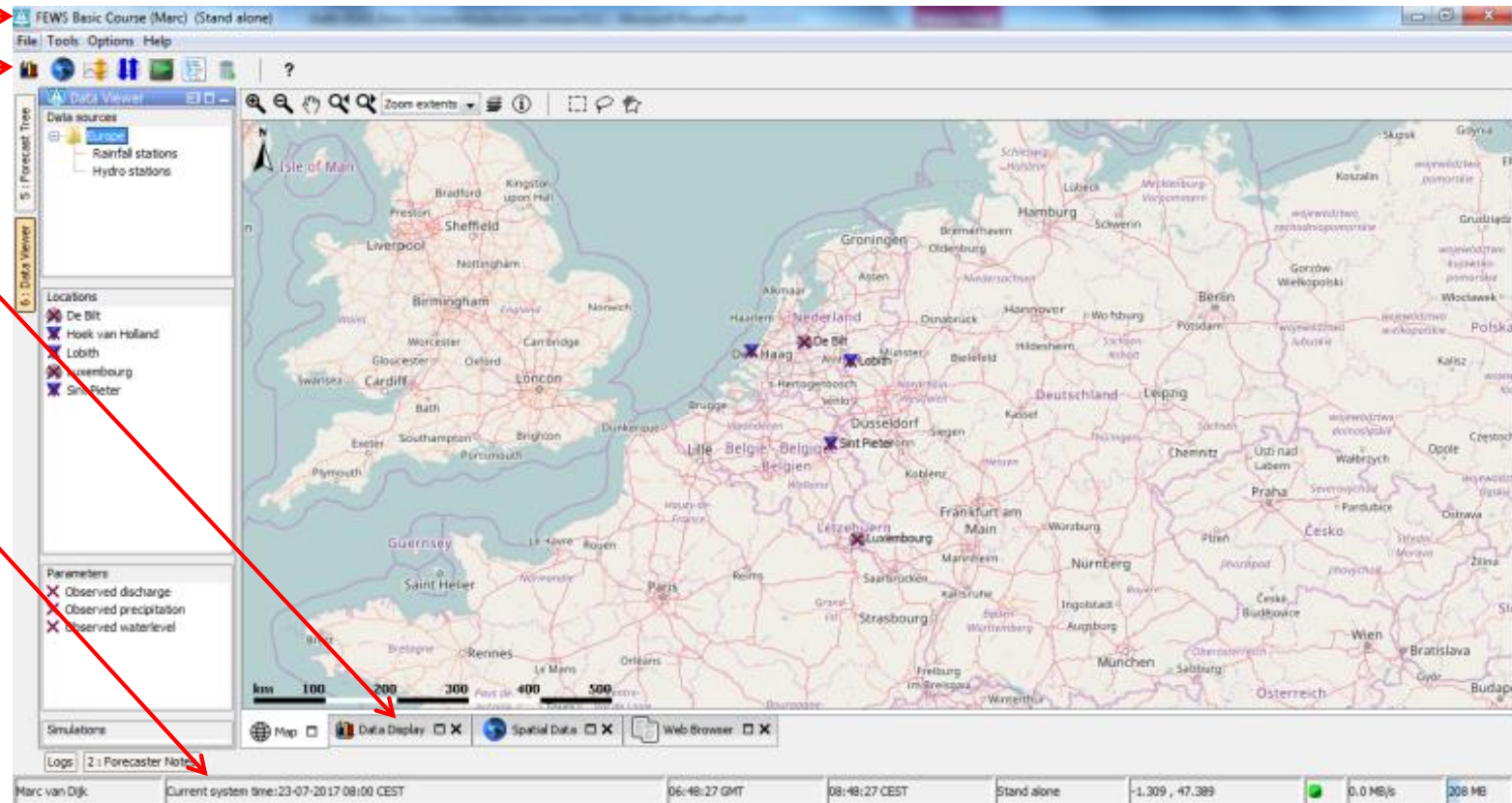
map	
geoDatum	WGS 1984
projection	web_mercator
defaultExtent	id=World
extraExtent	id=Europe
scaleBarVisible	true
northArrowVisible	true
labelsVisible	true
backgroundColor	white
openStreetMapLayer	(2)
layer	id=Satellite
wmsLayer	
id	srtmv4.1_s0_pyramidal_color
url	http://www.webservice-energy.org/mapserv/srtm?
wmsLayerName	srtmv4.1_s0_pyramidal_color
visible	false
cacheDir	\$CACHE_FOLDERS\$/WMSLayers/srtmv4.1_s0_pyramidal_color
esriShapeLayer	id=World



# Delft-FEWS: Explorer

The Delft-FEWS *Explorer.xml* configuration file contains many elements

- System Information
- Explorer Tasks
- Status Bar
- Data Time
- Global Datum
- Log panel





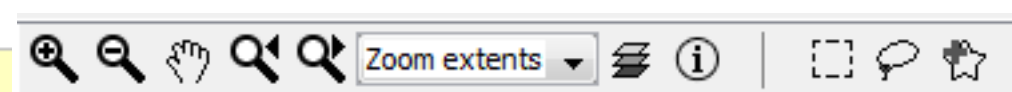
# Delft-FEWS: Explorer

Most used configurable elements of the *Explorer.xml* file

- Pre-configured zoom levels that can be selected from Maps toolbar

defaultExtent (1)						
	= id	() left	() right	() top	() bottom	
1	World	-180	180	90	-70	

extraExtent (1)						
	= id	() left	() right	() top	() bottom	
1	Europe	-30	50	70	30	



- Tools / Displays that can be started out from the Explorer and must be open on start-up of FEWS Application

explorerTask (13)										
	= name	() iconFile	() mnemonic	() arguments	() taskClass	() displayConfigFileName	() predefinedDisplay	() toolbarTask	() menubarTask	() al
1	Map Display	splitmap.gif	A	MapDisplay	nl.wldelft.fews.gui.plugin.map.MapDisplay			false	true	
2	Data Display	graph.gif	D		nl.wldelft.fews.gui.plugin.timeseries.EditorTimeSeriesDialog			true	true	true
3	Spatial Data	spatial.png	G	GridDisplay	nl.wldelft.fews.gui.plugin.grid.GridDisplay			true	true	
4	Manual Forecast	manforc.png	M		nl.wldelft.fews.gui.plugin.manualforecast.ManualForecastDialog			true	true	
5	Forecast Management	forcman.png	F		nl.wldelft.fews.gui.plugin.forecast.ForecastDialog			true	true	
6	System Monitor	sysmon.png	S		nl.wldelft.fews.gui.plugin.systemmonitor.SystemMonitorDialog			true	true	





# Delft-FEWS: Explorer


Most used configurable elements of the *Explorer.xml* file

- Global (vertical) datum

 <b>globalDatum</b>	MSL
--	-----

- DateTime

- Time Zones
- Date Time Format
- Cardinal Timestep

▲ <b>dateTime</b>		
	▲ <b>timeZoneName (2)</b>	
		Abc Text
	1	CET
	2	GMT
	 <b>dateTimeFormat</b>	dd-MM-yyyy HH:mm:ss
	▲ <b>cardinalTimeStep</b>	
	= unit	hour
	= multiplier	1

Current system time: 23-07-2017 08:00 CEST

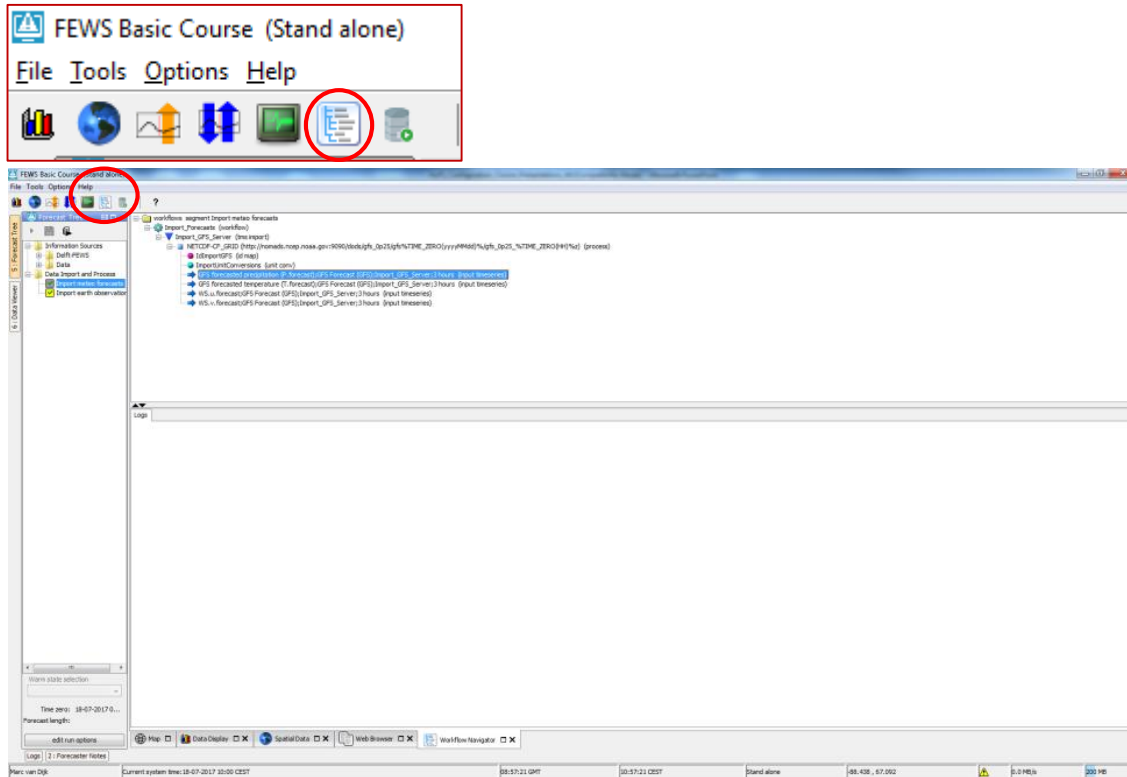
07:11:51 GMT

09:11:51 CEST

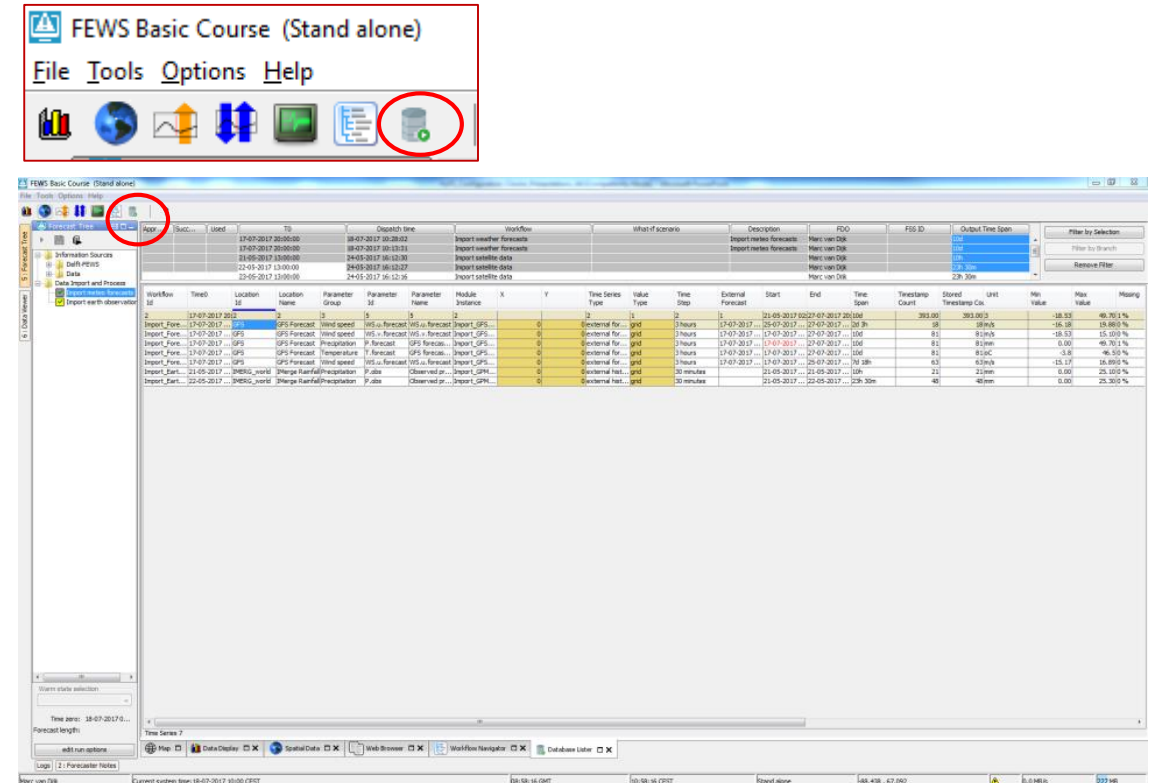


11

- Database Lister (Ctrl L)



- Access to input and output time series of latest successful (Current) run
- Helps in finding configuration errors

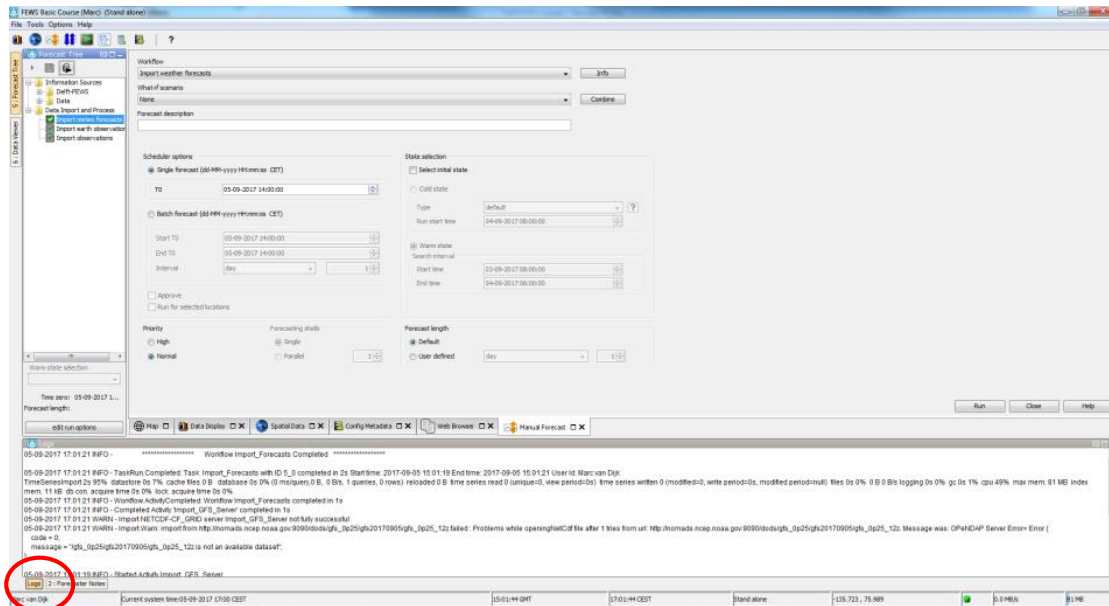


- Access to result time series of latest run (successful or not)
  - Shows exact details of time series
  - Helps in finding configuration errors
- Deltares**

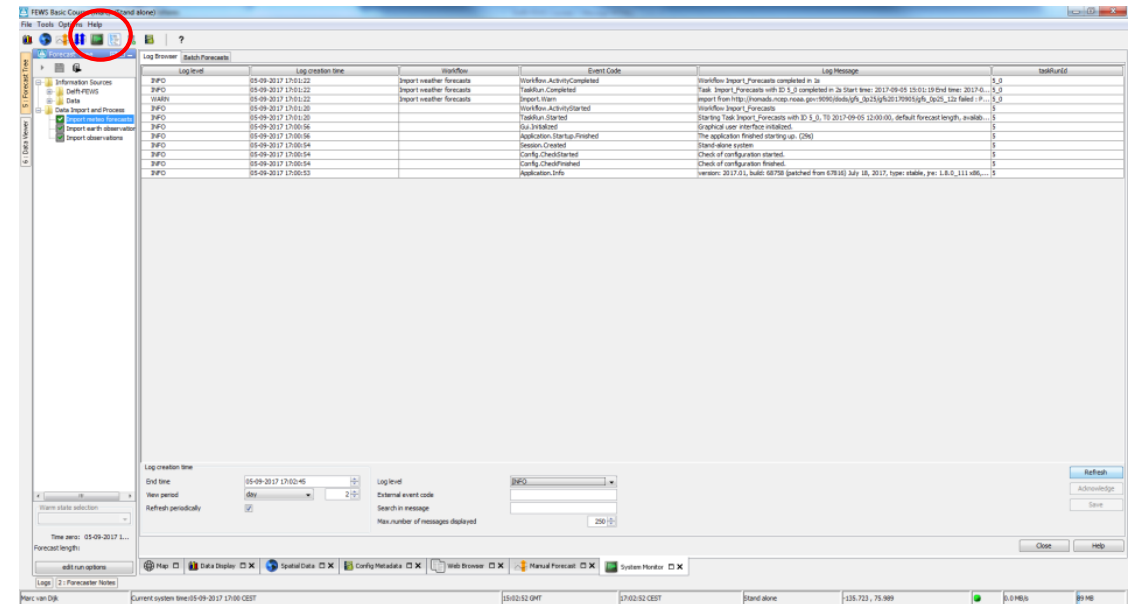
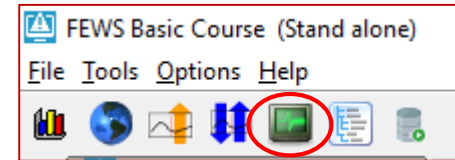


# Useful displays for configuration support

- Log Browser (-)



- System Monitor (Ctrl S)



- Logging of Delft-FEWS modules
- Same information also available in log.txt file

- Shows main log messages stored in the database
- Also log messages from previous sessions can be shown



# Delft-FEWS-Basic application: Navigation

Forecast Tree (*Topology.xml*) can:

- Access websites, e.g.:
  - Delft-FEWS User Guide
  - Data products
- Start configured workflows
  - Import data
  - Process data
  - Run models
- Navigate to tasks and data

