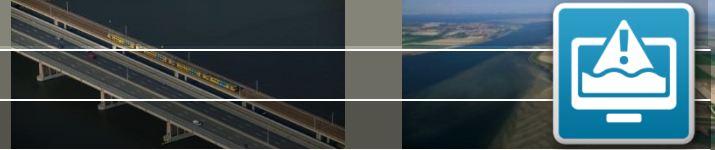




Delft-FEWS Accelerator

International Delft-FEWS User Days 2018

Marc van Dijk, Deltares
08 November 2018



- Delft-FEWS Roadmap Developments
- Why a Delft-FEWS Accelerator?
- What is the Delft-FEWS Accelerator?
- Plans for 2018 and 2019

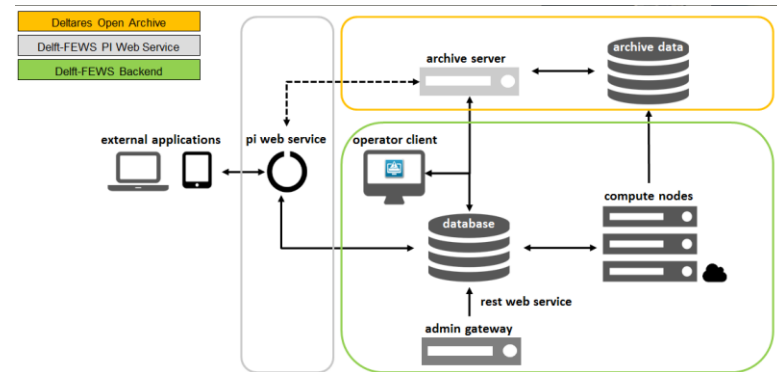
- **Live Demo**

Delft-FEWS Roadmap Developments



- Deltares Software Architecture is developed in 2004
- Deltares recognized a re-design was required for Delft-FEWS
- Discussions about a 2020 vision started at the 2015 International User Days and with the **Delft-FEWS Community Strategy Board**

- From the Delft-FEWS 2020 vision: 3 roadmaps are proposed
 - **Backend** Simplification and Automation
 - Seamless and **Open Archive**
 - Enhanced **Web Services** (PI Web Service)



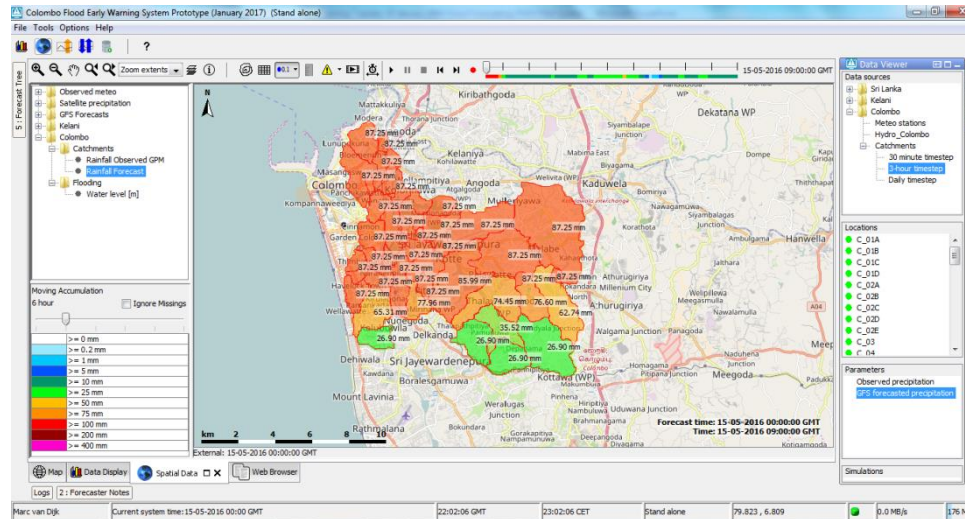


- With new Delft-FEWS features, the Delft-FEWS configuration complexity increased
 - Introduction of meta data files and XML templates made 'configuration' live more easy
 - Many Delft-FEWS users do not know about many of these new features
 - How can we make sure new FEWS-projects use the **latest** features and **modern** way of configuring Delft-FEWS applications?
- There is a growing number of **Open Data** and **Free and Open Source Models** available from the Internet
 - Delft-FEWS contains many standard import functions that can import this data
 - Delft-FEWS has model adapters for many of these free models
- Delft-FEWS is often seen as a very **complex** system, with steep configuration learning curve
 - Show Deltares colleagues that setting up a **simple** Delft-FEWS system is not that complex
 - If Deltares colleagues like it, why not present it to the Delft-FEWS Community

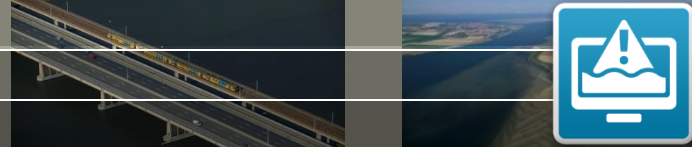
Trigger for the Delft-FEWS Accelerator



- A **Delft-FEWS Pilot System** was developed for Colombo City and Kelani Basin in Sri Lanka
- Pilot System is based on the Delft-FEWS flood forecasting software
- Contains data (open data and propriety data), models and dissemination tools
- Scalable FEWS Pilot System that can easily be extended to a full National system
- **The Open data in this pilot was very valuable for the local hydrologists**

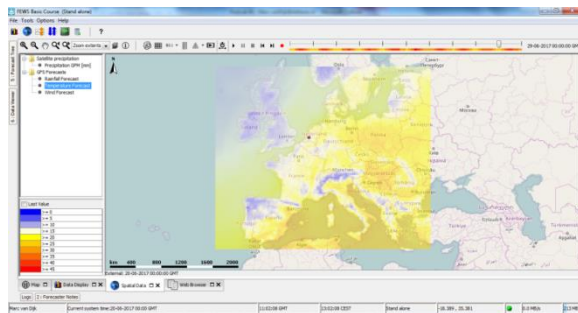


What is the Delft-FEWS Accelerator

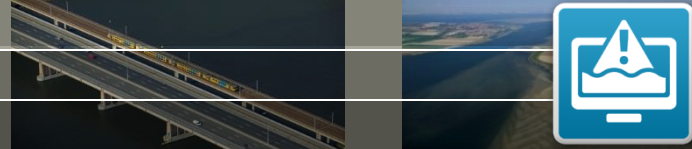


- Automated script from EXCEL that generates an 'Out of the Box' Delft-FEWS forecasting system for a user defined area in the world
- The Delft-FEWS system is able to import data from
 - Earth2Observe project results several global gridded products
 - GFS Meteorological Forecasts
 - EO Rainfall products from IMERGE-GPM and GSMAP
 - Wave height and direction products from WaveWatch 3
- Automatically integrate a WFlow rainfall-runoff model

| | Start FEWS Configuration | Start FEWS Application |
|---|--------------------------|---|
| This Excel sheet can be used to generate a basic Delft-FEWS system, capable of importing DelftFEWS earth observation data with observed rainfall | | |
| Importing GFS data with forecasted rainfall, temperature and wind data | | |
| Importing Earth2Observe processed earth observation data | | Generation of FEWS code completed on 16 Jan 18 15:06 |
| Together with this excel sheet there is a powerpoint presentation that will help making the correct choices for generating the basic Delft-FEWS accelerator system in the box below some basic information of the area of interest must be provided. When all choices are made, Press Start Script to generate the Delft-FEWS configuration | | |
| Edit the Green cells below | | |
| Country | France FR | Countrycode is computed automatically from Producted list |
| Delft-FEWS application name | Level | |
| Coordinates of Lower Left cell centre (X,Y) | 5 44 | http://boundaries.klostermp.com/ |
| Coordinates of Upper Right cell centre (X,Y) | 7 44 | Assumptions: Provide coordinates in integer numbers |
| WFlow Model (Yes/No) | Yes | WFlow model basin file will be generated, run the WFlowBasinTool.py |
| WFlow Model Name | LDRE | Name of the WFlow hydrological model |
| WFlow Grid size | 0.01 | Cell size of the WFlow model grid |
| TimeStep | day | TimeStep of the model |
| Coordinates WFlow Catchment Outlet (X,Y) | -1.5100 -47.2000 | WFlow catchment outlet coordinates |
| Use Earth2Observe Historic data (Yes/No) | Yes | |
| Spatial resolution (Easting, UTM) | 7000 | |
| Timing of EIO data (Daily, 3h) | Daily | |
| Use Wave Watch 3 data (Yes/No) | Yes | |



Integration of Open Data in Delft-FEWS



- Delft-FEWS has interfaces to many open data sources (gauges, satellite, NWP)
- Data is often available on ftp server, or as a (web) service

FTP Server

- Delft-FEWS can import complete files from ftp with complex folder structure
- Disadvantage: Large data volumes as many products cover world domain
- Processing step required in FEWS to cut out area of interest

OpenDAP

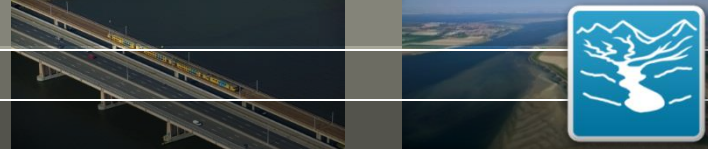
- Delft-FEWS can import NetCDF files from OpenDAP servers
- Advantage: Smaller data volumes as OpenDAP support download of area only
- Disadvantage: Most often data for limited time period available

Access of data

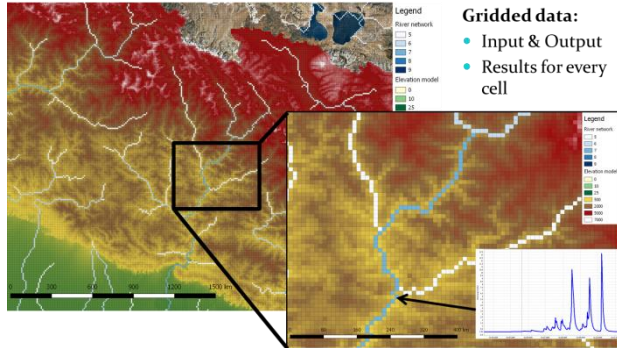
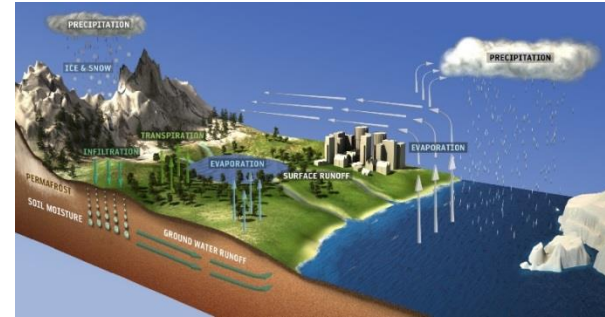
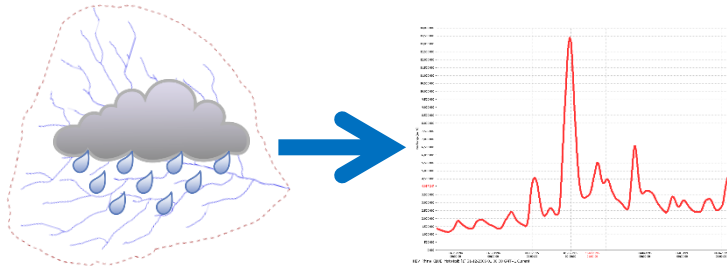
- Import from ftp and OpenDAP require username/password for each product!
- Registration for individual projects is required

Working with Standards can make live easy

Integration of WFlow Model in Delft-FEWS



- Used to understanding the process of **rainfall** → **runoff** on **catchment** scale



- The Deltares open source hydrological model
- WFlow can be used for:
 - > Flow forecasting
 - > River basin modelling
 - > Scenario analysis (climate and/or land use change)

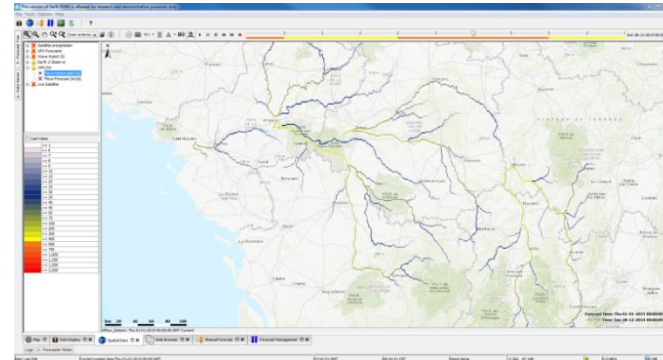
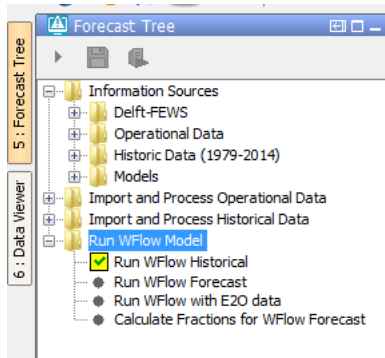
Friday is the Wflow User Day at Deltares

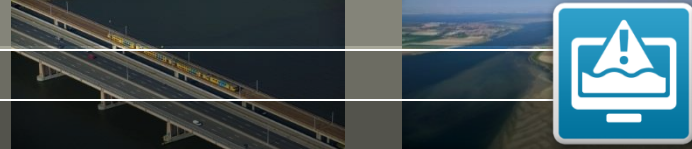
Deltares

Integration of WFlow Model in Delft-FEWS



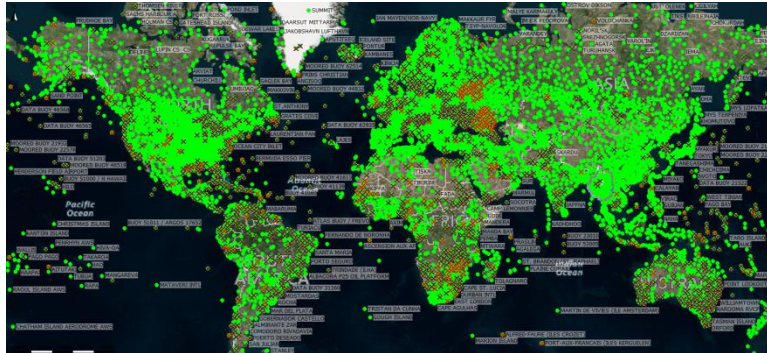
- Delft-FEWS Accelerator can automatically generate a WFlow model for the area of interest
- In the Accelerator script a **WFlow model creation script** is used that will generate a WFlow model with Google Earth Engine data
- Model is **automatically integrated** in FEWS workflows using E2O data and GFS forecasts
- How does it work
 - Enter a model name for the fluvial outflow point of a catchment
 - Accelerator will create all necessary information for the WFlow model creation script
 - Start the Wflow model creation script manually to generate the Wflow model

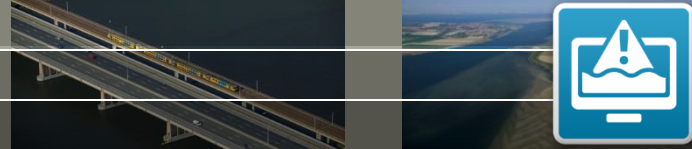




Activities that will be completed in 2018

- Integrated in new Delft-FEWS courses (can be downloaded from the portal)
- Include new developed generic Delft-FEWS functionality
- Prepare the integration of DelWaQ linked to Wflow
- Add new Open Data Feeds
 - Make more regional data available (France, Canada, Netherlands) with local open datasets
 - Import GSOD global datasets with observed meteo (Global Surface summary Of Day data, over 9000 of worldwide stations: 1929 - 2018)





Planned Delft-FEWS Accelerator activities for 2019

- Prepare the integration of Dflow-FM, with automated model builder.
- Link to the Gloffis and Glossis Archive (Deltares Services)



- Add new ‘useful’ Open Data Feeds
 - Any suggestions?

Related activities

- Scripting Delft-FEWS configuration in projects
- Make the Delft-FEWS Accelerator available from the Deltares Website

groovyFEWS by Joel Rachman (2013)