ADB | Japan Fund for Poverty Reduction | URBAN CLIMATE CHANGE RESILIENCE TRUST FUND

Catalyzing Innovations and Digitization for Safe, Sustainable, Resilient, and Inclusive Water Management

E-MARKETPLACE

15–19 March 2021

Flood Early Warning in Asia, exploring new solutions using Delft-FEWS

Daniel Twigt (presenter) & Brigitte Verhagen – Van Kessel (moderator)

Deltares (The Netherlands)

Brief introduction: Daniel Twigt

- Senior Advisor Flood Early Warning
- Research Coordinator Real-Time Information
- Flood Forecaster at Water Management Centre of the Netherlands

Deltares

Deltares

- We are working on smart innovations in the field of water and subsurface
- We are the knowledge partner of the Dutch government.
- We make our knowledge applicable worldwide.
- We are a strategic partner and trusted advisor internationally.
- We believe in open source / freeware software.

877
Number of employees

79%
University / Ph.D.
39 nationalities

Regional offices in Abu Dhabi, Singapore and Indonesia

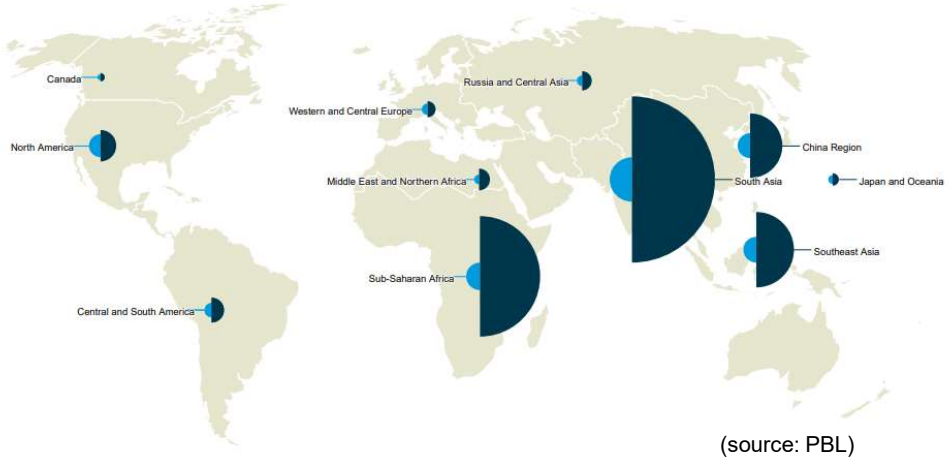
118
m€
Net turnover

ADB Deltares

Managing water in a changing world & climate

Flooding, and the importance of flood early warning

Annual exposed damage due to flooding is expected to increase substantially (2010 – 2050)



(source: PBL)

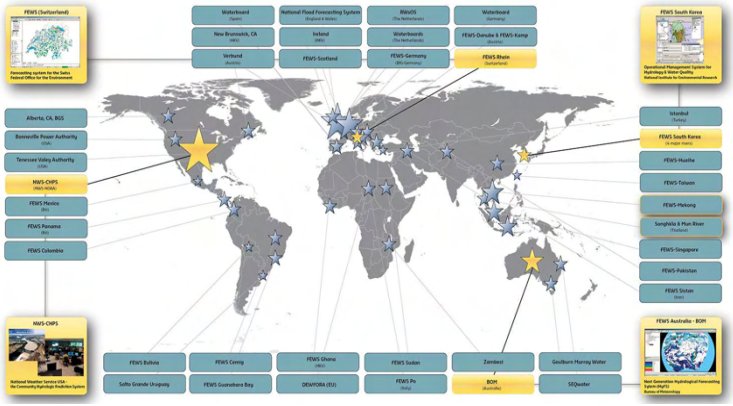
UN ISDR Guidelines for the reduction of flood losses: “The operation of a flood warning and response system is the most effective method for reducing the risk of loss of life and economic losses”

Sendai Framework target 7: “substantially increasing the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people”

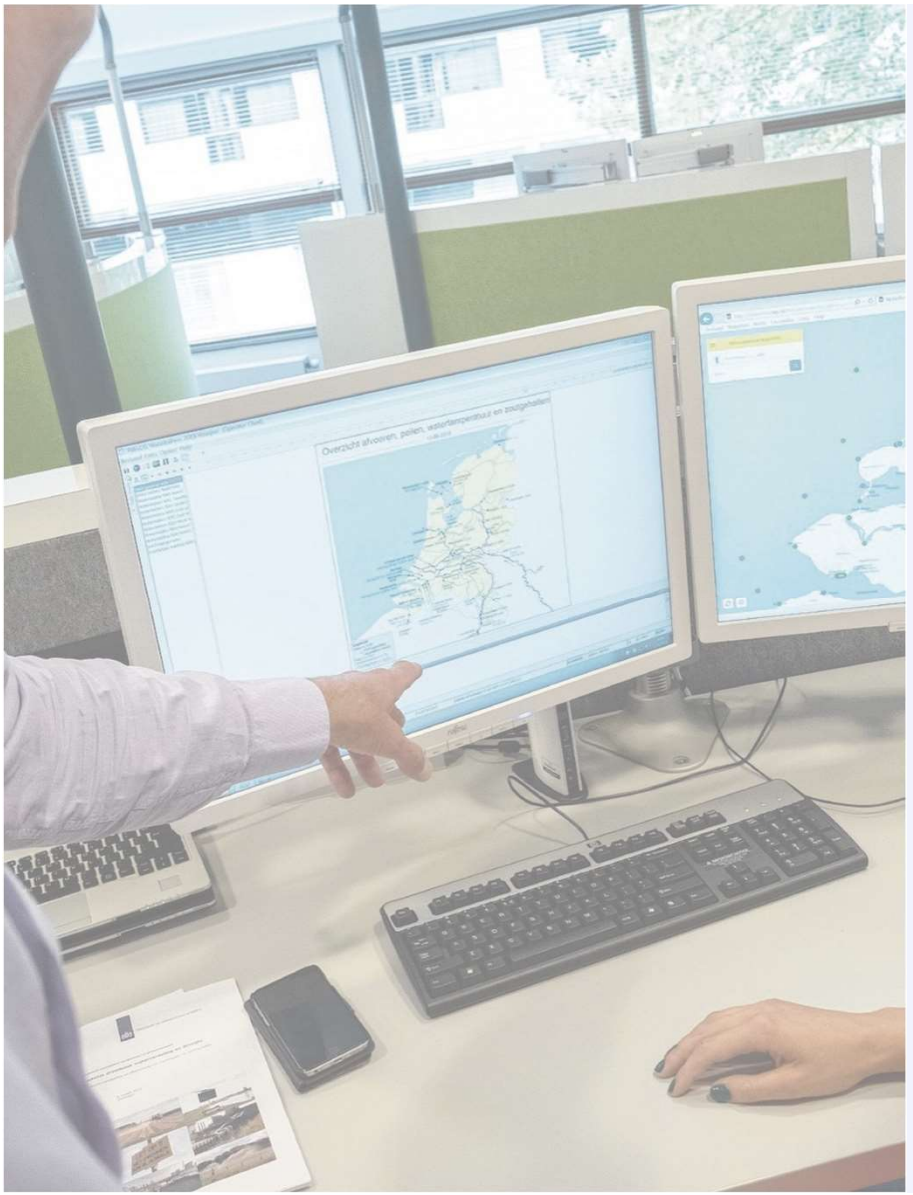
Our solution: Delft-FEWS

Delft-Flood Early Warning System (FEWS):

Powering flood early warning systems around the world



50+ countries



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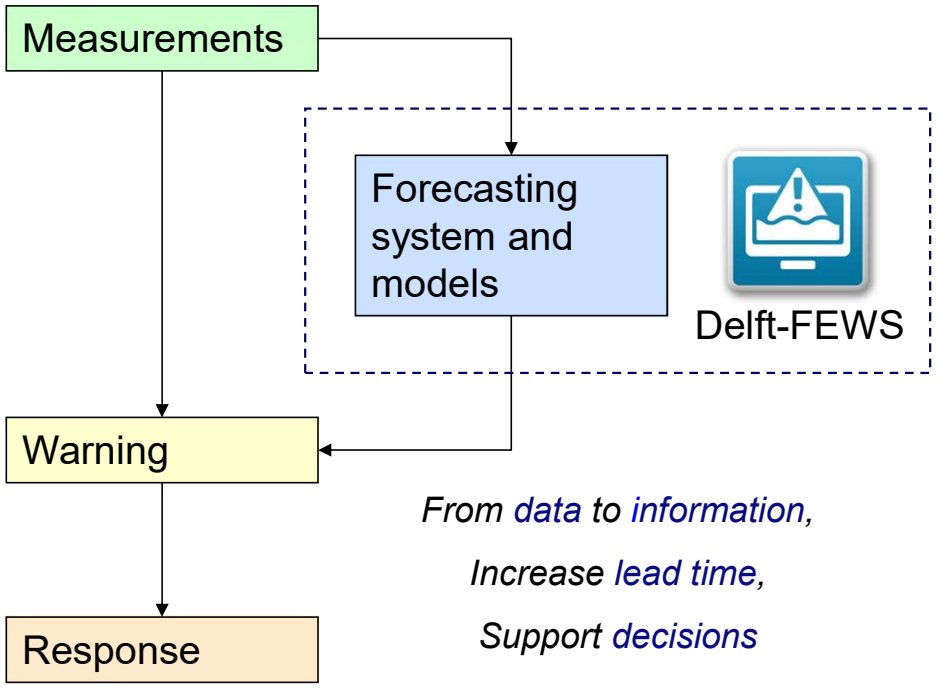
What is Delft-FEWS

People or properties at risk

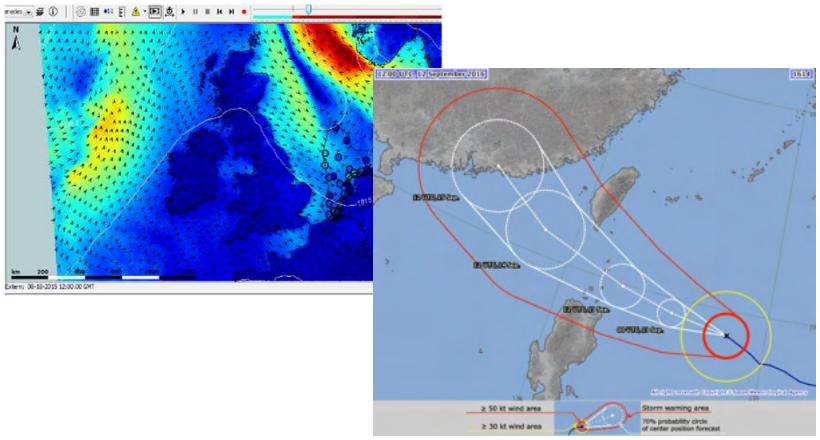


From data to information,

Increase lead time,

Support decisions

Response required



Source: UK Met Office

Source: ABC news

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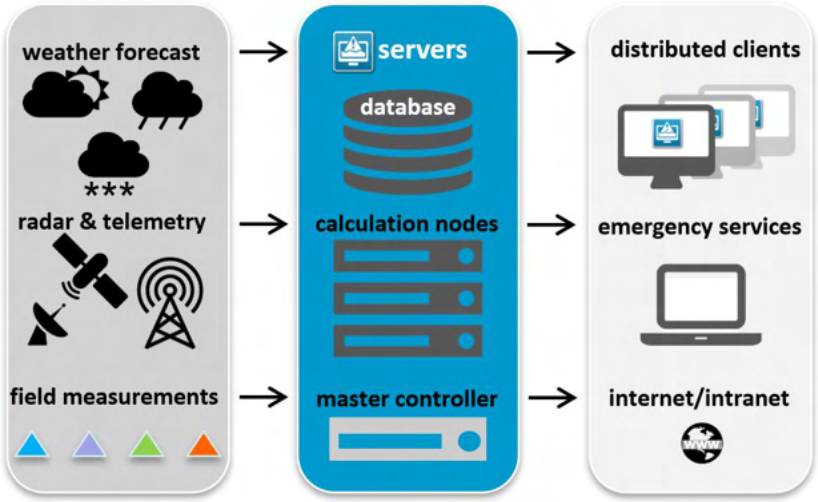
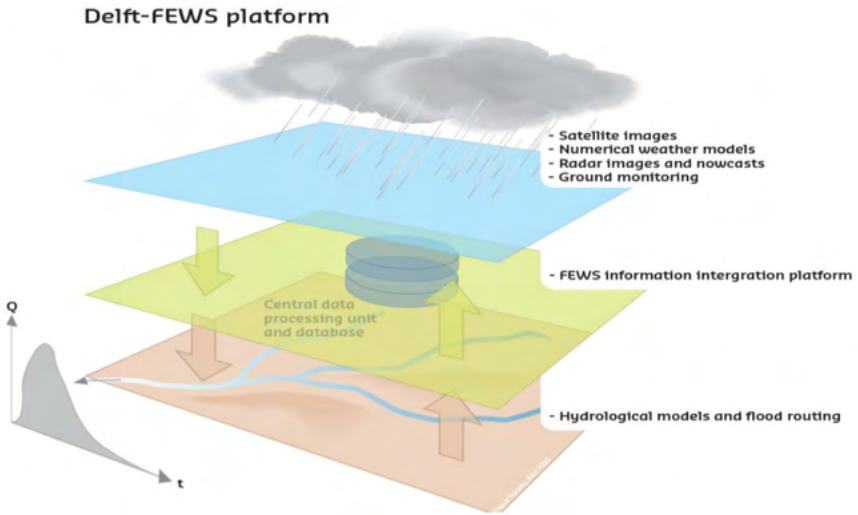
Structuring data, running models, easy access





Open platform for operational forecasting, integrates with many of the commonly used hydrological and hydrodynamic models

70+ models coupled

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Application of Delft-FEWS

- Flood Forecasting and Early Warning
- Operational Water Information System
- Drought Early Warning
- Operational Reservoir Management
- Operational Water quality monitoring
- Real-Time Control of Sewer Systems
- Real-Time Advice on Operational Management of water systems
- Research influence of climate change on hydrological systems
- Operational Dike Strength Monitoring
- Ground water management

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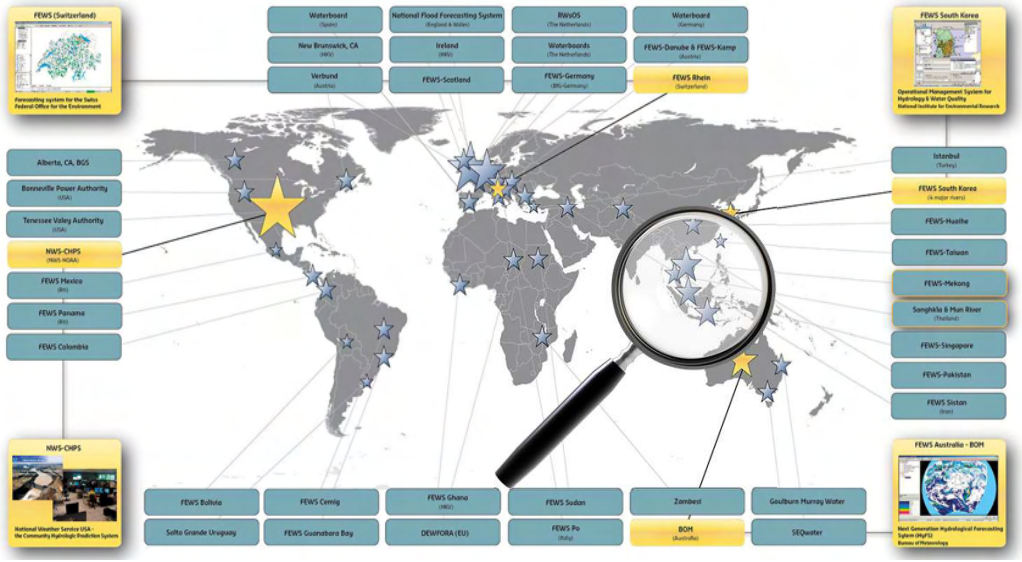
Applications in Southeast Asia: some examples



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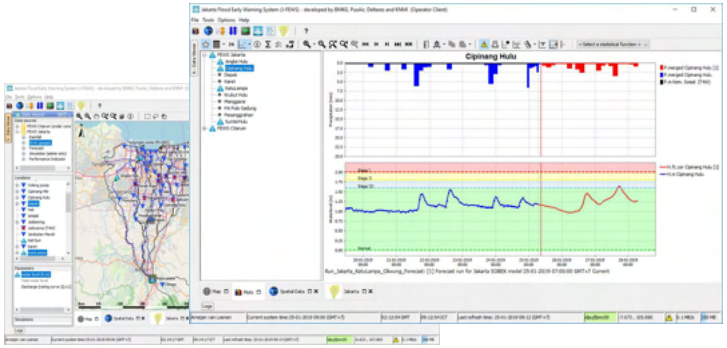
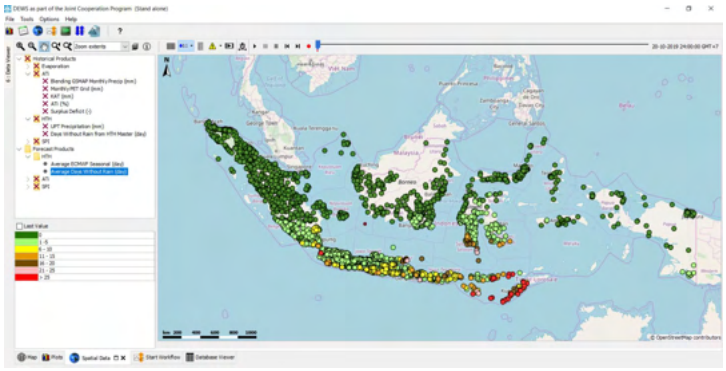
Examples: Indonesia

Various systems in development in Indonesia



Flood Early Warning for Jakarta and Upper-Citarum, forecasting floods by high river discharges and high sea levels



Drought Early Warning for Indonesia, forecasting water availability and surplus - deficit

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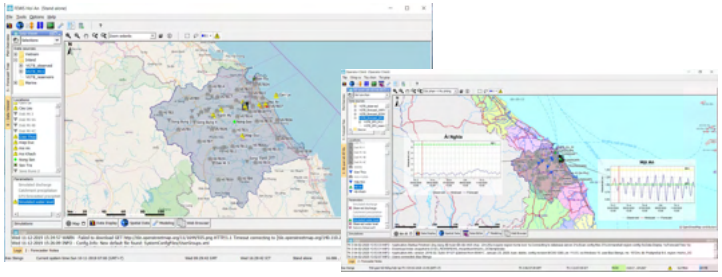
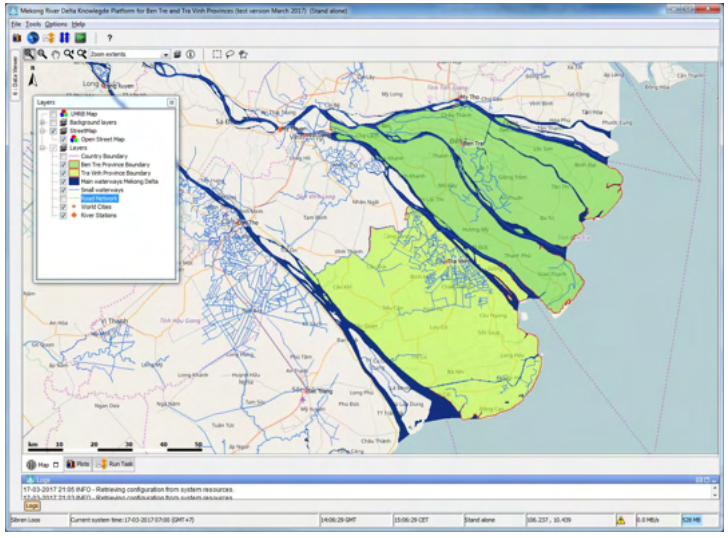
Examples: Vietnam

Various systems in development in Vietnam





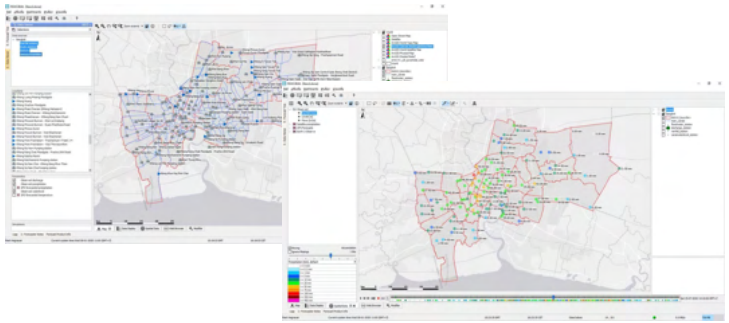
Flood Forecasting and Warning System for Hoi An and Vu Gia-Thu Bon River Basin

Mekong Flood Forecasting System for the Regional Flood Management and Mitigation Centre of the Mekong River Commission (MRC)

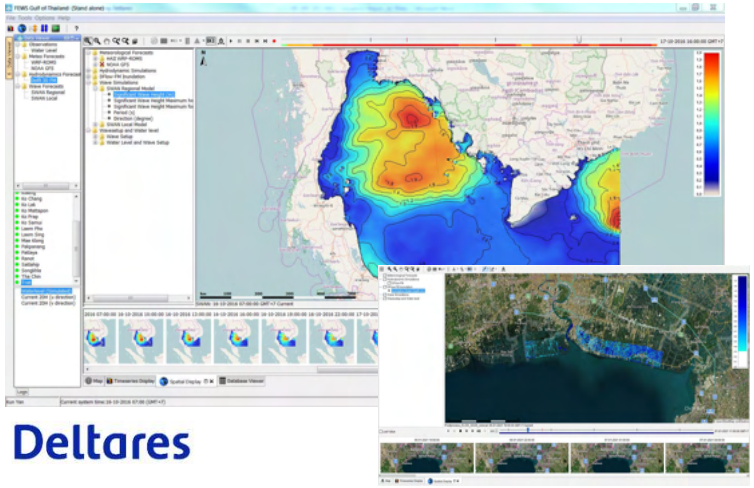
Automatic salinity forecasting and water quality monitoring system (ASWQM) in Ben Tre and Tra Vinh Provinces, Vietnam

Examples: Thailand

Various systems in development in Thailand



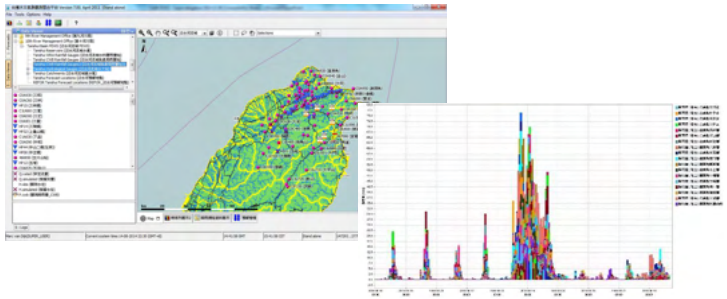
Flood Forecasting for city of Bangkok

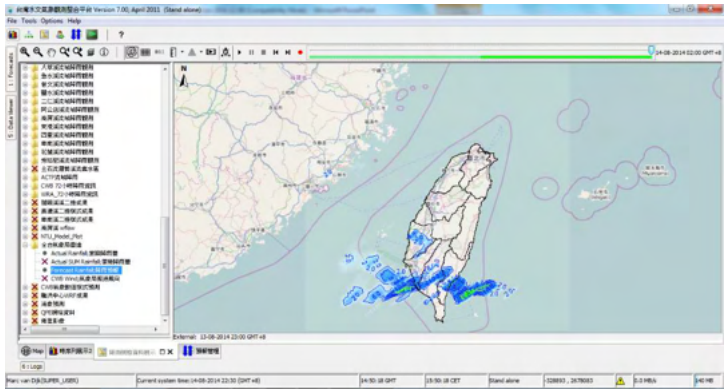


Coastal flood forecasting along the Gulf of Thailand together with the Hydro-Informatics Institute

Examples: Taiwan

FEWS-Taiwan in development in Taiwan





Flood Forecasting due to typhoons and extreme rainfall events for the Water Resources Agency

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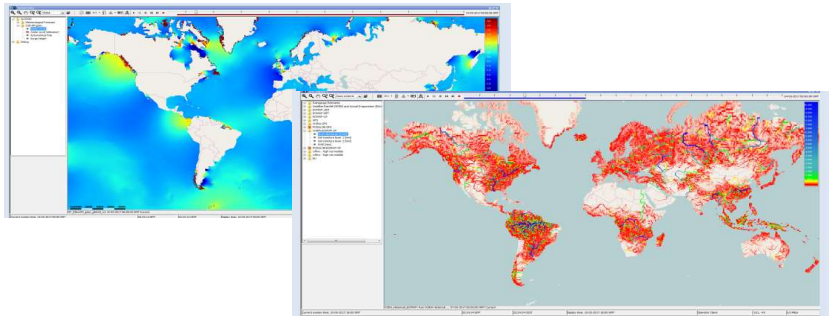
Date raster layer
11-03-2021 17:00
All datasets
Currents
Water level
Surge Height
-1
1
[m]
Tide
Maximum water levels
Tidal indicators
Wind
Waves
Precipitation
Air temperature
Discharge
Wave and wind climate
Bathymetry
Global Lowland LiDAR DTM
Elevation
Shoreline Monitor
Wave Height CHASM
Wave Direction CHASM
Wave Period CHASM
Turbulence CHASM
Wind Speed CHASM
Wind Direction CHASM
Groundwater declining trend
Ongoing developments
Deltares
mapbox

Examples: the whole world

Global forecasting R&D by Deltares



Global discharge and water level forecasts

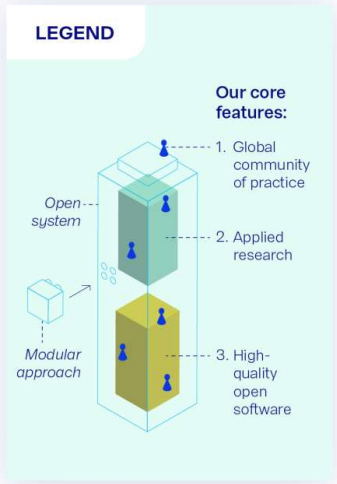
Forecasting coastal storm surge around the globe using Deltares' Global Tide and Storm Surge Model (https://blueearthdata.org)

Our vision of the future

- Related to Delft-FEWS software: modular, data handling, easy connection: an ecosystem
- Important research topics:
  - Global modelling
  - Impact forecasting
  - Nowcasting
  - New types of data and information, e.g. mining online data
  - Communication technology
  - Machine learning

The future of hydrological forecasting

In 2025, we foresee that hydrological forecasters will have to process large amounts of data, assess more models and describe the potential impact of extreme weather and water events. We expect that they have to communicate their prognoses - including uncertainties - to a wider public.



Delft-FEWS in 2025

Delft-FEWS software is a sophisticated collection of modules designed for building a hydrological forecasting system customised to the specific requirements of an individual organisation.

In 2025, Delft-FEWS has developed into a type of ecosystem: Delft-FEWS is at the core and easily connects to external data sources, other software applications and communication tools. The software is state-of-the-art due to the unique combination of:

1. Global community of practice
2. Applied research
3. High-quality open software

[The Future of Hydrological: A Scenario of Analysis | ADB Knowledge Event Repository (development.asia)]

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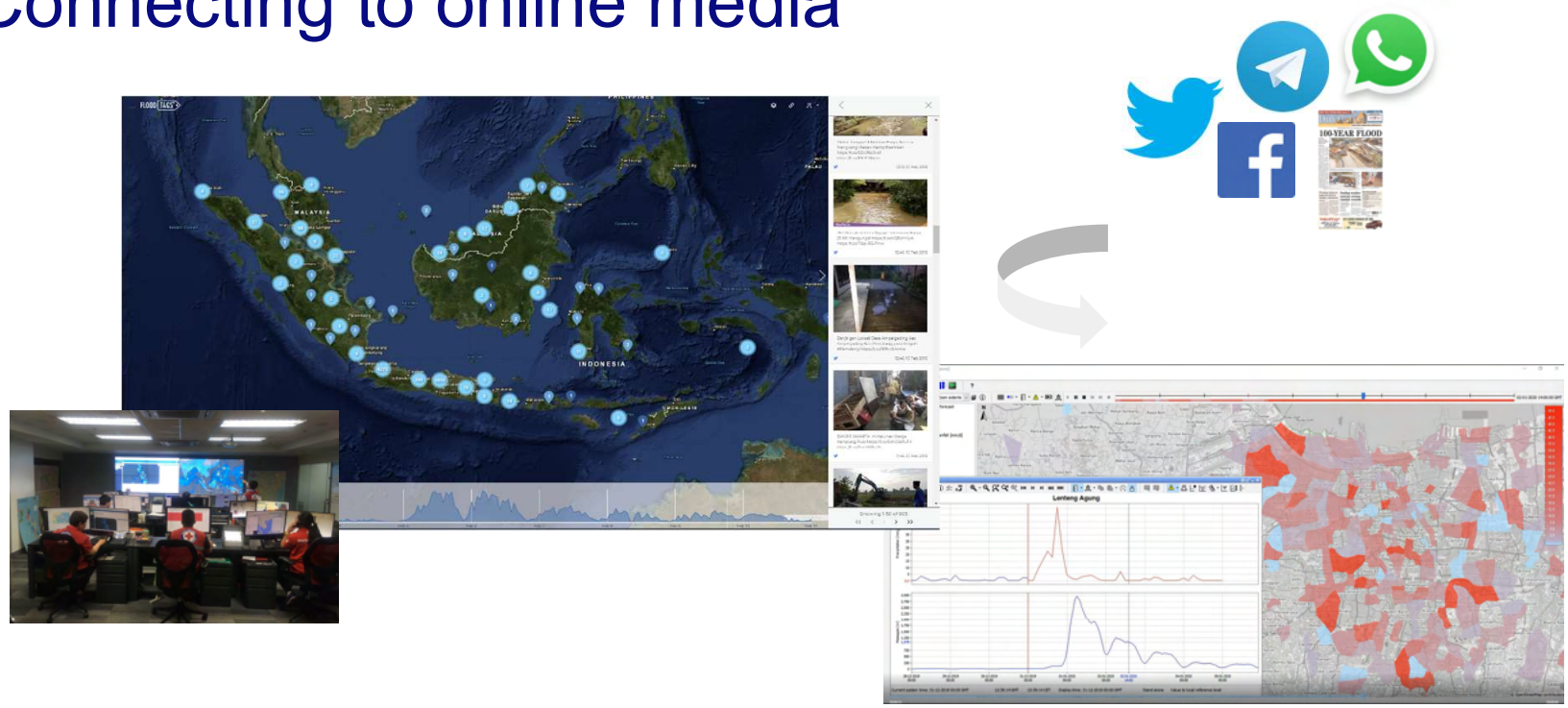
Connecting to online media



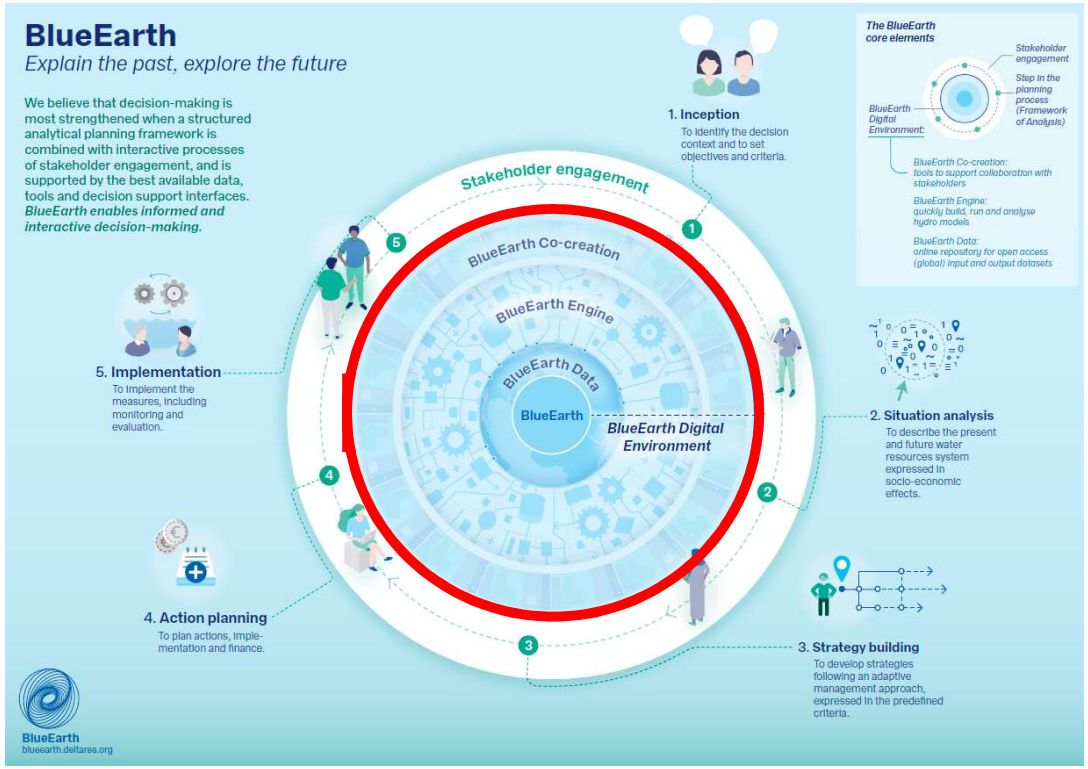
With FloodTags (https://www.floodtags.com)

Flood early warning in Asia, exploring new solutions | ADB Knowledge Event Repository (development.asia)

Deltares FLOOD TAGS®

BlueEarth

An integrated open platform with information and tools to support water-related planning processes



https://blueearth.deltares.org

- Blue Earth Tools are used to quickly **build**, **run** and **analyze** hydro models.
- The tools include **state-of-the-art data processing methods** to apply the models on various scales and resolution.
- The tools are developed largely in the **Open Source** domain, using the rich scientific **Python** eco-system.
- Blue Earth Tools links to Blue Earth Data. The main components within the Blue Earth Tools are the **Model Builder** (“hydromt”) and the **Computational Framework** to integrate data and models and prepare your scenarios.

Delft-FEWS inside

Collaboration

Community-based approach

Collaborative design and training on the job

Taiwan Indonesia Thailand

Deltares

Community-based approach

- Community of Practice (approx. 2500)
- Knowledge sharing Delft-FEWS User Days

Using Delft-FEWS

- Deltares maintains core application, users manage their own configuration (including models)
- International Community Strategy Board governs long term strategy of core application
- Delft-FEWS can be used free of charge following projects with Deltares
  - Where we co-develop your Delft-FEWS application with you, or
  - Where we train your staff to develop your Delft-FEWS application
- Delft-FEWS can be used free on charge following projects with Delft-FEWS intermediaries

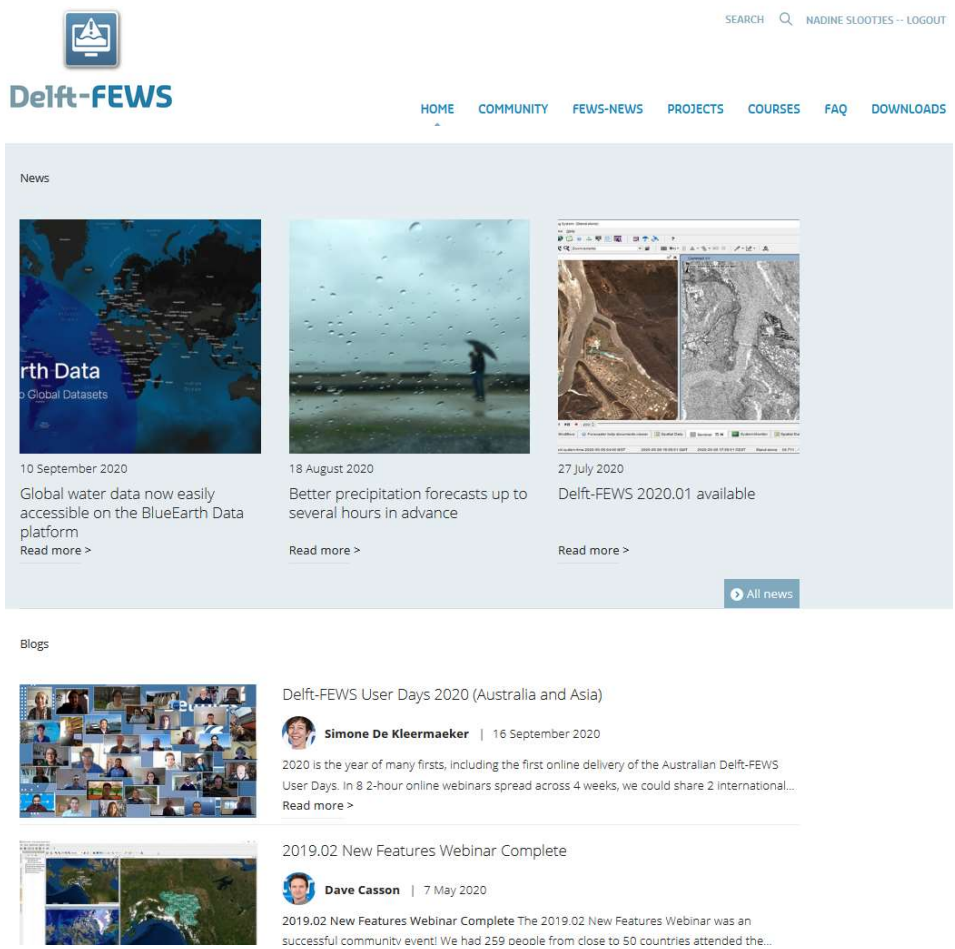
Get involved

Getting started:
http://www.delft-fews.com

Delft-FEWS Product Management:
fews-pm@deltares.nl

Regional Manager Asia:
tjitte.nauta@deltares.nl

R&D real-time information:
daniel.twigt@deltares.nl



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Q&A session

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