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# Introducing OWM

## FEWS Anwendertreffen 2024

Thursday, June 20, 2024

# Deltares – Enabling Delta Life

## About us

We are Deltares. A not-for-profit, world-leading, and mission-driven Dutch knowledge institute for water and the subsurface. We work throughout the world and we are guided by the major societal issues, for which Deltares' knowledge is indispensable. This is what drives our highly qualified workforce of over 900 colleagues, which is comprised of over forty different nationalities.


https://www.youtube.com/watch?v=Nxb9SnBIxYY

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# Deltares – Real time information

## WHO?

**About 50 people,**
**spread over 3 departments:**

- **Operational Water Management**
- **Environmental Hydrodynamics and Forecasting**
- **Water Operations Software**

## HOW?

**Research and Development**

**Software and support**

**Data and Services**

**Courses and Trainings**

**Expert consultancy**


HILFIGER
NEW YORK
Pedals

# OWM[1] Mission:

# Enabling better forecast, enabling better decisions

[1]OWM: Deltares' Operational Water Management department

# Department OWM strategy

**Enabling better forecast,**
**enabling better decisions**

ML & AI

**Decision making**

**Real time control**

**Improving forecasts**

**Drought forecasting**

**Impact forecasting**

**Urban flooding and nowcasting**

**Hydrological (flood) forecasting**

# Urban forecasting and nowcasting

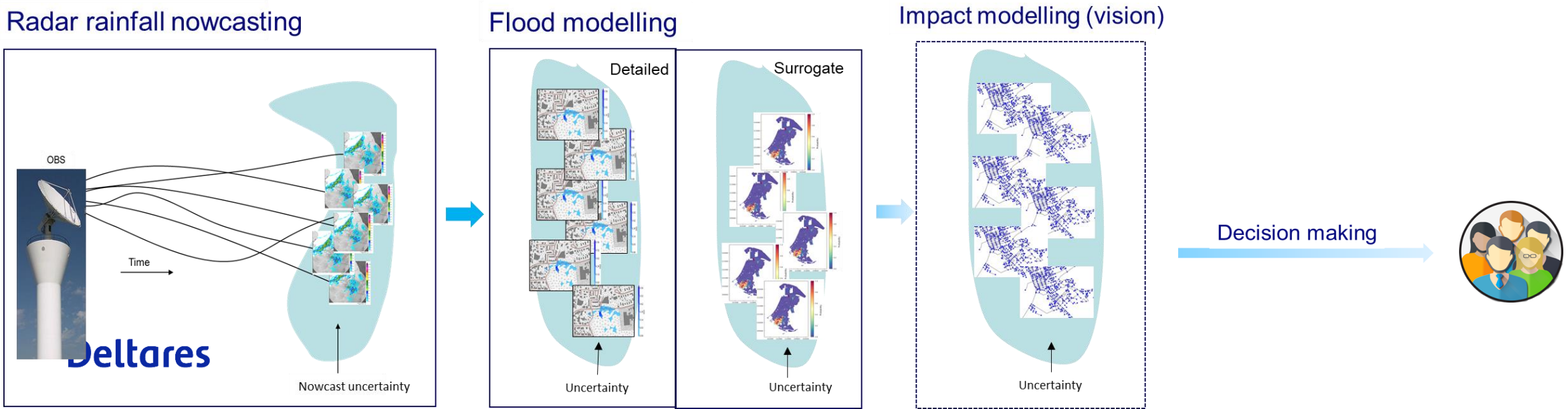
Goal: To create state-of-the-art **forecasting models and tools** specifically **tailored to urban environments** to reduce the impact of rapidly occurring urban floods.

Applications include:

- State-of-the-art nowcasting models
- Rapid flood models
- Tailored urban forecasting applications

How:

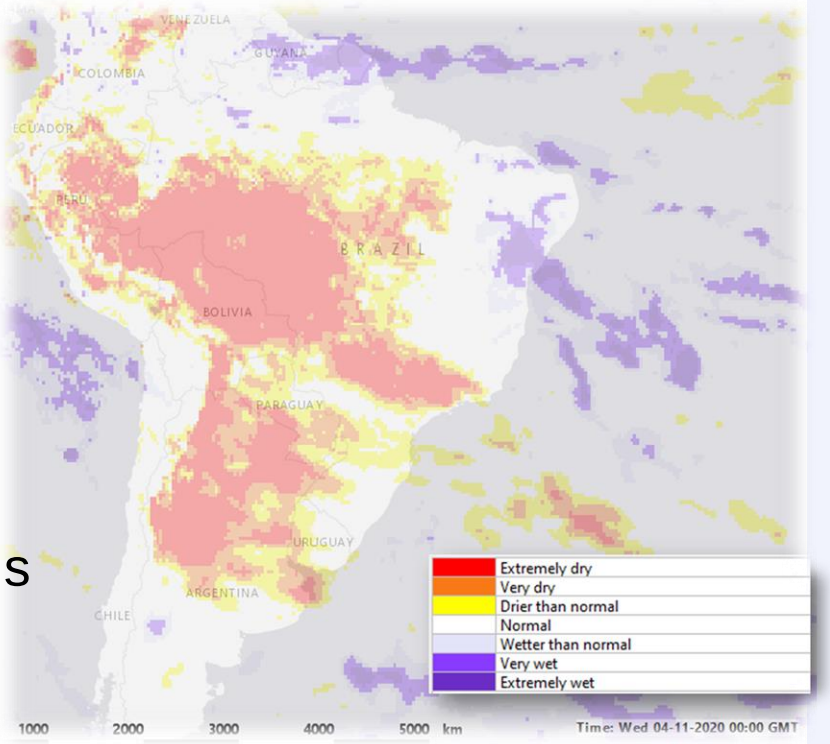
- Combining big data, radar and satellite data, exploration of opportunistic sensors, and AI techniques
- Contributor to open-source pysteps nowcasting framework
- Integration in Delft-FEWS
- Development of rapid urban flood surrogate models



# Drought Forecasting

Forecasting of **potential drought conditions** in a specific region over a defined period, helping communities and policymakers to better prepare and manage water resources and mitigate the impacts of droughts.

- At OWM we focus on the (sub-)seasonal forecasting of **meteorological**, **agricultural** and **hydrological** droughts.
- Applications include:
  - On-premises tailored applications (based on Delft-FEWS) for clients that have the capacity to operate those.
  - Cloud-based applications and supply of 'forecasts as a service' for clients that will not host dedicated system.
- **How:**
  - Combining big data, earth observation, hydrological models and meteorological forecasts
  - **Integration in Delft-FEWS**
  - Derivation of drought indicators and probabilities of occurrence

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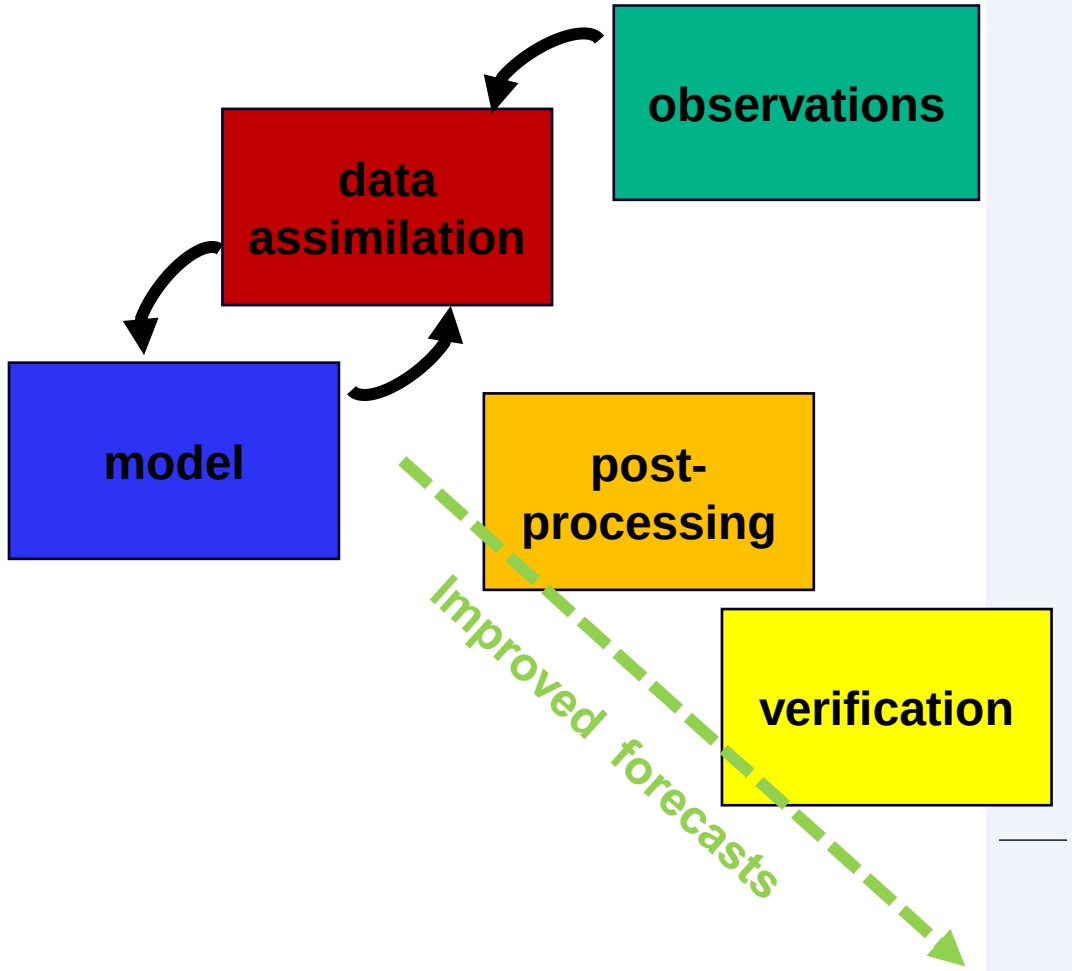
# Improving the forecast

**Measure and improve the quality** of hydrological forecasts to aid decision making, using advanced modelling techniques like **statistical post-processing** and **data assimilation**

At OWM we have long history in developing and using techniques to improve forecast quality and value

- **Applications include:**
  - **Forecast Verification:** calculating, interpreting and communicating scores and diagrams that give insights in forecast quality
  - **Data assimilation** to correct model simulations using real-time data
  - **Statistical post-processing** techniques to correct forecasts from analysis of long records
- **How:**
  - OpenDA for data assimilation with all sorts of models
  - Integration of tooling with the **Delft-FEWS stack (Archive and Webservice)**
  - Link with Data Science and AI/ML methods



# Optimization

Finding the **best possible** solution or set of **decisions to manage** and utilize water resources efficiently by **achieving specific objectives** while considering system constraints.

- At OWM we focus on the operational application of optimization techniques.
- Solve system over entire time horizon in one calculation → operational advice **accounts for future forecasted events**
- **Applications include:**
  - Reservoir operations
  - Groundwater management
  - Pump scheduling
  - Hydropower
- **How → RTC-Tools:**
  - Flexible tool, providing **optimal advice** for operating hydraulic structures
  - Goal programming → Transparency in prioritizing operational objectives
  - **Integration in FEWS**
  - Can **deal with forecast uncertainty** using ensemble techniques
  - Simulation companion models for a **decision support system**

RTC-Tools

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Edertalsperre dam, Germany