



# Hydrodynamic simulations in the cloud using QGIS

3Di Watermanagement



Nelen &  
Schuurmans

5-7-2023



# Introduction



Nelen &  
Schuurmans



- › 3Di is developed by Nelen & Schuurmans
- › **Software Development in the Water Domain**
- › **Water Management is Information Management,**  
since 1998

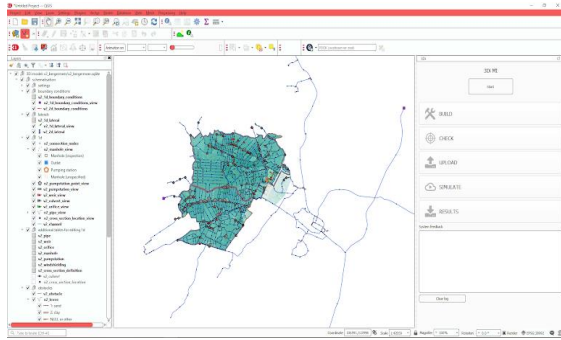
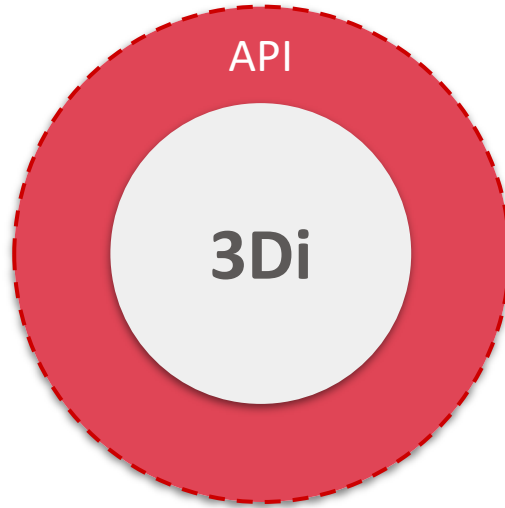
- › Jonas van Schrojenstein Lantman
- › Product Manager



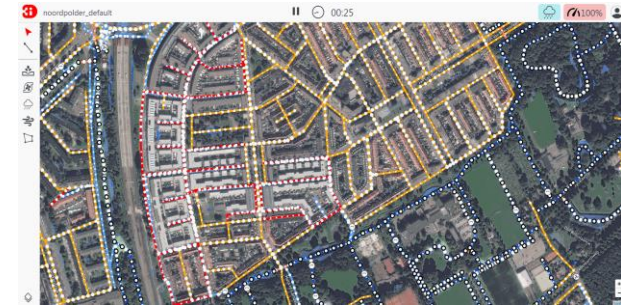
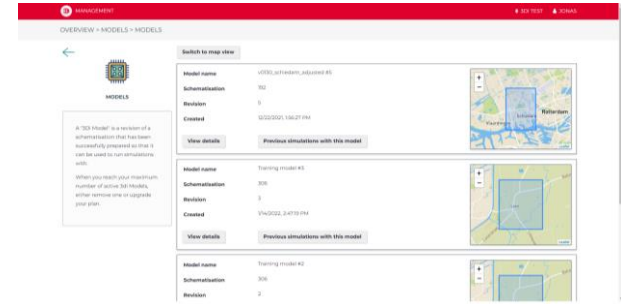




# Ecosystem 3Di



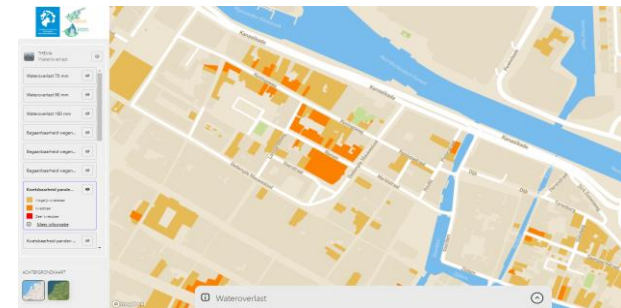
Modeller Interface



Training Dashboard Scenario 5(1)

FloodSmart Warnings

| Warning area                   | Current level (mNOD) | Max forecast level (mNOD) | Time to rise | Forecast level (mNOD) | Water depth (m) | Max water depth (m) | Map |
|--------------------------------|----------------------|---------------------------|--------------|-----------------------|-----------------|---------------------|-----|
| De Goyt Park                   | 28.40                | 28.40                     | 0min         | Major                 | 25.40           | 26.20               |     |
| Tongeren Creek                 | 28.70                | 28.70                     | 0min         | Major                 | 27.00           | 28.40               |     |
| Uiter Tongeren and Westervliet | 16.50                | 16.50                     | 0min         | Major                 | 14.40           | 15.40               |     |
| Westland and North Perkenen    | 16.00                | 16.00                     | 0min         | Major                 | 13.00           | 13.90               |     |
| Staking Mils Creek             | 16.50                | 16.50                     | 0min         | Major                 | 12.50           | 14.40               |     |
| Perkenen O&B                   | 8.45                 | 8.40                      | 30min        | Major                 | 3.00            | 3.30                |     |
| Wolfskreek Creek               | 9.60                 | 9.60                      | 0min         | Major                 | 7.60            | 8.40                |     |
| Clay C&P Creek                 | 11.30                | -                         | -            | -                     | -               | -                   |     |
| Weyland Creek                  | 9.30                 | -                         | -            | -                     | -               | -                   |     |
| Tubbeek Creek                  | 9.00                 | -                         | -            | -                     | -               | -                   |     |



Management & versioning

Live & Interactive

Flood Early Warning

Impact Assessment



## 3Di characteristics in short

- › 3Di is a **cloud-based** hydrodynamic modeling software
- › 3Di **follows** every drop of water **above** and **underground** (0D-1D-2D)
- › 3Di computes **large areas** using a **high resolution** with **subgrid**
- › 3Di model building is **fully GIS based**
- › 3Di has **model versioning**
- › You can **interact** with your 3Di simulation in the **browser**
- › You can **fully control** and **interact** with your 3Di simulation using its API
- › You can **automate every step** in the modelling process





# Kakhovka Dam

3Di Live

3di.live

Welcome, Jonas

**New session** Follow session

Billing goes to: N&S Demo

Hide deprecated models

Search: kak

| Model                       | Revision | Last updated | Updated by           |
|-----------------------------|----------|--------------|----------------------|
| Nova Kakhovka dam break #12 | 12       | 6/30/2023    | demo.jonas           |
| Nova Kakhovka dam break #11 | 11       | 6/23/2023    | leendert.vanwolfswin |
| Nova Kakhovka dam break #10 | 10       | 6/16/2023    | leendert.vanwolfswin |

1

START







## Flood Barriers

)



# 3Di Water Management

Hydrodynamic Simulation Software

Flood Barriers in the Live Site





# Demo Modeller Interface

The screenshot displays the QGIS 3Di Modeller interface. A central dialog box titled "Simulation overview" is open, showing a table for "Running simulations" with columns for "Simulation name", "User", and "Progress". Below the table is a "New Simulation" button and a "Stop Simulation" button. The background shows a 3D model of a landscape with a river and buildings. The interface includes a menu bar, a toolbar, a Layers panel on the left, and a 3Di Models and Simulations panel on the right. The status bar at the bottom shows the coordinate (237490.7, 559133.6), scale (1:1010), magnifier (100%), rotation (0.0°), and render options.

Nelen & Schuurmans



Nelen & Schuurmans

Netherlands  
Membership level: Medium  
(01 March 2023 - 29 February 2024)



Lutra  
CONSULTING





# Applications

## Pluvial flood >

Fluvial flood

Coastal and Estuary

Water system analysis

Calamity flood models

Resilient urban planning

Sewerage design

Operational models

Flood forecasting

Water Quality

Ground water flooding

## Pluvial flood

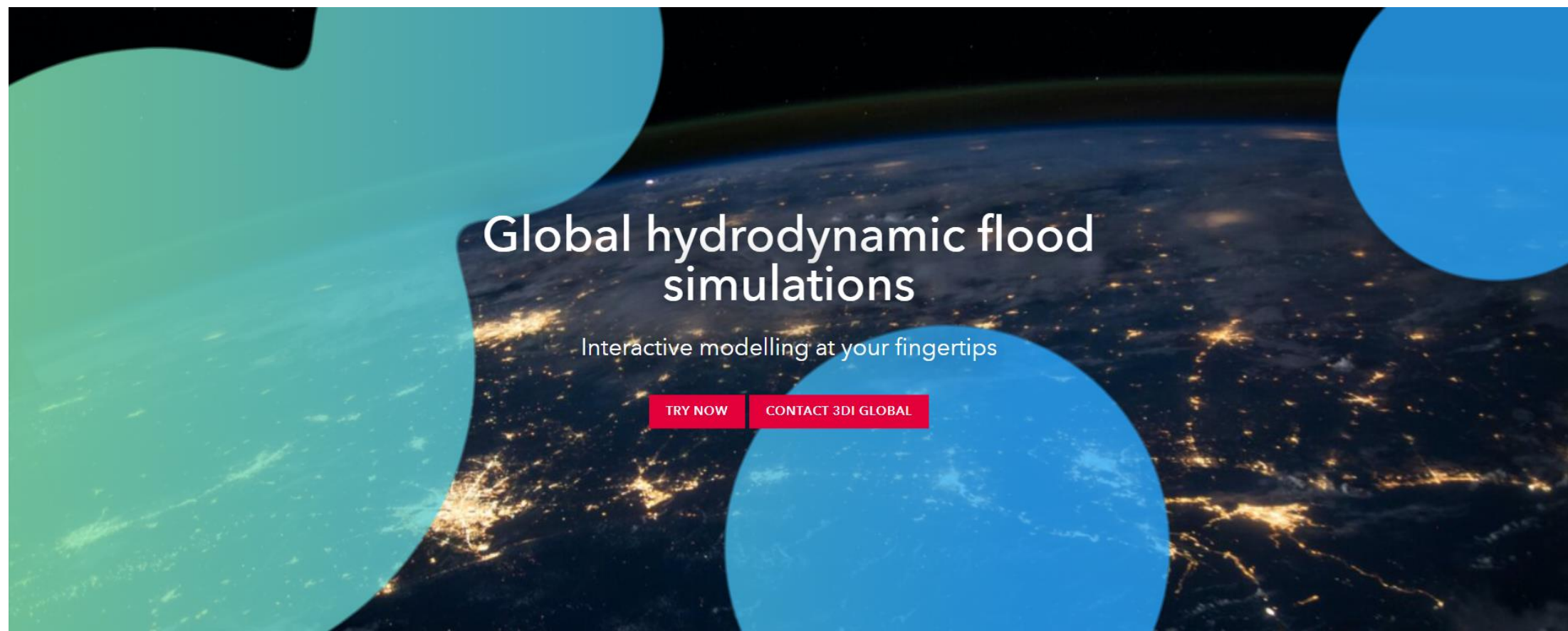
Flooding as a result of heavy rainfall. Options range from using simple rainfall timeseries to rainfall radar and weather forecast models. Thanks to the subgrid method, wetting and drying is automatically taken into account. This makes 3Di very stable for these situations. With the integrated calculation of surface-, sewerage - and freatic ground water flow it is possible to calculate the result of heavy rainfall in great detail, with high accuracy.







# Illustrating the value of cloud based simulations



## Global hydrodynamic flood simulations

Interactive modelling at your fingertips

TRY NOW

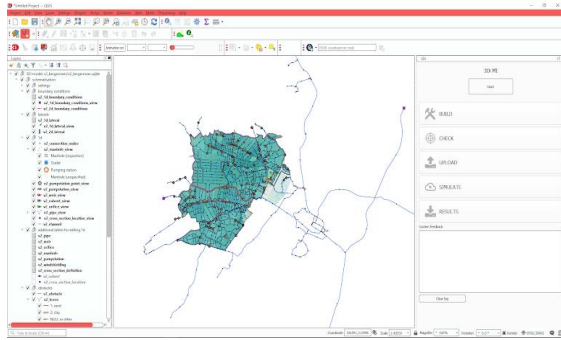
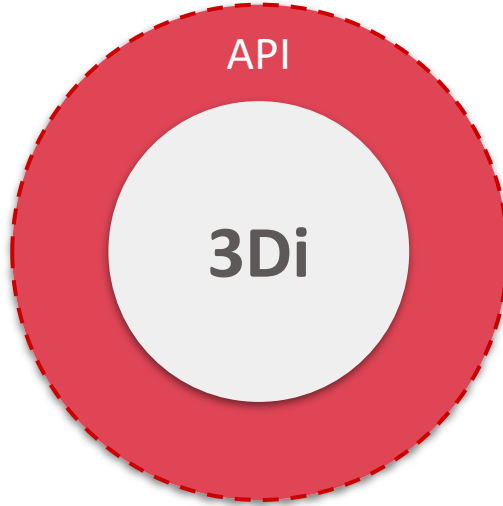
CONTACT 3DI GLOBAL

<https://3diwatermanagement.com/global/>

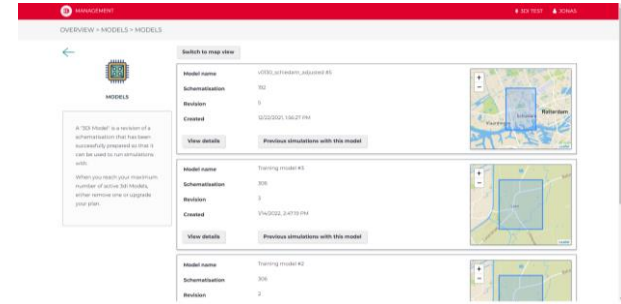




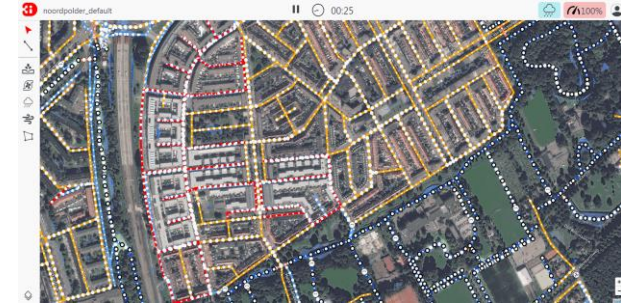
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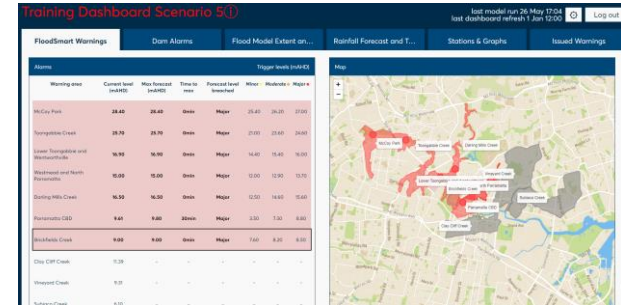
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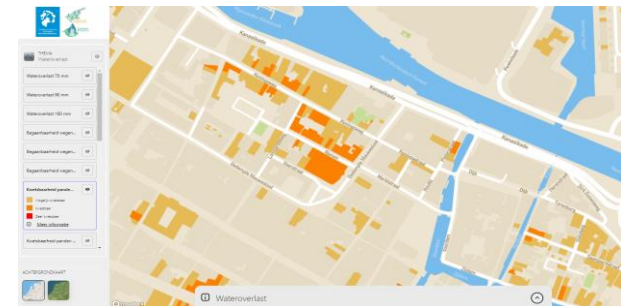
Management & versioning



Live & Interactive



Flood Early Warning



Impact Assessment



## Keep informed



- › Release mails / News Letters
- › LinkedIn: <https://www.linkedin.com/showcase/3di-water-management/>
- › Youtube: <https://www.youtube.com/channel/UCecYX88MyFeP-1mpx7HOoJw>
- › Webinars: <https://3diwatermanagement.com/learn/webinars-and-videos/>
- › (Scientific) Publications: <https://3diwatermanagement.com/learn/publications/>
- › User Documentation: <https://docs.3di.live/>







## Colofon

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