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Dutch Risk Reduction and Surge Programme (DRRS)
Global Near real-time modeling initiative 2026 - Hydrometeorological rainfall expert

1. Background

To assist worldwide during water related crises, the Dutch government has mandated the Dutch Risk Reduction and Surge Support (DRRS) programme with the responsibility to assist foreign governments and international organizations with expertise on water. Over the last 10 years innovative approaches have been found, and many partnerships have been built. A recent remote technical support initiative has been applied, amongst others, to Ukraine, Libya and Botswana, leading to the idea of further focusing on near real-time iterative flood modelling. The team is constantly being developed in order to function optimally in the dynamic environment of emergency management.

2. Overall specifications

a. Scope and objectives

There is a need for a hydrometeorological rainfall expert to be part of a group of standby experts, who in the case of an activation by RVO can join an ad-hoc team to deliver flood predictions within hours to days after request. A more detailed description on DRRS' Near Real-time Modelling (NRM) team can be found in annex C.

b. Activities

The NRM team is on standby to provide RVO and with input on separate but interlinked topics:

1. Determination of relevant scenarios in cooperation with RVO and partners
2. Estimation of the pluvial, fluvial and coastal parameters to serve as input for flood anticipation
3. Selection of suitable modeling tools
4. Visualization of the flood event or scenarios
5. Dissemination and explanation of the results with RVO and relevant partners

Between these overarching activities of the team, the role for Hydrometeorological rainfall expert will focus on the delivery of the appropriate precipitation data to serve as input for the hydrologic modelling or associated impact assessment.
Specifically, this should encompass the integration near-real-time satellite data with ground-based measurements to provide accurate, actionable information on precipitation that can be integrated into flood modelling. Herein, rapid analysis is key, aiming to provide results within a matter of hours.

The activities for the hydrometeorological rainfall expert will include:

- Testing the usefulness of available rainfall in the context of NRM team by hindcasting a set of 3-4 historical events together with the modelers, and assess reliability of associated flood forecasts.
- For future deployments, apply such approach to a number real-time events and produce the results with the joint NRM team in the ~2 hours timeline.
- Contribute to a workshop organized between RVO and EU-JRC (Joint Research Centre) to further develop and optimize the use of this 'near real-time' precipitation data for flood modelling, both in the processes of the NRM team as well as at EU-JRC.

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c. Deliverables

A key responsibility for the Hydrometeorological rainfall expert is to rapidly decide on and to prepare appropriate data source(s) for subsequent use in hydrological modeling and flood assessment in the NRM team. Specific deliverables are to be agreed upon on initiation of the deployment with the partner organizations. They will most likely encompass the following items:

1. An overview of suitable data sets and analysis tools
2. Hydrological modelling results (including visualization in charts and maps)
3. Documentation describing assumptions underlying the results
4. Explanatory presentation of assumptions, methods and results

Contributing to a (jointly organized) workshop on the integration of nowcasting data in the team.

3. Required expertise

General requirements (applicable for all for all NRM team members):

- Able to rapidly assess situations and data and provide conceptual and practical solutions;
- Experience in and knowledge of international (water) crisis context;
- Ability to be a relevant sparring partner for the local officials and to provide feedback on the existing plans and ideas, as well as provide input for suitable alternatives;
- Excellent presentation and reporting skills in English;
- Willing to work outside of office hours;
- Be available all days of the week to respond to questions by phone or refer to a colleague with similar skill set in case of absence;
- Good communication skills in English.

Hydrometeorological (rainfall) expert:

- Have insight and experience in working with available precipitation data sets and tools, including 'nowcasting' products and associated ongoing innovations.
- Experience with blending near-real-time satellite data and with ground-based measurements;
- Focus on (precipitation) data for extreme events;
- Able to very quickly integrate environmental datasets, clean them, and get them ready to be used on the modelling solutions applied;
- Strong experience with GIS packages, APIs;
- Experience working with/for European, and ideally Asian, African and Caribbean regions;

4. Budget

DRRS programme is a facility that supports foreign governments and international organizations in addressing water-related disasters.

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Each individual expert is expected to provide an all-inclusive detailed budget, including the fees and expected expenditures in order to conduct this assignment. While presenting a total budget for this assignment, the following items must be specified:

- Number of working days and applicable fee. See attached 'Dutch Risk Reduction & Surge Programme – Contracting Conditions'.

5. Timing

The period of the DRRS intervention will initially be from the January 2026 until the end of December 2026.

Initial contracting will be for 12 days, which are to be used in close coordination with RVO. The mechanism is request based, so part of the budget may be unused at the end of the contract period or in case of an abundance of requests, the contract may be extended.

6. Contracting and reporting

Contracting of the experts will be conducted by Netherlands Enterprise Agency (RVO.nl). All documents should be sent to drrs@rvo.nl.

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1. Annexes

Annex A: Official request

N.A

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Annex B: DRRS programme

Many countries around the world face severe water threats. Often, these countries are in urgent need of expert advice on how to prevent a disaster or how to recover from a calamity. For instance, when a country has been struck by severe flooding and the first emergency relief workers have gone, the need for advice on how to build a sustainable and safer water future arises.

To meet these needs with a swift response, the Dutch government (Ministry of Foreign Affairs and the Ministry of Infrastructure and Environment) has initiated the Dutch Risk Reduction and Surge support (DRRS) programme. This programme mobilizes a team of experts that advises governments on how to resolve urgent water issues related to flood risks, water pollution and water supply, to prevent disasters or to rebuild after water related disasters. The DRRS programme enables a foreign government to take action on the basis of sound advice and expertise. The DRRS programme is coordinated by the Netherlands Enterprise Agency (RVO.nl).

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Annex C: Near Real-time iterative Flood Modelling, a tool for effective response during flood crises.

Background

In order to assist worldwide during water related crises, the Dutch government has mandated the Dutch Risk Reduction and Surge Support (DRRS) programme with the responsibility to assist foreign governments and international organizations with expertise on water. Over the last 10 years innovative approaches have been found, and many partnerships have been build. A recent interesting initiative has been applied to 4 crises in the last 2 years, leading to the idea of further focusing on near real-time iterative flood modelling.

Figure 1: Hydrodynamic model for the Kakovka Dam breach (source: Tygron)

Situation

The tool is aimed at:

- the moment **close to and just after major flood** events
- where central **authorities are not (yet) equipped with flood models** and/or advanced flood early warning systems

Goal

The goal is to provide **accurate information on water levels** and flow velocities in the weeks following the flood event. More specifically:

- When and **where will water recede**
- Which **roads are usable**, or will become dry and which point in time
- Which other **vital infrastructure** (hospital, pumping stations, food distribution etc) will be inundated and when

And to make this information available for the right groups:

- First responders
- Emergency planning on a provincial or higher level with a time horizon of days to weeks

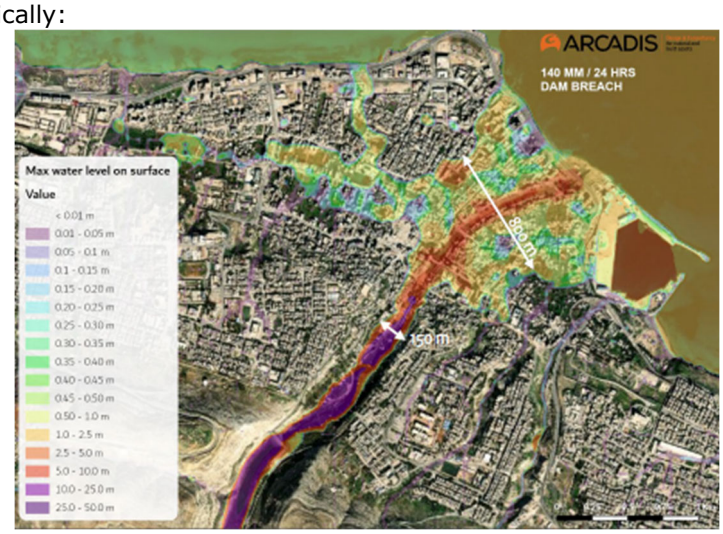

Figure 2: Model results for Derna after the breach of Derna and Abu Mansour dam

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Methods

Hydrodynamic model and user interface: Tygron[1], FastFlood[2] or similar software

- GIS-based Modeling: The Tygron Engine can quickly build a hydrodynamic model from scratch anywhere in the world, using **global open source data** enriched with locally available data where possible
- Fast (GPU-powered) simulation: Enables the **simulation of floods in seconds to minutes**, a stark contrast to the hours or days required by traditional methods.

Calibration and validation using

- Users can log in using a standard internet connection, zoom in to their area of interest and provide feedback to improve the model (**iterative**)
- FloodTags: Analyses social and news media to collect real-time information on flood water levels and critical changes (failures) in key water infrastructure. Global coverage. Online community response (through linkedin, cluster, informal networks)[3]
- Satellite based inundation data once available (UNOSAT, Copernicus, etc)

Examples

Successfully applied in response to the Kakovka Dam disaster[4], the Derna Dam disaster in 2023, the 2024 floods in Kazakhstan and in 2025 in Gaborone Botswana.

Why innovative?

- **Very quick**: results can be published in less than a day, with further improvements in the days following
- Easy access for anyone
    - User can **zoom in to his/her area and moment** of interest
- **Iterative** approach together with the community: All online information will be used to improve (calibrate and validate) the model
    - **Feedback** from users and actors on the ground
    - Pictures on social media/news

Needs and costs

In order to effectively implement this, the following is needed

- Creating the model and resulting maps (supported by DRRS programme in the pilot phase)
    - A skilled hydrologist, coastal expert, dam expert, GIS, other (depending on situation)
    - Potentially tech support from model provider and FloodTags team
    - Coordination
- Dissemination of results to stakeholders on the ground:
    - To local authorities (on ad hoc basis, depending on how quick we can find the right people)
    - First responders (UNDAC, Red Cross, WASH cluster and other)

[1] https://journals.open.tudelft.nl/jcrfr/article/view/7538
[2] https://fastflood.org/
[3] Also used by national water services such as the UK Met Office
[4] https://www.tygron.com/nl/blog/2023/06/09/khakhova-dam-break-simulation/

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Annex D: Needs for Social Media Monitoring

Below a list is formulated with the general needs that should be covered by the solution applied for the monitoring of social media and other internet based sources.

The goal of the monitoring of social media is firstly to provide calibration points for flood modelling.

The data should have the following characteristics

- Overview pictures with a specific timestamp that show the flood extend and identifiable landmarks which can be place in space. The picture(s) should allow the modellers to verify the model results in both space and time.
- Depth approximations showing
    - Location (lat/lon)
    - Timestamped
    - Depth approximation with precision in order of 0.1m, ideally better
    - Points distributed over the flood area
    - Ideally 5-10 points, or more

More generally:

- All relevant internet sources should be monitored
    - X
    - Blue sky
    - Facebook
    - News outlets
    - And more
- Results are to be shared near real-time. So the lag between availability and disclosure to the modelling team should be minutes to hours, not days.
- Flexibility to respond to changing needs
- Availability for questions and (additional) requests all days of the week.