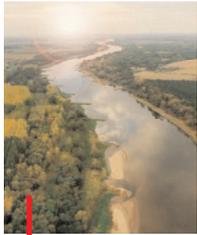


WATER CONSERVATION



EASE

Objectives



Elbe at Breitenhagen

The results of the project will create a basis for the technical implementation of an automated incident warning system in surface waters with the aid of measuring networks. In particular, the project seeks to make the results available to as many river basin associations in Europe as possible and thereby place them on a broad international footing.

Other tasks being pursued by the project include the following:

- Developing strategies for identifying the factors responsible for changes as quickly as possible
- Sampling strategy and concepts for automatic sampling
- More detailed localisation of unusual events detected, using additional measurement methods
- Simulation of concentration gradients over time
- Optimisation of the International Warning and Alarm Plan for the Elbe using the results of the project, and possible implementation of the information in alarm plans for other river basin associations
- Relevance of and connections of the project with the Water Framework Directive



NSG near Hamburg



Intact underwater landscape

INFORMATION



EASE

Further information sources

The latest data and a detailed description of the project can be found under www.ease.hamburg.de.

Do you have any further questions?

We will be glad to help you. You can contact us as follows:

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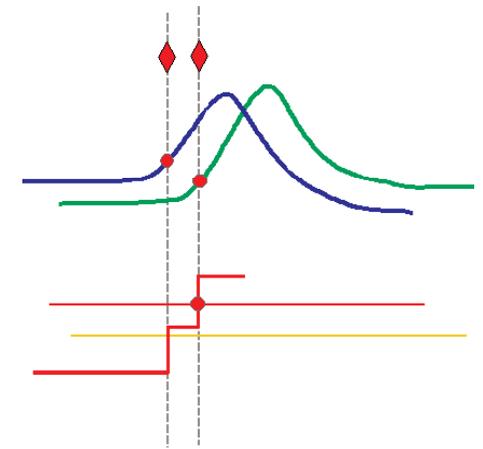
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EASE

Development of Alarm Criteria and Detection of Major Incidents in Measuring Stations in the Elbe Catchment Area for International Emergency Planning



Alarm

Monitoring

Water Conservation

Umwelt
Bundes
Amt
Für Mensch und Umwelt



Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit



Institute for Sanitation and Environment
Hamburg

INCIDENT DETECTION

EASE

Why the project?

Effective monitoring of the waters in the Elbe catchment area calls for optimised detection and assessment of pollutant surges. In the light of existing solutions, Hamburg's Health and Environment Department (BUG) is preparing, at the request of the Federal Environmental Agency (UBA), an immission oriented framework for assessing accident-induced inputs into the Elbe.



Toxic discharge



Fish mortality



Dead underwater landscape

One essential component is an efficient automatic event and incident detection system that makes it possible to take timely countermeasures. To this end, BUG is developing a system which permits continuous analysis of significant incident related data in automated water quality measuring networks in accordance with defined criteria, and which raises the alarm automatically where appropriate.

As well as deciding on suitable accident relevant parameters, it is also necessary to develop and test alarm criteria. Statistical "alert thresholds" have proved to be impracticable. Although incidents are typically characterised by "deviations" in individual parameters, these frequently fall within the limits of the long-term range of "normal" measurements. The crucial factor in identifying an incident is how current measurements differ from the expected course of the relevant parameter over time.

Early warning systems for detection of unexpected pollution and unforeseeable accidents with a view to reducing risks to aquatic ecosystems are an integral part of the "fundamental measures" under the EU Water Framework Directive (2000/60/EG Art. 11 para. 3 letter I).

MONITORING

EASE

Continuous analysis at the Elbe measuring stations

As long ago as 1997, the BUG in Hamburg started to implement systems with dynamic limit adjustment in its measuring stations. In view of the many years experience gained here in the detection and assessment of physical and chemical indicators, the work on alarm systems attached special attention to combinations with continuous biological test devices, since only these are capable of detecting impacts within the complex system of potential disturbing factors with the necessary speed.

The system for recognising unusual events is based on automated mathematical algorithms that continuously analyse the data generated. The aim now is to develop an integrated alarm detection system to further optimise the existing registration of incidents.

The intention is to link the results of all accident relevant parameters, such as UV absorption and electrical conductivity, within the measuring stations. These links will be summarised in an alarm index. The alarm index will be continuously recalculated automatically during the operation of the measuring station, and will thus permit rapid and reliable recognition of events and incidents. Various communication channels (SMS, fax, e-mail, pager, system reporting) can be used to inform the responsible persons at an early stage. Yet another advantage of linking the data from different devices is reliable avoidance of false alarms.



Obristvi measuring station



Magdeburg station



Bunthaus station



Seemannshöft station



Grauerort station

ALARM INDEX

EASE

How does incident detection work?

The following diagram shows an example of the schematic course of events in the detection of an incident with the alarm index. In the example chosen, there is a marked and clearly recognisable change in the values measured in the river. The station computer analyses the measurements and detects a sudden rise in the values (A1 and A2) of both parameter 1 (M1) and parameter 2 (M2). In addition, a biological test device (B1) registers that the alarm threshold has been exceeded (A3).

The station computer calculates the alarm index (AI) from all the unusual events registered, applying different weightings. After every unusual event recognised, the value of the alarm index increases by an amount defined for that parameter. If the alarm index exceeds the threshold (G rot), the station computer reaches the notification threshold (MS).



Measuring systems (pH, O₂ etc.)



Daphnia toximeter

