



# Real-time-monitoring of nutrients and physico-chemical parameters for detection and differentiation of impacts in small and middle scale catchments

Angelika Meyer

Saarland University

Institute for Inorganic and Analytical Chemistry

Saarbruecken, Germany





## WFD: Point ↔ Diffuse Pollution

*Article 10*

### **The combined approach for point and diffuse sources**

ANNEX II

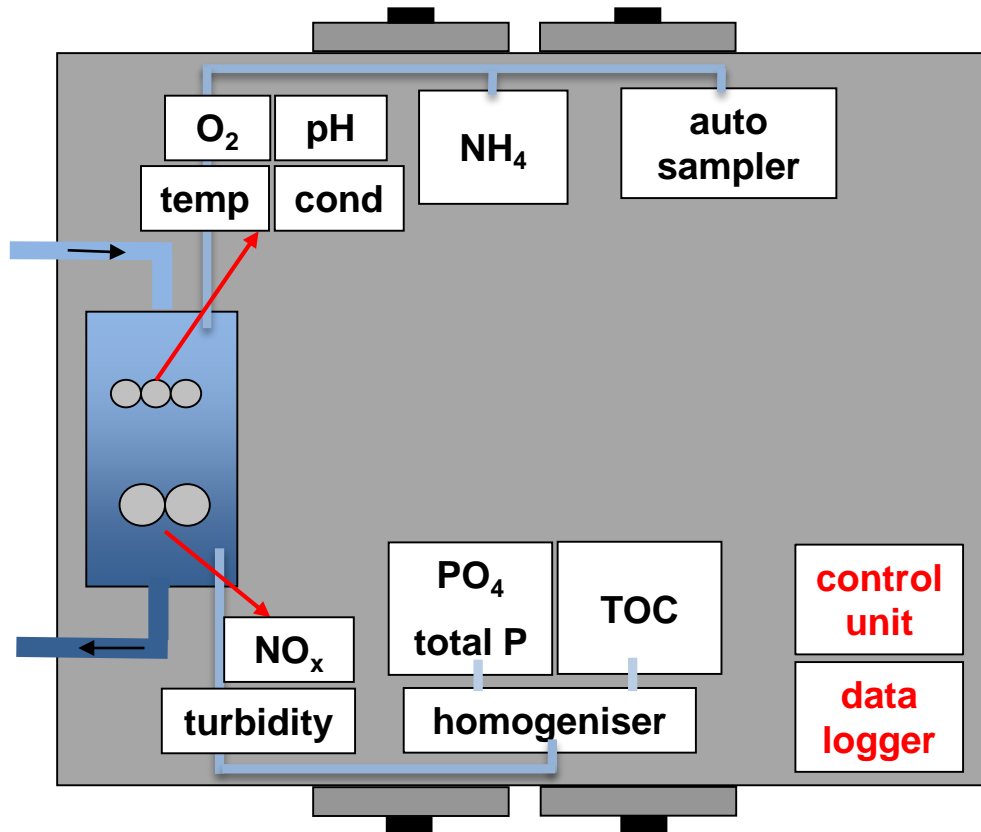
#### 1 SURFACE WATERS

##### 1.4. **Identification of Pressures**

Estimation and identification of significant diffuse source pollution, in particular by substances listed in Annex VIII, from urban, industrial, agricultural and other installations and activities; based, *inter alia*, on information gathered under:

2001 – 2004: LIFE ENVD/D/000337

Remotely controlled monitoring of eutrophication substances from diffuse sources in the region SAAR-LOR-LUX (Eutroph Monitor)



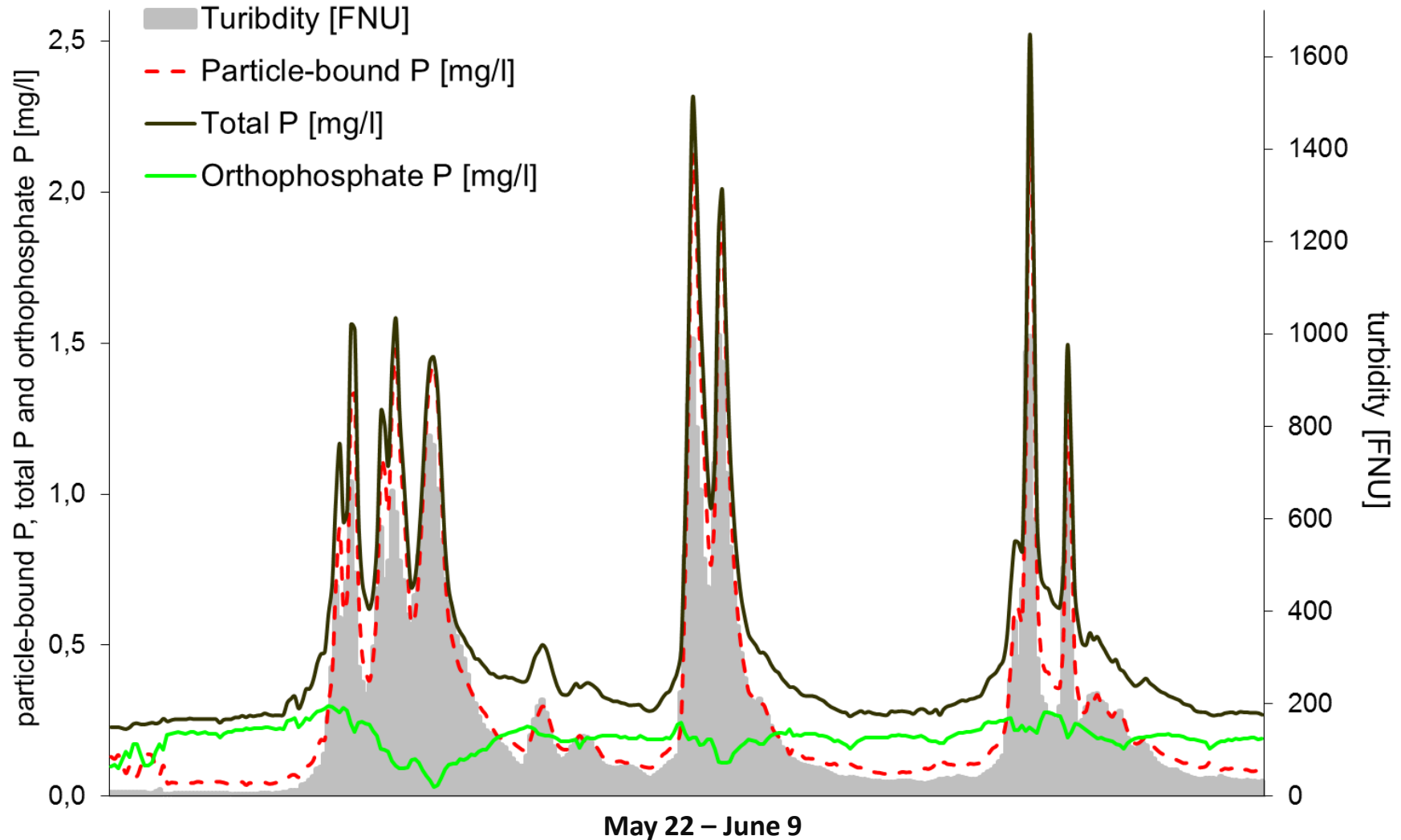
- sample basin continuously filled by a submerged pump in the river
- in situ measurement of temperature, oxygen, conductivity, pH-value, nitrate and turbidity
- sample primed by analysers for ammonia, phosphorus and TOC
- control unit for information about water level in the basin, pump status...
- data logger for storage of all gathered data and data transfer via GSM

modular designed system → adaptation to different investigation issues

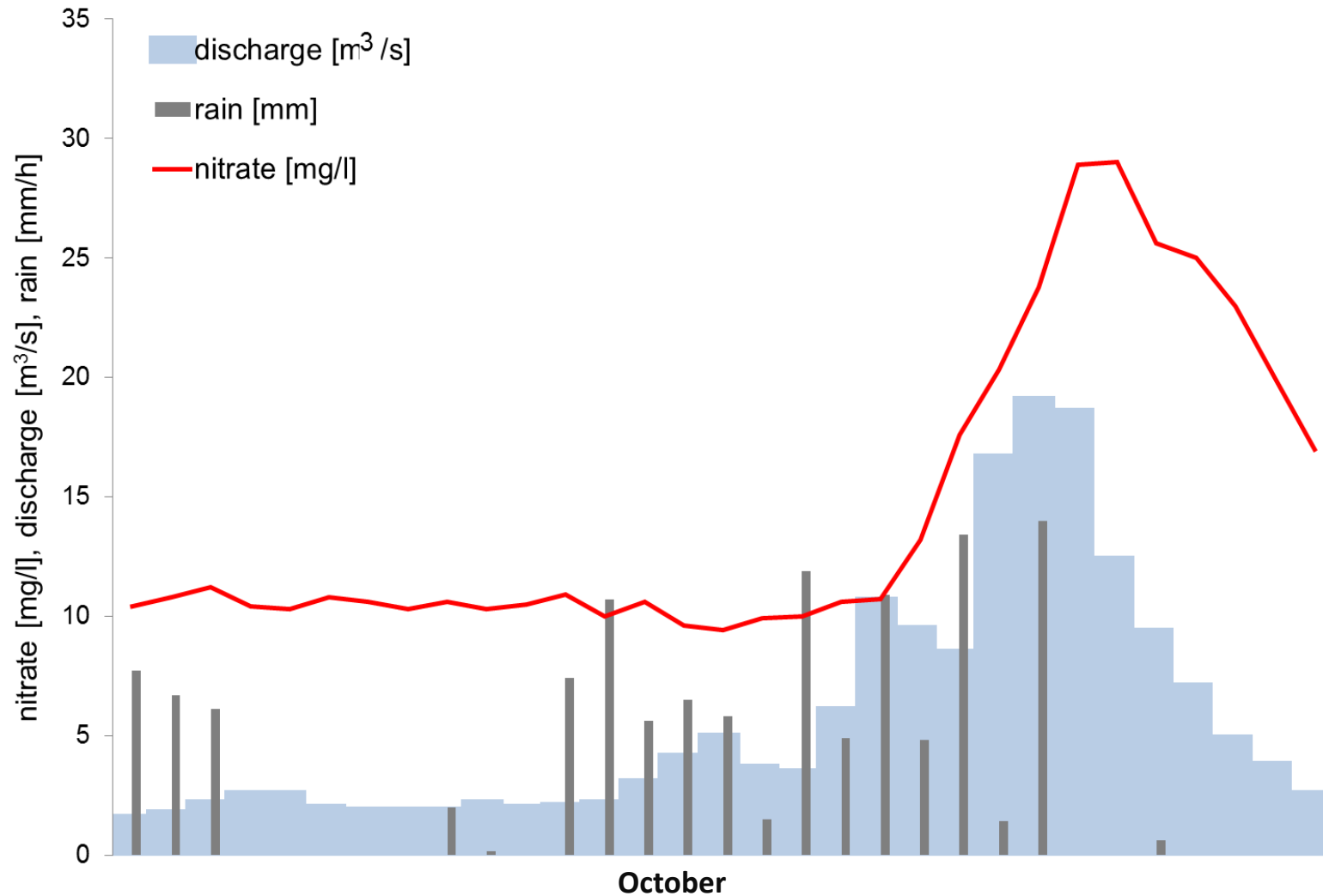


## Interpretation of the data collected (average per hour) considering

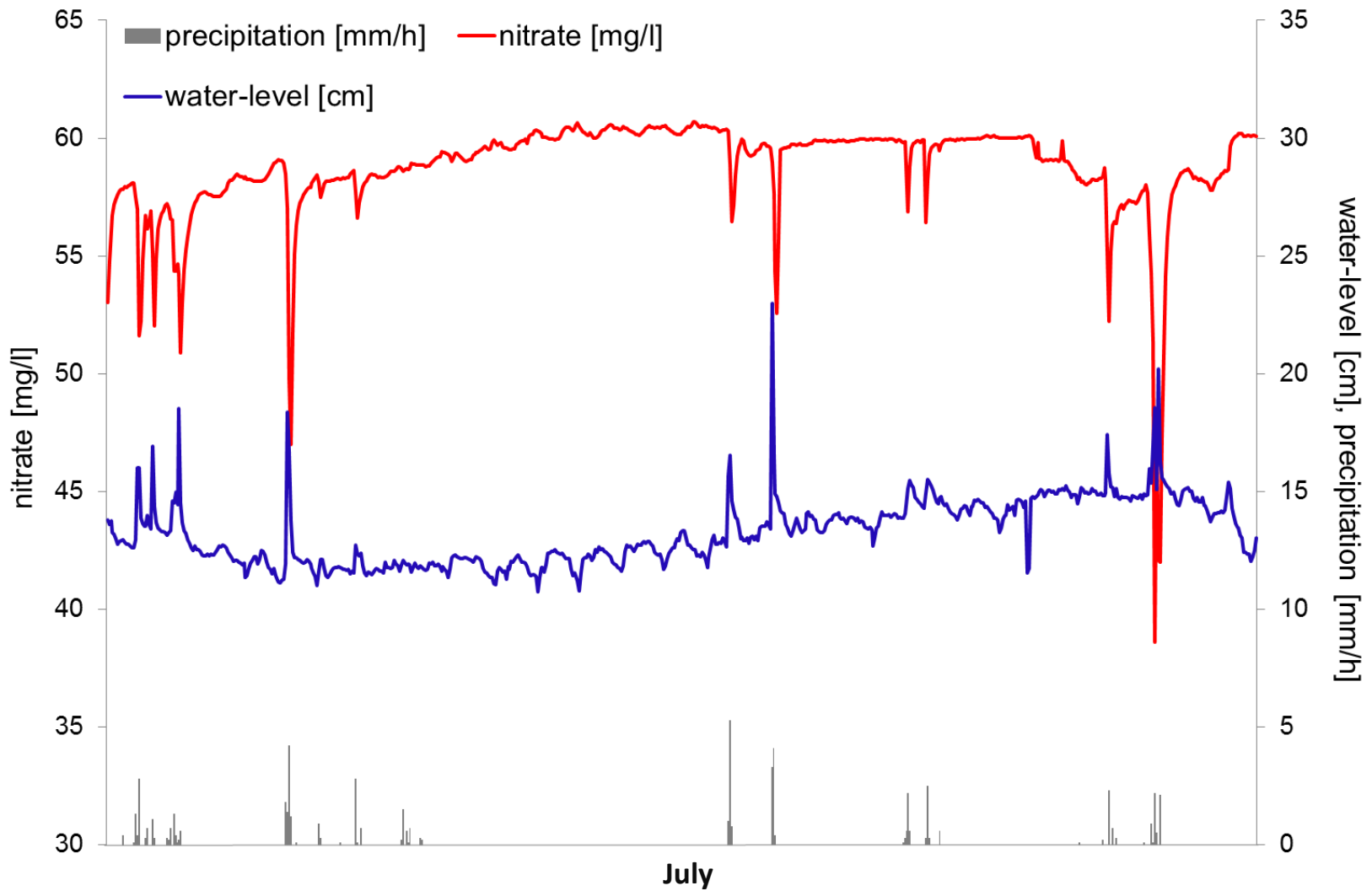
- hydrologic information (discharges, water levels)
- weather conditions (precipitation, temperature, insolation)
- geologic and lithologic conditions
- polluters (domestic / industrial wastewater...)
- land use



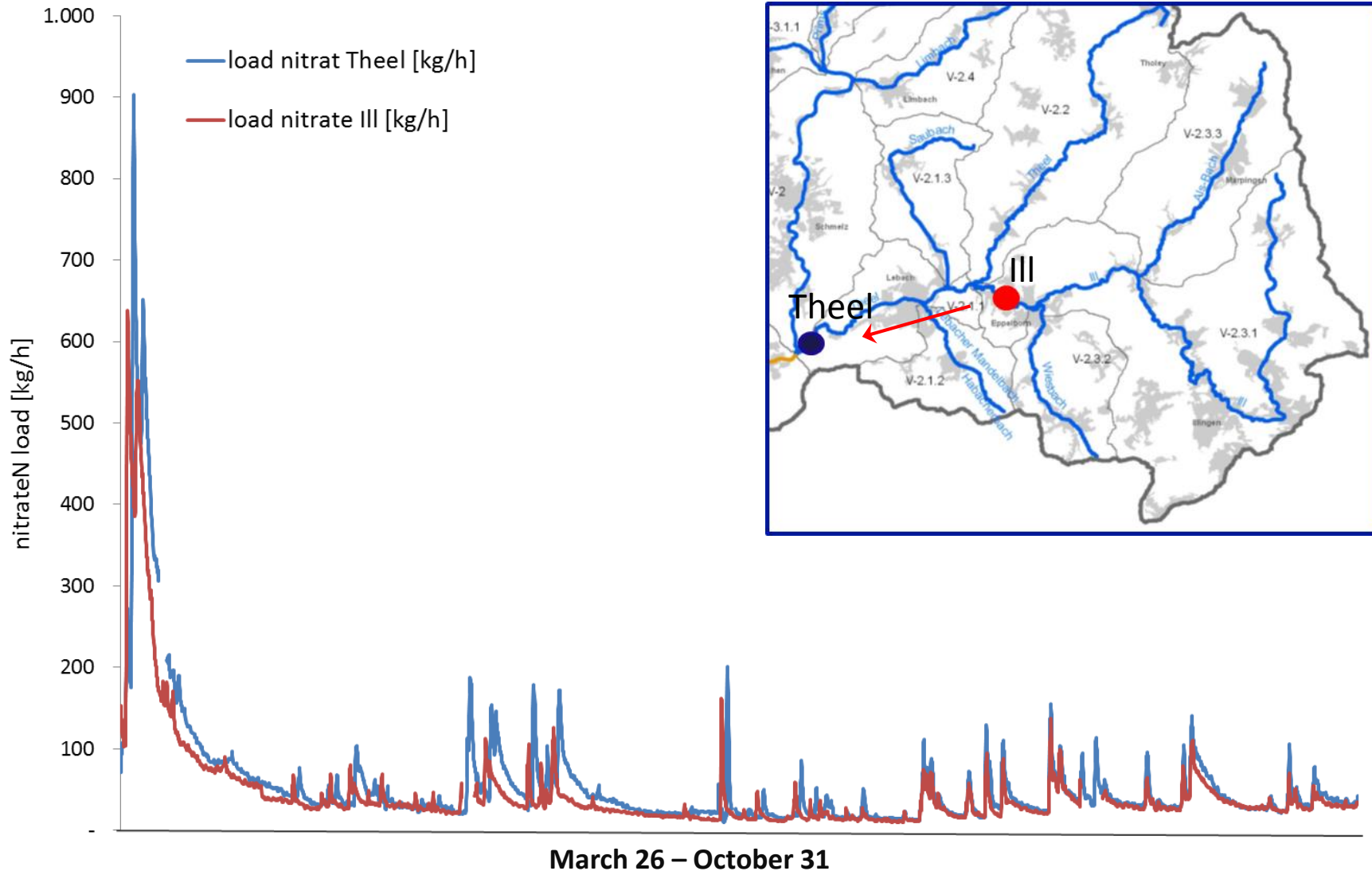
Impacts by surface runoff: erosion of P



Impacts via interflow:  $\text{NO}_3$ : time-lag of several days



Impacts via basic flow (groundwater):  $\text{NO}_3$



Estimation of pollution's origin regarding loads





**Online measurements of these parameters and their interpretation allows to:**

- **detect and differentiate diffuse and point source pollution**
- **differentiate between impacts via basic flow, surface runoff and interflow**
- **compare to thresholds / environmental quality standards**
- **know about geological / “natural” background**
- **calculate loads and emission amounts for short time intervals**
- **calibrate models very exactly**
- **measure the duration and effect of impact events (e.g. oxygen deficits)**
- **estimate the sensitivity of the system to changes**
- **....**



# Thank you!

Angelika Meyer

[ameyer@mx.uni-saarland.de](mailto:ameyer@mx.uni-saarland.de)

[www.gewaesser-monitoring.de](http://www.gewaesser-monitoring.de)

