High-frequency monitoring of catchment nutrient exports reveals highly variable storm-event responses and dynamic source zone activation

**Introduction**

Storm events can drive highly variable behaviour in catchment nutrient and water fluxes, yet short-term event dynamics are frequently missed by low resolution sampling regimes. High-frequency monitoring can improve our understanding of storm-event controls on catchment nutrient export. This information contributes to developing management practices to control nutrient exports from agricultural landscapes.

**Study site**

![Map of study site]

- Arable fields
- Farm buildings
- Rain gauge
- Soil moisture probe
- Mature deciduous woodland (planted 2014)
- Young deciduous woodland
- Air temperature probe
- Groundwater logger
- Elevation (in m)

**In situ monitoring**

Hourly *in situ* measurements of streamflow, nitrate (NO$_3$-N) and dissolved organic carbon (DOC)

8 month time series (March to November 2016)

![TriOS OPUS UV-VIS analyser for NO$_3$-N and DOC](analysis_device)

**High-frequency nutrient data**

Time series of stream discharge, NO$_3$-N and DOC through the monitoring period. Grey bars denote individual storm events.

**Hysteresis patterns**

Examples of clockwise and anti-clockwise hysteresis patterns observed in NO$_3$-N and DOC concentrations during selected storm events. The inset panels show the hydrograph for each event.

**New process-based understanding**

Results reveal key processes that control stream nutrient export under different hydroclimatological conditions.

**Seasonal- and event-based variability**

![Graph of seasonal and event-based variability](variability_graph)

**Further information**
