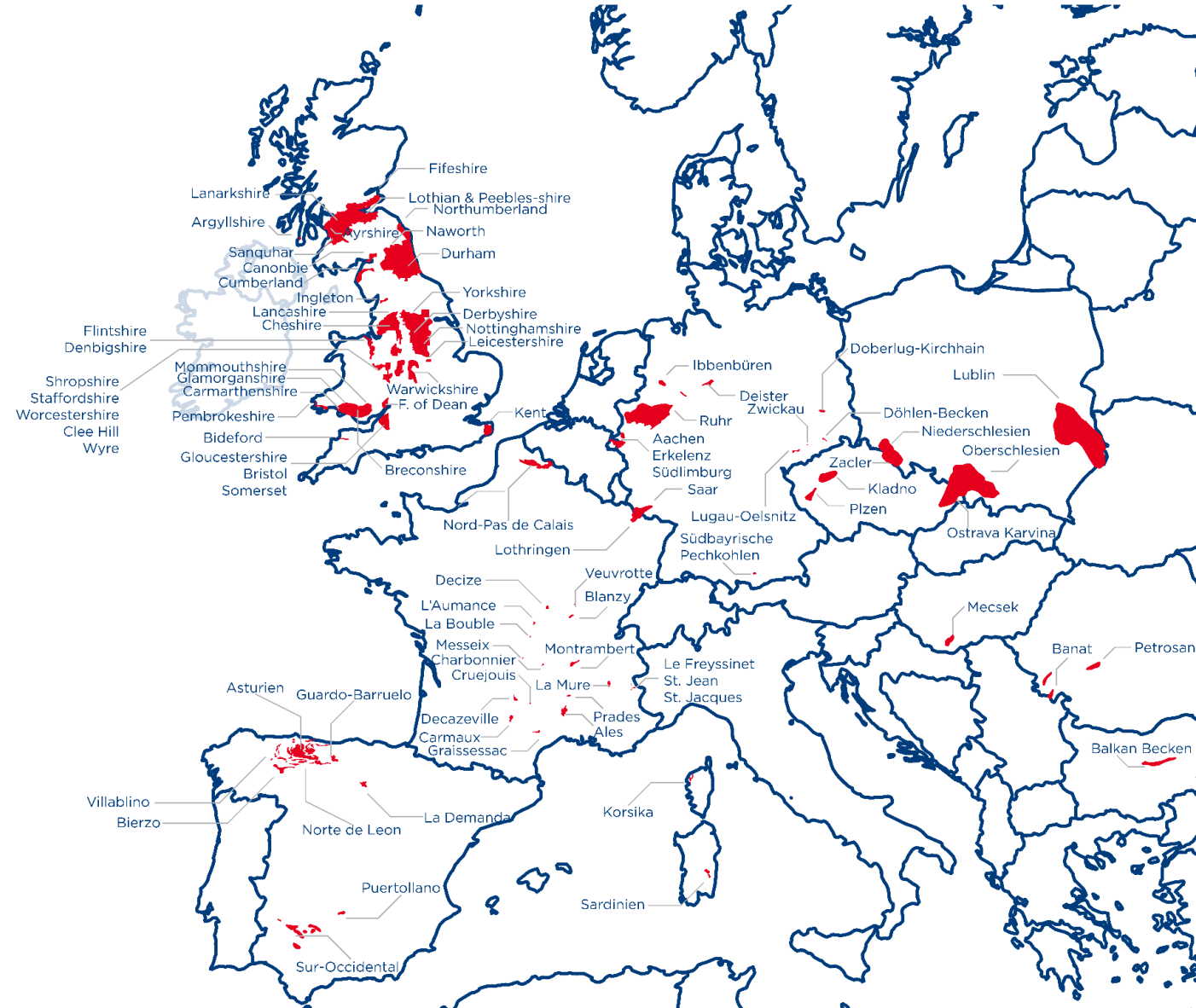# Erfahrungen digital zugänglich machen:

Das Internetportal „Grubenwasser"

Dr. Bastian Reker

Forschungszentrum Nachbergbau

# Evaluierung von Grubenwasseranstiegsprozessen 2016 - 2019

Technische Hochschule Georg Agricola

Projektbericht

Evaluierung von Grubenwasseranstiegs-prozessen

Christian Melchers, Sebastian Westermann, Bastian Reker

Berichte zum Nachbergbau Heft 1

Kostenlos verfügbar unter www.nachbergbau.org

Erfahrungen:
Deutschland

Bodenbewegungen

Zeche Ewald, Ruhrgebiet

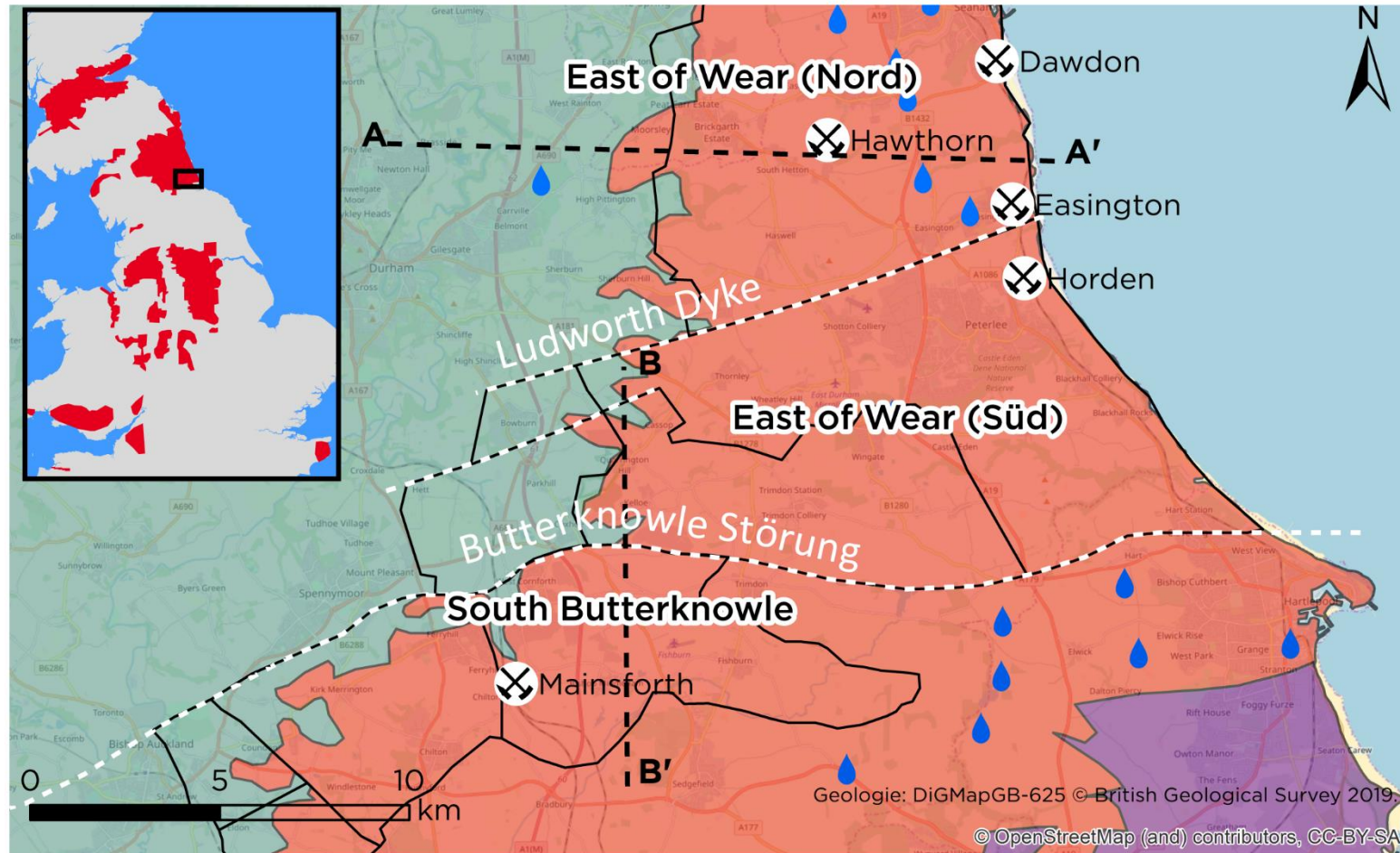# Königsborn: Bodenbewegungen
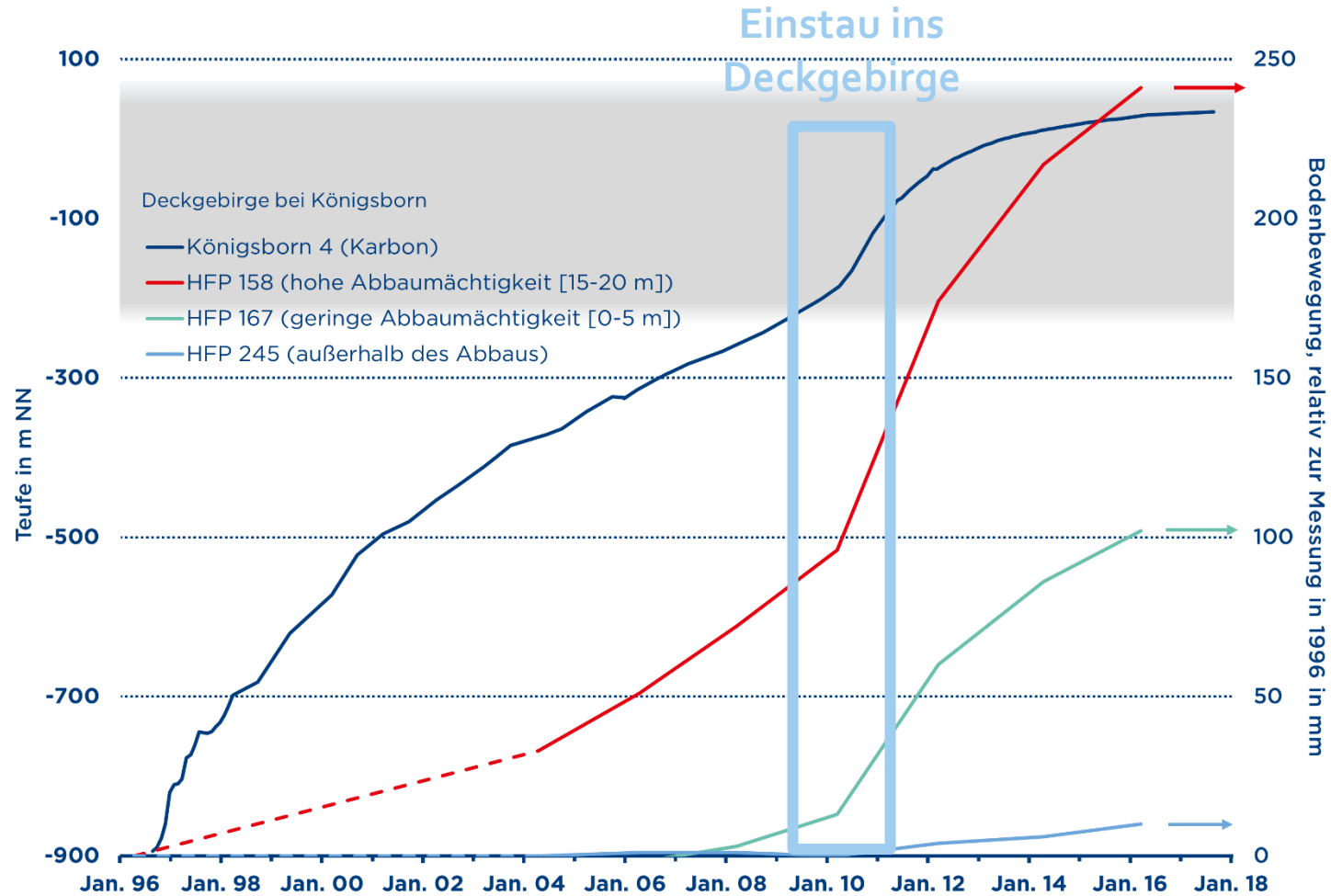
Erfahrungen:
Großbritannien

Grundwasser-beeinflussung
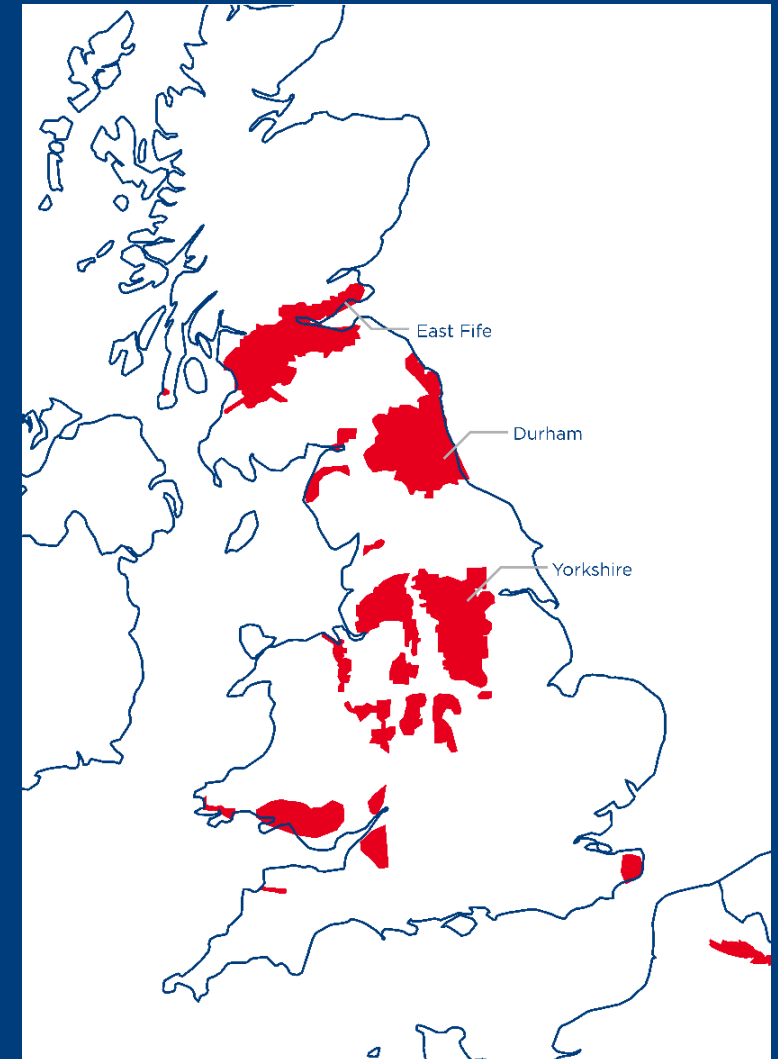
East Fife

Durham

Yorkshire

South Butterknowle: Beeinträchtigung eines GWL durch ansteigendes Grubenwasser - Sulfat

Druckpotenzial des Grubenwassers **ist kleiner als** Druckpotenzial des Grundwassers
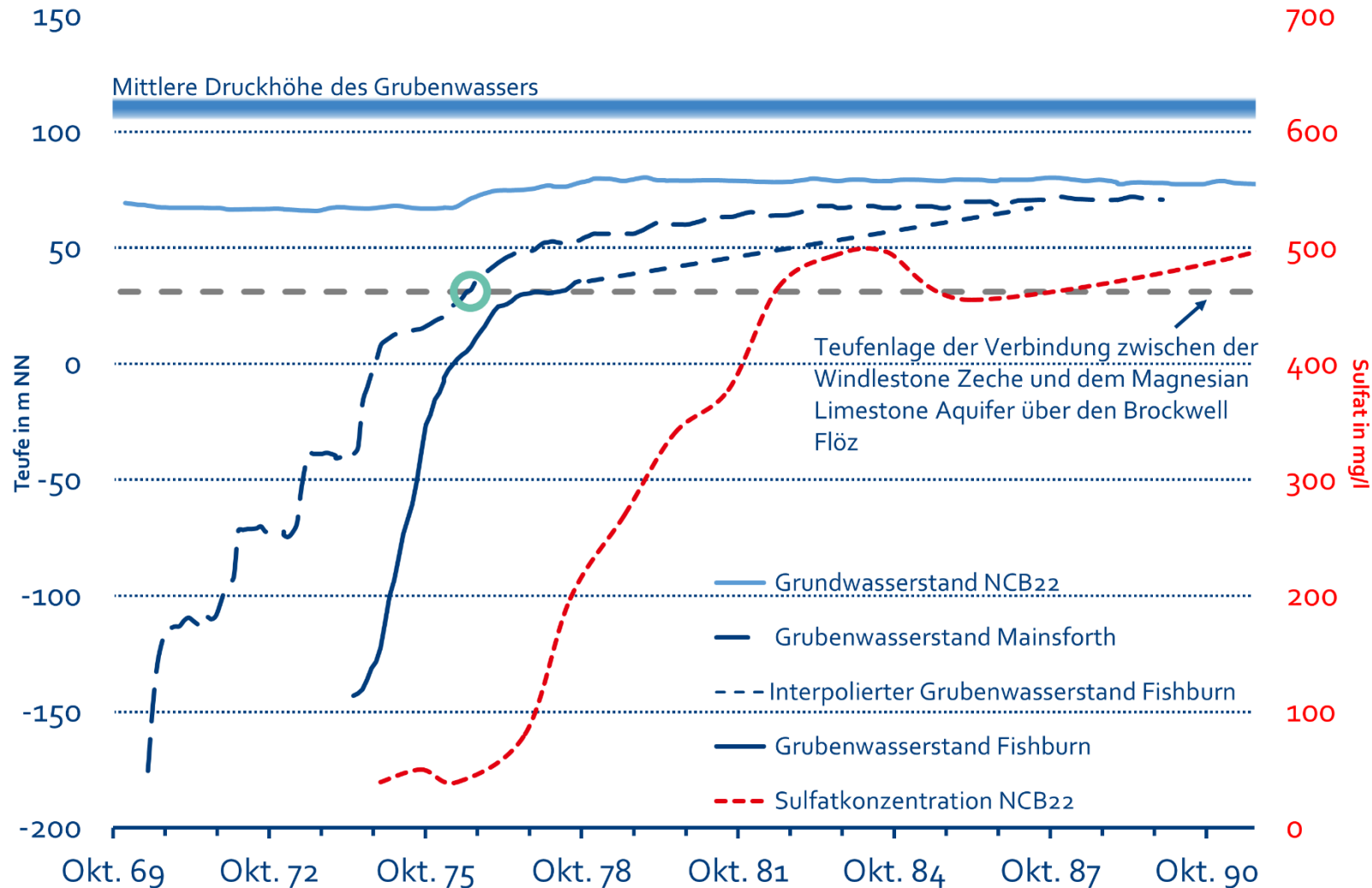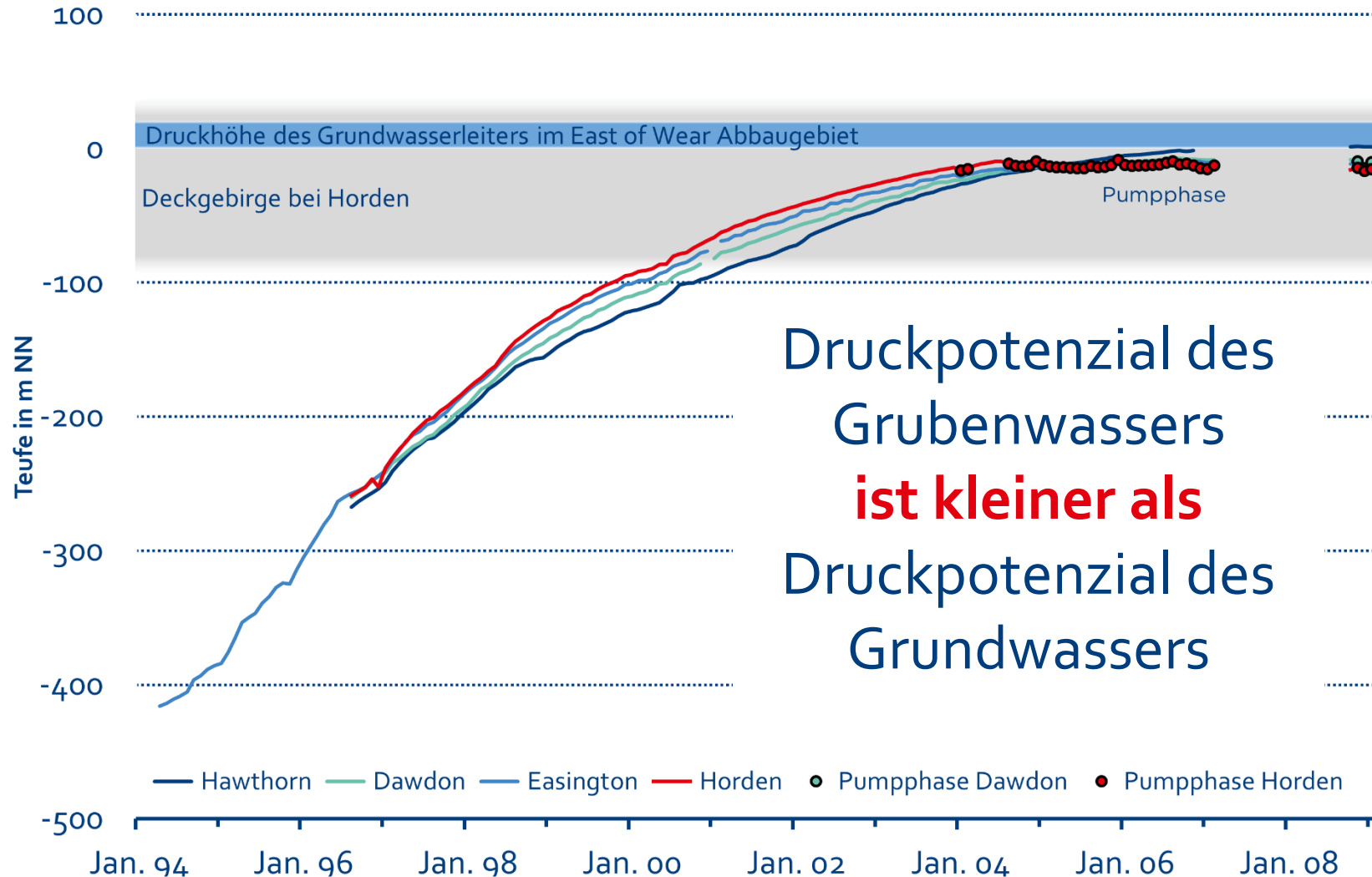
Erfahrungen:
Frankreich

Druckpotentiale
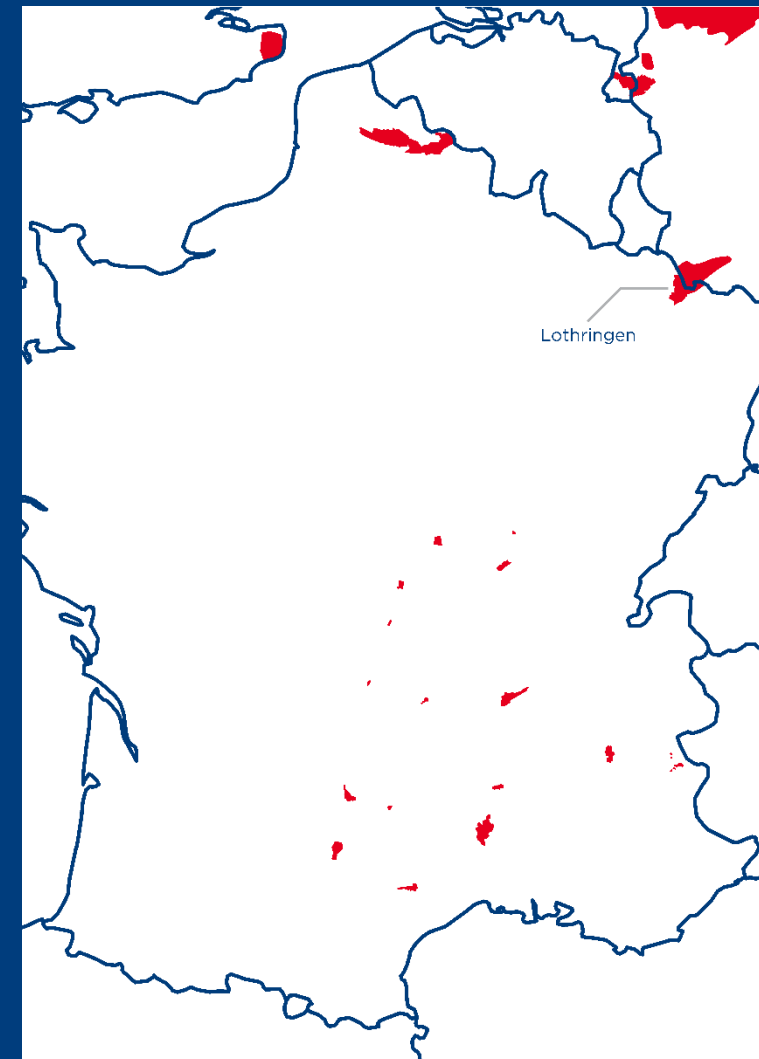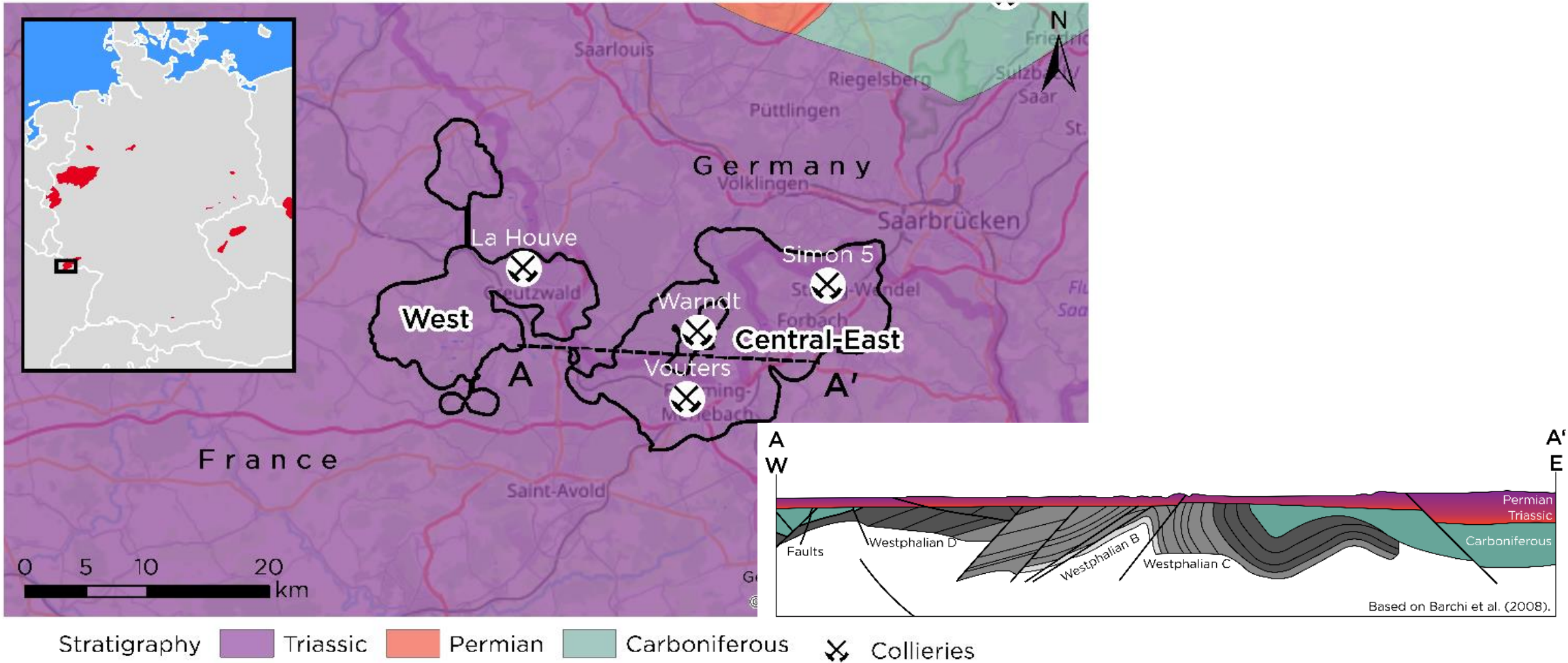
Forum Bergbau Wasser

Technische Hochschule **Georg Agricola**

Druckhöhe Grubenwasser **kleiner** Druckhöhe Grundwasser
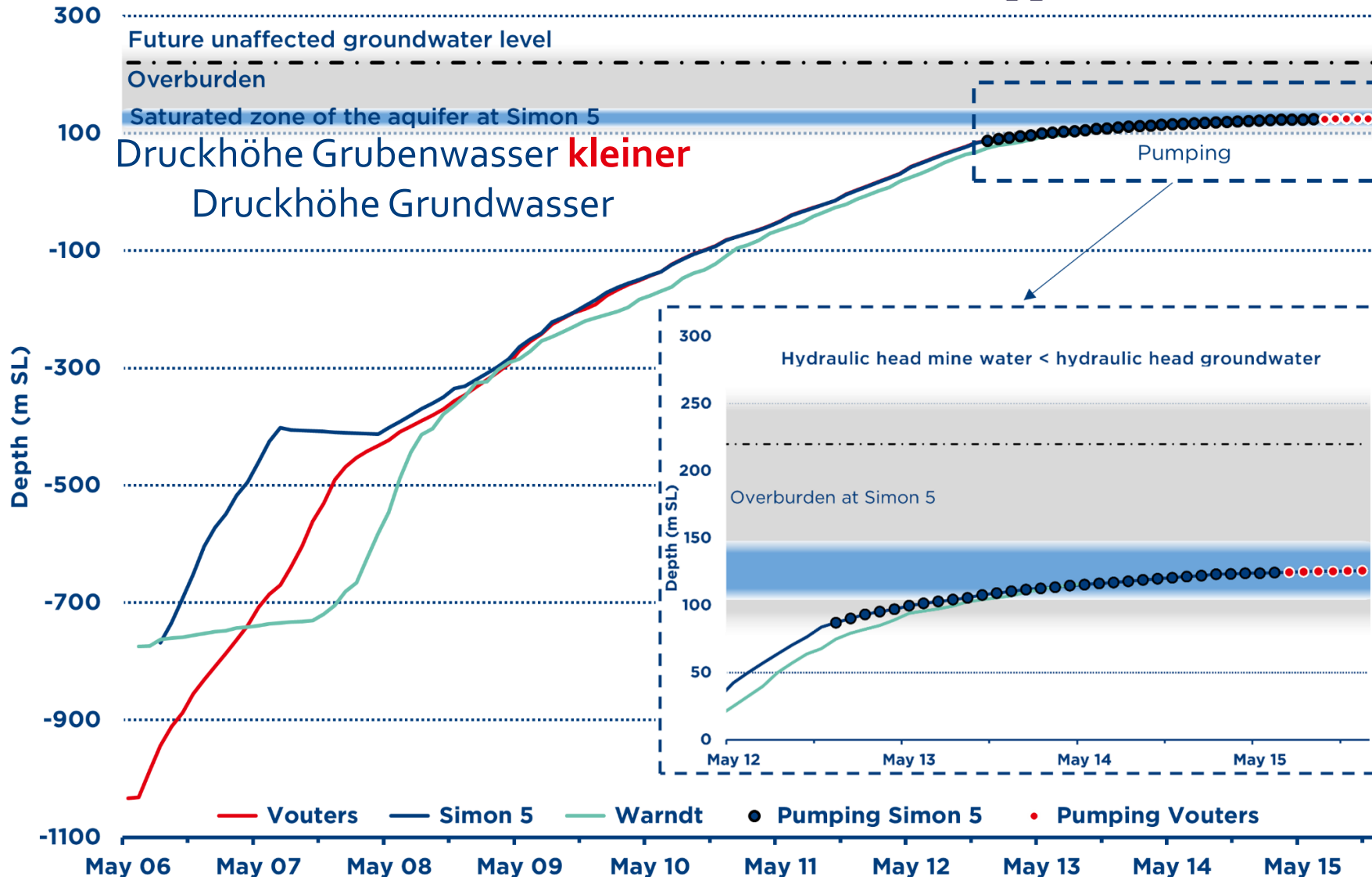
Digitalisierung:
Erfahrungen im Nachbergbau

Aufbau der Datenbank

Sämtliche Informationen aus Literatur und Feldarbeit können in die Datenbank integriert werden.

Jede Eintragung erhält einen eindeutigen Index (MineID) in einer separaten Datei.

Chemische Analysen können zusammen mit der MineID in einem separaten Shape-file, das mit der Datenbank verknüpft ist, hinterlegt werden.

Dateianhänge (Grafiken, Office-Dateien etc.) können der Datenbank beigefügt werden.

FlowChart Geodatabase Internetportal „Grubenwasser"

Aufbau der Datenbank

Technische Hochschule Georg Agricola

|		
Depth to raw material	MineRawMaterialDepth	thickness of rock above raw material deposit
Depth of mine	MineDepth	Maximum depth of mine
Shaft Name	MineShaftName	Name of the measured shaft
Shaft Depth	MineShaftDepth	Depth of measured shaft
Shaft Diameter	MineShaftDiameter	Diameter of measured shaft
Shaft Geometry	MineShaftGeometry	Geometry of measured shaft (e.g. oval | round | square | unknown)
Shaft lining	MineShaftLining	Shaft lining (e.g. brick | wood | concrete | unknown)
Shaft Remarks	MineShaftRemarks	Remarks, e.g. number of branches
Mine Shafts	MineShaftType	single shaft mine | multiple shaft mine | unknown
Stratification First Observed	StratificationDate	First occurrence of stratification
Stratification First Literature	StratificationLiterature	Literature to first occurrence of stratification
Stratification Location	StratificationLocation	onsetting station | shaft lining | various | lithology | unknown
Stratification Count	StratificationCount	Number of water bodies
Start of flooding	MineFloodingStart	Field type: Date (if just year is known, take 1.1.XXXX)
End of flooding	MineFloodingEnd	Field type: Date (if just year is known, take 31.12.XXXX)
Flooding Type	MineFloodingType	active | passive | unknown
Mine water make	MineWaterMake	Flow into or pumping rate
Flooding development	MineFloodingData	Data of water levels during flooding
Receiving Water Course	DischargeReceiving	into which stream/river dose the water discharge
River Catchment	DischargeCatchment	River catchment based on EU Water Framework Directive
Shaft Stratification Class	ShaftStratificationClass	Free text
URL	URL	Free text (Weblink to recent Website of mine etc.)
Mining Area Local Name	MiningAreaLocName	Free text
Mining Area English Name	MiningAreaEngName	Free text

Additional notes	MineRemarks	Remarks [free text]
Literature	MineLiterature	Free text (must be noted in „literature_da…
Chemistry	MineWaterChemistry	Not available | see attachment (→ Featur…
Chemistry Water Type Discharge	MineChemistryType	Discharge chemistry, Furtak and Langguth…
Chemistry Depth Related	MineChemistryDepth	Were depth dependant samples taken? y…
Flooding Scenario	MineFloodingImage	Not available | see attachment
Flooding Scenario Literature	MineFloodingLiterature	Free text (must be noted in „literature_da…
Stratification Data	StratificationImage	Not available | see attachment
Stratification Parameters measured	StratificationParameter	temperature | electrical conductivity | pH…
Hydrogeological Description	MineHydrogeology	Free text
Mining History	MineHistory	Free text
Geological Profile	MineGeologyProfileImage	Not available | see attachment
Flooding History	MineHistoryFlooding	Free text
Treatment	MineTreatment	Neutralisation | Low density sludge LDS | Electrochemical | Electrocoagulation | Ele… Deionisation | Electrodialysis/membrane… Microfiltration | Ultrafiltration | Nanofiltr… Forward osmosis | Ettringite precipitatio… Bioreactors fermenters | Ion exchange | S… Flotation liquid-liquid extraction | Freeze crystallisation | Carbonate channels and flumes | anoxic limestone drain ALD | oxic limestone drain OLD | open limestone channel OLC | aerobic wetland, reed bed | anaerobic wetland, compost wetland | RAPS, SAPS | settlement lagoon | Permeable reactive walls | Vertical flow reactor VFR | Passive oxidation | ARUM Acid Reduction Using Microbiology | In situ | Passive general | Active general
Cross section	MineCrossSectionImage	Not available | see attachment
Mining Method	MiningMethod	longwall mining, cross-cut mining | shrinkage stoping | cut-and-fill mining | cross working | sub level stoping | room-and-pillar | room-and-pillar caving | cross working | bell pit mining | sublevel caving | pillar mining | block caving

Flooding Process Status	MineFloodingProces…	
Water level	WaterLevel	
Water level date	WaterLevelDate	
Altitude top of shaft	AltitudeTopOfShaft	
Access to the water	WaterAccess	
Discharge Type	WaterDischargeType…	
Discharge Pumped	WaterPumped	
Geological Info	MineGeology	
Ore type	MineOreType	Exhalative-diagenetic | Hydrothermal epigenetic | Magmatic | Marine-sedimentary | Metasomatic | Placers | Residual and supergene
Deposit type	MineDepositType	e.g. Sedimentary manganese deposits| coal
Company	Owner	current owner (free text)
Contact	OwnerContact	Free text
Country	MineCountry	English name
Latitude	MineLat	Geographic coordinates WGS 84
Longitude	MineLon	Geographic coordinates WGS 84
Site type	MineSiteType	quarry | open pit | placer | surface mine | underground … facility
Site size	MineSize	< 2 km² | 2 – 10 km² | > 10 km²
Activity status	MineActivity	operating, active | abandoned, orphaned | closed
Activity level	MineActivityLevel	continuous | intermittent | seasonal | not available
Year of Opening	MineYearOpening	Commonly accepted year of first production
Year of closure	MineYearClosure	Commonly accepted year of last production
Reason for closure	MineClosureReason	bankruptcy | exhaustion of mineral resources | accident flooding | war | politics | decease
Legal access restriction	MineAreaLegal	nature protection | geopark | heritage site | tourism | ba… general | residential area | sports and leisure activities | … scheme | waste land | wilderness

Parameter	Feldname in Datenbank	Mögliche Auswahl / Freitext / Bemerkungen
ID	ID	Database ID, integer
Mine Index	Index	Running ID; ISO 2 letter code country, running number; e.g. PT0001 (must be stated in "MineIndex.xlsx" !)
Name Local	NameLocal	Common name of the mine in local language
Name translated	NameTranslated	Common name in English
Mining Info Type	MineType	Individual Mine | Mining District | Concession Area
Metallic/Non-metallic mine	RawMaterialType	Metallic | Non-Metallic
Main Commodity 1	CommodityMain1	aluminium | amber | anthracite | antimony | arsenic | asbestos | barium | baryte | bauxite | beryllium | black coal | lignite | calcite | chert | chromium | cobalt | copper | feldspar | fluorite | garnet | gold | graphite | gypsum | hematite | Industrial material | iron | kaolin | kyanite | lead | lithium | REE | magnesite | magnesium | manganese | marble | mercury | mica | molybdenum | nickel | niobium | ochre | oil | palladium | phosphorous | platinum | potash | potassium | pyrite | salt | silver | slate | strontium | sulphur | talcum | tin | titanium | tungsten | uranium | vanadium | zinc
Main Commodity 2	CommodityMain2	See above
Main Commodity 3	CommodityMain3	See above
Main Commodity 4	CommodityMain4	See above
Secondary Commodity 1	CommoditySecond1	See above
Secondary Commodity 2	CommoditySecond2	See above
Secondary Commodity 3	CommoditySecond3	See above
Secondary Commodity 4	CommoditySecond4	See above
Access to the mine	MineAccess	Road | Path
Classification Access	MineAccessClassification	Tar | gravel | …
Distance to Road	MineAccessDistance	In meters
Section	MineInformation	Data or information source availability
Flooding Status	MineFloodingStatus	fully flooded | partially flooded | potentially flooded | not flooded

4 Geodatabase Flooded Mines

Mine ID
Name
Commodity 1
…
pH
Fe
Cl
…
MineID_mwr_name.xls
Cross Section.jpg
…

Visualisierung der Datenbank online über ArcGis

Derzeitiger Datenbestand:

124 Bergwerke in ganz Europa mit

593 Datensätzen zu chemischen Analysen.
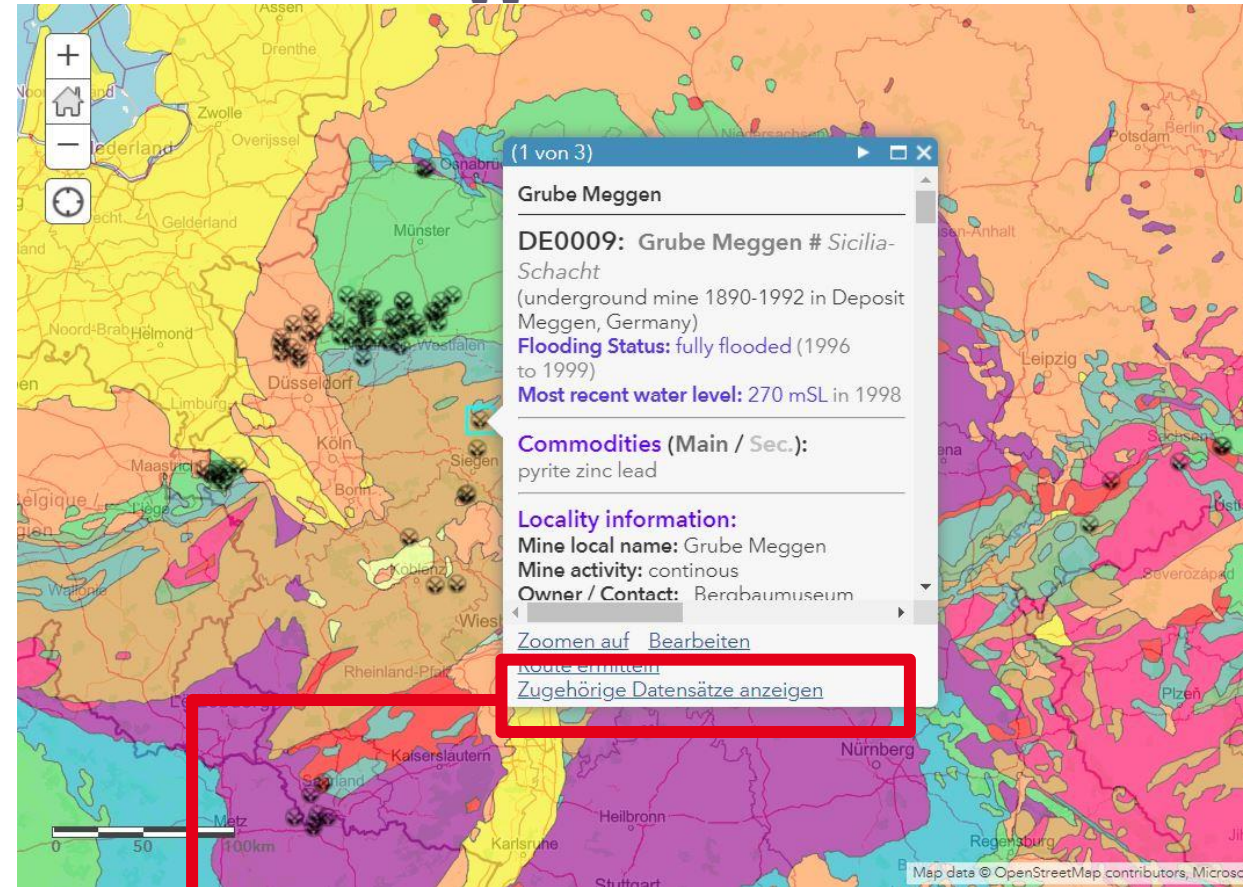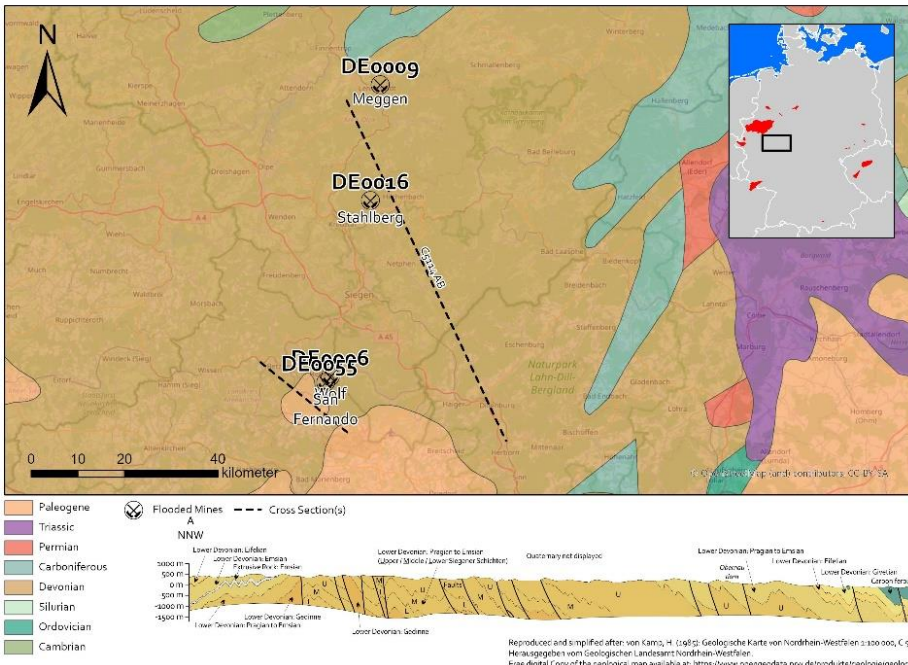
Ausschnitt aus der Karte / Datenbank mit aktivierter Geologie.

Angehängte Dateien, z.B. Geologische Profilschnitte

Digitalisierung:
Erfahrungen im Nachbergbau

PRAXIS

Danke für Ihre Aufmerksamkeit und
Glückauf

Dank an das Forum Bergbau und Wasser für die Finanzierung des Projekts!
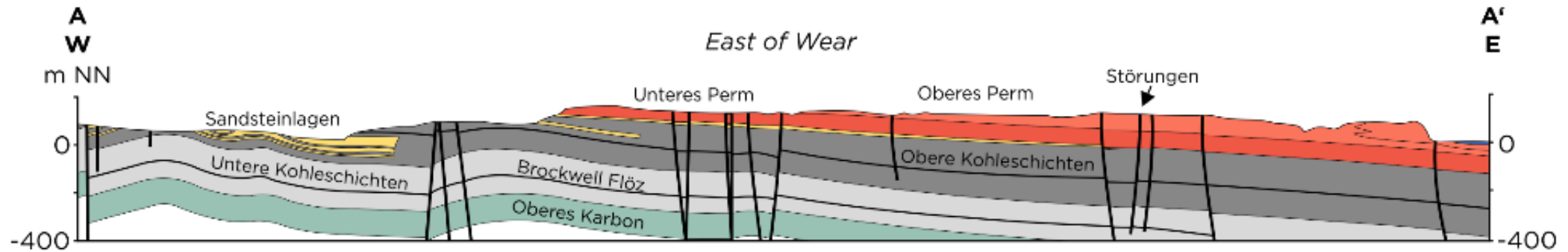
Updates zum Projekt und vieles mehr!

www.nachbergbau.org

Auch zu empfehlen & interaktiv:

https://umweltkumpel.thga.de/
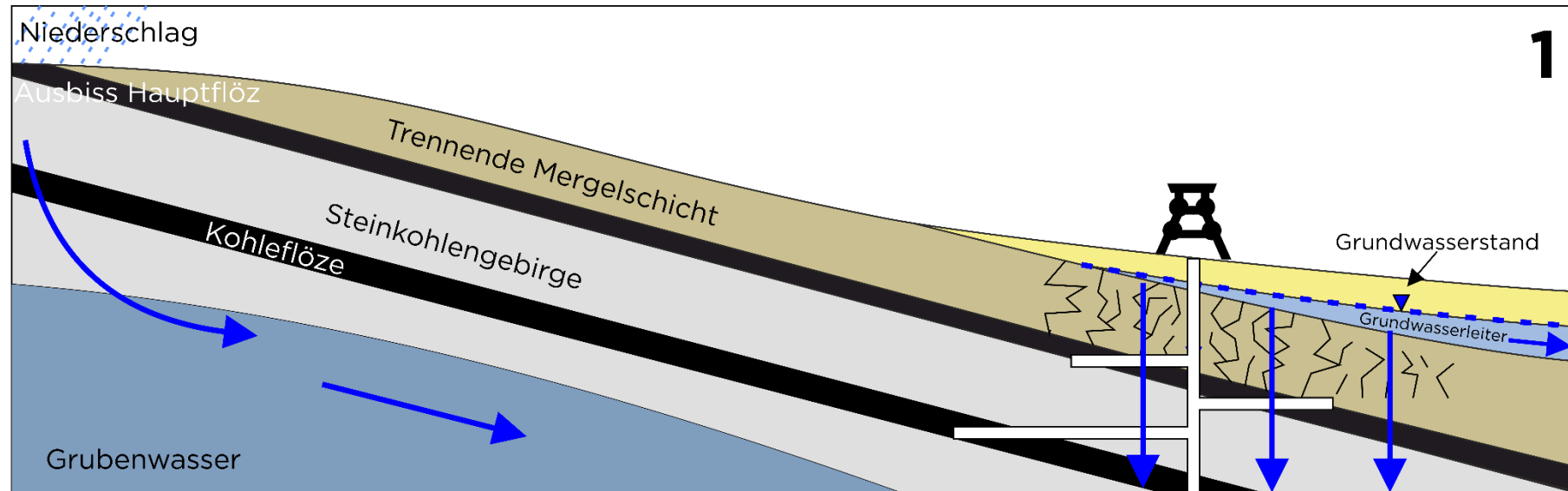
Bastian.Reker@thga.de

Sebastian.Westermann@thga.de

Perm: Magnesian Limestone GWL

Nach Geologischer Karte Nr. 27 (Durham), British Geological Survey 2008
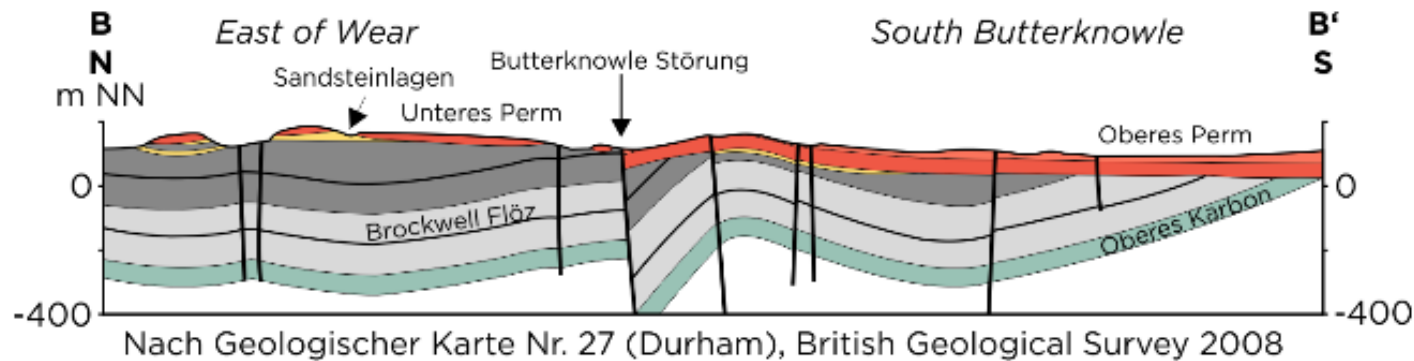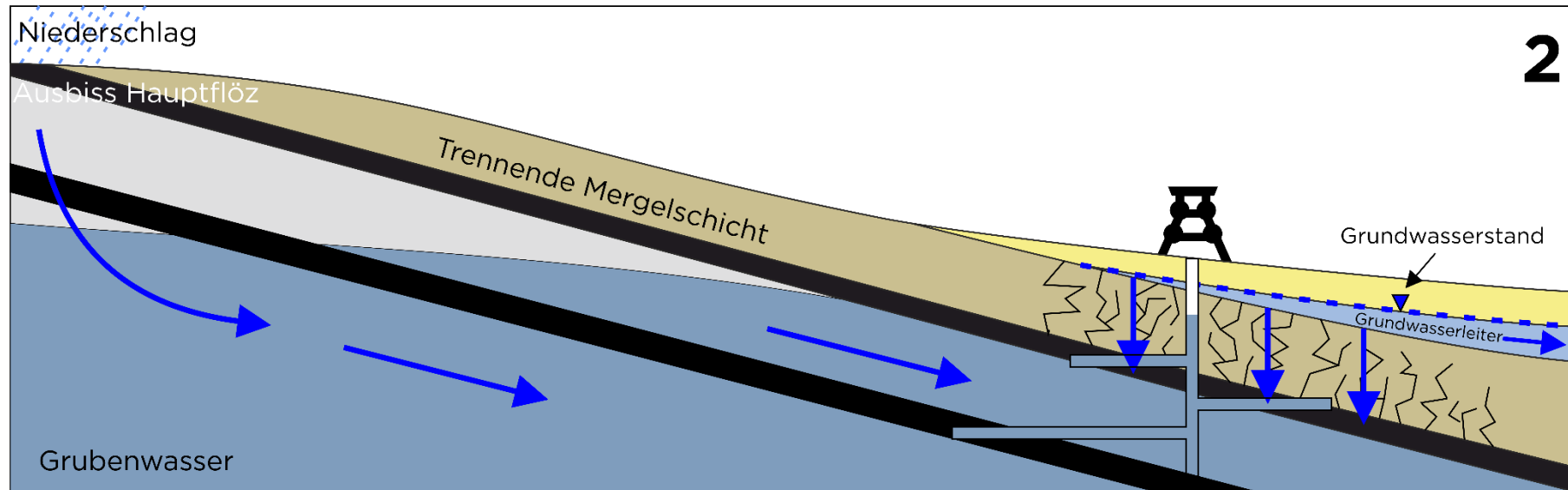
3 x überhöht

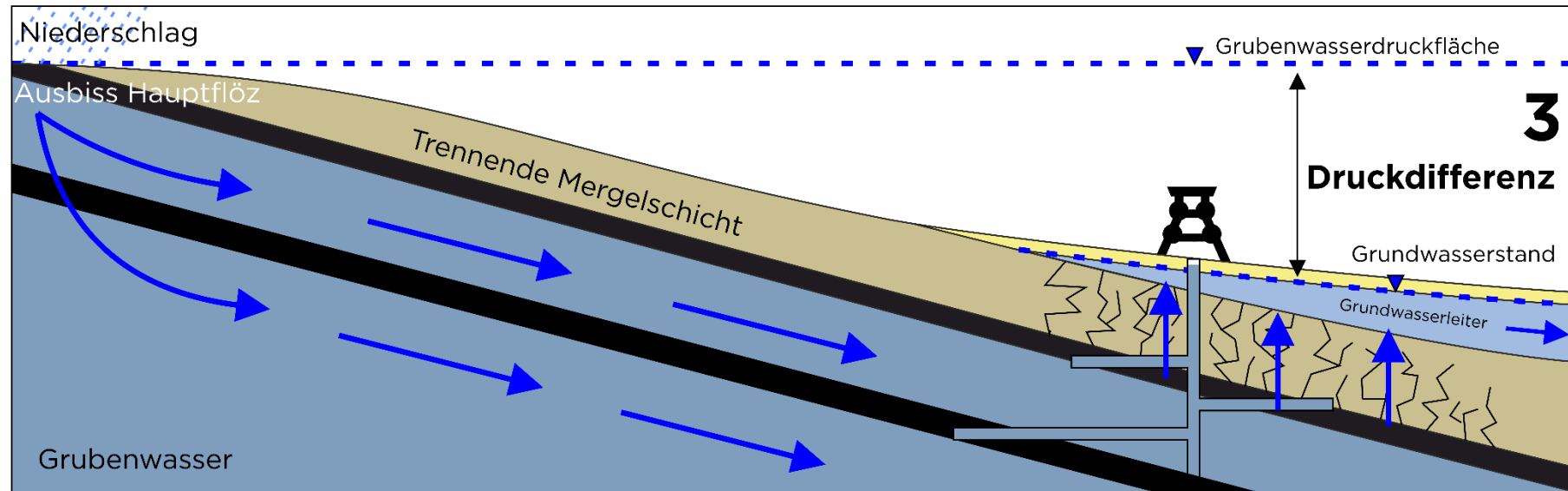## Phase 1: Abfluss des Grundwassers ins Grubenwasser

Druckhöhe Grubenwasser kleiner Druckhöhe Grundwasser

Phase 2: Verringerter Abfluss des Grundwassers ins Grubenwasser

Druckhöhe Grubenwasser kleiner Druckhöhe Grundwasser

Phase 3: Infiltration des Grubenwassers in das Grundwasser

Druckhöhe Grubenwasser größer Druckhöhe Grundwasser