United Nations Educational, Scientific and Cultural Organization

Intergovernmental Hydrological Programme

DRIN CORDA

Global Water Partnership Mediterranean

IW LEARN

Session 6
Data management

Considerations on data processing, storage, quality assurance and reporting. Sharing databases in transboundary aquifer monitoring programs

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UNESCO Technical Webinar - October 2020
Guidelines for Monitoring Strategies in Transboundary Aquifers: Goals, Methods and Tools.
The Case of the DRIN project (ALB-MTN)

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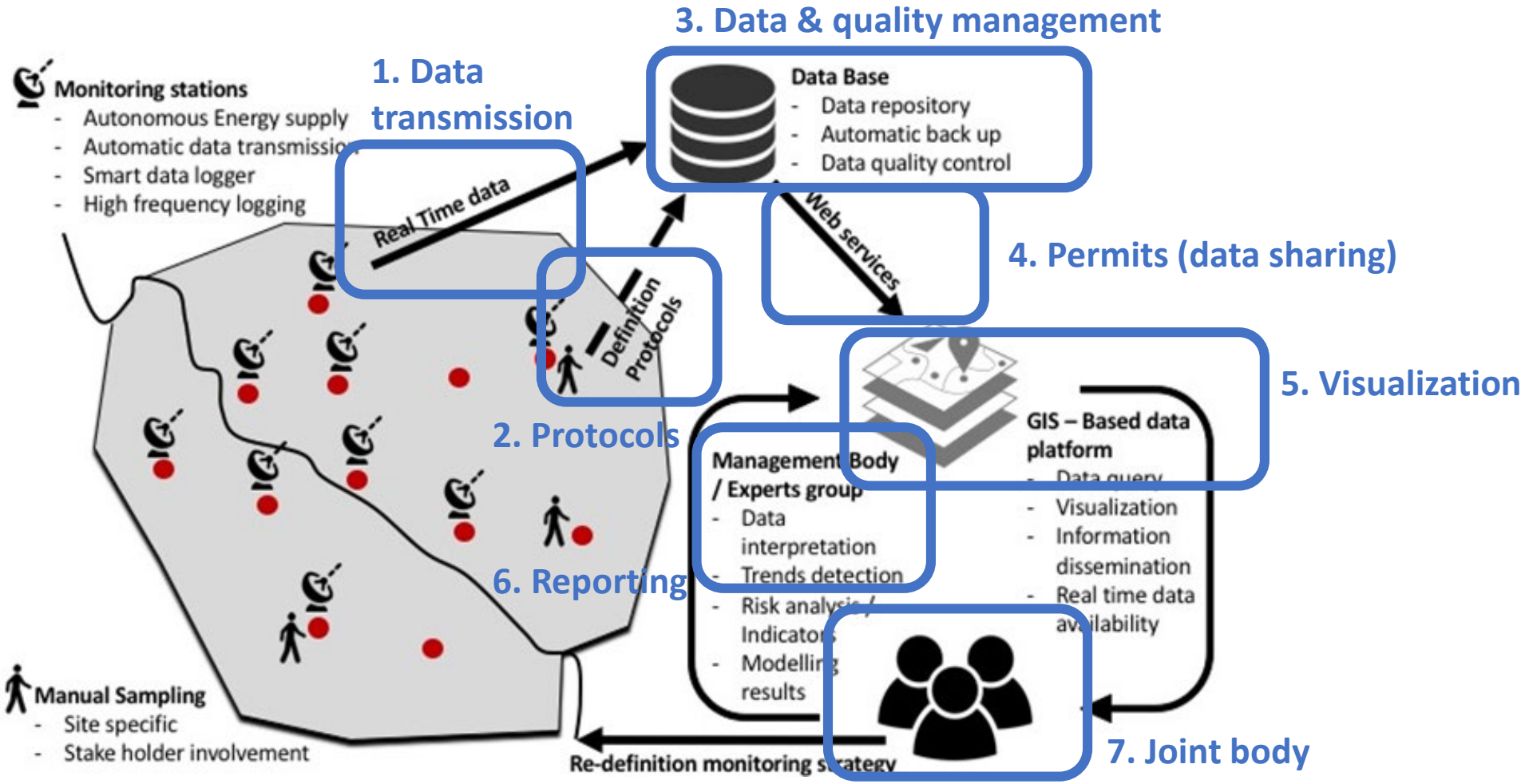
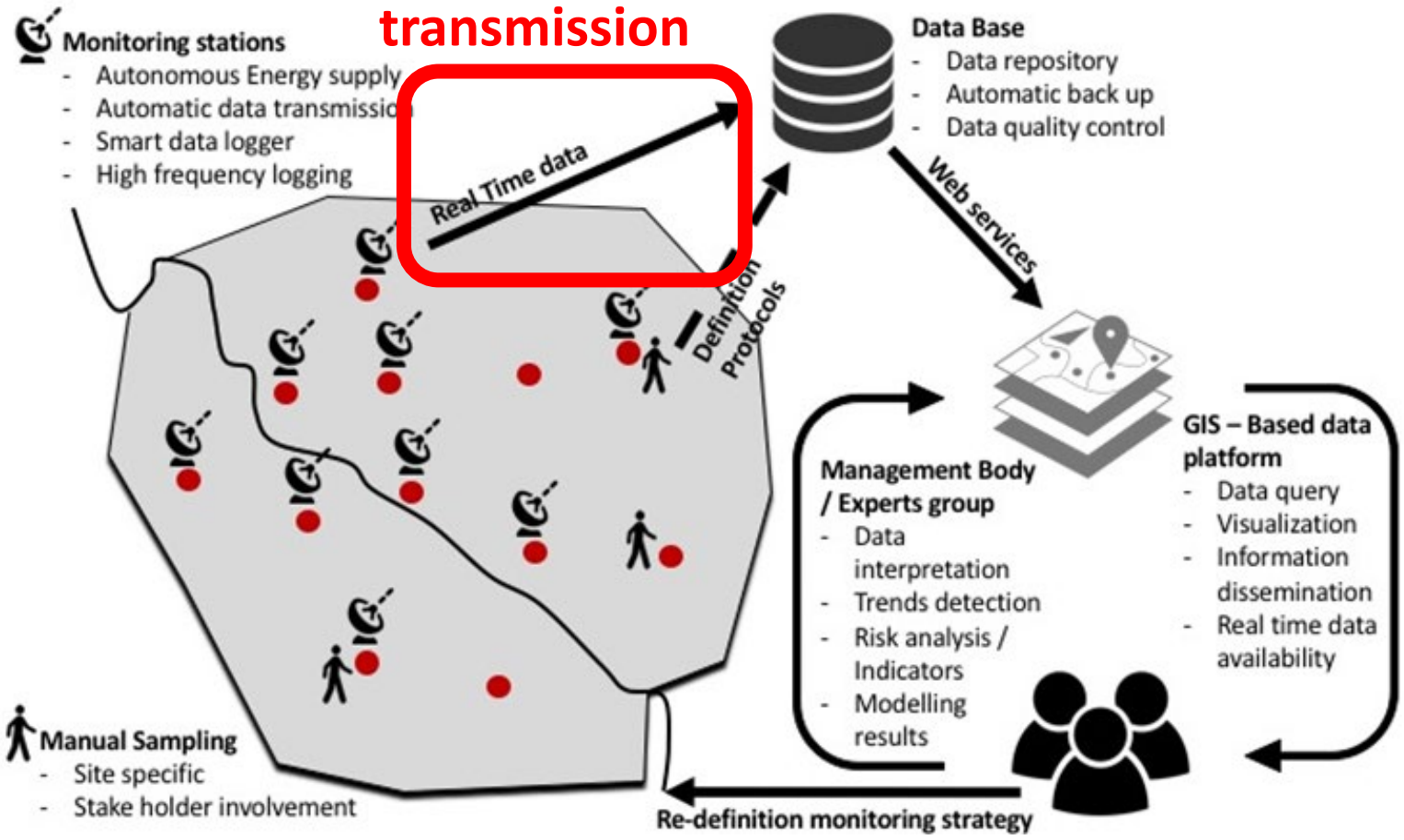
1. Dataflow

Data need to be collected, stored, interpreted and translated into useful information



2. Field tools

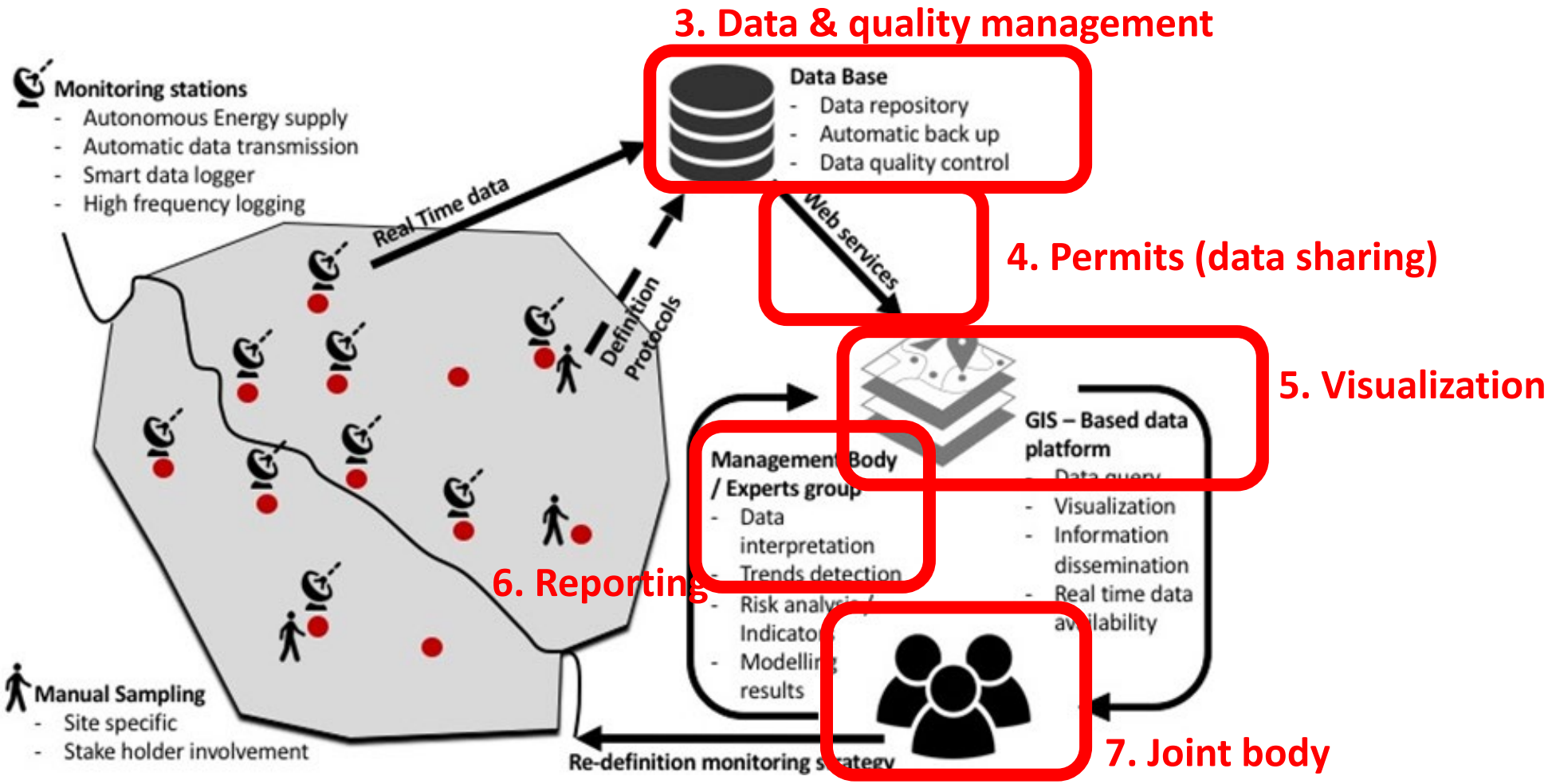


2. Field tools

Telemetric stations: transmission of data from field to database

	Characteristics	Aprox. price	Communication	Power input
Sutron Well Cap	Data logger, User interface, Solar panel, Battery, box (sensors on request)	4000 Eur	Satellite SIM card	Batteries Solar
DataHub	Data logger, User interface, Solar panel, Battery, box (sensors on request)	1500 – 2000 Eur	SIM card	Solar
Multiparameter Sonde from Hydrolab	Temperature, Conductivity, Depth, pH ,ORP, Dissolved Oxygen, etc	5000 – 9000 Eur	Yes, but unknow	Solar Electric
Seametric Smarth sensor	Pressure / Temperature/ Conductivity/ Turbidity / pH / ORP / DO	7000 – 10000 Eur	Yes, but unknow	Yes, but unknow
STS Edge (Solinst)		?	SIM card	Yes, but unknow
Atmos 21	Atmospheric station but can connect pressure sensors	2500 – 3500 eur	Yes, but unknow	Solar

3. Online databases



3. Online databases

Data management solutions from international institutions (Transboundary):

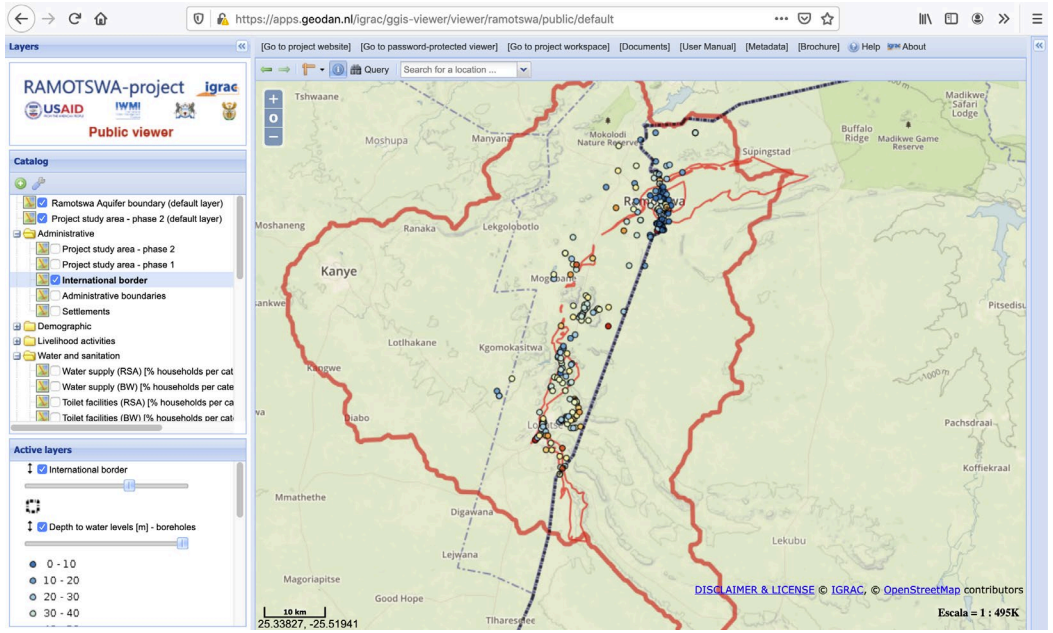
- UNESCO's IHP-WINS (https://en.unesco.org/ihp-wins)
- UN-IGRAC's GGIS (https://www.un-igrac.org/global-groundwater-information-system-ggis)

Examples of private data management solutions (No Transboundary):

- Van Walt User Interface → 400 Eur/month aprox
- Hydras 3 (OTT Hydromet) → 3000 – 4000 Eur/year aprox

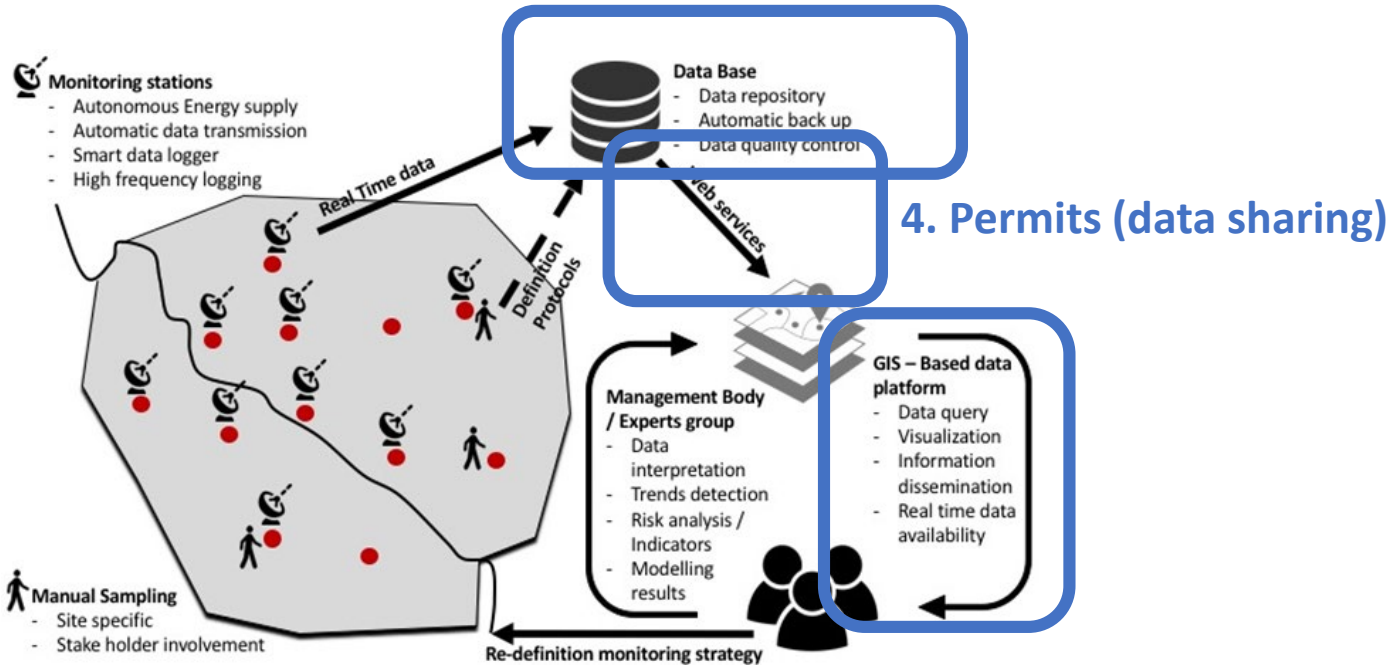
3. Online databases

- Data storage and management
- Quality checks
- Permits, data sharing and transmission
- Visualization, query and dissemination



(Source: screen-print: https://www.un-igrac.org/global-groundwater-information-system-ggis)

3. Data & quality management



4. Permits (data sharing)

5. Visualization

4. Data management strategy

Enhance cooperation between riparian countries

Guidelines on Monitoring and Assessment of Transboundary Groundwaters from UN/ECE:

- Transform data into information
- Collected data should be validated by a joint commission/body
- Information should be reported to decisión-makers
- Data and information necessary for future use should be stored
- Data exchange should be facilitated between riparian countries but also international, ECE regionwide, and aquifer level.

5. Quality management

Quality assurance procedures should include:

- **Identification** and records for samples, devices and operators
- Sampling methods, sampling plan and sampling **field reports**
- **Protocols** for sample transportation, receipt, storage and preservation
- **Validation** of methods, including uncertainty estimation
- Analytical measurement procedures
- Internal quality control of methods
- **Participation** in external QC schemes (proficiency testing schemes etc)
- Expression of results
- **Traceability** of documents
- Traceability of measurements

6. Check list

- ❑ Join body
- ❑ Joint document approved by riparian countries containing:
  - Protocols for data collection in the field (sampling, transportation, storage, analysis, etc)
  - Data sheets for field campaigns and data acquisition
  - Data exchange protocol
  - Templates for reporting
- ❑ GIS-based database (online if possible):
  - Data storage
  - Visualize and analyse
  - Permits for data approval and sharing
  - Data sharing between countries

Further reading

- UN/ECE Task Force on Monitoring and Assessment (2000). Guidelines on Monitoring and Assessment of Transboundary Groundwaters. ISBN 9036953154
- Wickert, Sandell, Schulz, Crystal (2019). Open-source Arduino-compatible data loggers designed for field research. Hydrol. Earth Syst. Sci., 23, 2065–2076, 2019. https://doi.org/10.5194/hess-23-2065-2019

Thank you!

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