Session 6
Data management

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

Dr. Laura del Val Alonso

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

1. Dataflow
2. Field tools
3. Online databases
4. Data management strategy
5. Quality management
1. Dataflow

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

1. Data transmission
2. Protocols
3. Data & quality management
4. Permits (data sharing)
5. Visualization
6. Reporting
7. Joint body

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2. Field tools

1. Data transmission

- Autonomous Energy supply
- Automatic data transmission
- Smart data logger
- High frequency logging

Real Time data

Data Base
- Data repository
- Automatic back up
- Data quality control

Web services

GIS - Based data platform
- Data query
- Visualization
- Information dissemination
- Real time data availability

Management Body / Experts group
- Data interpretation
- Trends detection
- Risk analysis / indicators
- Modelling results

Re-definition monitoring strategy

Manual Sampling
- Site specific
- Stake holder involvement

Monitoring stations

Definition Protocols
## 2. Field tools

### Telemetric stations: transmission of data from field to database

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

3. Data & quality management
- Data repository
- Automatic back up
- Data quality control

4. Permits (data sharing)

5. Visualization
- Visualization
- Information dissemination
- Real time data availability

6. Reporting
- Data interpretation
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- Indicator results
- Modeling results

7. Joint body

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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)
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

Thank you!

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