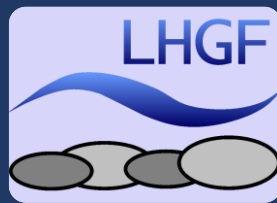


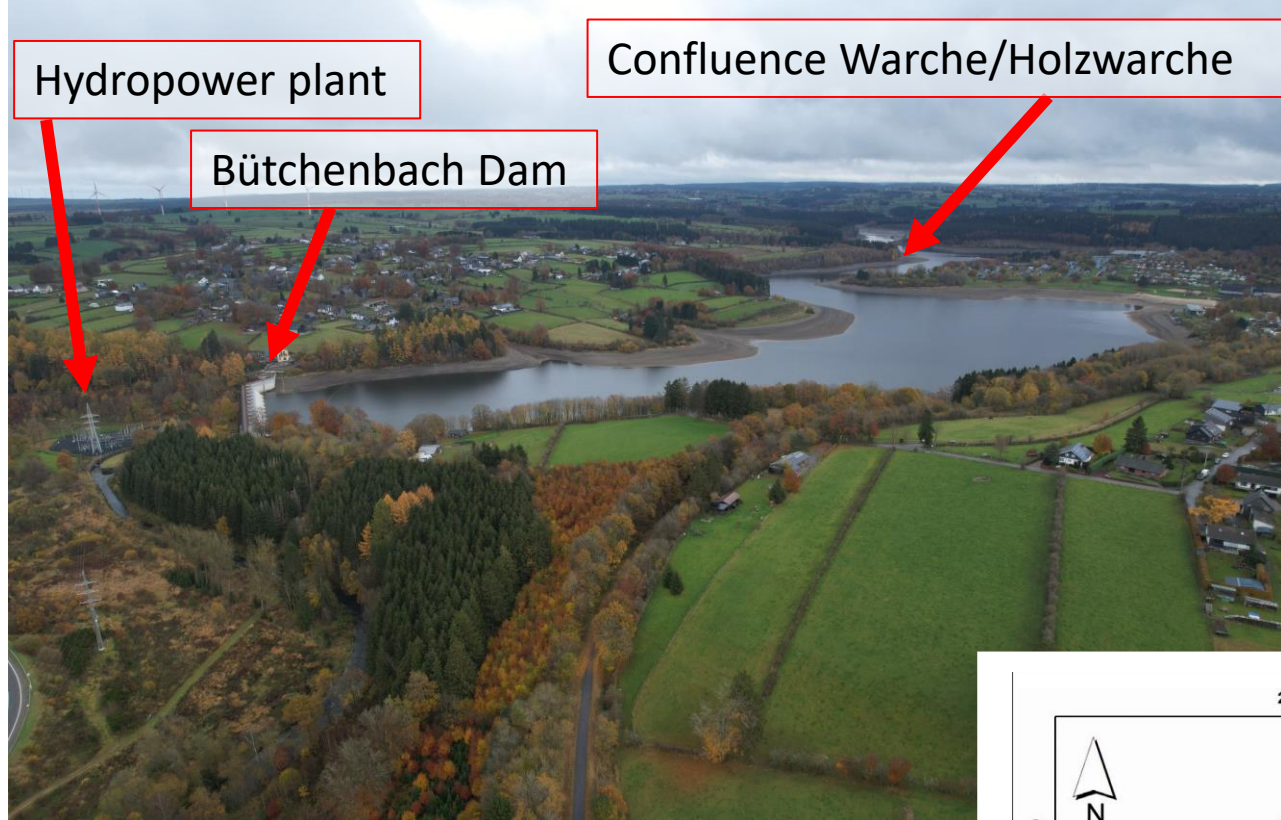
# Long-term impacts of hydropower plants on the sedimentology and morphology of the Warche riverbed (Belgium)

Complement on IAG 2022 Poster



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Hydropower plant

Confluence Warche/Holzwarche

Bütchenbach Dam

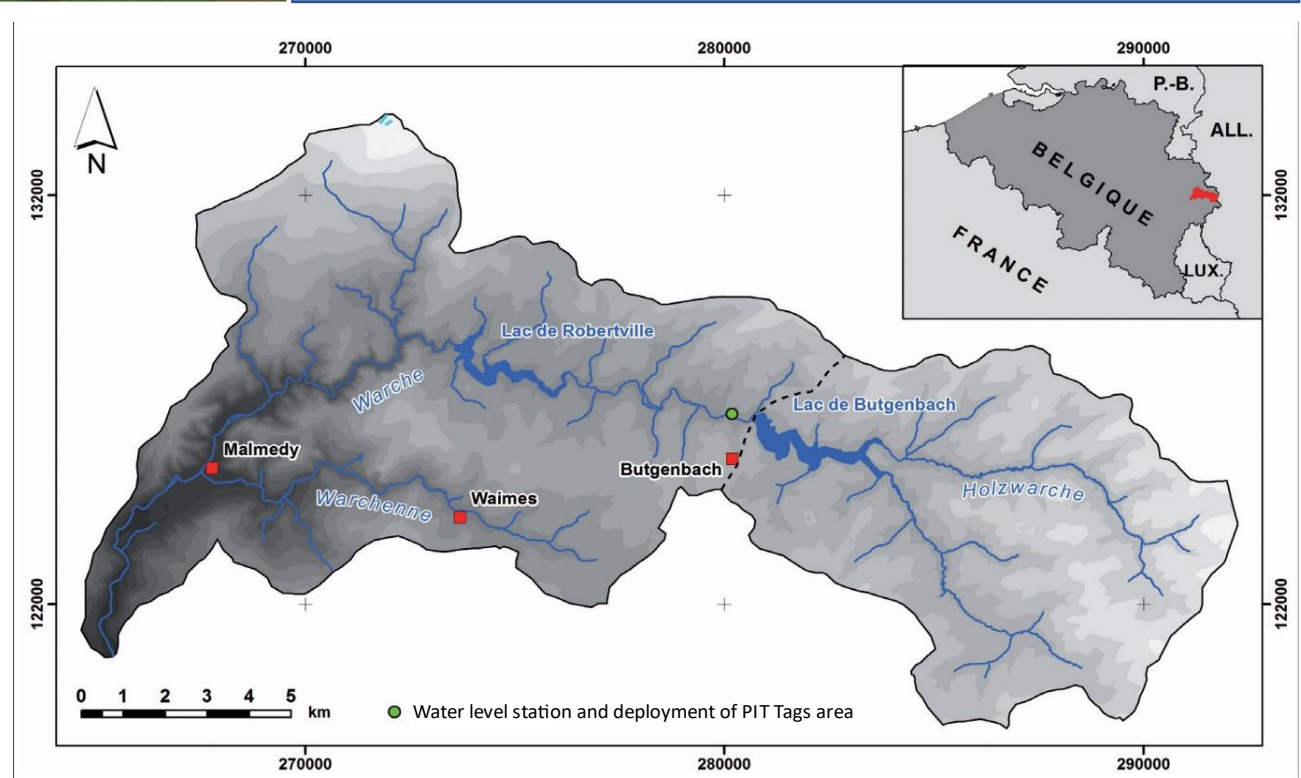
**Bütchenbach Dam on the Warche river**

- Built in **1932**
- **Height 23 m - Width 140 m**
- Rivers : **Warche + Holzwarche**
- Volume of the storage reservoir : **11.000.000 m<sup>3</sup>**

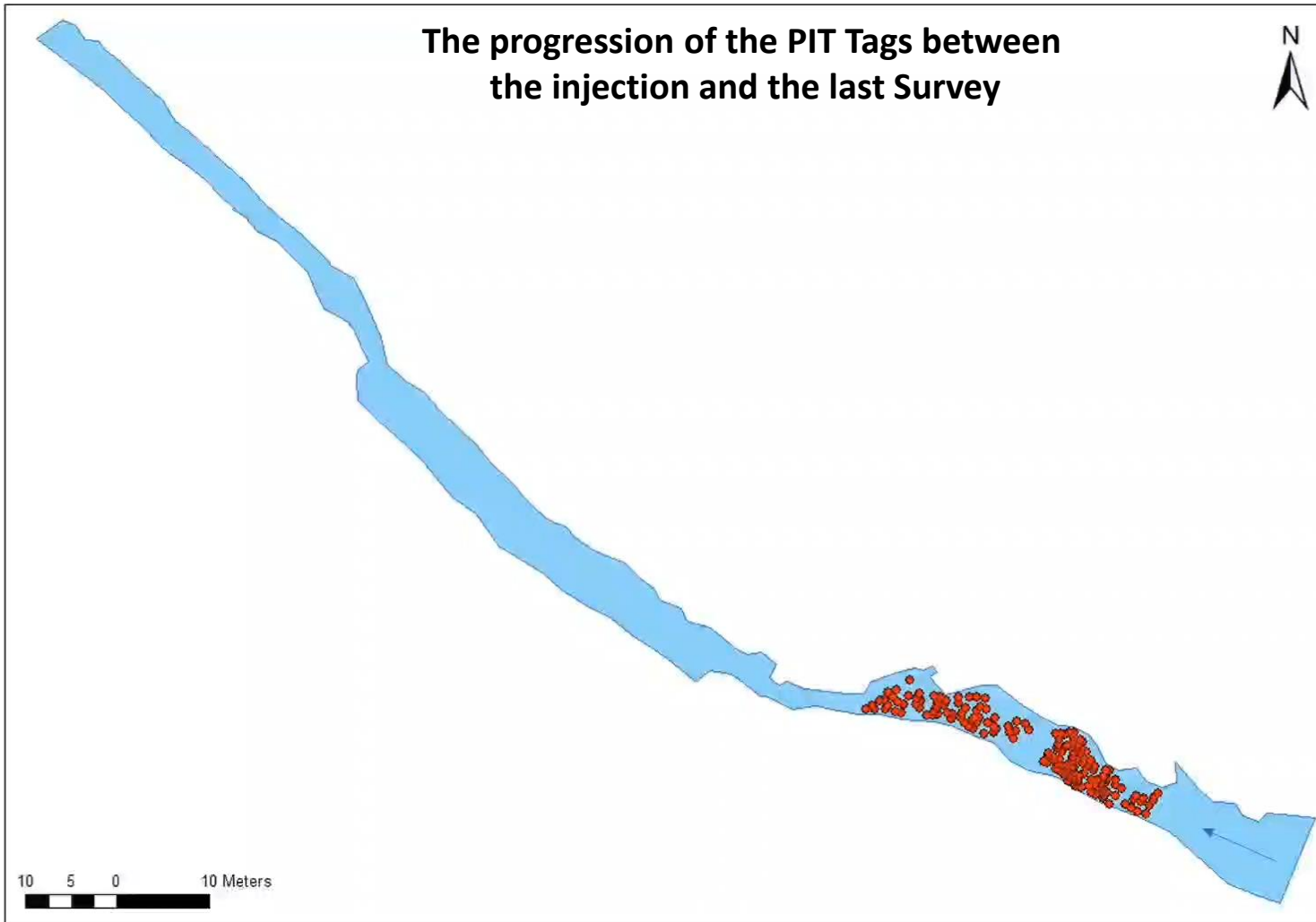
➔ It's first of all a **pre-dam for the hydropower plant of Robertville**. Bütchenbach dam allows to **store more water**

**Assani's Results (Assani & Petit, 2004) :**

- The average **width** has more than **doubled in 45 years (1966-1996)**
- The **depth** has **not changed** significantly (incision has stopped)
- A rise of formation of islets
- Reduction of sinuosity



The progression of the PIT Tags between the injection and the last Survey



	Date of the Survey (D/M/Y)	Hours of turbine (since the last survey)
Injection	10/05/2022	
Survey 1	16/05/2022	3h
Survey 2	30/05/2022	18h15
Survey 3	17/06/2022	10h15
Survey 4	28/07/2022	12h40
<b>Total</b>		<b>44 h 10</b>

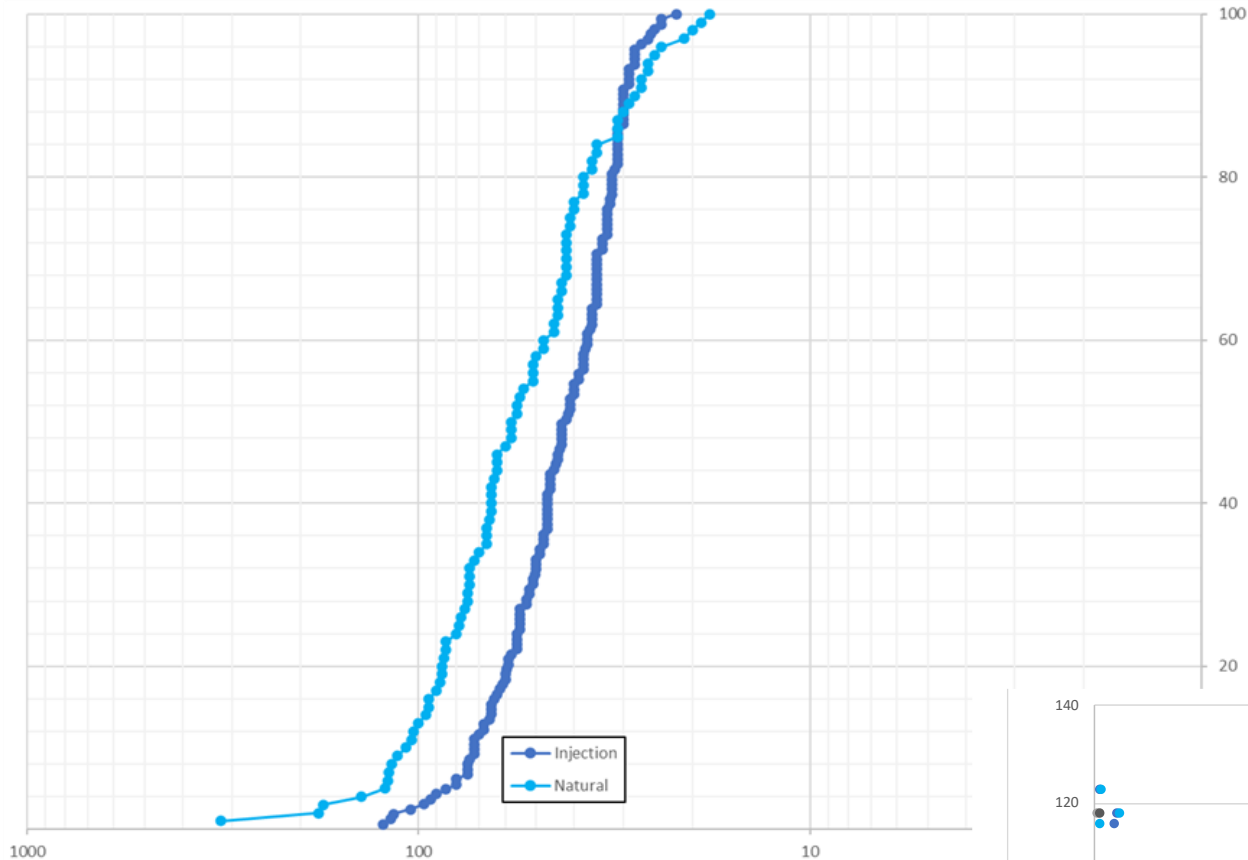
The study doesn't include **floods above 10 m<sup>3</sup>/s** yet, so this is an **estimation** for the **minimal distance**

<https://youtu.be/FSPL14etJm4>

**In future :**

➤ The **autumn water release** will induce a **long turbine time** → **other surveys are planned** after this

➔ **Several years of survey** will allow to see the **gradual effect** of the **reorganization** and the **sedimentary trapping** on the **slowdown of the sediment bedload** (the RFID tracers here) **on the long term**



To calculate the progression of the RFID tracers :

During the 2<sup>nd</sup> survey a **topographic survey of the course of the river** has been done

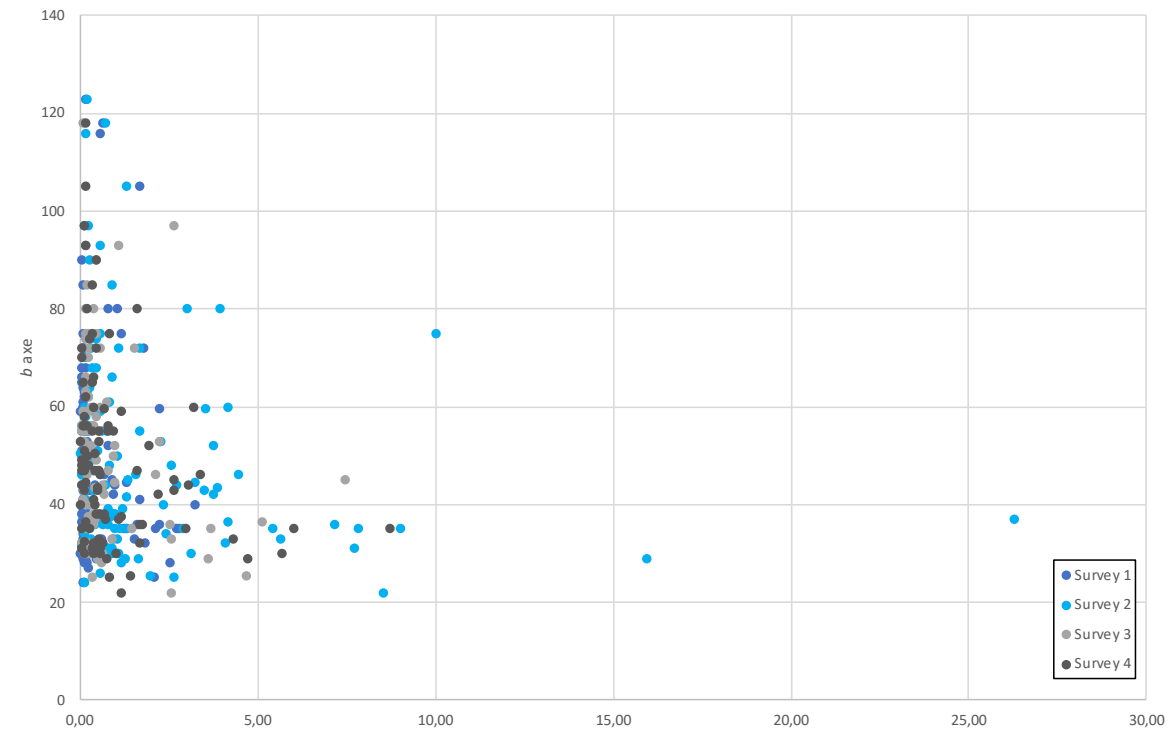
**For a survey to another :**

- the minimal **significant distance** between two survey is **1 m**
- **Distance** = Survey<sub>n</sub> + Survey<sub>n+1</sub>

Progression of RFID pebbles classified by *b* axe

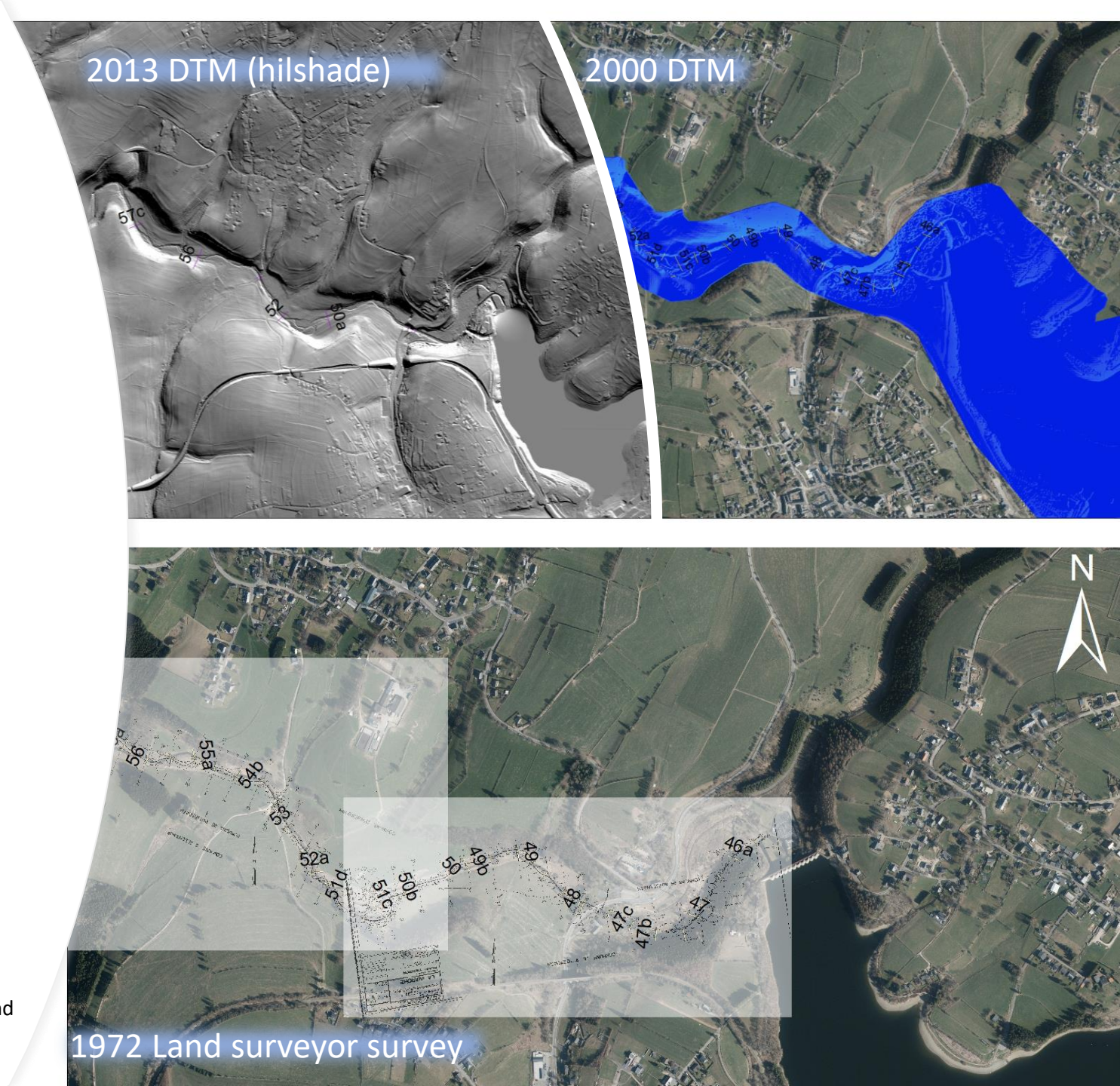
**Difficulties :**

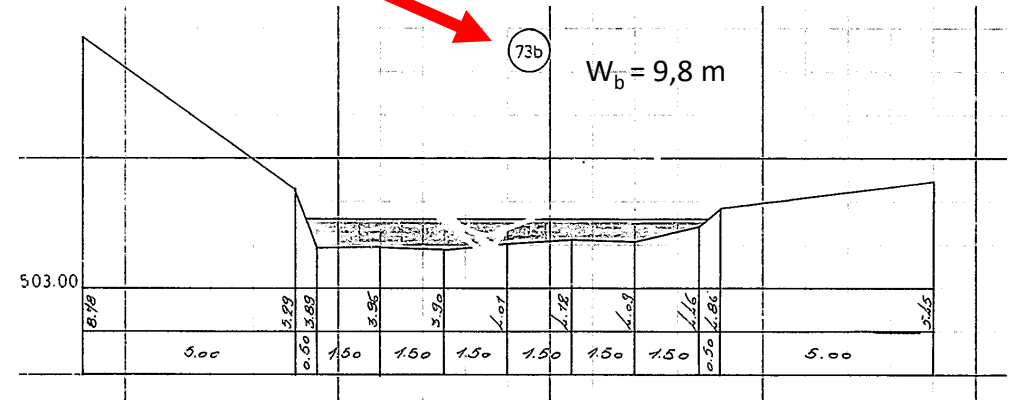
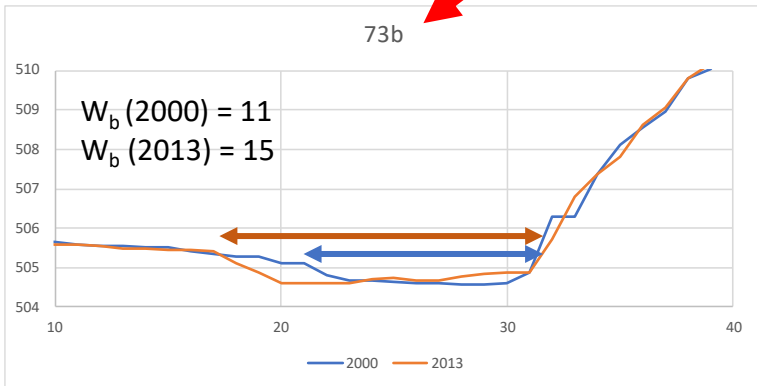
- The study started during summer : The season with the **least turbinning for 20 years**
- **the shape** of tagged pebbles (flatness) is **quite different** of **local pebbles** of the Warche River (pebbles were too flat to be microchipped)



## Comparison between 3 time scales

- The 1972 cross section was selected to be compared to 2000 & 2013 DTM if :
  - It is **still perpendicular** to the river
  - There is **no vegetation** hiding the river
  - There are **no important changes of the sinuosity**
- The **same cross section** was used with **2000 and 2013 DTM** to facilitate comparison





**Difficulties :**

- The 2013 DTM has been modified to minimize level mistakes on earth  
 ➔ The river level next to human constructions has been modify too
- DTM is very often wrong about the depth altitude in the river

**Solutions :**

- To do a topographic survey with a GPS RTK