Impact of vegetation development on the hydraulic characteristics and flow patterns in lowland rivers

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Wethydro Conference: 23 - 24 Sept. 2005

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Content

- Introduction: importance of modelling
- Data collection and processing
- Importance of the friction factor n
- n as a function of distance and water level
- Biomass influence on velocity distribution
- Conclusions

Introduction:
Importance of Hydraulic Modelling of open Channel Flow

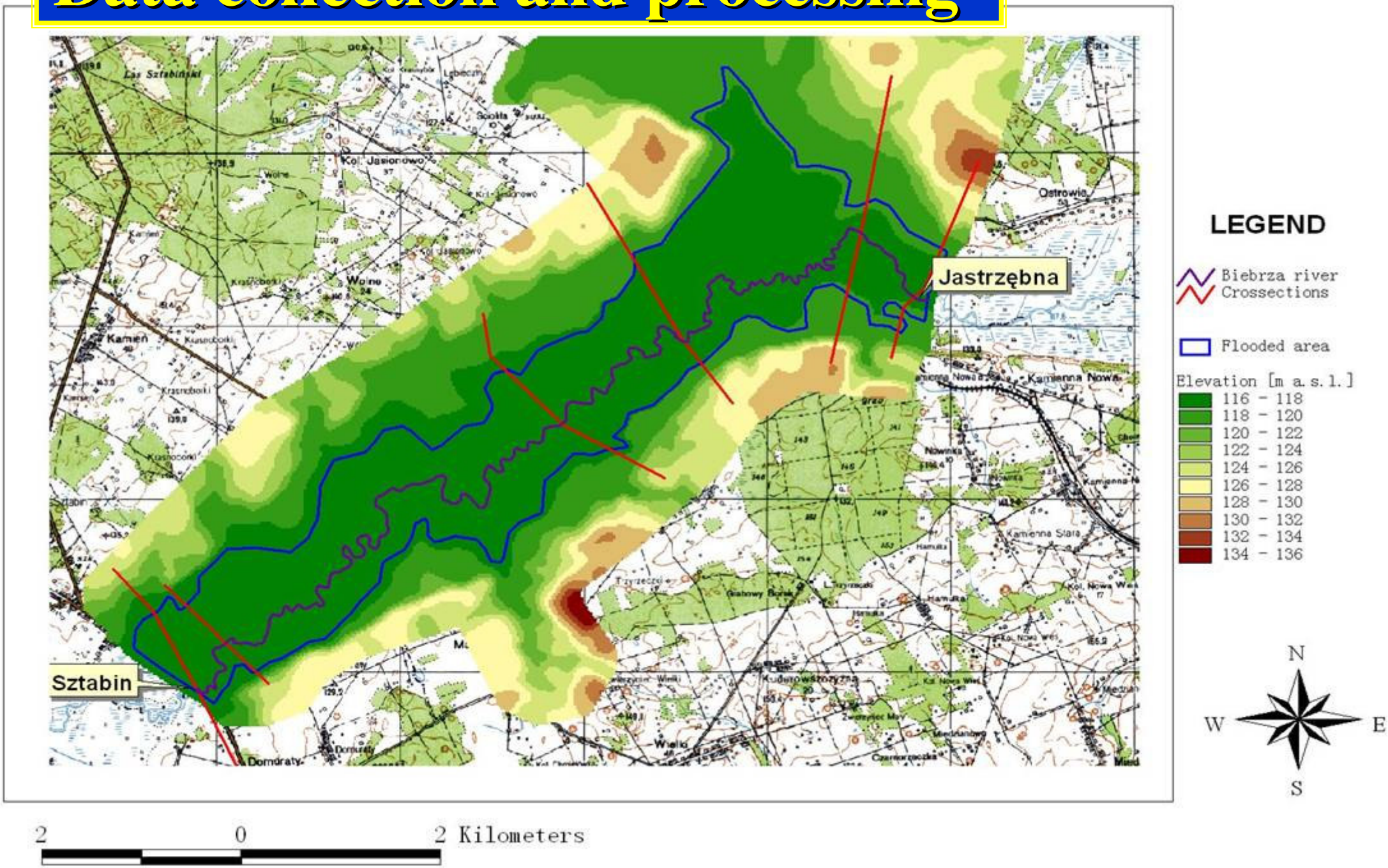
- Water Resources Management
- Strategic planning – scenario's
- Crises Management

Introduction:
Importance of Hydraulic Modelling of open Channel Flow

Supositions

- Uniform velocity distribution: $Q = A \cdot U$
- Prismatic bed – constant cross-section
- Hydrostatic cross sections
- Constant bottom slope
- Constant friction factor !!!!

Data collection and processing



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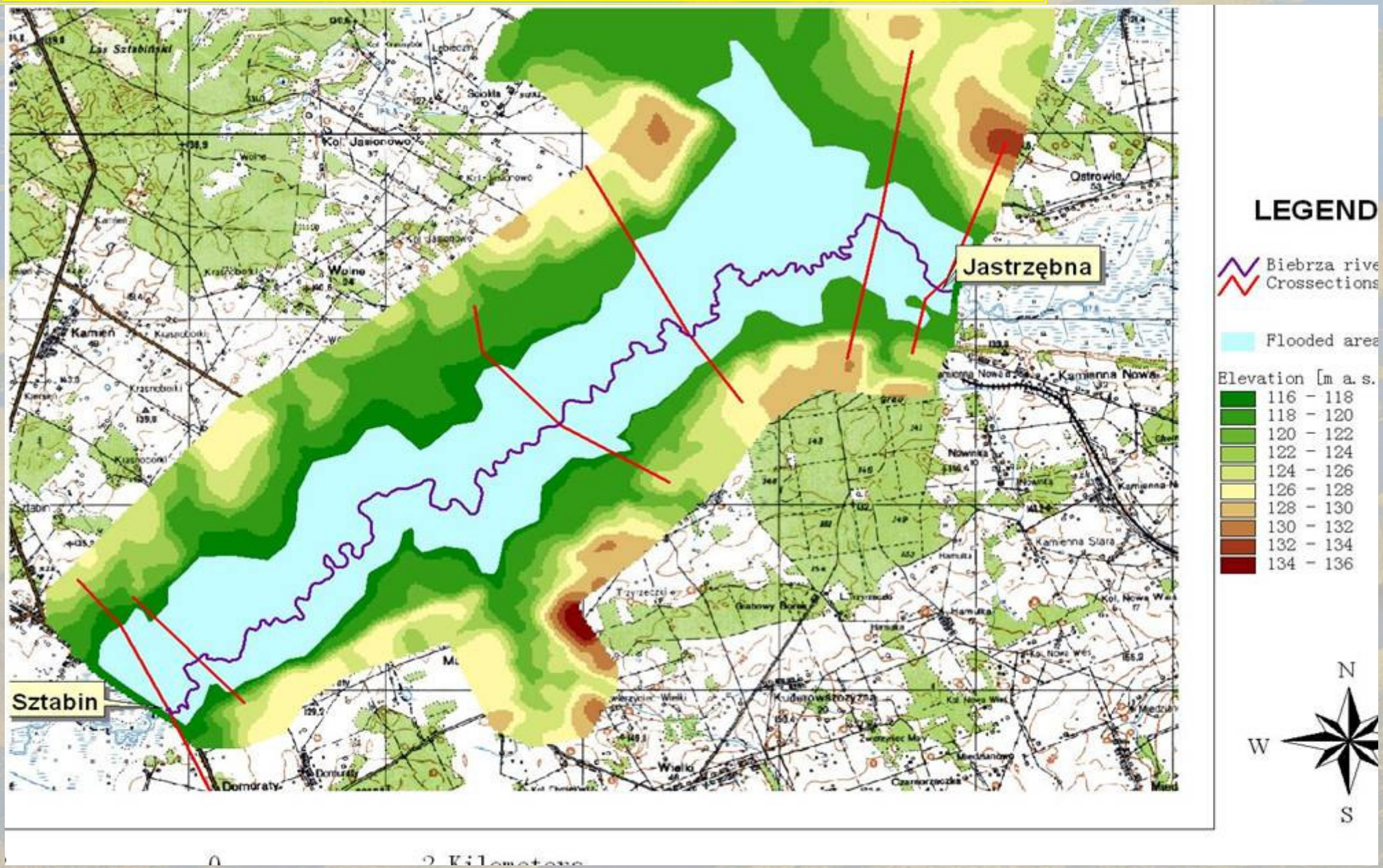

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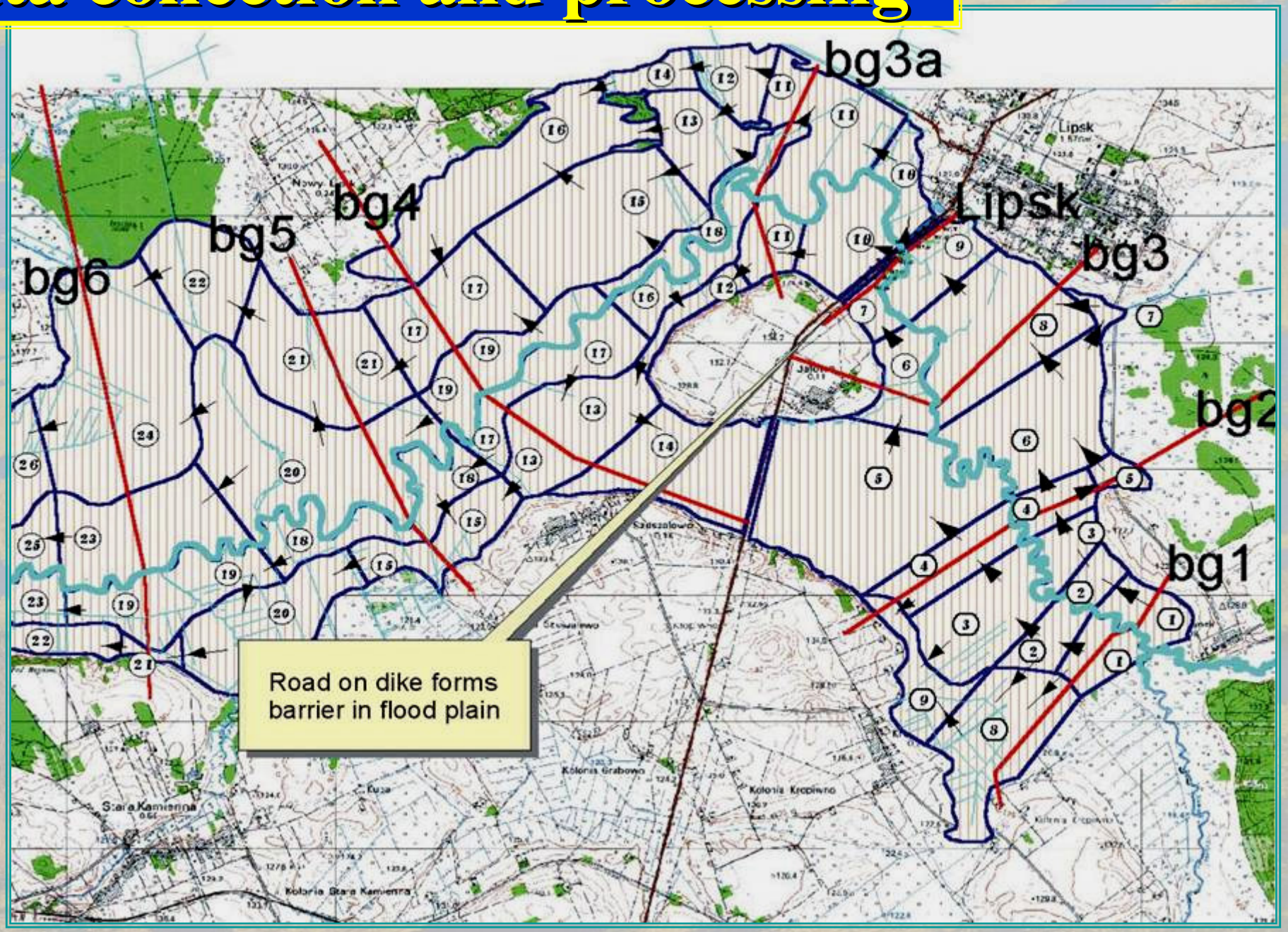
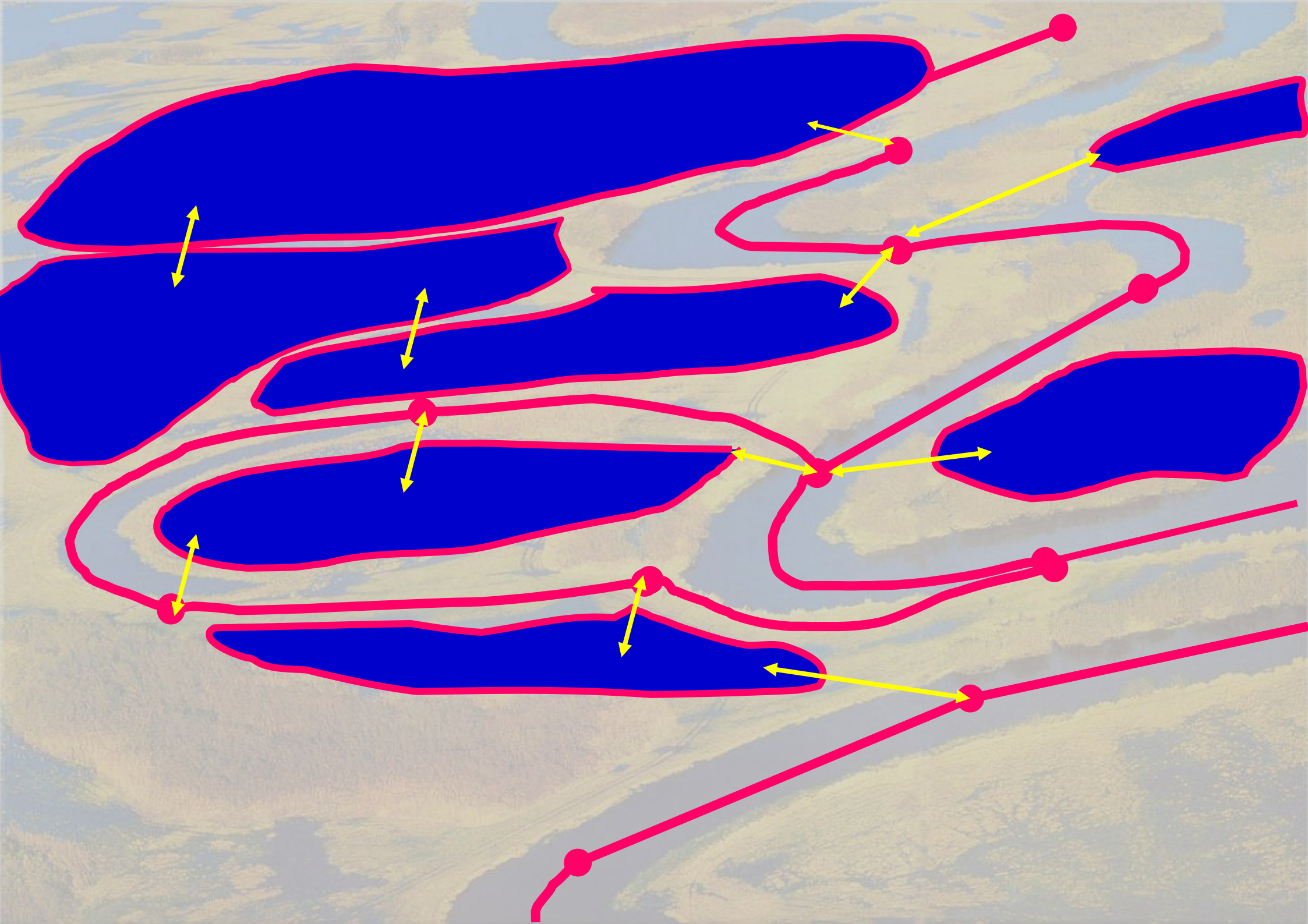


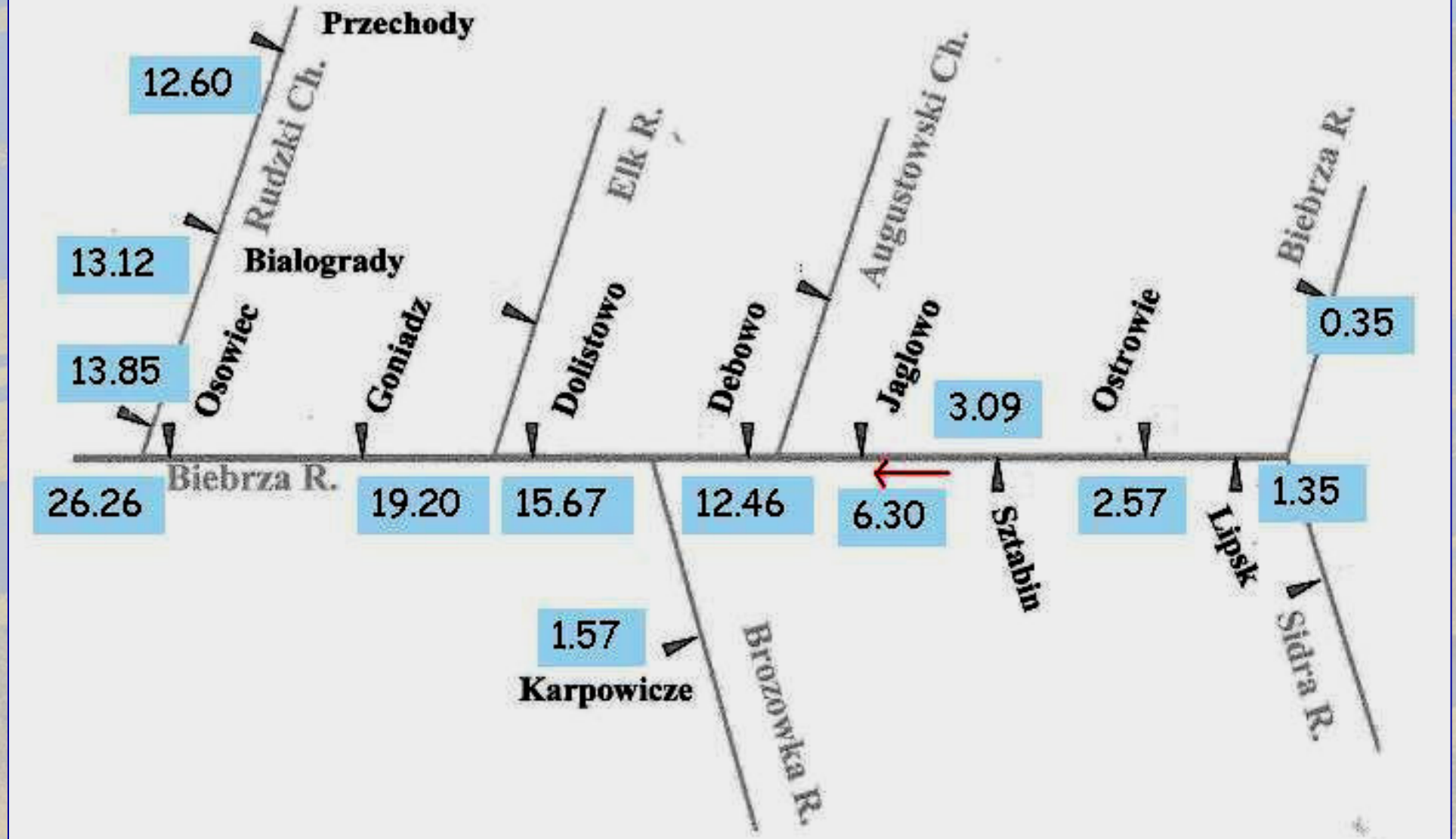


Data collection and processing

How to determine the longitudinal profile?

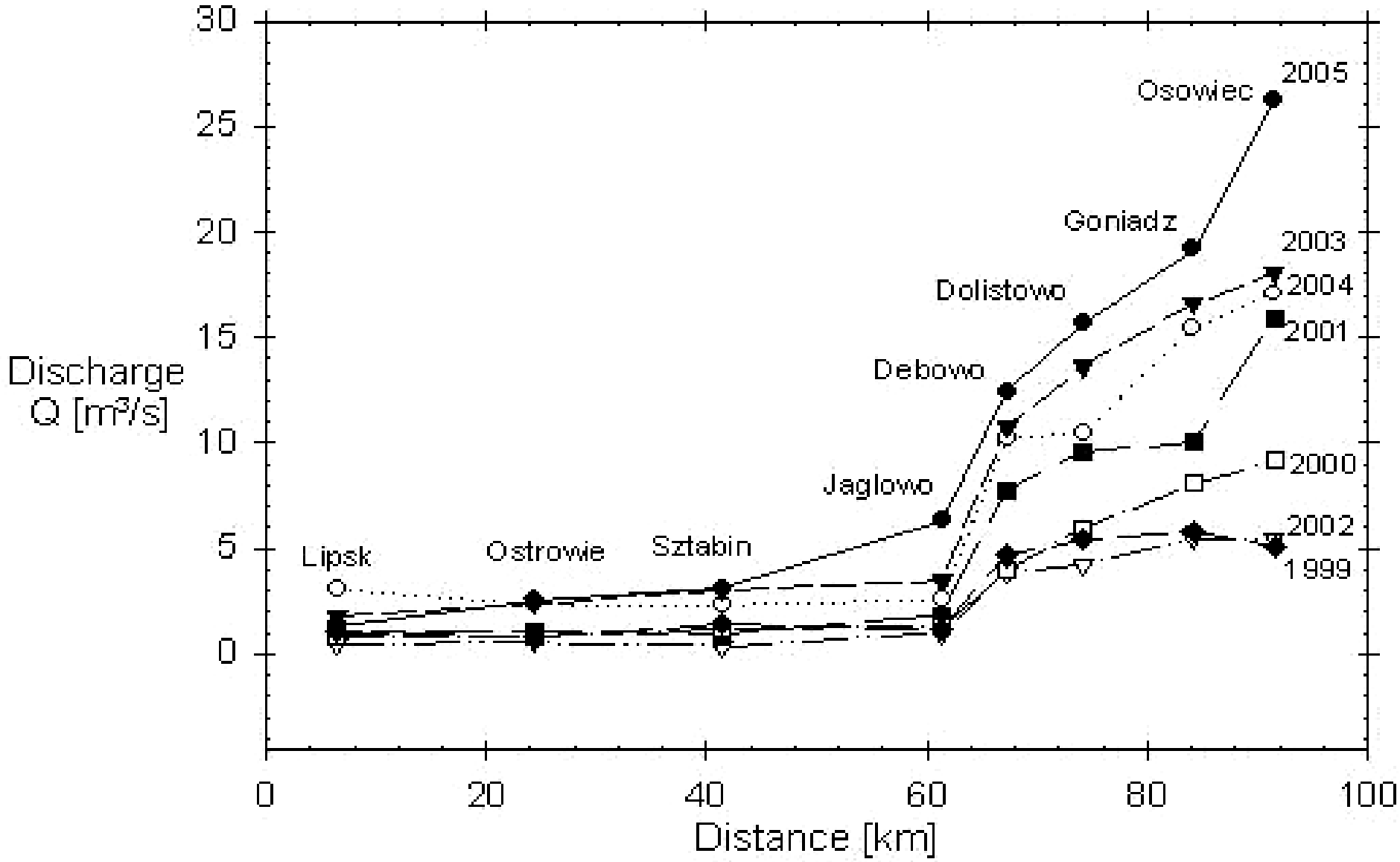
Effect of friction!

Data collection and processing



Measurement campaign 2005: Q [m^3/s]

Data collection and processing



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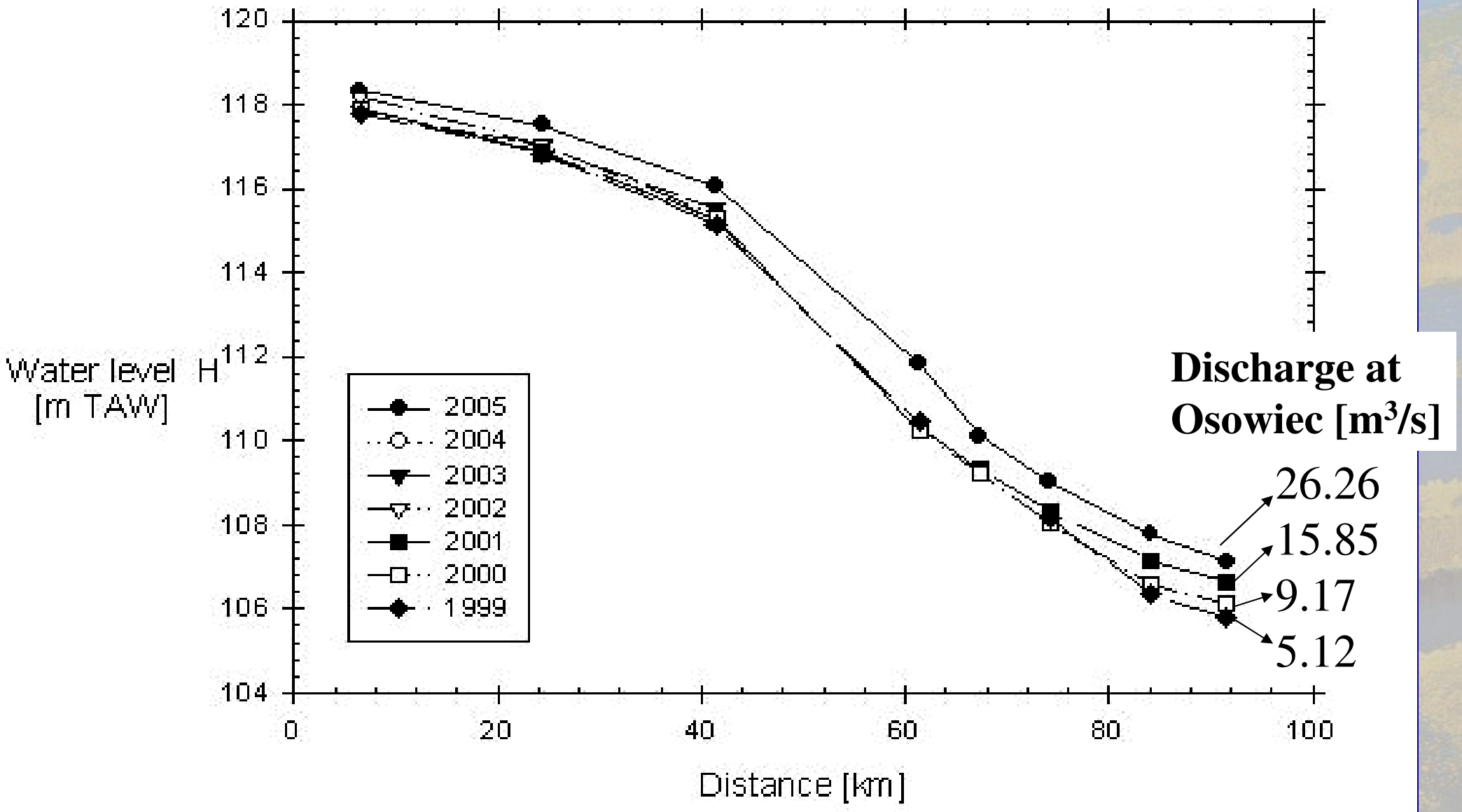
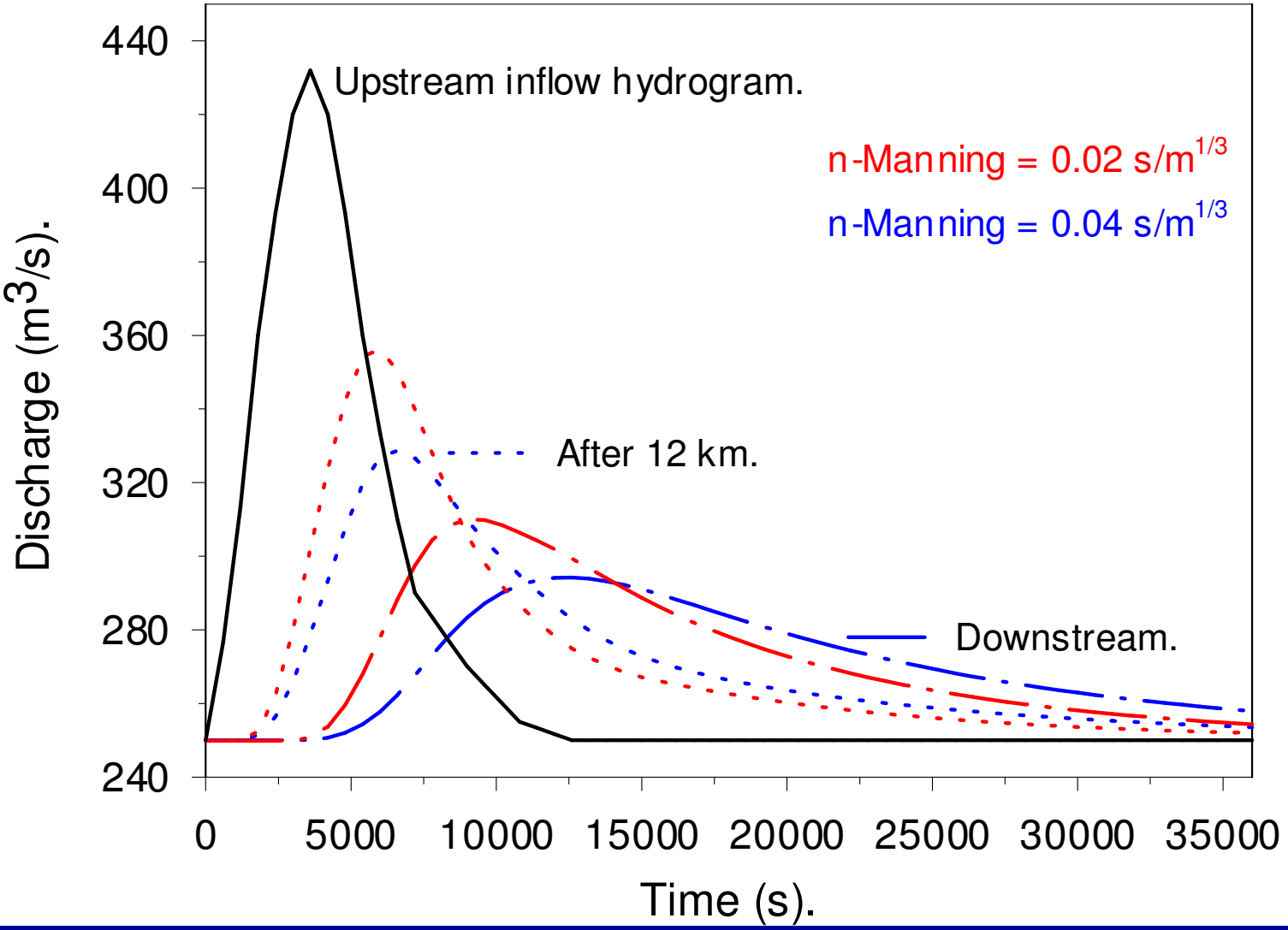


Importance of the friction factor n



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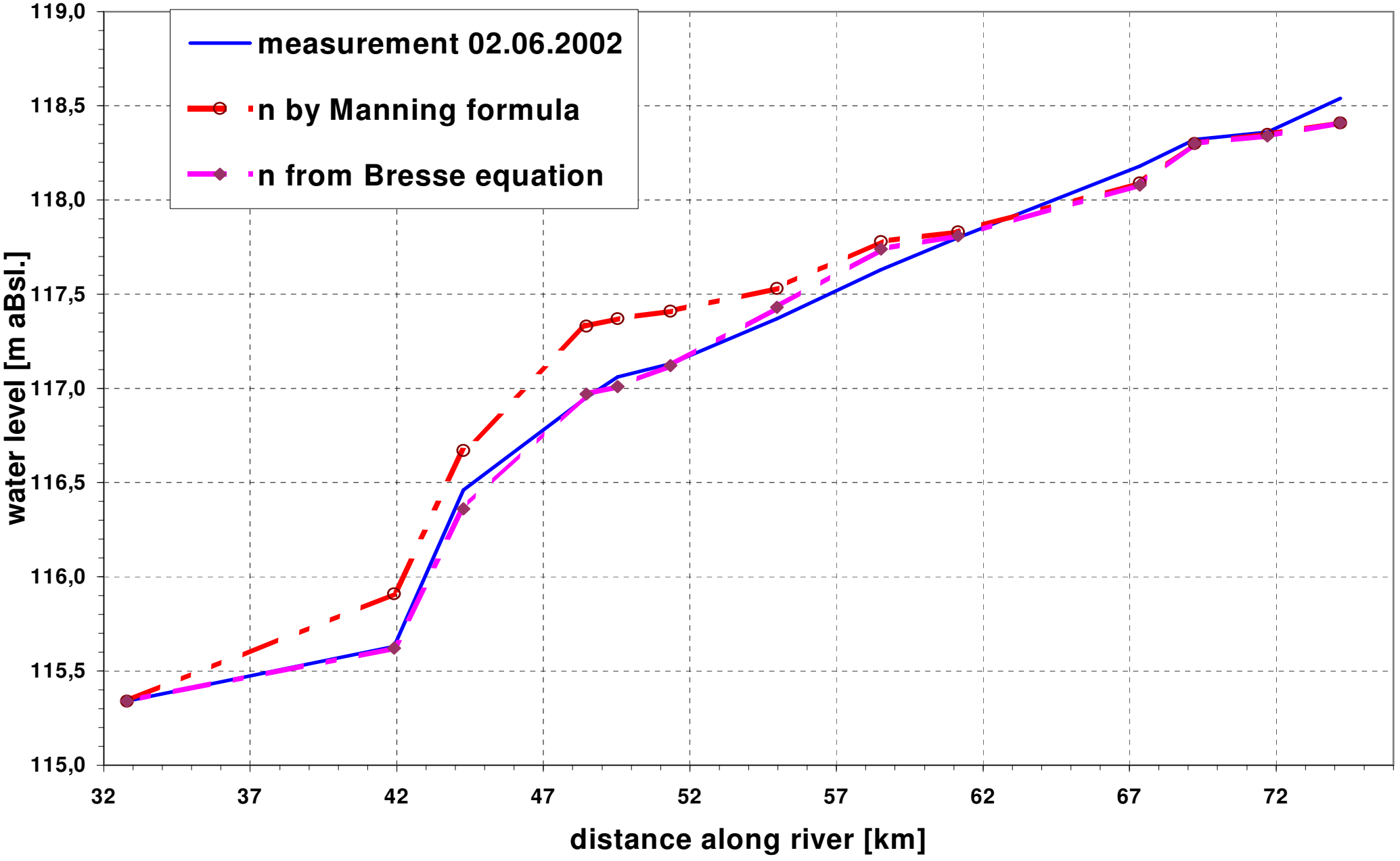

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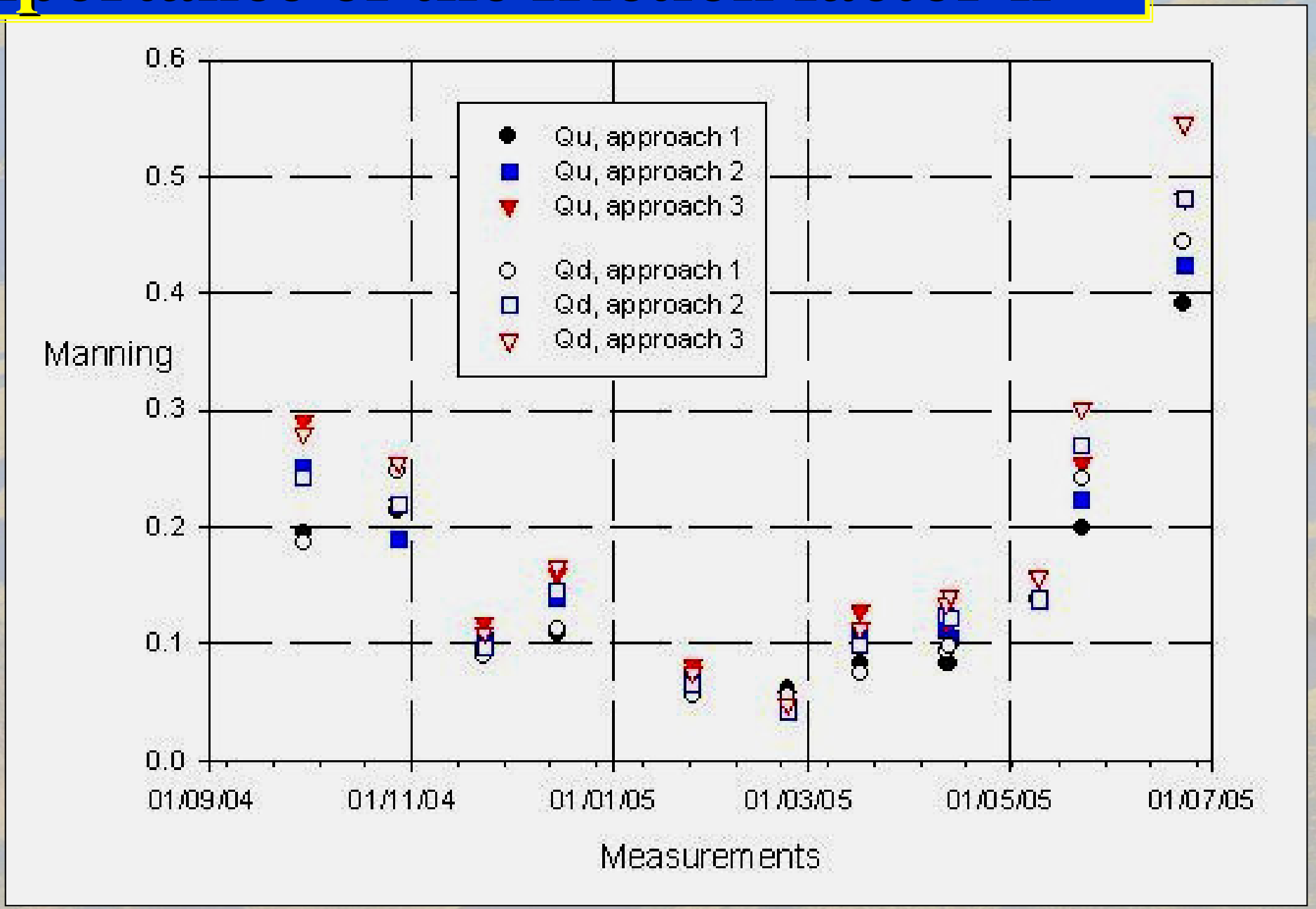

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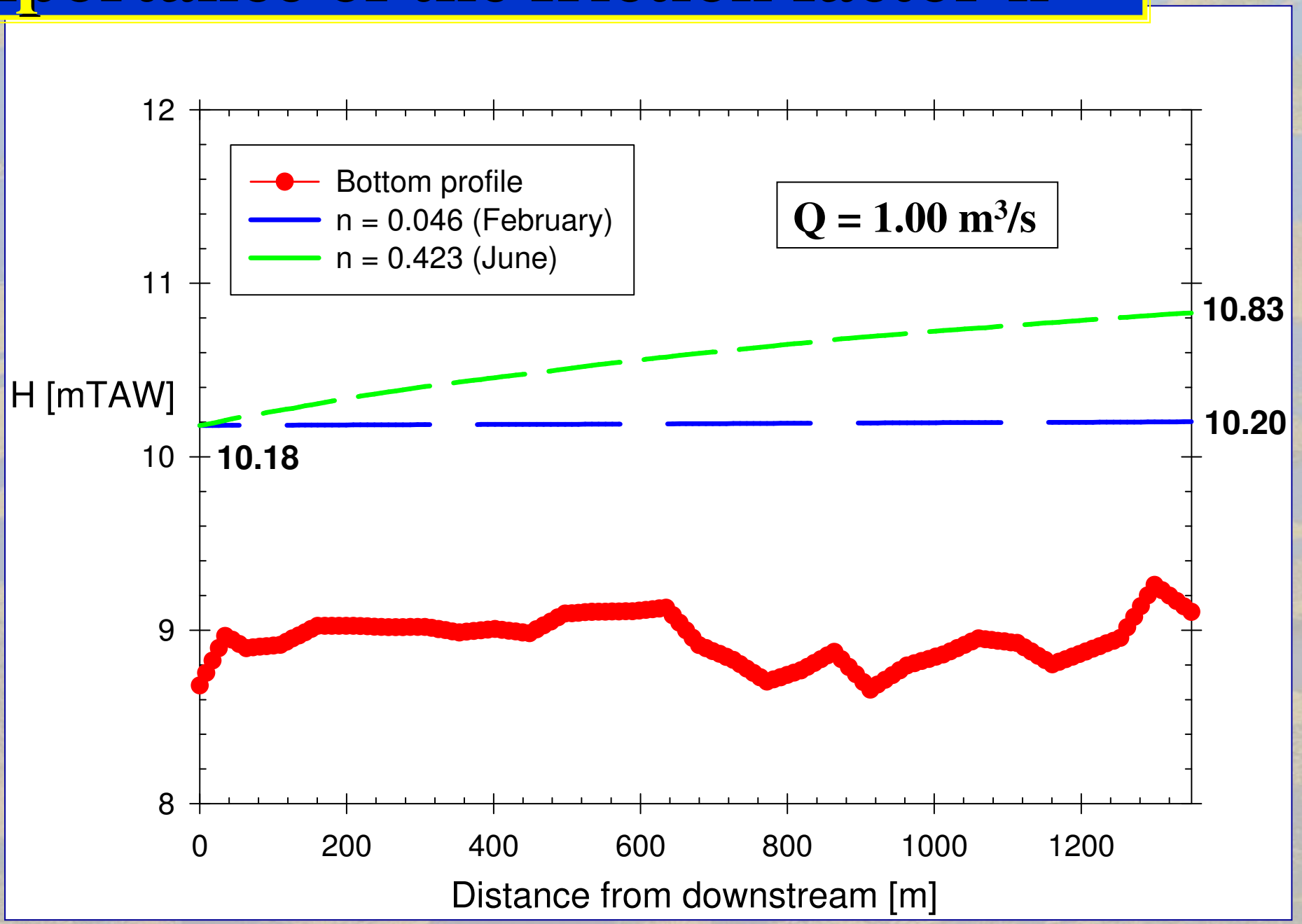

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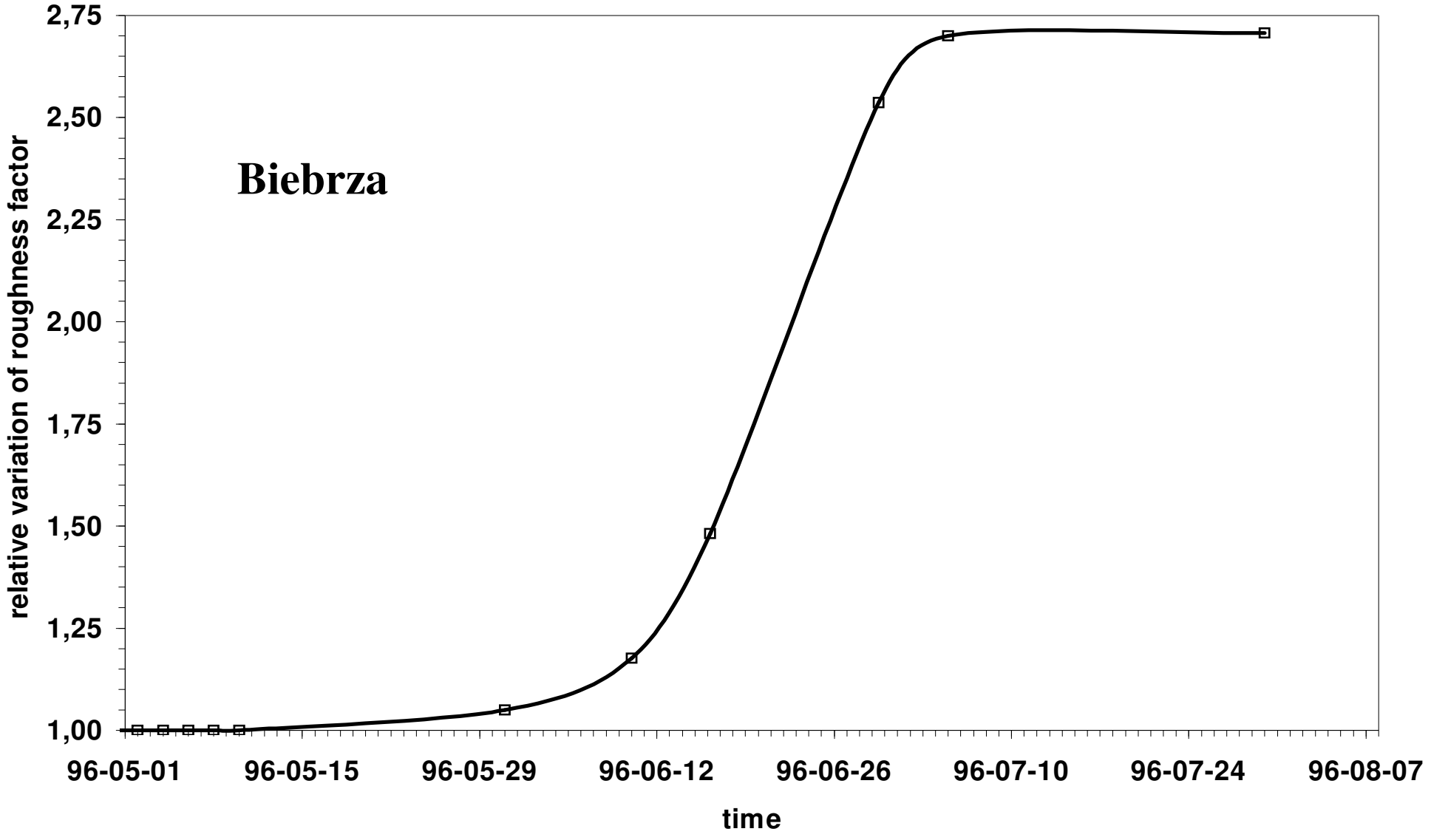
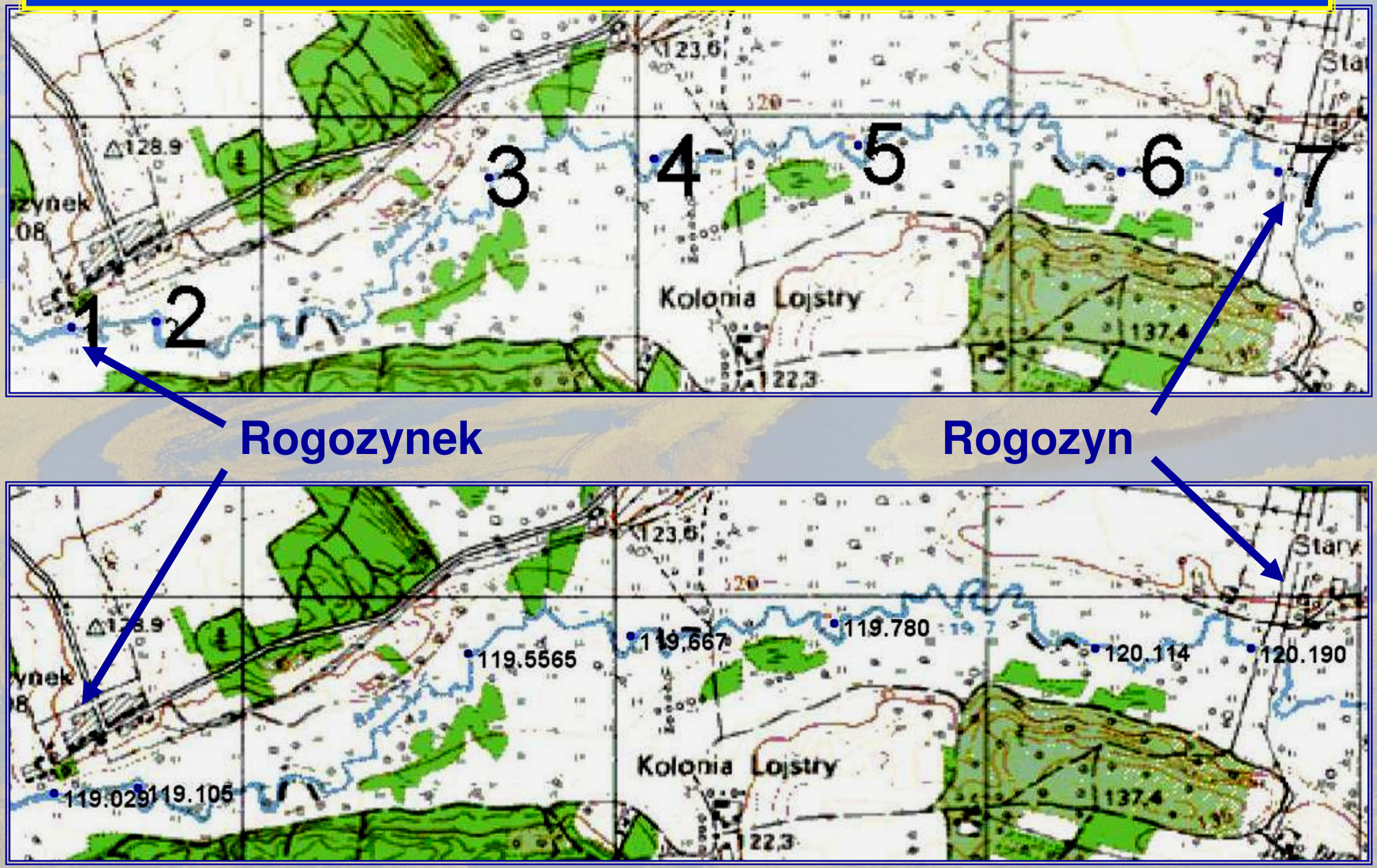


n as a function of distance and waterlevel



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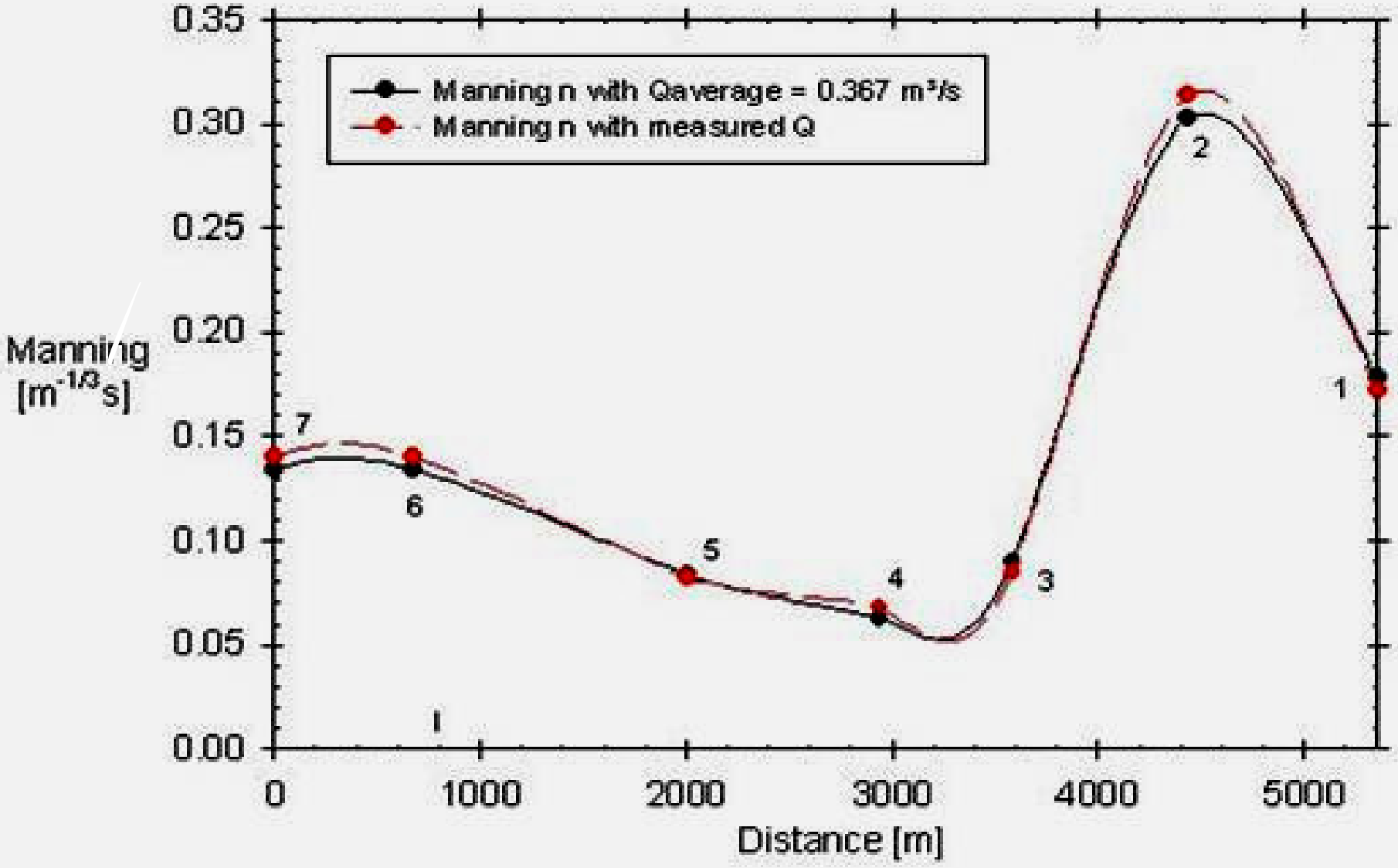

n as a function of distance and waterlevel

Biomass influence on velocity distribution

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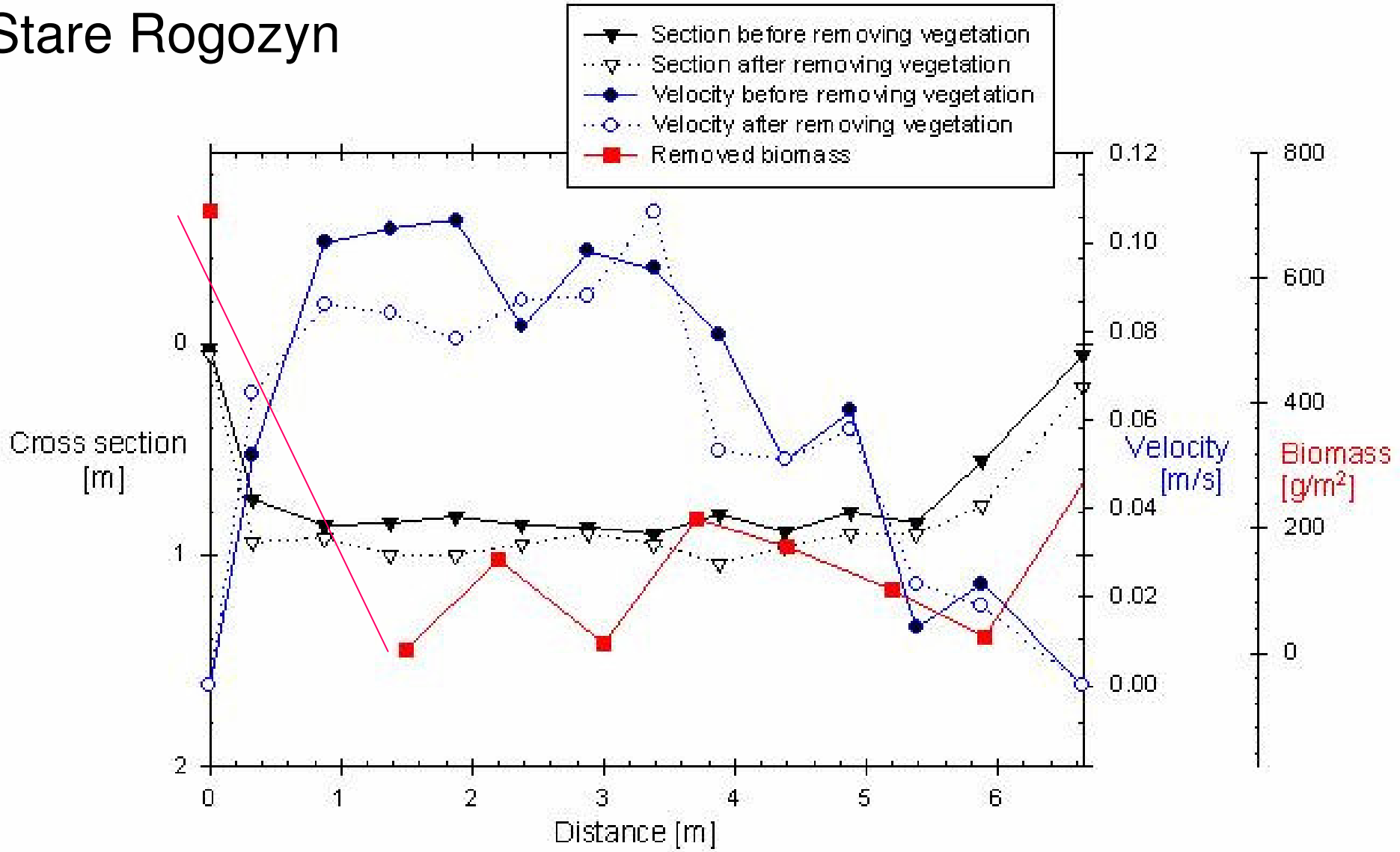
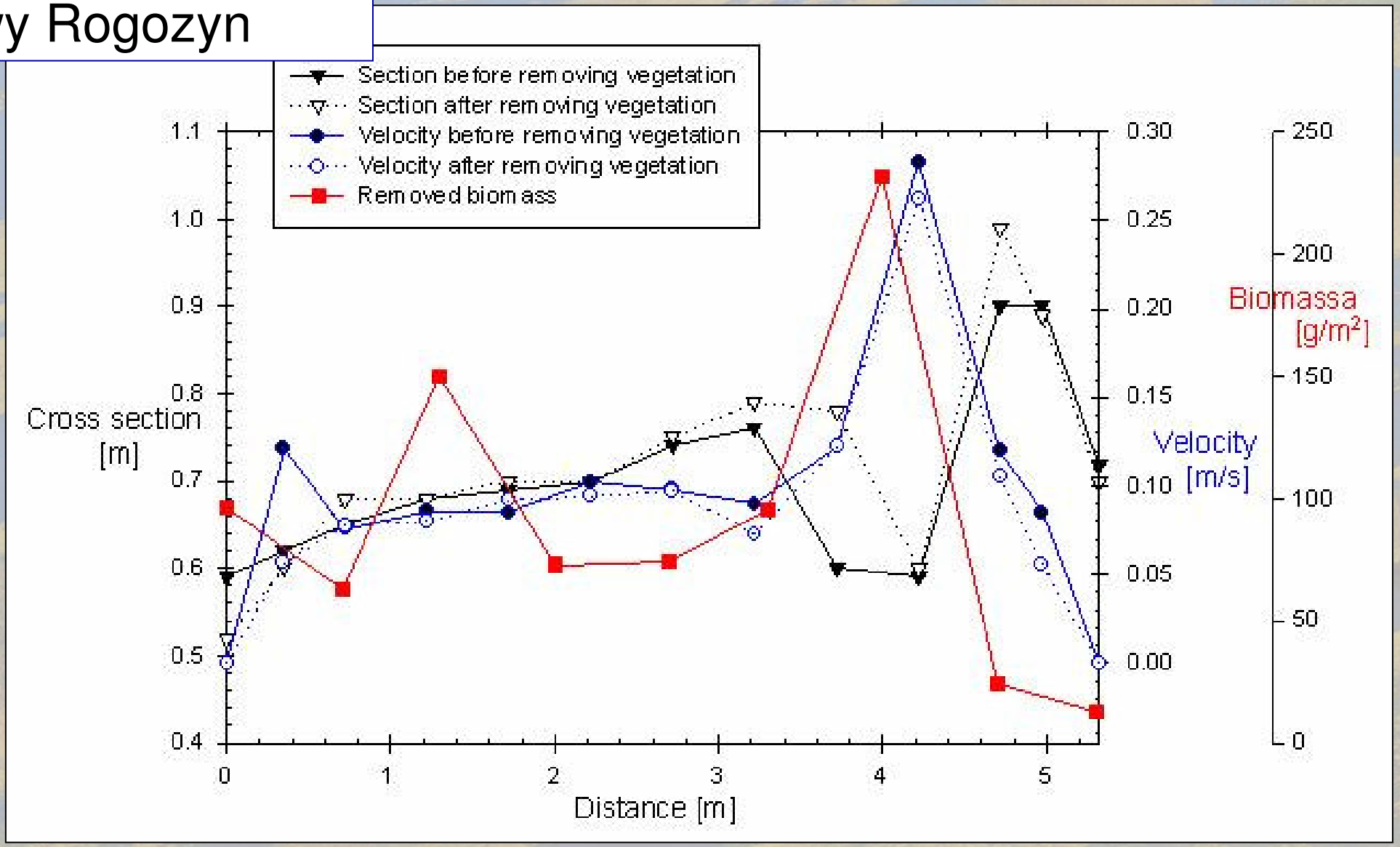
Stare Rogozyn



Biomass influence on velocity distribution

Nowy Rogozyn



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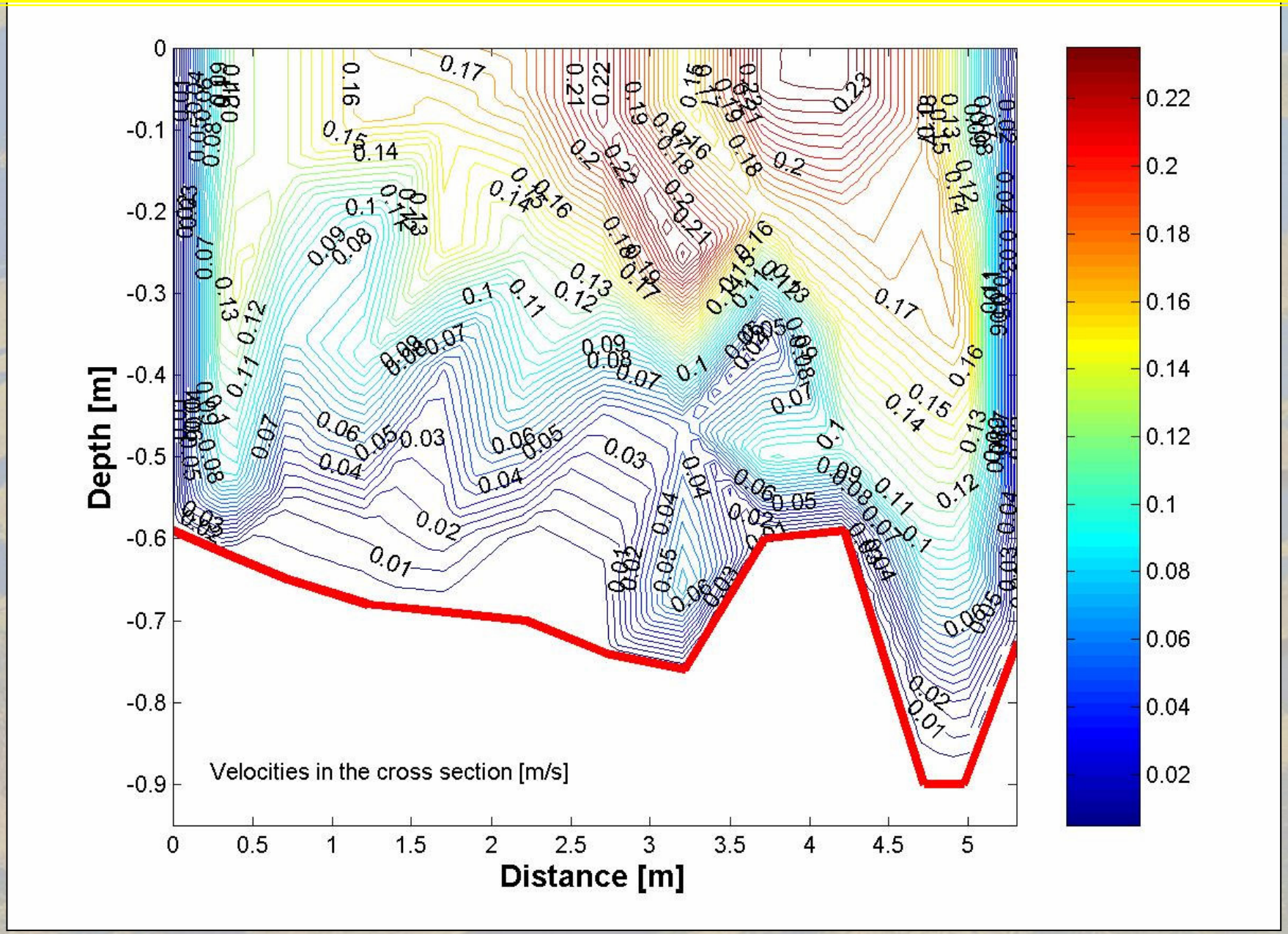

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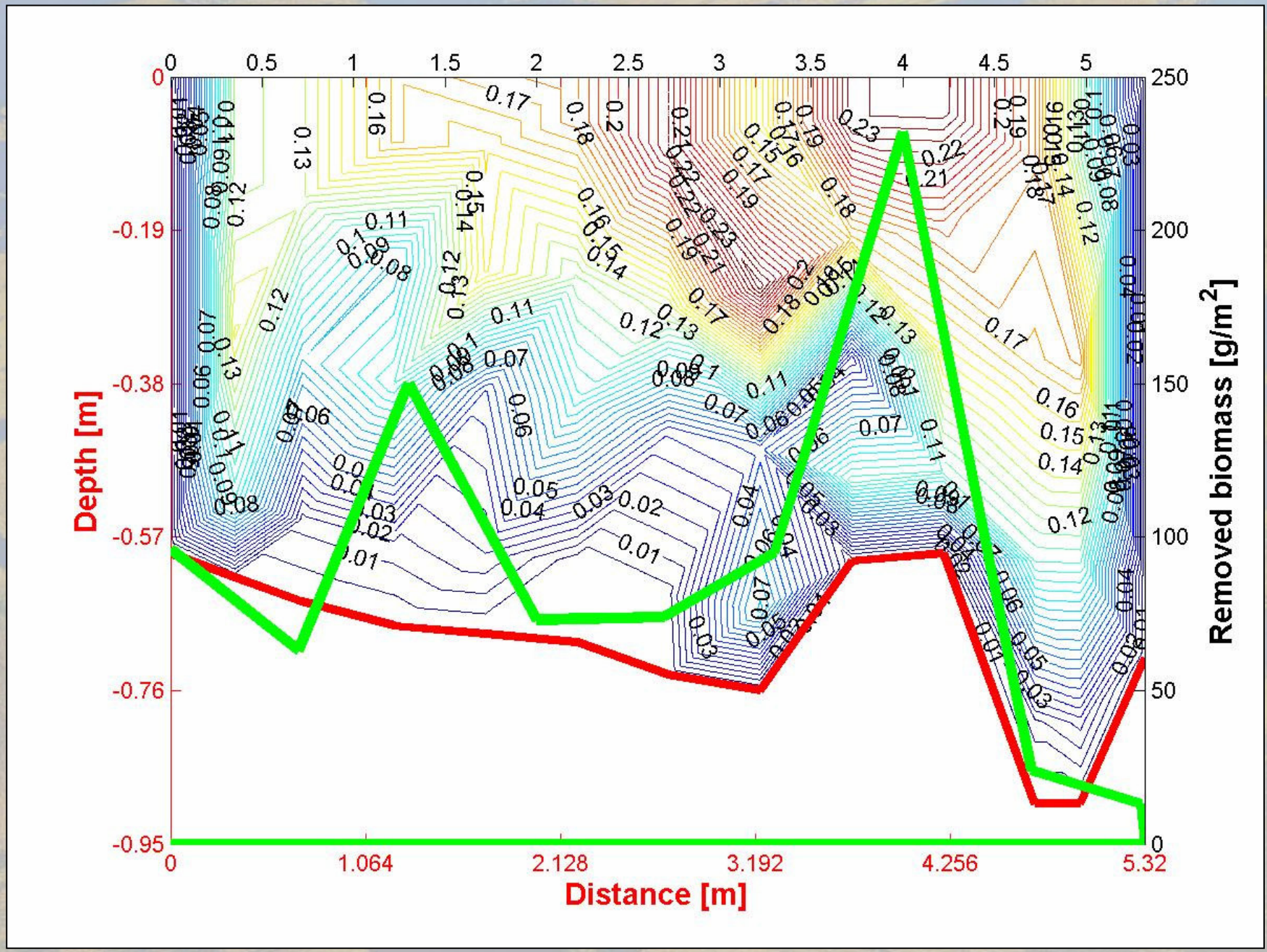

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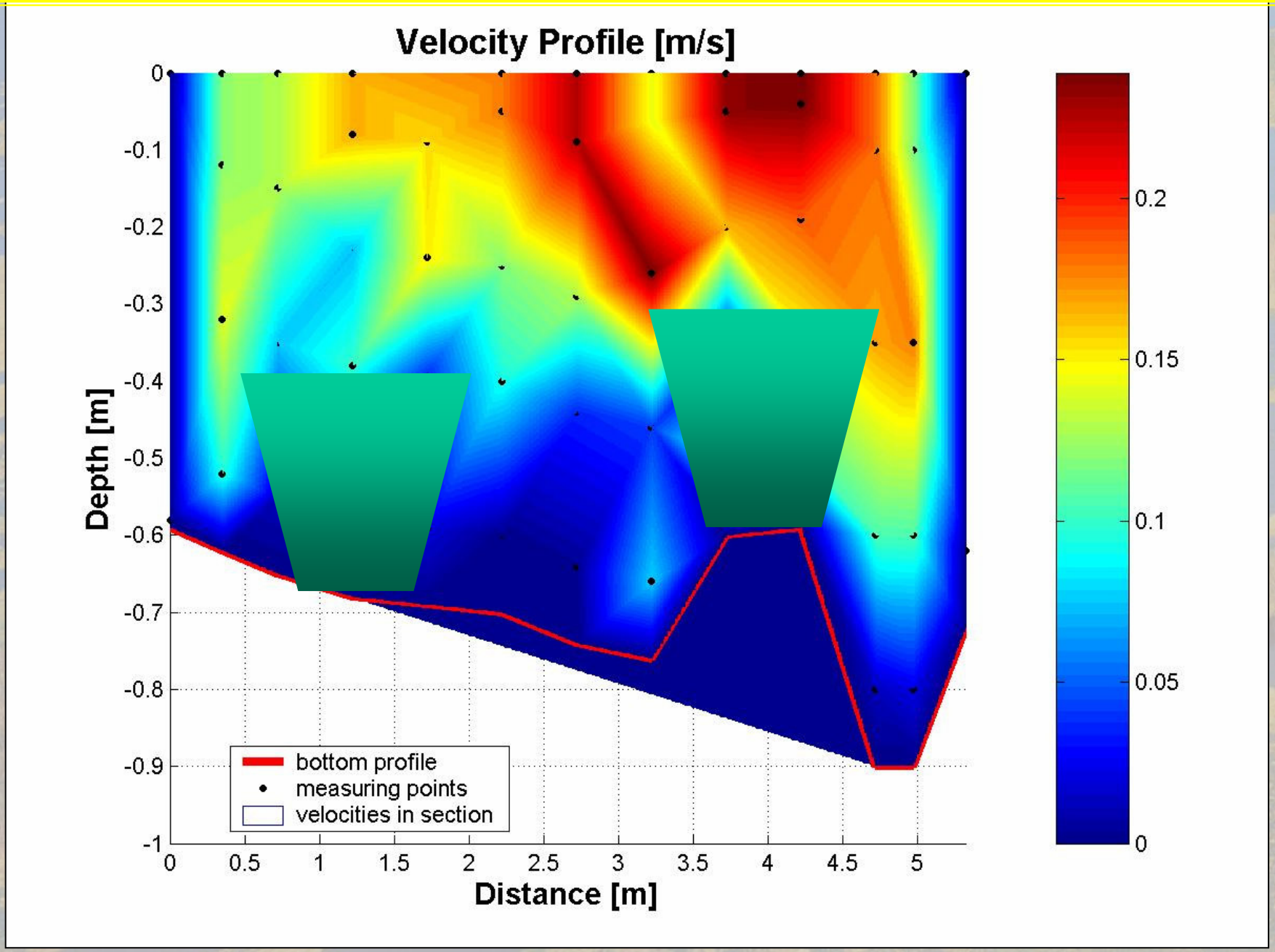

Conclusions

- The quality of a numerical model strongly depends on the data available to build and to calibrate the model.
- Good knowledge of the variation of the friction factor as a function of time, distance and water stage is important.
- The determination of the variability of n requires serious efforts.
- The impact of vegetation on the velocity distribution over the cross-section is strongly dependent on the plant species.
- The relation between the biomass variation and the variation of the friction factor should be investigated.