Water level statistics in delta areas

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2 - Water level statistics in delta area

Overview

- Objective of study
- Characteristics of the Volga Delta
- Modeling the Volga Delta
- Current state of the model
- Aspects of the model to be researched

Objectives of study

- To make a numerical model of the lower Volga Delta (1D as well as 1D/2D)
- Use these models for a Value of Information analysis

Characteristics of the Volga Delta

- A widely varying discharge near the head of the Delta (5,000 – 20,000 m³/s)
- A small bottom slope (O (5 * 10⁻⁵))
- Caspian Sea has a rapidly changing water level (max -26.5 in 1995)
- Between 500 and 1000 branches

Modeling the Volga Delta

- Use of a numerical model in Sobek software package
- Model consists of a network of nodes and branches determined from 1:100,000 maps containing height levels, depths and widths of the channels
- Upper boundary condition: Discharge in Volga and Akhtuba river
- Lower boundary condition: Water level in Caspian Sea
Current state of model
- Nodes and branches finished
- Cross-sections need refining
- Start calibration and validation
- Implement a 2D overland flow grid to simulate flooding of parts of the delta during high discharge

Aspects of the model to be researched
- Water level probability functions
- Q-h Relation
- Value of information analysis

Water level probability functions

Q-h Relation
Interesting because of:
- High discharge during small part of the year
- Low bottom slope ($O(5\times10^{-5})$)
Value Of Information

• Compare added value of information to effort and time of extra research:
  How does additionally collected data influence the (accuracy of the) results of
  the model?
• Define accuracy of model in relation to failure probability