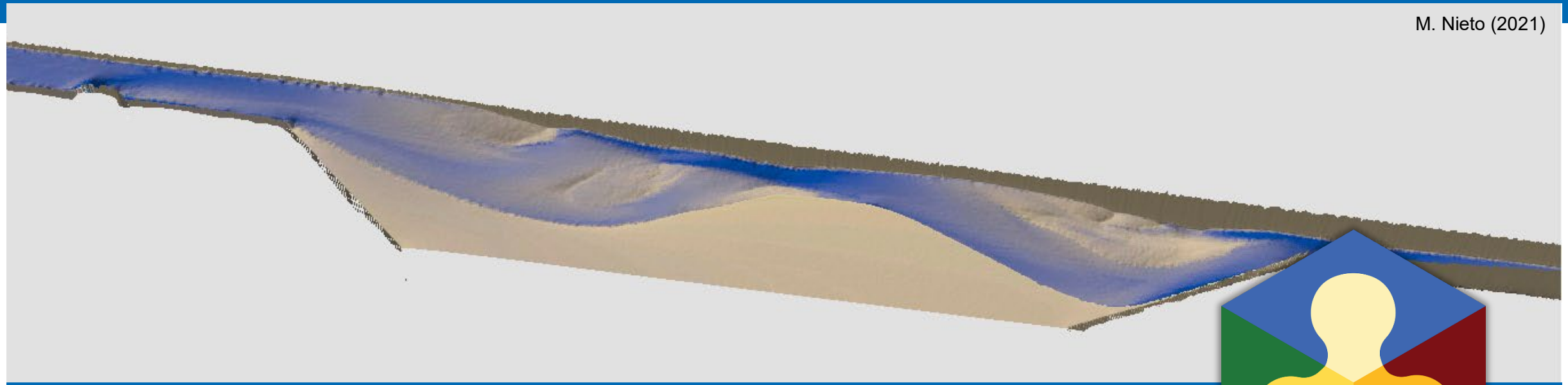
ETH zürich



Current and future development of BASEMENT software

David F. Vetsch

7th BASEMENT Users Meeting

February 3, 2022, online via Zoom

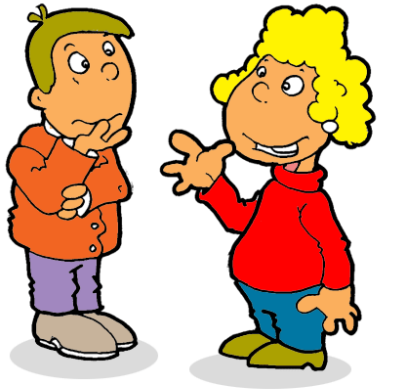
Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie

Contents

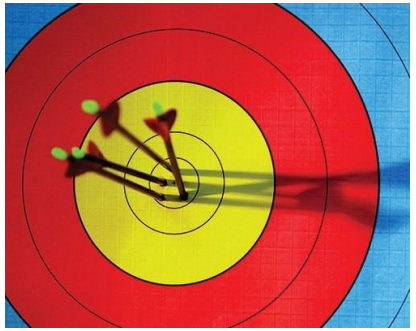
- Objectives of the meeting
- Recent progress
- Roadmap 2022
- i.d.l.b.b.o. – I don’t like BASEMENT because of…

Objectives of the meeting

- Users are in the focus
  - exchange of experience
  - tell others about your success stories and pitfalls
  - participate to have a vivid discussion
  - networking -> at next COVID-free meeting



- Exchange between users and development team
  - share requirements and problems with us
  - modelling challenges in engineering practice
  - support focussed optimization of models



https://longbowevents.com

Recent Progress

Key tasks of current development phase (2018 - 2023)

Key Tasks Development *BASEMENT* 18-23			
concepts for engineering practice (A)	development & maintenance (B)		knowledge transfer (C)
	state-of-the-art models	new models	
40%	40%		20%

Recent Progress

(A) concepts for engineering practice / practice-oriented concepts (poc)

- objectives:
  - show scope and limits of model application based on examples
  - support best possible model application, i.e. generation of meaningful results
  - discuss plausibility and interpretation of results
  - best practice and pointing out the relevant theoretical correlations
- topics:
  - evaluated in collaboration with advisory group
  - many interesting inputs
  - 1. priority: **modelling of bed load transport**

You are asked to model problem X.
Is your model capable of doing this?
How can BASEMENT support you in this?

Recent Progress

https://www.reddit.com/r/funny/comments/kwicdc/here_let_me_show_you_how_it_is_done/?utm_source=share&utm_medium=web2x&context=3

Recent Progress

(A) practice-oriented concepts

- Tentative outline of poc:
  - Introduction
  - Example with focus topic (1) and selected key aspects
  - Example with focus topic (2) and selected key aspects
  - Example with focus topic (3) and selected key aspects
  - Summary
  - Bibliography

outline: example with focus topic

1. problem definition according to focus topic
2. model perimeter and data basis
3. theoretical basics of focus topic
4. requirements for the numerical model
5. model setup
6. model application
7. evaluation
8. avoid most frequent errors

Recent Progress

(B) development & maintenance

- Roadmap 2021 (**main features only**)
  - Version 2.8.2
    - longitudinal slope collapse 1D ✓
    - ~~scheduled Q1 2021~~ Q1 2022 ✓
  - Version 3.2
    - vegetation model (✓)
    - ~~scheduled Q1 2021~~ Q2 2022
  - Version 3.3
    - mixed-size sediment transport (✓)
    - ~~scheduled Q2 2021~~ Q2 2022
  - Version 3.4
    - turbulence models ✓
    - suspended load ✓
    - ~~scheduled Q3 2021~~ Q1 2022
  - BASEmesh 2.1
    - 1D channel generator (BASEchange v1) ✓
    - scheduled Q1 2021 ✓
  - BASEtools 1.0
    - BASEprohaz (✓)
    - ~~scheduled Q4 2021~~ Q2 2022
  - BASEbreach (✓)
    - scheduled Q1 2022

Recent Progress

(B) development & maintenance

Consolidation of versions 2 and 3: “2+3=4”

- reduce maintenance effort
- maintain valuable features of version 2
- provide efficient framework

consolidation:

- replace GUI of v2 by GUI from v3 ✓
- same input format ✓
  (bmc2json converter for last version 2.x)
- modularize v2 to match workflow of v3 ✓
- adjust output of v2 to v3 (work in progress) ..

Recent Progress

(C) knowledge transfer

- **main focus on the development of the first POC**
- instructions and application of BASEMENT software in gradate courses at ETH Zurich:
  - Experimental and Computer Laboratory I
  - River Morphodynamic Modelling

Roadmap 2022 (main features only)

Version	Date	Comments
3.2	Q1 2021	turbulence model, suspended load
3.3	Q2 2022	mixed-size sediment transport
3.4	Q2 2022	BASEveg
3.5	Q3 2022	temperature model
4.0	Q3 2022	consolidation of v2.8 and v3
BASEbreach v1.0	Q1 2022	stand-alone, open source, GPL
BASEchange v1.1	Q2 2022	arbitrary river course
BASEtools	Q2 2022	consolidation of various tools
POC bed load	Q4 2022	first version

i.d.l.b.b.o.

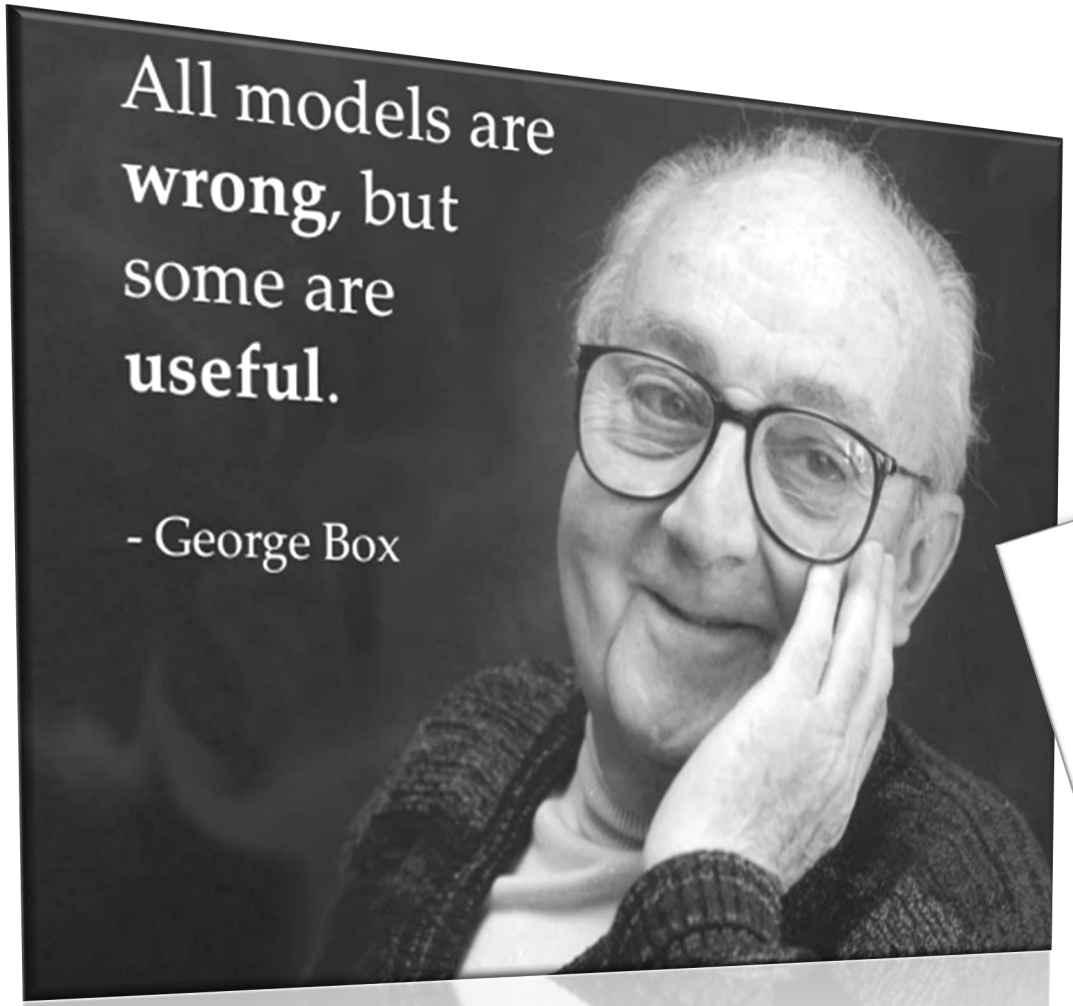
I don't like BASEMENT because of…

they (the development team) claim that BASEMENT can simulate dynamic river morphologies but they give no proof – i.e. there is no application example.

This is rather a philosophical question because of…

the application example we can show will never be complete or adequate because it does not reflect what is expected - it will always remain incomplete.

i.d.l.b.b.o.



"If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts, he shall end in certainties."

— Francis Bacon, 1605

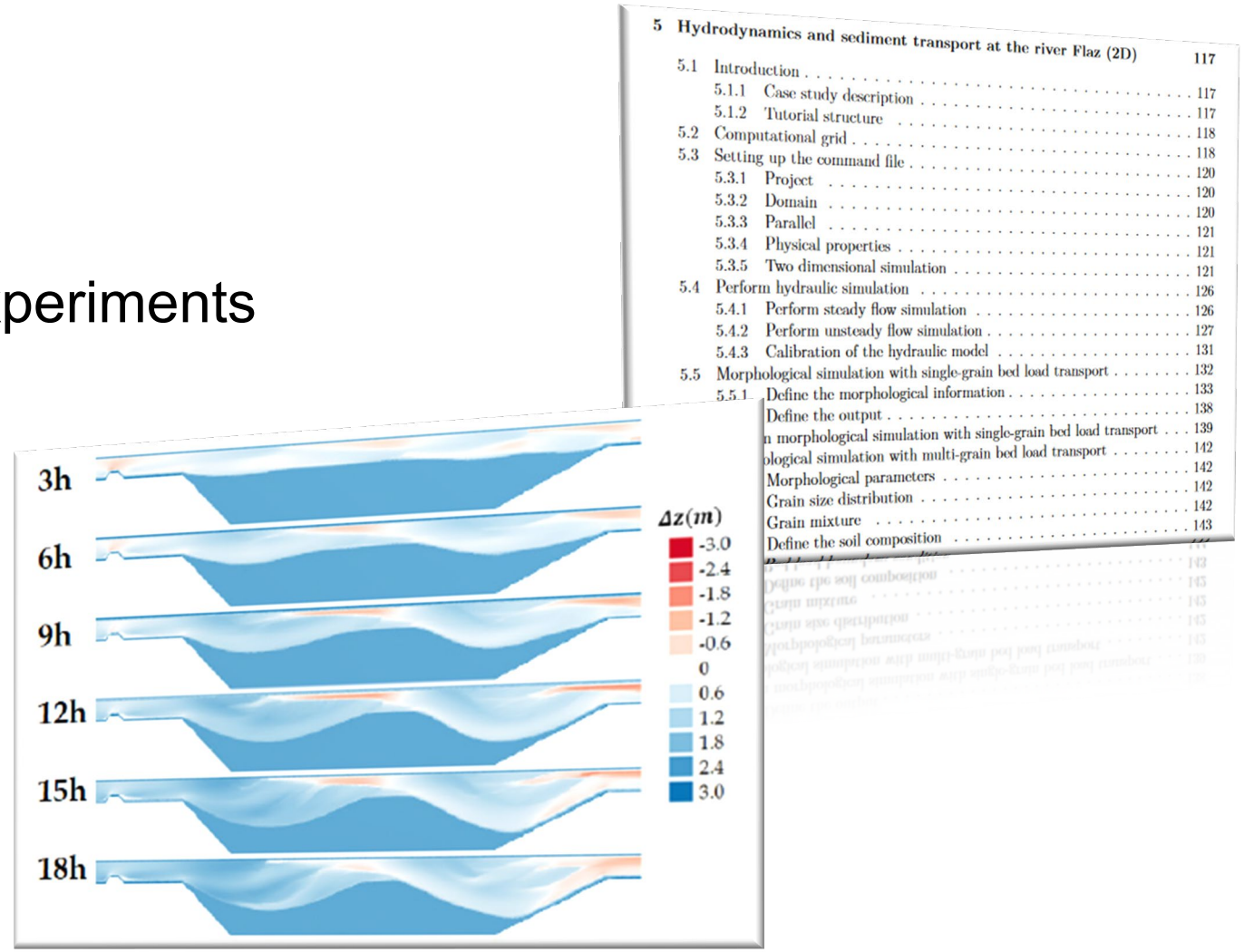
i.d.l.b.b.o.

What can we do?

- Tutorials
- Comparison with laboratory experiments
- POCs
- Provide tools
- etc.

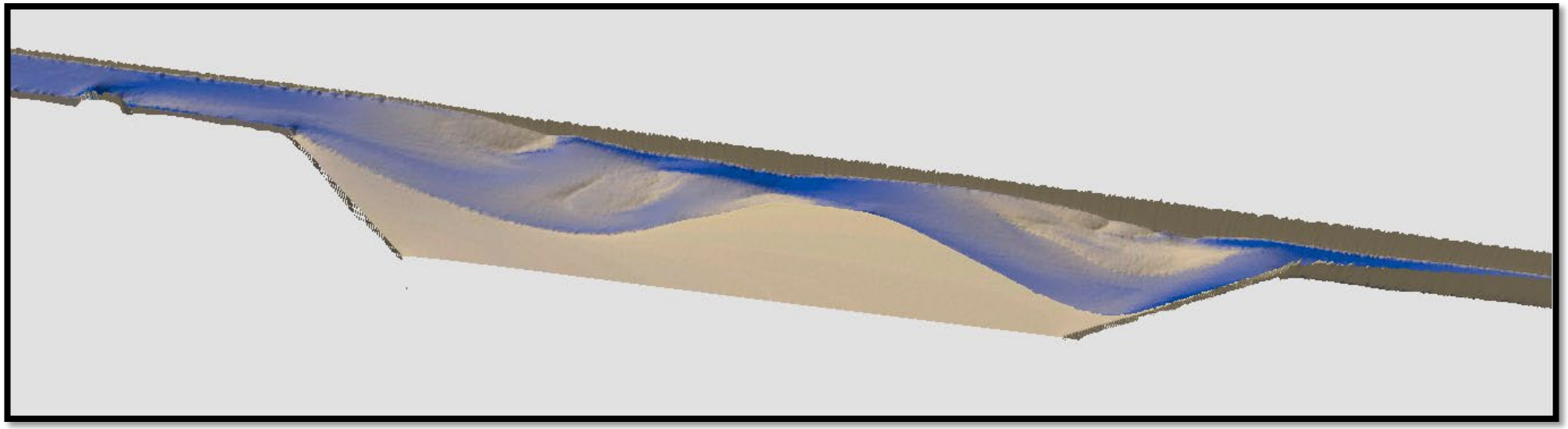
What can you do?

contribute a success story



i.d.l.b.b.o.

learn and gain experience!



M. Nieto (2021)

STEREO

The Jimi Hendrix Experience

Are You Experienced