

Digital twins for a safe and sustainable delta in a changing climate



Femke C. Vossepoel*, Neelke Doorn, Nick C. van de Giesen, Arnold W. Heemink, Rolf W. Hut, Sebastiaan N. Jonkman, Caroline A. Katsman, Mark van Koningsveld, Stef Lhermitte, Julie Pietrzak, Herman W.J. Russchenberg, A. Pier Siebesma, Susan C. Steele-Dunne, Riccardo Taormina, Philip J. Vardon, Jazmin Zatarain Salazar,
Delft University of Technology

Courtesy Port of Rotterdam



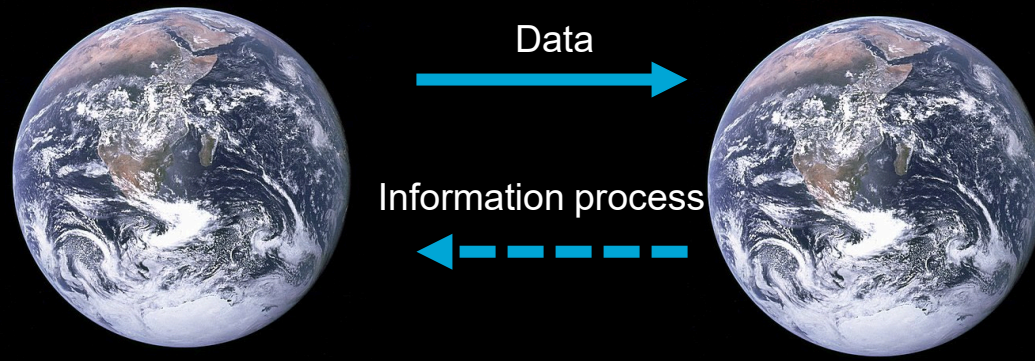
Courtesy Port of Rotterdam





Courtesy Port of Rotterdam





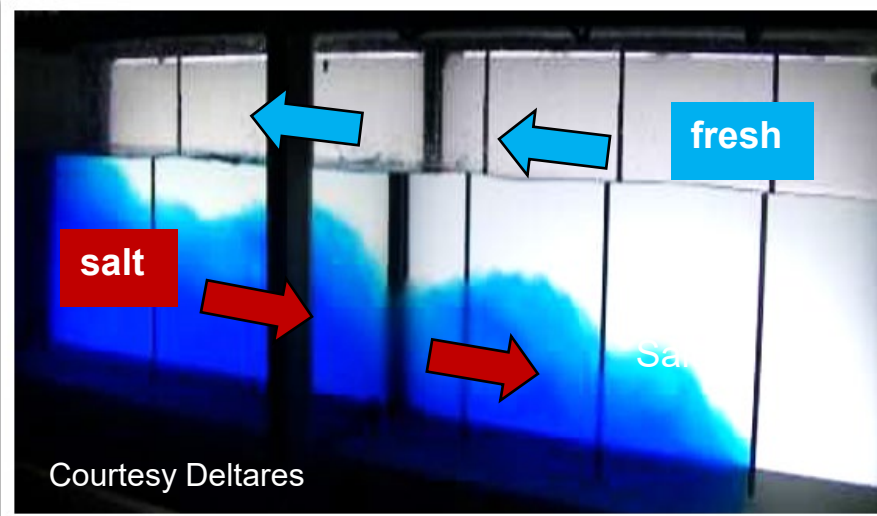


Data

Information process



SALTISolutions : Monitoring salt intrusion in the Rhine-Meuse Delta



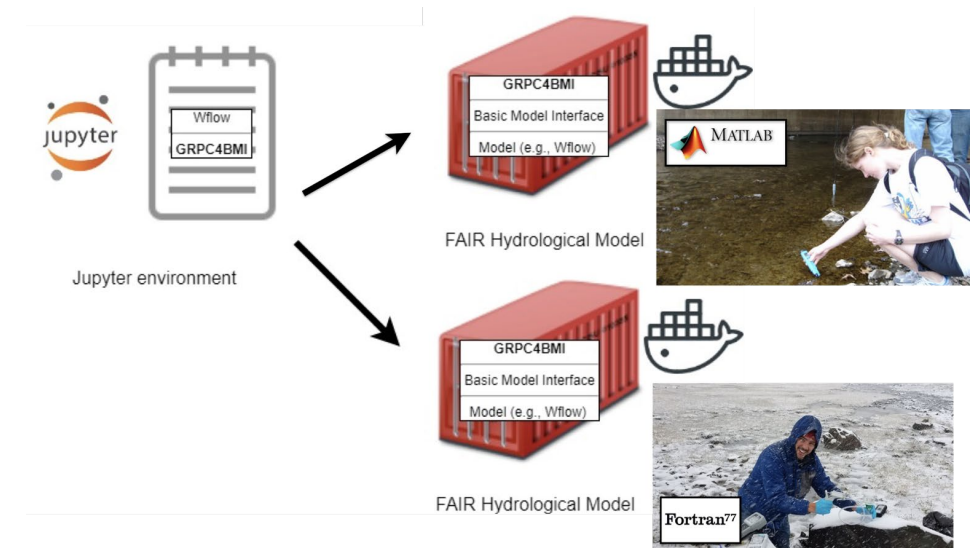
Monitoring salt intrusion in the Rhine-Meuse Delta

Purpose and potential use of eWaterCycle

Hydrology:
many models
describing processes



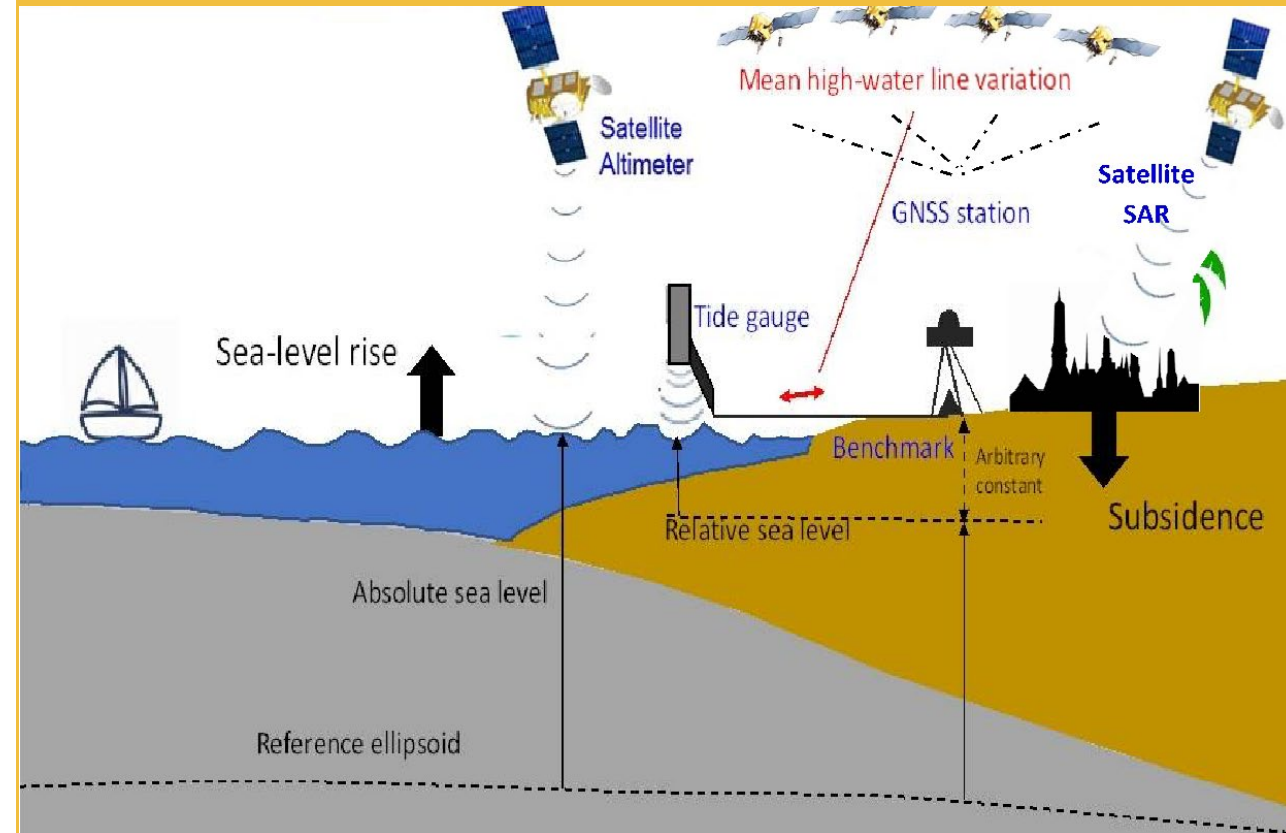
interact with
existing models on
common platform



Lessons learned

- Original Data, Original Models
- Work across scales
- Context matters

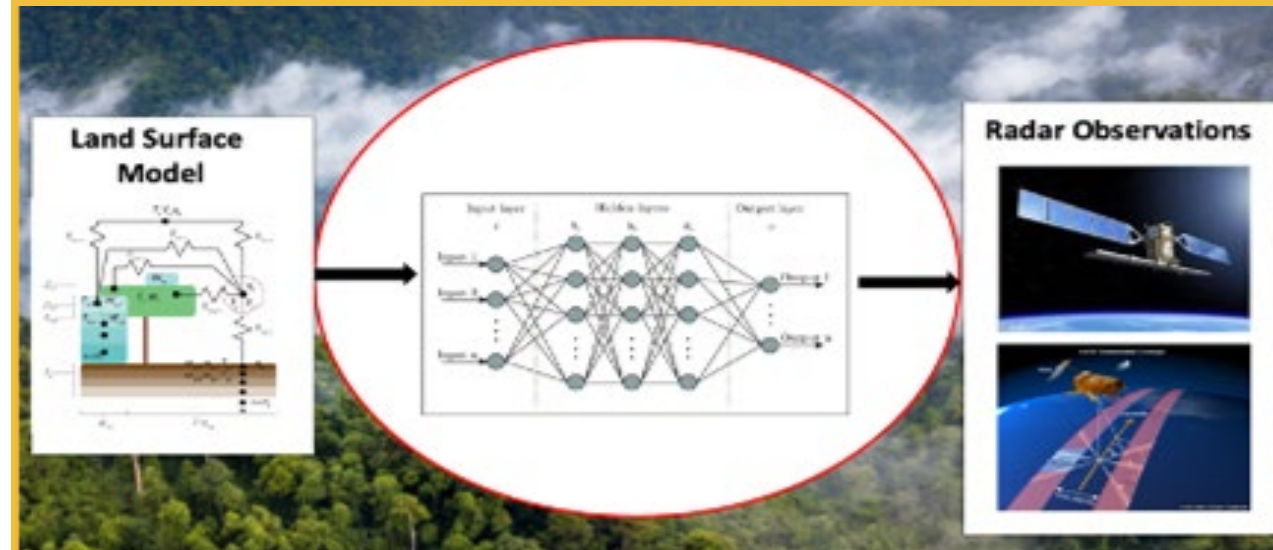
Data assimilation of in-situ and satellite data for assessment of coastline changes in Bangkok



Lessons learned

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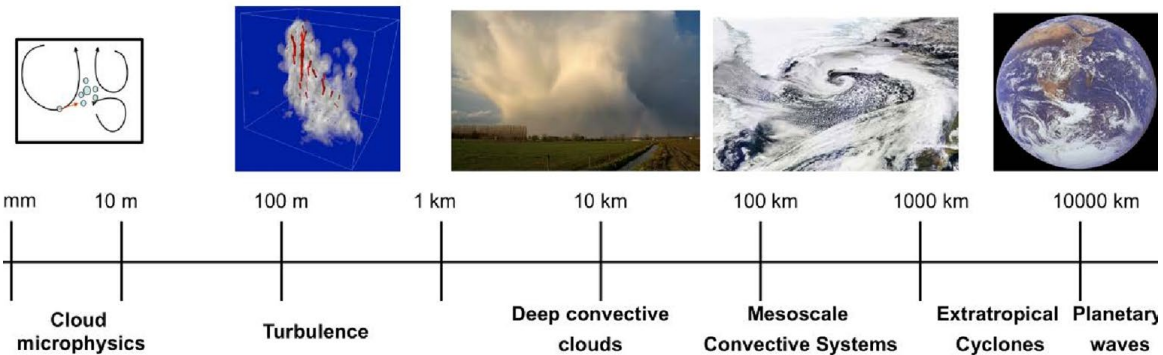
Data assimilation Advanced Scatterometer (ASCAT) satellite radar data for monitoring soil moisture



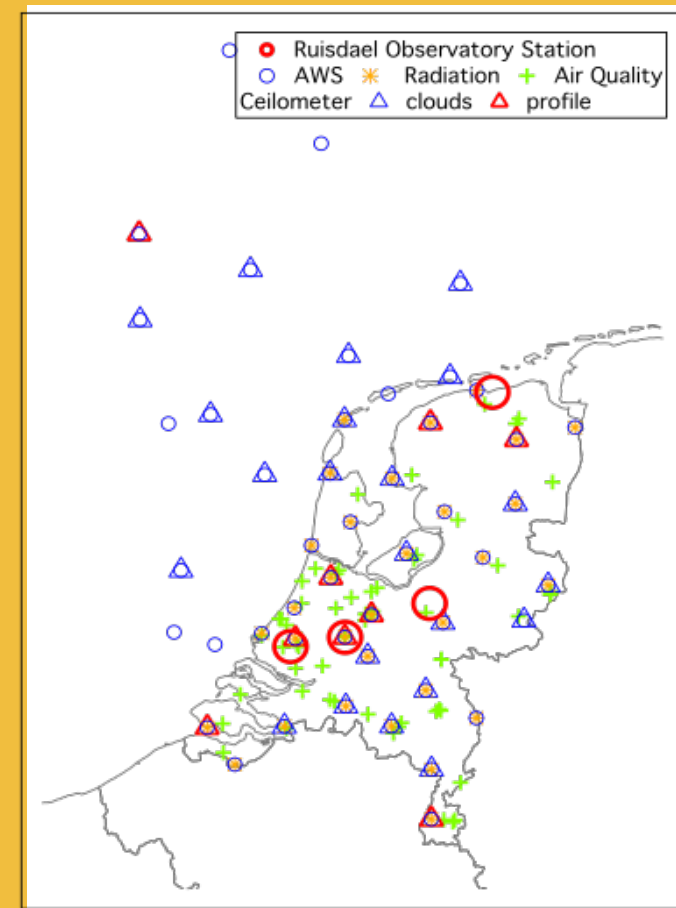
Shan et al. (2021, in review)
Collaboration MeteoFrance, TU Wien, ESA

Lessons learned

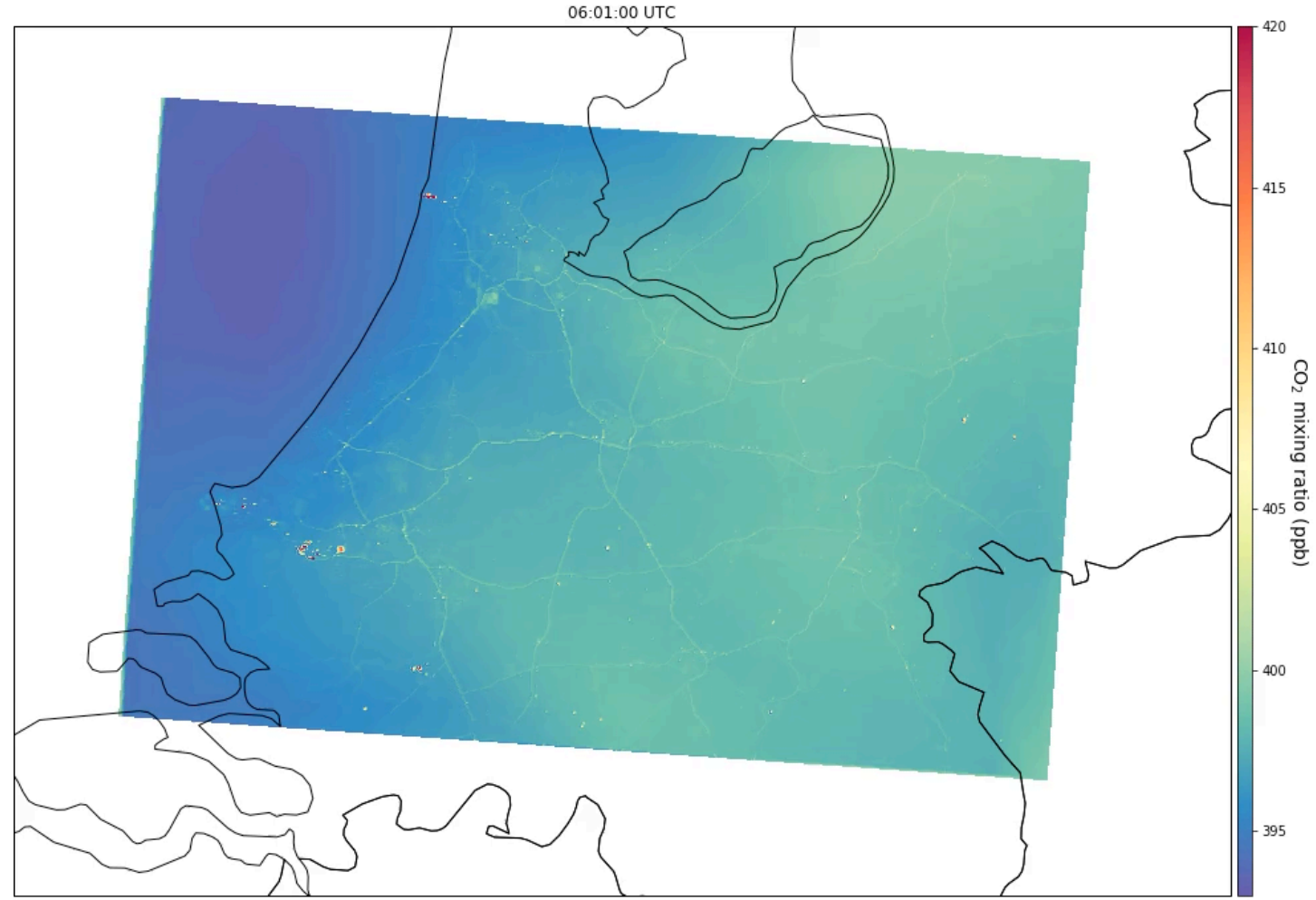
- Original Data, Original Models
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Ruisdael Observatory



Ruisdael Observatory



Lessons learned

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Negotiation Simulation Lab in Zambia

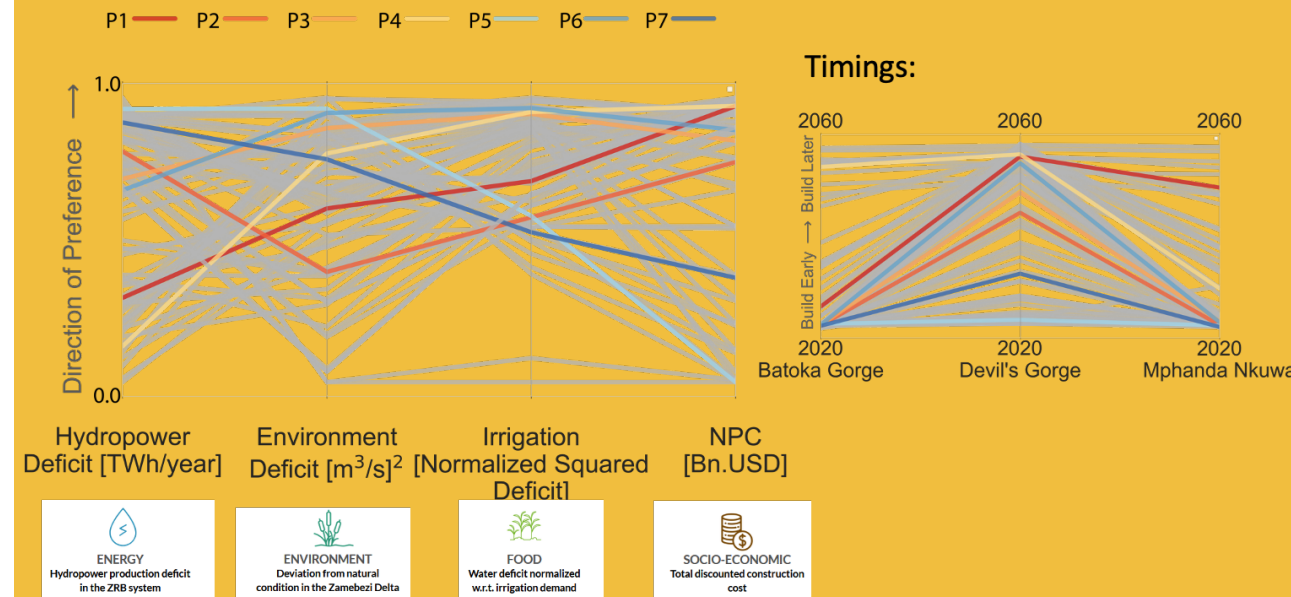


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Negotiation Simulation Lab in Zambia

Selected Tradeoffs



Co-creation labs with serious gaming for a safe Delta



- Context and dilemmas
- Domain expertise
- Model development
- Data collection
- Intended use
- ...

Policymakers

Scientist

Model developers

Industry

- Localisation of risk
- Near real-time decision support
- Short-term planning, e.g., evacuation plan
- Long-term scenario-based planning
- ...



- Original data, Original models
- Work across scales
- Context matters

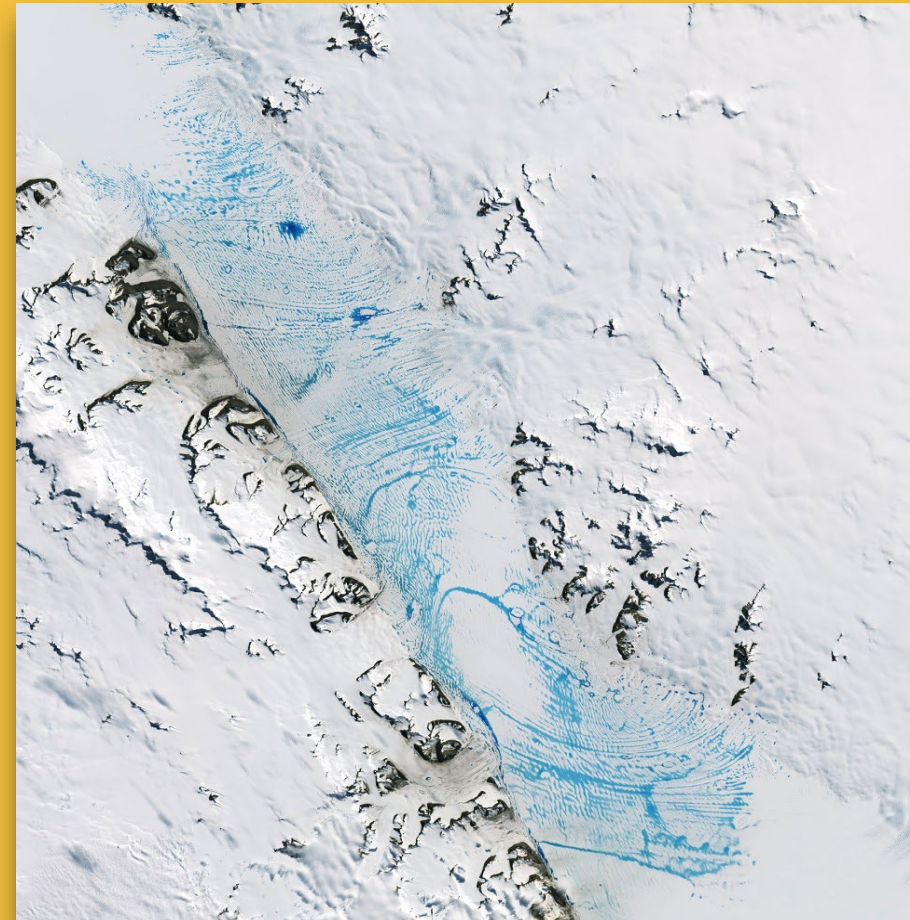
Thank you

Extras

Lessons learned

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Machine Learning in climate models for ice sheet Antarctica

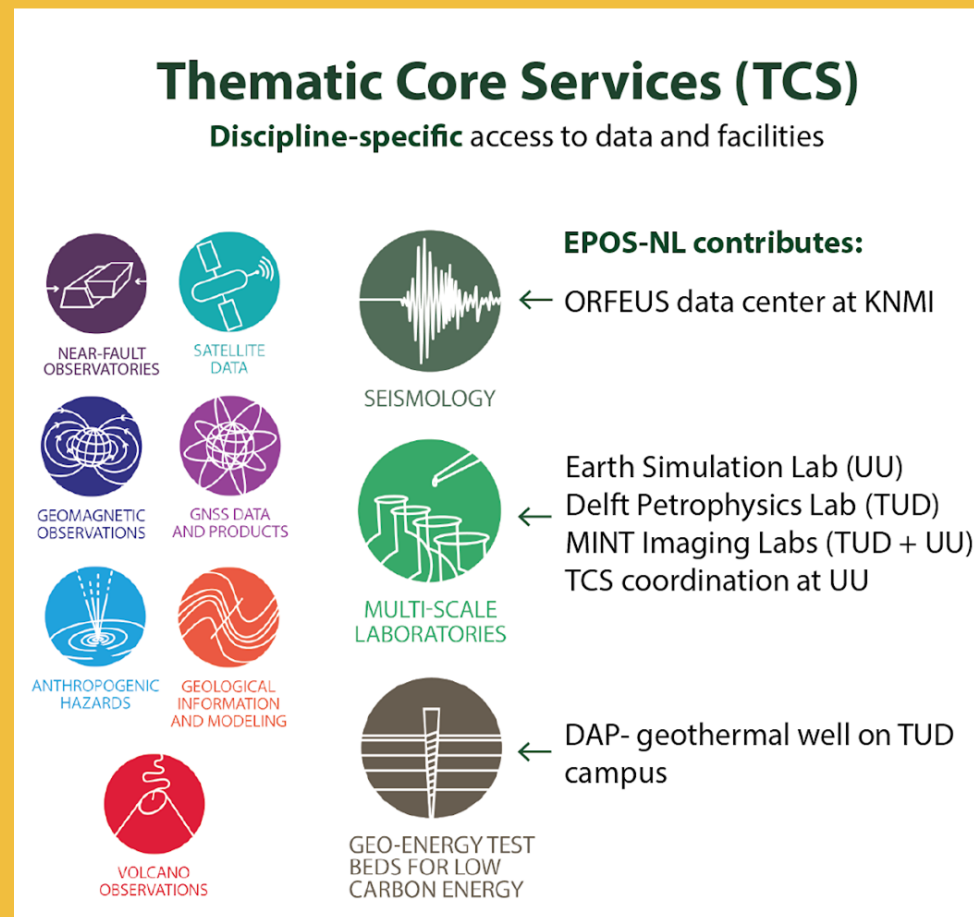


Banwell et al, 2021

Lessons learned

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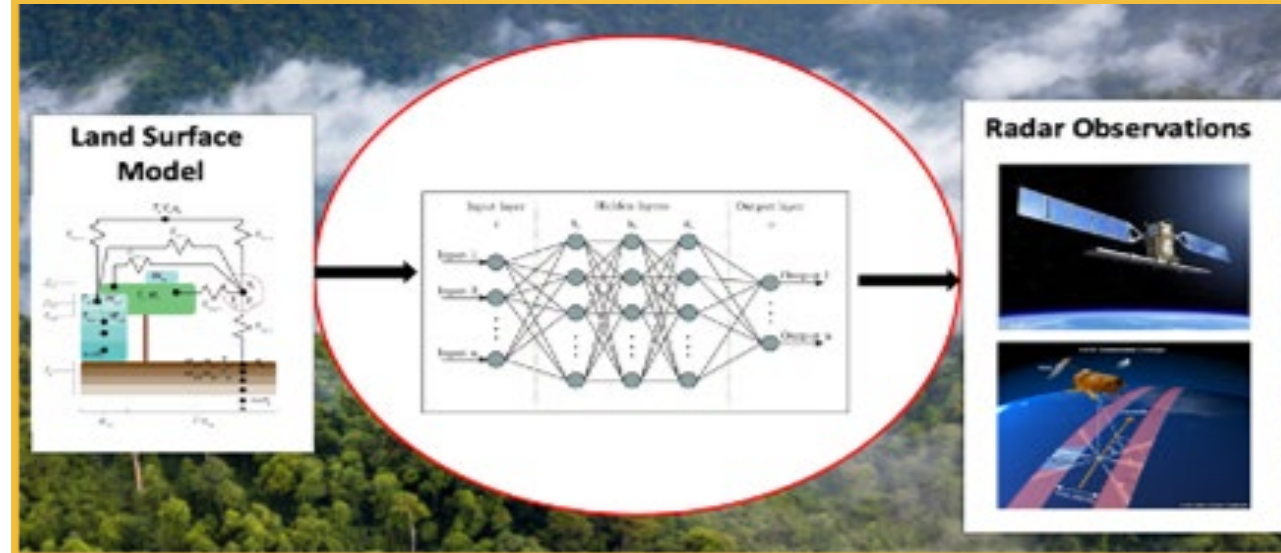
EPOS-NL data infrastructure



Lessons learned

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Data assimilation of Advanced Scatterometer (ASCAT) satellite radar data for soil moisture



Shan et al. (2021, in review)
Collaboration MeteoFrance, TU Wien, ESA

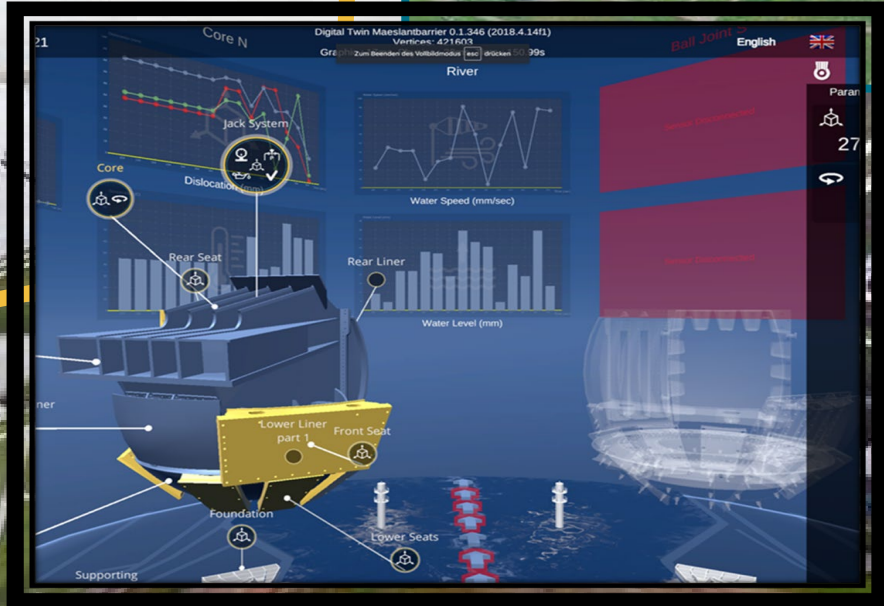
Predictive maintenance

Dutch Delta

Lessons learned

Dutch Delta

Destination Earth



With Aveco de Bondt, Dutch Ministry of Infrastructure and Water Management (Rijkswaterstaat)

Bas Jonkman, Luc Ponsioen et al., TU Delft/Aveco de Bondt

