

Update Drainageclasses

Project Introduction

Understanding today.
Improving tomorrow.



2021-05-05

Update Drainageclasses

Agenda

- About us
- Task
- Challenge
- Solution
- Questions



About us



Antea Group worldwide

Antea Group is an international consultancy and engineering firm, specialised in full-service solutions for infrastructure, environment, spatial planning and water. We guide our clients towards relevant solutions for an ever-changing world. In Belgium we rely on the enthusiasm of a diverse team of 250 colleagues. Together we work towards creating a better future. Through the combination of strategic thinking, a multidisciplinary approach, technical expertise and pragmatic action, we provide effective and sustainable answers to the questions of governments, industry and private companies.

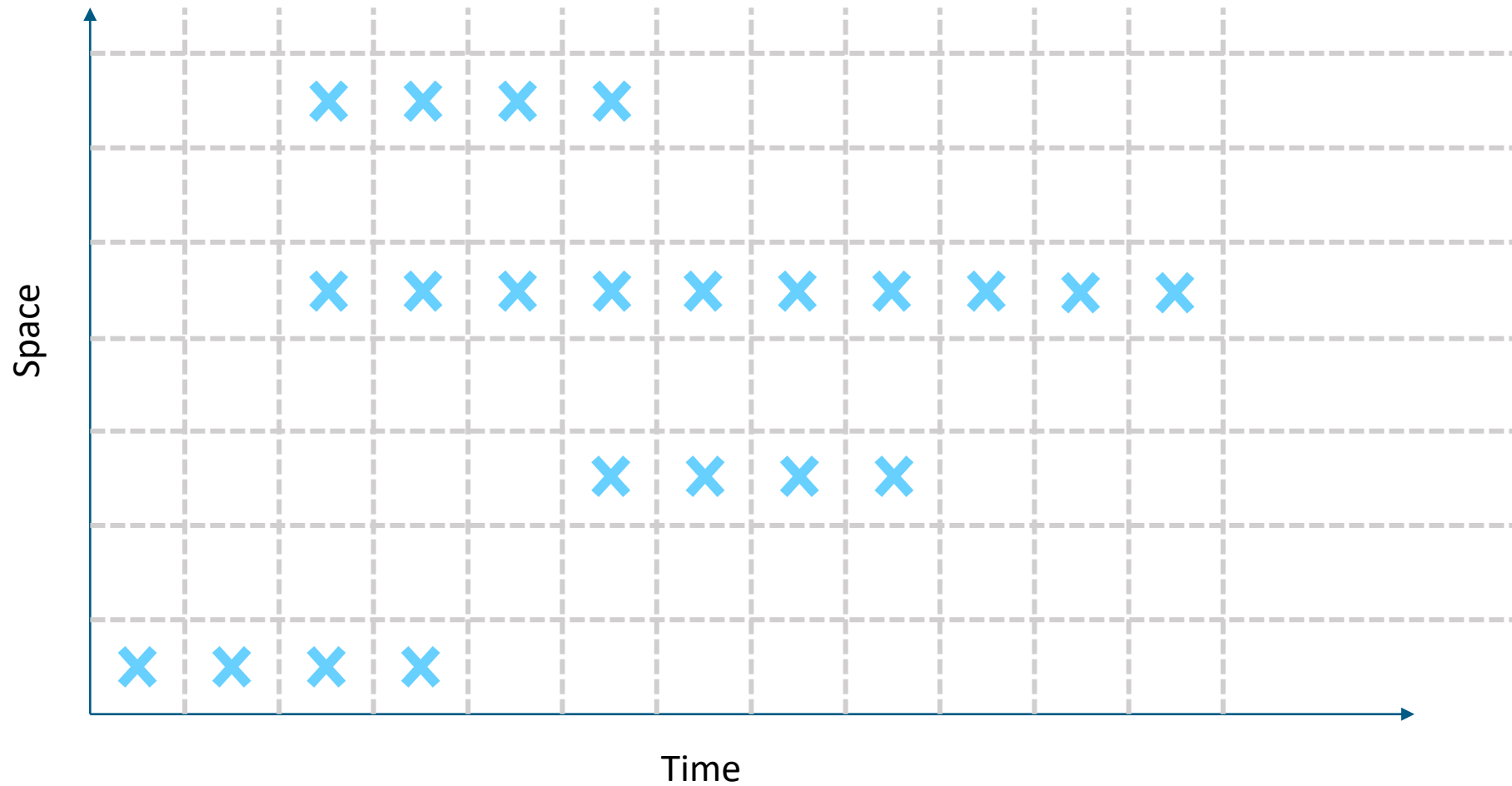
The task

- The Flemish Bureau for Spatial Planning (VPO) and its partners desire an updated soil map with **improved drainageclasses**
 - A drainage class is a classification about the behaviour of the groundwaterlevels in the soil
 - It is useful for a permitting, modelling and water management issues
- Original map dates from 1970
 - Obtained through soil characteristics (RedOx horizons)
- Modern method is through analysis of monitoring well data and modelling

The challenge

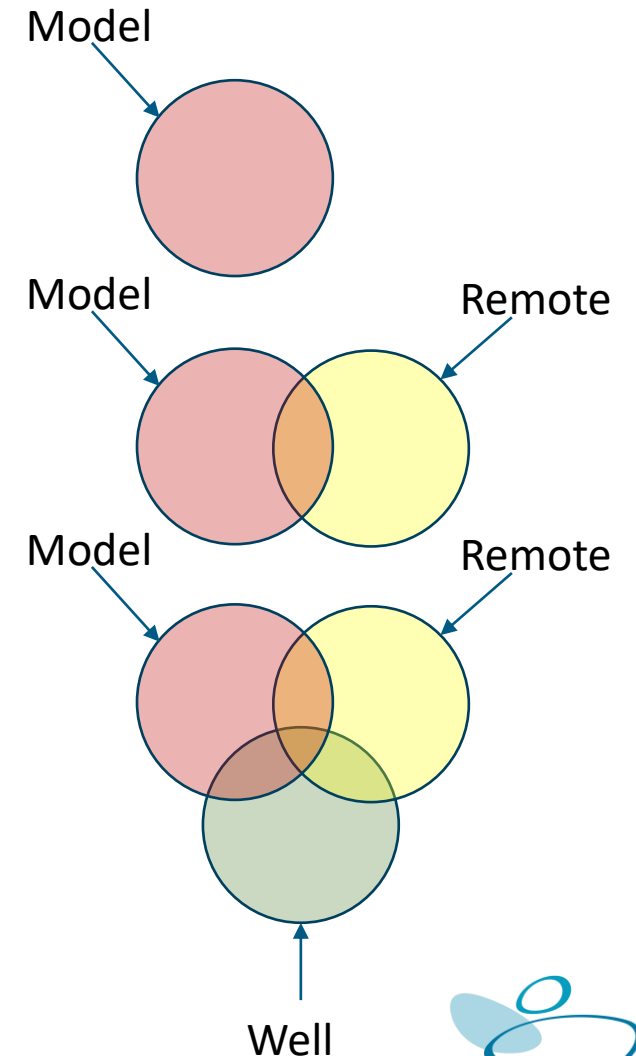
- **Not enough well data** to obtain a map for the entirety of Flanders
 - Typically 8 years of data required!
 - **Numerical modelling is difficult** at such large scales
 - Not enough calibration and forcing data
 - Not enough data on boundary conditions
- However :
 - Many incidental, ancillary and auxiliary data sources
 - Rainfall
 - Evapotranspiration
 - Occasional groundwater heads at many locations
 - Remote sensing Soil Moisture
 - Etc.
- Many incidental data does not a dataset make... or does it?
- Typical solution is to use “standard” interpolation (e.g. kriging, IDW)

The Challenge in general

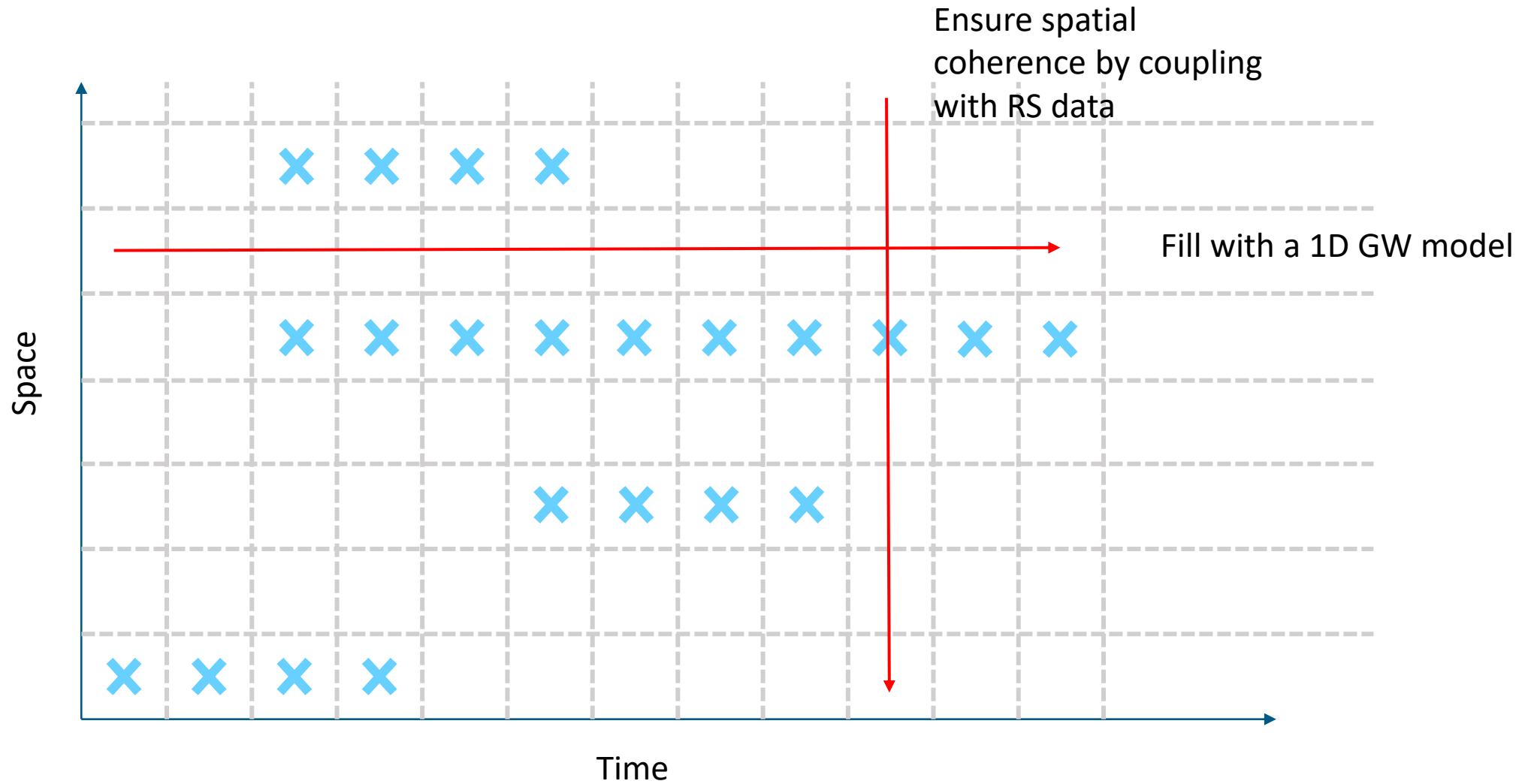


The solution

- Solve through **State Space Modelling**
 - Allows for the **flexible combination** of different data sources and models.
 - Different scales, different models, non-stationarity are all possible.
 - **Allows us to use complex models for interpolation**
 - But: **Also allows for simplified models**
- Use coarse scale space data as “glue” to create a coherent dataset.
 - Use Remote Sensing data as a “glue” between incidental data sources



The Solution in general



Conclusions

- In real world problems, we often have lots of “poor” data
 - We also have models that perform well in limited settings
- State space modelling can allow use to optimally exploit knowledge from disparate sources
 - Numerical/Statistical models
 - Space borne (coarse scale) observations
 - Incidental data
 - Etc.
- We can use high coverage coarse scale data to ensure coherence in fine scale models / interpolation
 - Allows gluing sparse datasets together to form high coverage datasets
 - Works similar to a constrained optimization problem
- In a few months we hope to impress you with our results!

Questions

