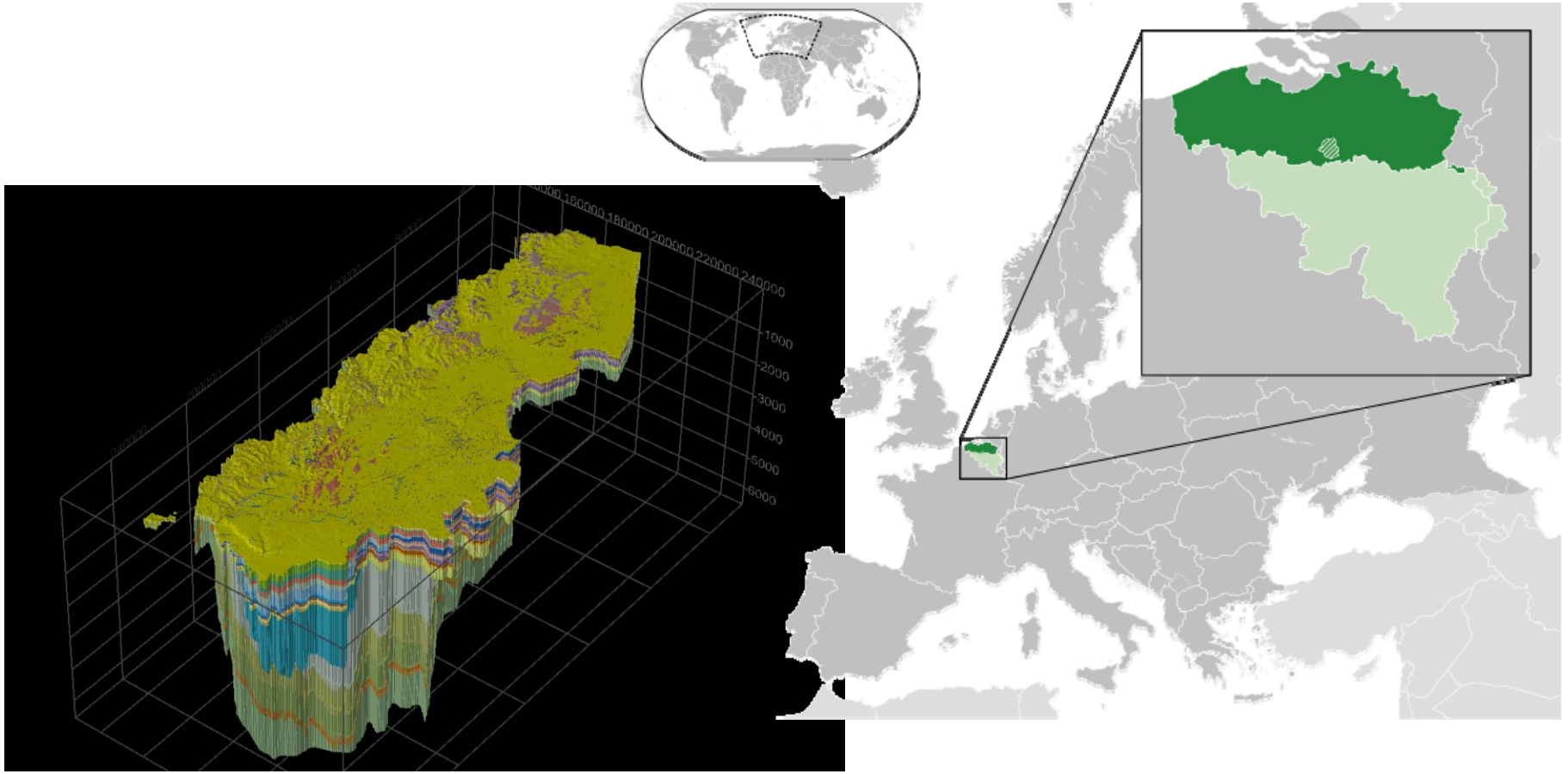
Country update: northern Belgium (Flanders)

Jef Deckers

2008-2013: G3Dv2

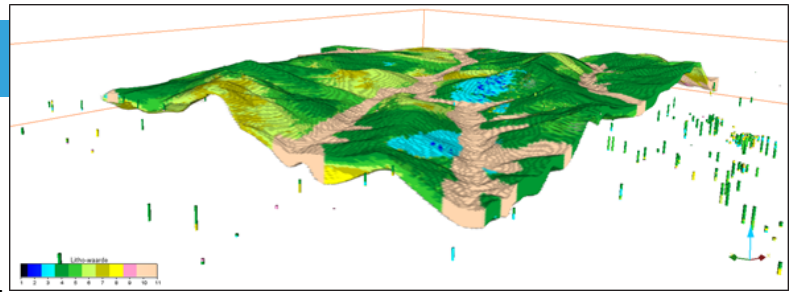
- First 3D geological model of Flanders from the lower Carboniferous up to the surface on the level of formations and mainly based on borehole data

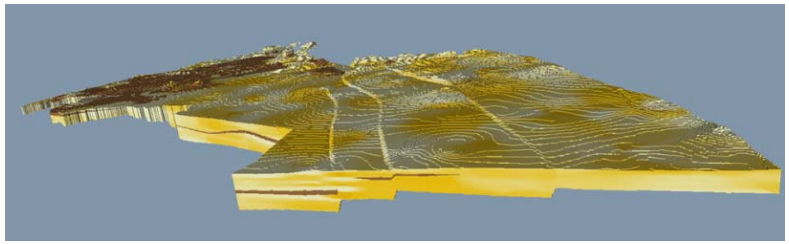


2013-2018: G3Dv3

✓Voxel models:

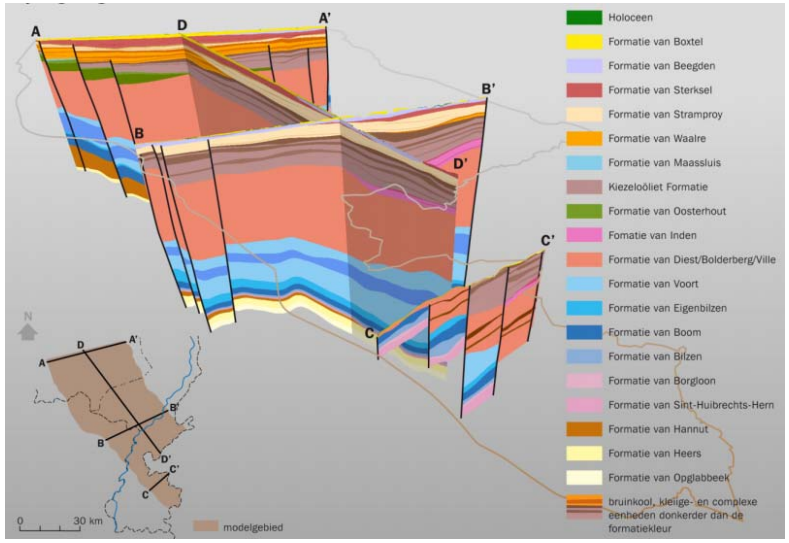
- Quaternary loam from 2013-2015: Van Haren, T., De Koninck, R. & Broothaers, M., 2015. Thematisch delfstoffenmodel voor (niveo-) eolische leemvoorkomens in Vlaanderen. Studie uitgevoerd voor ALBON, VITO-rapport ETE/1310192-01/2015-0002, 37pp.
- Quaternary sands/gravel from 2015-2017: Van Haren, T., Dirix, K. & De Koninck, R., 2017. Thematisch delfstoffenmodel - Zand- en grindafzettingen van Maas en Rijn in Vlaanderen. VITO-rapport 2017/RMA/R/1073.





✓Cross-boundary projects:

- Cenozoic interval from 2012-2014: Deckers et al., 2014. Geologisch en hydrogeologisch 3D model van het Cenozoïcum van de Roerdalslenk in Zuidoost-Nederland en Vlaanderen (H3O-Roerdalslenk). VITO-rapport, 2014/ETE/R/1, p.200
- Cenozoic interval from 2015-2018: Vernes et al., 2018. Geologisch en hydrogeologisch 3D model van het Cenozoïcum van de Belgisch-Nederlandse grensstreek van Midden-Brabant / De Kempen (H3O – De Kempen). In press.



- 3D Geological model: **G3Dv3**

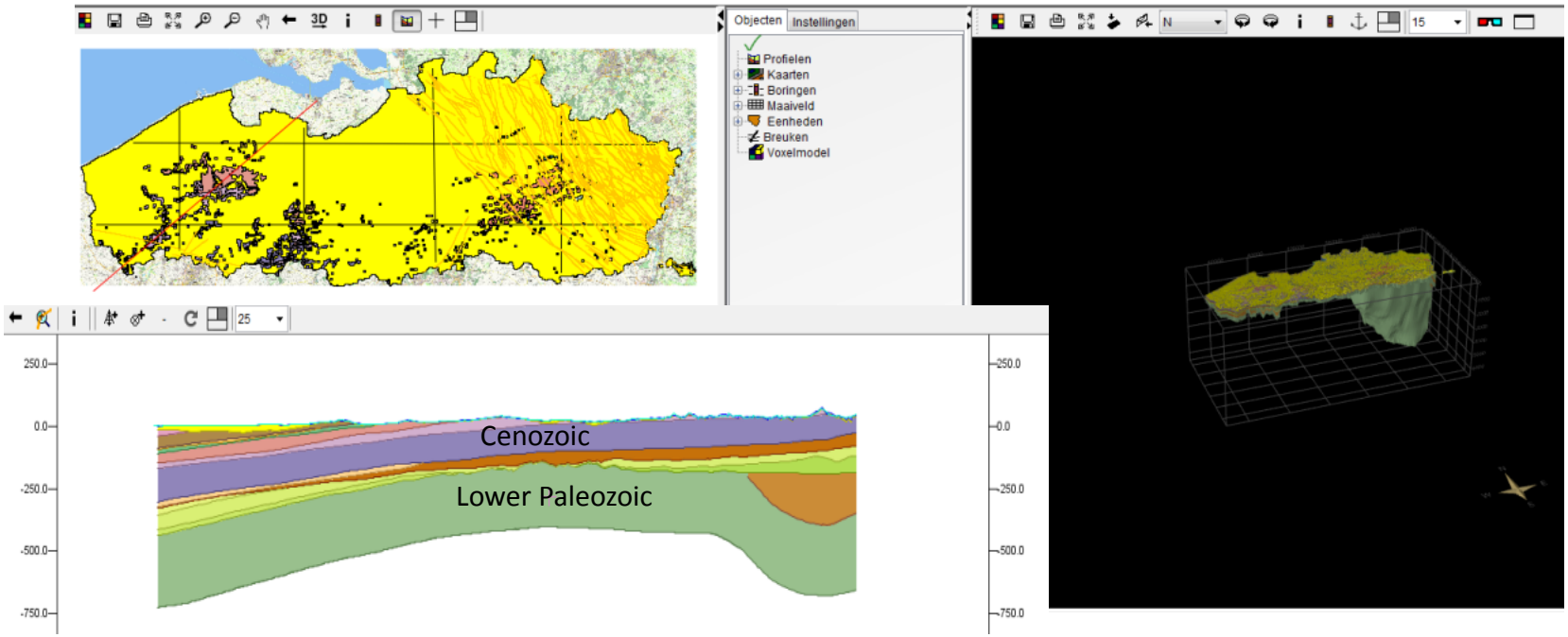
- Update of the G3Dv2-model and infilling on the level of members from the Lower Carboniferous to surface from 2013-18: In progress

- 3D Hydrogeological model: H3D

- Lower Carboniferous to surface from 2013-18: In progress

INTRODUCTION G3Dv3

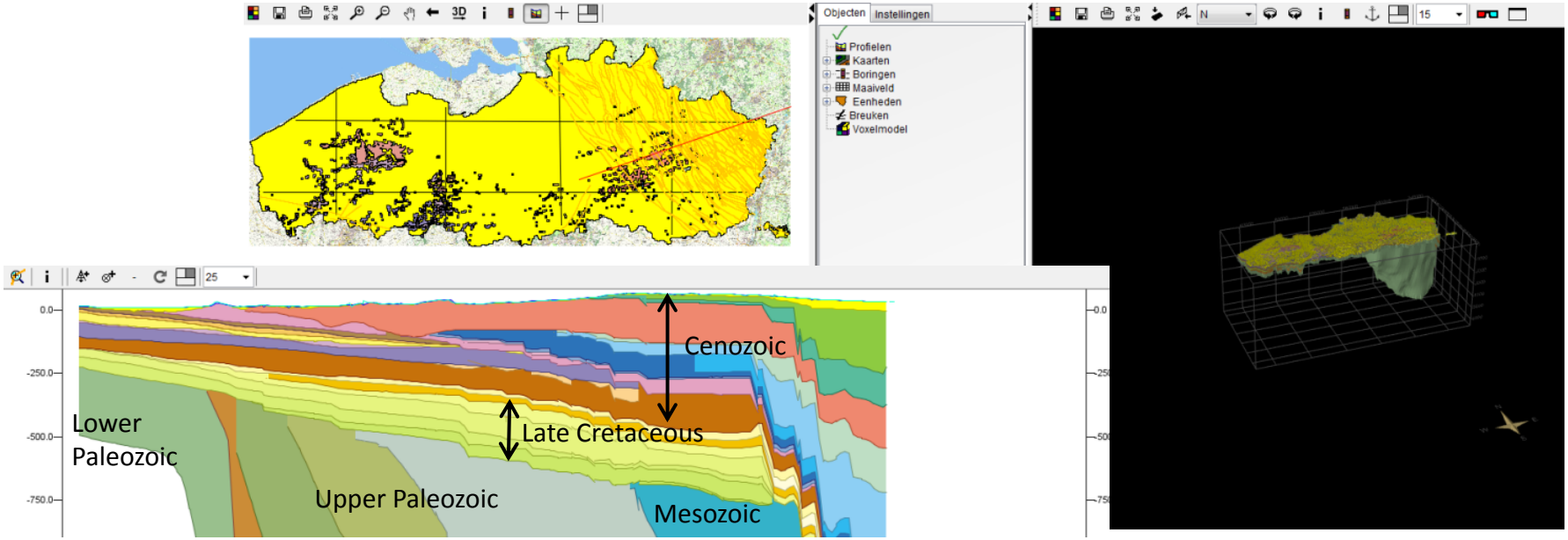
- Western part of Flanders:
  - Lower Paleozoic basement (London-Brabant Massif)
  - Cretaceous chalk
  - Cenozoic siliciclastics



- Borehole data is sufficient to cover the structural complexity
- Updating and filling in the formation boundaries of G3Dv2 with members based mainly on well log data

INTRODUCTION G3Dv3

- Eastern part of Flanders:
  - Lower Paleozoic basement
  - Upper Paleozoic carbonates and coal-rich strata
  - Mesozoic siliciclastics and carbonates
  - Cenozoic siliciclastics (Roer Valley Rift System)



- Borehole data alone is insufficient to cover the structural complexity
- Creating a new model on the level of both formations and members

DATASET AND METHODOLOGY

- Main tools:

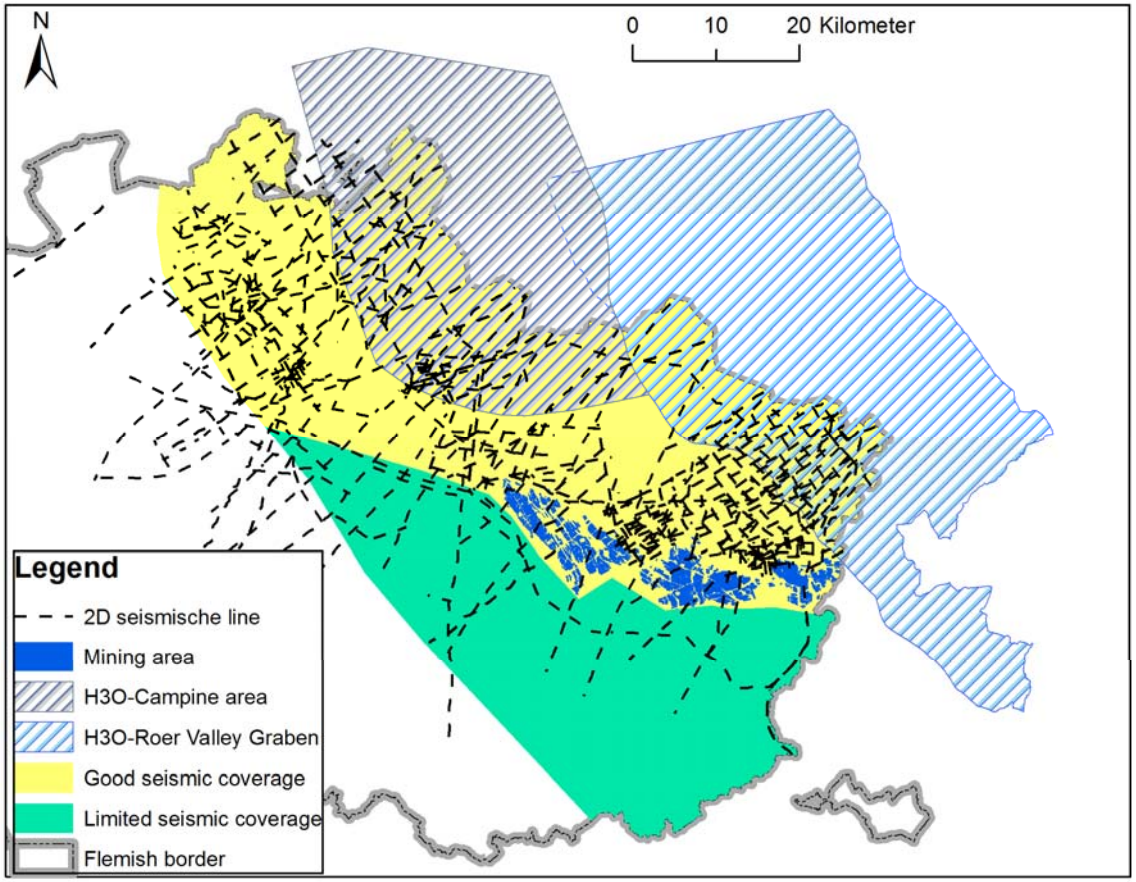
  - Borehole data

  - 2D seismic data (350 lines that cover 3200 km in the eastern part of Flanders)

  - Mining information (coal layer depths in the eastern part of Flanders)

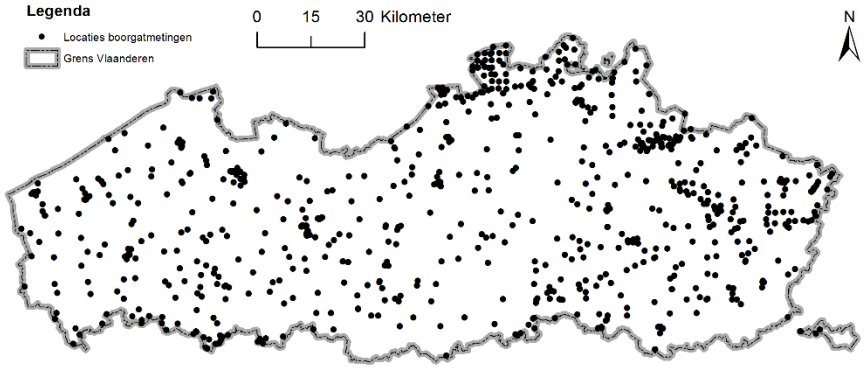
  - Topographic and gravity data

  - Existing geological models (G3Dv2, H3O-projects)

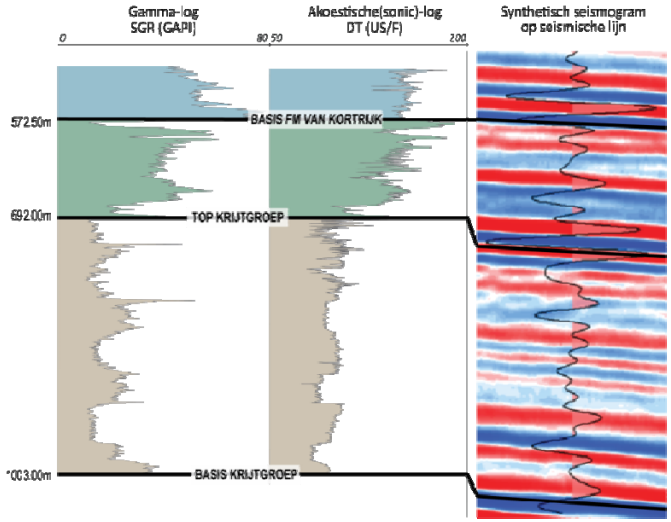


INTERPRETATIONS

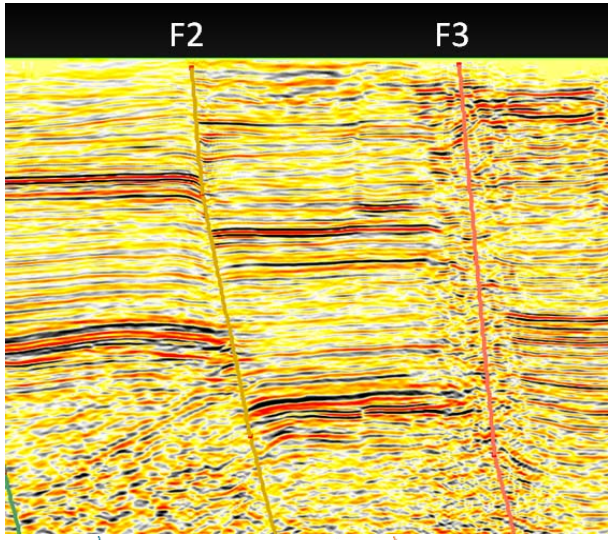
- Borehole interpretations →Mainly use of boreholes supported with log data



- Horizon interpretations

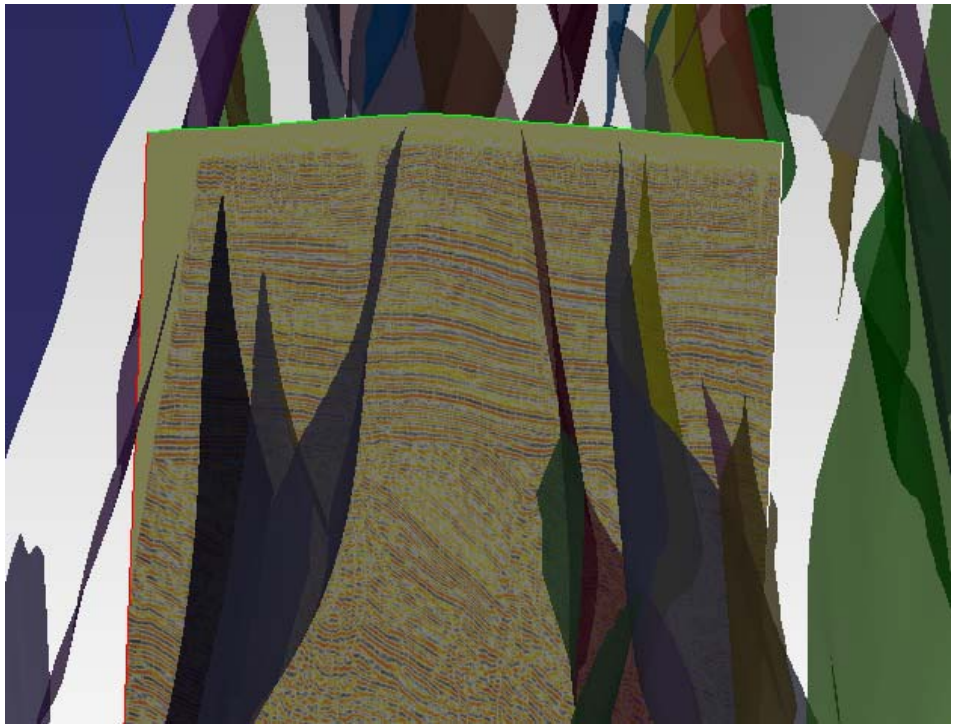


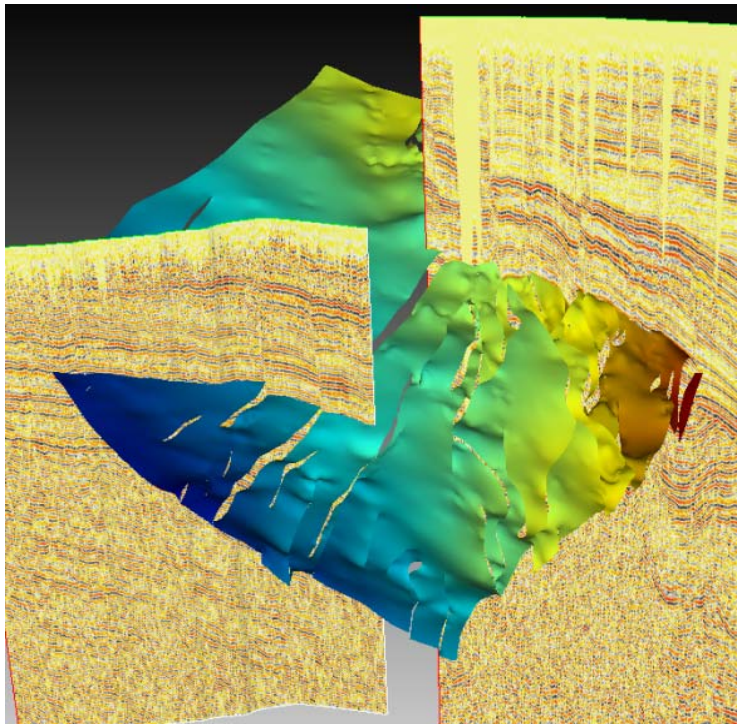
- Fault line interpretations



MODELLING IN TIME-DOMAIN

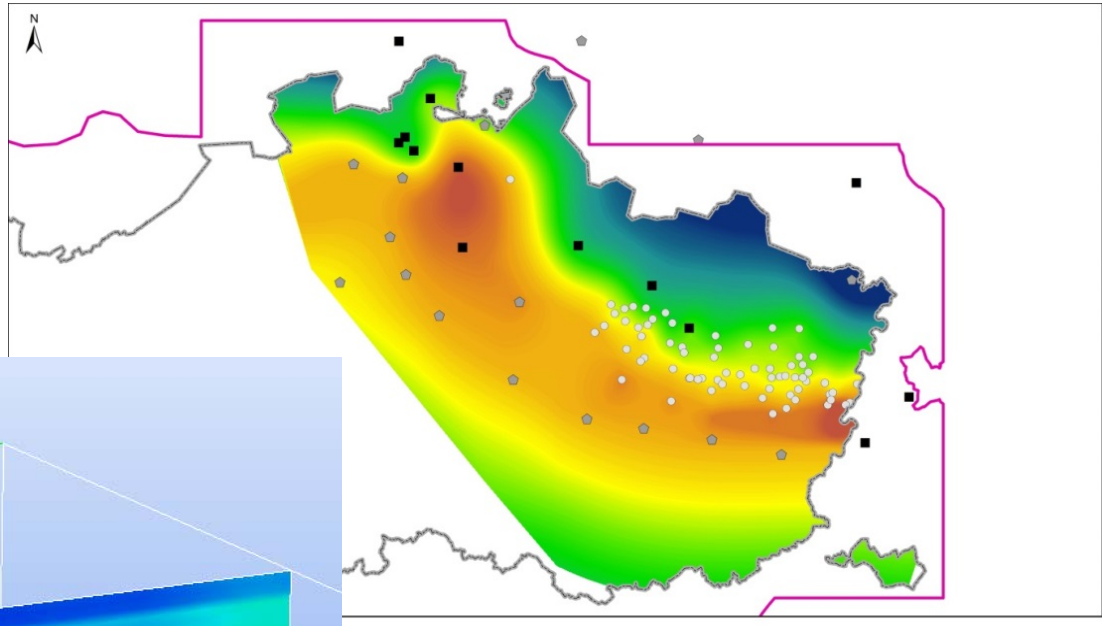
- Horizon modelling into 3D layers (8 horizons modelled from Neogene to lower Carboniferous)
- Fault modelling into 3D fault planes (> 200 fault surfaces modelled)

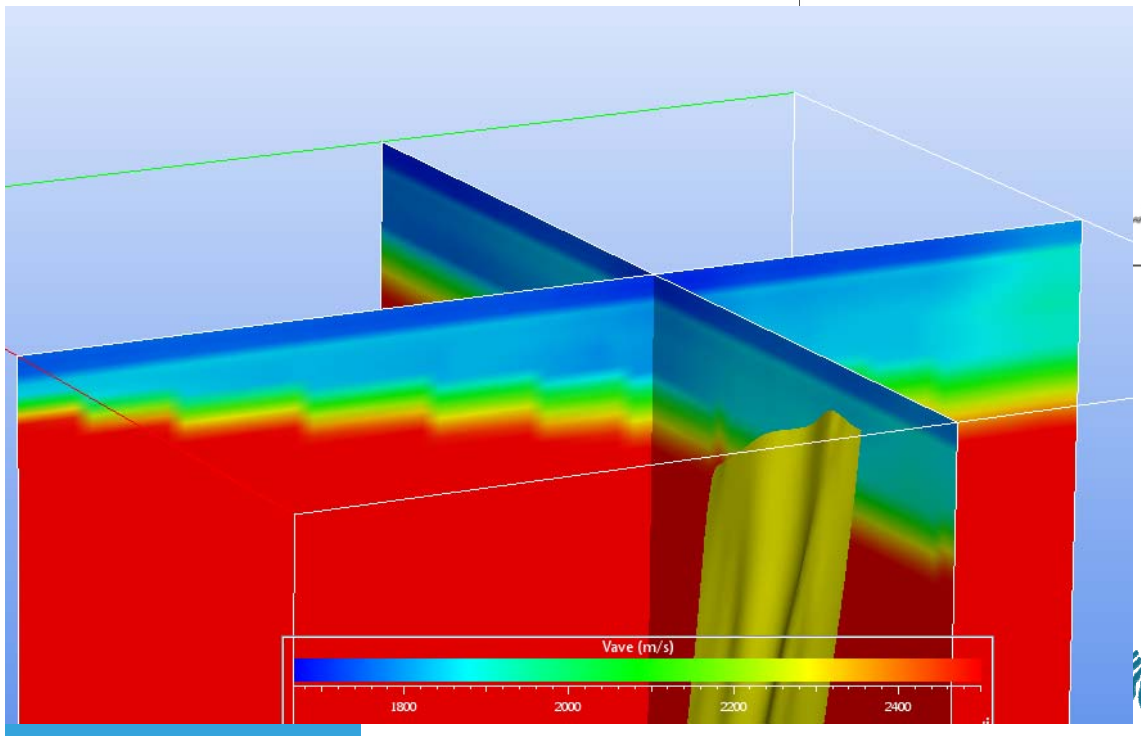




TIME-DEPTH CONVERSION

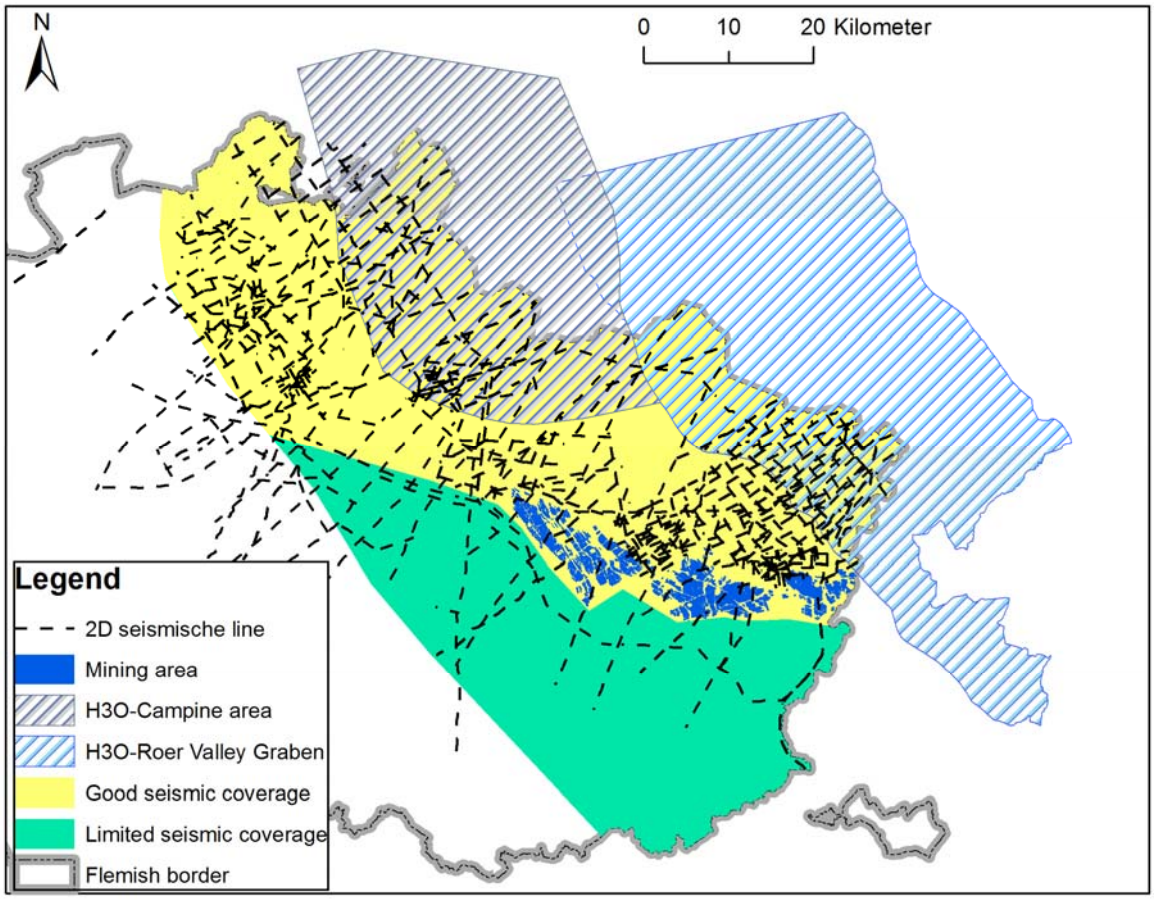
- Converting the 3D fault planes and horizon surfaces from the time domain towards the depth domain



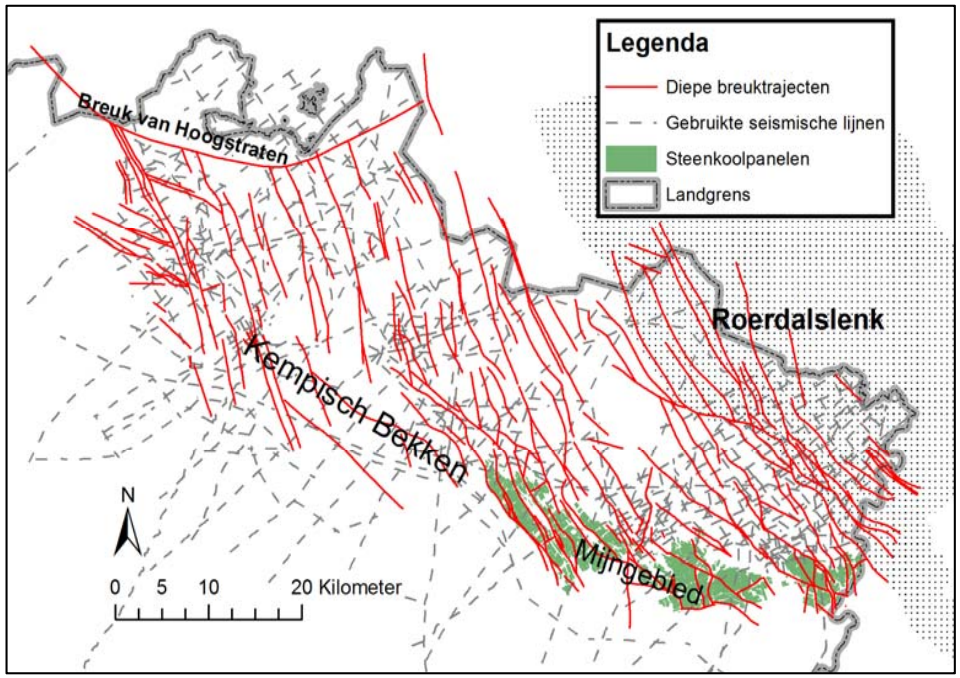


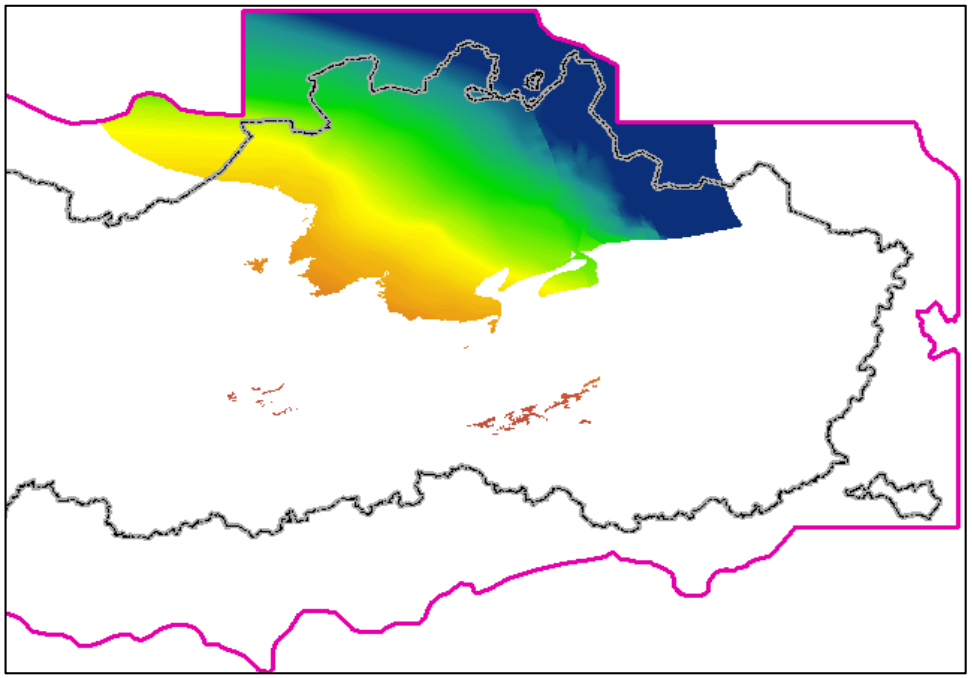
MODELLING IN DEPTH DOMAIN

- Integrating layers in the western and eastern half of Flanders (different methodologies)
- Integrating layers and faults from the cross-boundary projects (H3O-projects)
- Filling in the framework with (55) formations and (88) members



RESULTS G3Dv3: NEW 3D FAULT AND LAYER MODELS





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