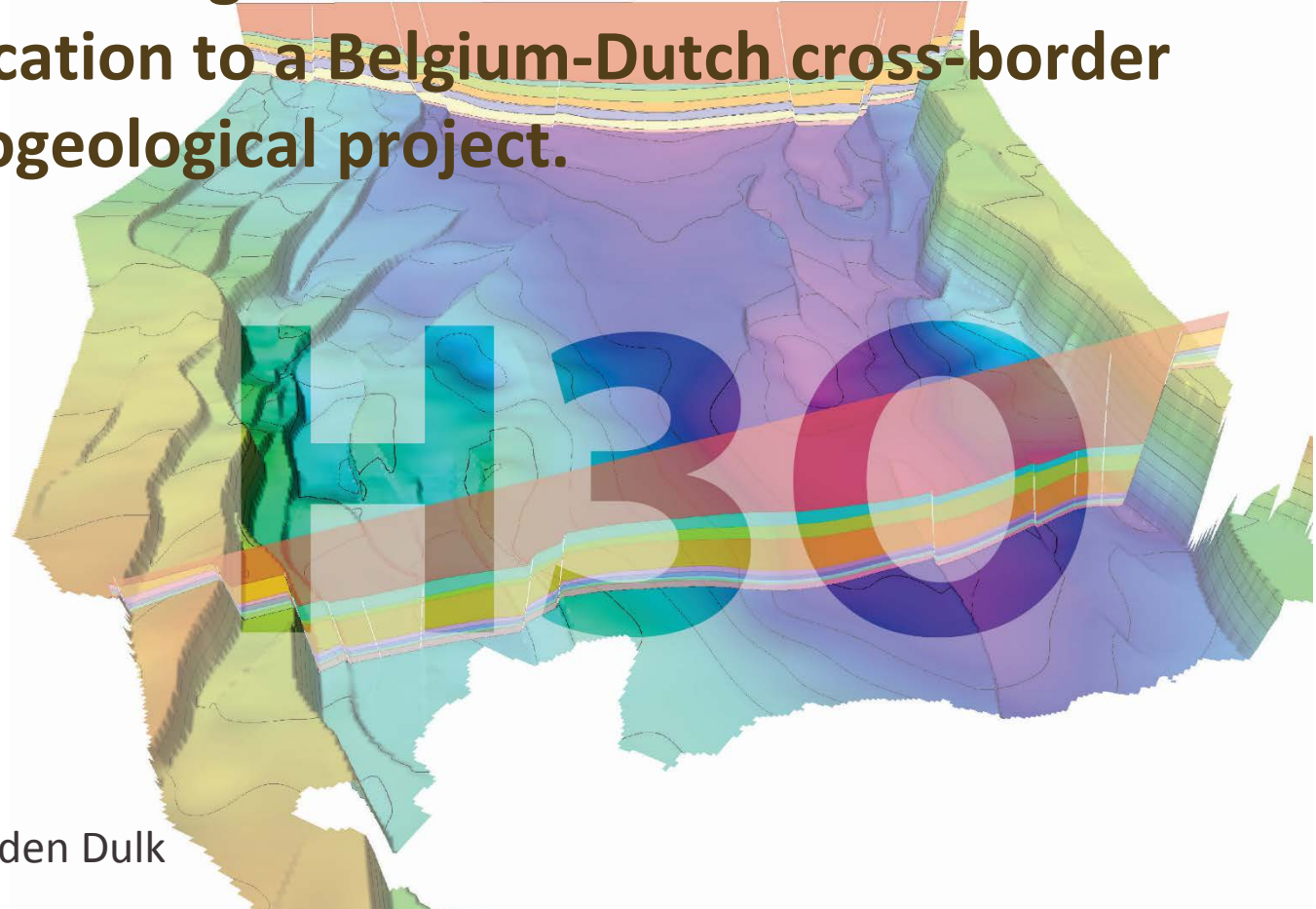




# 3D Modelling based on 2D seismic data: application to a Belgium-Dutch cross-border hydrogeological project.



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**TNO** innovation  
for life

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**vito**  
vision on technology



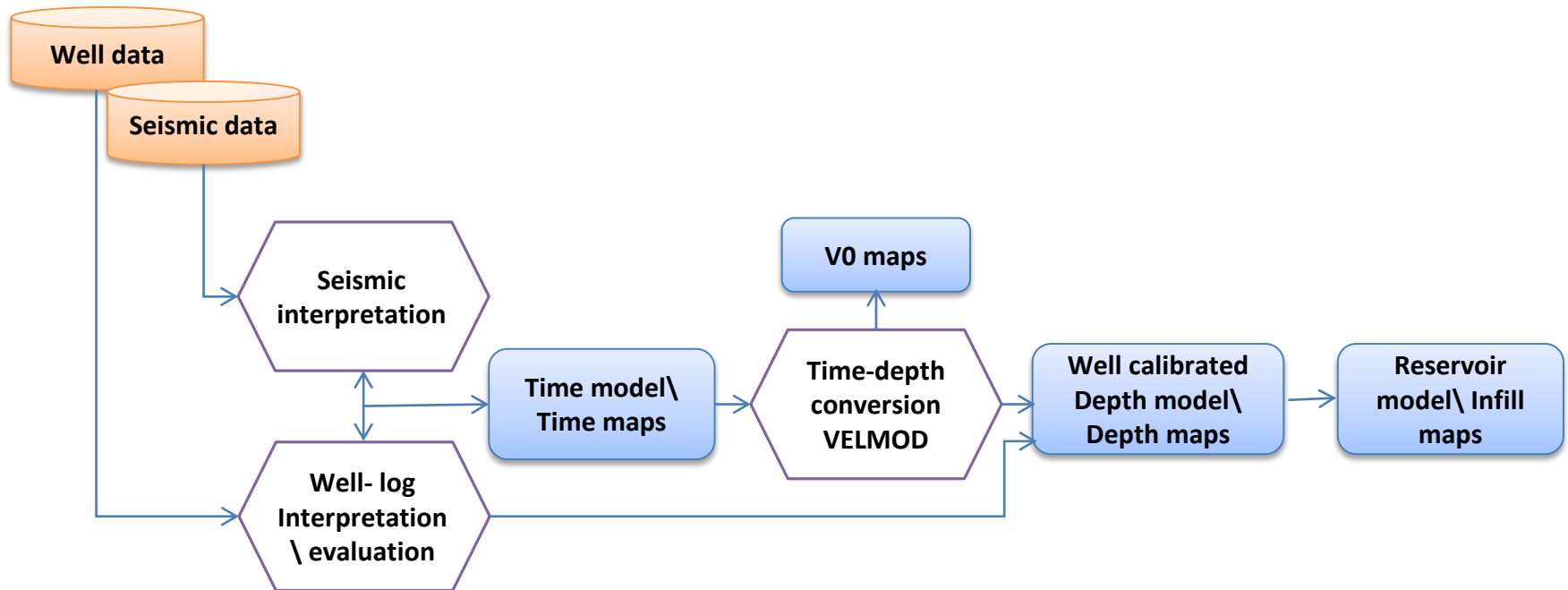


## Outline

- › General workflow seismically based models DGM-deep
- › Regional models vs. H3O-model
- › Seismic interpretation and seismic to well-tie
- › Fault modelling approach
- › Horizon modelling and uncertainty



# General workflow seismically based models DGM-deep

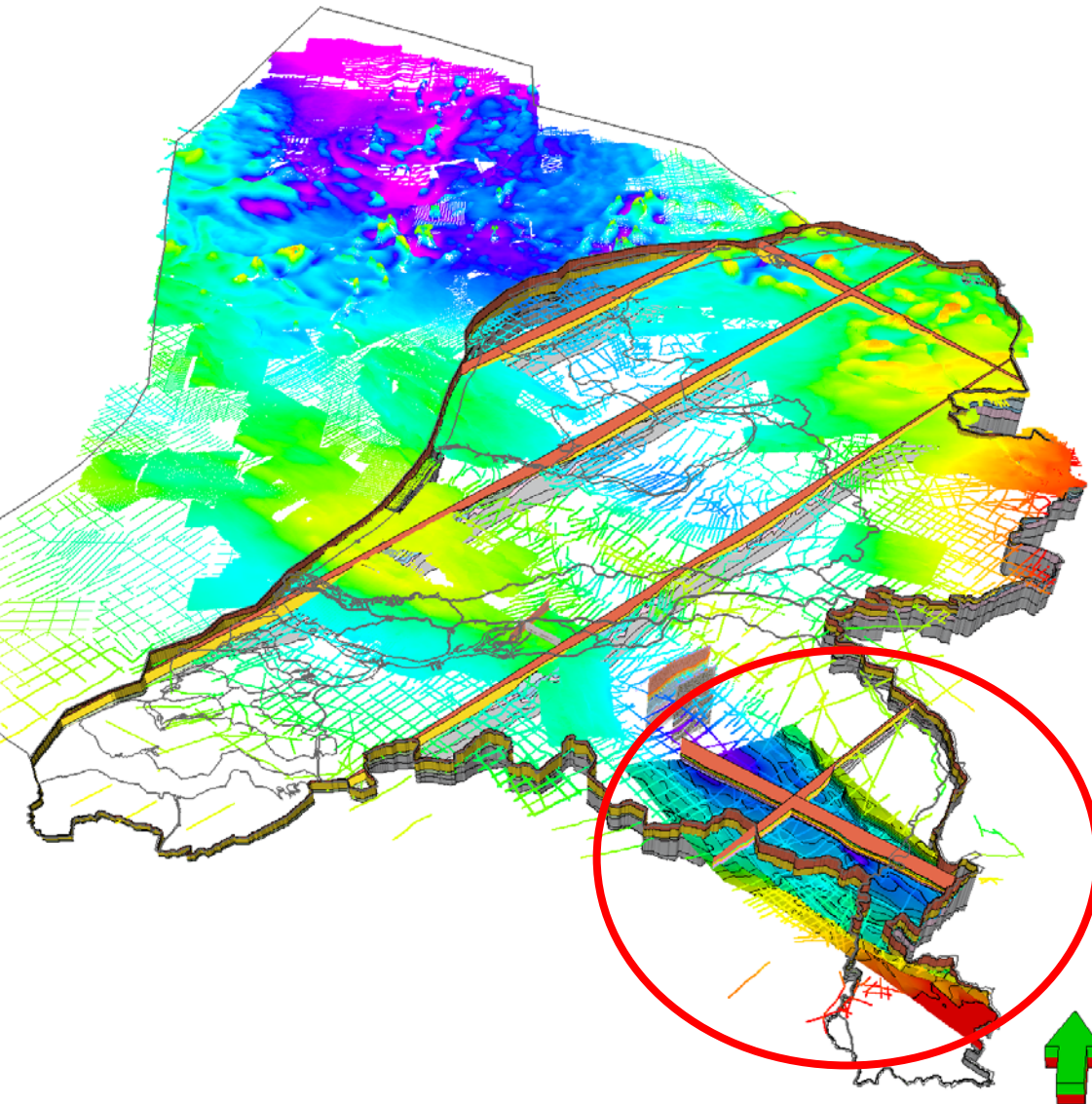


## VELMOD

- » Velocity data from well logs (sonic, checkshots)
- »  $V_0$ , k method (V increases linearly under influence of burial & compaction)



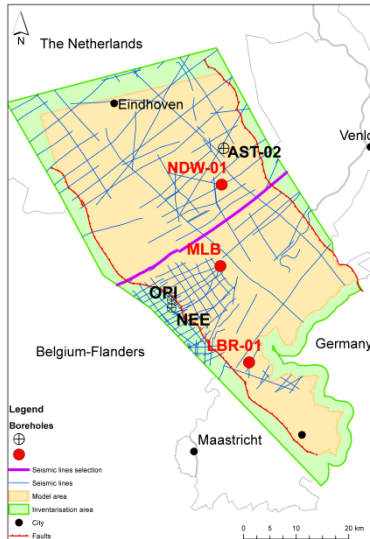
## Regional models vs. H30 model



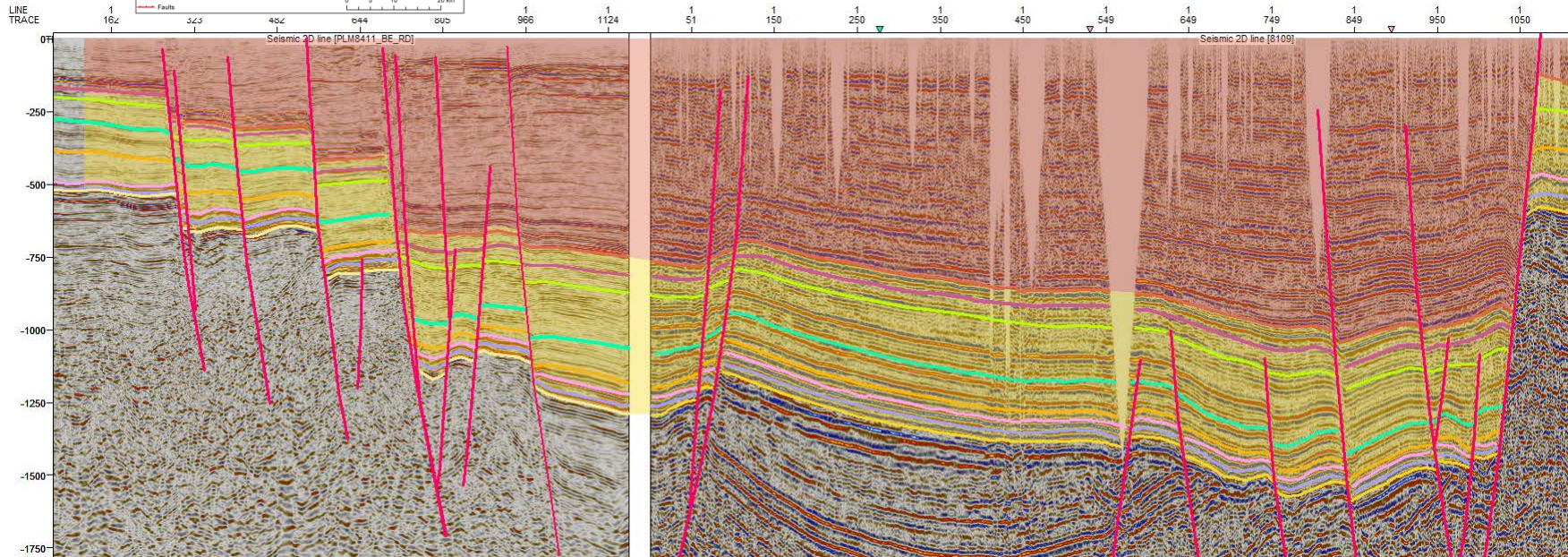
- » Digital data, vectorised 2D-seismic lines
- » Cross-border correlation
- » Nr. of Cenozoic horizons
- » Fault modelling approach



# Seismic interpretation and seismic to well-tie



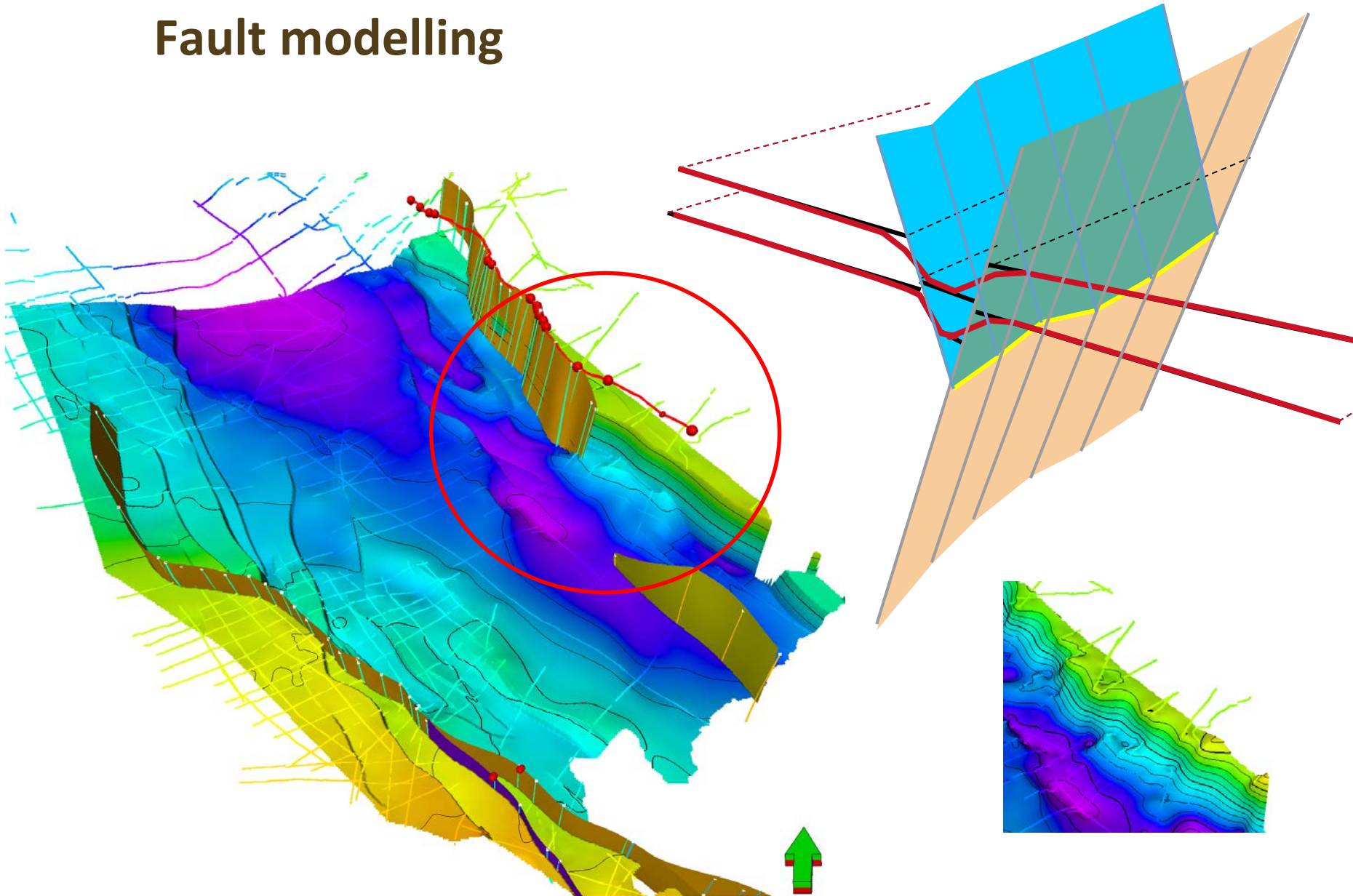
- » Six key-wells for stratigraphic correlation and seismic to well tie
- » 8 seismically interpreted horizons
- » Fault zones represented by 1 or 2 Fault sticks – simplification of reality





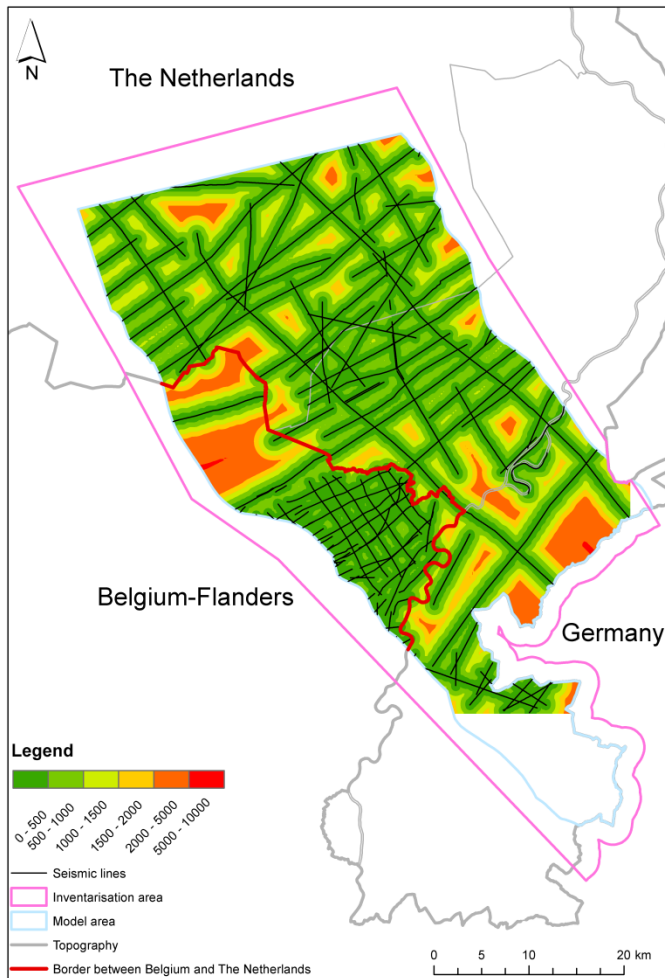
Project H30

# Fault modelling

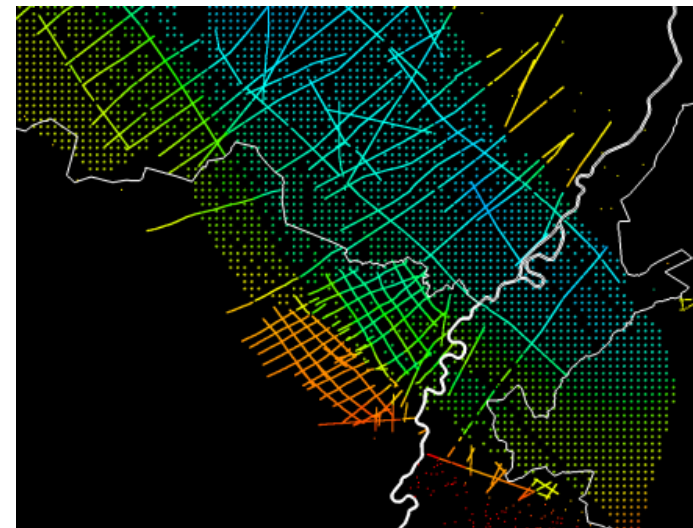
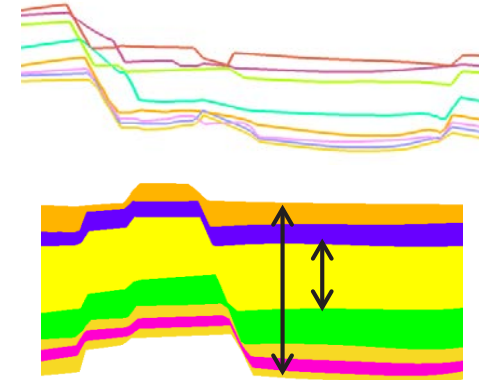




# Horizon modelling & uncertainty



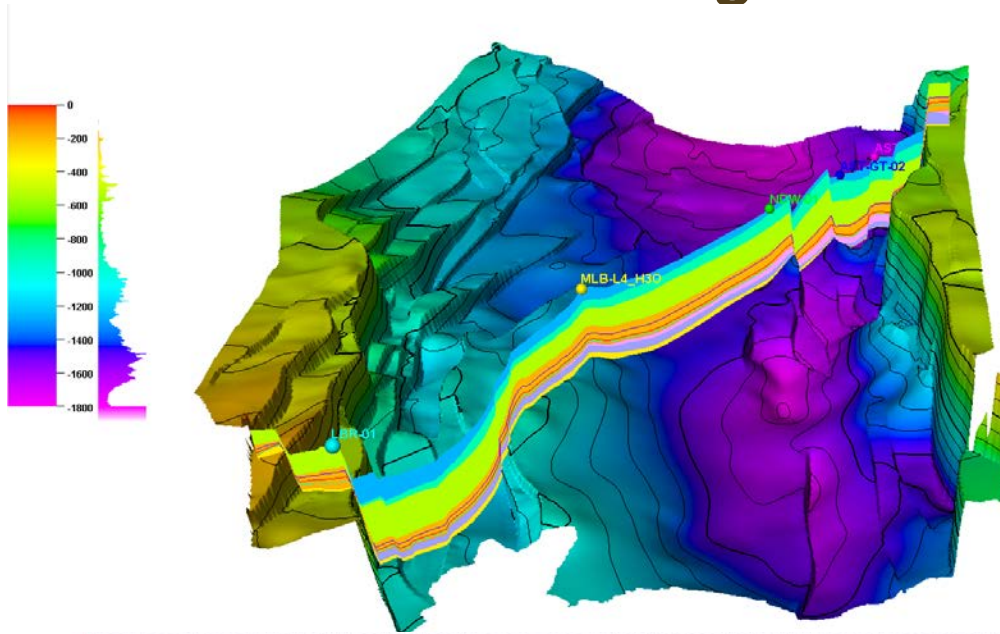
Coherent layers



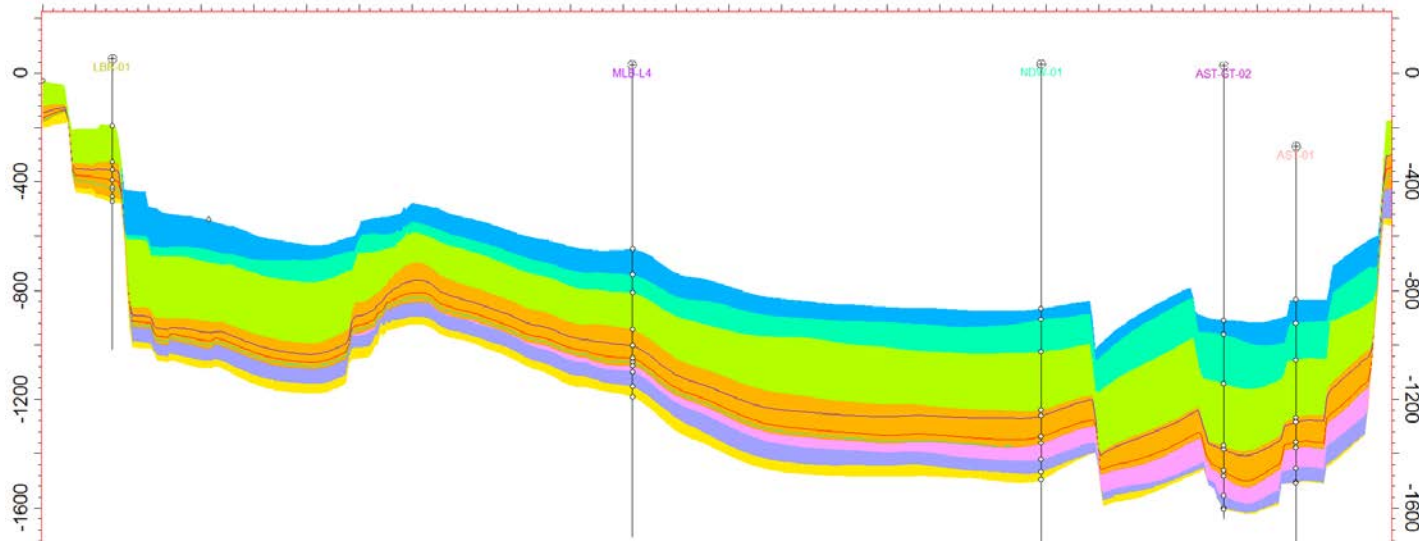
Seismic interpretation and 750x750m mesh steering-points



# Horizon modelling & uncertainty



- » Gridding input and settings strongly influence surface output: velocity and well corrected depth surfaces
- » Final modelling step: 3 infill horizons based on well-tied depth model and well data







## Concluding Remarks

- › For the H3O project a challenging effort was undertaken to interpret 8 horizons, create fault planes and build a high-resolution- and coherently-stacked structural layer model using (vintage) 2D seismic data
- › Methods developed will benefit upcoming H3O-projects.



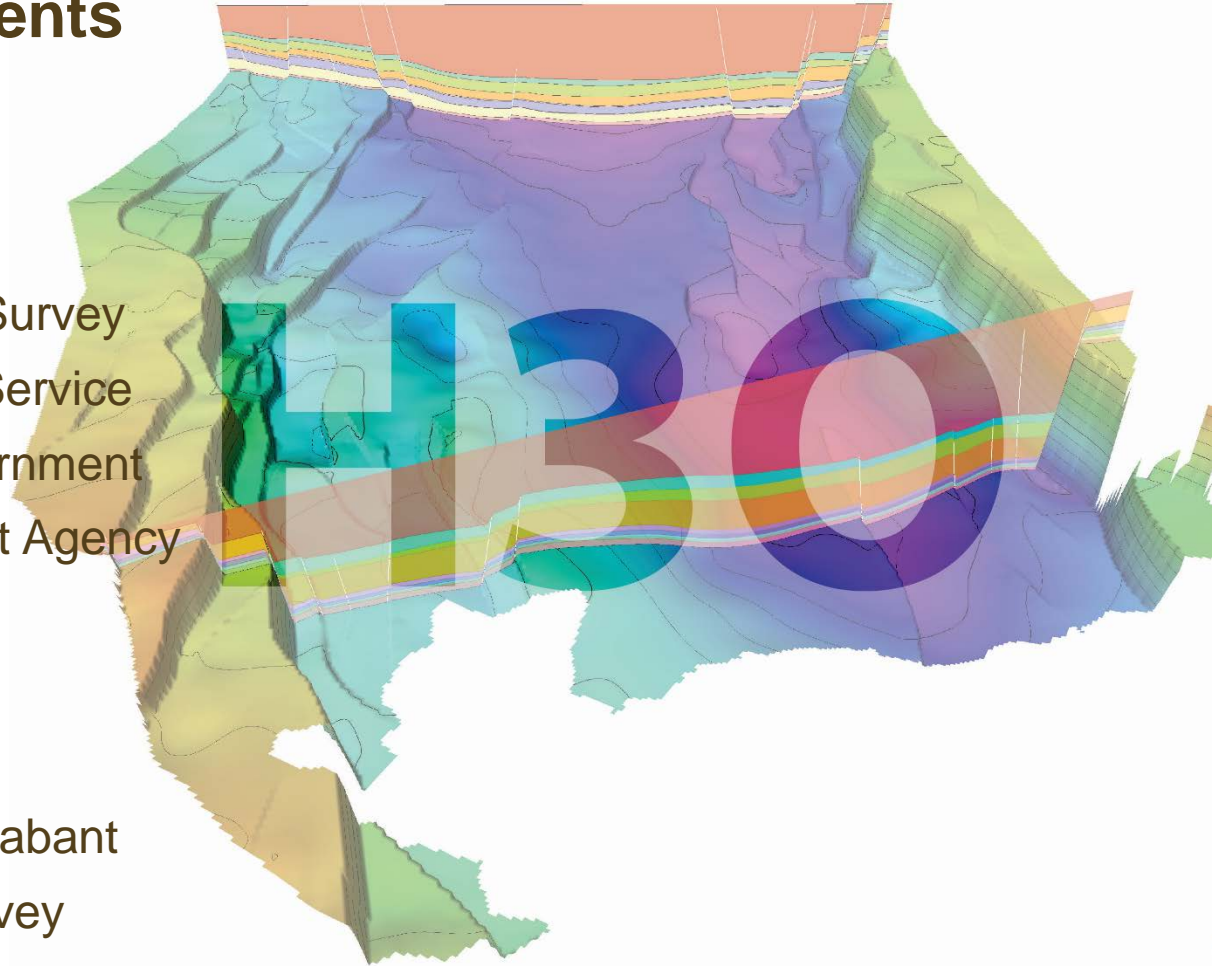
# Acknowledgements

## Flanders

- › VITO
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- › Flemish Environment Agency

## The Netherlands

- › Province of Limburg
- › Province of North-Brabant
- › TNO Geological Survey



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