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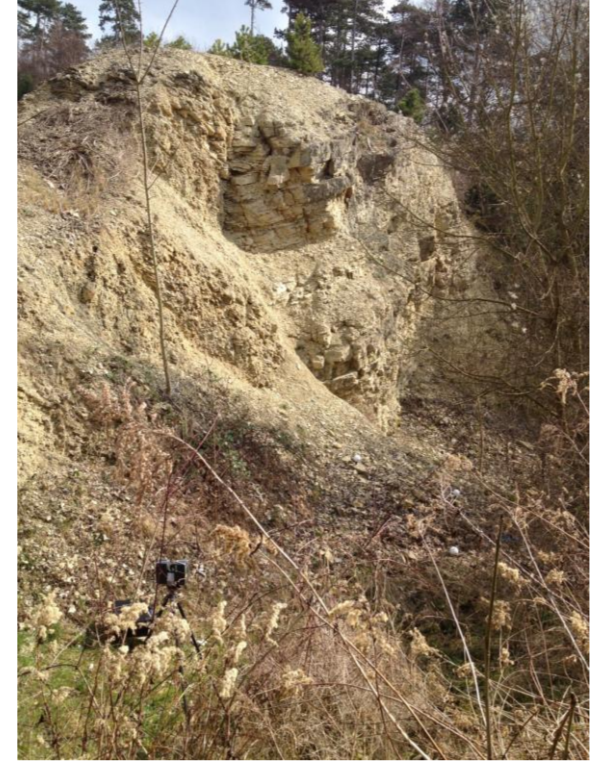


## Location

„Leine Graben“ structure  
Southern Lower Saxony  
East of village Sudheim  
abandoned limestone quarry  
heterogenous outcrops  
diffuse information



Sudheim quarry (view from NE to SW)



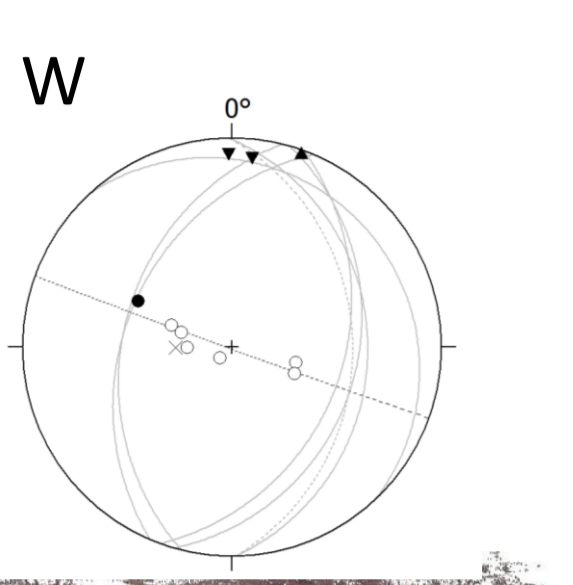
Southern outcrop



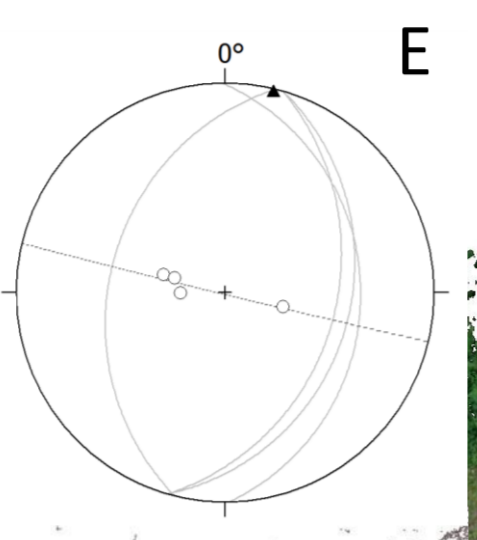
Diffuse outcrops at the floor

## Methodology

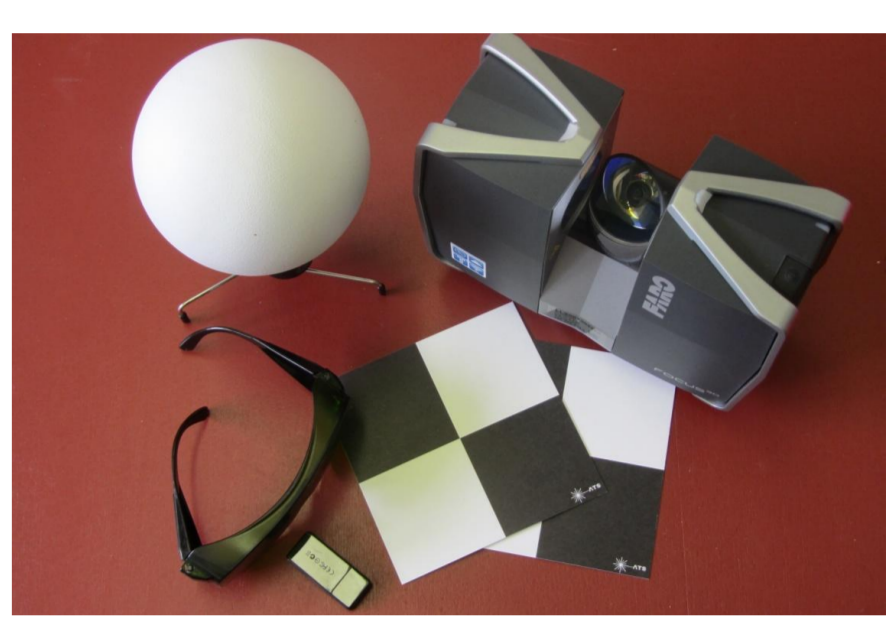
- Traditional field mapping
- Differential GPS receiver
- Terrestrial laserscanner
- Digital SLR camera
- Drone with optical camera
- ArcGIS, Agisoft, Cloud Compare & Move



- Pole of bedding plane
- Slickenside
- ▲ Pole of constructed fold axis
- ▼ Pole of measured fold axis
- × Pole of fault plane



Orthoimage of the Sudheim quarry



Orthoimage of DOM (northern outcrop) based on laserscanning (view to North, wide 25 m)

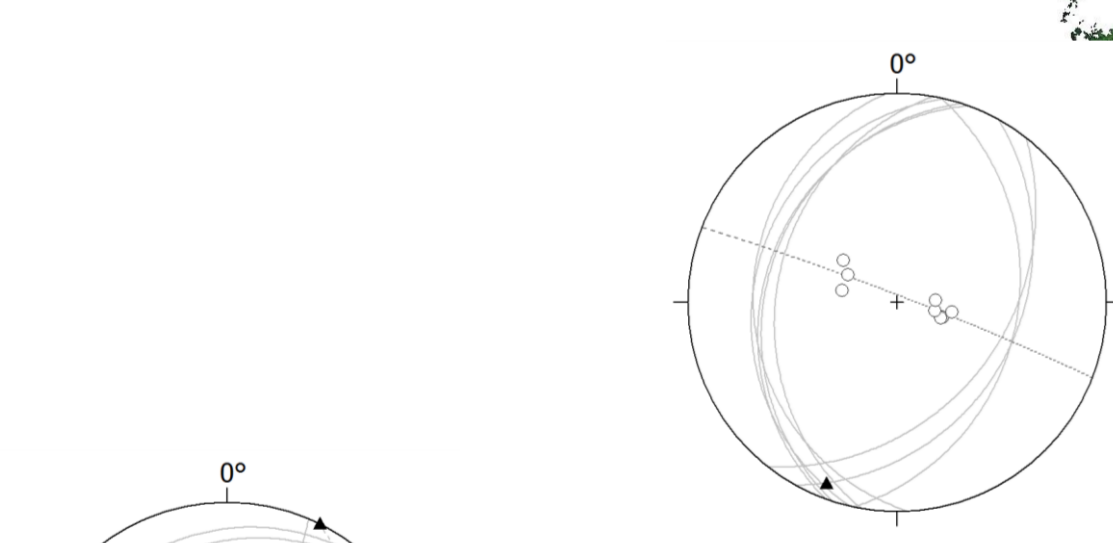
## Results

- Digital outcrop models (DOM)
- Digital elevation model (DEM)
- Ortho images
- Geological 3D model
- Vertical geological section

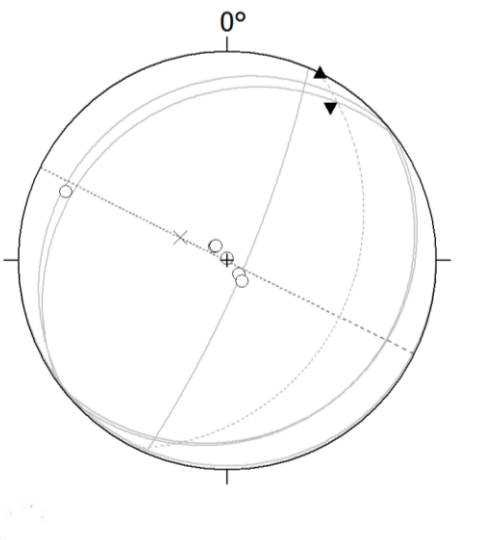
### Central outcrop



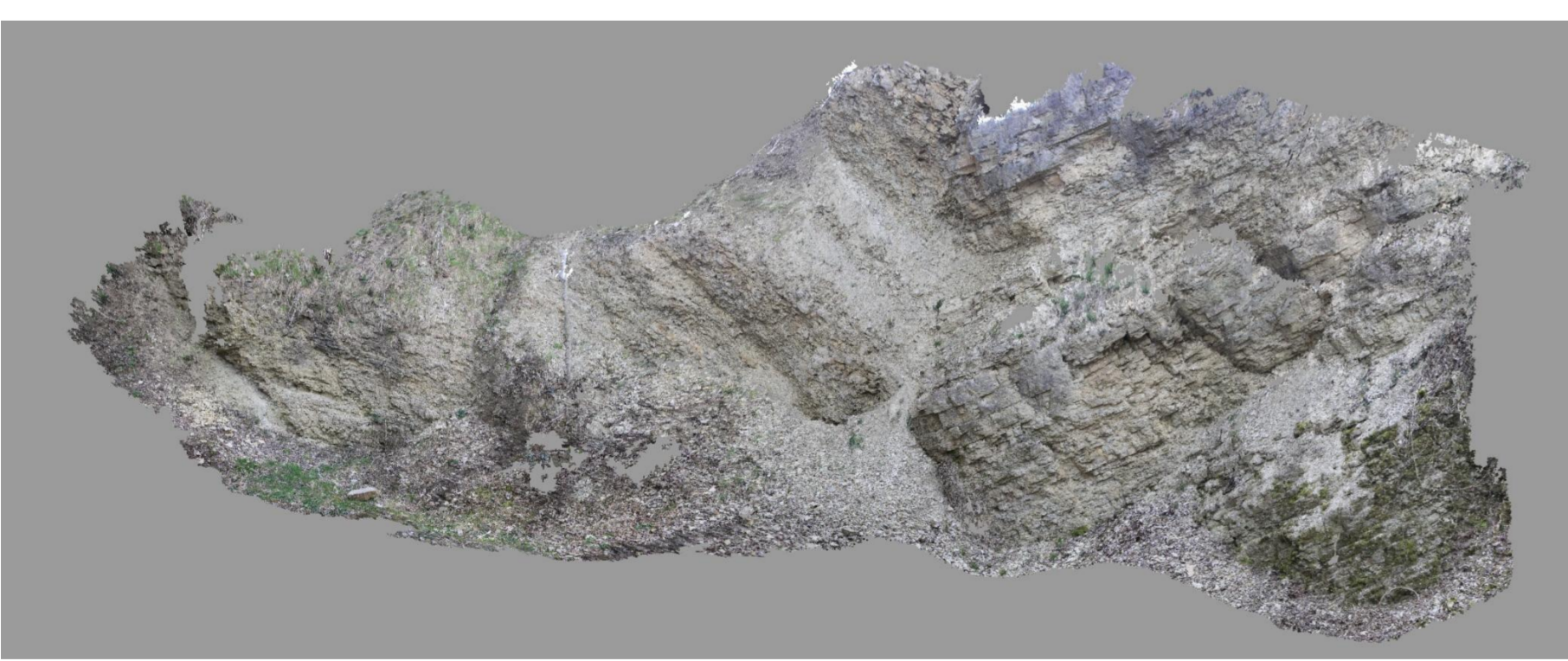
Digital outcrop model based on photogrammetry (view to East, scale variable)



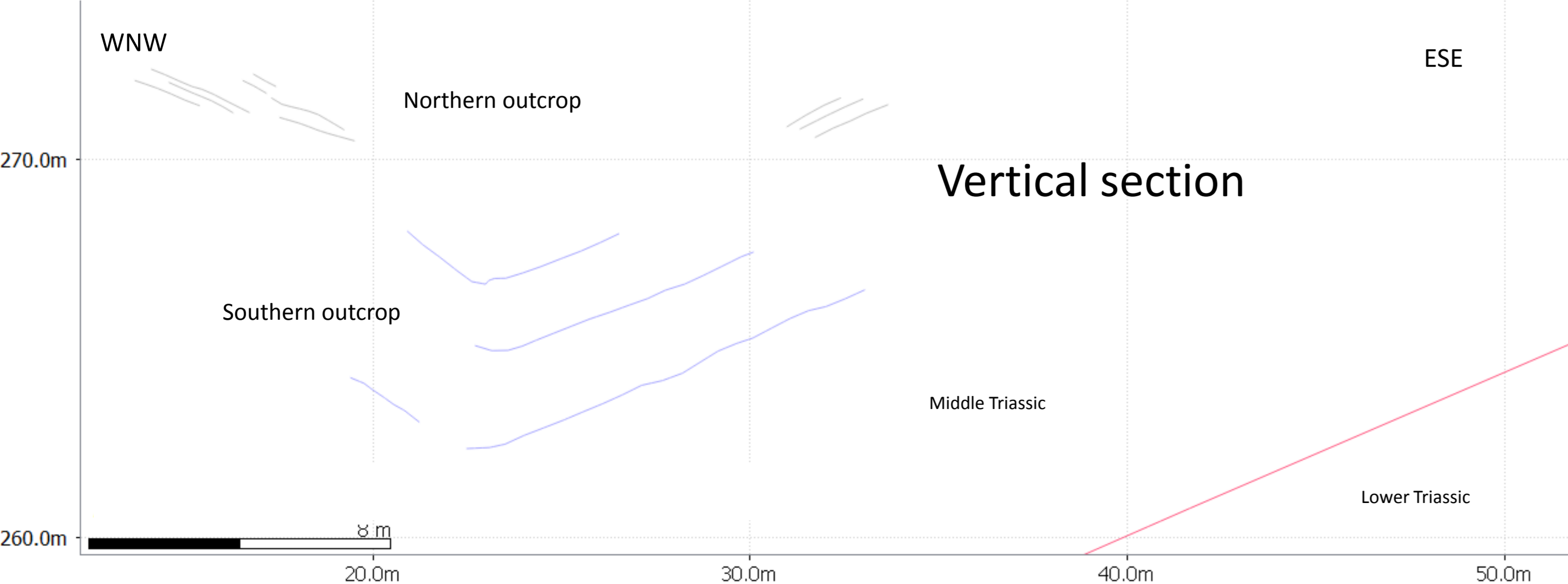
Southern outcrop



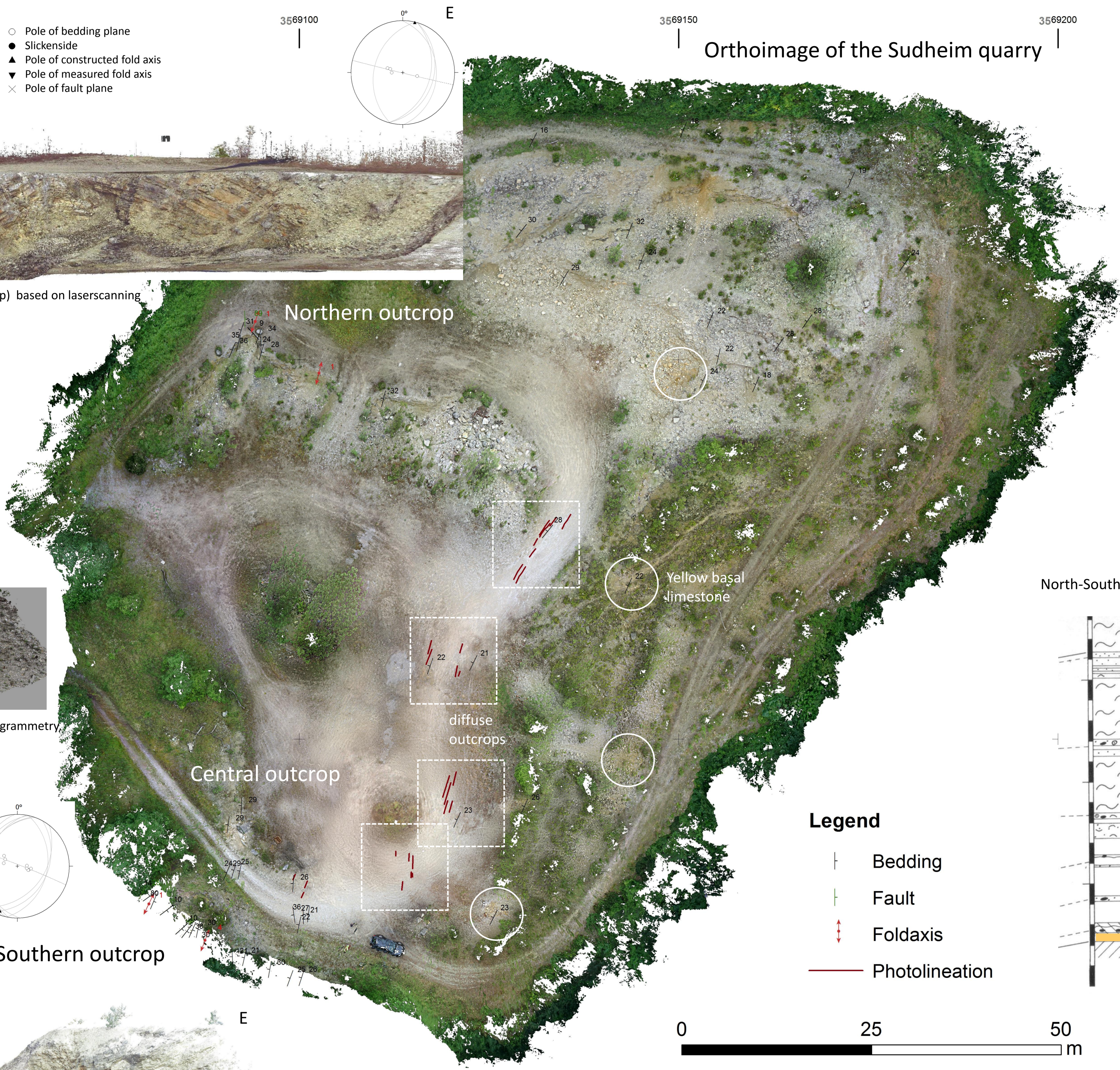
Orthoimage of DOM based on laserscanning, (view to North, wide 27 m)



Orthoimage of DOM based on photogrammetry, (view to North, wide 25 m)

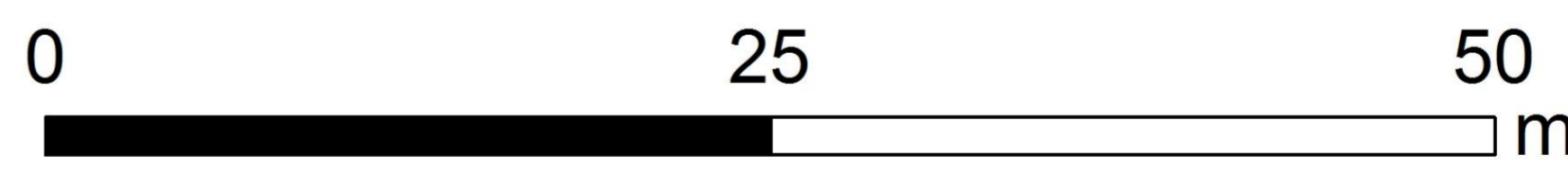


Vertical section



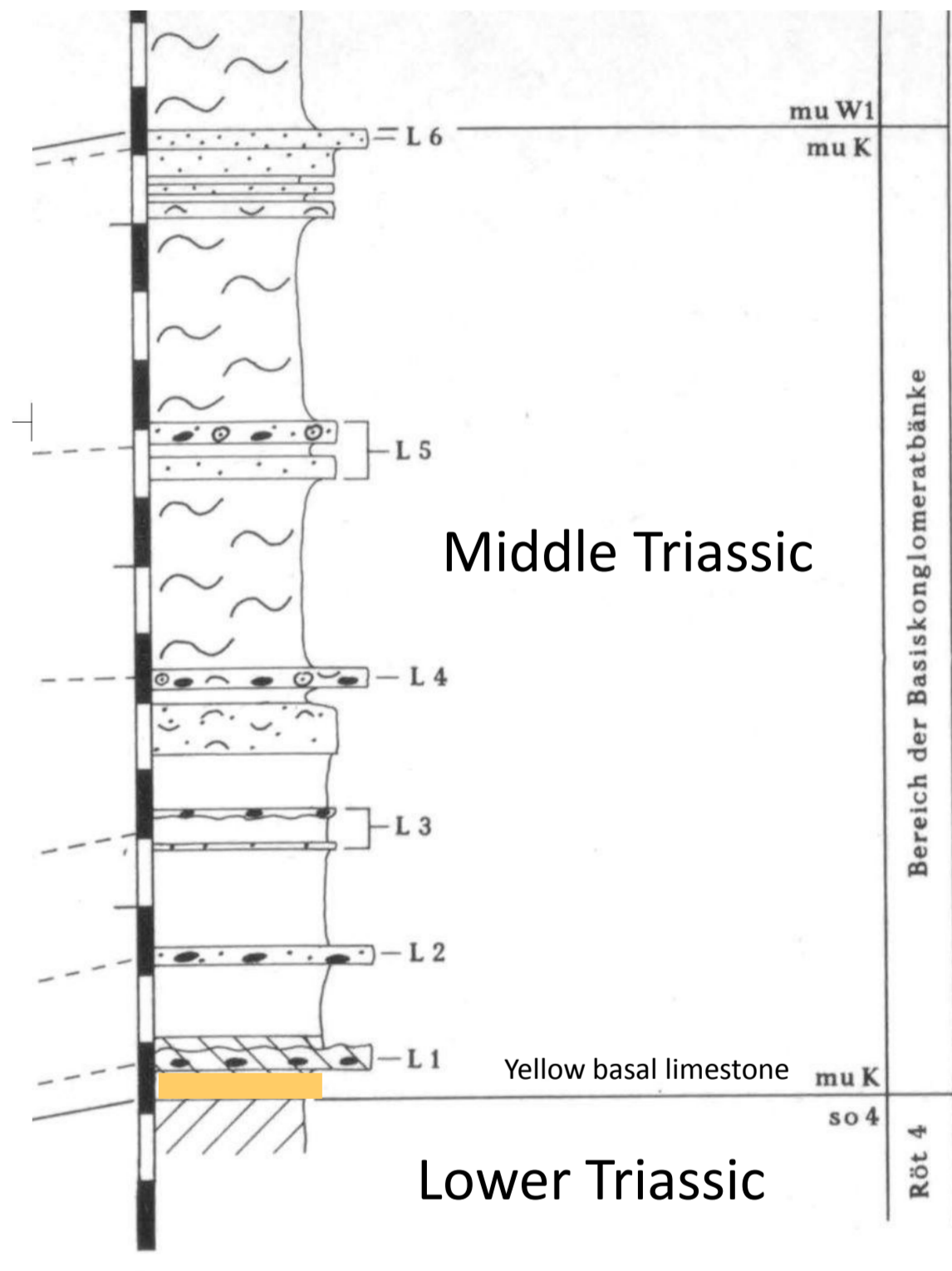
### Legend

- Bedding
- - - Fault
- ↕ Foldaxis
- Photolineation



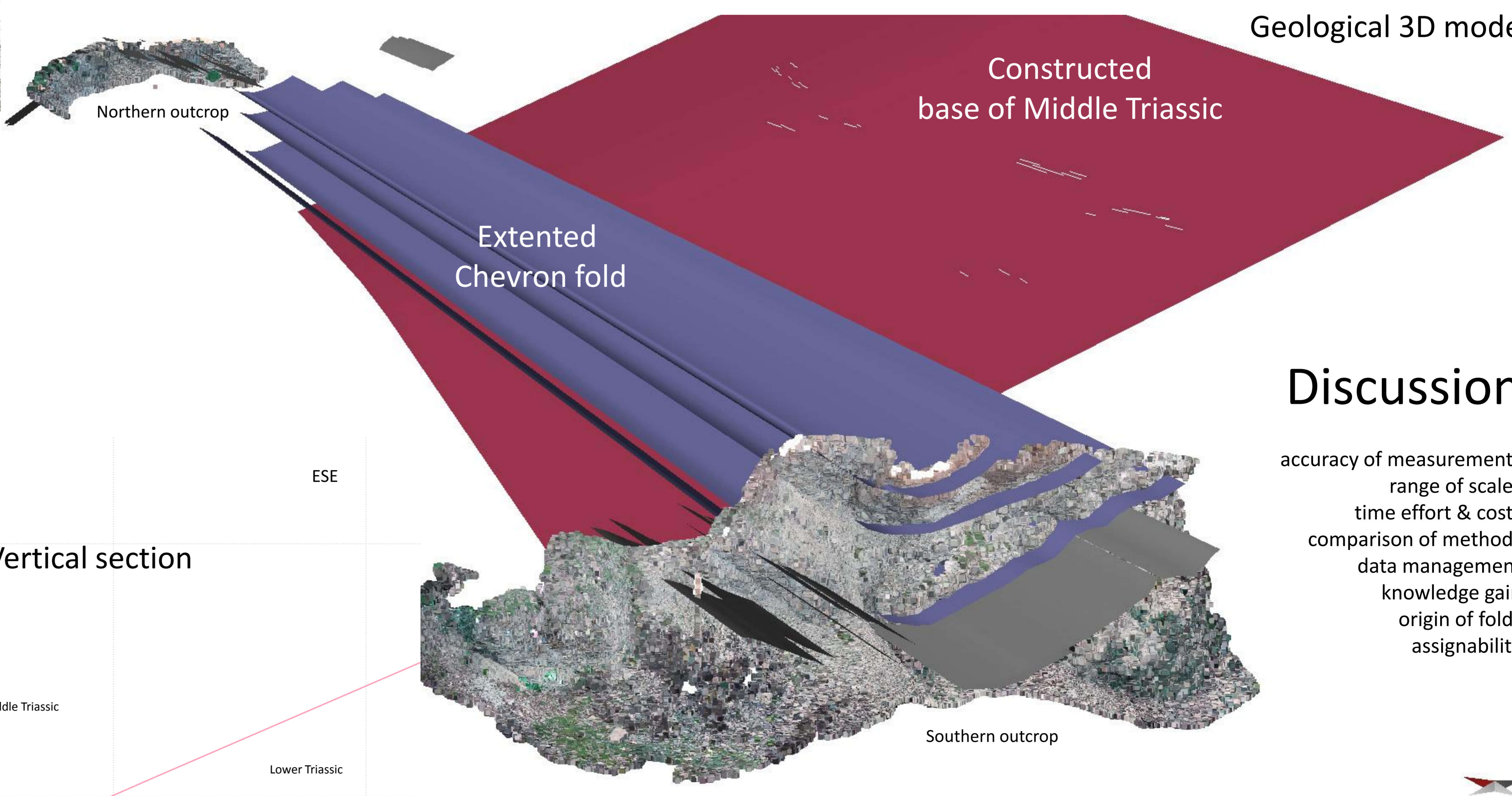
## Geological situation

folded Middle Triassic limestones  
undulating and lensing horizons  
shallow reverse faults  
West – East oriented compression  
North-South-trending graben structure nearby



Stratigraphy and lithology of Lower and Middle Triassic rocks around Göttingen (Dünkel & Vath, 1990)

## Geological 3D model



## Discussion

- accuracy of measurements
- range of scales
- time effort & costs
- comparison of methods
- data management
- knowledge gain
- origin of folds
- assignability