Mont Terri Project

Geological tunnel-mapping using photogrammetry

Mont Terri rock laboratory, St-Ursanne, Switzerland

www.mont-terri.ch
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Introduction

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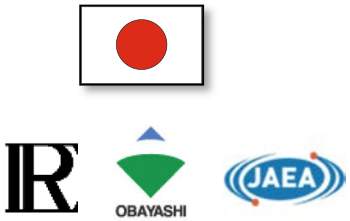
Mont Terri Project

- 19 Organisations from 9 Countries
- Implementors, Regulators and Safety Organisationis
- Geological Surveys and two Oil Companies
- Over 1000 Scientists, Engineers and Technicians



Underground rock laboratory

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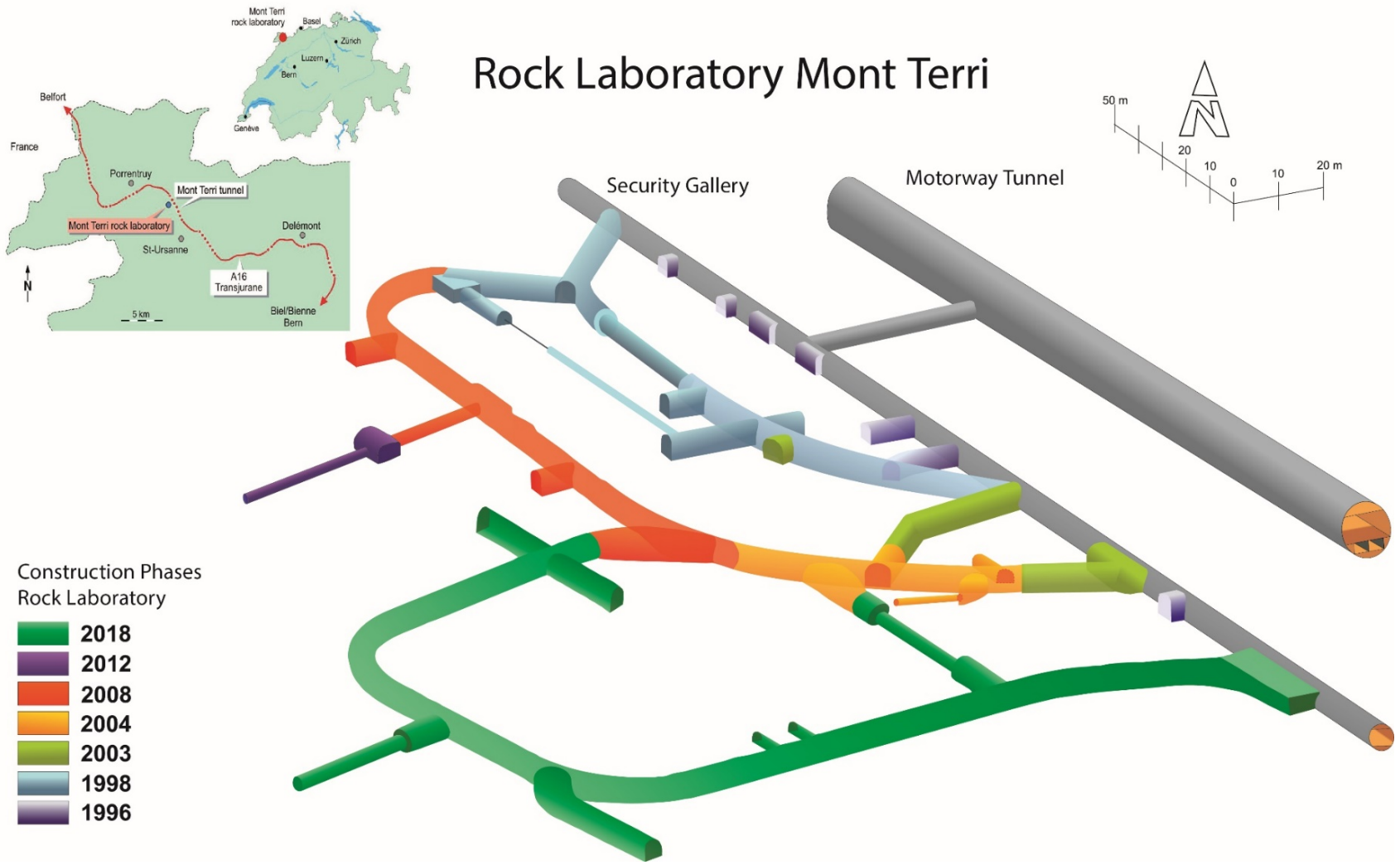

Geological map of rock laboratory

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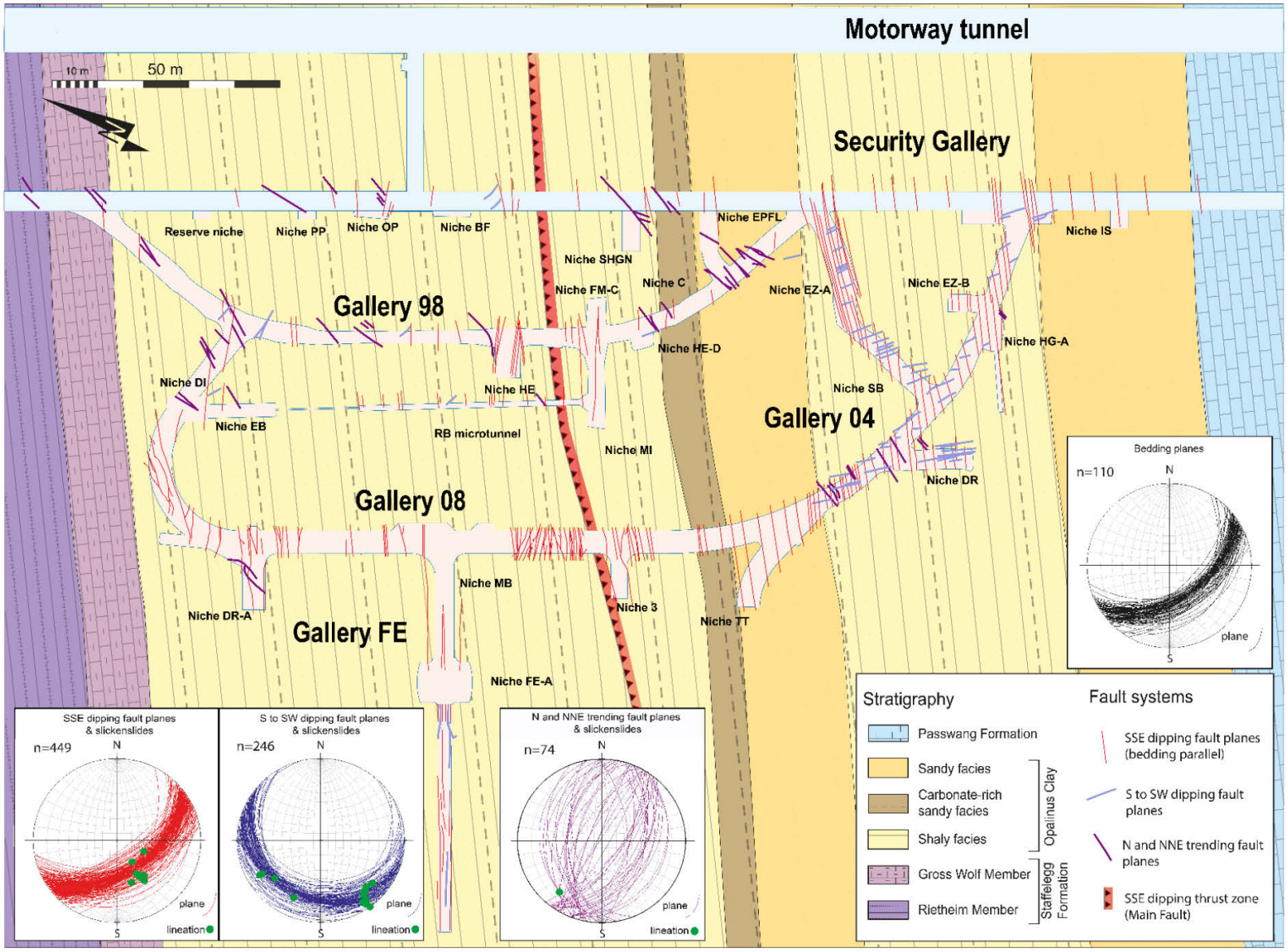

Extension 2018…

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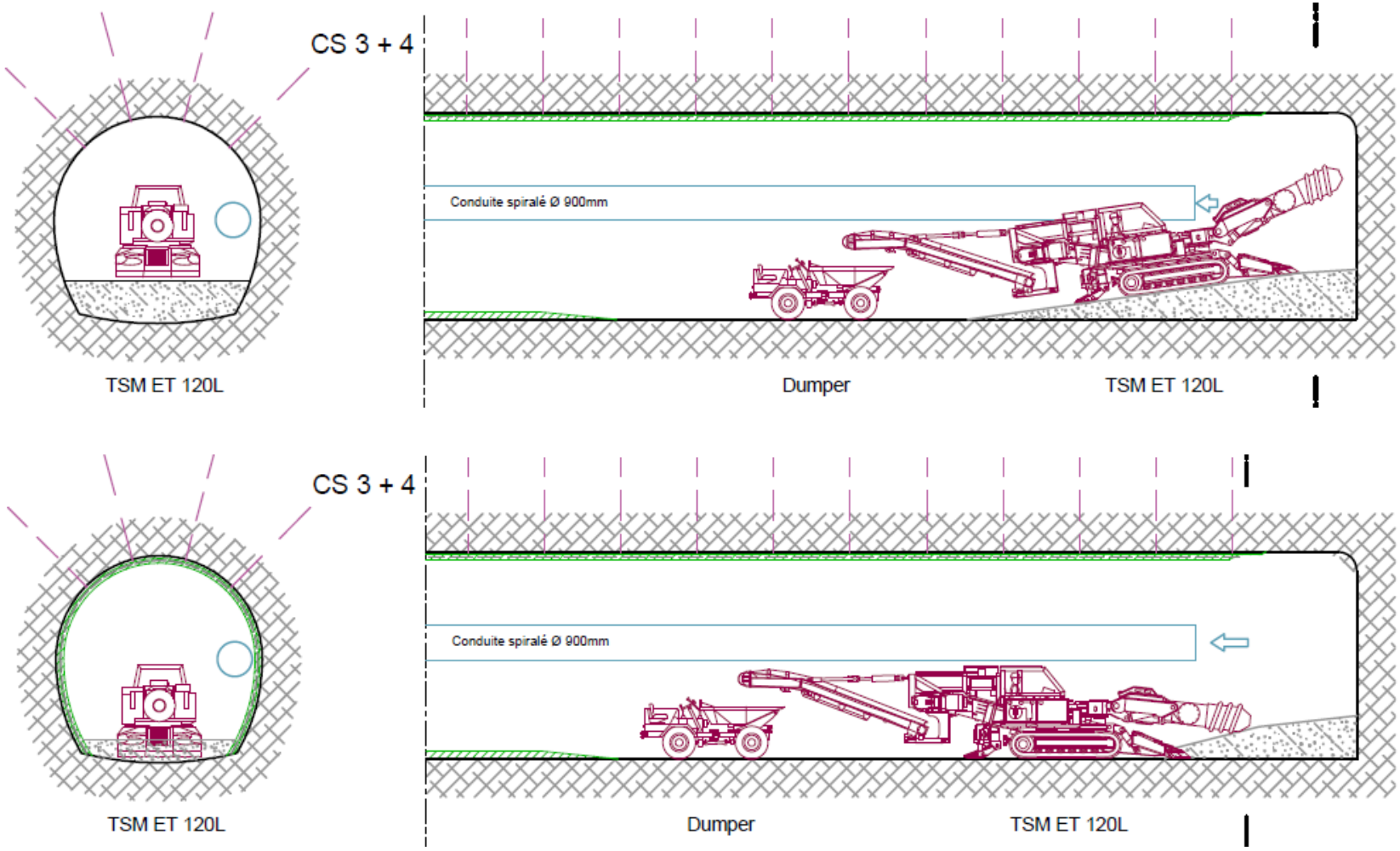
Excavation with road header



Extension 2018…

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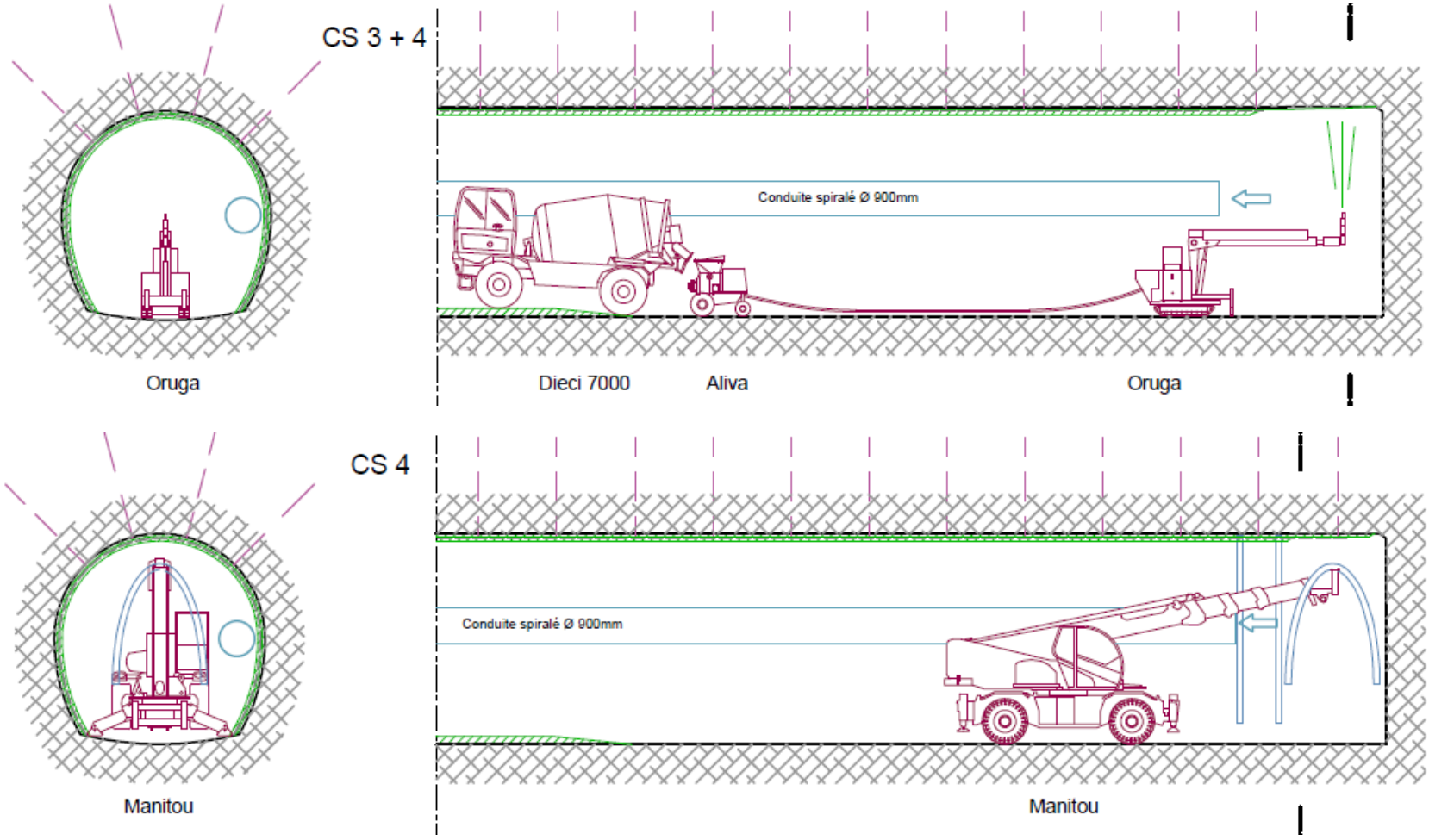

Mapping (30 minutes!)

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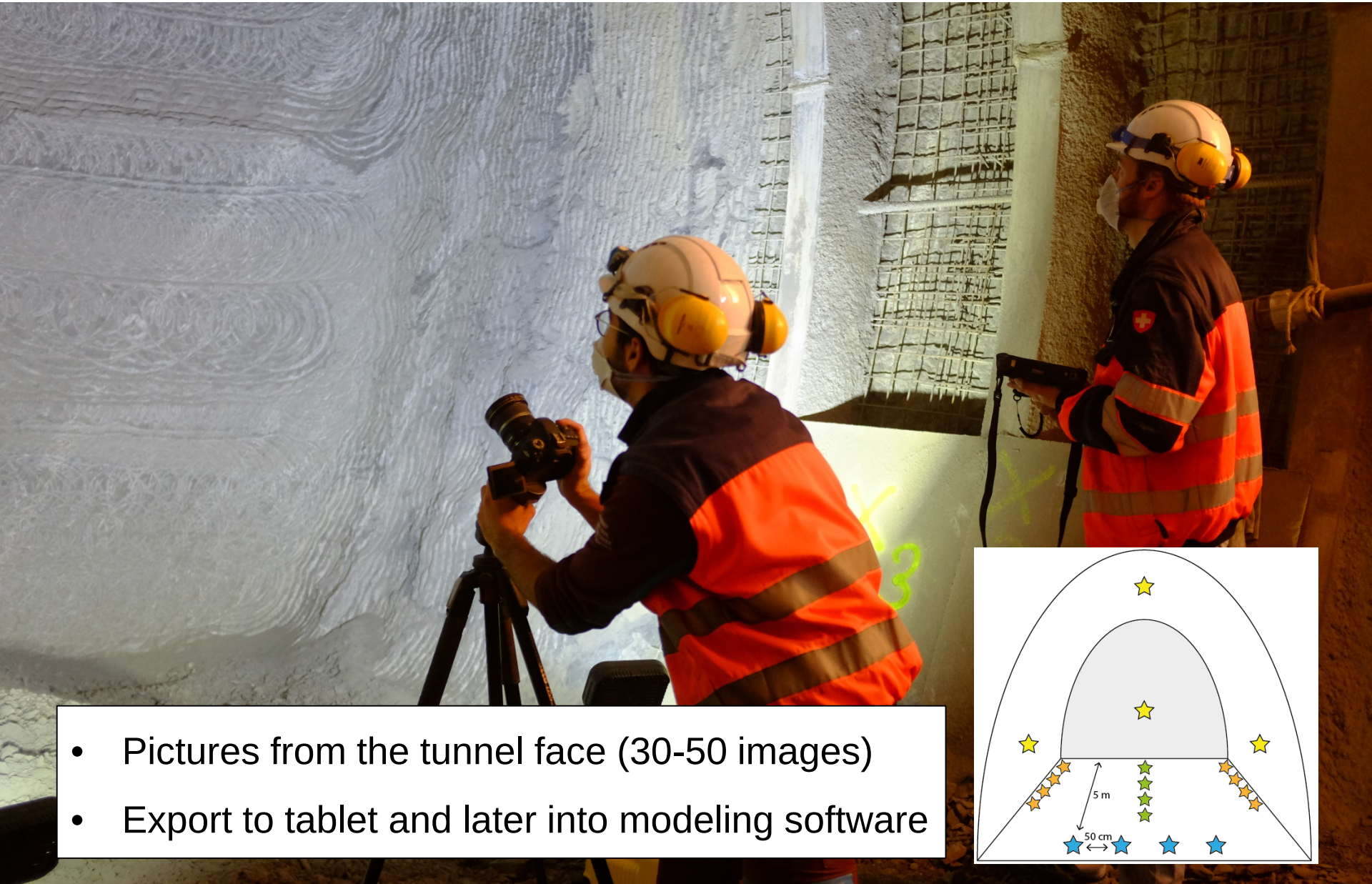

- Pictures from the tunnel face (30-50 images)
- Export to tablet and later into modeling software

Mapping (geodetic measurements)

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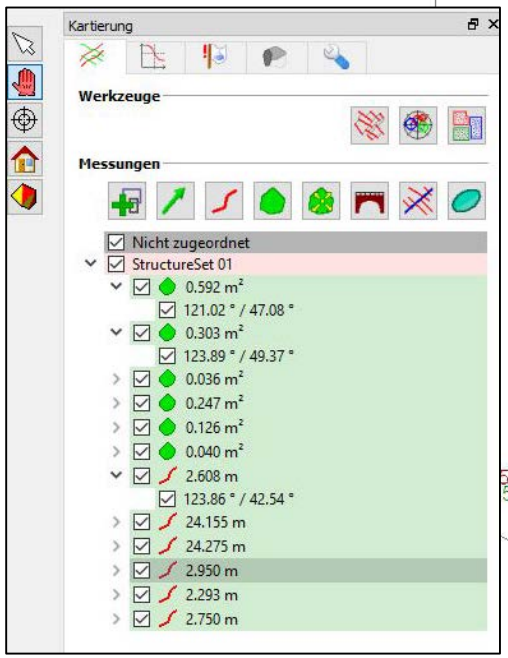
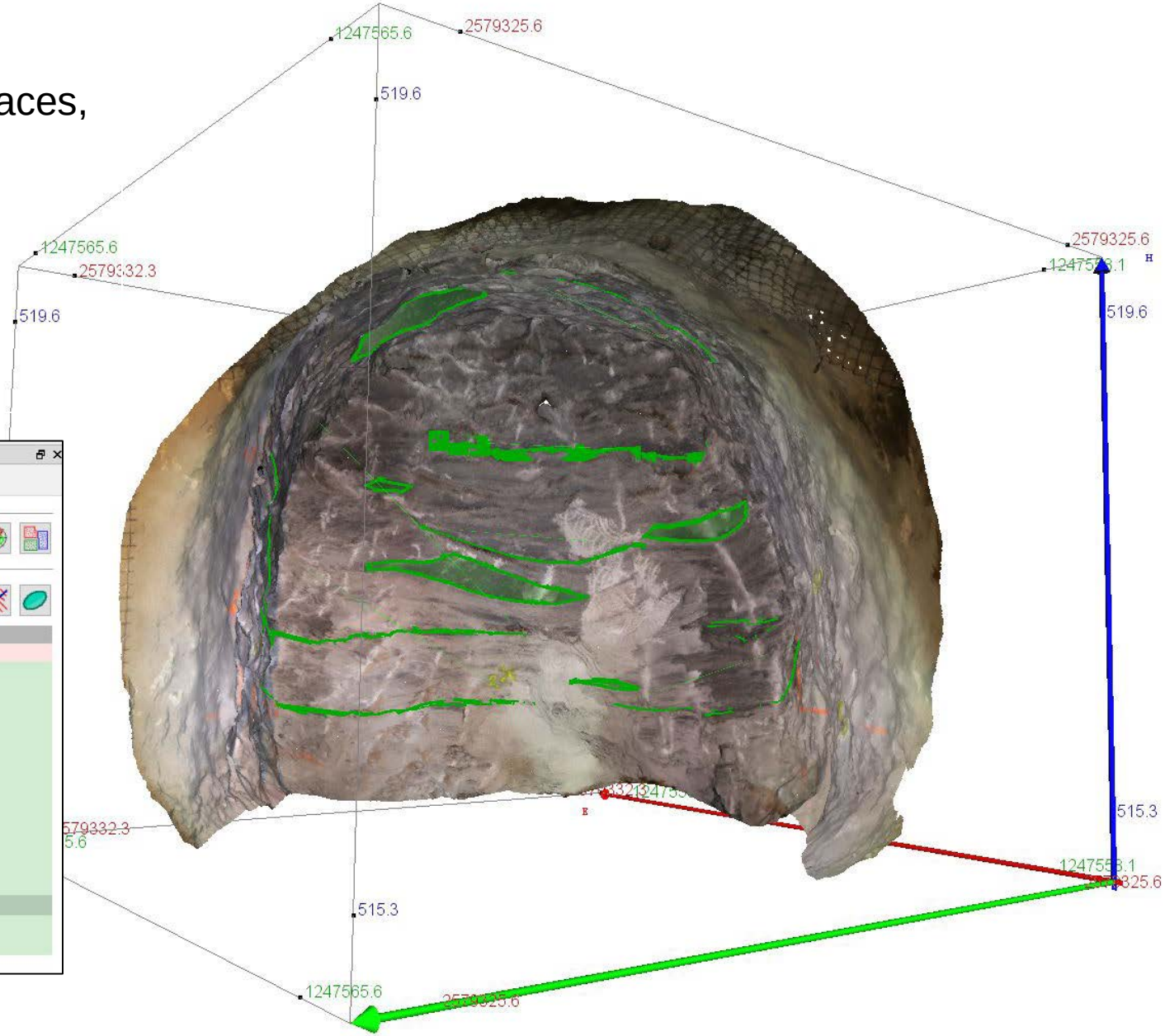
Result of photogrammetry and mapping

- Orientation of polylines or surfaces, georeferenced!
- Stereoplots
- Calculation of volumes
- Cross sections





Input data for documentation and modelling

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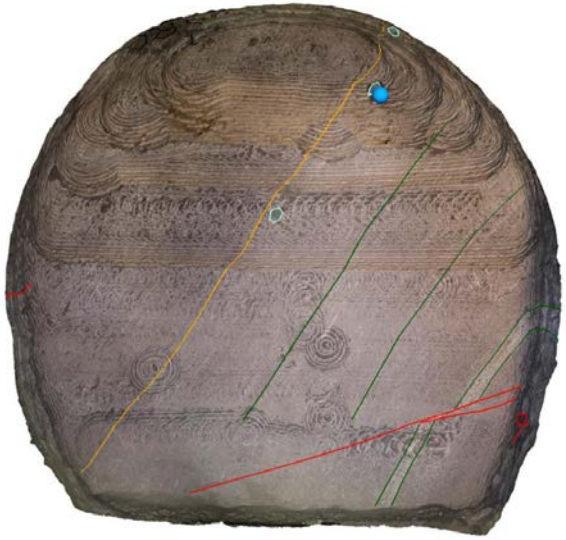
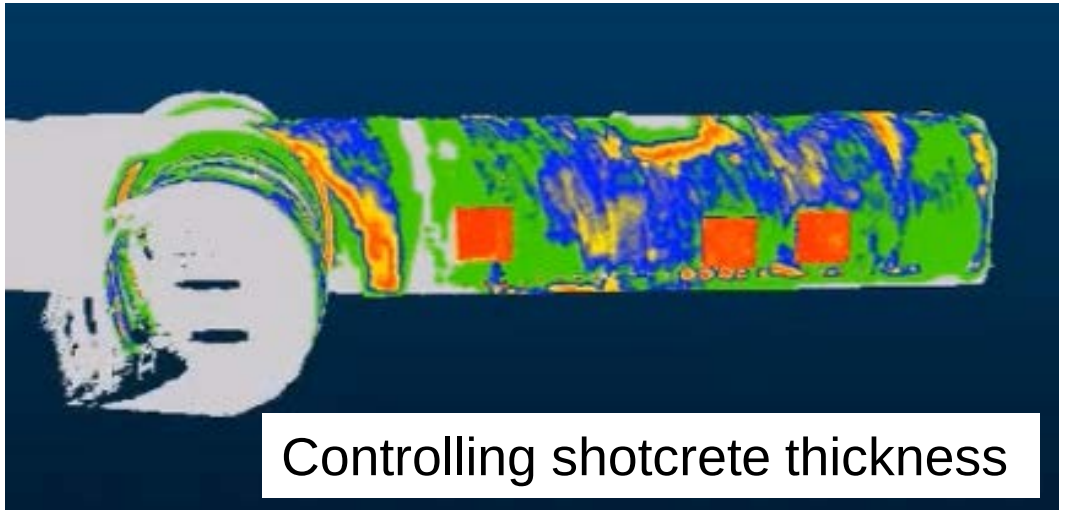
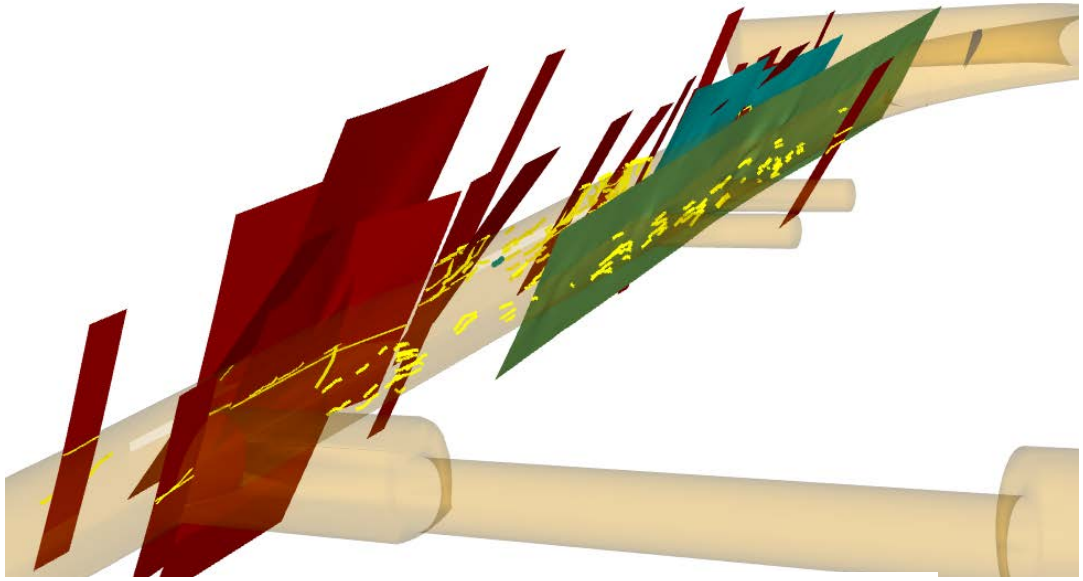


Documentation of outcrops



Control of tunnel trend



Update Geological Model

Thickness of shotcrete – integration of laser scanning data

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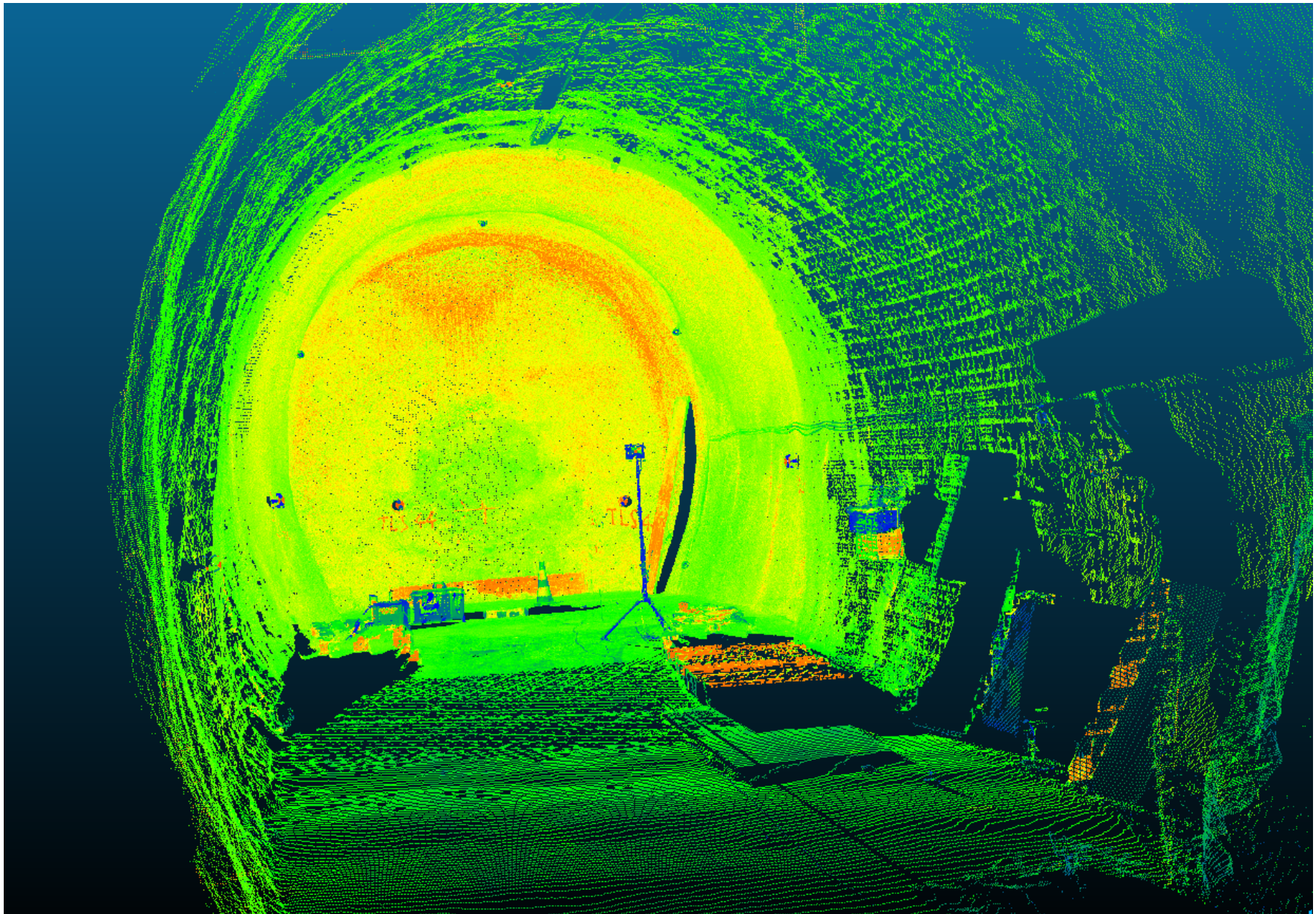

Thickness of shotcrete – comparison of the two data sets

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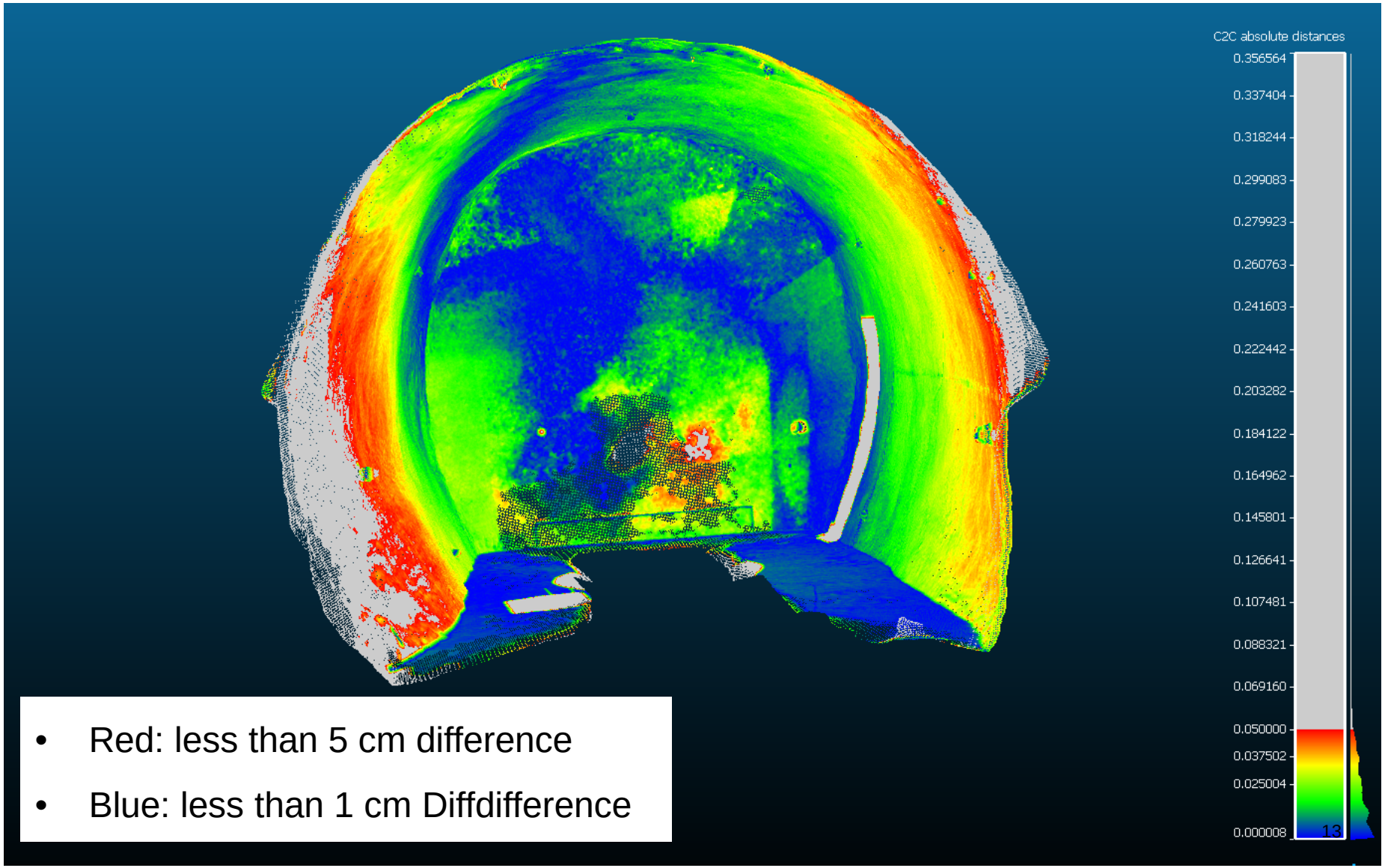

- Red: less than 5 cm difference
- Blue: less than 1 cm Diffdifference

Thickness of shotcrete

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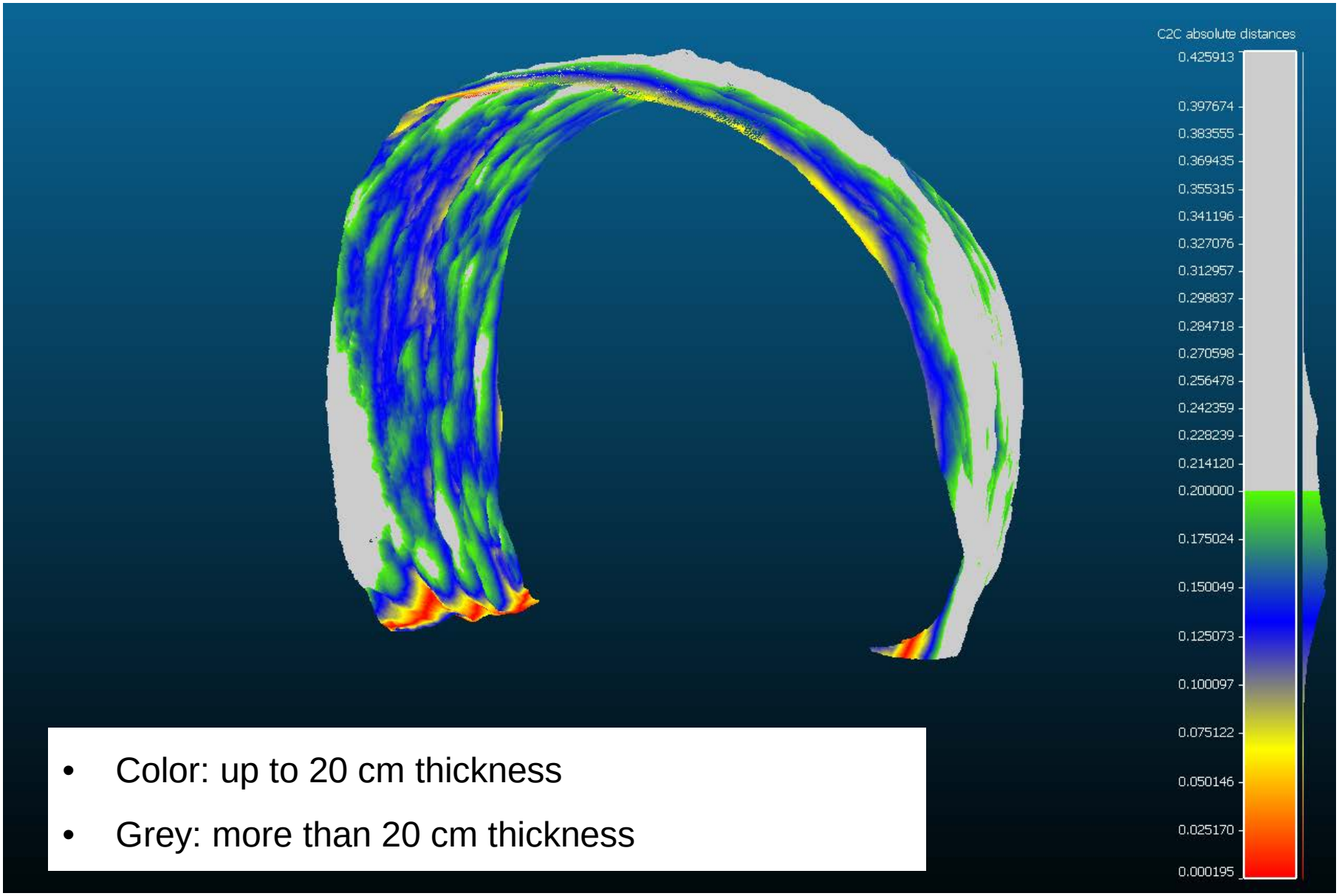

- Color: up to 20 cm thickness
- Grey: more than 20 cm thickness

Thickness of shotcrete – validation of modelling

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Punkt	Plan	Fotogrammmetrie	Laserscan	Gemessen
B1	20 cm	14 cm	14 cm	13 cm
B2	12 cm bis Netz, 8 cm bis Fels	24 cm	24 cm	10 cm (bis Netz)
B3	20 cm	23 cm	23 cm	22 cm
B4	20 cm	13 cm	13 cm	12 cm
B5	20 cm	10 cm	10 cm	11 cm

Creation of geological maps with Move

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Export all features as .dxf into Move

Creation of geological maps with Move

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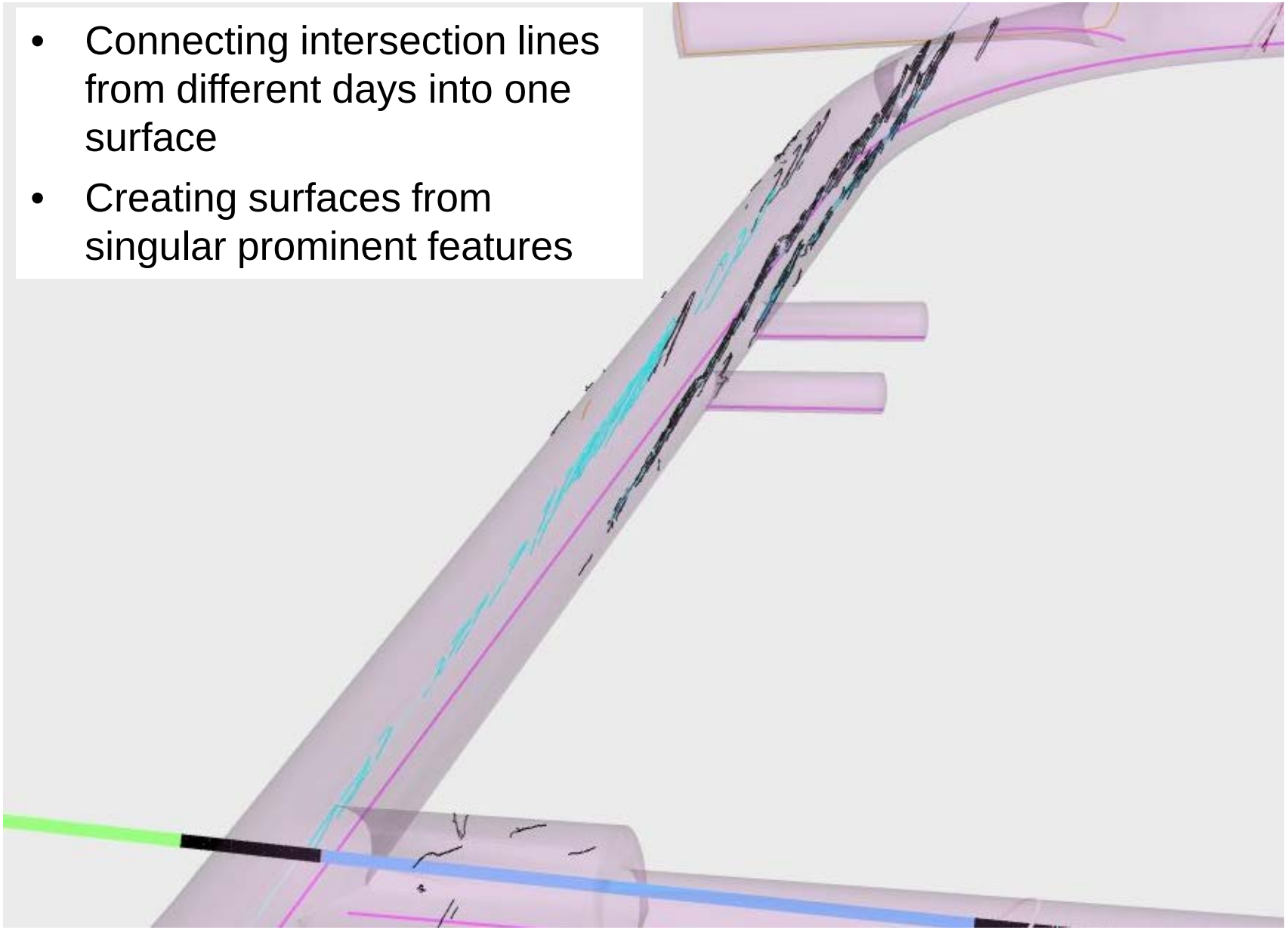
- Connecting intersection lines from different days into one surface
- Creating surfaces from singular prominent features



Creation of geological maps with Move

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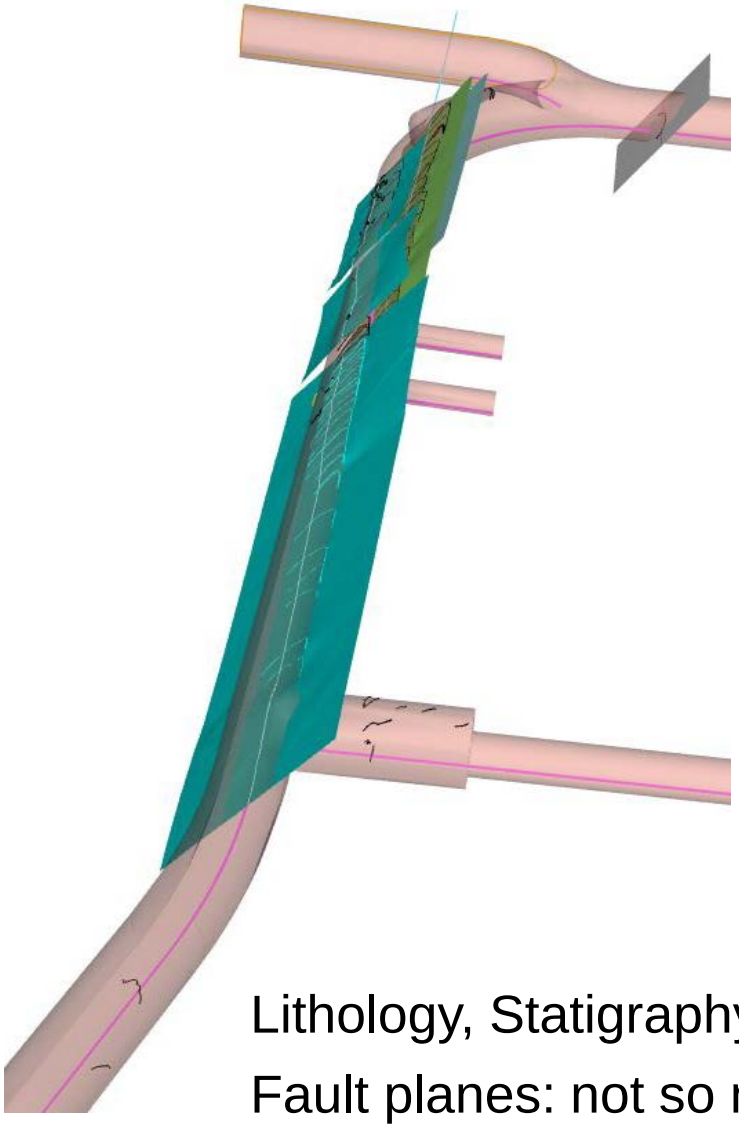

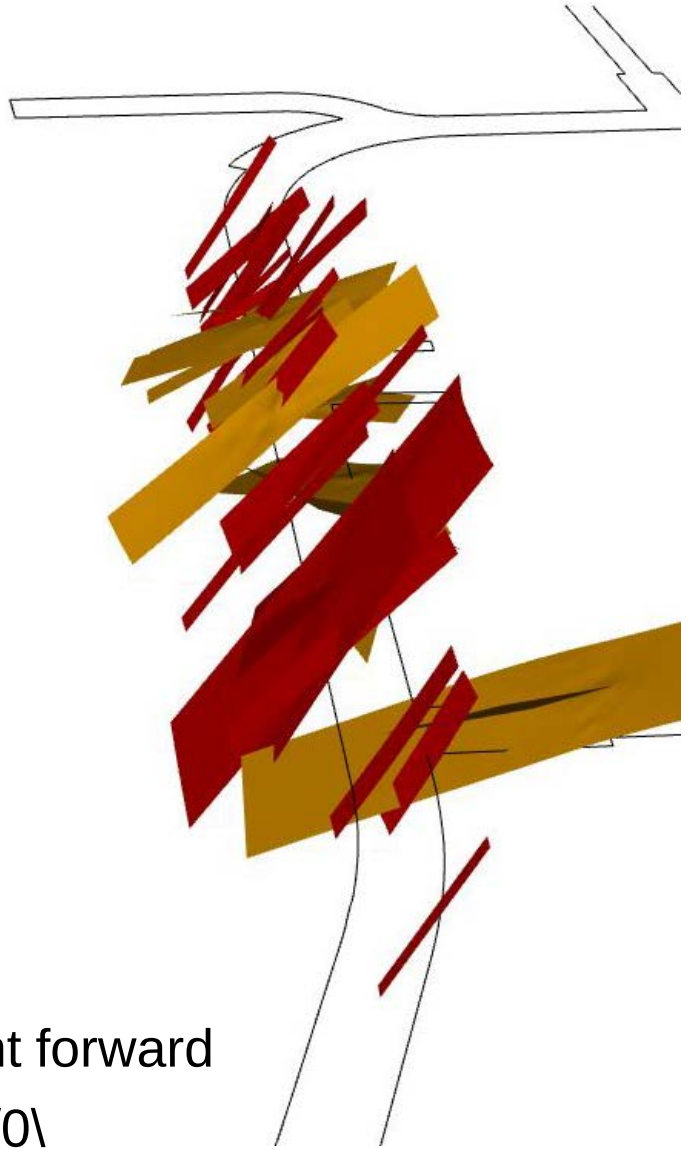

Lithology, Statigraphy: straight forward

Fault planes: not so much… /0\

Creation of geological maps with Move

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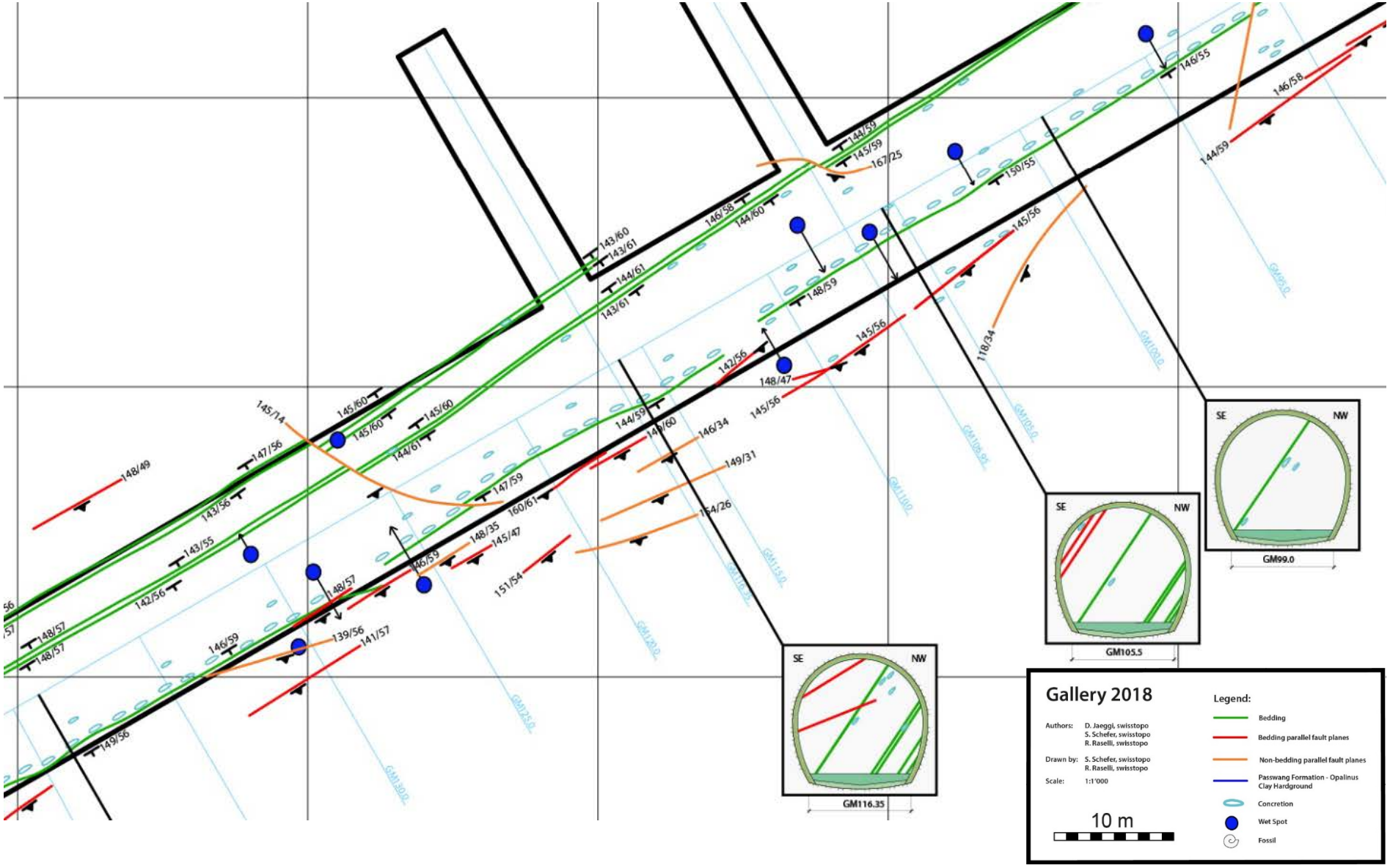


Thank you for your attention!