

Geophysical investigation of the Pb-Zn deposit of Lontzen/Poppelsberg , Belgium



GeMMe
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Challenge of the Mining Industry

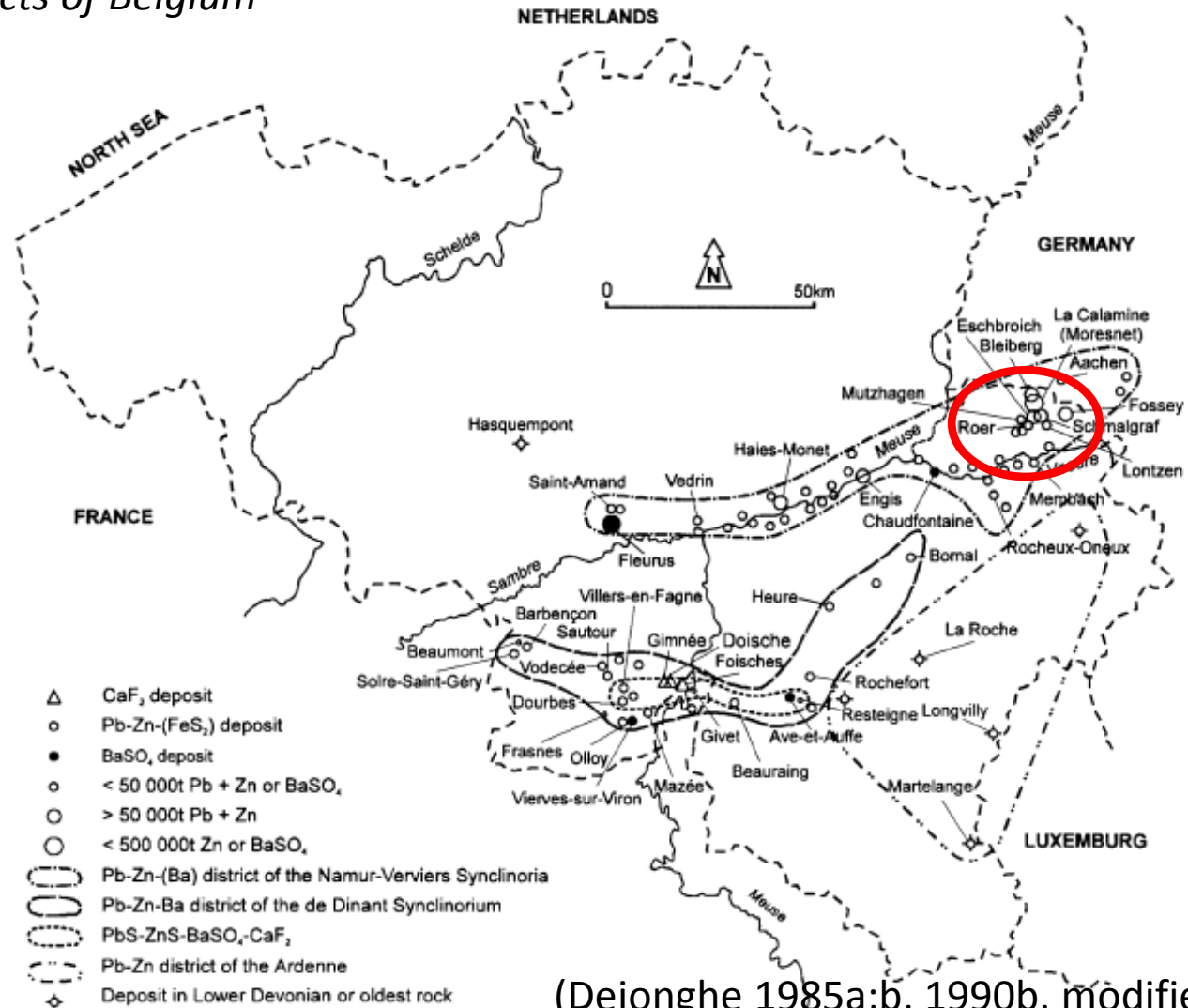
Ore deposits are more and more complexe

- Low grades
- Small size
- Mineralogy
- Geometry
- Depth

>>> **Actual needs:** more accurate geophysical methods
(tonages, geometry, grades...)

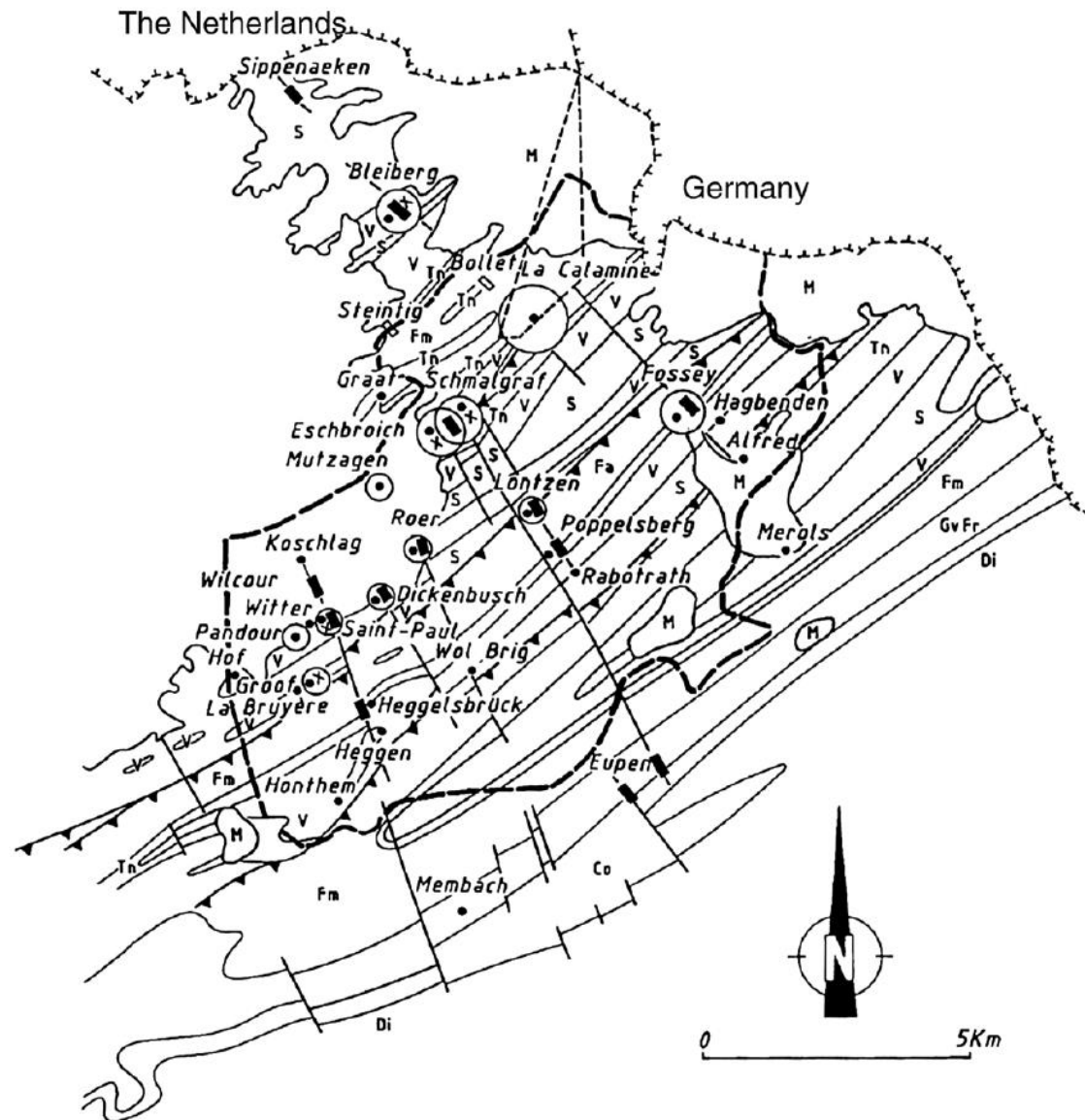
Location

Pb-Zn districts of Belgium



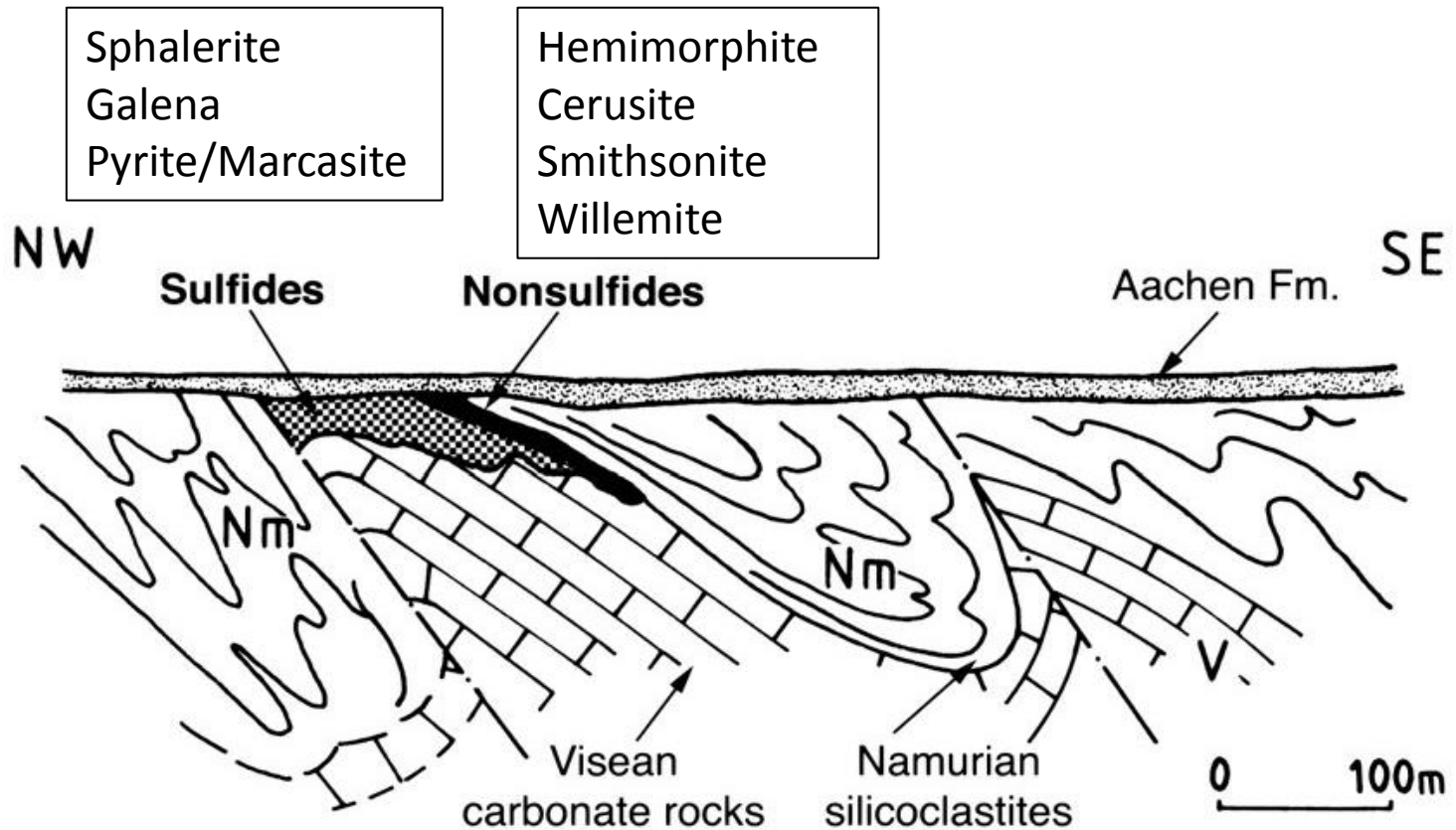
(Dejonghe 1985a;b, 1990b, modified)

Geological context



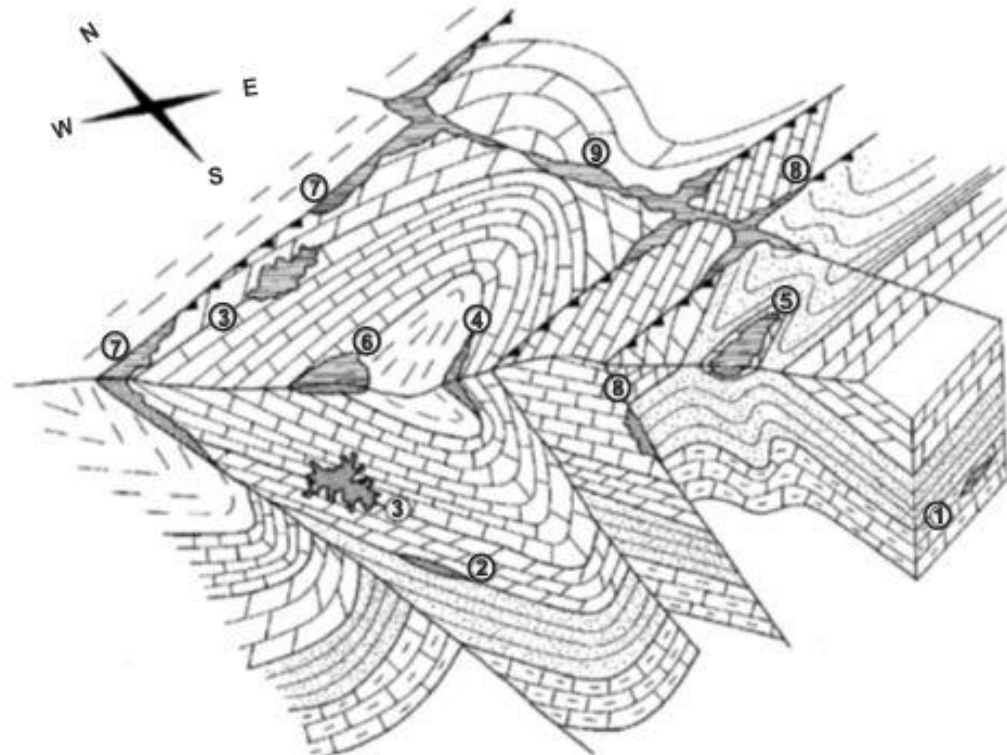
(Dejonghe et al., 1998)






Mississippi Valley Type deposit of Belgium



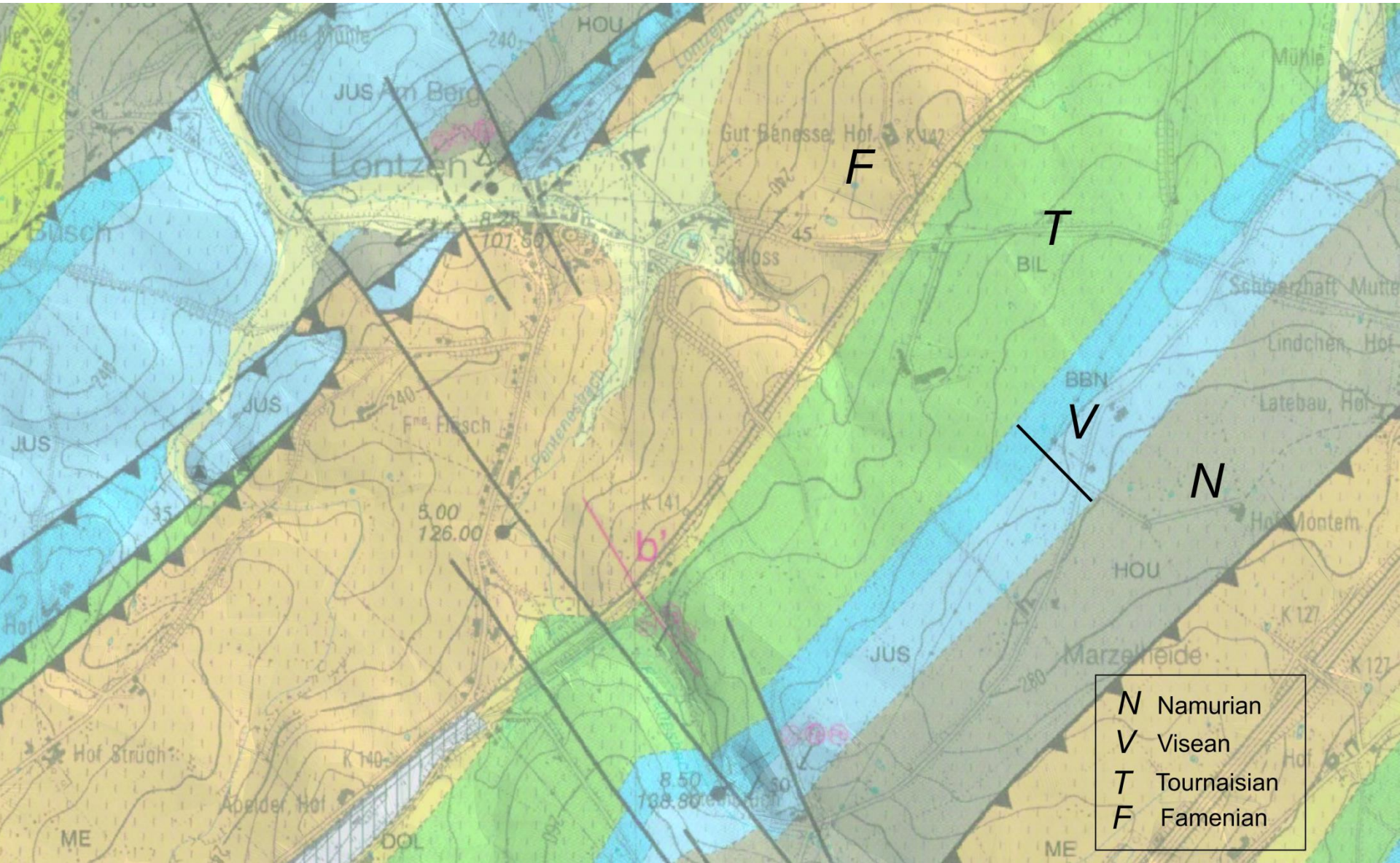
Deposit of Dickenbusch (*Dejonghe et al., 1993*)

Mississippi Valley Type deposit of Belgium



N°	Exemple		
1	Chaufontaine		Namurian (Nm) shales
2	Wol Brig		Visean (Vi) Limestones
3	Eschbroich		Tournaisian (Tn) Dolostones
4	Rabbotrah		Famennian (Fa) Sandstone and Shales
5	La Calamine		Frasnian (Fr) and Middle Devonian (DM) Limestone and shales
6	Pandour		
7	Dickenbush		
8	Lontzen		
9	Schmalgraf		

Study area

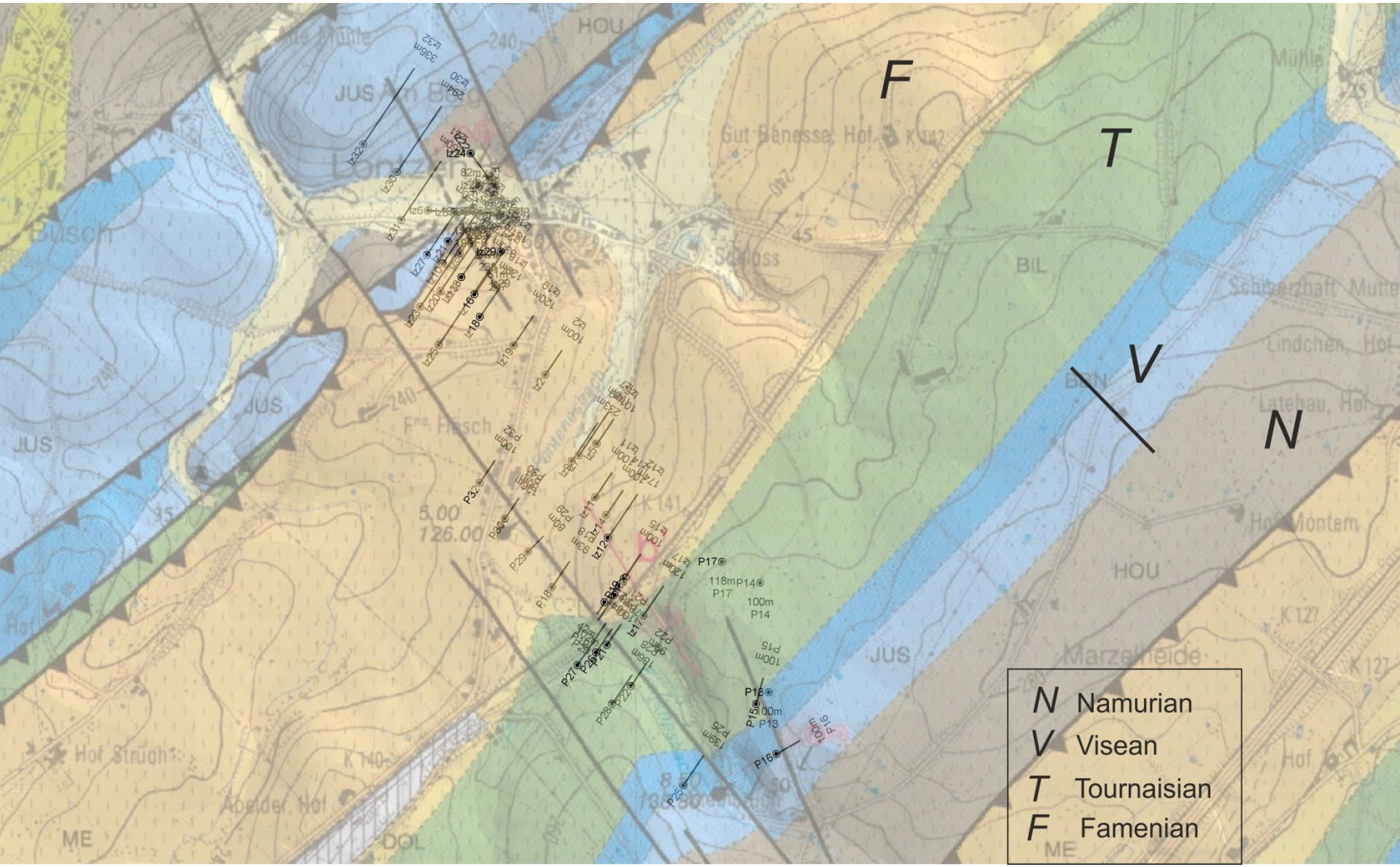


Lontzen/Poppelsberg mineralogy

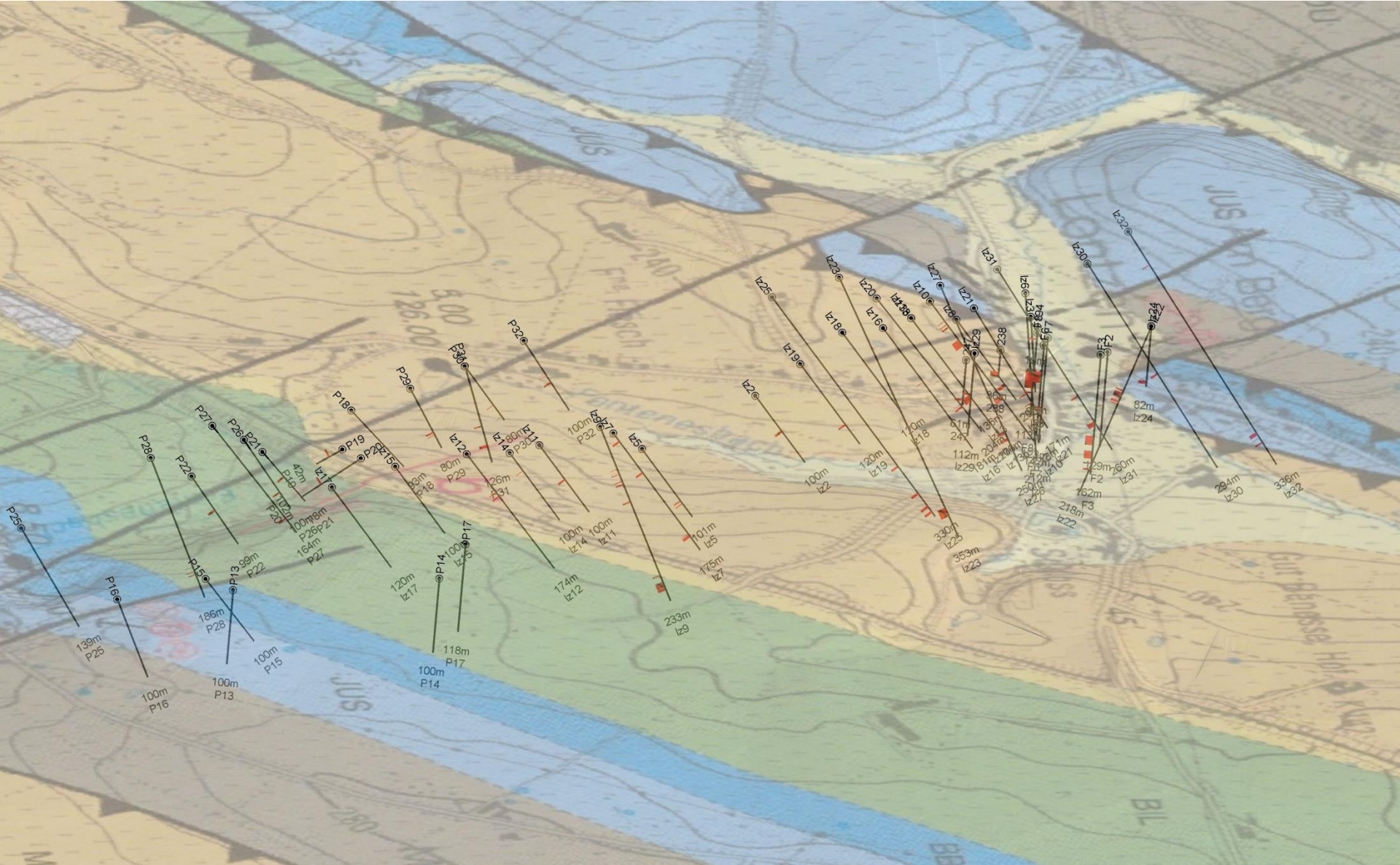
- Massive sulphides (95%)
 - Sphalerite, galena, pyrite/marcasite, chalcopyrite...
- Massive oxides (5%)
 - Smithsonite, limonite, cerusite...

Hole-drilling program

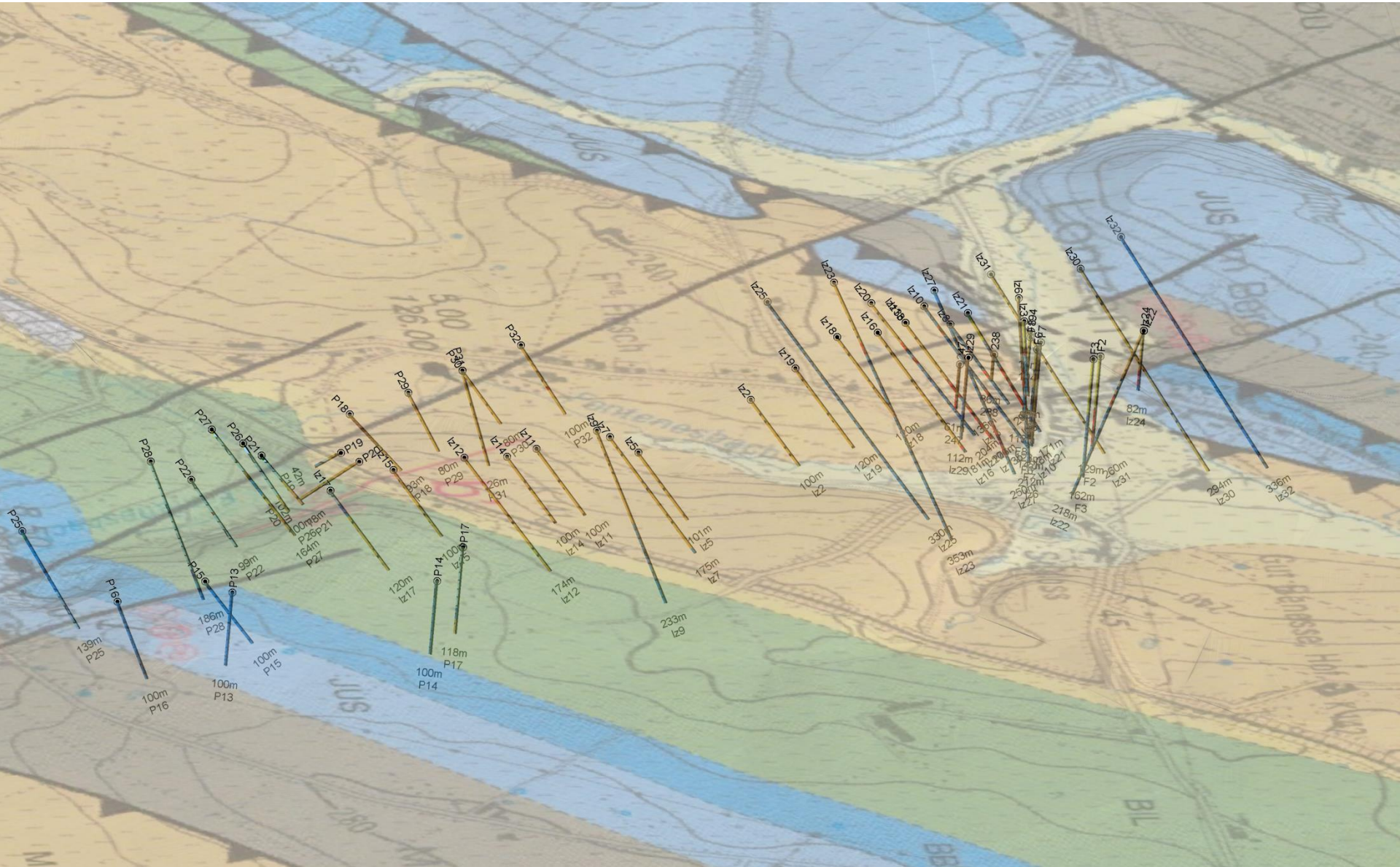
55 hole drill



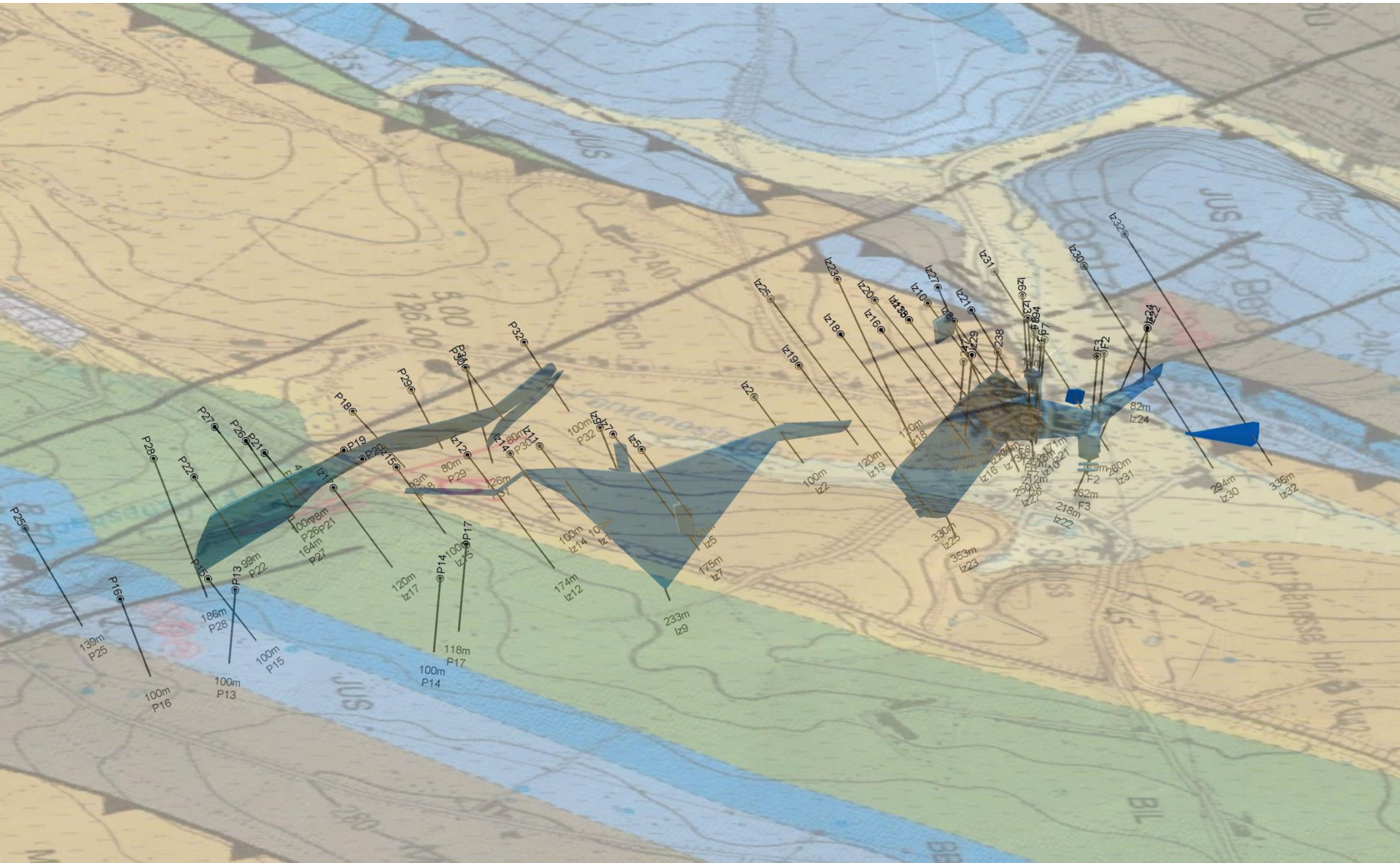
3D modeling



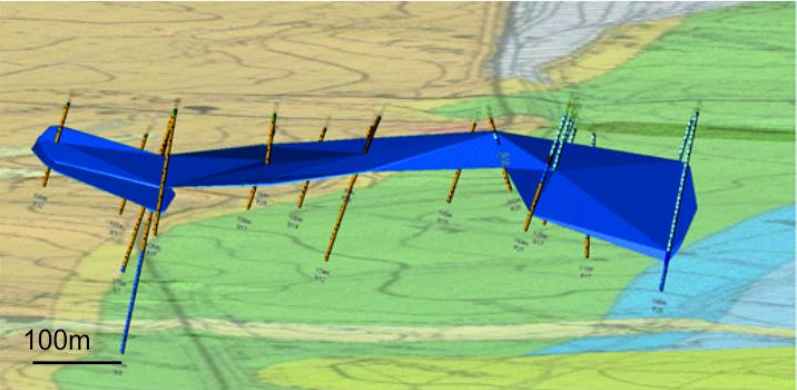
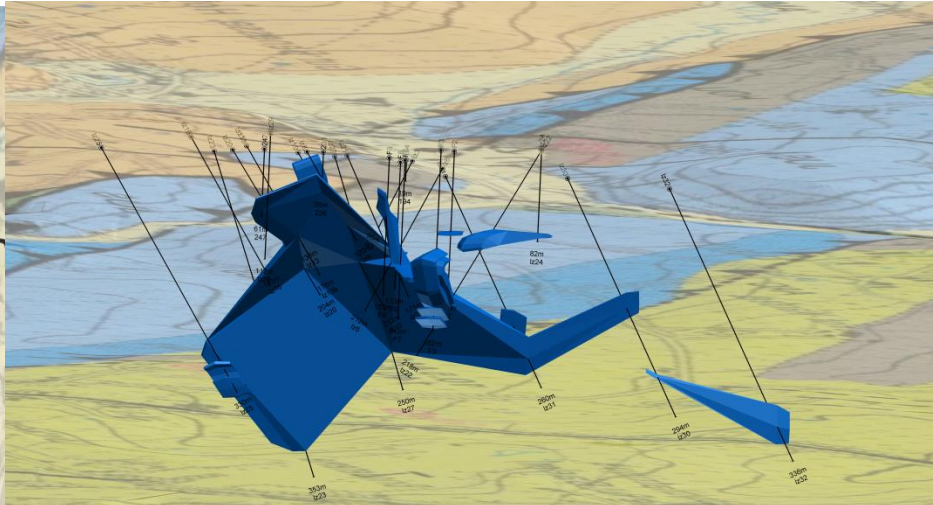
3D modeling



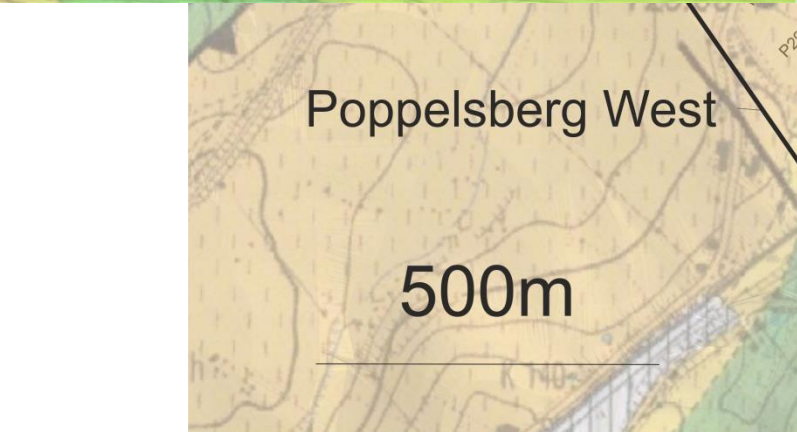
3D modeling



3D modeling

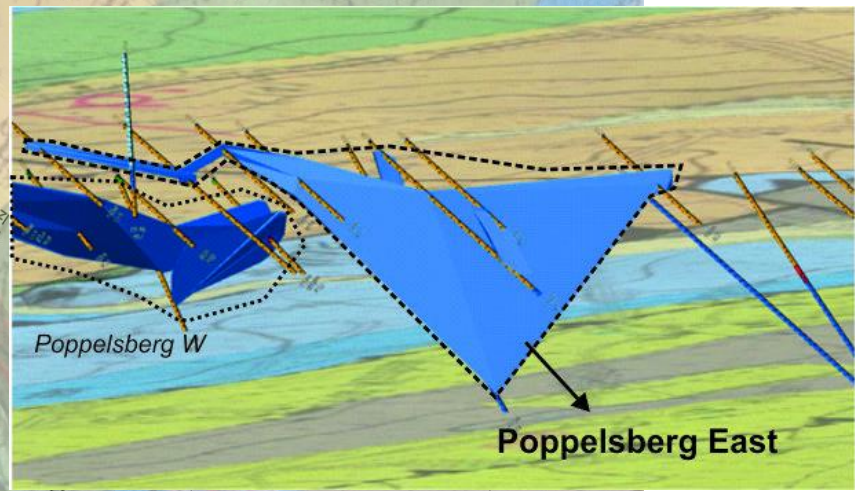


Poppelsberg East



Poppelsberg West

500m

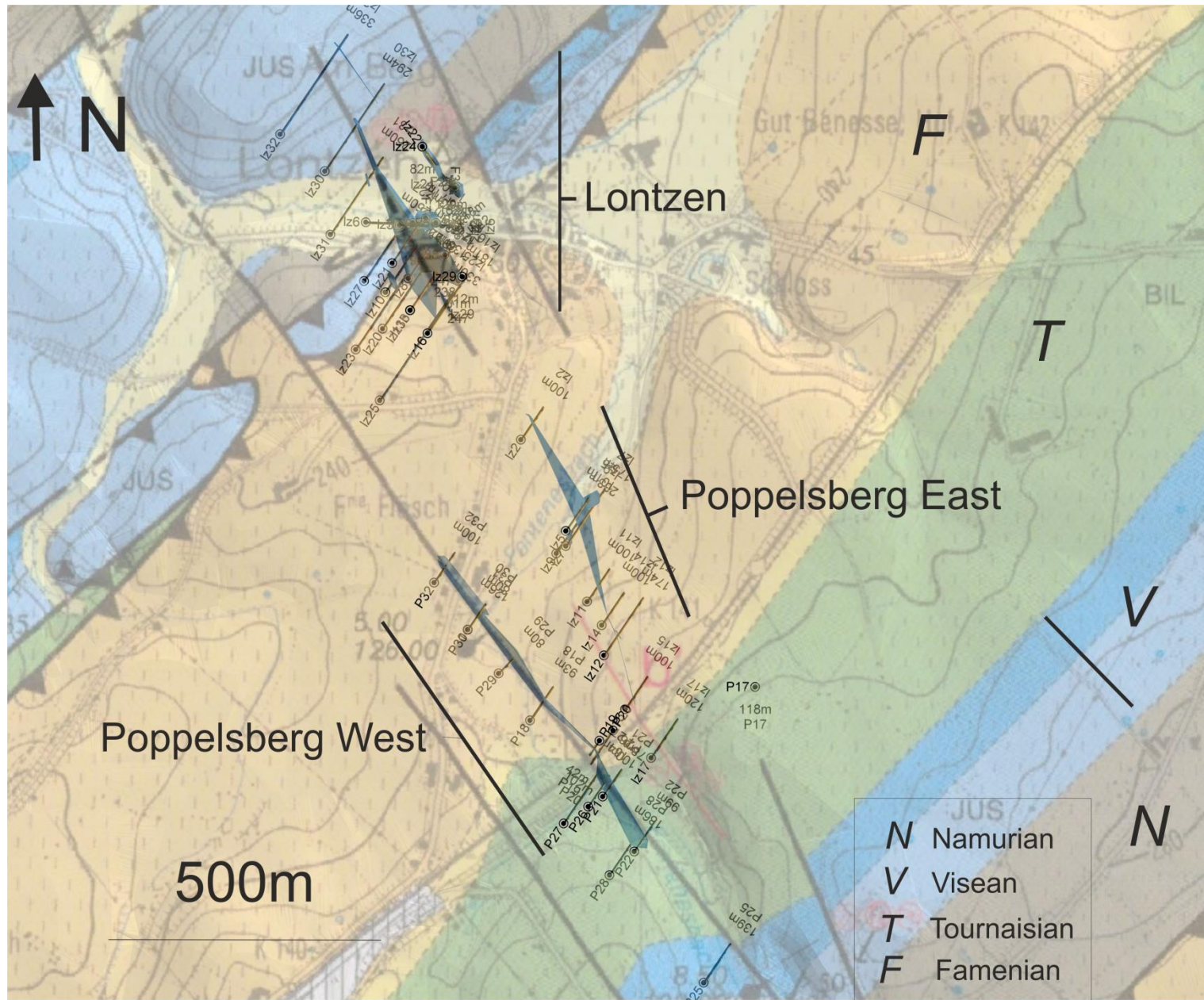


Poppelsberg W

Poppelsberg East

- T Tournaisian
- F Famenian

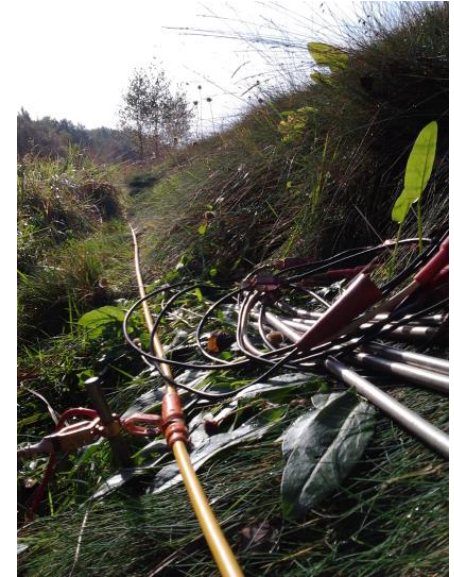
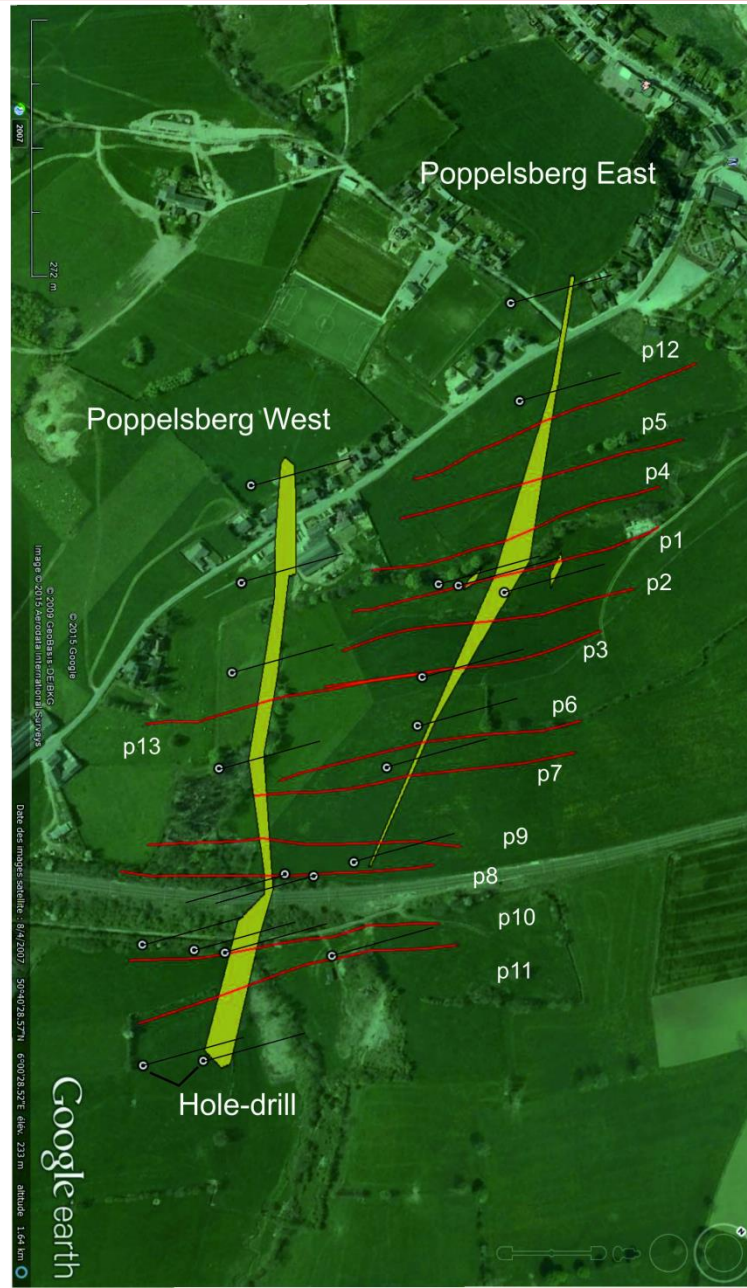
3D modeling



Geophysics survey on the field

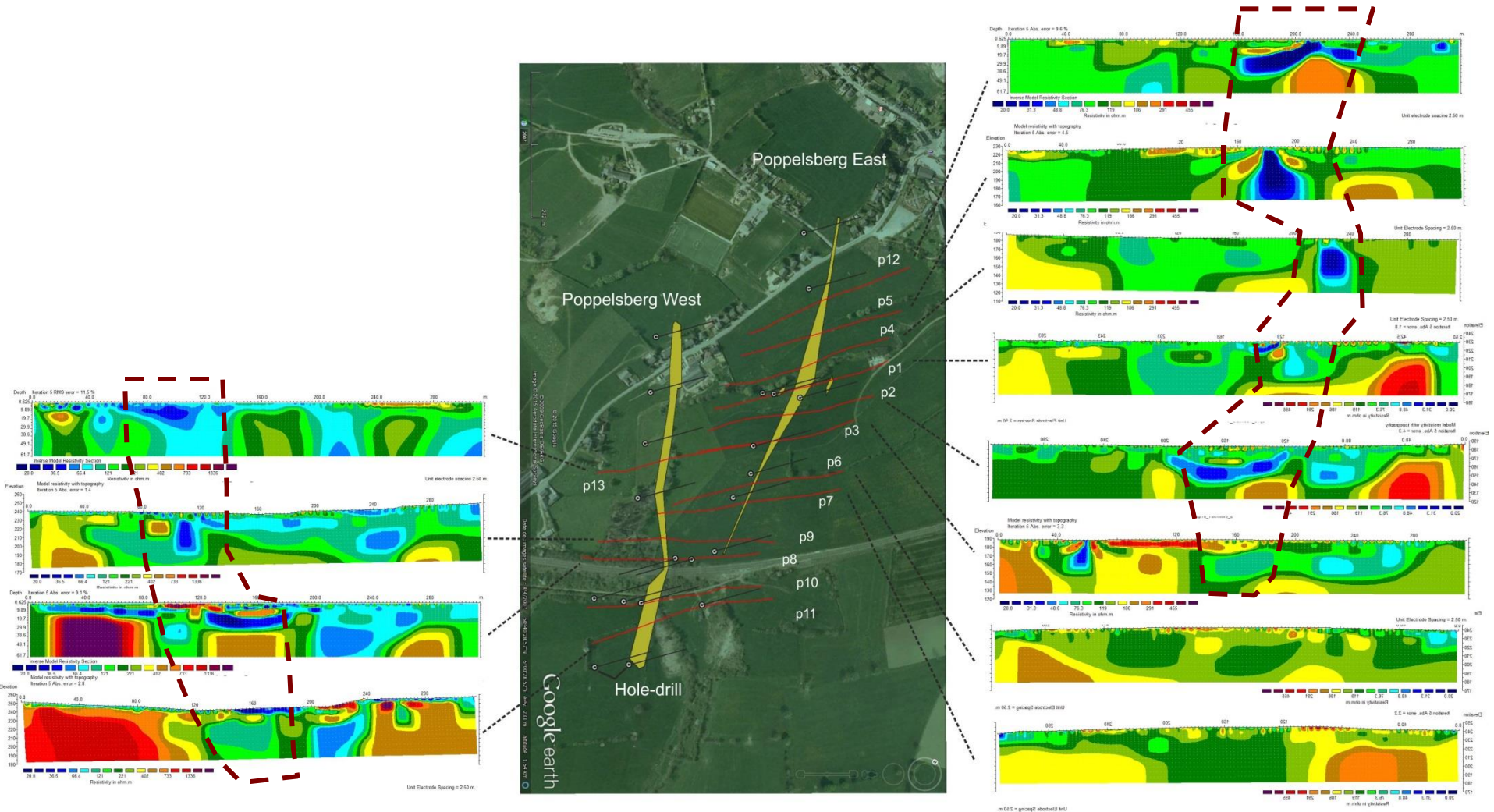
- **Electrical survey:** Electrical Resistivity Tomography and Induced Polarisation (chargeability of the basement)
- **Gravity survey**
- **Magnetometry**

Electrical survey on the field



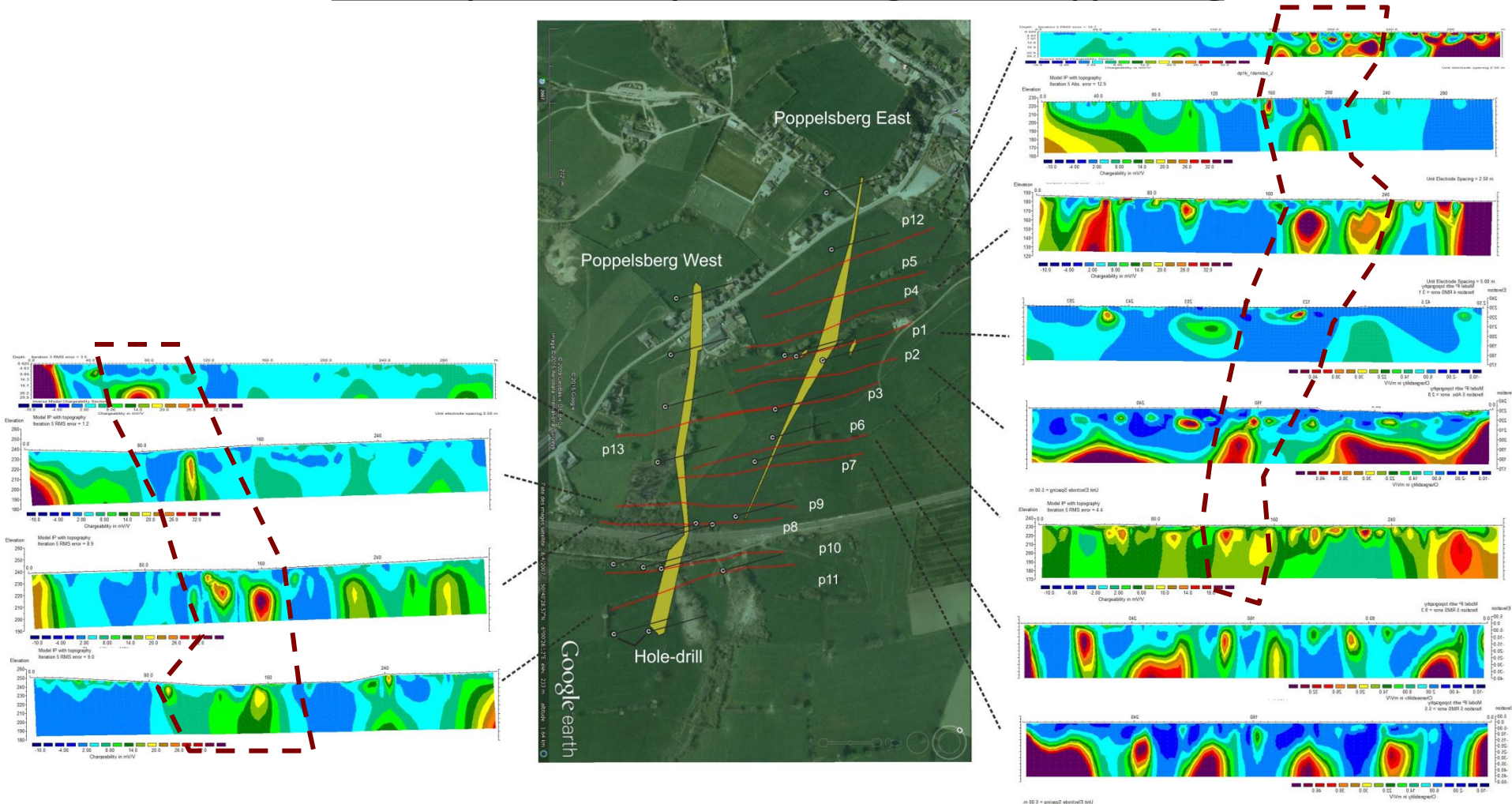
Electrical survey on the field

Resistivity profile investigation in Poppelsberg



Electrical survey on the field

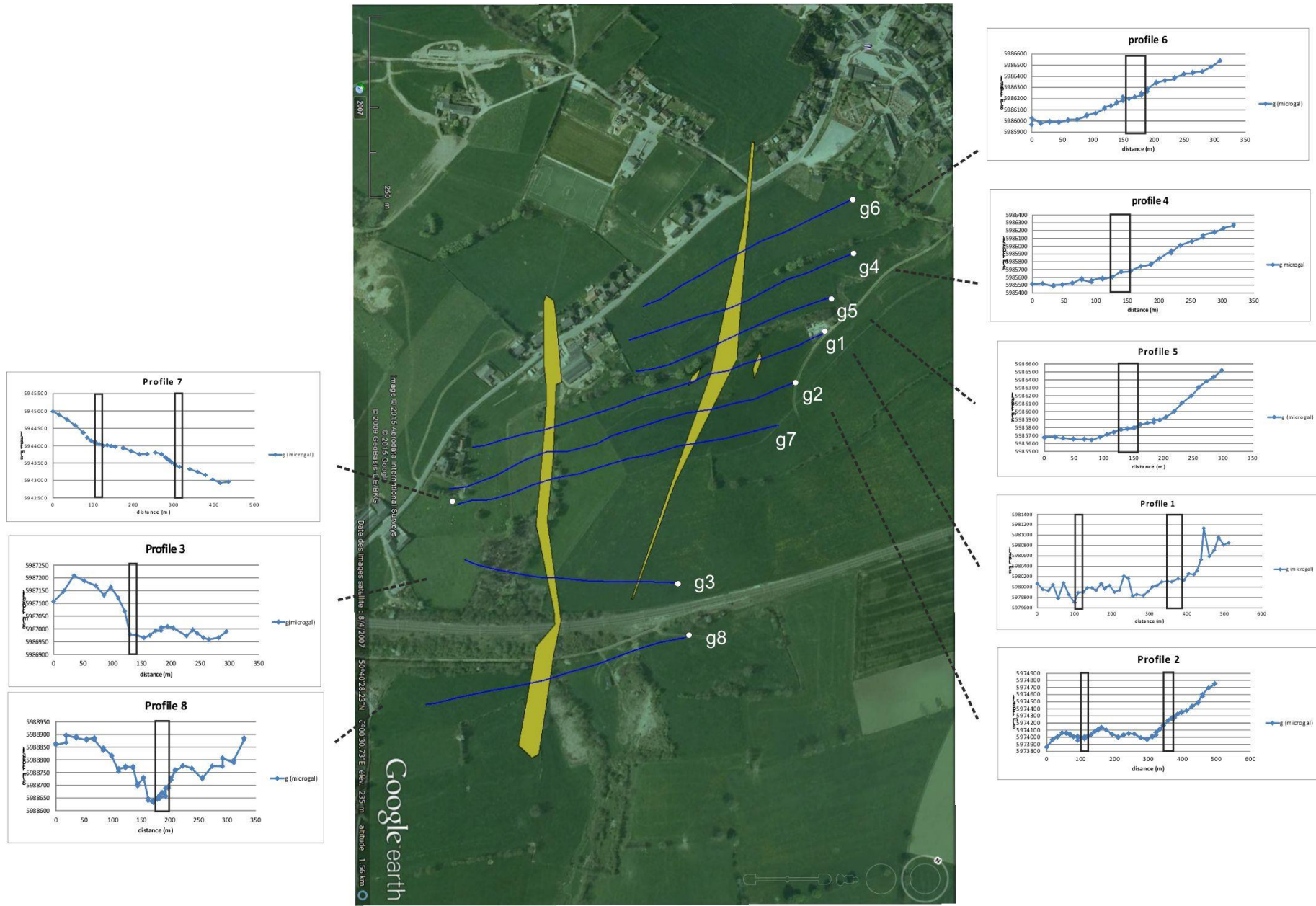
Induced polarisation profile investigation in Poppelsberg



Gravity survey on the field

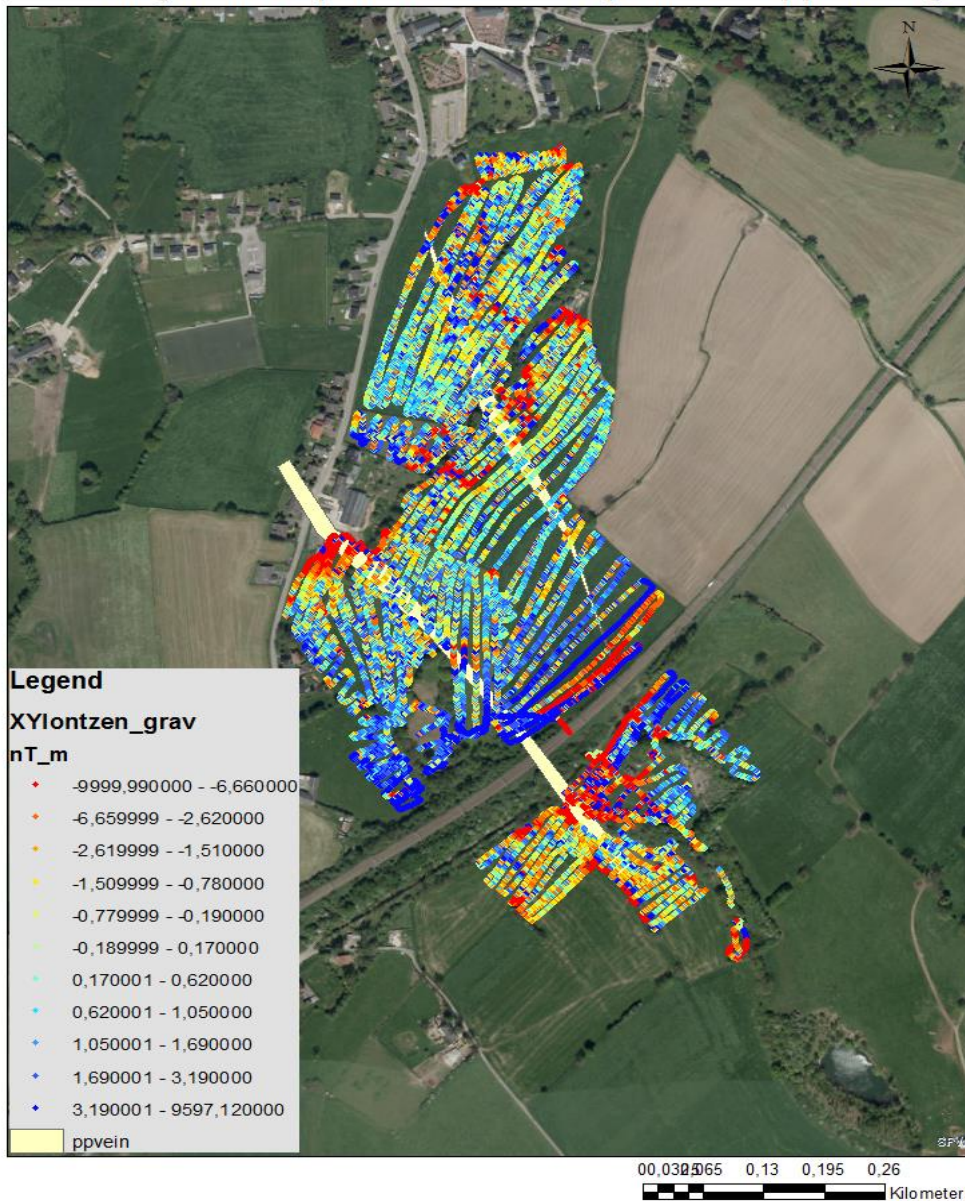


Gravity survey on the field



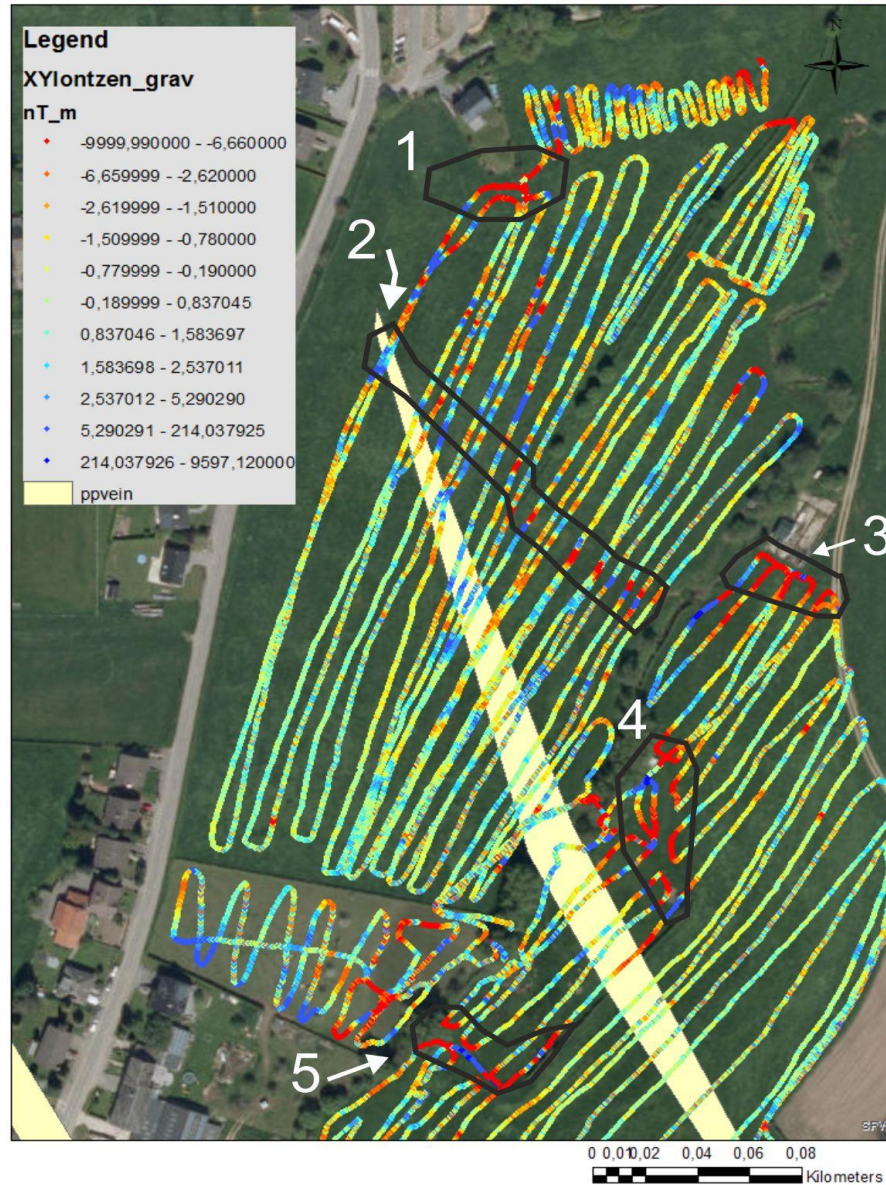
Magnetometry survey

Magnetic map of the Pb-Zn deposit of Poppelsberg



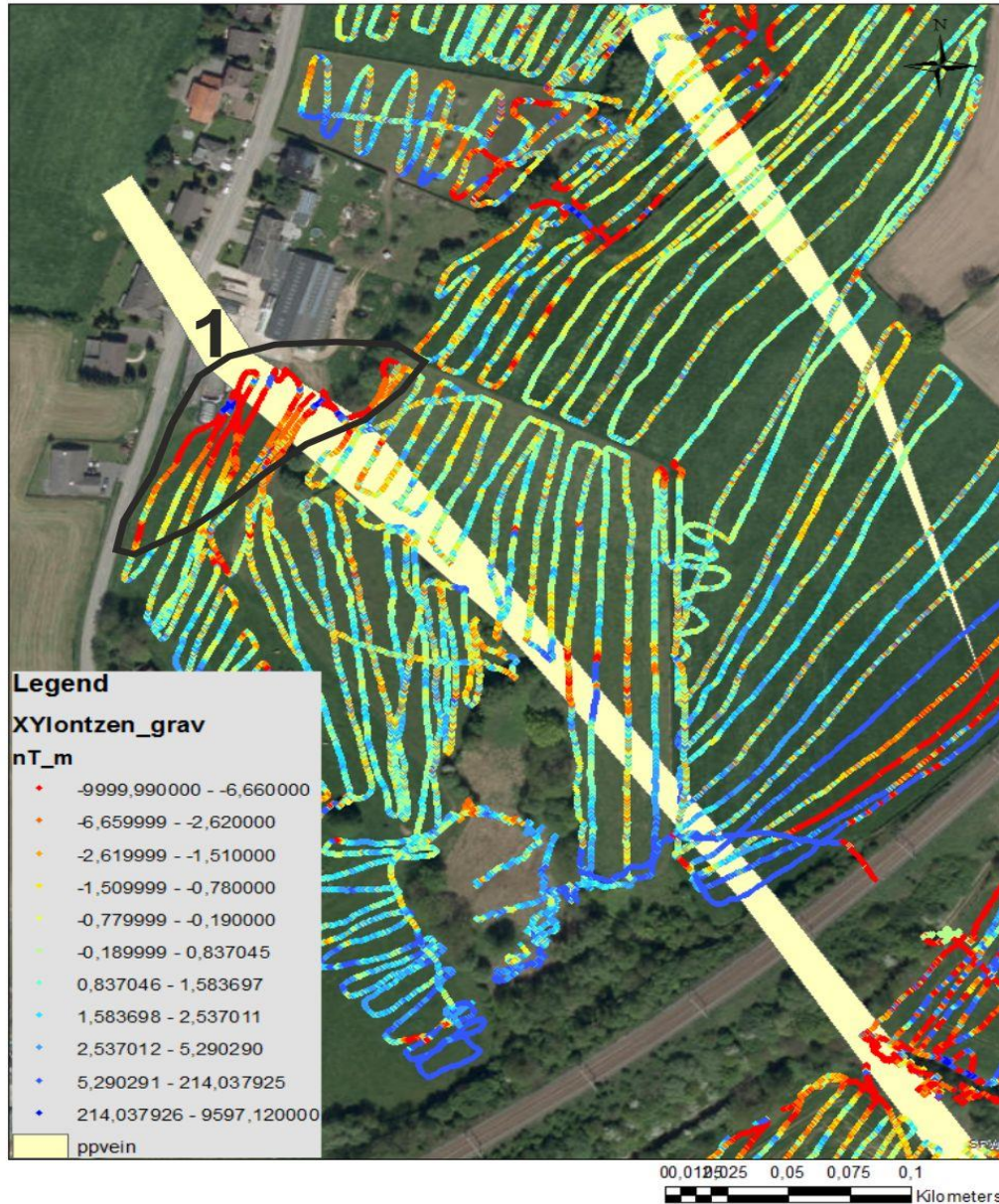
Magnetometry survey

Magnetic map of the Pb-Zn deposit of Poppelsberg



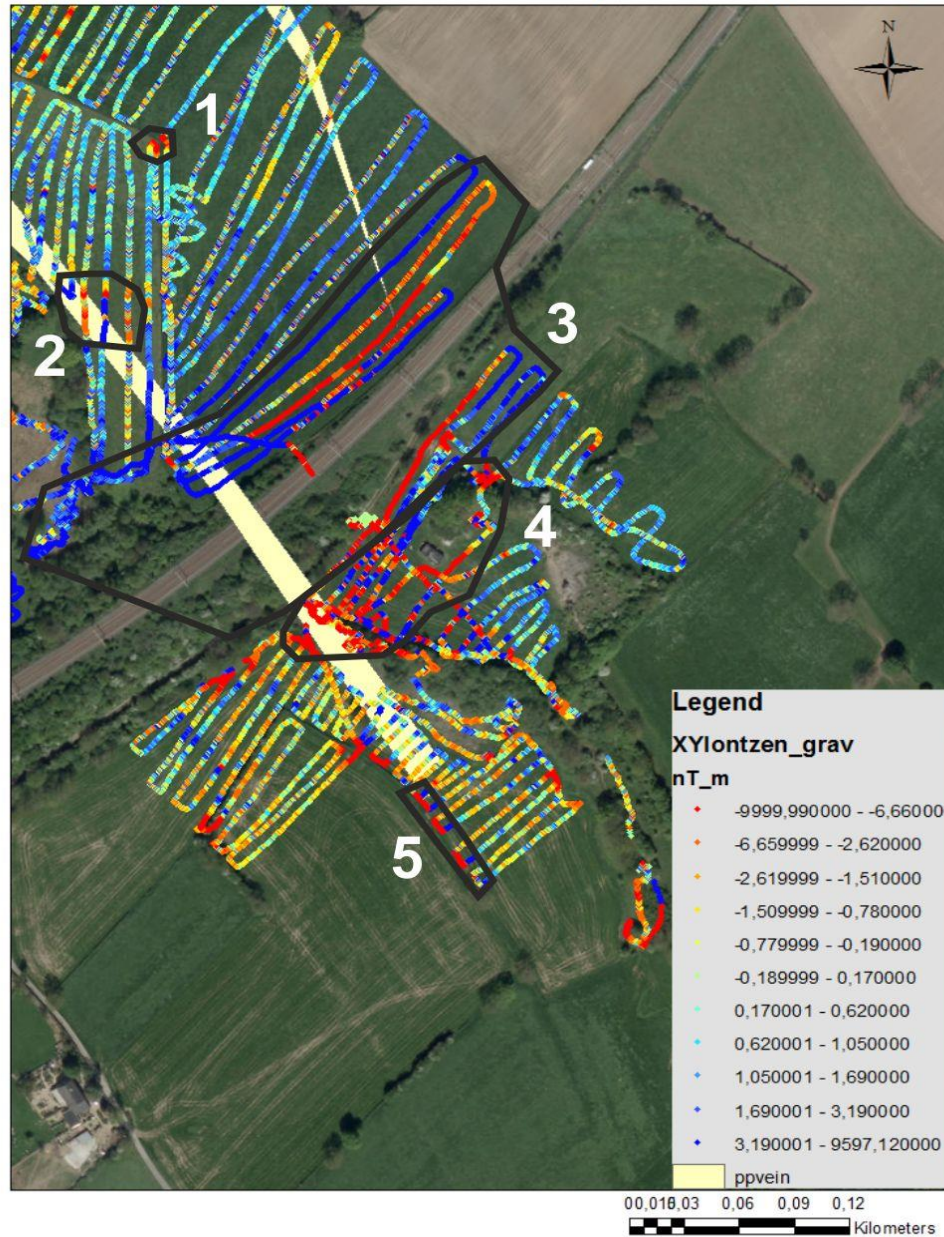
Magnetometry survey

Magnetic map of the Pb-Zn deposit of Poppelsberg



Magnetometry survey

Magnetic map of the Pb-Zn deposit of Poppelsberg

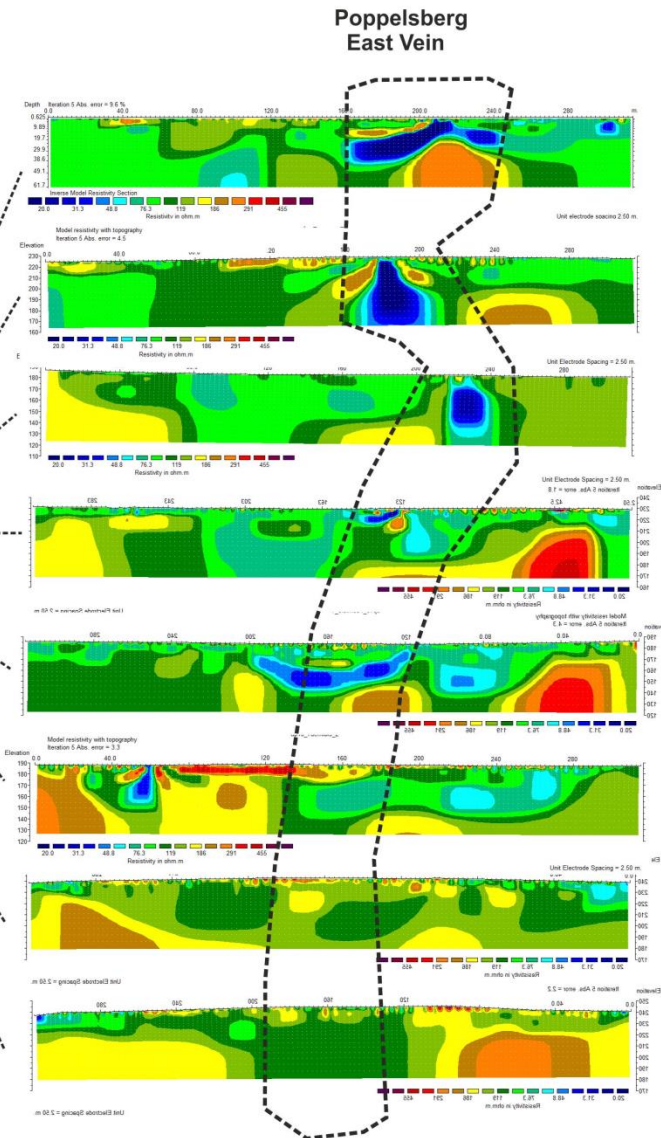
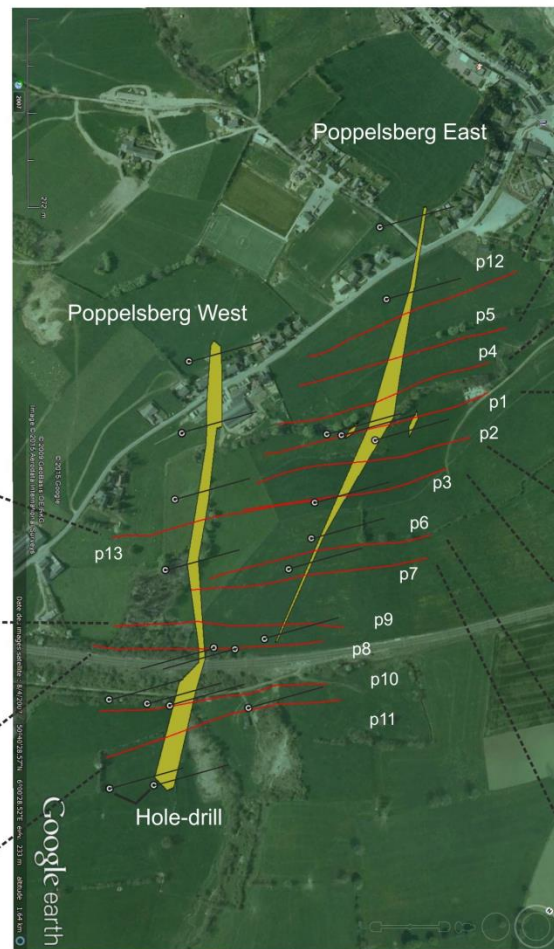
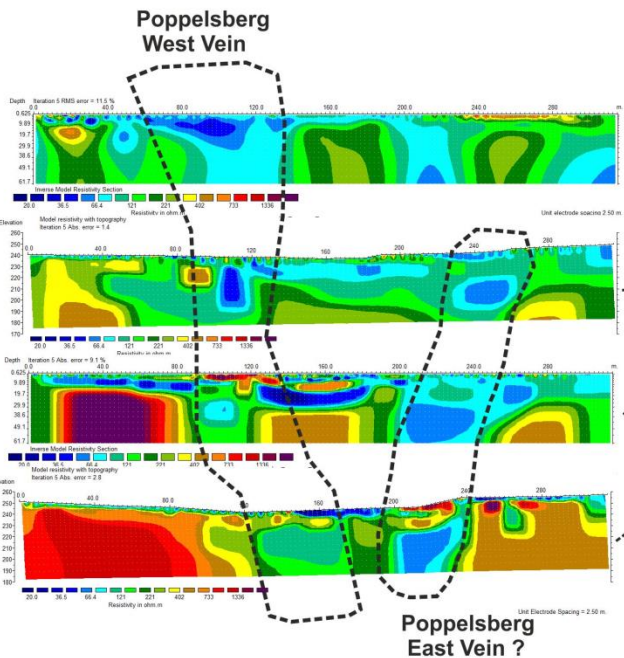


Discussion

- **The electrical tomography** (resistivity and Induced Polarization) gives the best results to detect the Pb-Zn mineralization of Poppelsberg
- 2D informations >< ponctual information of the hole drill
 - Extension in depth of the Pb-Zn vein
 - Lateral extension of the Pb-Zn vein between the hole drill
 - Discovery of other anomalies (Pb-Zn ore?)
 - Mineralogical information (pyrite/marcasite)
- Results are linked to galena, marcasite/pyrite and silver content

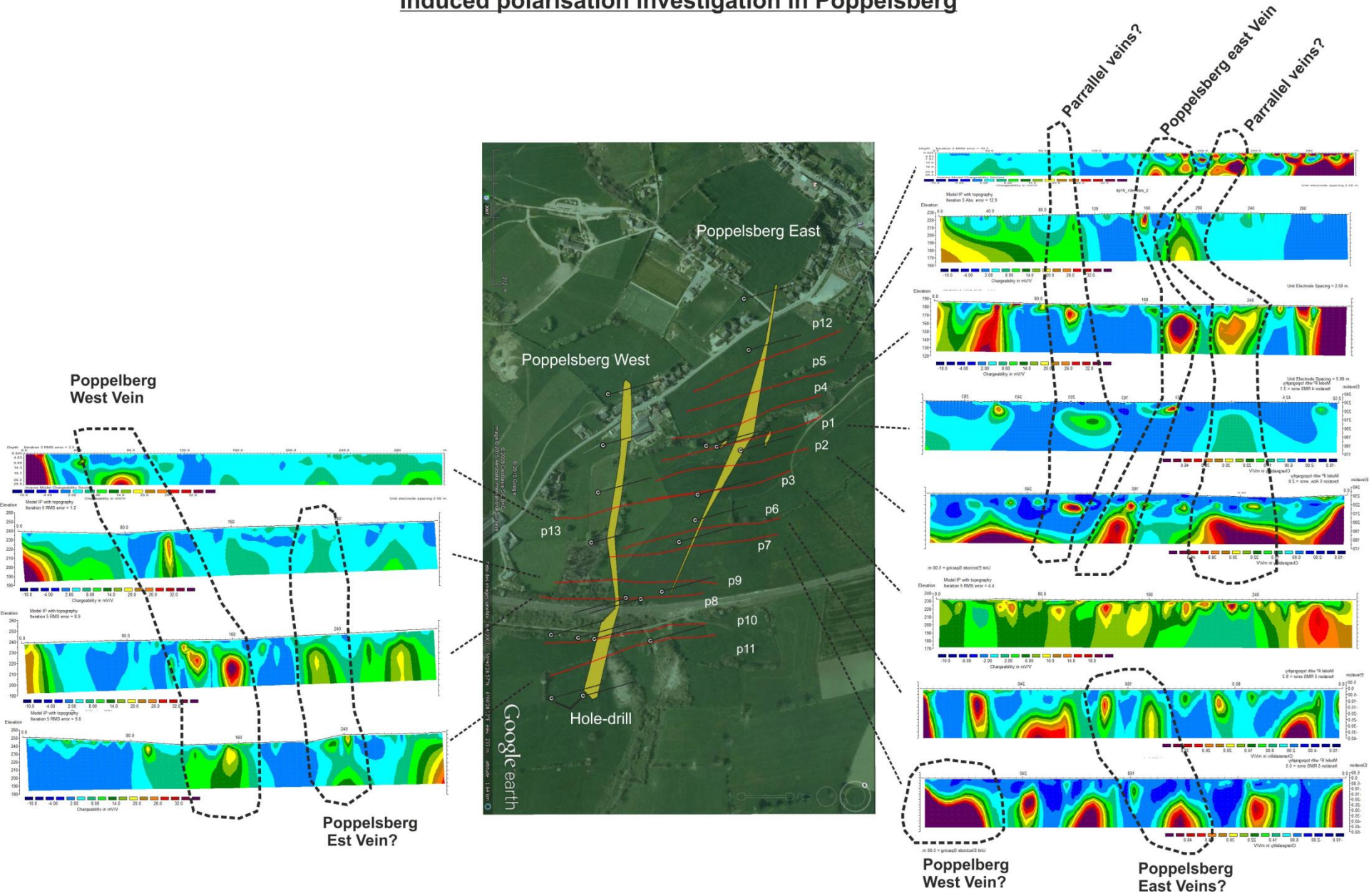
Discussion

Electrical resistivity investigation in Poppelsberg



Discussion

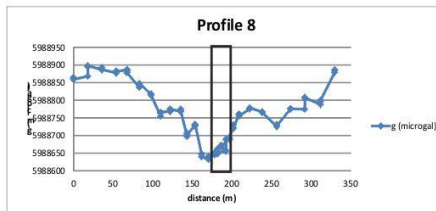
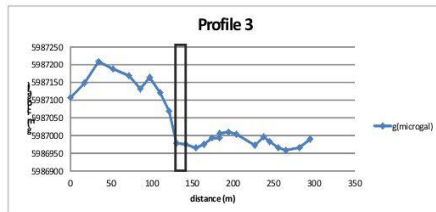
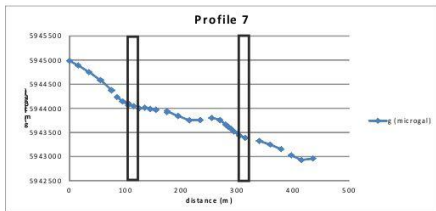
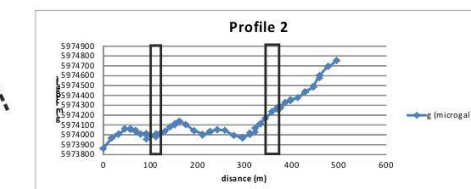
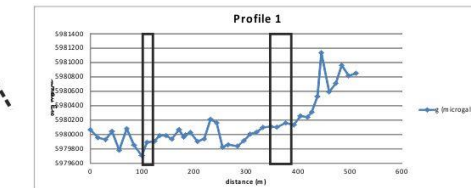
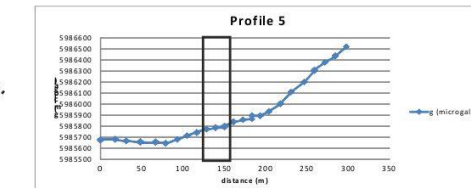
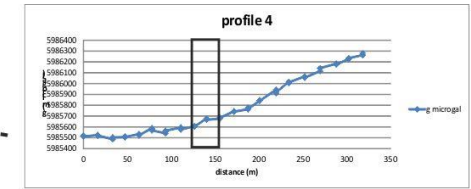
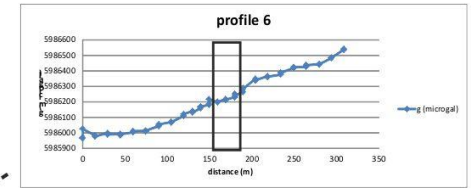
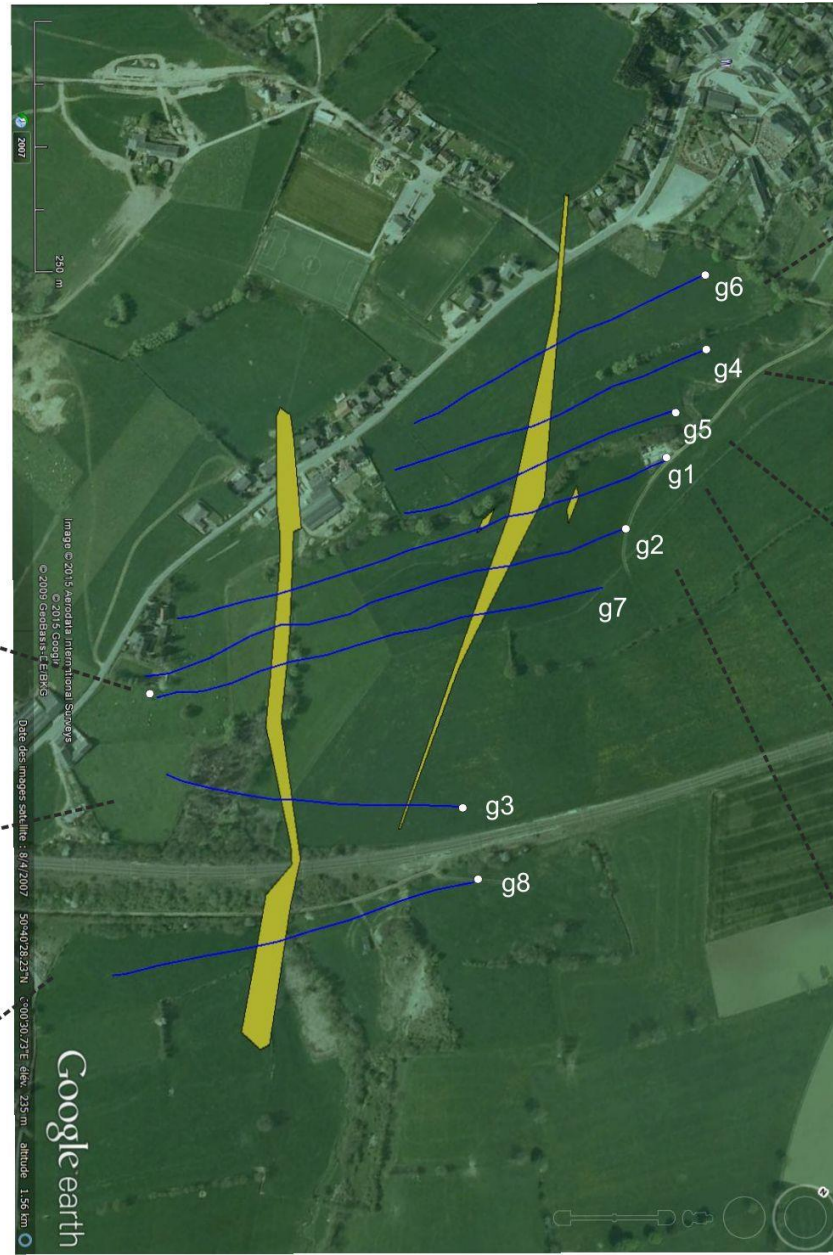
Induced polarisation investigation in Poppelsberg



Discussion

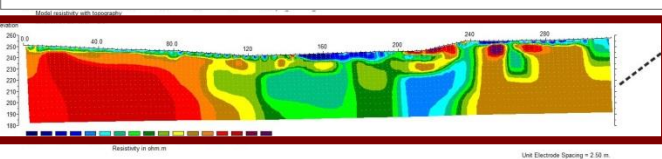
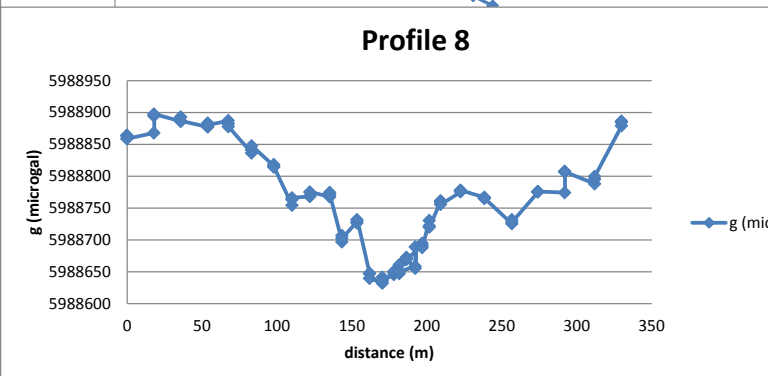
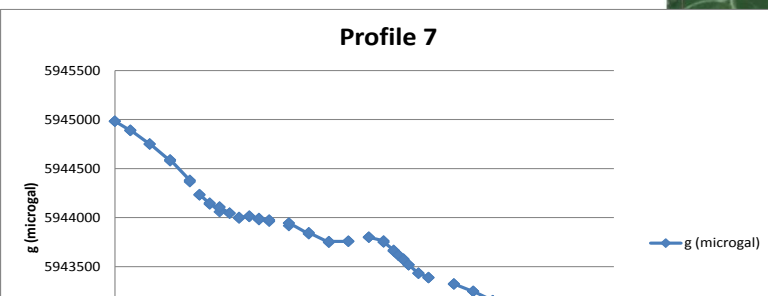
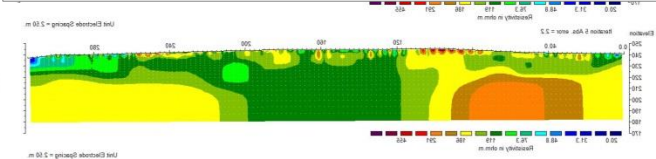
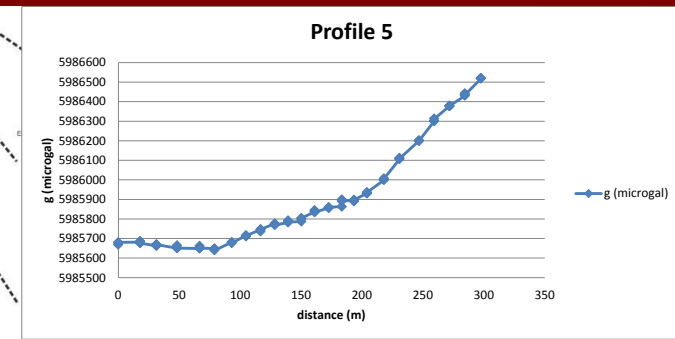
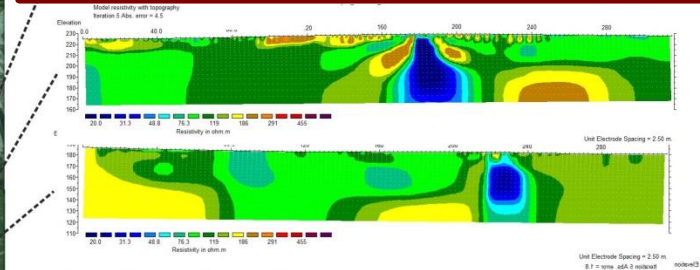
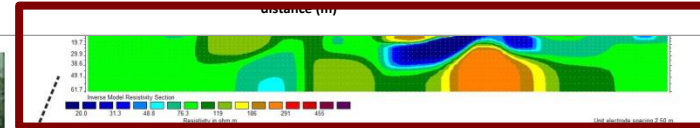
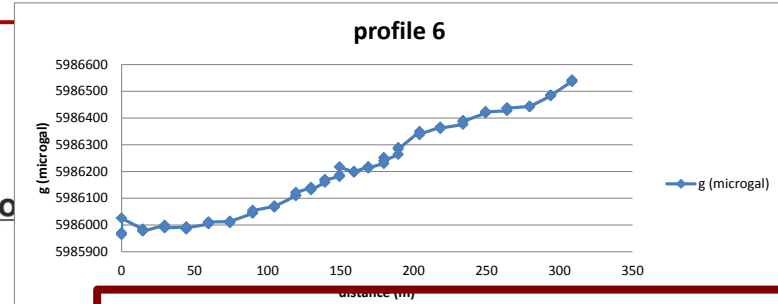
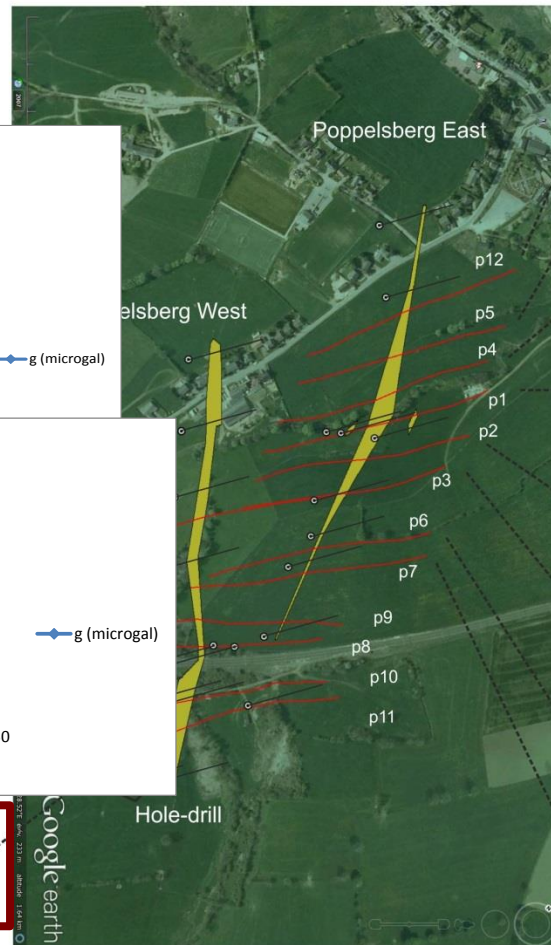
- The gravity survey** results were not as good as expected (model)
- Influence of the non fractured rocks > density of mineralization

Discussion



Discussion

Resistivity profiles investigation in Poppelsberg



Google earth

Discussion

- The magnetic** survey give no informations about the Pb-Zn mineralization
- No presence of ferro/para-magnetic minerals in the deposit/faults

Conclusion

- **3D modeling of the Pb-Zn deposit of Lontzen allowed to**
 - **Better understand the geology and the genesis of the deposit**
 - **Target the deposit to explore it using geophysics**
- **Geophysics on the field:**
 - **Electrical survey** : The best technique in our case study
 - **Gravity survey**: mixed result but still in progress
 - **Magnetometry**: no ferro/para-magnetic minerals
- ...

Thank you for you attention

