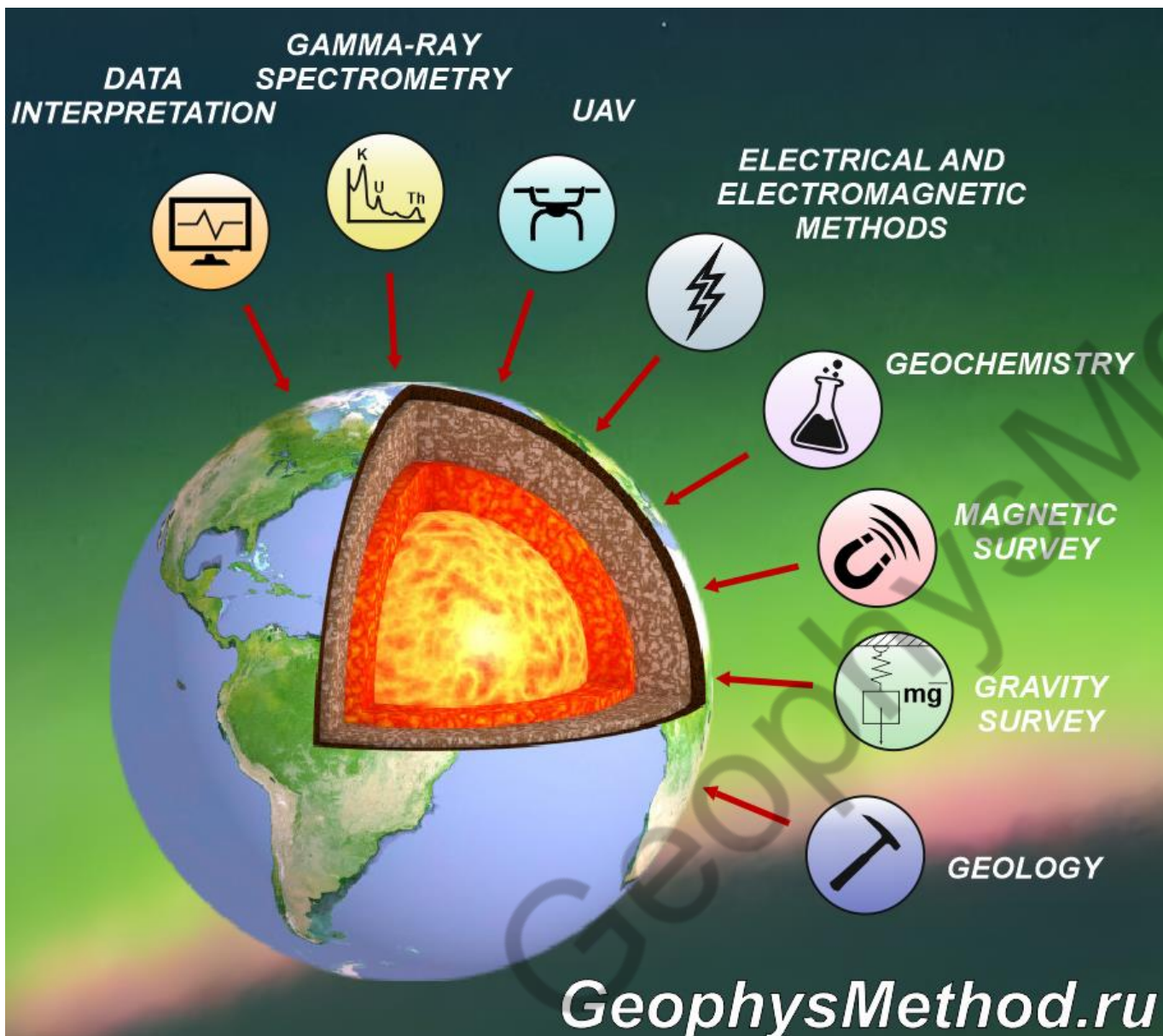


Dr. Evgenii Ermolin

Modern exploration technologies and some optimization approach

Relevance and study objective



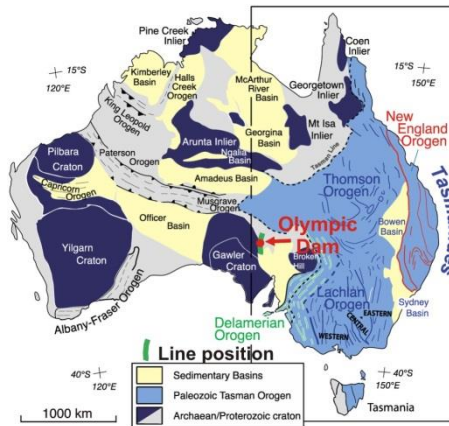
Relevance

Time effective and commercial effective way to find deposit

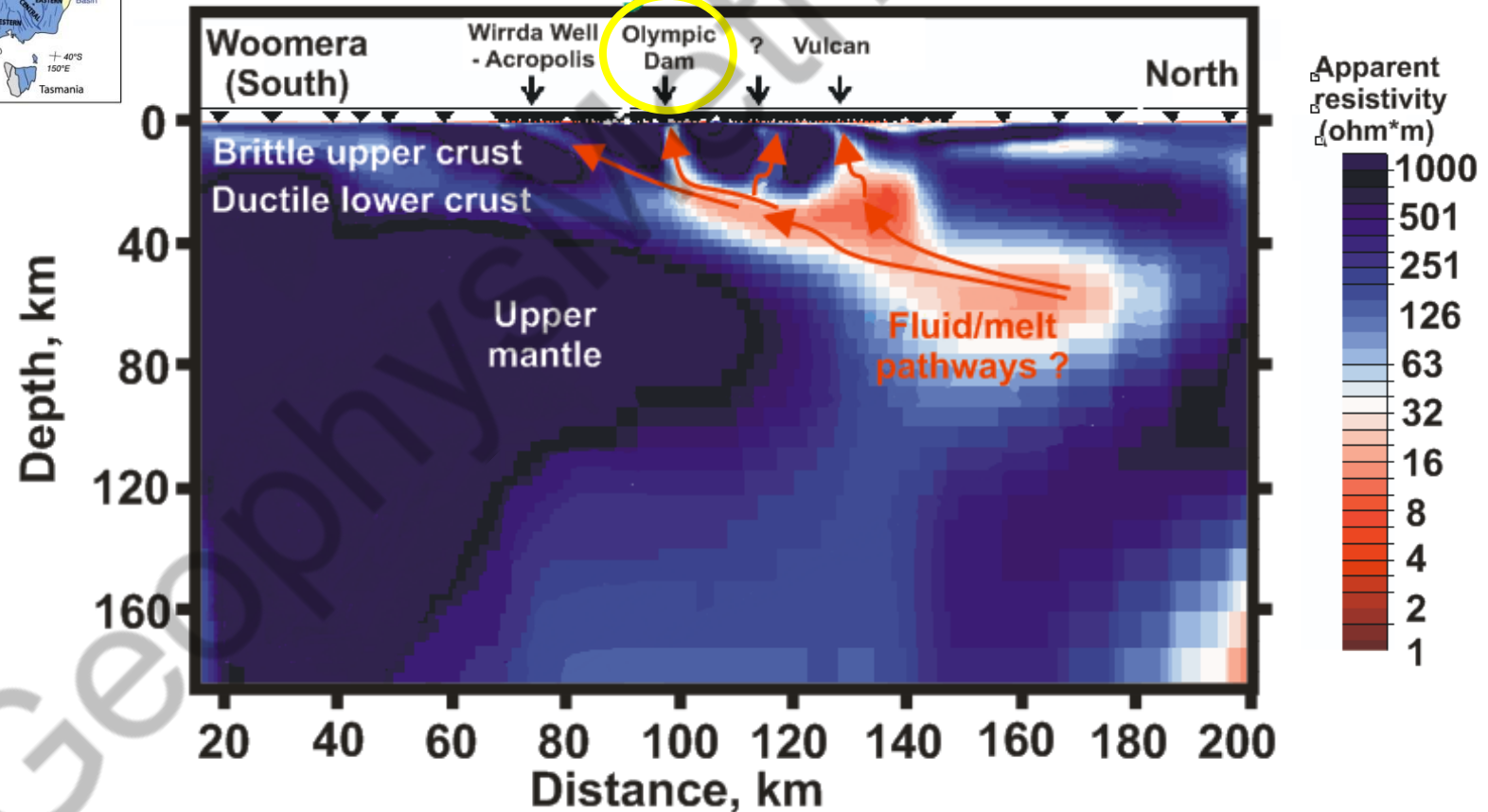
Plan of Presentation

- Study of mineral systems
- Combining of methods (geophysics, geology and geochemistry)
- UAV-based survey (pluses and minuses)
- Seasonality of field work
- Partial automatization of the data interpretation stage

Mineral Systems - Olympic Dam IOCG deposit

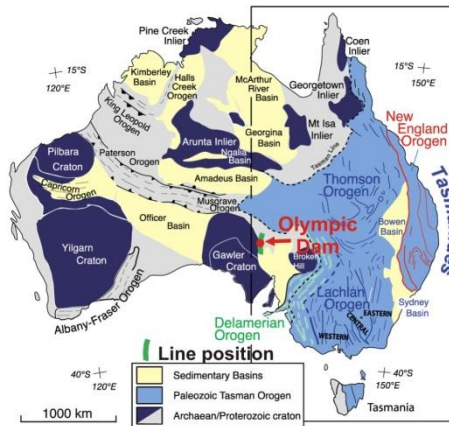


Resistivity cross-section

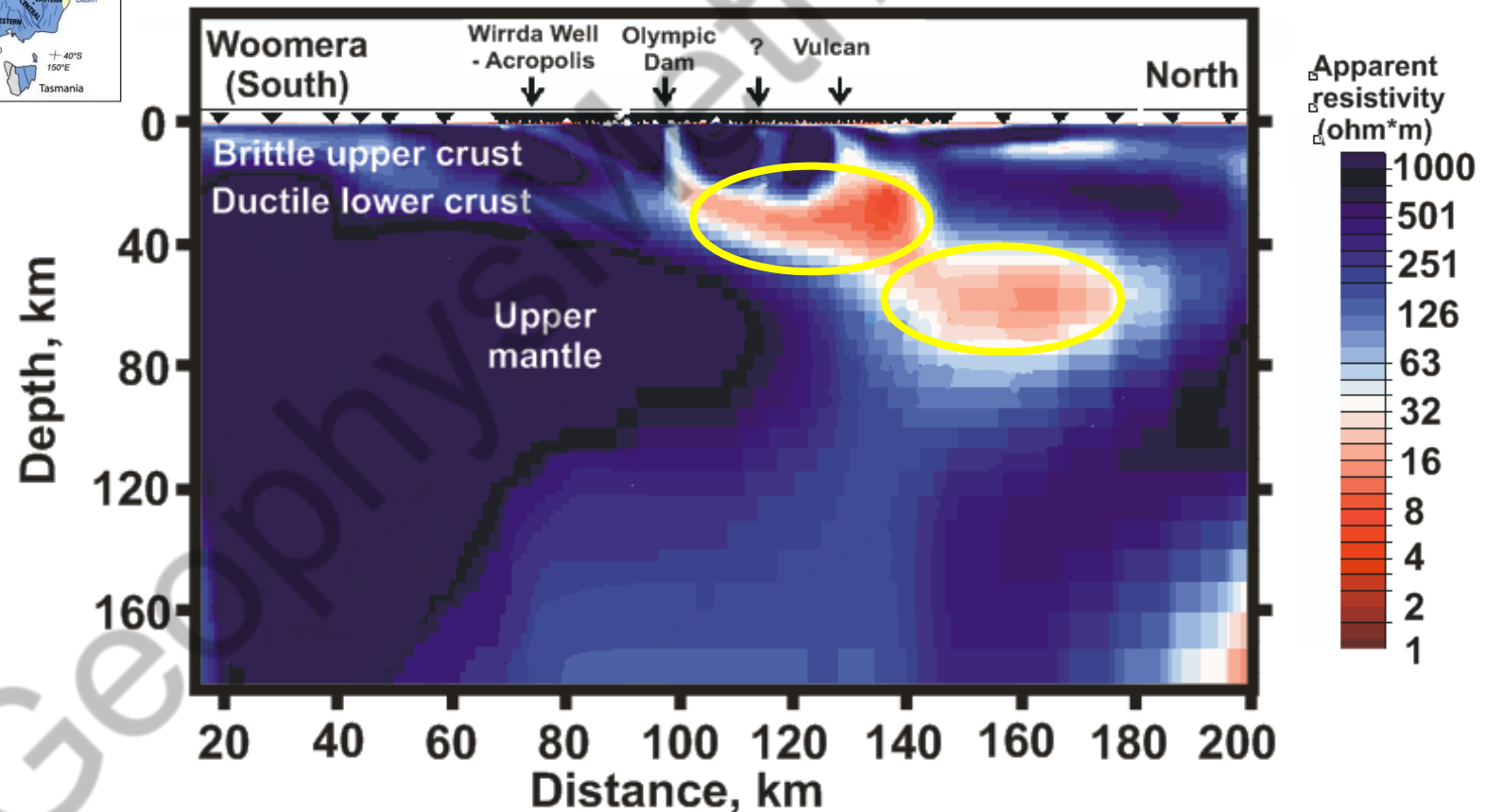


[According to M. Dentith, 2017]

STUDY OF MINERAL SYSTEMS OLYMPIC DAM IOCG DEPOSIT

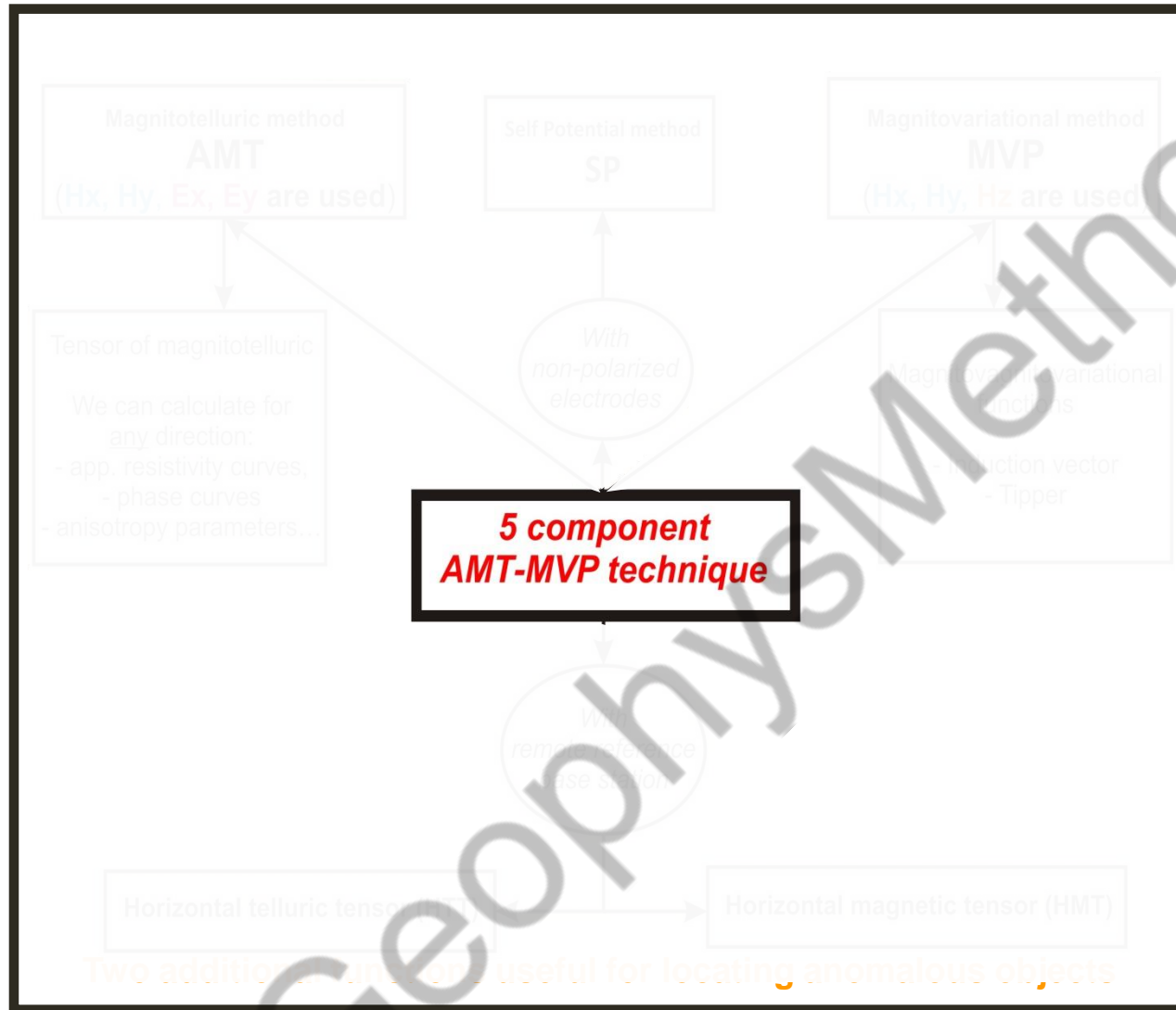


Resistivity cross-section



[According to M. Dentith, 2017]

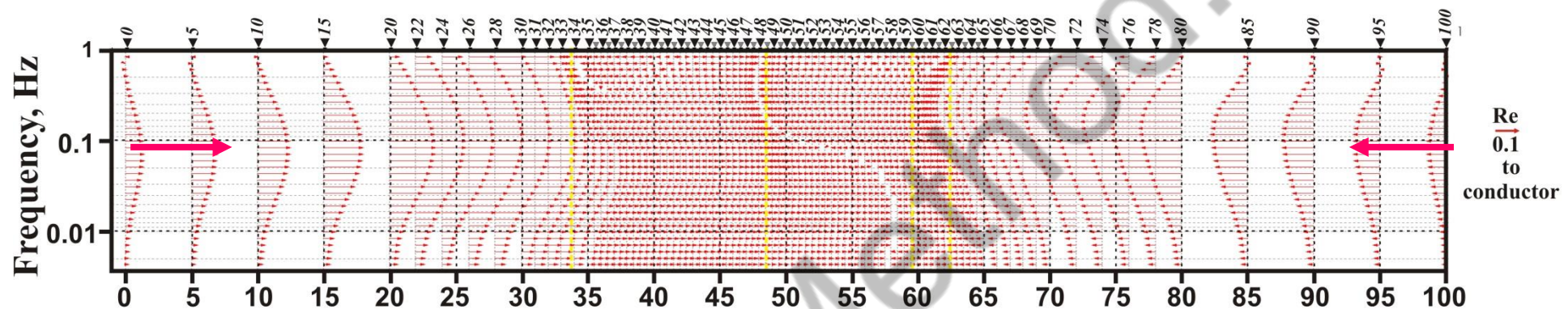
5 – COMPONENT (A)MT-MVP TECHNIQUE



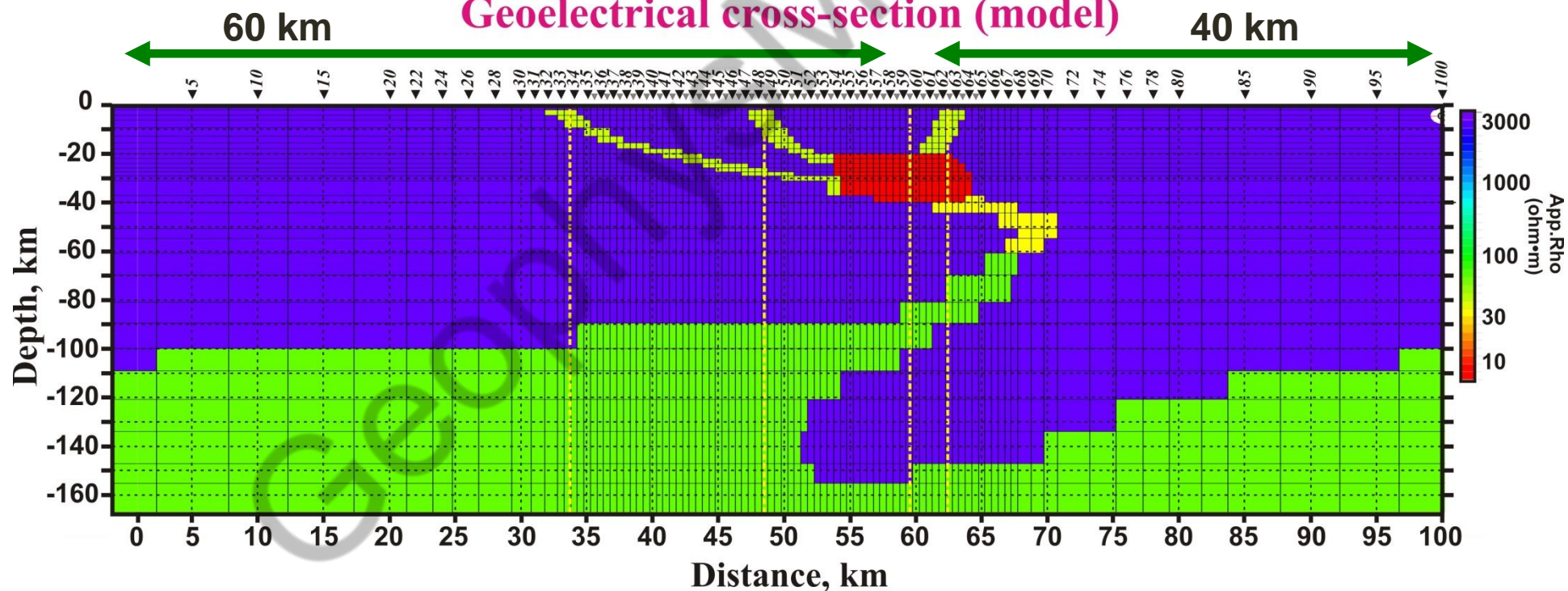
- ❑ Magnetotelluric methods describe well the sub-horizontal boundaries
- ❑ Magnetovariational methods are sensitive to sub-vertical boundaries (in a horizontally layered medium, the response functions are zero)
- ❑ Joint application of the (A)MT-MVP makes it possible to describe detailed the 2-D and 3-D medium in a wide depth interval (from the first meters to 1000 km)

Analysis of modeling results

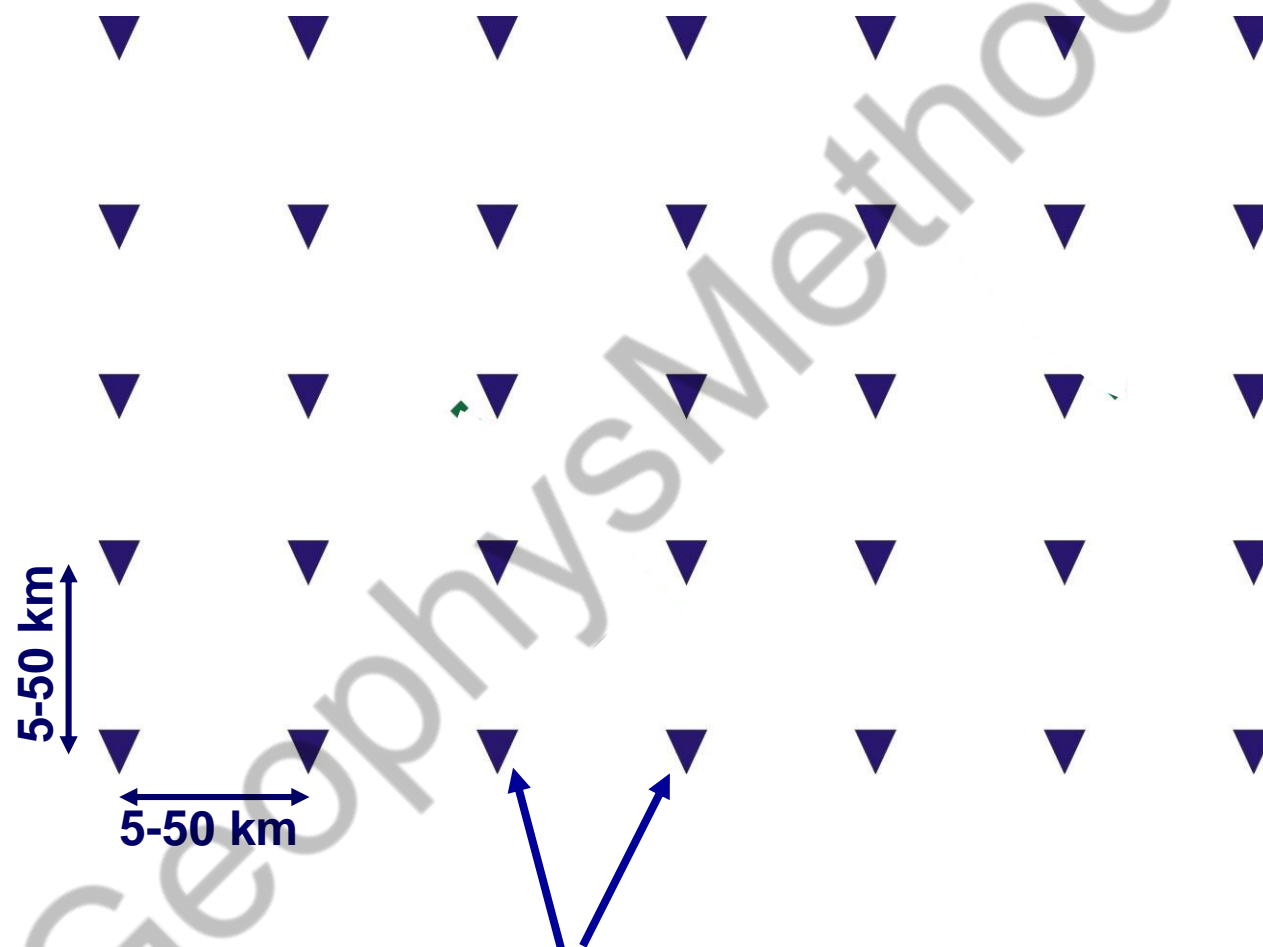
Induction arrows cross-section



Goelectrical cross-section (model)



Regional studies



Magnetotelluric and magnetovariational profiling

Plan of Presentation

- Study of mineral systems
- Combining of methods (geophysics, geology and geochemistry)
 - UAV-based survey (Pluses and minuses)
 - Seasonality of field work
 - Partial automation of the data interpretation stage

Soil geochemistry and Gravity survey can be performed in the same time

It saves the budget and time



**We covered 1000 sq. km.
In 2021 summer season
(3 month) in Chukotka
region**

GM-Service gravity and soil geochemistry team completed 1000 sq. km.

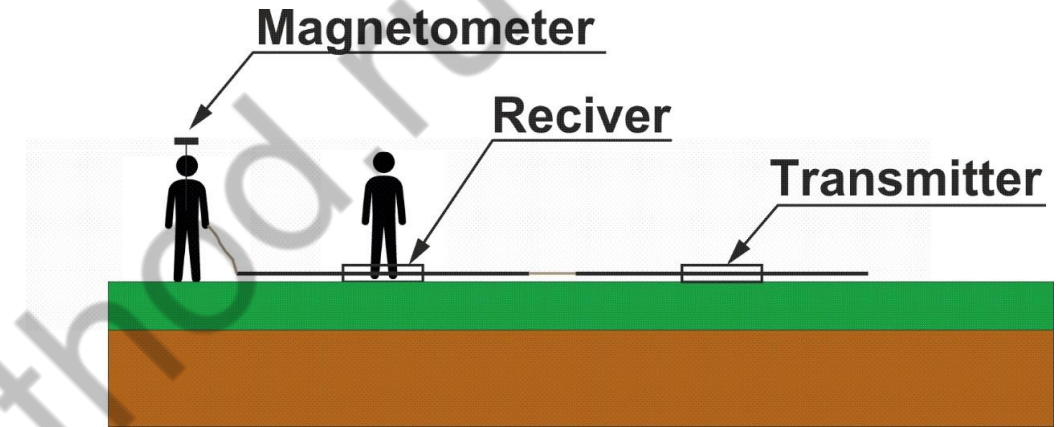


GM-Service team, September 2021



Dr. Evgenii Ermolin

Ground magnetic survey and EM-Methods
can be performed in the same time
Ground magnetic survey – free



**We covered 30 sq. km.
In 2021 summer
1/2 season
(1.5 month) in Chukotka
region by one
instrument complement**

Plan of Presentation

- Study of mineral systems
- Combining of methods (geophysics, geology and geochemistry)
- UAV-based survey (Pluses and minuses)
- Seasonality of field work
- Partial automation of the data interpretation stage

High quality

DJI Matrice 300 RTK
(PAYLOAD: 2.7 KG)



AERODYNE, PEGAS
(PAYLOAD: 7.0 KG)



High productivity

DIAM
(PAYLOAD: 5.0 KG)



Flight time from 31 UP TO 80 MINUTES

- MAGNETIC SURVEY
- GAMMA-RAY SPECTROMETRY
- EM-METHODS

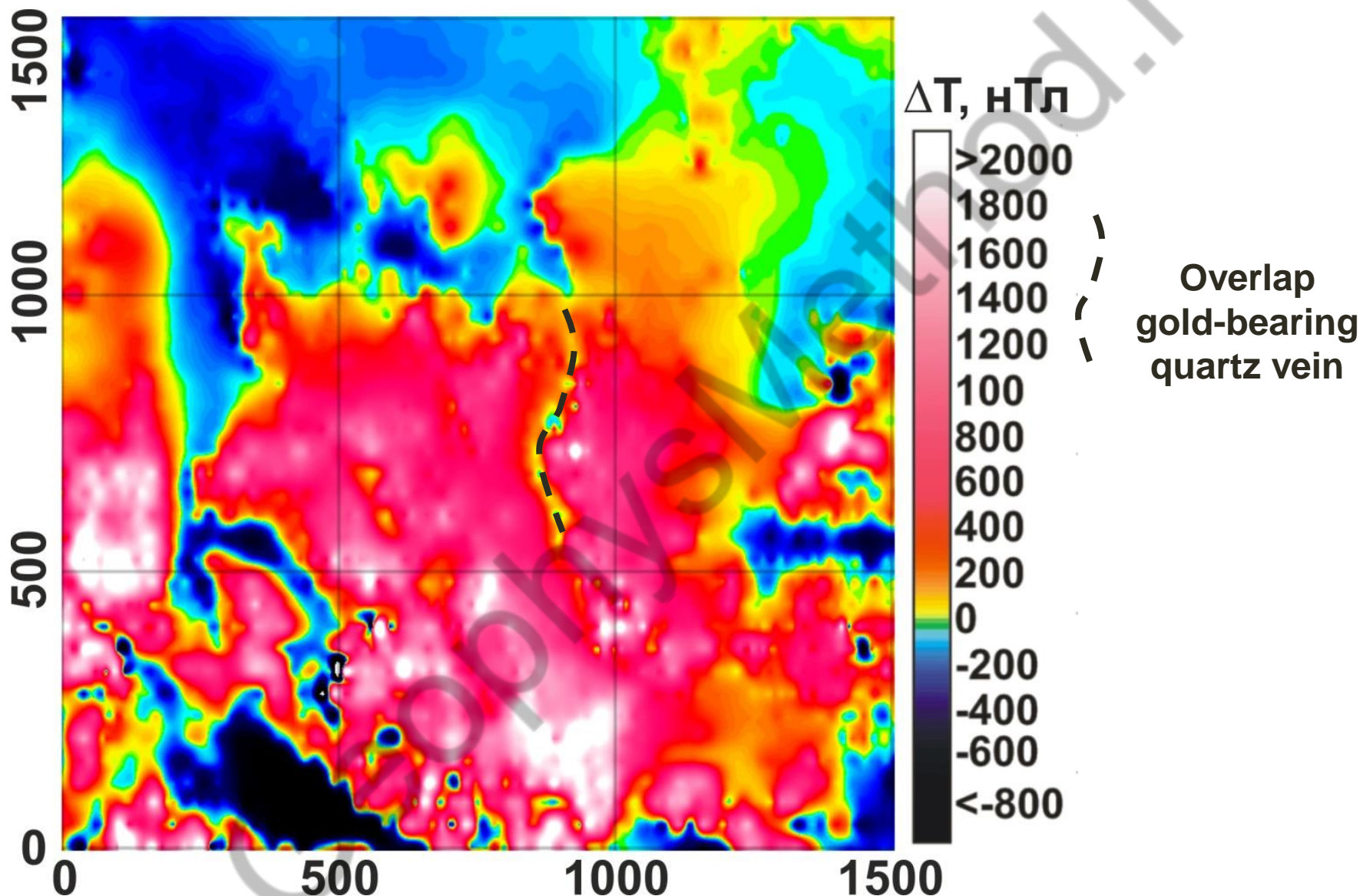
UP TO 500 SQ. KM. IN A MONTH*
(5 000 LINEAR KM IN A MONTH)

Flight time UP TO 10 HOURS

- MAGNETIC SURVEY
- AERIAL PHOTOGRAPHY

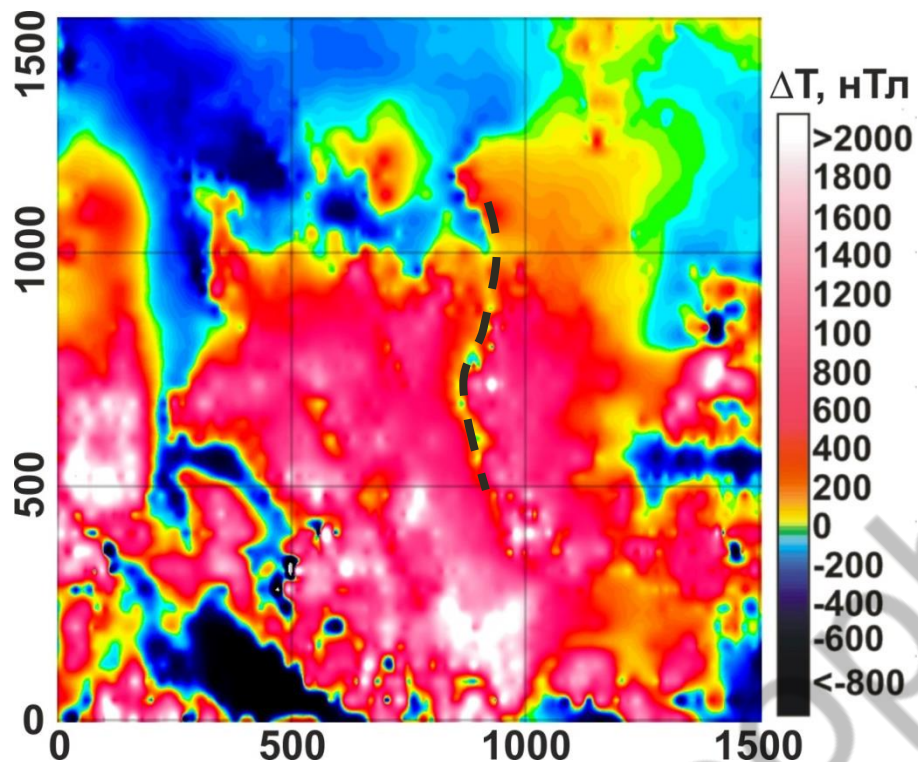
UP TO 5 000 SQ. KM. IN A MONTH*
(50 000 LINEAR KM IN MONTH)

**subject to good weather*

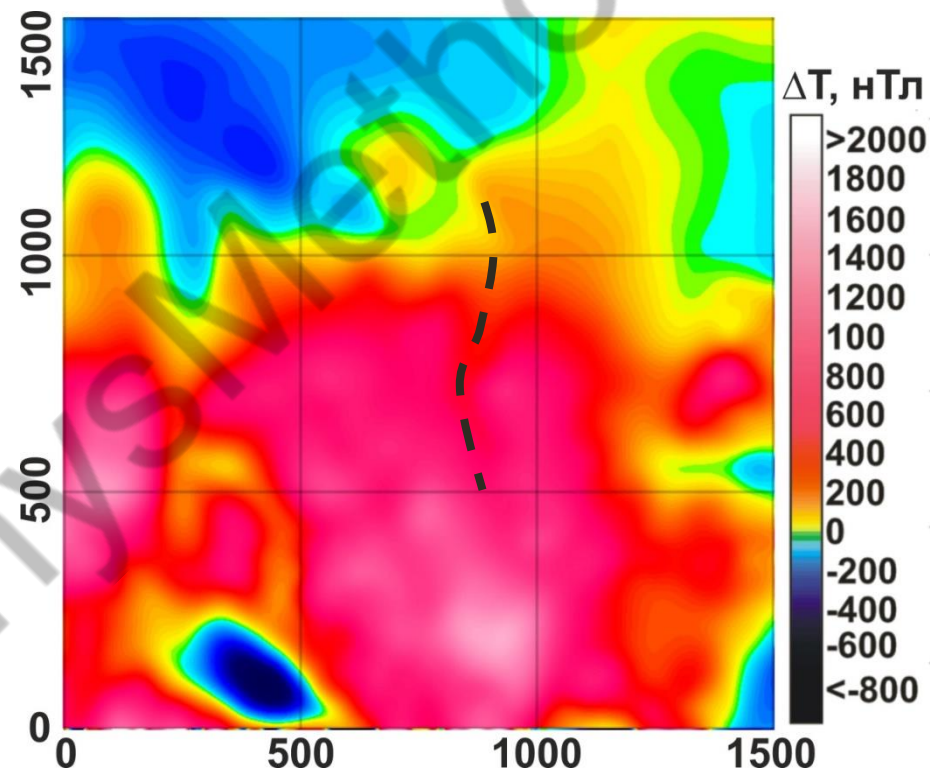




Land magnetic survey



UAV-based survey (20 meters upward)



Overlap
gold-bearing
quartz vein

If the area
square more
than 100 sq
km than
Drone more
actual

UAV Not effective for low amplitude anomalies, complex terrain and bad weather



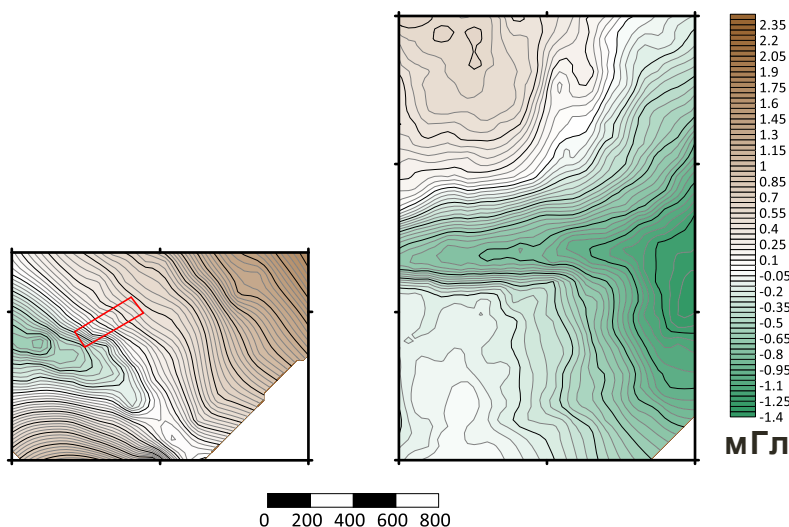
Plan of Presentation

- Study of mineral systems
- Combining of methods (geophysics, geology and geochemistry)
- UAV-based survey (Pluses and minuses)
- Seasonality of field work
- Partial automation of the data interpretation stage

WORKS IN WINTER SEASON

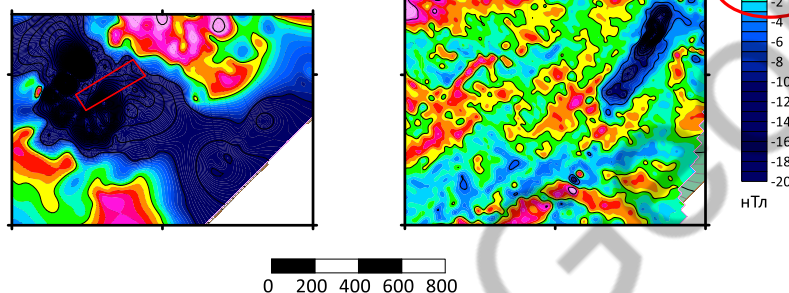


In winter season performance some types of work is cheaper

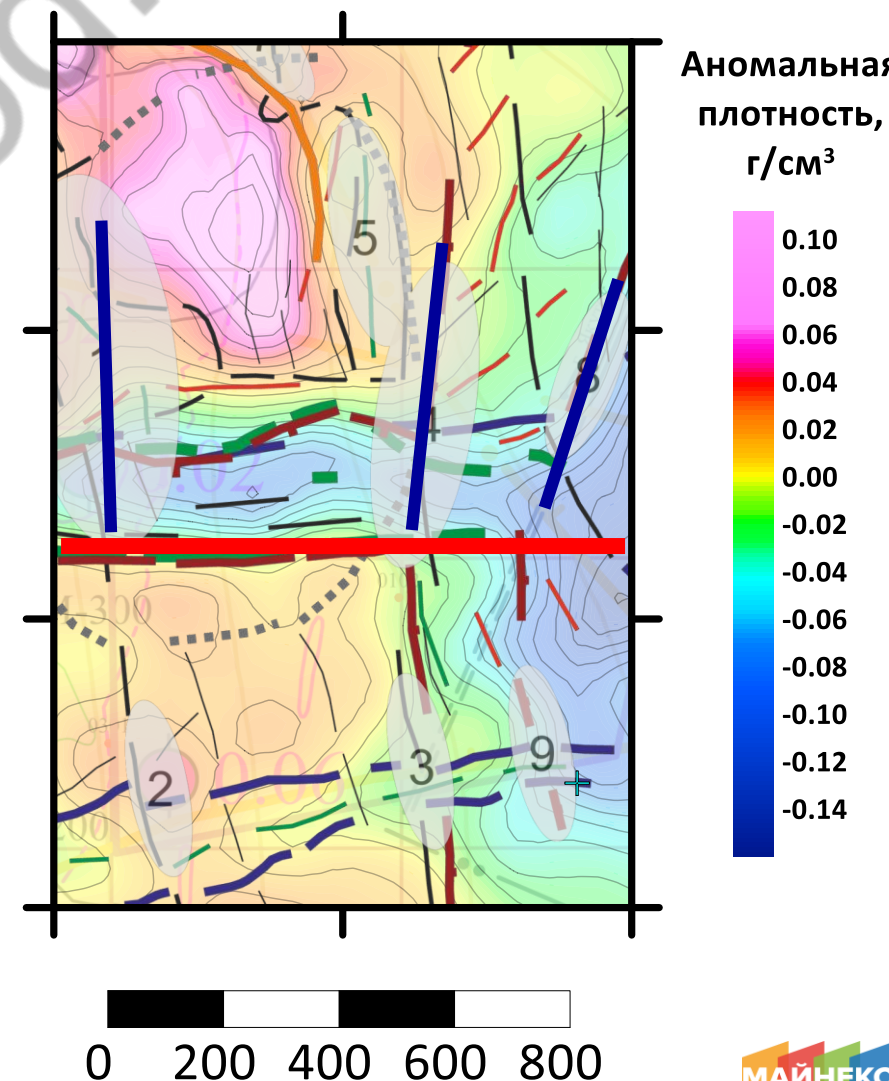


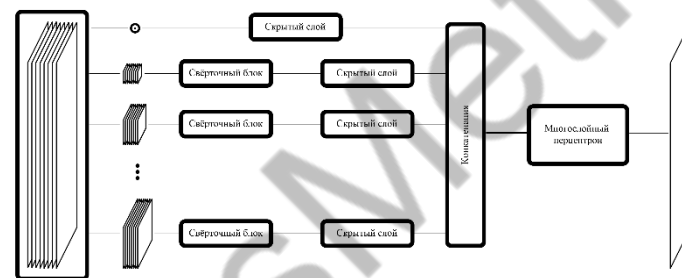
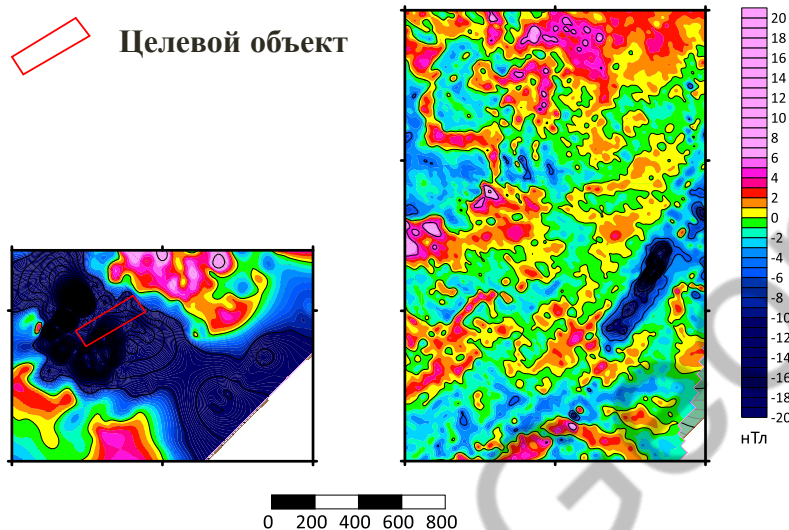
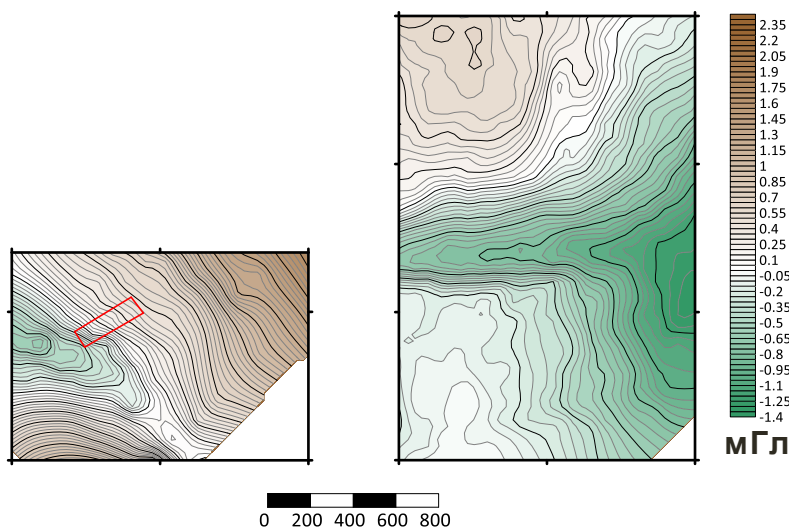
Целевой объект

qualitative



+ - 3 нТл

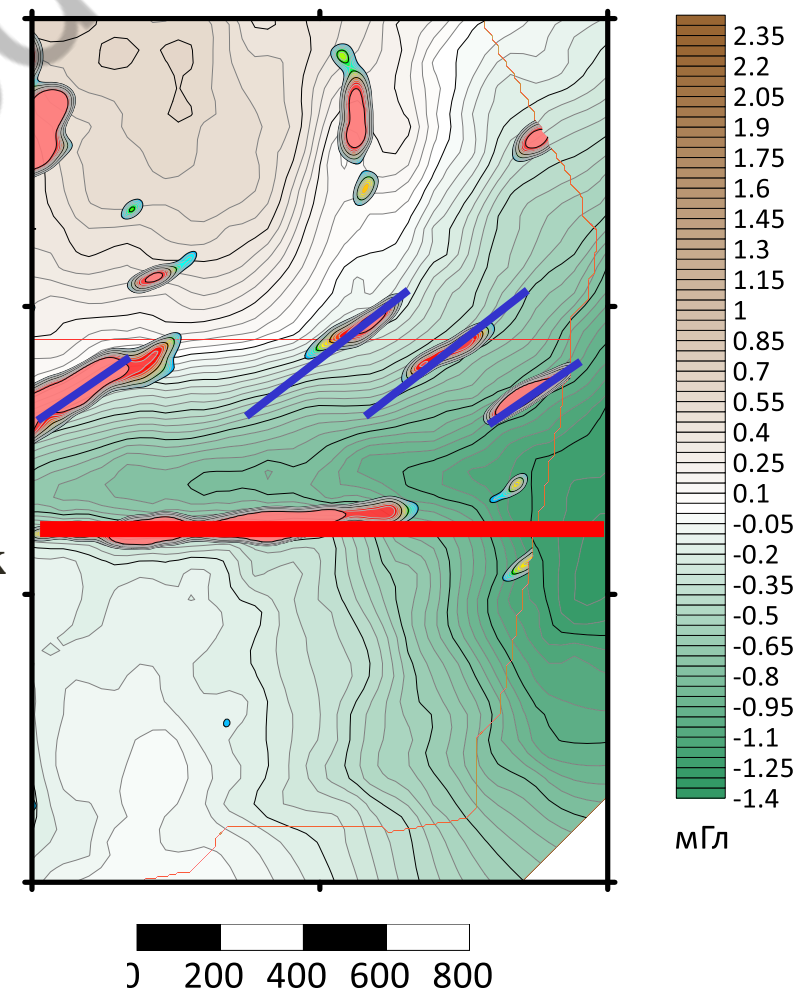


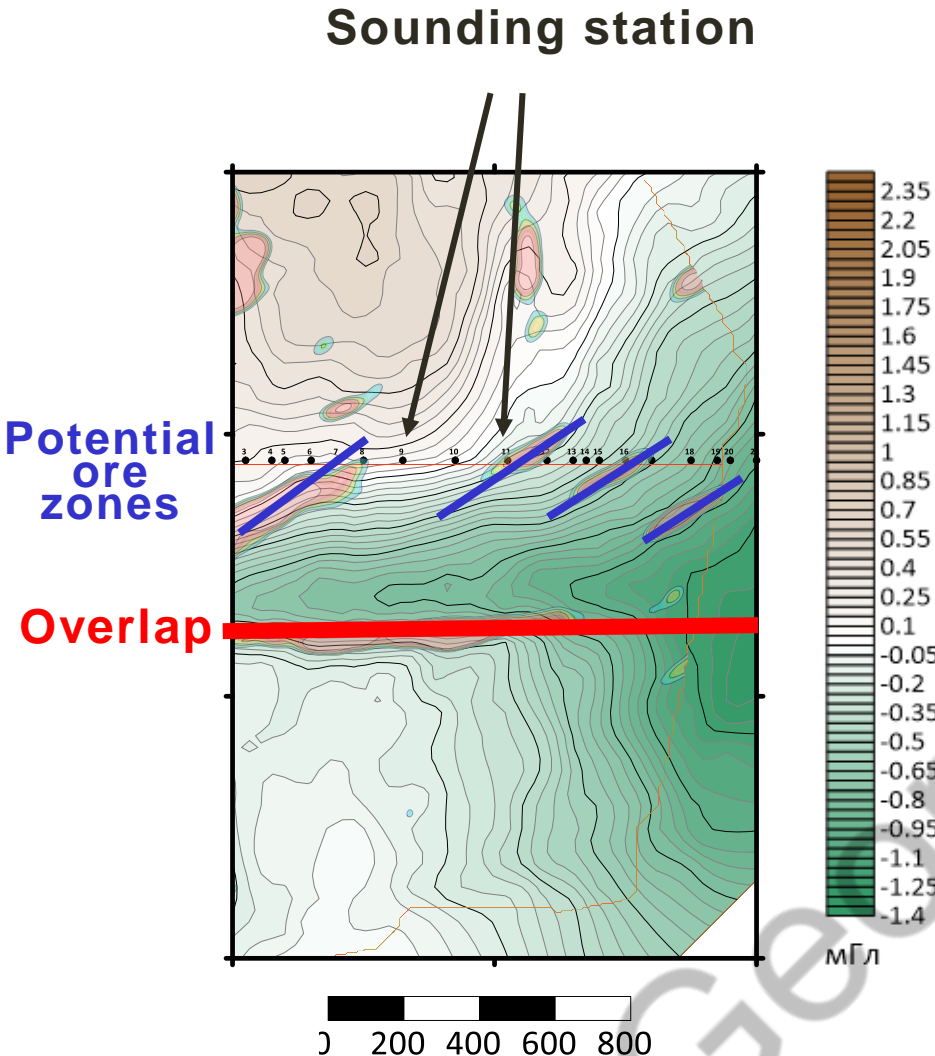


Block scheme of the neural network

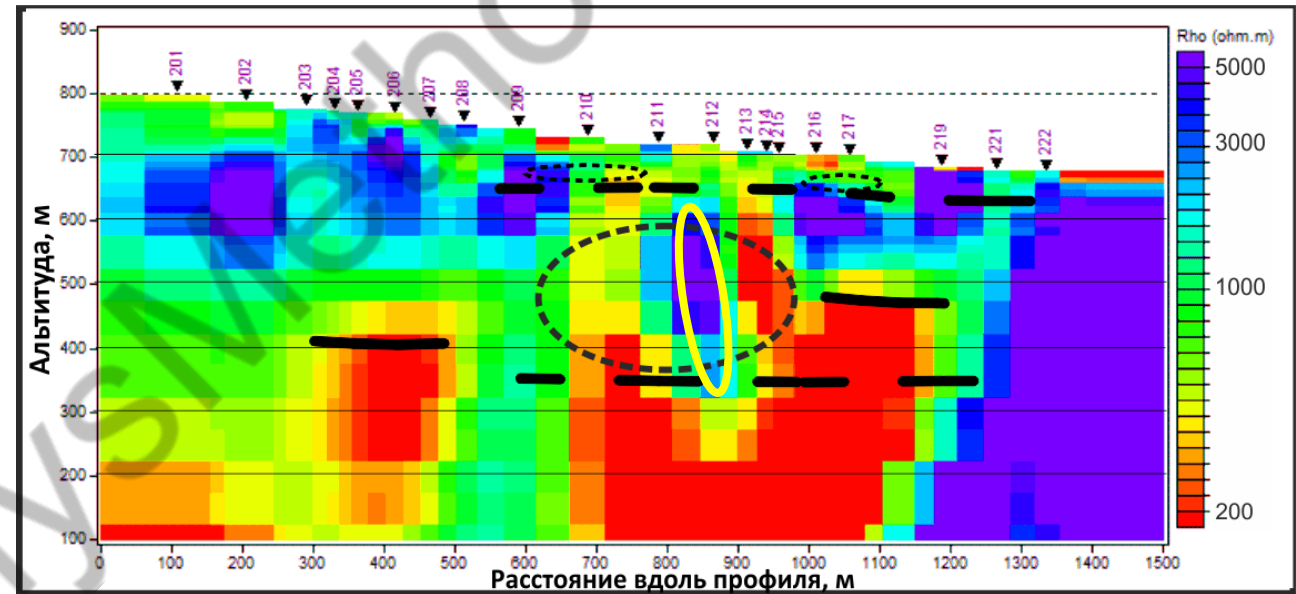


Формализованный прогноз по данным магниторазведки и гравиразведки





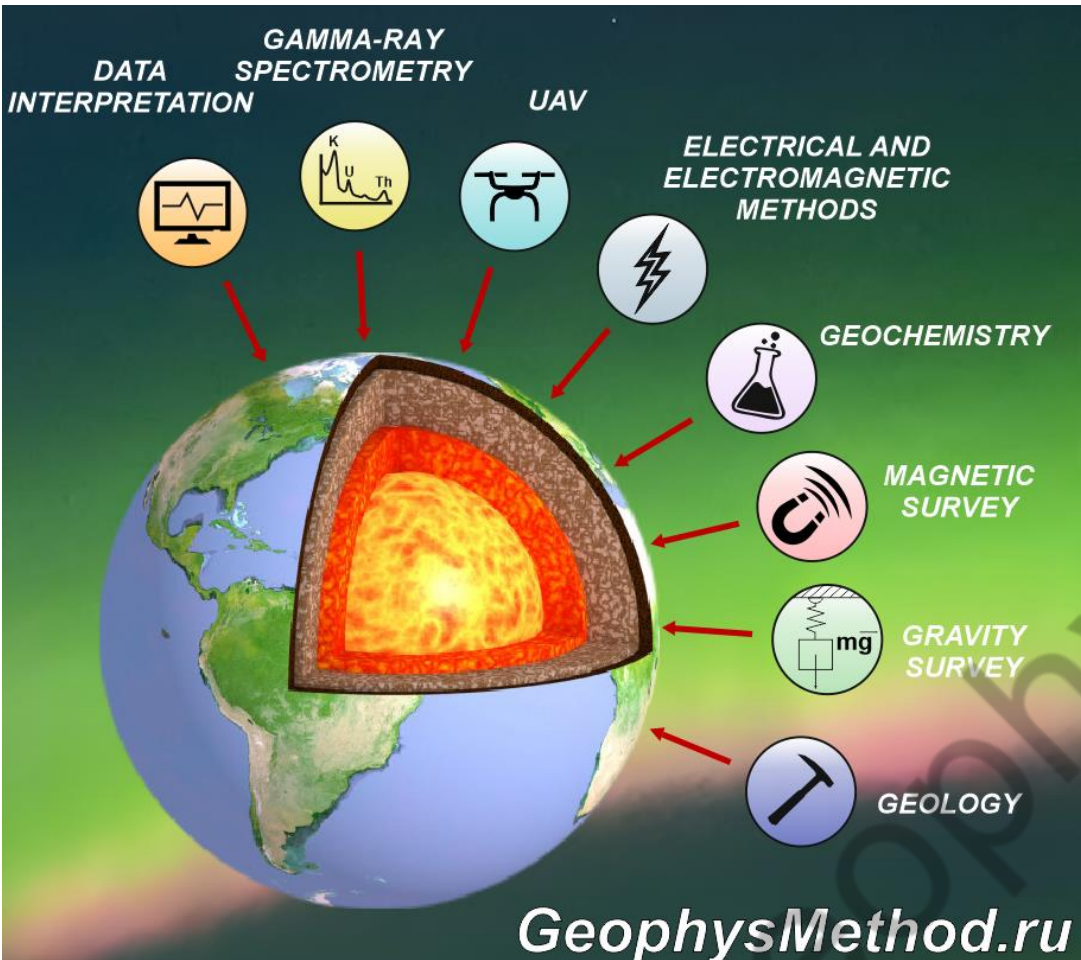
Geoelectrical cross-section according to (A)MT-MVP, resistivity survey and IP



Аномалии поляризуемости с амплитудой > 4%
(индикатор сульфидной минерализации)

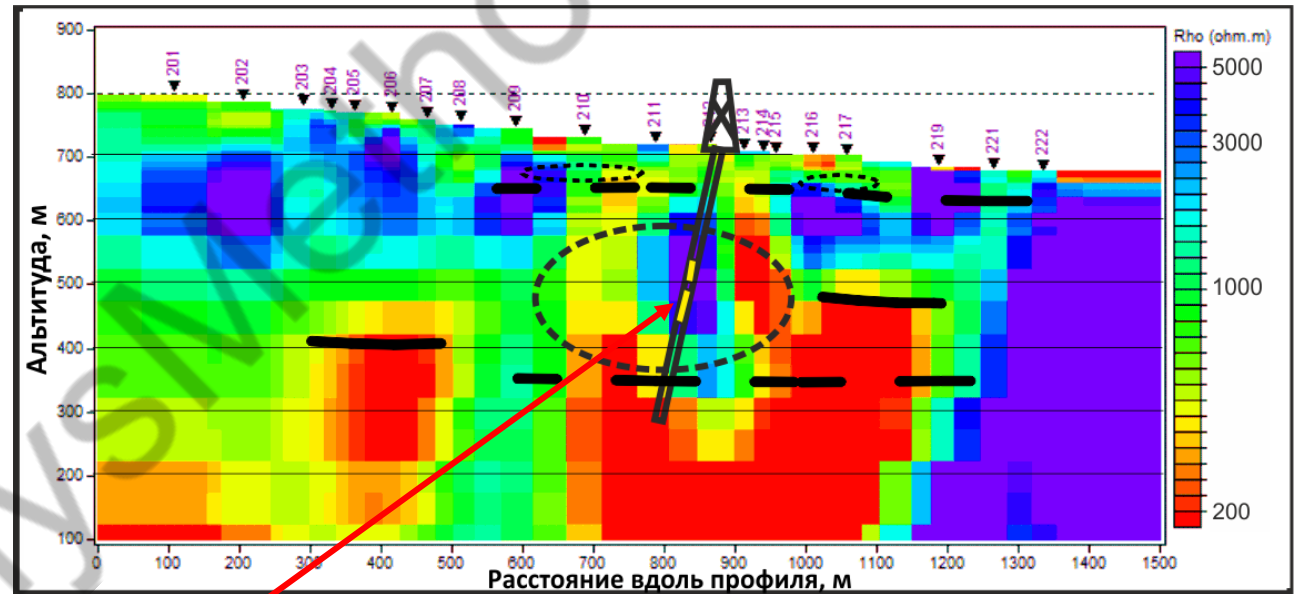


Area recommended for drilling



0 200 400 600 800

Geoelectrical cross-section according to (A)MT-MVP, resistivity survey and IP



Результаты бурения
промышленные концентрации
золота



Аномалии поляризуемости
> 4 %
(сульфидная минерализация)

2022, Sakha region

**Thanks for your
attention!**



Geophysical service company

"GM-Service" Ltd.

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Website: <http://GeophysMethod.ru/> (RUS) Website: <http://GeophysMethod.com/> (ENG)