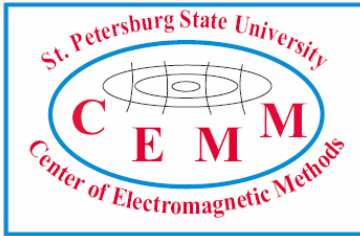


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Application of the magnetic susceptibility logging

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Application of the magnetic susceptibility logging to diamond exploration and prospecting

The magnetic susceptibility logging (MSL) is applied in diamond bearing regions at the solution of tasks of checking of ground magnetic anomalies, study of cross sections of searching wells, at investigation of kimberlite pipes and gravel deposits of diamonds.

The examples of application of MSL for differentiation of kimberlite overlapping and hosting rocks are given in Fig. 1 and 2.

Possibilities of MSL at correlation of hosting and overlapping rocks and structural constructions is illustrated in Fig. 3 and 4.

Application of MSL at study of kimberlite pipes and gravel deposits of diamonds are given in Fig. 5, 6 and 7.

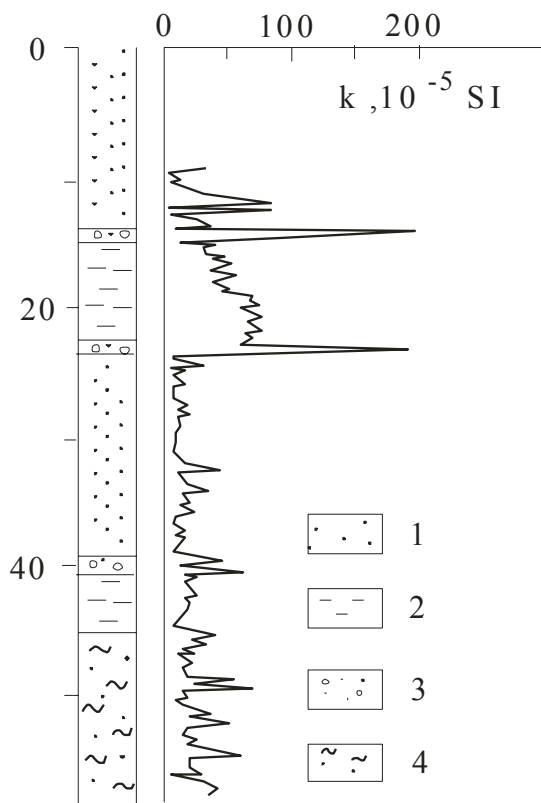


Fig. 1. Differentiation of kimberlite overlying sedimentary rocks.
 1 – sand, 2 – siltstone, 3 – conglomerate, 4 – clay with sand.

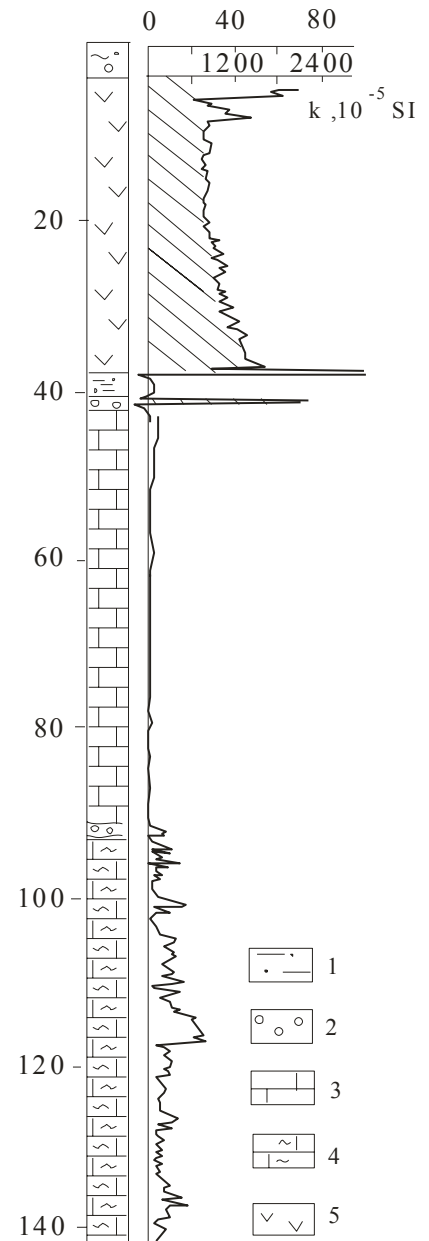
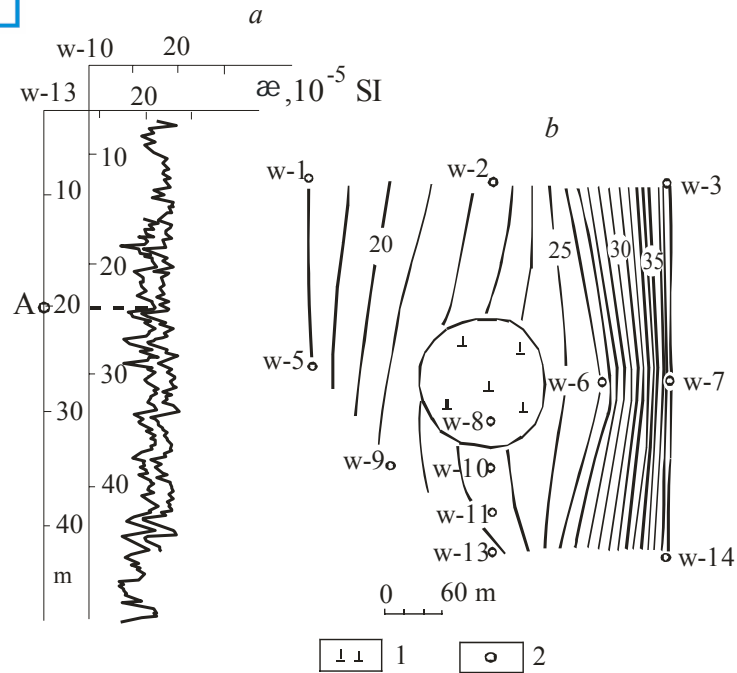
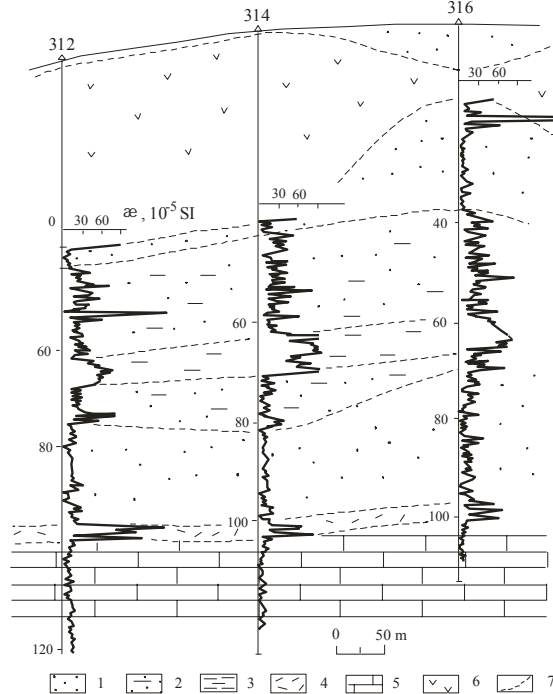


Fig. 2. Differentiation of dolerites and kimberlite hosting carbonate rocks and limestone and marble into hosting section
 1 – siltstone, 2 – conglomerate, 3 – limestone, 4 – marble, 5 - dolerite

Application of the MSL to diamond prospecting



**Fig. 3. Correlation of kimberlite hosting rocks (a) and study of structure features of area at the kimberlite pipe (b).
A – reference point, 1 – kimberlite, 2 – wells.**



**Fig. 4. Correlation of overlaying of kimberlite pipes sedimentary rocks.
1 – sand, 2 – sandy siltstone, 3 – siltstone, 4 – sediments of basal horizon,
5 – limestone, 6 – dolerite, 7 – borders of rocks.**

Application of the MSL to diamond prospecting

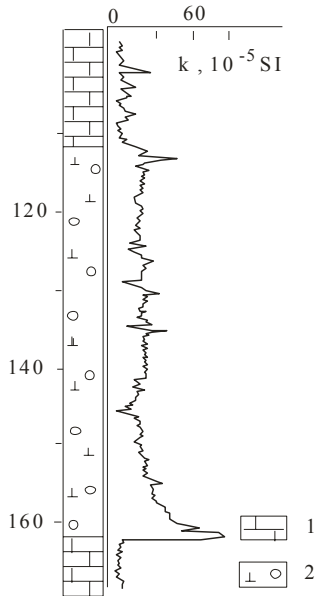


Fig. 5. Allocation of kimberlite with low magnetization.
 1- limestone, 2 – kimberlite.

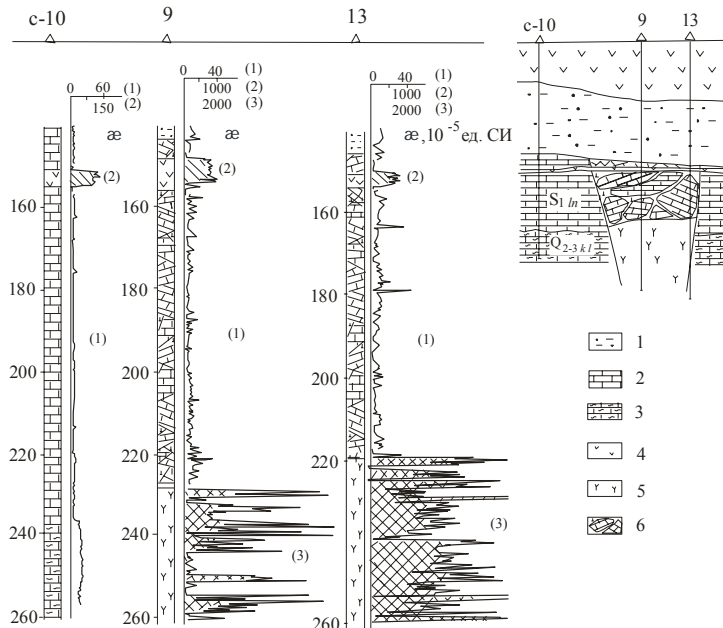


Fig. 6. Allocation of kimberlite with big content of carbonates and monolithic kimberlite.
 1- terrigenous sediments, 2 – limestone, 3 – marble, 4 – dolerite, 5 – monolithic kimberlite, 6 – kimberlite with big content of carbonates

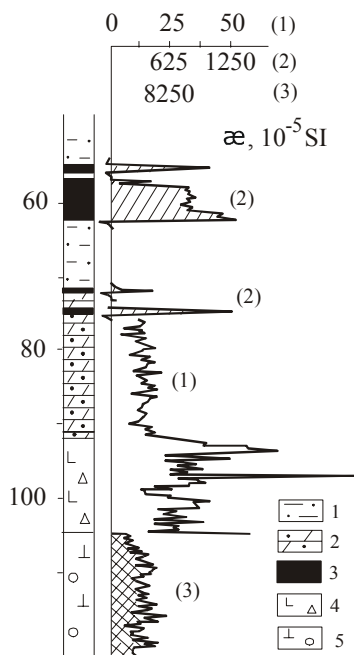


Fig. 7. Allocation and differentiation of kimberlite of low and high magnetization.
 1 - siltstone, 2 - dolomite, 3 - dolerite,
 4 - kimberlite tuff, 2 - kimberlite breccias.

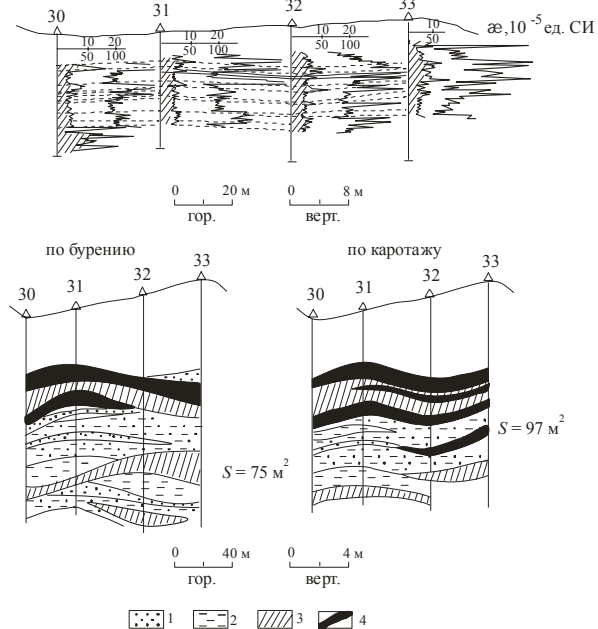
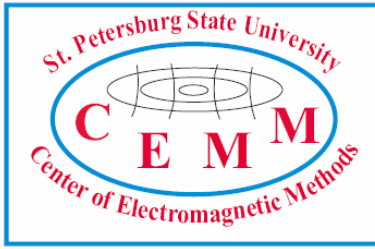


Fig. 8. Adjustment of contours of gravel deposit of diamonds. On the cross section according to geological data the area of productive layers makes 75 m², and on MSL data – 97 m². 1- sand, 2 - siltstone, 3 – coils siltstone, 4 – productive gravel sediments .



Application of the magnetic susceptibility logging to golden ore prospecting

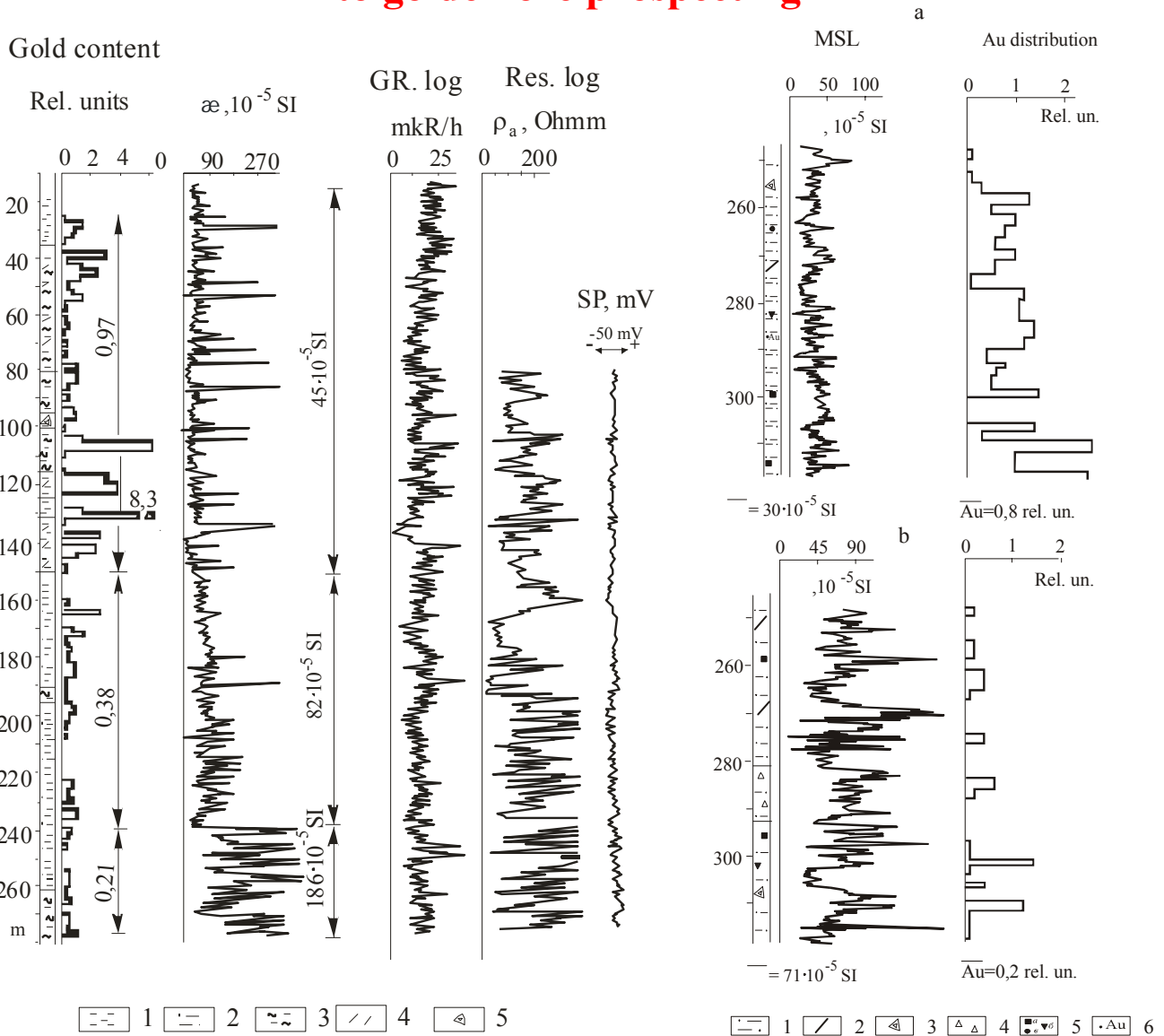


Fig. 1. Differentiation of cross section and localization of ore zone on MSL data (golden-quartz deposit in black shales Muruntau). At the depth 238 m on jump of magnetic susceptibility is marked boundary of golden mineralization (pyrite-pyrrhotine transition zone).

1 – siltstone, 2 - shale, 3 – clay with siltstone, 4 – quartz veins, 5 – quartz zones.

Fig. 2. Comparison of MSL data on wells with different gold content (Muruntau deposit).

1 – siltstone, 2 - quartz veins, 3 - quartz zones, 4 – broken zones, 5 – pyrite (a), sulfide (b) and metasomatic zones (b), 6 – gold appearance.