



## Some new results of the analysis of the Livingston magnetic anomalies with elementary sources

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### Introduction

On the basis of a profound theoretical analysis, and a lot of experiments, we came to the conclusion, that the model of positive and negative elementary sources is one of the more suitable (in the sense of approximation possibilities and more real physical meaning) among the ones used so far (Zidarov, 1968, 1990; Zhelev, Petrova, 1994), etc. for interpretation of local and to some degree of regional geomagnetic anomalies, as in this case in most of the situations, the charges of the sources of different sign are usually drawn apart. Besides, this model is very flexible, as in the process of optimization, it can be easily transformed into each of them, since they are its boundary cases.

With a computer program worked out, a number of experiments with theoretical and real observations were made. Promising results were obtained. The Livingston Island (Antarctic) magnetic anomalies were studied here using this method. After some preliminary polynomial approximations to eliminate some

residuals of the regional trend (so that to ease the optimization), the local anomalies together with the rest of the trend are modeled with a set of point sources and a linear trend. The unknown parameters of the suggested model are determined through optimization. The obtained results seem to be quite in agreement with the intrusive bodies supposed to be in the upper part of the crust at different depths in this region. The locations of the real sources of the observations are determined, and an excellent model of the corresponding observations is obtained.

### Conclusion

It may be said in conclusion, that the obtained results are significant both for clearing up the inner structures of the Earth in this region as well as for prospecting of mineral resources. Better results can be expected on the basis of more details observations and some improvements in the method, based mainly on the introduction of some additional restrictions on the model and better separation of the trend.

### References

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## **Някои нови резултати от анализа на магнитните аномалии на остров Ливингстън чрез елементарни източници**

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**Абстракт.** Някои магнитни аномалии от остров Ливингстън, Антарктида са изследвани с модел от положителни и отрицателни елементарни източници (в случая точкови източници). След предварителна полиминална апроксимация за елеминиране на някои остатъци от регионалния тренд (с цел улесняване на оптимизацията), локалните аномалии заедно с остатъка от тренда

са моделирани с точкови източници и линеен тренд. Неизвестните параметри на предполагаемия модел са определени чрез оптимизация. Получените резултати са в добро съответствие с интрузивни тела очаквани (предполагани) в горните слоеве на Земята на различни дълбочини в този район.