

引用本文(Citation):

刘彦, 严加永, 吴明安, 赵文广, 赵金花, 邓震. 基于重力异常分离方法寻找深部隐伏铁矿 ——以安徽泥河铁矿为例. 地球物理学报, 2012,55(12): 4181-4193,doi: 10.6038/j.issn.0001-5733.2012.12.030

LIU Yan, YAN Jia-Yong, WU Ming-An, ZHAO Wen-Guang, ZHAO Jin-Hua, DENG Zhen. Exploring deep concealed ore bodies based on gravity anomaly separation methods: A case study of the Nihe iron deposit. Chinese J. Geophys. (in Chinese), 2012, 55(12): 4181-4193, doi: 10.6038/j.issn.0001-5733.2012.12.030

基于重力异常分离方法寻找深部隐伏铁矿 ——以安徽泥河铁矿为例

刘彦¹, 严加永¹, 吴明安², 赵文广², 赵金花¹, 邓震^{1*}

1. 中国地质科学院矿产资源研究所, 国土资源部成矿作用和资源评价重点实验室, 北京 100037;
2. 安徽省地质调查院, 合肥 230001

Exploring deep concealed ore bodies based on gravity anomaly separation methods: A case study of the Nihe iron deposit

LIU Yan¹, YAN Jia-Yong¹, WU Ming-An², ZHAO Wen-Guang², ZHAO Jin-Hua¹, DENG Zhen^{1*}

1. Institute of Mineral Resources, Chinese Academy of Geological Sciences, MLR Key Laboratory of Metallogeny and Mineral Assessment, Beijing 100037, China;
2. Geological Survey of Anhui Province, Hefei 230001, China

摘要

参考文献

相关文章

Download: [PDF](#) (10942 KB) [HTML](#) (0 KB) Export: [BibTeX](#) or [EndNote](#) (RIS) [Supporting Info](#)

摘要

重力异常是地下不同规模、不同形态和不同埋深的不均匀地质体的综合响应,重力勘探主要通过从重力异常中提取感兴趣的局部异常,以便探测深部结构,寻找隐伏矿床.为探讨重力异常分离原则并检验方法效果,本文从各方法原理入手,加上模型试验以及在安徽省泥河矿区深部隐伏铁矿的探寻实践检验,阐明:趋势分析法是整体拟合不同于最小二乘圆滑的局部拟合,由于是多项式拟合区域场,趋势分析法不适宜范围大、地质情况复杂的测区;插值切割法以计算点场值与四点圆周平均值的插值运算为切割算子,通过连续切割,得到重力异常的切割区域场和局部场,插值切割法对于小测区单个异常的分离效果较好,切割次数选择1到2次即可;匹配滤波法通过分析实测异常功率谱曲线、选择合适的滤波段、建造适宜的低通和带通滤波器进行滤波,从而提取不同波数成分的异常场,匹配滤波更适合垂向叠加的异常分离;解析延拓是根据一个面上的一组位场数据确定另一个不同高度面上位场值,应用中要把握延拓高度;垂向二阶导数法可以起到突出浅源异常,区分水平叠加异常,确定异常体的边界,消除或削弱背景场的作用.通过安徽泥河铁矿重力异常分离实验,发现三阶趋势分析、向上延拓以及插值切割法能很好地分离出矿体异常和背景场,同时发现在泥河矿区东南部和东北部还存在剩余重力异常,可为泥河铁矿扩大规模提供新的线索.

关键词 重力异常场, 资料处理, 异常分离, 隐伏矿床

Abstract:

Gravity anomalies are responses of multiple inhomogeneous geologic bodies of different scales, different patterns and different depths, which are difficult to be accurately separated. According to method principles, model tests and application to the Nihe iron deposit, this article compared five gravity anomaly separation methods. It is explained that trend analysis is global fitting other than least squares smoothing. As trend analysis fits the regional field by polynomial, it is not used for large complex geologic areas. Based on interpolation operation of the calculation field values and the four average circles for cutting operator, the interpolating cut method gets the regional field and the local field through continuous cutting. The interpolating cut method is suitable for small areas and single gravity anomalies, in which 1 to 2 times of cutting is good. By analysis of power spectrum of observed gravity, choosing suitable wave bands and building low-pass & band-pass filter, matched filtering can extract different wave anomaly fields. It is fit for vertical stack anomalies. According to the potential field data of a surface, analytic continuation makes another different height potential field, in which continuation height is very important. Vertical direction second derivative can highlight shallow gravity anomalies, distinguish horizontal stacked anomalies, determine the boundaries of anomalies, and eliminate or weaken the background field effect. These methods are successfully applied to the gravity anomaly separation of the Nihe iron deposit in the middle and lower Yangtze River, and two new clues of iron ore bodies are found which lie in the northeast and southeast of Nihe.

Service

- [把本文推荐给朋友](#)
- [加入我的书架](#)
- [加入引用管理器](#)
- [Email Alert](#)
- [RSS](#)

作者相关文章

- [刘彦](#)
- [严加永](#)
- [吴明安](#)
- [赵文广](#)
- [赵金花](#)
- [邓震](#)

Keywords [Gravitational anomaly field](#), [Data processing](#), [Anomaly separation](#), [Concealed deposit](#)

Received 2012-04-28;

Fund:

国家科技专项(SinoProbe-03)、国家自然科学基金重点基金项目(40930418)、中央级公益性科研院所基本科研业务费专项(K1008)以及科技支撑计划项目(2009BAB43B02)和地质大调查项目(1212010813052)联合资助.

About author: 刘彦,女,1975年生,助理研究员,博士,主要从事地球物理勘探技术和深部探测研究.E-mail: liuy@cags.ac.cn

链接本文:

<http://manu16.magtech.com.cn/geophy/CN/10.6038/j.issn.0001-5733.2012.12.030> 或

<http://manu16.magtech.com.cn/geophy/CN/Y2012/V55/I12/4181>

[查看全文](#) [下载PDF阅读器](#)

Copyright 2010 by 地球物理学报