

技术应用

InSAR技术在矿区沉降监测中的应用研究

刘广<sup>1</sup>, 郭华东<sup>1</sup>, Ramon Hanssen<sup>2</sup>, Zbigniew Perski<sup>2</sup>, 李新武<sup>1, 3</sup>, 岳焕印<sup>4</sup>, 范景辉<sup>1, 5</sup>

1.中国科学院遥感应用研究所, 遥感科学国家重点实验室, 北京 100101; 2.Department of DEOS, Delft University, the Netherlands, 2629 HS; 3.农业部资源遥感与数字农业重点开放实验室, 北京 100081; 4.中国科学院电子学研究所, 微波成像技术国家级重点实验室, 北京 100080; 5.中国国土资源航空物探遥感中心, 北京 100083

摘要:

介绍了应用InSAR技术监测矿区地表沉降以及地下开采活动的原理; 利用重轨差分InSAR技术获得了峰峰矿区地表ENVISAT和JERS 1的雷达形变干涉相位图; 分析了在矿区地表沉降过程中ENVISAT C波段和JERS 1 L波段形变干涉相位图的相干特性、相位特性以及干涉测量技术在矿区地表沉降监测中应用的可行性和局限性。实验结果表明, 利用C波段和L波段雷达数据可以实施对矿区地表沉降的监测, 但是C波段雷达受到空间干涉基线的限制更加严格, 如果要实现对矿区地表沉降的监测, 需要充分利用每个卫星回访时期的雷达数据, 建立长时序的星载雷达形变干涉相位图序列, 才能较好地实现矿区地表沉降监测。

关键词: 矿区地表沉降 干涉测量 形变干涉相位图

THE APPLICATION OF INSAR TECHNOLOGY TO MINING AREA SUBSIDENCE MONITORING

LIU Guang<sup>1</sup>, GUO Hua-dong<sup>1</sup>, RAMON Hanssen<sup>2</sup>, ZBIGNIEW Perski<sup>2</sup>, LI Xin-wu<sup>1, 3</sup>, YUE Huan-yin<sup>4</sup>, FAN Jin-hui<sup>1, 5</sup>

1.State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing Applications, CAS and Beijing Normal University, Beijing 100101, China; 2.Department of DEOS, Delft University, the Netherlands, 2629 HS; 3.Key Laboratory of Resources Remote Sensing & Digital Agriculture, Ministry of Agriculture, Beijing 100081, China; 4.National Key Laboratory of Microwave Imaging, Institute of Electronics, CAS, Beijing 100080, China; 5.China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, Beijing 100083, China

Abstract:

Interferometry SAR is an emerging earth observation technique, which is especially useful in cartography and surface subsidence survey. This paper describes the method for monitoring the mining activities using the InSAR technique. Both ENVISAT ASAR and JERS1 SAR data were used to generate deformation interferograms, Characteristics of coherence as well as phase patterns on the C band and L band deformation interferograms were comparatively studied, and the feasibility and limitation of using InSAR technology in mining area subsidence monitoring were analyzed. The experimental result shows that both C band and L band can accomplish the monitoring of mining area subsidence, but C band has more restricted conditions for its perpendicular baseline. For the purpose of obtaining a satisfactory outcome in mining area subsidence monitoring by using the InSAR method, the time series of SAR images of every visit period and SAR deformation interferograms should be established.

Keywords: Mining area subsidence SAR Interferometry (InSAR) Deformation interferogram

收稿日期 2007-09-07 修回日期 2007-12-26 网络版发布日期

DOI:

基金项目:

农业部资源遥感与数字农业重点开放实验室2006年开放课题“多极化雷达和光学遥感数据农作物类型识别方法研究”、国家自然科学基金青年基金(40501050)项目“极化干涉SAR植被覆盖区土壤水分反演研究”及中国科学院遥感应用研究所遥感科学国家重点实验室科研支持基金“应用长时序干涉SAR测量方法监测煤矿区地表形变”等共同资助。

通讯作者: 刘广(1979-), 男, 博士研究生, 研究方向为雷达遥感与应用, 雷达干涉测量。

作者简介:

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(518KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 矿区地表沉降
- ▶ 干涉测量
- ▶ 形变干涉相位图

本文作者相关文章

- ▶ 刘广
- ▶ 郭华东
- ▶ Ramon Hanssen
- ▶ Zbigniew Perski
- ▶ 李新武
- ▶ 岳焕印
- ▶ 范景辉

PubMed

- ▶ Article by Liu, G.
- ▶ Article by Guo, H. D.
- ▶ Article by Ramon Hanssen
- ▶ Article by Zbigniew Perski
- ▶ Article by Li, X. W.
- ▶ Article by Yue, H. Y.
- ▶ Article by Fan, J. H.

作者Email:

参考文献:

本刊中的类似文章

文章评论

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text"/> 3040

Copyright by 国土资源遥感