

空间物理学★大气物理学★大地测量学

雷达干涉PS网络的基线识别与解算方法

陈强¹, 丁晓利², 刘国祥¹, 胡植庆³, 袁林果²

1 西南交通大学测量工程系, 成都 610031

2 香港理工大学土地测量与地理资讯学系, 香港九龙

3 台湾大学地质科学系, 台湾台北

收稿日期 2008-10-5 修回日期 2009-4-13 网络版发布日期 2009-9-20 接受日期

摘要 时序雷达干涉图中的永久散射体(PS)可看作“天然GPS点”, 以构成网络用于监测长期的地表形变. 本文提出采用邻接矩阵拓扑模型对基于Delaunay剖分算法生成的PS网络进行基线识别, 并采用时序相干最大化算法求解PS基线的线性形变速度增量和高程误差增量. 该数据模型和计算方法被应用于探测香港地区2006~2007年间的区域地表沉降. 实验研究采用由Envisat卫星ASAR传感器对该地区成像所获取的时序SAR影像作为数据源, 并联合该地区12个GPS连续运行参考站的观测数据予以大气修正和地面控制. 实验结果表明, 该模型和方法应用于地表形变测量是有效的和可靠的, PS网络方法探测地面沉降的精度约为 ± 2.0 mm/a.

关键词 [永久散射体](#) [雷达干涉](#) [基线识别](#) [参数估计](#) [地表形变探测](#)

分类号 [P225](#)

DOI: [10.3969/j.issn.0001-5733.2009.09.006](#)

Baseline recognition and parameter estimation of persistent-scatterer network in radar interferometry

CHEN Qiang¹, DING Xiao-Li², LIU Guo-Xiang¹, HU Jyr-Ching³, YUAN Lin-Guo²

1 Department of Surveying Engineering, Southwest Jiaotong University, Chengdu 610031, China

2 Department of Land Surveying and Geo-Informatics, The Hong Kong Polytechnic University, Hong Kong, China

3 Department of Geoscience, National Taiwan University, Taipei Taiwan, China

Received 2008-10-5 Revised 2009-4-13 Online 2009-9-20 Accepted

Abstract Similar to GPS sites, persistent scatterers (PSs) identified from a time series of radar interferograms can be used to establish a network for monitoring long-term ground deformation. We propose an adjacent array model for searching PS to PS connection (baseline) to form a Delaunay triangular network. The algorithm of temporal coherence maximization is employed to estimate the increments of deformation velocities and elevation errors along each PS-PS connection. The baseline recognition and parameter estimation methods are applied to detect land subsidence in Hong Kong. The algorithm validation is performed using SAR images collected over Hong Kong by the ASAR sensor onboard satellite Envisat during 2006~2007. The GPS measurements at 12 sites are used to correct atmospheric effects in the interferograms and calibrate the PS solution. Test results show that the proposed methods are viable and reliable for detecting ground deformation. The achievable accuracy of linear deformation velocity is about ± 2.0 mm/a.

Key words [Persistent scatterer](#); [Radar interferometry](#); [Baseline recognition](#); [Parameter estimation](#); [Ground deformation detection](#)

通讯作者:

陈强 swjtucq@sina.com

作者个人主页: 陈强¹; 丁晓利²; 刘国祥¹; 胡植庆³; 袁林果²

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