

论文

永久散射体雷达差分干涉应用于区域地表沉降探测

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摘要 永久散射体干涉测量技术可以克服常规干涉方法在区域地表形变测量中的雷达信号失相关和大气延迟影响. 本文对基于永久散射体的干涉处理全过程进行了分析, 基于差分相位的两个主要特性: 沉降信号时序相关、地形相位与空间基线成比例, 提出构建PS网络, 并采用间接观测平差法估计沉降速度网和高程修正网的全局最优解. 实验选取上海地区近10年间的ERS-1/2卫星C波段SAR数据进行干涉处理, 在永久散射体上分离形变信号、高程修正和大气分量, 并最终提取上海地区高分辨率地面沉降速度场, PS结果与地面精密观测成果吻合较好.

关键词 [永久散射体网络](#) [合成孔径雷达差分干涉](#) [沉降探测](#) [信号失相关](#) [大气影响](#)

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Radar differential interferometry based on permanent scatterers and its application to detecting regional ground subsidence

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Abstract Synthetic aperture radar differential interferometry (DInSAR) based on permanent scatterers (PS) may overcome or mitigate two main disadvantages, i.e., radar signal decorrelation and atmospheric delay influence, which often take place in the conventional DInSAR. This paper analyzes all the processing procedures involved in PS based DInSAR. Considering that deformation is of temporal correlation and topographic phase is proportional to normal baseline, the method of generating PS network is proposed. A parametric adjustment method is adopted to estimate total optimum solutions of subsidence rates and elevation corrections in the PS network. With the proposed algorithm, the experiment is performed to extract subsidence information over Shanghai using ERS_1/2 C_band SAR images taken during the latest 10 years. Deformation, elevation correction and atmospheric phase on PS points are effectively separated and the subsidence rate field with high resolution is presented. The results obtained from PS network are in a good agreement with leveling measurements.

Key words [Permanent scatterers network](#); [DInSAR](#); [Subsidence detection](#); [Decorrelation](#); [Atmospheric influence](#)

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