

SUB-PIXEL CHANGE DETECTION FROM MULTI-TEMPORAL CBERS REMOTE SENSING IMAGES BASED ON SPECTRAL MIXTURE MODEL*Du, Peijun¹; Liu, Sicong²; Liu, Pei³; Xia, Junshi³**¹Nanjing University; ²University of Trento; ³China university of mining and technology*

Usually, for change detection applications in urban areas, the conventional approaches are mainly based on per-pixel processing, which ignore the sub-pixel spectral variations resulted from spectral mixture. Especially for medium-resolution remote sensing images, land use/cover components within a single pixel are usually complicated and heterogeneous. The traditional methods based on the pure pixel assumption lead to a high level of omission and commission errors inevitably, which further degrades the overall accuracy. In this paper, a novel sub-pixel level change detection scheme is designed based on the theories of change detection and spectral mixture analysis. Nonlinear spectral mixture model is selected for spectral unmixing and sub-pixel change, which is implemented by investigating the inter-pixel subtle changes and combining multiple evidences. Multi-temporal China Brazil Earth Resources Satellite (CBERS) remote sensing images are used as experimental data for land cover change detection and urban growth monitoring. The effectiveness of the proposed approach is confirmed in terms of overall accuracy, commission and omission errors in contrast with traditional pixel-based change detection methods. In particular, the proposed sub-pixel change detection approach provides not only the binary change and non-change information, but also obtains the characterization about types, directions and change intensity, which greatly enriches and extends the applicability of the detected change maps.

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基于光谱混合模型的多时相CBERS遥感影像亚像元变化检测

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通常，对于城市区域的变化检测应用来说，传统方法主要基于像素为单位的处理，忽略了光谱混合而导致的亚像元级的光谱变异。特别对于中低分辨率的遥感影像来说，单一像素内的土地利用/覆盖成份常较为复杂且具有异质性。因此，传统基于纯净像元假设的方法会不可避免导致较多的漏检和虚检变化产生，而降低整体的变化检测精度。本文设计和提出了一种基于变化检测理论和光谱混合分析模型的亚像元层变化检测方法。选择非线性光谱混合模型进行光谱分解和亚像元变化检测，以进一步探究像元内部细微变化，并综合多种证据特征。试验使用多时相中巴资源卫星遥感影像（CBERS）进行土地覆盖变化检测和城市扩展监测，结果表明对传统基于像素的变化检测方法相比，本文提出的方法可以有效提高整体检测精度，同时抑制漏检和虚检变化。此外，所提出的亚像元变化检测方法不仅可以提供变化和不变化的二值信息，还可以同时获得变化的类型，方向和变化强度信息，极大地丰富和扩展了变化检测结果的应用性和多样性。

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