



## **Multi-scale investigation of shrub encroachment in southern Africa**

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There is growing speculation that savannah environments throughout Africa have been subject to shrub encroachment in recent years, whereby grassland is lost to woody vegetation cover. Changes in the relative proportions of grassland and woodland are important in the context of conservation of savannah systems, with implications for faunal distributions, environmental management and tourism. Here, we focus on southern Kruger National Park, South Africa, and investigate whether or not shrub encroachment has occurred over the last decade and a half. We use a multi-scale approach, examining the complementarity of medium (e.g. Landsat TM and OLI) and fine (e.g. QuickBird and WorldView-2) spatial resolution satellite sensor imagery, supported by intensive field survey in 2002 and 2014. We employ semi-automated land cover classification, involving a hybrid unsupervised clustering approach with manual class grouping and checking, followed by change detection post-classification comparison analysis. The results show that shrub encroachment is indeed occurring, a finding evidenced through three fine resolution replicate images plus medium resolution imagery. The results also demonstrate the complementarity of medium and fine resolution imagery, though some thematic information must be sacrificed to maintain high medium resolution classification accuracy. Finally, the findings have broader implications for issues such as vegetation seasonality, spatial transferability and management practices.