FOREST MONITORING AT CONTINENTAL AND REGIONAL SCALE WITH OPTICAL SENSORS – SOME RESULTS FROM AUSTRALIA

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ABSTRACT:

The potential for monitoring of forests, perennial vegetation and other land covers for a range of societal benefits has increased at a rapid pace with the advances in sensors, computation, analytical, algorithmic and other advances. The technical advances open up opportunities to ask new questions of the data, ranging from national to local government requirements. In this paper we describe monitoring systems that we developed in response to questions posed from local, regional and national concerns. Common to these approaches is the requirement for remotely sensed data acquired at regular time intervals that provide spatially explicit mapping of extent, changes in extent, and changes within the extents, providing an understanding of historical patterns of change in the land cover classes. We provide recent examples from a national program considered driven by the requirements for greenhouse gas emissions monitoring, with land use changes associated with agriculture and forestry being a significant component in Australia's carbon budget. The requirements include national spatial and temporal consistency in reporting, by a structural definition of forest, at a spatial resolution of less than one hectare over an extended period. The paper describes the development and evolution of the national system, which utilises thousands of Landsat MSS, TM, ETM+ and OLI images to monitor forest and sparse woody classes at 25m resolution for multiple time periods (currently 17) since 1972. We also describe efforts with deci-metre and metre-scale monitoring for case where deca-metre resolution is not sufficient.

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