3

Fire extent mapping: procedures, validation and website application

Rohan Fisher and Andrew C Edwards

Summary

Our current understanding of global fire regimes is largely informed through satellite-derived fire mapping. The primary sources of satellite imagery are the continental-scale Moderate Resolution Imaging Spectroradiometer (MODIS) and Advanced Very High Resolution Radiometer (AVHRR) sensors from which are derived active fire, 'hot spot', and post-fire, burnt area, mapping. The mapping is particularly important for management in the highly fire-prone savanna landscapes of northern Australia, and also provides insights into the environmental, social and economic impacts of fire. Since 2003, fire mapping for northern Australia has been produced from MODIS data using a semi-automated object-based classification technique. Importantly, these data are updated regularly and made available through the North Australian Fire Information (NAFI) web portal for fire management planning and carbon and greenhouse gas emissions accounting. The robust nature of this dataset and its high public profile through NAFI have led to its becoming the baseline mapping legislated for use in the savanna burning greenhouse gas emissions abatement scheme, already approved for the higher rainfall regions of northern Australia.

In this chapter we describe the processes for producing the MODIS-derived burnt area mapping served through NAFI. We then undertake a thorough validation using an independent and extensive point dataset and compare it to a series of automated global fire mapping datasets through regression analysis of Landsat-derived burnt area mapping across five scenes in two seasons of 2 years.

The results demonstrate a high level of confidence in the product, with an overall accuracy of 88% when compared to the field data. When compared to other fire datasets the NAFI data was consistently more accurate. The accuracy of the global datasets decreased by nearly half compared to the NAFI and DLI AVHRR data when mapping smaller early dry season burnt areas. This is significant as these areas often have important implications for operational fire management. This suggests that although providing useful statistics (e.g. percentage area burnt, seasonality and