

## Improving forest management using remote sensing

Large-scale remote sensing data offers a cost effective alternative to field-based inventory for checking the growth performance of forest crops. This presentation shows how medium-resolution satellite data can be used to track the growth and performance of newly established forest crops. The method uses a time-series of Landsat data normalized to each other so that the reflectance values can be used to predict forest height changes through time.

### Monitoring forest change

This example uses satellite acquired over Galloway Forest District from 1989 to 2001. These data are radiometrically normalized to a common image date. In this case the 2001 image is used as it matches with the timing of the field inventory measurements. On the change image changes in forest practices such as clearfelling are easily identified as bright colours, because these represent large changes in spectral reflectance. Areas of no change are dull in colour as the spectral change is small i.e. areas of moorland (Figure 1)

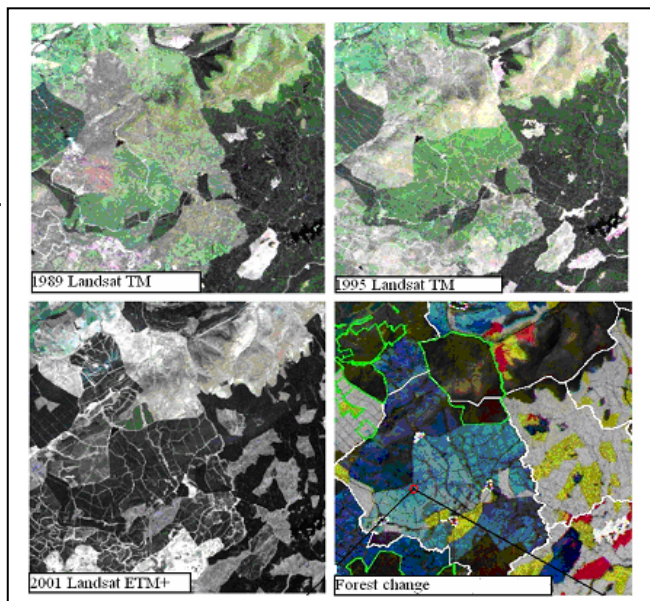


Figure 1. Forest change image using Landsat TM/ETM+ SWIR bands

### Adding height estimates

By relating image reflectance to field height an estimate of height can be derived for each image date. If added to the image time-series, forest height development can be tracked through time (Figure 2).

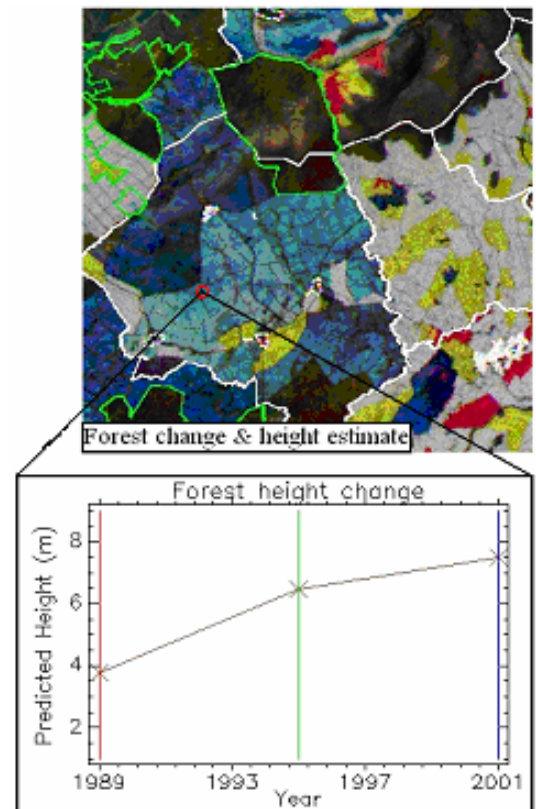
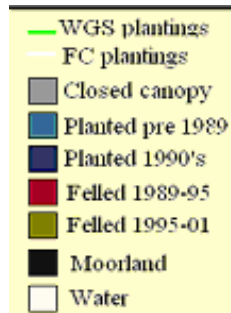


Figure 2. Forest height change through time

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The same method can be applied to any image data, which expands the number of satellite sensors that can be used for this application.

### Applications

- Monitoring forest owner compliance
- Tracking forest growth over time
- Identifying problem stands