

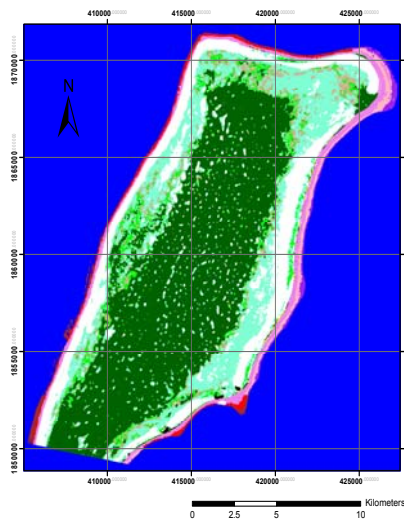
## “Coral Reef Maps”

### Habitat mapping

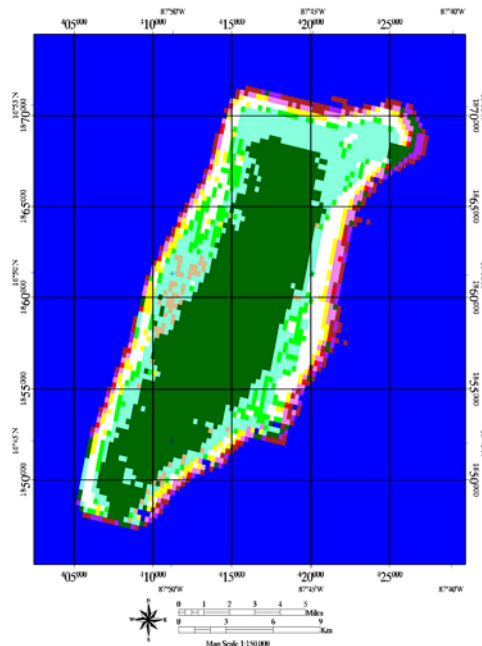
Maps of typical coral reef habitats can generally be used as a surrogate for species of functional information. They serve as a baseline for resource availability and location and can be used to detect gross changes in resources.

### Results

An unsupervised classification of MERIS full resolution imagery into 12 habitat classes was conducted with class determinations and accuracy assessed by 200 ground truth points. Results showed that similar accuracy to 4-channel SPOT classified data was obtainable, but the greatest confounding factor was the low spatial resolution of MERIS (300m x 300m). Some reef features, such as reef-crest and *Montastraea* (live coral) areas occur on scales of less than, or comparable to, 300 m, hence the exact alignment of MERIS pixels over the reef can have substantial effect of the classified type and overall accuracy.



SPOT 20 m x 20



MERIS FR 300 m x 300 m

Figure 1: Comparison of SPOT and MERIS based coral reef habitat mapping.

### Coral bleaching

Coral bleaching is the process whereby live corals turn white in appearance. Bleaching often, but not always, leads to mortality of the corals. The causes of bleaching are primarily thought to be thermal and light stress (i.e. when it gets too hot for prolonged periods and under bright sun). Monitoring coral bleaching events is therefore an important objective for reef management and conservation, given global climate change – bleaching may be expected to increase in frequency and severity, but on the other hand no-one really knows how fast corals can adapt to changes in climate.

## Results

As there was no significant bleaching event within the DIVERSITY project time frame, no imagery was available to conduct a direct assessment of the capability of MERIS to detect a bleaching event. Instead a modelling analysis was carried out assessing the predicted reflectance at the MERIS sensor and the proportion of bleached coral. Input data was available from previous work of the experts.

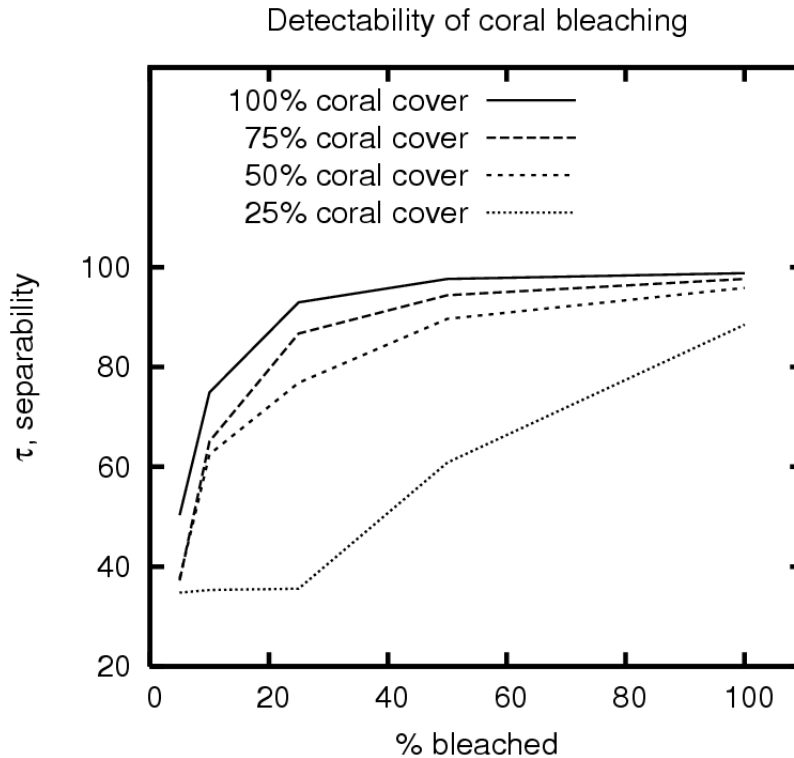


Figure 2: Coral bleaching (simulation).

The results indicate that MERIS does have capability to detect bleaching events provided that

1. there is sufficiently high coral cover in the first place, i.e. live coral is > 20% of what is on the substrate, and
2. that the proportion of bleaching is high – that is, a large proportion of the coral which is present bleaches.

In a situation where live coral cover is low or only a small amount of it bleaches then the overall change in the reflectance is relatively small and the capability to detect the bleaching event in MERIS data is greatly reduced.

For further information, please have a look at the Deliverable D10 (Operational Documentation), or contact Peter Mumby ([P.J.Mumby@exeter.ac.uk](mailto:P.J.Mumby@exeter.ac.uk), Phone: ++ 1392 263798).