Method

1. Current resolution of satellite images and analytical methods makes possible the large-scale mapping of Macrocystis pyrifera beds in New Zealand waters using this method.
2. It is possible to follow the evolution through time of Macrocystis surface canopy, satellite images being acquired every two weeks.
3. Comparisons of progression or regression of Macrocystis surface canopy between sites can be made.

Background

1. Giant kelp Macrocystis pyrifera (bladder kelp) is a large, perennial kelp that forms dense beds with layers of floating surface canopies.
2. These beds are at the base of many temperate coastal food webs, providing important habitat.
3. Because giant kelp is a foundation species that responds to a range of pressures, it is a potentially good indicator species for monitoring the ecological integrity of the New Zealand marine environment.
4. Although there is some evidence that the extent of New Zealand’s Macrocystis beds is declining, there has to date been little quantitative evidence to assess the extent and rate of this decline.

Results

Long Island (30 Sep 2010) Long Island (18 Oct 2013)

- The classification results of satellite images could pick up the signal of canopy forming kelps (red layer in above images).
- Significantly different Macrocystis canopy extent were detected between areas and years.
- The extent of Macrocystis canopy beds were 53,030m², 45,022m², 78,265m² and 100,415m² for Long Island 2010, Long Island 2013, Tory Channel 2010, Tory Channel 2013.

Prospects

- Satellite images could provide a powerful tool to remotely map the extent of Macrocystis pyrifera beds.
- The potential exists for quickly mapping large areas and creating robust reference points for past and future time series.
- Further tests are required to assess the effect that tidal levels, currents or turbidity might have on the signal picked up by satellites.

References