

Reef sites

Ecological observations associated with an anomalous warming event at the Houtman Abrolhos Islands, Western Australia

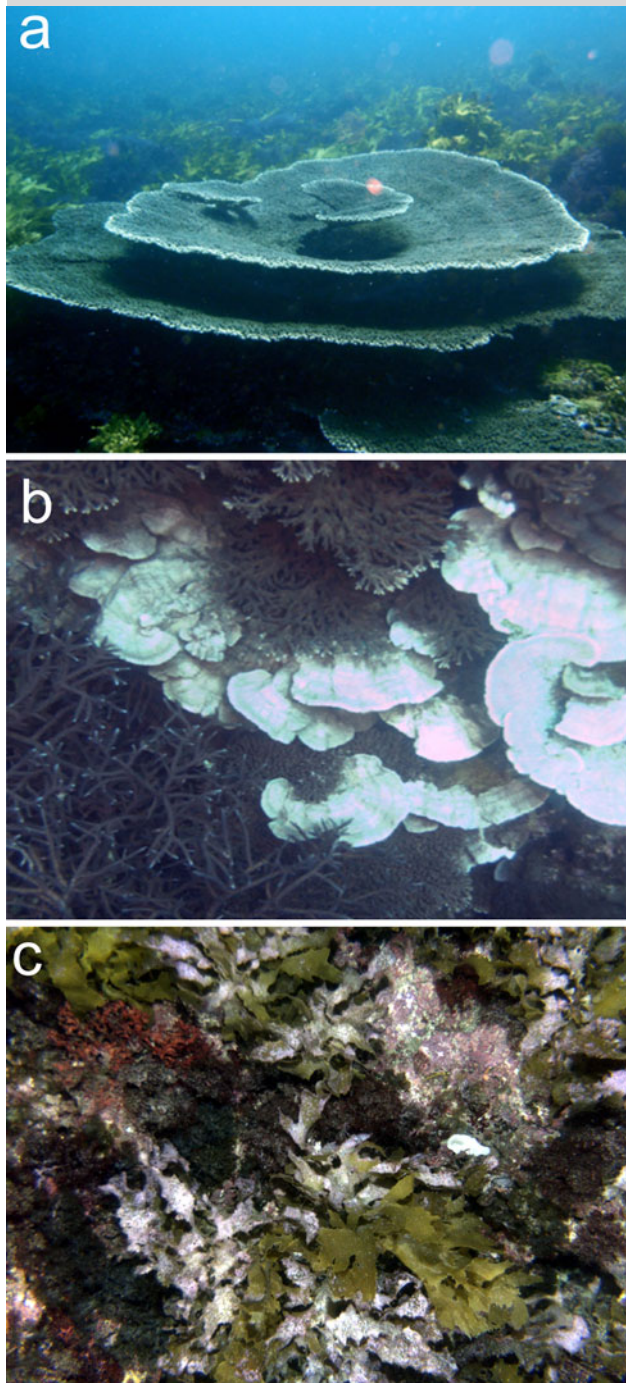


Fig. 1 **a** Massive plate coral (*Acropora spicifera*) thriving amidst dense kelp (*Ecklonia radiata*) at the Houtman Abrolhos Islands, **b** bleached coral, *Montipora* sp., and **c** heavy biofouling of *Ecklonia radiata* observed in April 2011

Coral reefs and kelp beds are two of the most ecologically and economically important marine habitats on Earth. Coral reefs and kelp beds are usually biogeographically distinct, being associated with tropical and temperate to subpolar areas, respectively. However, at the Houtman Abrolhos Islands (28° 43' 0" S, 113° 47' 0" E), a group of small limestone protrusions some 60 km off Western Australia (WA), coral reefs and kelp beds are juxtaposed (Smale et al. 2010) (Fig. 1a). This unusual constellation is likely conditioned by the long environmental stability and unique oceanography of the region. The Houtman Abrolhos Islands experienced a marine 'heat wave' in 2011 driven, in part, by strong La Niña conditions, which increased the poleward flow of warm water along the coastline of WA (Pearce et al. 2011). Satellite-derived SSTs off WA were the highest on record during the event, while at the Houtman Abrolhos Islands temperature peaked at 28.7°C on March 1; 5°C higher than the long-term monthly mean (Pearce et al. 2011). Surveys of coral reefs and kelp beds (>5,600 m²) were conducted with an AUV in April 2011 at multiple sites, between 15 and 25 m depth. Image analysis revealed extensive bleaching (up to 20% of coral cover per site), primarily of *Montipora* spp (Fig. 1b). Widespread coral bleaching has not been reported from this system previously, even during exposure at spring tides and during the global bleaching event of 1998 (Webster et al. 2002), and no bleaching was observed in previous AUV surveys. Furthermore, extensive epibiosis of the kelp *Ecklonia radiata* (most likely by encrusting coralline algae) was observed adjacent to bleached coral (Fig. 1c), which has also not been reported before and may be associated with elevated temperatures. The islands represent a temperate–tropical transition zone, with many key species found at the edge of their ranges, so that marine communities here may act as important indicators of climatic change.

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References

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