Turbid reefs experience lower coral bleaching effects in NE Borneo (Sabah, Malaysia)

ABSTRACT

The impacts of climate change are becoming more evident in recent years. Future projections suggest that heat stress events will likely be more frequent and severe over the next century, threatening the high diversity of the Coral Triangle. Shallow turbid reefs may help dampen some of these effects as several studies have shown their inherent resilience to heat stress events. Therefore, our main goal was to test this hypothesis by assessing the response of corals to the heat stress event of 2020. We conducted bleaching surveys in two contrasting habitats in Darvel Bay, Sabah: the turbid reef of Sakar, and the clear-water reef of Blue Lagoon. Relatively high coral cover (40–43%) was observed on both reefs in 2019. Underwater data loggers were used to monitor temperature and light. Coral colonies were scored from video transects of 100 m at 5 m and 10 m depth in both localities, with an additional transect at 15 m depth in Blue Lagoon. A total of 1326 coral colonies were evaluated for bleaching presence and bleaching severity based on the six-point scoring method. Bleaching severity varied significantly between both reefs. Low bleaching impacts were observed in the high turbid reef, with an average of 9.6% of colonies having bleached. Meanwhile, the clear-water reef of Blue Lagoon had an average of 37.1% of coral colonies affected by bleaching. Bleaching severity also varied significantly among depth, where corals in deeper depths bleached less in Blue Lagoon. Foliose coral forms were most affected in Blue Lagoon, while massive coral forms suffered the most in Sakar reef. Bleaching responses were also significantly different among coral genera. While Ctenactis and Herpolitha were consistently resistant in both reefs, Leptoseris, Fungia and Goniopora were most affected in the 5 m of Blue Lagoon. Meanwhile, Pachyseris was notably more affected in Sakar reef at 10 m than in Blue Lagoon. Overall, bleaching indices within these two reefs are lower than most that were assessed around the globe during heat stress events in 2020. These outcomes support the hypothesis of turbid reefs hosting resilient coral communities in the face of climate change.