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Temporal drivers of abundance and community structure of scyphozoan jellyfish in tropical coastal waters

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ABSTRACT

Population blooms of scyphozoan jellyfish in tropical shallow water regions can fuel localized fisheries but also negatively impact human welfare. However, there is a lack of baseline ecological data regarding the scyphozoans in the region, which could be used to manage a fast-growing fishery and mitigate potential impacts. Thus, this study aims to investigate the temporal factors driving the distribution of scyphozoan community along the environmental gradients under different monsoon seasons, rainfall periods, moon phases, and diel-tidal conditions in the Klang Strait located in the central region along the west coast of Peninsular Malaysia, where bloom events are increasing. Scyphozoan samples were collected using commercial bag nets during a 19-month survey. Temporal variations in species abundance and composition were evident and related to the local environmental parameters (salinity, dissolved oxygen, temperature, turbidity, and pH) that varied with the regional monsoon events, although these effects appeared to be species-specific. *Phyllorhiza punctata*, *Acromitus flagellatus*, *Lychnorhiza malayensis*, and *Rhopilema esculentum* were more abundant during the wetter northeast monsoon (NEM) while the abundance of *Chrysaora chinensis* and *Lobonemoides robustus* increased during the drier southwest monsoon (SWM). During the wet period of NEM, scyphozoan abundance was generally higher during the daytime than night-time. The regional monsoon regime and local hydrological events account for jellyfish abundance in the nearshore area with concurrent threats to coastal tourism and power plants, as well as benefits to fisheries especially during the NEM.

Subjects Biodiversity, Ecology, Marine Biology, Zoology, Population Biology
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INTRODUCTION

Over the past decades, a significant increase in bloom incidents of scyphozoan jellyfish has been reported in marine ecosystems worldwide (*Purcell, 2005*; *Richardson et al., 2009*; *Lucas & Dawson, 2014*). These reports had triggered a series of ongoing debates; one being the magnitude of the reported increases purportedly amplified beyond available evidence in the reviews by *Condon et al. (2013)* and *Pitt et al. (2018)*. Another pertains to the nature of these blooms –whether they may be 'true' blooms, *i.e.,* seasonal and generally predictable population fluctuations, or merely aggregations driven by the environment, which had led