THE FLOATING SARGASSUM OF SOUTH ATLANTIC OCEAN – LIKELY SCENARIOS

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Introduction

Floating Sargassum is well known since the 19th century from the Sargasso Sea, a region in the northwestern Atlantic Ocean occupying approximately 4,164,000 km2 extending between 228–388N and 768–438W and centred on 308N and 608W. The Sargasso Sea is formed by floating masses of Sargassum natans (Linnaeus) Gaillon and S. fluitans (Børgesen) Børgesen (Butler et al. 1983; Guiry & Guiry 2016). The floating Sargassum provides substrate, shelter and feeding grounds for invertebrates, turtles and fishes, of which 10 species are endemic (Butler et al. 1983; Laffoley et al. 2011). Due to their unequivocal evolutionary, ecological and economic importance, conservation initiatives look to protect this particular environment, especially in areas beyond any national jurisdictions (Warner 2014). The establishment of the Sargasso Sea Commission (http:// www.sargassoalliance.org) encourages and facilitates voluntary collaboration toward the conservation of this environ- ment in regard to its health, productivity and resilience.

The singular condition of the subtropical convergence zone concentrates the main floating Sargassum patches from the Gulf of Mexico to the open sea. These floating islands are directed by surrounding currents (Sehein et al. 2014) that also transport the Sargassum and the associated biota across a broad area and to long distances, influencing and even enhancing the dispersion process of marine organisms that utilise them as rafts (Thiel & Gutow 2005; Luiz et al. 2015). However, recent changes in patterns of surface currents may be displacing this drifting environment to new regions, offshore (Sze chy et al. 2012; Gower et al. 2013; Moreira & Alfonso 2013) and to coastal areas (Gavio et al. 2015). Sargassum masses arriving on the coast may be a threat to coastal environments, as biomass decomposition has nega- tive effects on tourism activities as well as local fisheries (Solarin et al. 2014).

Furthermore, pelagic Sargassum potentially brings rafter and associated species that are exotic to different ecosystems, compromising their equilib- rium (Ferreira et al. 2009).
Sze´ chy et al. (2012) reported the first occurrence of Sargassum masses offshore on the northern Brazilian coast in July 2011 (Fig. 1). In the same year, pelagic Sargassum reached the coast of western Africa, from Sierra Leone to Ghana (Johnson et al. 2013; Smetacek & Zingone 2013), in an unprecedented event named the 'golden tide'. In April 2015, floating masses of Sargassum were observed arriving at Fernando de Noronha Archipelago (038500S, 328250W), a marine national park 345 km from the northeastern coast of Brazil, coming from the eastern side of the South Atlantic Ocean.

Afterwards, an enormous amount of stranded Sargassum was recorded in coastal regions of Brazil, including Para´ (008350S, 478170W) and Maranha˜ o (28290S, 0 44817 W) states. Slicks of Sargassum were also spotted next to the Brazilian oceanic islands of Rocas Atoll (038520S, 338480W) and Sa˜ o Pedro and Sa˜ o Paulo Archipelago (008550N, 298200W), 230 km and 1000 km from the Brazilian coast, respectively (Fig. 1). We have gathered information on the unusual Sargassum biomass reaching the shores of the South Atlantic, attempting to explain its origin, the main environmental drivers and alternatives for management.

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