On the recurrent Sargassum blooms in the Central Atlantic
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\textbf{Abstract:} Since 2011, massive \textit{Sargassum} landings on the Lesser Antilles islands in the southern Caribbean have been reported frequently, representing a serious environmental problem to local tourism and economy. Yes despite an initial effort of using MERIS to document \textit{Sargassum} distributions between 2002 and 2011, our knowledge on the source, abundance, distribution, and long-term trend of this ecologically important marine organism is extremely limited. The objective of this research is to address the technical challenges of remote quantification of \textit{Sargassum} in the tropical Atlantic Ocean, and then study their spatial and temporal changing patterns as well as their potential origin and environmental response. The technical approach is based on the MODIS AFAI (alternative floating algae index) images and statistical analysis of the classified \textit{Sargassum} pixels over the Atlantic region. The fully-automatic classification takes into account of various confusion features that influence the detection accuracy, such as cloud shadow, cloud adjacency effect, and sun glint induced large-scale variance. A weighting factor is also determined by comparing the \textit{Sargassum} pixel with the nearest water pixel to determine the sub-pixel \textit{Sargassum} coverage. \textit{Sargassum} percent coverage for each pixel is then generated at monthly, seasonal, and annual intervals, which are then used to study their spatial and temporal distributions as well as their long-term trends. Environmental factors such as wind, sea surface temperature, surface irradiance, and ocean currents are examined to determine the potential origins and transport pathways of the massive blooms.

\textbf{Keywords:} MODIS, AFAI, \textit{Sargassum}, Feature extraction, Time series, Atlantic Ocean