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Interactive comment on "On the potential causes of the recent Pelagic Sargassum blooms events in the tropical North Atlantic Ocean" *by* Sandrine Djakouré et al.

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Short comment on ms by Djakoure et al

General comments

This is an interesting paper that tackles the difficult question of the causes of the recent large scale Sargassum proliferation. The dataset is appropriate, hereafter we suggest changes that should improve the methods, context and writing of the paper.

Specific comments

1) Use of different time periods to relate environmental changes to Sargassum changes

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during recent years: SST 1979-2015. NAO and AMO 1950-2015. Amazon river discharge 1979-2015. Biogeochemical simulations MERCATOR GREEN 1998-2014. Authors should use a common time period to compare the various time series and a common period to compute the seasonal mean. The appropriate time series should be the period of MODIS satellite record of floating algae indices 2000-2015.

The NERR box appears to have been arbitrarily defined as . [0âÛę-10âÛę N; 50âÛę-10âÛę W].. Its definition should be explained. Are the results sensitive to a halving of the box or to a zonal translation? Did the author try to study other boxes? (coastal Brazil, coastal Congo, north-tropical Atlantic?, . . .)

2) How do you define years with sargassum blooms ? Reference ? What about the significant differences from year to year since the “2011 beginning”? 2013 was in particular a “no bloom year” and there should not be a star for this year in Fig.1 bottom panel, Do the strandings always occur both in the western and eastern Atlantic?

3) River impacts: The question of the spreading of the river plumes into the Atlantic is not evoked. For the Amazon the directional variability is very large : toward the NERR or toward the Caribbean sea: see e.g. the satellite study by Korosov et al. JGR 2015

Technical corrections

P2L7 tropical P2L16: “the new Sargassum distributions ‘’ : why “new”. Besides, the Gower et al. satellite studies informed both on the seasonal cycle over the whole N. Atlantic and on the 2011 events. They could be fruitfully quoted.

P2L22-26. Each hypothesis on the causes of the blooms should be supported by its specific references.

P2L31. “Rapid water motion”. Does not apply here. Sargassum natans and fluitans are pelagic. Thus these algae do not “see” the water motion as they move together with the water body. Given references are inappropriate as they refer to fixed species, such as Sargassum muticum.

P2L33 Wrong reference: Gao and McKGao. Should be Gao and McKinley 1994.

P3L12-16 : this sentence is discussion and unclear. P3L20 : Âń there is no evidence of drift from north to south ‘’ : what does that mean ?

P4L6 : why these particular climate indices ?

P5 formulas (3) and (4). Why P ? Q instead I guess.

P5L20 : PISCES model is forced by the circulation model. Not the reverse.

P5L22-24. Please detail. You must indicate that river discharge in the model is constant through the year

P5L25. What is the period used to compute the “climatological seasonal cycle”. It should be the same for all variables.

P6L19 for what reasons Lefèvre et al. 2013 and Servain et al. 2014 are quoted?

P7L2-4 The authors note that the first bloom in 2011 corresponds to the minimum Amazon discharge from 1979 to 2015. This deserves an explanation.

P7L15 Lapointe (1986) says the exact contrary : Sargassum are phosphate limited. Please use the correct reference and correct here and elsewhere. P7L15. Sissini et al 2017 do not show any result on nutrient limitation.

P7L18. “These results ...”. This sentence should be in the methods. P7L 23 and elsewhere : the verb Âń evince Âż is pretty unusual.

P8L5. Iron concentration in PISCES is the remainder of its use by phytoplankton. More appropriate would be the atmospheric deposition of iron that is used as a forcing by PISCES.

P8L9-11 Fig 5f shows significant positive anomalies in chlorophyll from 2012, not from 2011. Chl also seems to exhibit a relative minimum in its positive anomaly in 2013, a year with no Sargassum bloom. These behaviors deserve a more accurate analy-

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sis. It should also be useful to know how the PISCES model chlorophyll compares to (satellite) observations. Are the observations assimilated in the model?

P9L6. “Indeed, It has been ...”. Awkward sentence.

P9L12 : The authors have not shown any correlation between increased temperature and Sargassum blooming. They only showed that a positive temperature anomaly occurred just before the beginning of the repetitive bloom period.

P9L15 Please rewrite. Peaks in climate indices cannot generate blooms.

P9L20 If the authors have analysed the position of the ITCZ they should tell it before in he paper. Dynamics certainly play a role in the problem.

P9L31-32. Why is it important? How is it related? Unclear. P9L33. “Good agreement” Can you quantify it? For instance with a correlation coefficient?

P10L1 and L4-6: The discussion of deforestation is out of the scope of this study. P10L8 deferred: prefer “delayed” P10L21: Add reference for the vertical velocity biases.

References: Check the names. Please only use validated source of information. Some references are non-peer reviewed reports, for instance Hernandez 2011.

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