This study utilizes aerosol measurements from the Ragged Point site in Barbados, in conjunction with model simulations, to comprehend the effect of implementing air quality policies in the US and EU. This perspective is very interesting, given that the observation site is situated significantly distant from both the US and EU in a remote region. The implementation of air quality measures is expected to certainly influence local aerosol changes, but the effects on areas far away from the US and EU remain unclear. The long-term observational data is unique and intriguing. The data and the story have been presented clearly and meticulously. However, trace gases observation, such as NO_x, SO_2, and CO_2 are absent in these studies, making the results less robust. The author has utilized simulated data to aid in understanding the information, which is helpful but also comes with high uncertainties. Furthermore, why is there no measurement data available after 2011? The current dataset is rather dated. I also have a concern regarding the absence of information from South America, a region geographically closer to Barbados. The local sources there may have less stringent air quality controls. In summary, addressing the following questions and comments would potentially lead to its acceptance.

Main comments:

1) From the map, the observation site BACO is closer to South America, making its effect on BACO's aerosol more interesting to me. Do you know the ratio of wind from South America? The current study focuses on the effect of North America and Africa, which is good and interesting. However, how significant is the fraction they represent compared to the effect from South America?
2) What is the aerosol and SO2 lifetime compared to the travel time of air masses from North America to the site?
3) Check all figure number in the text.
4) Anthropogenic emission is one of SO2 sources. However, in this study, when examining the air mass from the ocean, we cannot ignore the oceanic emission of SO2 from dimethyl sulfide (DMS), which may be affected by the ocean acidification and other parameters. In the section of discussion and conclusion, the authors exclude DMS by model simulation. However, the uncertainty of DMS simulations in the model are not well refined. It would be good to find some other possible evidence to support it, e.g., recent publication about DMS vs CO2. The contribution of local SO2 to aerosol and transported SO2 from US and EU need to be evaluated carefully.

Detailed comments:

Line 18-20, 'Elevated .... in the spring of 2010 and summer and fall of.... biomass burning emissions to our site', make the sentence more clear.

e.g., 'as well as during the summer and fall of 2018', 'transported biomass burning emissions from both northern and southern Africa to our site.'

Line 25: change 'predicts' to 'simulates' and apply the same for the following instances.

Line 33: add 'e.g.,' to '(NOy)'.

Line 110: Information regarding the distance of the site from anthropogenic emissions is missing. Additionally, there is no information about the site's distance from various sources (line 245 mentioned multitude emission sources).

Line 125:126: Your pump was on when the wind blows from the ocean, thereby excluding emissions from the local islands. What is the ratio of the ocean wind to the wind from south America. However, does this also exclude anthropogenic emissions from the land direction, basically South America?

Line 224-226: What does it mean? Does it imply that these two references have already presented similar results and provided explanations? If that is the case, please specify. If not, kindly make a statement regarding the changes in NOx and SO2 during the same period as shown in Figure 1. The current information is unclear and difficult to comprehend.

Fig 2: why not add the data from Bermuda.

Line 233-245: The entire paragraph aims to indicate that Ragged Point is a more remote location and may be influenced by various emission sources. However, questions arise regarding the local measurements of SO2 and NOx—do they exhibit similar trends to aerosols? Additionally, an inquiry is posed regarding the multitude of emission sources and how they impact aerosols in Ragged Point.

In line 125-126 you already mentioned that your pump was on when the wind direction blows from the ocean. Then how about the data from Bermuda? Add more details for Bermuda.

Line 246-255: Why is there no correlation between dust and sulfate, but a modest correlation between nitrates and dust? Add more details for this.

Line 264: Seasonal trends?

Line 269-271: The days of back-trajectories for 2009 and 2010 MAM are different, does it make any difference for the analysis?

Figure 4: Mark the year for figure 4d.

Line 308: The impact of Amazon biomass burning on aerosol levels measured at BACO can only be observed when the air mass originates from the South American continent. Current evidence in this study is not strong enough to me.

Line 360-368: can be in the method.

Change the order of Fig 7 and Fig 8.

Line 412-417: can be in the method.

Line 436-437: How about the agreement of nss-K+ between observations and simulations?

Line 457-460: Compared to African wildfires, how about Amazon wildfires, which is much closer and larger.

Line 463-466: How fast the SO2 can be transported from US and EU to our observation site? Compared to SO2 lifetime?