Reviewer #2: The Global Oceans segment of the 2020 State of the Climate report is (as always) an impressive compendium of new and invaluable results, presented in a clear and succinct form. The chapter will be an invaluable resource for researchers and policy makers, and it provides a useful baseline assessment of the current state of the changing ocean. As a reader, I particularly appreciate the chapter editors' efforts to provide a clear and accessible overview with clear takeaway messages (nicely summarized in haiku form). My comments are relatively minor.

ALL SECTIONS

One common issue throughout the chapter is that many figures are presented without formal uncertainty estimates. In some cases uncertainty information might be unavailable, and it would be good to state this. In many cases, a reasonable assessment of difference maps depends on knowing whether differences are statistically different from zero. As much as possible, information should be included to help readers understand the robustness of the observed changes in ocean climate.

SECTION b. SST

lines 217-218 . Given that satellites are unable to measure SST under sea ice, the source of the measurements in sea-ice covered regions is unlear. A citation or comments about SST data under sea ice would be helpful. Is it even fair to refer to upper ocean temperatures as SST if they are under ice?

SECTION c. OHC

line 348. "ranges" --> "range"

lines 359-361. The treatment of land vs ocean is referenced earlier but might be worth reiterating here. My understanding is that the 0.58 to 0.78 W/m^2 heat input is a net input to the Earth system, which would need to be divided by about 0.70 to represent net input to the ocean per unit area of ocean.

SECTION d. SALINITY

lines 447-449. The unexplained salty trends off of California and Chile are intriguing. These are regions with strong seasonal ranges. Out of curiosity, has seasonality been taken into account in the historic observations?

SECTION e. FLUXES

line 567. I know that the word "tendency" is used throughout this chapter, but here (and in some other places) it seems a bit jarring. Meteorological literature usually refers to tendency as the time derivative, so when it refers to difference maps, the terminology seems unclear. Would it be possible to refer to these maps as "differences" instead of "tendencies"?

line 575. The text refers to Fig. 3.1b as showing a tendency, but the figure caption indicates that it's a difference. This could be clarified in the text by using the word "difference".

Section e on heat, freshwater, and momentum fluxes could be strengthened with the addition of uncertainties for the difference maps in Figs. 3.11-3.13.

line 595. The wording "2020 P-E tendency pattern" doesn't really convey what the plot shows, which is a difference between 2020 and 2019.

SECTION f. SEA LEVEL

line 742. Again, the wording "2020 sea level tendency" does not provide a precise explanation for readers of the quantity in question, which I think is the 2020-minus-2019 sea level change.

line 765. Nuisance flooding is computed as an extreme event on the basis of a fairly short record. It seems like this estimator would be more meaningful if it were defined either based on a much longer time record, or based on an absolute measure of what constitutes nuisance flooding in each identified location.

SECTION h. AMOC

line 902. There is a mysterious font change in this line, which could confuse typesetters and readers.

*Thank you. This will be corrected prior to layout.*

line 968 and thereabouts. The discussion of Figure 3.23a is a little confusing. I think perhaps the shades of green are different for the line and for the legend, which makes the plot difficult to interpret. The three lines are not extraordinarily well correlated. It's particularly confusing that the text says that the green and black lines are better correlated after Argo becomes available, since the differences between these lines are determined by more than just the availability of Argo, and in fact the physical processes that they represent are sufficiently different that we might not expect the lines to be well correlated. This should be discussed more clearly.

SECTION i. PHYTOPLANKTON

line 1059 or so, and Figure 3.24c. Figure 3.24c and Figure 3.1a both show SST anomalies, but they are strikingly different. If possible, these differences should be addressed.

line 1080 and Figure 3.25. The red dots in this figure should include statistical uncertainties.

SECTION j. CARBON

line 1195 and Figure 3.28c. To establish a better parallel with earlier figures in this chapter, Figure 3.28 should include the 2020 anomaly relative to climatology (the current panel c) as panel b and the 2020-minus-2019 difference as panel c.