Detailed Review for 'Refining Marine Net Primary Production Estimates: Advanced Uncertainty Quantification through Probability Prediction Models', Jie Niu et al.

1. Line 26: In the abstract, the source of the NPP estimate (i.e., model output or observation) used in the paper should be mentioned.
2. Line 30: The author should explain the nature and the sources of uncertainty in NPP estimates. And why it is important.
3. Line 61-61: It is important to mention the recent study in Satyendranath et al. 2020 (Reconciling models of primary production and photoacclimation, Applied Optics)
4. Line 122: Again, it's important to mention why estimating uncertainty is important?
5. Line 137-138: Authors should rephrase "discloses the results" to "discusses the results".
6. Line 167-167: Why are these variables (input features) important in terms of estimating NPP?
7. Line 164: For PAR, SSP, SH and NPP data, authors should mention direct links for the data they used for experiments.
8. Line 783: Table-1: No need to mention the links here, acronyms are sufficient.
9. Line 785: Table-2: Authors should be more clear about the "missing quantity" units i.e., days.
10. Line 187: What specific algorithm was applied to make the time series interpolation?
11. Line 198-216: Authors can drop using "NPP" repeatedly, just the algorithm name is sufficient.
12. Line 208-211: It is not clear why CbPM is negatively correlated with AP. Authors should give an explanation.
13. Line 223: Typo in equation number.
14. Line 282: It is not clear whether the author had normalised the input features since they are in different scales.
15. Line 378: Do the authors have any explanation behind finding the lowest CPRS value than the other models?
16. Line 466-467: Applying a low pass filter on the time series is recommended before reaching this conclusion about long-term trend.
17. Line 478-481: Any previous studies (reference papers) that can support the statement about Bayesian model performing better in estimating uncertainty?
18. Line 483: What formula did the authors use to estimate the CDFs?
19. Line 486-487: As mentioned in the previous comment, the estimation of Train mean NPP and CAFE NPP curves are not clearly mentioned.

20. Line 505 “Small” should be replaced by “lower values” for more clarity.
21. Line 509-515: Test mean NPP lying below at lower values and the alteration at higher values is not appearing very significantly. Also, test mean NPP seems to over-estimate at mid-range but this is not the same as seen in the scatter plot (Fig. 6) where it is almost evenly distributed across either side of the 1:1 line.
22. Fig 10: The curves are difficult to distinguish. Different choice of colours recommended.
23. Fig 10: Capturing the seasonal cycle is fairly easy as most of the input features contain the same signal. To have a better understanding about how good the models are in reproducing the extreme values, authors should plot the anomaly time series by removing seasonal signals overlayed with observation treated in the same way.