This manuscript describes a submesoscale eddy dataset derived from satellite ocean color products, which can be very useful for the studies of eddy dynamics and the ecosystem of oceanic environments. Overall, data and method to generate the dataset are well described, results are validated, and information for data access is complete. However, there are various grammar issues and fuzzy descriptions, which should be revised/corrected before publication. Specifically,

1. **Line 9, "… an observational dataset on submesoscale eddies, which obtains from high–resolution chlorophyll–a …", clearly the grammar is not correct, should be something like "which was obtained from …"**

Response: We feel great thanks for your professional review work on our article. I have changed it in line 9. "which was obtained from…"

2. **L14, "which covers eight daily periods between 00:00 and 08:00 (UTC) from April 1, 2011, to March 31, 2021", this sentence belongs to a new sentence.**

Response: Thanks for your comments. In deep learning, the range of confidence ranges from 0 to 1. I have changed it in line 14. "The dataset covers eight daily periods between 00:00 and 08:00 (UTC) from April 1, 2011 to March 31, 2021."

3. **L15, "at a confidence threshold of 0.2". Need to state this 0.2 is high confidence or low confidence.**

Response: Thanks for your comments. From the identification results, we find that the eddies with confidence greater than 0.2 are basically reliable and retain most of the eddies. I have changed it in line 15. "A total of 19,136 anticyclonic eddies and 93,897 cyclonic eddies were identified with a confidence minimum of 0.2.". Additionally, I added an explanation in line 210. "The higher the confidence of the identification results, the greater the reliability of identification results."

4. **L40, "and there is some controversy" Need citations to support this statement.**

Response: Thanks for your comments. I heard this from a lecture on submesoscale processes, and submesoscale dynamics are still developing. I'm sorry I didn't go into too much detail about submesoscale dynamics, so I decided to delete that sentence.

5. **L42, ", etc(Zhang …" It should be "etc.", and there should be a space before "(". Please check the entire manuscript for similar issues.**

Response: Thank you very much for your careful review. I have checked and corrected everything. (Line 43)

6. **L50, "chlorophyll" here should be phytoplankton, as concentration of chlorophyll is a proxy for phytoplankton.**

Response: Thanks for your comments. It is probably better to think about phytoplankton in conjunction with that rather than just say chlorophyll, which I have substituted. (Line 50)

7. **L54, "from high–resolution chlorophyll", note that "high-resolution" is subjective, and a resolution at 500 m is not "high-resolution" by many standards or measures.**

Response: Thanks for your careful comments. The high resolution here refers to chlorophyll retrieved by remote sensing technology. I have modified it in line 54. "high–resolution chlorophyll distribution images"

8. **L75, "Chlorophyll Image Enhancement" à "Enhancement of Chlorophyll Image". Make similar changes for 2.2.2.**

Response: Thanks for your comments. I have amended both to "Enhancement of Chlorophyll Image" and "Establishment of Train Set".

9. **L82, "directly manually ..", this is confusing.**

Response: Thanks for your comments. I have modified it for "artificial visual interpret". (Line 82)

10. **L92, "The Comparison of different …" should be "A comparison of different ..". Please also check similar issues at other places.**

Response: Thanks for your comments. I have revised all of them.

11. **L128, "where cyclones rotate counterclockwise and anticyclones rotate clockwise." This is common knowledge, no need to state here.**

Response: Thanks for your comments. Indeed, it is a common question, but many people in the computer field have asked me about how the training dataset was established to distinguish and classify different polarities of eddies, as well as the criteria used. I didn't delete it.

12. **L167, "We used the YOLOv7–X as the model", need citation for this model.**

Response: Thanks for your comments. I have a quote at the end of this sentence. The github address of the model can be found in this reference.

13. **L168, "YOLOv7–X was obtained by performing stack scaling on the neck and using …" This sentence is confusing, please rephrase.**

Response: Thanks for your comments. I restate it as "YOLOv7–X was obtained by increasing the number of layers and the number of features extracted per layer in the YOLOv7 model, aiming to amplify the model for improved performance in object detection tasks." (Line 167)

14. **L193, "the watercolor remote sensing images". Not such a thing of "watercolor remote sensing". It is either ocean color remote sensing, or "water color" remote sensing, but the latter is very rare.**

Response: Thanks for your comments. I have corrected it. (Line 192)

15. **L194, "images cannot represent the actual distribution of SMEs in the region." What does this mean?**

Response: Thanks for your comments. I'm sorry I made a mistake. What I mean is that the direct results of identification cannot be directly used to calculate the geographical distribution pattern. The influence of cloud occlusion needs to be removed. I made the following modifications. "The results of SMEs identification obtained from the ocean watercolor remote sensing images cannot represent the actual distribution pattern of SMEs in the region." (Line 192)

16. **L195, "The coverage of clouds above the region is the primary obstacle that affects the identification of eddies using this method." This is nearly identical to the previous sentence.**

Response: Thanks for your comments. I have merged two sentences into one. "The primary obstacle that affects the identification of eddies using this method is the obscuring of ocean color remote sensing signals by cloud cover, which varies across different regions, different months of the year, and different times of the day." (Line 193)

17. **L205, Result à Results.**

Response: Thanks for your comments. I have corrected it.

18. **L216, "the energy of the SMEs dissipates within just two hours, making it impossible to trace them in the chlorophyll field"   Why 'impossible'?**

Response: Thanks for your comments. I'm sorry, I'm being too absolute, but it's impossible for this model to recognize. I have changed "impossible" to "difficult".

19. **L220, "(e) and (f) demonstrate". This is not professional description, should be "Figs. (e) and (f) …"   Please also correct other similar places.**

Response: Thanks for your comments. I have corrected all references to subgraphs in the article.

20. **L237, please insert space between figure title and main text. Do so at other places.**

Response: Thanks for your comments. I have corrected everything.

21. **L258, "Performance of the Model for eddy identification", why "M" is capital? Style of headings or subheadings should be consistent.**

Response: Thanks for your comments. I have unified the style of all the headings and subheadings.

22. **L281, "Validation and comparison of the identification results using Sentinel–3 chlorophyll image". Why compare with results using Sentinal-3?**

> Note that the spatial resolution between GOCI-I and Sentinel-3 is similar, so similar results in eddy observation are expected.

Response: Thanks for your comments. This comparative experiment is of great significance. 1. Although the spatial resolutions of the two are similar, it can demonstrate that the differences in the measured central wavelengths and bandwidths of each spectral band will not affect the recognition performance of the model trained using the training set produced by GOCI, proving the model's certain universality. 2. Sentinel-3 provides global coverage with its dual satellites, which is important for future applications of this method in identifying submesoscale eddies at any location worldwide. 3. The chlorophyll algorithms used in the two instruments are also slightly different, further demonstrating their robustness.

23. L282, "Due to the differences in the GOCI and OCLI sensors, the blue-green spectral bands used for chlorophyll inversion are different, the calculation coefficients are different, and even the image resolutions are different." The reasoning is strange.

Response: Thanks for your comments. Indeed, from Figure 11, it is not apparent that these differences have a significant impact on the recognition results. However, these quantitative differences are mitigated by the unified process of chlorophyll image enhancement outlined in the article, making them less pronounced and enhancing the model's universality. For instance, when conducting recognition using images with different resolutions, parameters related to image segmentation and model recognition need to be adjusted. This experiment is beneficial for directly applying the methods and well-trained model from the paper to batch identification of submesoscale eddies in ocean color products with similar resolutions.

24. Paragraph below section 3.6. Many grammar issues, descriptions are confusing.

Response: Thanks for your comments. section 3.6. is modified as follows.

"As it is well known, altimetry is commonly used to identify mesoscale eddies through sea level height data. using altimetry can identify mesoscale eddies from sea level height data, but However, a daily global mesoscale eddy dataset is obtained by optimal interpolation is identified by measuring different time orbits, which results in a reduction of spatial and temporal resolutions. Therefore, We show the comparison between our identification results of SMEs and mesoscale eddies identified by altimetry on the same day in Fig. 12. Obviously, eddies identified by altimetry is morethe altimeter identifies more eddies and the method can avoid the impact of cloud cover, but our identification results of SMEsour method has higher spatial and temporal resolutions. Many of the eddies identified by both methods exhibit consistent spatial scales and locations. However, there are numerous submesoscale eddies that the altimeter fails to identify. These submesoscale eddies are found both within and outside the mesoscale eddies.The figure shows results that match well with the location and scale, as well as smaller-scale eddies that have been identified. It can

be observed that there are smaller-scale eddies present in both the chlorophyll field inside and outside the mesoscale eddies. The eddies identified by the AI method are the mapping of their physical properties to the chlorophyll field."

25. **L316, "from the chlorophyll spirals structures at the sea surface" Please check grammar.**

Response: Thanks for your comments. I have changed "at" to "of".

26. **L316, "… and with high spatiotemporal resolution chlorophyll data from ocean color sensors, we suppressed large-scale ocean signals and increased chlorophyll concentration gradients to highlight eddy-induced chlorophyll spirals with more significant contrast in different oceanic environments" Confusing sentence.**

Response: Thanks for your comments. I'm sorry that my explanation makes reading difficult. I have revised it as follows. "Therefore, eddies can be observed from the chlorophyll spirals structures of the sea surface. With high spatiotemporal resolution chlorophyll data from ocean color sensors, we suppressed large-scale ocean signals by filtering and highlight eddy-induced chlorophyll spirals by specific image enhancement."

27. **L320, "in ten eight-year periods" So, a total of 80 years? That is impossible.**

Response: Thanks for your comments. Sorry, I have modified it. "We identified a total of 19,136 anticyclonic eddies and 93,897 cyclonic eddies for eight times a day for a total of ten yearsin ten eight-year periods at a confidence threshold of 0.2."

28. **L330, "this method can detect SMEs, and the eddy-induced chlorophyll spirals represent a direct mapping of eddy physical properties in the chlorophyll field, with high credibility." Confusing sentence.**

Response: Thanks for your comments. I have revised the sentence as follows. "The method proposed in this paper successfully detects SMEs, and the presence of chlorophyll spirals induced by SMEs serves as a credible and direct representation of their physical properties within the chlorophyll field."

Finally, we appreciate for reviewer warm work earnestly and hope that the correction will meet with approval.