**“Seasonal lagrangian study of eddies produced at the capes of Kamchatka” written by Alexandre L’her and reviewed by Emma Bent**

**Summarize the main results of the article in a few sentences:**

The two main results are:

**1) Description of the flow characteristics**: southwestward and southeastward between the Aleutian eddy and the Kuril-Kamchatka eddies.

**2) Seasonality has an effect**: when EKC is weaker (summer) the eddies are less advected by the currents, so they can mix the particles over geographically-limited regions, or keep them trapped. For example the seeded particles can stay trapped around the position of the quasi-stationnary Kamchatka Eddy through summer.

**Answer the following questions about the structure of the paper:**

**Overall content:**

1. Is the overall purpose of the study and /or central question clear?

No because the Abstract and Introduction don’t exactly state the same purpose of the study:

**Purpose 1:**

“The goal of the study was to find the **destination of water masses** that are trapped by the eddies created in the capes of Kamchatka.”

**Purpose 2:**

“The goal of this study is to find out **if the eddies formed at the capes of Kamchatka are the ones that merge with the KE**.”

1. Does the interpretation of the findings answer the overall question of the paper?

**Purpose 1:**

Yes, the Results explain where the particles are advected for each group (north, middle and south capes) and for both seasons (summer and winter).

**Purpose 2:**

Yes as it is noted in the Results: “In particular [particles from the northern cape] stay where the Kamchatka eddy is situated at this moment in time: its center is positioned around 160°E, 50.7°N.”

1. Is every paragraph and sentence in the paper relevant to the overall question?

*If no, point to some examples:*

I find that the part “3.3. Velocity of the particles” does not answer the two overall questions. It explains that if velocities are slow in winter this is probably due to the fact that particles are trapped in eddies. It also shows that particles are mostly affected by eddies rather than the EKC. This explains mechanisms that may experience the particles but is not an argument to show where they are advected or if they stay in the KE.

1. Are there portions of the text that could be omitted?

*If yes, point to some examples:*

Either part 3.3 can be omitted or it should be explained more in what way it is relevant to the rest of the study.

1. Is the overall organization of the paper clear and effective?

*Suggestions for improvement:*

Yes, all expected parts are present and follow a logical order.

**Individual sections:**

1. Does the title adequately represent the content of the paper?

Yes it does represent the content of the paper but it does not present the major result.

*Suggestions for improvement:*

“Eddies produced at the capes of Kamchatka merge with the Kamchatka Eddy”

1. Does the abstract clearly and concisely summarize the paper and state the main results? Does is contain all needed information (context, need, task, object, findings and conclusion)?

Context: missing

Need: missing

Task: “the positions of Lagrangian particles were integrated in the daily AVISO geostrophic velocity fields around the Kamchatka peninsula”

Object: “trajectories of the particles”

Findings and conclusion: “We found that the seasonality of the Eastern Kamchatka Current has an impact on the characteristics of the flow, and thus on the trajectories of the particles. The seeded particles can stay trapped around the position of the quasi-stationnary Kamchatka Eddy through summer, in particular the ones coming from the northernmost cape. We also show that our study is coherent with previous Lagrangian studies on buoys in the area.”

1. Does the introduction provide enough context to the readers? Does it state the need for the work? Does it state clearly what has been done to address it?

I find that a map of the region is missing to help understand where the study takes place.

Context is well explained: “Eddies are an important feature in the ocean. They can transport water masses, nutrients and living species. They contribute to the global climate, the weather and the mixing in the ocean. In this work, we focus our study on anticyclonic eddies present all year long along the coast of the Kamchatka peninsula.”

The need of the work is more or less described in the context part but not specifically addressed.

Method is addressed: “To answer this question, we will seed Lagrangian particles at the capes and integrate their position using geostrophic velocity fields to get their trajectories, through summer and through winter.”

1. Does this paper put the progress it reports in the context of existing published work? Is there adequate referencing and introductory discussion?

The Introduction doesn’t reference enough existing work to offer context to the study. For example this statement has no reference to back it up: “The EKC presents mainly seasonal variations in its intensity: it strengthens in winter and weakens in summer.”

1. Are the material and methods used in the study clearly explained? Can you point out what is special, unexpected, or different in the approach compared to existing published work? Does it contain too many technical details?

The method is clearly explained without too many technical details, but nothing special, unexpected, or different in the approach, is pointed out in comparison to existing published work. Another thing is that some technical terms are not explained such as “Lagrangian particles” or “Runge-Kutta algorithm”, probably because the authors expect the readers to have knowledge of what they are. Therefore it is complicated for a reader not familiar with the subject to understand everything.

1. Is the results sections(s) clearly and concisely written? Are there logical and smooth transitions between sections, subsections and between paragraphs?

The Results are clearly and concisely written, the section is easy to follow and understand even if there are no smooth transitions between sections 3.1 and 3.2. As presented before in this review, it is not explained clearly why section 3.3 is relevant to the work.

1. Does the conclusion clearly state the most important outcome of the work? Does it address the questions stated in the Introduction? Does the conclusion just summarize the results or does it interpret the findings and explain what they mean?

In the Conclusion the authors mostly summarize the results and interpret them: the direction of the flow (southwestward), the seasonality (particles are advected further in winter) and the fact that some particles stay in the KE. The most important outcome of the work is not clearly stated. The authors rather present a list of results they obtained.

The question stated in the Introduction (Purpose 2) is answered: “This confirms that the anticyclonic eddies - which are formed by the interaction of the EKC with the capes - get advected southwestward by the current and merge with the Kamchatka Eddy.” And the question stated in the Abstract as well: “In particular, most of the particles coming from the capes are advected southwestward.”

1. Are the interpretations and conclusions adequately supported by the evidence presented? That is, are the assumptions valid, is the methodology sound, is the evidence adequate, and do the conclusions logically follow?

Each interpretation and conclusion is well backed up by the method and the results. Therefore the conclusions logically follow.

1. Are all parts of the text, references, graphics and tables necessary for the new results and main points to be understood?

I find that part 3.3 is maybe not necessary to understand the main point. Other than that the two figures and the references help to understand the main points.

1. Are the graphics and tables clear and their captions self-explanatory?

Figures and tables are well constructed and clear. They have self-explanatory captions.

* **Sentences and Wording**

1. Can you find grammatical mistakes?

🡪 “… time spent in the KE by the particles in function of their initial position.”

Should be “as a function of”.

🡪 “They are also looping trajectories offshore the southern cape, which was already seen from the particles in figure 3.1b.”

Should be “There are” or “They also loop offshore the southern cape…”

Other than that the grammar is very good in this article.

1. Can you point to sentences that loose you (too long/complex) and do you have suggestions for improvement?

The sentences are not too long or too complex. The authors stick to a simple and clear writing with short sentences, which is really appreciated for comprehension of the article.

1. Are generally the action in verbs, characters in subjects and subjects near verbs? Can you find counter-examples? Can you point out misused nominalizations?

Counter-example of actions in verbs/characters in subjects:

“This required interpolation in space as well as in time.” 🡪 “This required us to interpolate in space and time.”

Misused nominalization:

“For a better understanding” 🡪 “To understand better”

1. Is the writing cohesive? Does it flow well? Is the part of the sentence that links to the previous sentence at the beginning or the end?

The writing is cohesive except for part 3.3 (as mentioned before), which doesn’t enable a fluid reading as the reader may wonder what is the purpose of this part. In general the part of the sentence that links to the previous sentence is at the beginning.

1. Are the paragraphs coherent? Do the first and last sentences of paragraphs match? Can you find counter-examples?

The first and last sentences of paragraphs usually do not match as in this article each paragraph describes one idea (for example in part 3.3 one paragraph describes the mean velocity and the next describes the maximum velocity).

One thing to point at is that the two sentences below, which form a paragraph, have no explicit link between them. We expect an explanation between high eddy activity and trapping of particles in an eddy which is not here:

“The relatively high mean velocity of the particles coming from the southern cape could be related to the high eddy activity at the southern tip of Kamchatka. Particles in this region will spend most of the time trapped in eddies than being purely advected by the EKC.”

1. Is there an abusive use of passive voice?

The authors use the passive voice to describe the work done with the particles or the study but it not used too much:

🡪 “… the positions of Lagrangian particles were integrated…”

🡪 “Lagrangian particles were seeded at the 3 capes of the Kamchatka coast. Their positions were integrated forward in time for 200 days… “

🡪 “A more exhaustive study could be done…”

1. Can you find a lot of useless words/phrases?

I found one “Indeed” in the Conclusion. Other than that I think the writing is simple and direct.

1. Can you find complex words that could be replaced by simpler ones?

Overall the authors use simple words, understandable by most readers. The only things is that for readers who are not familiar with oceanography, the article lacks some explanation of the technical terms such as “eddy”, “anticyclonic” or “geostrophic velocity fields”. The Method part is also hard to understand if we don’t know what a “one-dimensional fourth order Runge-Kutta algorithm” is for example.

1. Can you find too complex subjects?

No, all subject are straightforward.

1. Can you find inadequately used adverbs/ repetition/ excessive hedging?

There is no excessive/inadequate use of adverbs or repetition. On the other hand I find there is excessive hedging in part 3.3 with the use of “could be” or “may”.

1. Is the use of tenses (past/present/future) adequate?

The Abstract is written in the past when it should be written in the present tense. The present is adequately used for general truth and atemporal facts in the Introduction and to describe the results in the Results part. The past tense is used to report the work that has been done (Method, Conclusion). And the future tense is used to talk about future work that could be done (Results, Conclusion).

* **Other comments?**

I really enjoyed reading this article to learn more about the possibilities of Lagrangian studies. I find that the authors did an overall really good job at conveying the work that was done and the results that came out of it. The reading flows easily thanks to short sentences. The figures are well made and explained.