Author’s comments for the manuscript submission: **Turbine Repositioning Technique for Layout Economics (TRTLE) in Floating Offshore Wind Farms – Humboldt Case Study**

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RC1:

General Comments:

This article demonstrates several innovative means for reducing the Levelized Cost of Electricity (LCOE) for floating wind farms, applied to the Humboldt south-west wind energy area (WEA). This is achieved by reduction of wake losses by a passive repositioning technique shifting the floating wind turbines away from upstream wakes, and by reduction of the number of mooring lines and anchors.

This work is important because cost reductions are necessary for most components of floating wind farms. The impact of wake losses on the annual energy production (AEP) of course directly affects LCOE. Assuming that the mooring system costs are for example 15% of the total costs, major savings on mooring line length and the anchor count also makes a significant difference on LCOE.

The impact of this article may be visible in future floating wind farms, with new and innovative mooring system configurations.

I find the quality of this interesting and comprehensive article very good. The article is innovative, clear, logical, and easy to follow.

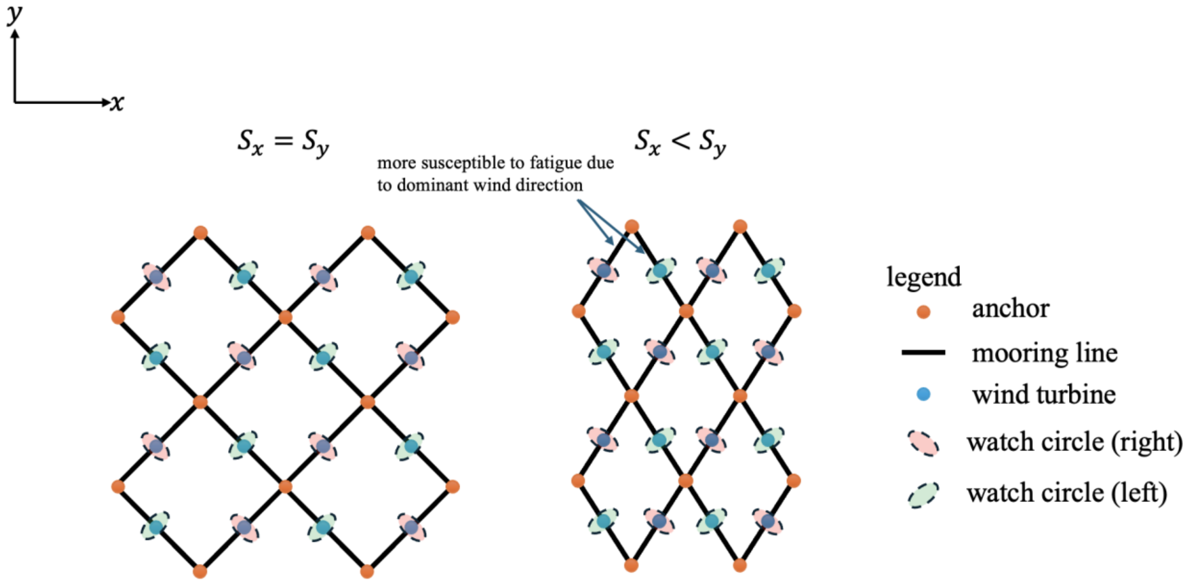
Specific Comments:

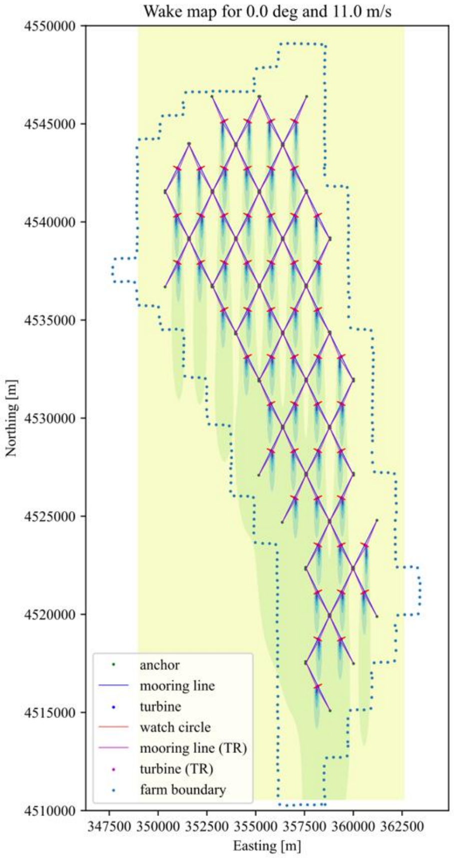
Q) In the description of the PyWake model, it is stated that the wake superposition from multiple turbines is represented by a linear addition of the individual wakes. I suspect that this might exaggerate the wake losses below rated power, and thereby the reduction of wake losses from the TRTLE procedure relative to the reference configuration. The WeightedSum option in PyWake might be more accurate. If a sensitivity study on the effect of these options have not been done already, I would like to see this included in the article.

A) In the paper, I used the Niayifar porteagel (2016) model. However, since this model is not based on a node rotor average model, WeightedSum and CumulativeWakeSum cannot be used in conjunction with that model. However, I ran another model (Zong, PorteAgel, 2016 model) that uses the WeightedSum function. Results: Averted wake effects: -11.748% (Niyafiar) and -11.585% (Zong_PorteAgel_2020). The difference is minimal. The wake model by Niayifar has shown in the literature to be accurate. This will be mentioned in the revised manuscript.

Q) The reference wind farm has the same spacing in the x- and y directions. The wind rose for the WEA has a distinct prevailing wind direction from the north. A wind farm layout would then typically have larger spacing north-south, and tighter spacing east-west. The shape of the WEA also favors this configuration, perhaps allowing more wind turbines, with the same or even lower wake losses than the reference case. The authors also point out that Sx and Sy do not have to be the same, but I miss a discussion how this could affect the comparison between the reference and optimized cases.

A) The tighter spacing in the east-west direction is a valuable solution. However, this will vary the shared anchor configuration and the mooring heading orientation. For instance, for the tetragonal design, the N-S angle between the mooring lines would become less than 90 degrees and the E-W angle more than 90 degrees. While this could still be a valid solution, some mooring lines become facing more north-south direction which can violate the wind-mooring misalignment constraints (having more fatigue on mooring lines facing north and having to deal with slack lines facing south, etc..). The hexagonal design is already at the threshold of the misalignment constraints and therefore east-west spacing kept the same as north-south. Additionally, whether having equal spacing or not, the turbine repositioning methodology can still be applicable as it depends on the mere fact that neighboring turbines have opposite mooring heading as illustrated in the figure attached (red watch circles indicate repositioning towards the right in case wind is headed from the N and green watch circles indicate repositioning towards the opposite side). For simplicity and to satisfy the constraints, we chose to keep S_x=S_y. Attached is a figure with S_x=5, and S_y=10. TRTLE still shows an advantage, however, with diminishing returns (4% avoided wake in that example).



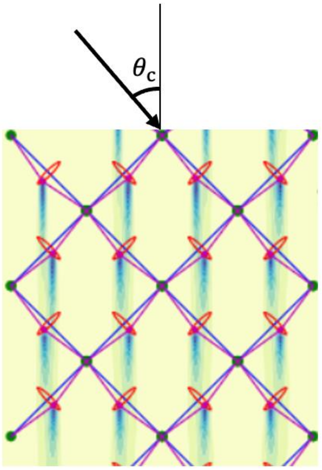


Q) The steady-state computations are based on rotor thrust, ignoring turbulence, current and waves. Although this belongs to future work, I think it is important to mention issues that might show up when dynamics, turbulence, current and waves are taken into account, for example:

a) If I read the reference articles on the rotor and platform right, the drag force on the platform is 40% of the rated rotor thrust for 1m/s of current. How can this affect the results?

b) The two-line configuration allows large platform offsets. This gives a desired reduction of wake losses in the steady-state computations. Could wave drift forces give a different behavior?

A) Including loading based on wind turbulence, currents and waves is crucial for the continuation of this work. For wind loads, while turbulence is critical, the mean platform offset, and direction are mainly governed by the mean wind speed and mean wind direction. However, mean currents and waves can cause mean offsets at different directions, which alter the repositioning of the turbines. The author has conducted a sensitivity analysis of the effect of including additional current force as a ratio of the maximum thrust force at various angles of attacks. The table attached shows values of wakes avoidance relative to the baseline case (percentage). Current force to max. thrust ratios from 0 to 0.6 (60% of max. thrust) are tested with 0.15 increments at various angles of attacks. The additional force and its angle are included in the watch circle calculations. Then, AEP is computed for each of these cases individually based on the wind rose at the site. The (12.7%) is the original tetra-design case where current forces are zero. As we increase current forces, wake avoidance is varied based on the table shown. Current forces seem to have minimal disruption on the intended turbine repositioning for avoiding wake effects. When currents are opposite to the main direction of the wind ($\theta_c = 180°$), the lowest avoided wake is reported at 10.3% as it is competing with the thrust force from the North direction. However, it is only 2.4% difference.



avoided wake [%]		current angle of attack, θ_c [deg]												
		0	15	30	45	60	75	90	105	120	135	150	165	180
current force to thrust ratio	0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
	0.15	12.8	12.7	12.7	12.6	12.6	12.5	12.5	12.4	12.4	12.3	12.3	12.3	12.4
	0.3	12.6	12.5	12.5	12.4	12.4	12.3	12.3	12.1	12.0	11.9	11.8	11.8	11.8
	0.45	12.2	12.1	12.0	12.1	12.1	12.1	12.0	11.8	11.6	11.3	11.1	11.1	11.2
	0.6	11.6	11.4	11.5	11.6	11.8	11.8	11.7	11.5	11.1	10.8	10.5	10.3	10.3

Technical Comments: Line number in old script

Q) L11 - ..27% mooring system cost reduction, corresponding to 4% investment cost reduction if we for example assume that the baseline mooring system accounts for 15% of the total costs.

A) Yes. However, these numbers are optimistic. When applying a more realistic design with shared lines, the initial cost of mooring system reduces that window and sometimes can be higher than all anchored baseline mooring system. However, AEP gains due to wake effect reduction provides higher revenue per year. More on shared line in the response to the second reviewer.

Q) L58 - while keeping the loads within acceptable limits, right ?

A) Correct. Intra-array farm parameters are varied under max. displacement constraint

Q) L70 - so the platform max displacement is simply given by the rated thrust and the mooring system restoring force (as function of direction)

A) Correct. Additionally, the author conducted a sensitivity analysis to investigate the effect of current loading as a percentage of the thrust force on the platform's response and AEP of the array.

Q) L73 - A matter of taste, but x and y often refer to positions, how about \delta_x and \delta_y for spacing ?

A) I agree. X and y are changed to Δx and Δy.

Q) L95 - Consider putting 1 and 2 in the subscript as well.

A) Changing superscript to subsript for equation 2 and equation 5.

Q) L97 - Unclear. What is C ?

A) Describing what C means as maximum installed capacity before it's provided in Equation 6

Q) L102 -Does this mean that you assume extreme winds cannot occur from any direction ?
A) No. We are avoiding alignment with the main direction of the wind. Extreme winds could still occur from other direction. However, its frequency is lower than the dominant wind direction. Avoiding alignment is expected to be met with longer fatigue life.

Q) L119 - y is the lateral distance from the wake centerline

A) Correct. I have added y as the spanwise direction

Q) L125 - is this consistent with the latest findings i Nextfarm ?

A) The choice of method of superposition can have a significant impact on predicted velocities in the farm. The author has conducted a sensitivity study for two superposition models and saw that the conclusion remains intact that AEP is affected by turbine superposition despite having different wake superposition methods. However, this is still an open question for future research.

Q) L164 - , normal to the mooring line direction for the 2-line configuration
A) Correct. I have added that in the script to clarify this better.

Q) L196 - 15% of what ?
A) 15% of all anchors. I have clarified that in the manuscript.

Q) L218 - 20% of the reference case wake loss ?.
A) Correct. I have clarified that in the manuscript.

Q) L234 - Which direction do the excursion values refer to. Normal to the two mooring lines ?

A) $e_{\max}$ refers to the maximum excursion throughout all directions, which for a 2-line system, corresponds to the direction, normal to the two mooring lines.

Q) L260 - resulting in AEP increases of xx% and xx% respectively.
A) adding the AEP enhancement percentages to the conclusion.

RC2

General comments:

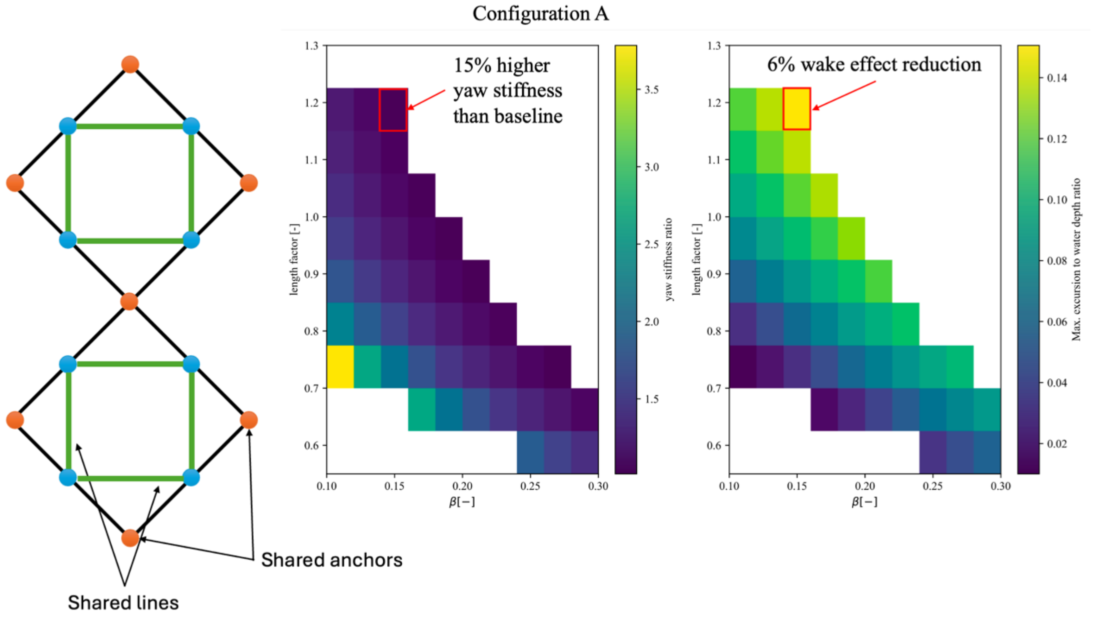
The paper introduces a method to design mooring systems with two lines to relocate the turbines out of the wake, which aims to increase the AEP and decrease the mooring system cost. This type of research is crucial for enhancing the efficiency of floating wind energy and fostering future investment. The innovative approach and potential cost reductions are promising aspects of this study.

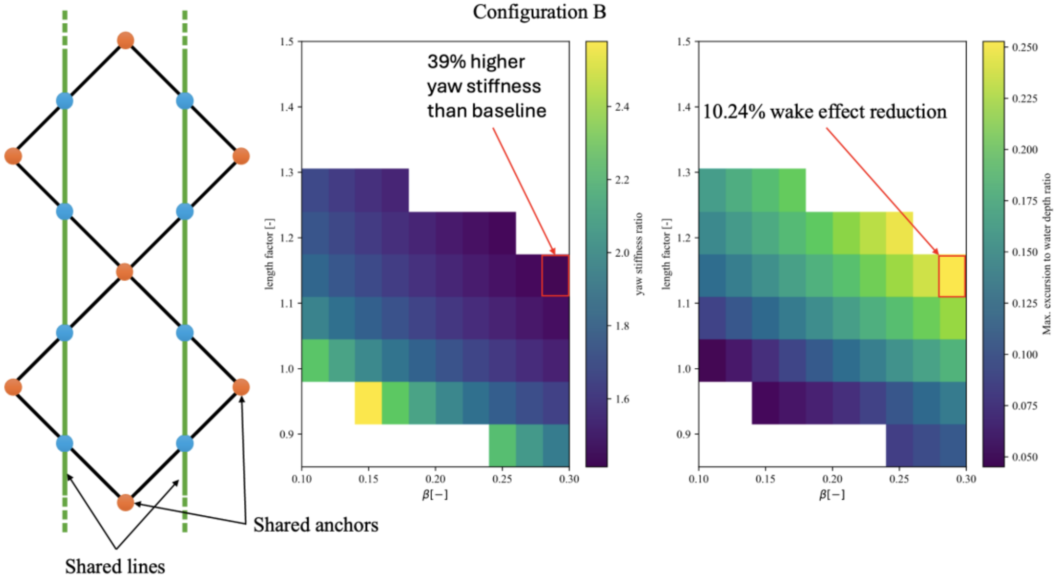
Specific Comments:

Q) I have read the previous work by the authors (Yuksel R. Alkarem et al., 2024), which I found to be an excellent paper with interesting new concepts. While this current work is a good continuation, it does not significantly extend the previous research. It investigates a new site with similar assumptions and the same level of simplicity. The first research question, which aims to investigate the MS's turbine repositioning ability to mitigate wake effects under various wind speeds and directions, closely mirrors the research question of the prior study. To enhance and extend this paper, it would be beneficial for the authors to clearly highlight the unique contributions and advancements of their current research, distinguishing it more effectively from their earlier work.
Moving a step further to use more realistic designs for deep water sites would demonstrate the method's applicability with more realistic designs. The passive relocation of the FOWT heavily depends on the mooring system design, which seems oversimplified in the current work.
The innovative use of two mooring lines could drastically decrease future costs. However, the paper does not discuss the potential challenges, such as low yaw stiffness, which currently limits the adoption of two mooring line designs. Including a discussion on the change in yaw stiffness between different designs and its relationship with wind direction variations would add valuable insights.

A) Based on the reviewer's comments, the current research is expanded to include additional analysis to distinguish further from the previous research. While the current article continues to examine the influence of MS design on their self-positioning to enhance AEP while incorporating array designs that focus on shared anchors, the authors also extend to investigate the co-existence of shared lines. The shared lines are assumed to be the same type as the anchored lines with line length equals length of the anchored line times a length factor. The length factor is chosen as a design variable under two constraints: 1) the near-constraint: the clearance from the middle point of the shared line to the sea surface must be higher than 100m when the two connected platforms drift opposite to each other, and 2) the far-constraint: the clearance from the middle point of the shared line to the seabed must be higher than 100m when the two connected platforms drift towards each other. An appropriate fairlead radius based on a reference platform is assumed for the yaw stiffness analysis. The length factor is varied along with the catenary coefficient (β) to test their influence on yaw stiffness (as a ratio to the baseline hexagonal design) and wake effects reduction. The TRTLE-tetra design is modified to include shared lines (and is entitled TRTLES-tetra). Two configurations of the shared lines are tested. These configurations are illustrated in the attached figure. Configuration A connects four adjacent platforms. This configuration, however, adjusts the static equilbirum positions of the platforms. Configuration B connects platforms in a linear fashion. This configuration does not alter the static position of the platforms. After connecting shared lines, the watch circles are recomputed as a function of wind speeds and wind directions. Configuration B shows to be the superior options in terms of enhancing platforms yaw stiffness and turbine repositioning for wake effects reduction. The highlighted red rectangles are examples of selected design variables that yield high wake effects reduction and acceptable yaw stiffness ratios. From an economic perspective, three configurations are checked. configB-1 to 3 with increase total mooring line's length in the farm. As expected, yaw stiffness ratio is higher for shorter line lengths. However, that limits the motion of the platforms, therefore, a diminished AEP gain. If lines are less stiff, they are generally longer and more expensive. However, AEP gains are higher. The total difference between revenue and cost for 20 years is computed and shown that configB-3 has both the highest initial cost but also the highest revenue with a return of investment (ROI) in 12 years. This comparison is shown in the table below.

	β	Share line factor	yaw stiffness ratio	excursion ratio	wake effects avoided	line's length	AEP gain [GWh]	line cost relative to baseline [$]	gain in 20yrs [$]	total difference [$]	RoI [yrs]
configB-1	0.15	0.95	2.95	0.05	0.29	225.46	1.02	-3,435,206.50	3,549,600.00	6,984,806.50	-
configB-2	0.2	1.1	1.59	0.17	3.06	243.86	10.84	29,146,133.50	37,723,200.00	8,577,066.50	15.45
configB-3	0.3	1.15	1.41	0.257	6.39	256.01	22.67	50,660,442.25	78,891,600.00	28,231,157.75	12.84





Technical Comments

Q) Line 70: The connection between avoiding the most dominant wind direction and slack condition is unclear. Please clarify.

A) Slack condition occurs when the line is headed 180 degree opposite to the dominant wind direction. This is explained further in the text.

Q) Line 70: Consider revising to "steady wind loads."

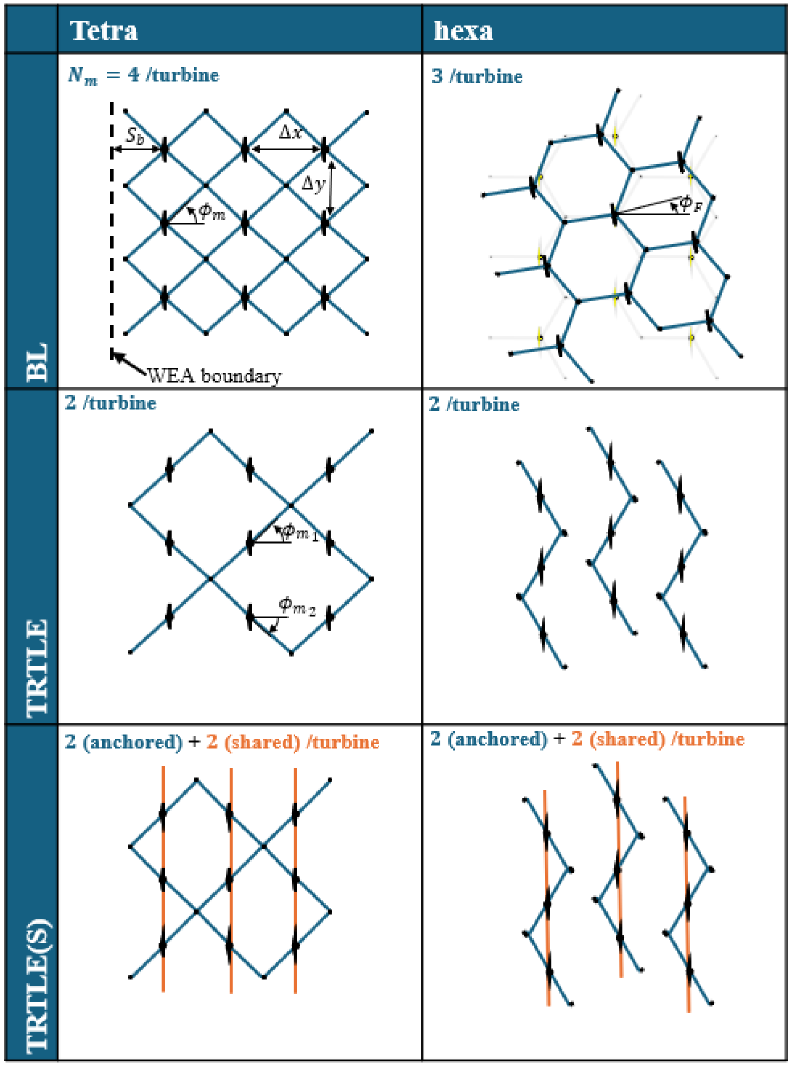
A) done.

Q) Equation 2: Is it π/2 multiplied or added?

A) It is addition. Corrected in the manuscript

Q) Figure 2: Please use this figure to clarify the parameters and how they are defined inside the wind farm: Sb, Sx, Sy, ϕm, ϕm1, ϕm2, ϕF. It is not clear how the angles are measured and how the distances are defined. Using Figure 2 to clarify these parameters on the plots would be helpful.

A) Figure is updated as following:



Q) Sb is defined following Equation 1 for semi-taut mooring. Are the mooring lines in this paper catenary? Or are there loading conditions where there is no section of the mooring line lying on the seabed? Is this considered while choosing the anchor type?

A) The mooring lines have a catenary configuration in their unloaded equilibrium position. When loaded, the anchored lines can have no section lying on the seabed. Anchor design is not included in this paper. It is estimated to be of suction type for this configuration. The design of the mooring lines and anchors are out of scope for this current research but worth investigation in a more detailed analysis.

Q) Sections 2.1.1 and 2.1.2: Apologies if mistaken, but it is hard to connect these sections to the rest of the paper. If Sx, Sy, and ϕF are assigned fixed values later, are these equations only used to calculate ϕm and Rm? There is no iteration or optimization over these parameters, correct? If so, it would be easier to define the values of each parameter early on in the text and use Figure to help the reader understand what each parameter means on a farm level.

A) S_x, S_y, and ϕ_F define the shape of the array. They could be used iteratively to maximize the array configuration. However, this is not the objective of this study. We are showing an example of using MS's turbine repositioning method to enhance AEP under a specific array configuration. The previous research by the author investigates the effect of varying these parameters to the AEP enhancement. Therefore, it was not performed in this study. The choice of these parameters in this study was determined to keep mooring lines from aligning with the dominant wind direction and to provide high the capacity of the farm (for instance, if ϕ_F any value other than zero, the capacity diminishes due to having turbines outside the boundaries). This will be revised in the updated manuscript.

Q) Equation 6: What is C?

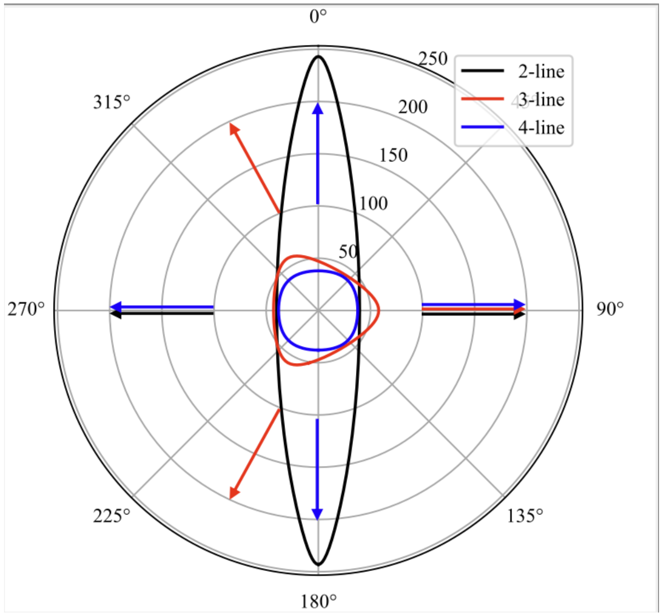
A) It is the capacity of the farm. This was added as a description in the text.

Q) Line 150: Why are Sx and Sy chosen to be 8?

A) This is an arbitrary selection. Any other value would have concluded similar results. For more sensitivity analysis of the spacing on the AEP enhancement, please see previous works by the authors (Yuksel R. Alkarem et al., 2024). We have added that explanation in the manuscript. As for why they were chosen equal, this is to keep mooring lines and wind misaligned for fatigue reasons and to have identical mooring lines per turbine.

Q) Figure 4: What are the orientations of the mooring systems for these watch circles? Can a subplot be added next to this plot with the mooring lines to show their orientation? + Line 167: Can you please clarify which line is the bow line using any of the figures?

A) The fairlead-anchor unit vector of all lines are shown in the new Figure 4. All orientations share the same bow line and the other lines are relocated in increments of 90, 120, and 180 degrees for N=4, 3, and 2, respectively.



Q) From Figure 5: It appears the stiffness of the TRTLE design is higher than the baseline designs in some wind directions. Showing the stiffness of the mooring systems at different wind directions would be interesting.

A) Stiffness of the TRTLE design as a function of direction can be extracted from displacement (Figure 4) and forces (Figure 5). For instance, at the direction facing east, 2-line shows less displacement and higher tensions simply because for a 3-line system, there is no line heading east

Q) Line 228: Is the amplification factor also multiplied by the mooring lines? I believe the mooring line cost is a function of the mass of the chains. It is not affected by the increase or decrease in tension. The increase in tension can affect the anchor, but this depends on the anchor type.

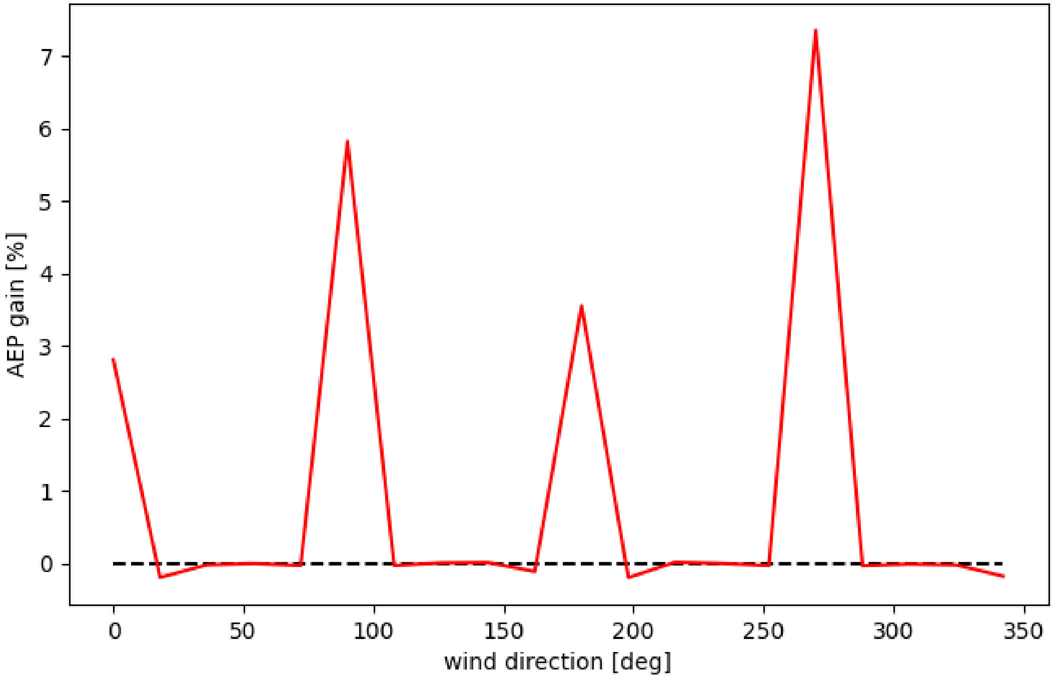
A) This is assuming the amplification in the tension will require heavier mooring lines, therefore, driving the price up compared to the baseline case.

Q) Section 4.5: What are the types of anchors assumed for each mooring system design?

A) Similar to line design, no anchor design has been performed. However, given the semi-taut to taut configuration, suction piles are assumed for the preliminary component cost analysis.

Q) Line 233: At which wind direction is the AEP gain highest? Are there any wind directions where relocation increases wake losses? Showing AEP gain distribution over wind direction would be insightful.

A) AEP gains are shown in this graph. The gain slightly dips below zero, indicating a slight increase in wake loss for those directions but are quite minimal. The highest gain in AEP is 7%. If the reviewers believe this is a good addition, I can add this as a plot to the final manuscript.



Q) Line 233: The AEP gain percentage may be low because the wind rose distribution of the site favors higher wind speeds, where there are no wake losses. Discussing this would highlight the method's higher potential for different sites and dependency on the wind rose.

A) Precisely. A sentence explaining that is added to the results and discussion section. However, any slight gain in AEP, especially by passive means, is quite profitable.

Q) Table 4: Why did the single-line anchor cost change between the baseline and the TRTLE?

A) Similar to mooring lines, higher loads will drive the design of the anchors to have higher capacity, therefore, driving the price up compared to the baseline case.

Q) Table 4: For multiline anchors, are all anchors connected to 2, 3, or 4 lines in the tetra baseline design summed up here? A more detailed cost calculation and clarification of methods used for each mooring component are suggested.

A) No. However, multiline anchors have their own cost. They are assumed to have higher capacity than a singleline anchor. The component cost coefficients are adopted from the study of Hall et al. (2022) in their floating wind farm design with shared mooring lines. Installation and removal cost is assumed the same for both singleline and multiline anchors. The author is aware of the limitation of this preliminary cost analysis. More realistic cost coefficients can only be obtained after conducting anchored/shared line, singleline/multiline anchor design. We focused on the relative difference between baseline and TRTLE and not absolute values.

RC3

General Comments

This paper presents an interesting discussion of an innovative turbine repositioning technique, applied to a Humboldt Case Study, which has the potential to reduce wake losses and mooring system costs. This is an important area of research.

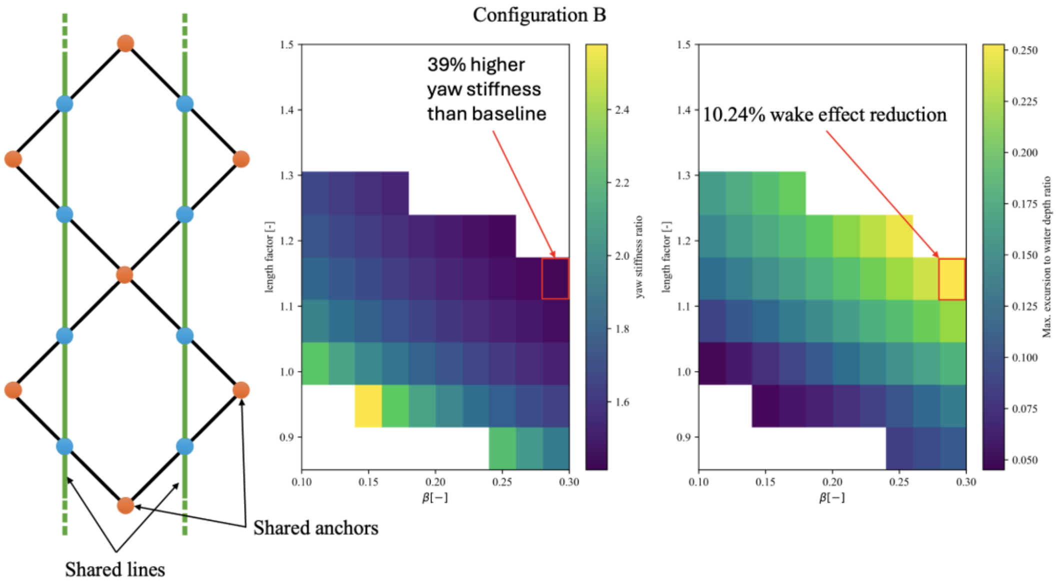
Specific Comments

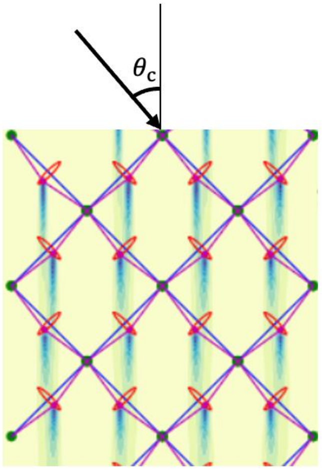
Q) The technique presented in this work is highly dependent on two line mooring systems, which are necessary to allow the large platform offsets and reduction in mooring system materials that lead to the large cost reductions found. However, the mooring system detail design is considered out of scope in this paper and a very simplified catenary model is assumed. This feels like an oversight, because two-line mooring systems are uncommon and much more research is required to understand whether they are feasible (impacts on mooring system, turbine, and tower loads, yaw stiffness, dynamic cables).

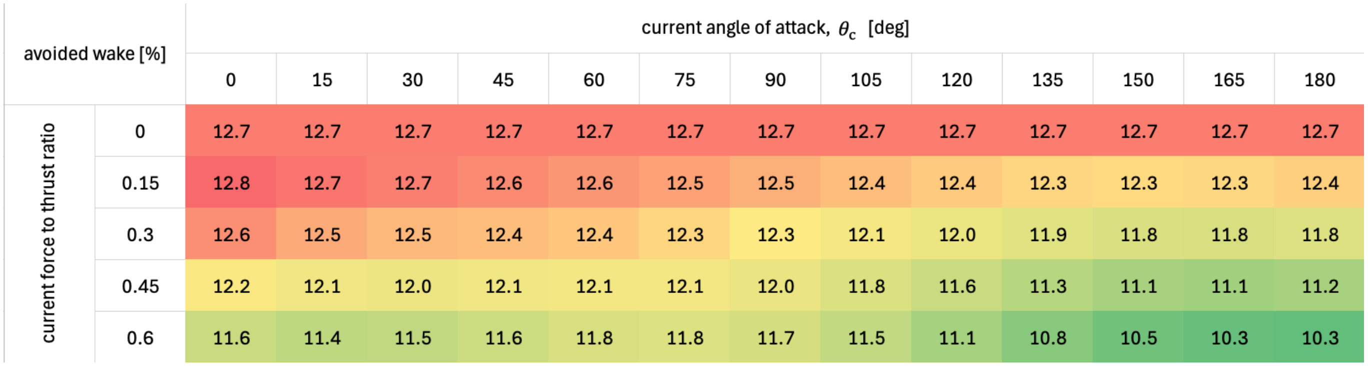
A) An additional analysis is carried out where the use of share lines (two shared line per platform) along with the original two anchored mooring lines system is investigated and its effect on AEP gain and yaw stiffness is included. It was shown that it is quite possible to increase the yaw stiffness of two anchored line, two shared line (4 in total) mooring system as well as keep the AEP gains as the original, two anchored lines system.

Q) The paper by the same author "Passive Mooring-based Turbine Repositioning Technique for Wake Steering in Floating Offshore Wind Farms" presented the start of this work. It's not clear how the present paper adds significant contributions to the previous paper. Some of the main ideas are repeated, including the same simplified mooring model. One of the main new contributions of this paper is that the TRTLE technique is applied to the Humboldt lease area, however a catenary mooring system is again assumed which is not applicable to California deep water sites. While the authors acknowledge this limitation, it remains a weakness.

A) The Current study includes the possibility of designing the mooring systems for wake dodging while also integrating shared anchors in the layout design of the wind farm. Additionally, analysis that investigates using shared mooring lines as an addition to the two anchored lines in the original TRTLE configuration is carried out during this AC and will be added to the manuscript. The shared lines effect in providing yaw stiffness while allowing turbine repositioning for wake dodging capabilities is demonstrated. Finally, a sensitivity analysis that demonstrate the effect of current/mean wave forces as a ratio of the maximum thrust force and at different angles of attack on wake avoidance is additionally carried out based on the reviewer's comments. It was shown that despite having an exacerbating effect on reducing the avoided wake, the difference is minimal and the main driving force that affects turbine repositioning is the steady mean wind forces. These three main analyses add novelty to the previous research conducted by the author. The figures below show the two additional analysis that will be added to the manuscript. Please see responses to RC1 and RC2.



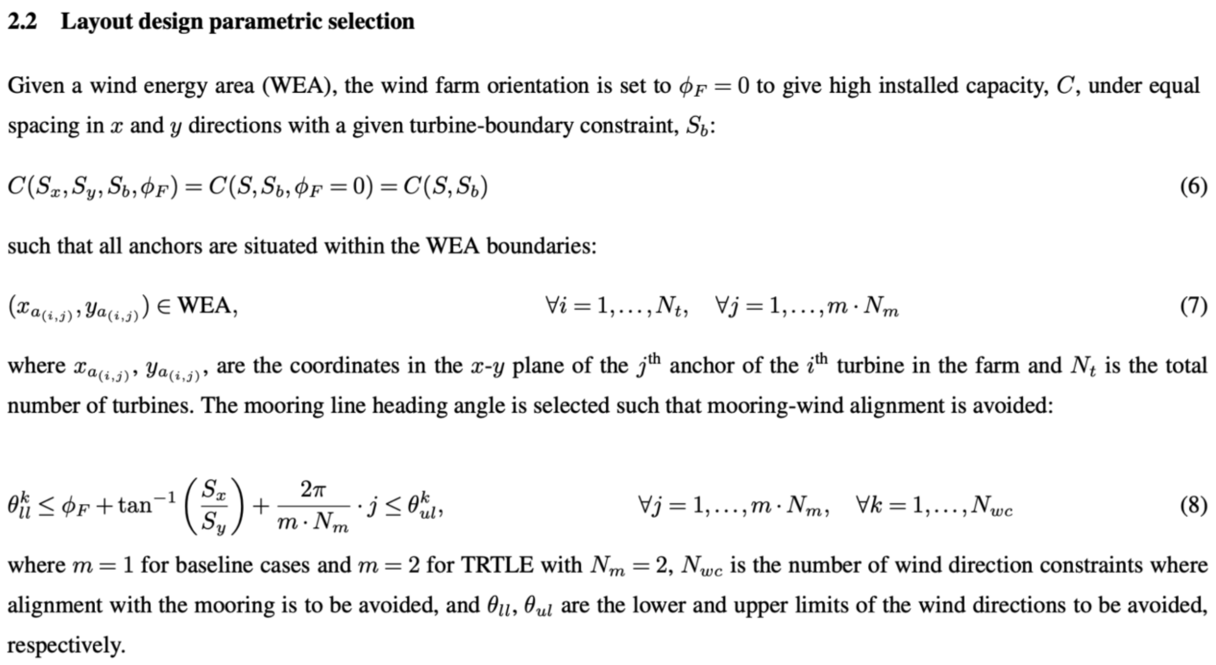




avoided wake [%]		current angle of attack, θ_c [deg]												
		0	15	30	45	60	75	90	105	120	135	150	165	180
current force to thrust ratio	0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
	0.15	12.8	12.7	12.7	12.6	12.6	12.5	12.5	12.4	12.4	12.3	12.3	12.3	12.4
	0.3	12.6	12.5	12.5	12.4	12.4	12.3	12.3	12.1	12.0	11.9	11.8	11.8	11.8
	0.45	12.2	12.1	12.0	12.1	12.1	12.1	12.0	11.8	11.6	11.3	11.1	11.1	11.2
	0.6	11.6	11.4	11.5	11.6	11.8	11.8	11.7	11.5	11.1	10.8	10.5	10.3	10.3

Q) The methodology section presents many equations, that are somewhat difficult for the reader to follow. It's not clear how these equations are used as the turbine spacing is defined as fixed. The equations may be better defined using diagrams that show relationships between turbine spacing and mooring system orientation, for example. The constraints in section 2.2 are also difficult to follow and may be better explained in words. It's not clear whether these constraints were applied in some sort of optimization. The AEP and power law equations can probably be left out, given that they are well known.

A) The equations in the methodology section provides the general form of layout configurations. Later at the layout parametric selection, an example is given where global parameters such as S_x, S_y, and ϕ_F were selected. Equations in section 2.2 are simplified in the manuscript for the reader to understand. Additionally, Figure 2 is altered to clarify the relationship between different parameters.



2.2 Layout design parametric selection

Given a wind energy area (WEA), the wind farm orientation is set to $\phi_F = 0$ to give high installed capacity, C, under equal spacing in x and y directions with a given turbine-boundary constraint, S_b:

$$C(S_x, S_y, S_b, \phi_F) = C(S, S_b, \phi_F = 0) = C(S, S_b) \tag{6}$$

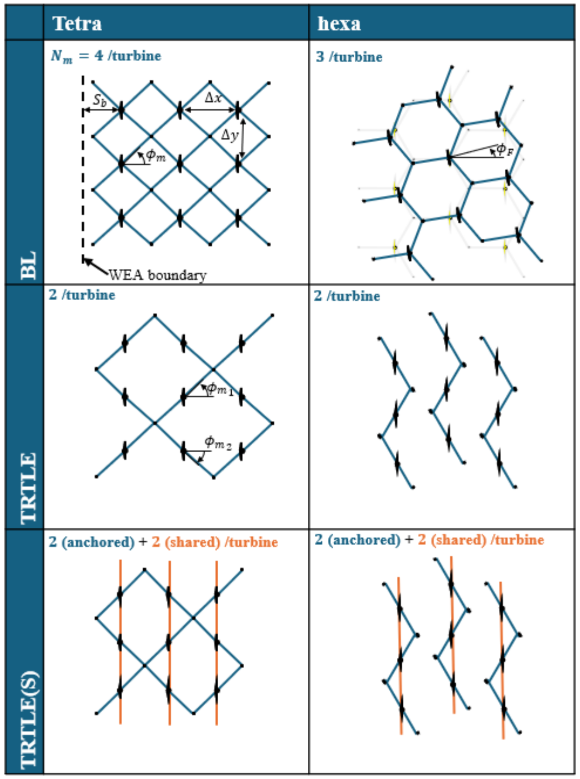
such that all anchors are situated within the WEA boundaries:

$$(x_{a_{(i,j)}}, y_{a_{(i,j)}}) \in \text{WEA}, \qquad \forall i = 1, \ldots, N_t, \quad \forall j = 1, \ldots, m \cdot N_m \tag{7}$$

where $x_{a_{(i,j)}}$, $y_{a_{(i,j)}}$, are the coordinates in the x-y plane of the j^{th} anchor of the i^{th} turbine in the farm and N_t is the total number of turbines. The mooring line heading angle is selected such that mooring-wind alignment is avoided:

$$\theta_{ll}^k \leq \phi_F + \tan^{-1}\left(\frac{S_x}{S_y}\right) + \frac{2\pi}{m \cdot N_m} \cdot j \leq \theta_{ul}^k, \qquad \forall j = 1, \ldots, m \cdot N_m, \quad \forall k = 1, \ldots, N_{wc} \tag{8}$$

where $m = 1$ for baseline cases and $m = 2$ for TRTLE with $N_m = 2$, N_{wc} is the number of wind direction constraints where alignment with the mooring is to be avoided, and θ_{ll}, θ_{ul} are the lower and upper limits of the wind directions to be avoided, respectively.



Q) The section on design for redundancy mentions some ideas for improving redundancy, but they aren't supported by any concrete research in the present paper. This is also mentioned in the abstract "giving a financial window for increasing reliability to the mooring system".

A) In the new manuscript, we will add the shared-line concept (TRTLES-tetra) which serves as a proof for one concept of improving redundancy in the design. The TRTLE-tetra design gives a financial window of 27%. The cost of adding shared lines for that configuration uses a portion of that window and in some cases can be even more expensive than the baseline case (discussed in response to RC2). However, it was shown that initial investment in shared lines is covered from the AEP gains through reducing wake losses (with a case study showing return of investment in 12 years).

Q) Sigma m1 and sigma m2 are not defined.

A) The reviewer is probably referring to ϕ_{m_1} and ϕ_{m_2}. They are the first and second mooring heading as defined before being introduced in Eq. (2).

Q) Where are two line mooring systems attached to the VolturnUS-S platform? How would the suggested bridle configuration be attached?

A) The authors have agreed to keep the MS design agnostic to the platform selection. Therefore, the reference to VolturnUS-S definition is omitted. All analysis in this paper is based on horizontal motion which the force from the MS is the only restoring forces for these degrees of freedom. Hence, the selection of the platform design does not change the displacement results this paper relies on.

Q) The tension amplification ratio would be much more valuable if supported by dynamic results. Curious how two-line mooring systems impact peak loading.

A) This can be achieved at a next stage with higher fidelity models where the mooring system is further detailed and designed based on the stiffness values this study provides based on the current low-fidelity model.

Q) The baseline layouts and the TRTLE layout align turbines in the dominant wind direction, which maximizes the benefits of the repositioning technique. Providing another comparison with the turbines not aligned in the dominant wind direction would provide another nice data point.

A) That is correct. The reason for this selection is to provide an example where the selection of the platform's location is sub-optimal in terms of wake effects but was chosen due to other criteria. In this study, wake effects can be reduced by simply changing the wind farm rotation angle (ϕ_F). However, that choice brings down the farm nameplate capacity. For instance, if the wind farm (BL-tetra) has its rotation angle varied from 0 to 5 degrees, wake effects are reduced from 9.38% to 5.7%. However, nameplate capacity is reduced from 735 MW to 675 MW simply due to the configuration of the WEA and hence AEP is reduced (from 3470 to 3329GWh). Therefore, when faced with certain constraints such as maximizing AEP, understanding the platforms motion can be quite beneficial in potentially reducing wake effects through self-adjusting mechanisms due to the mooring configuration at the farm level in case the selected layout is sub-optimal.