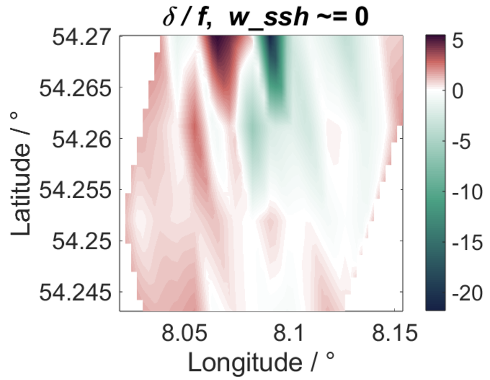
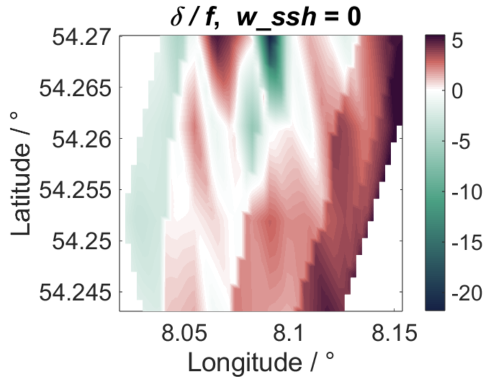
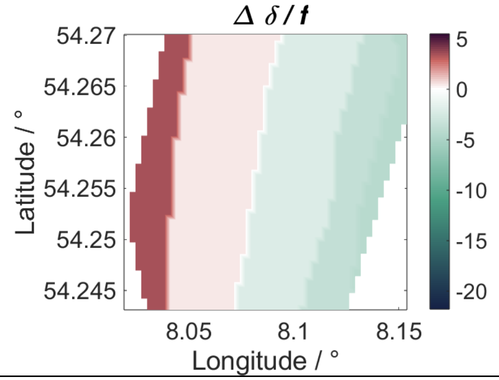
Comment	Response	Line, Text old	Line, Text new	Text/Figure, new version, Text
Main comments				
The authors acknowledge that the tidal flow speed-up and slow-down provide spurious convergence and divergence values. And they can be in constructive or destructive interference with the filament's divergence. I would like this to be more quantitative. How much divergence is due to tidal flow alone? In plots about divergence, a rough value of tidal divergence and its phase is useful to guide the reader to understand when they are in constructive and destructive interference. The estimate for tidal flow could come from the model that the authors used to get the SSH estimate in their data processing.	Thank you for pointing to this, I also think it would help to have a number for the tidal contribution. I calculated the divergence with $w_{ssh} = 0\ \mathrm{m\ s^{-1}}$ for *t2* and then, just as a bulk number, the mean divergence over time and space; the results (normalized by *f*) are the following: $\delta(w_{ssh} \neq 0) \approx -0.27$ $\delta(w_{ssh} = 0) \approx 0.60$ $\Delta\delta(w_{ssh} \neq 0) - \delta(w_{ssh} = 0) \approx -0.87$ I also added the appropriate plots in the last column of this row for spatial variability assessment. So, the tides in this time frame add an overall negative divergence after slack water, increasing the convergence area/period, whereas at the beginning of the time frame they add divergence, both of half the order of the filament divergence signal.			 

				
I think we have the opposite understanding of what ``filementogenesis'' is. I take it as processes that sharpen the filament/front, increasing its density/velocity gradient. That means, divergent flow at the light filament center is frontolytic. I can see opinions might differ on the definition because this paper is looking at a light filament, the opposite of the more commonly studied dense filament. The authors can make their own choice here, but should take a paragraph at the beginning of the paper to define the terminology in precise detail.	Thank you for the comment. That is true, our definition of "filamentogenesis" deviates slightly from the common term. I adjusted the following paragraph and I hope it is clearer now, what we mean with it.	44	44	"During frontogenesis, ASC drives upward motion on the light side and downward motion on the dense side, flattening isopycnals and enhancing stratification, whereas reversed ASC leads to frontolysis. Analogous dynamics occur in narrow buoyancy filaments, where horizontal strain sharpens buoyancy gradients and drives ASC, a process referred to as filamentogenesis (McWilliams, 2009, 2015; Garcia-Jove et al., 2022; Jakes et al., 2023). This circulation acts to restore stratified balance but modifies the filament structure depending on its buoyancy anomaly: dense filaments are reinforced by surface convergence and central downwelling that deepen the anomaly to several hundred meters (e.g., Garcia-Jove et al., 2022), whereas light filaments experience reversed circulation that shoals buoyant water toward the surface (Thomas et al., 2008) and promotes rapid filament decay. In this study, "filamentogenesis of light filaments" is defined as the ASC-driven adjustment process acting on buoyant filaments, in which reversed circulation transports light water upward and outward, shoaling the buoyancy anomaly and leading to rapid filament weakening and decay as stratification is restored."

Minor comments				
NSL is not defined anywhere as far as I can see.	Thank you for your comment. I defined the depth range of NSL in line 70.	70	70	“[…] near-surface layer (NSL; 0.1-10 m).”
What makes the anticyclonic strain zone anticyclonic? Strain is defined to be independent of vorticity. In this case, is the vorticity due to the shelf jet? For someone not familiar with the North Sea, some more description would be helpful.	You are right, I will be more precise. I did not calculate strain itself, but since the divergence term is part of it and by t3, -(δ/f) has mostly decayed, showing the filament has stretched in terms of the filament thickness (without telling about stretching direction). The vorticity comes from the frontal jet shear, so it would be better to say that it’s a region of strong strain acc. to divergence that coincides with anticyclonic vorticity.	27	27	“In contrast, light filaments arise when buoyant water intrudes into denser regions, typically in regions of anticyclonic vorticity associated with the frontal jet, where horizontal convergence and shear help shape and elongate the filament.”
For the light filament, does the ASC subduct the light anomaly? The classic picture paints it to spread the light anomaly on top with frontal divergence. From what I understood, that's what the observation shows in this paper as well.	Thank you for pointing towards this, you are completely right, I mixed up dense and light filaments in this sentences. Please see the correct version in the correction column.	28	28	“ASC upwelling spreads the buoyant anomaly above the mixed layer, […]”
Johnson et al. 2024 is nowhere to be found in the reference list.	Thank you for finding my mistake, first it has to be 2020, not 2024 and second, I missed adding the reference to the reference section. Please see the correction and added reference.	59 -	59 645	Johnson et al., 2020 Johnson, L., Lee, C. M., D’Asaro, E. A., Thomas, L., & Shcherbina, A. Restratification at a California current upwelling front. Part I: Observations. Journal of Physical Oceanography, 50(5), 1455-1472, 10.1175/JPO-D-19-0203.1, 2020.
Using km to describe the resolution might be better at such a resolution.	I just used the values given by the model, but I like your recommendation of providing the model resolution in km better. Thank you!	91	91	~3 km × 3 km
synoptic usually means O(1000 km), which this paper is not.	I did not come across a length scale definition for the term ‘synoptic’. I refer to it as a temporal ‘snapshot’ of a process (e.g., a filament or front) that was obtained from parallel measurements fast enough (on submesoscale: hours-1 day) to capture the process. Do you think I could stick to that term? But I also thought about adjusting it a bit, because the drifters behave a bit different than the ASV transects (Lagrangian	375	375	“The synoptic-Lagrangian in situ observations in this study […]”

	approach). See in the last column my suggestion, I would be pleased to hear about your opinion.			
What does "capture the kinetic energy'" means? Fronts usually convert PE to KE.	You are right, fronts usually convert PE to KE. The focus of this sentence is especially on “[…], mainly when biofilms occur at convergence zones and the wave-dumping effect is visible […]”. Then, filaments can store potential energy because waves and currents deform their viscoelastic biofilm structures and density gradients, temporarily converting kinetic energy into elastic or buoyancy potential energy, whereas ocean fronts typically do the opposite by releasing stored density-driven potential energy and converting it into kinetic energy of currents and eddies. I would much appreciate a recommendation on how to improve this sentence to avoid a misunderstanding for the reader. Thank you!	377	-	-

Comment	Response	Line, Text old	Line, Text new	Text/Figure, new version, Text
Conceptual framing and terminology				
The term “light filament” is used throughout the manuscript. While I understand the intention, the term may be misleading to readers outside the immediate submesoscale community, as “light” can imply luminosity rather than buoyancy. I suggest considering “low-density filament” or “buoyant filament”. This is a stylistic suggestion.	Thank you for the recommendation, I see the point of ensuring clarity for this crucial term. I will change the term from “light” to “low-density filament”.	-	-	(adjusted within the entire text)
Statements describing light filaments as rare and dynamically significant require explicit references and justification. It is not clear how rarity is defined here, nor relative to which class of filaments.	Thank you for pointing this out. The rarity of low-density filaments cannot be quantified so far, because there is not much literature investigating these type of filaments. Studies like Jakes et al. 2023, McWilliams 2009 or Lapeyre and Klein 2006 state that those filaments occur, but there is no quantification. This is why I adjusted the “rare” to “rarely observed”. I also added a short paragraph describing this issue.	22 -	22 36	“are a rarely observed” “Those findings apply well to dense/cold filaments that are investigated within various studies (e.g. McWilliams, 2009; Johnson et al., 2020; Chrysagi et al., 2021; Esposito et al., 2023). Some of them state the occurrence of low-density filaments and Lapeyre and Klein (2006) underscore the importance of filamental upwelling as develops at low-density filaments for the ocean nutrient flux. ocean nutrient flux. McWilliams (2015) points to the rarity of low-density filaments, but otherwise frontal literature lacks a quantification from either models and in situ observations of this type of filaments.”
The hypothesis of light-filament formation is introduced early, but the physical mechanism remains vague. It would help to clearly state what process is being tested, for example strain-driven frontogenesis, tidal modulation, or freshwater-induced buoyancy contrasts. Is	Thank you for questioning that. I focused now on the tidal modulation and the freshwater input driven buoyancy. Therefore, I added more information on the freshwater budget in the North Sea (line 39, new 49) and added the mentioned freshwater sources in figure	39	49	“[…].Especially in the southern North Sea, freshwater input from rivers can lower coastal salinity by up to 10 $g \cdot kg^{-1}$ (Chegini et al., 2020), steepening density gradients and intensifying fronts (Simpson et al., 1990; Ricker et al., 2021; Goßmann et al., 2025). According to Núñez-Riboni and Akimova (2017) river-runoff is responsible for ~ 80 % of the inter-annual salinity variability in the southern North Sea, both in terms of spatial extent and magnitude. Chegini et al. (2020) estimated the combined freshwater flux of Elbe, Weser, Ems and Eider to be 1200 $m^3 s^{-1}$, however, Meyer et al. (2025) state that the river Elbe can afford a freshwater input up to 1420 $m^3 s^{-1}$ alone in winter season. The additional freshwater mainly remains in the upper water column, forming a two-layer stratification (Stanev et al., 2015). This state persists depending on

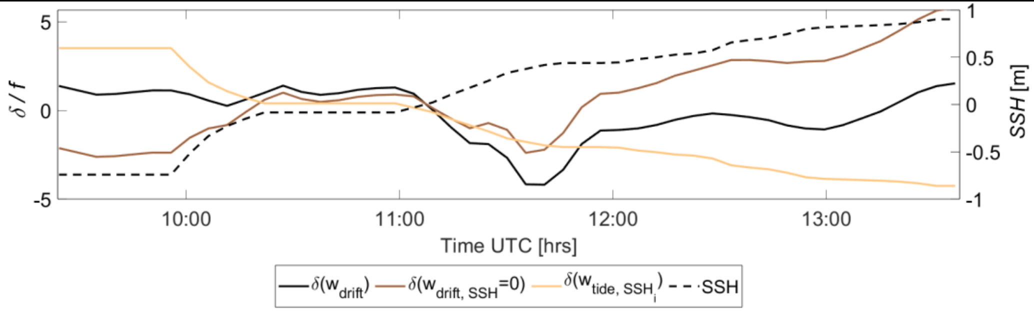
not clear what is doing what.	1. I also rephrased the last paragraph of the introduction (and the manuscript in general, **see also next comment row**), focusing the mechanism to be tested on freshwater-driven buoyancy and tidal modulation on the filament.	 70-72	 96-98	the freshwater flux added; Chegini et al. (2020) recorded a massive Elbe-runoff event (>4000 $\mathrm{m^3 s^{-1}}$) causing a continuous stratification in shallow waters (20-30 m; near the island of Helgoland) in summer 2013 that lasted 120 days. In combination with semidiurnal tides with tidal hubs exceeding ~3.5 m (Meyer et al., 2025), an overturning estuarine circulation forms, where low-density surface water flows seawards and denser North Sea water propagates landwards near the bottom, oscillating with mixing during periods (Burchard and Badewien, 2015). Stanev et al. (2015) explain salinity to be responsible for 20 % of this overturning circulation, with the remaining drivers being winds, external salinity input (precipitation, inflow from adjacent seas and channels; Núñez-Riboni and Akimova, 2017). These cumulative processes and preconditions acting on horizontal density gradients, make North Sea TMFs highly sensitive to mesoscale and submesoscale strain, a key prerequisite for frontogenesis (Garcia-Jove et al., 2022). " "This dataset allows us to investigate the buoyancy-driven nature of the filament and the role of tidal modulation in amplifying and weakening its surface divergence signal, providing new insight into these dynamically important features."
Several claims about filament lifetime, asymmetry, and dynamical importance appear without the supporting analysis. These arguments need evidence or should be clearly stated as .	Thank you for this comment. Because of the resolution of the SSH data set and the need for even higher spatial and temporal synoptic measurements (especially of the background/tidal field), we cannot resolve parameters like "lifetime". This is why I now focused on the observed asymmetric erosion of the filament and therefore added the following paragraph. In general, I went through the manuscript and sharpened the analysis, results and discussion, focusing on freshwater input and tidal modulation on the filament	450-456	481-500	"The temporal evolution of the low-density filament indicates spatially asymmetric erosion, with earlier and stronger weakening on the eastern/right-hand side. This asymmetry coincides with evolving kinematic conditions, including a gradual reduction of convergent signatures in δ/f, increasingly patchy anticyclonic vorticity, and a broadening of the secondary circulation. Within the simplified tidal-modulation framework based on Copernicus SSH-derived divergence (section 3.2), decelerating ebb flow would generally be expected to enhance convergence and support downward motion within the filament. However, the observations do not clearly reflect this expected strengthening of convergence. One possible contributing factor may be a vertical phase structure in the tidal circulation, where ebb flow persists in the lower water column while flood currents already propagate near the surface. Such a configuration could introduce surface-intensified divergence that partly counteracts the expected convergent tendency, potentially weakening downwelling within the filament. In addition, across-front velocity sections show stronger near-surface across-filament flow and enhanced horizontal and vertical shear on the eastern side, suggesting locally intensified differential advection or lateral stirring, both vertically and horizontally. Constructive and destructive interference between tidal motions and filament-induced circulation may have further modulated vertical velocities, contributing to the observed reduction in filament coherence, as also reflected in the sensor chain signal (section 3.1). Overall, the filament appears to have evolved within a kinematically heterogeneous environment where evolving patchy anticyclonic vorticity and local shear structures likely modulated the background tidal convergence field. Given the simplified nature of the tidal-modulation estimate and the limited spatial resolution of the forcing fields, the relative contributions of tidal forcing, vertical phase structure, and

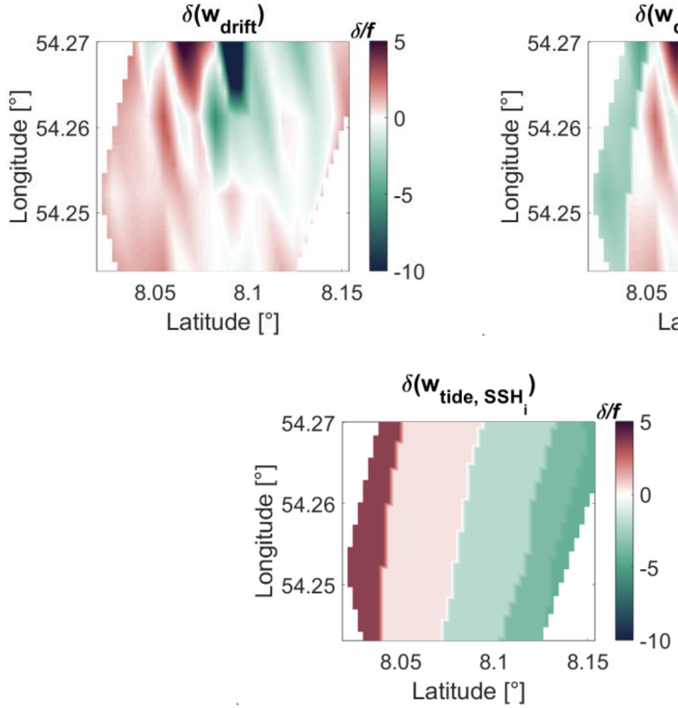
	structure (and asymmetry), and discussed the limits of the data set.			local advection processes remain difficult to fully disentangle, but together they provide a consistent qualitative framework for the observed asymmetric erosion. […]"

Introduction and background				
Please add references to support the relationship between anticyclonic strain and the formation of buoyant filaments.	Thank you for this hint, I added appropriate references.	29	29	"(Mahadevan and Tandon, 2006; McWilliams, 2015; Jakes et al., 2023)"
When discussing filament lifetime, explicitly state why light filaments are hypothesized to be short-lived.	I added information on the live span of filaments of filaments in general (line 31, see next row entry) which I think answers this question.	-	31	See next row entry
The variability of the filament is mentioned, but not clearly defined. Specify whether this refers to changes in gradient sharpness, spatial position, depth extent, or temporal persistence.	Thank you for pointing to this gap. I added a paragraph with the appropriate information. Note, that these are information about filaments in general and not specifically for low-density filaments as there is none in literature.	-	31	"Their horizontal scales are located between the mesoscale regime and small-scale three-dimensional turbulence (Chrysagi et al., 2021) with a vertical extent to the upper 50 m of the surface ocean (Thomas and Lee, 2005; Mahadevan and Tandon, 2006). Vertical velocities driving ASC may reach ±100 m d^(-1), restratifying horizontal density gradients within subinertial time scales (Thomas and Lee, 2005; Chrysagi et al., 2021)."
The description of filamentogenesis and filamentolysis is conceptually dense and not helpful in understanding how they occur in this scenario. A schematic or a direct reference to an existing schematic figure would substantially improve clarity.	Thank you for your comment. First of all, I rephrased the paragraph a bit, strengthening the distinction between literature-based definition of filamentogenesis (of dense filaments) and the definition we use in this study. The reference to a graphical scheme is made in the text, especially the one presented by Jakes et al. 2023, which is one of the rare studies depicting low-	46	66	"During frontogenesis, ASC drives upward motion on the light side and downward motion on the dense side, flattening isopycnals and enhancing stratification, whereas reversed ASC leads to frontolysis. Analogous dynamics occur in narrow buoyancy filaments, where horizontal strain sharpens buoyancy gradients and drives ASC, a process referred to as filamentogenesis (McWilliams, 2009, 2015; Garcia-Jove et al., 2022; Jakes et al., 2023). This circulation acts to restore stratified balance but modifies the filament structure depending on its buoyancy anomaly: dense filaments are reinforced by surface convergence and central downwelling that deepen the anomaly to several hundred meters (e.g., Garcia-Jove et al., 2022), whereas low-density filaments experience reversed circulation that shoals buoyant water toward the surface (Thomas et al., 2008) and promotes rapid filament decay. In this study, "filamentogenesis of low-density filaments" is defined as the ASC-driven adjustment process acting on buoyant filaments, in which reversed circulation transports light water upward and outward, shoaling the buoyancy anomaly and leading to rapid filament weakening and decay as stratification is restored."

	density filamental ASC. I wouldn't add a schematic figure at this point, because we already have the schematic illustration in the discussion section.			
The term "parcel deformation" should be clearly defined or replaced with more specific kinematic language.	Thank you for your comment. I modified the phrase. In our opinion, at this point a closer definition on parcel deformation might be not suitable, since the method explanation comes in the methods section.	52	79-80	"[…] or path-integrated velocity gradient quantities (e.g., parcel deformation; Vélez-Belchí and Tintoré, 2001; […])"
Excessive use of acronyms				
The manuscript introduces many acronyms that are not strictly necessary and significantly hinder readability. Examples include TMF, NSL, DKL, and others. In several cases, spelling out the full term would improve clarity. I recommend being more selective when defining new acronyms.	I agree, therefore I removed the acronym for DKP, since it is not mentioned as often as ASC, ASV or NSL. Those, however, I would keep as acronyms, since they are used >20 times in the manuscript. However, I removed TMF as abbreviation for better text flow.	-	-	-
Data and methods				
The motivation for using the CMEMS model for frontal detection should be clarified. Were satellite SST or SSS fields examined as an alternative or complement?	Thank you for finding this gap. Satellite SST was used for prior identification of the research area and model SSS was then used to find the appropriate gradient for sampling.	-	118	"Front detection was performed by observing satellite-based sea surface foundation temperature (CMEMS, 2023) and guided by […]"
Density variability appears to be dominated by salinity rather than temperature, yet the early	Yes, you are right, salinity accounts for a density variability of $\sim 0.54\ \mathrm{kg\ m^{-3}}$,	306	352-354	"Density gradients were due to 10 times stronger influence of salinity (Δρ(S)≈0.54 kg m^(-3)) than temperature (Δρ(T)≈0.04 kg m^(-3)) (not shown), identifying the low-density filament as salinity-driven due to high freshwater contrasts."

sections give the opposite impression. This should be clarified consistently throughout the manuscript.	whereas temperature accounts only for ~ $0.04\ \mathrm{kg\ m^{-3}}$. The goal was to state that at tidal mixing fronts, which are governed by temperature gradients, filaments governed by salinity can be present, too, arising from a different mechanism (freshwater input) than the tidal mixing front. I added a short paragraph in the text.			
Please clarify what is meant by uniform resampling of drifter trajectories.	Uniform resampling refers to the calculation of divergence for distinct time intervals, e.g. Tarry et al. 2022 or Esposito et al. 2023 chose 15 min temporal bins for their calculation.	161	190-191	-
The description of the Delaunay triangulation procedure needs more detail, particularly why it is reinitialized at the start of each interval.	Delauney triangulation is reinitialized at every *t*, because tidal modulation strongly deforms drifter triplets (see explanations in section 2.2 and especially the sentence in line 175).	162	192	"Delaunay triangulation at the start of each interval increased usable triplets and avoided configurations already deformed."
The RMSD introduced in the context of SSH comparison is unclear. RMSD relative to what reference? Please clarify.	The RMSD is given by CMEMS (2024) for the estimation of the SSH.	-	-	-
The comparison between in situ measurements and CMEMS predictions raises questions about error propagation. A brief discussion of uncertainty introduced by this comparison would strengthen the analysis.	Thank you for this question. I added a paragraph to the according figure Fig. B1 in the appendix section.	530	603-614	The correlation of model SSS (CMEMS, 2024) with salinity recorded by a Ferrybox flow-through system is shown in Fig. S1. For each spatial bin of the model data at a time step, Ferrybox salinity data is averaged within that bin and at that specific time. Proceeding like this for the three consecutive days (August 4th to 6th), the resulting data points are plotted for standard deviation, time, latitude and longitude. Applying a linear regression to the correlation, a R^2 of 0.705 can be achieved. The standard deviation throughout the correlation data lies on average below 0.05 $\mathrm{g\ kg^{-1}}$ and reaches only in a few exceptions 0.1-0.15 $\mathrm{g\ kg^{-1}}$ that are not covered by the regression. Regarding the temporal distribution, especially the slack water times from late August 4th and whole 5th fall out of the regression. In terms of latitude, those outliers are mostly pronounced in higher latitudes (> 54.2 °N) and for longitude in eastward values (> 8.1 °E). The model data, thus, underestimates the salinity in the eastern, more coastal areas, probably assuming a higher freshwater input and hence a lower salinity than was obtained by the

				Ferrybox. In particular during low water, when the ebb current exports the more saline water seawards, the model predicts a lower reduced salinity. Compared to this, in more western areas, in between the slack water times, the estimation of the model is much better.
Results and interpretation				
Line ~282: clarify how large the remaining bias is after quality control. Here you say it could be significant. How can we trust this analysis then?	Thank you for the comment. I added the spatial mean error for t2 in the text.	282		"Despite potential overestimation due to error propagation from the divergence estimation ($\overline{\Delta\delta/f} \approx 2.928$), […]"
Sharp discontinuities in Figure 3 panels b and c after ~12 hours need explanation.	Sorry for missing this explanation. I added a short paragraph on this issue.	(300)	330-331	"Sharp discontinuities observed outside the filament (~12 h) likely resulted from a secondary crossing of strong density gradients. Although the drifting sensor chain was positioned farther south than the drifters, both datasets indicate a coincident gradient crossing at that time (Fig. 2)."
The formation of the filament is still not fully convincing. The processes are not clearly separated and justified.	Please see the comment in the **Conceptual framing and terminology** section, **row 3**.	-	-	-
The role of tidal-induced vertical velocities is underdeveloped. There are no clear tidal diagnostics shown to support this interpretation.	Thank you for pointing to this, I provided additional analysis of the contribution of tidal modulation to the time frame of the low-density filament (see figures in this row). The analysis is done based on the divergence calculations from the drifters, where $\delta(w_{drift})$ refers to the divergence calculated like previously in the manuscript (using triplet method + vertical displacement by tidal hub), $\delta(w_{drift,SSH} = 0)$ refers to divergence calculated by the triplet method but with tidal displacement set to 0 (without tidal modulation) and $\delta(w_{tide,SSH})$ displays the difference between the			

	previous two, so divergence based only on tidal modulation. Those three are shown as means over time (upper plot) and in space (lower 3 subplots). I added this figure also to the manuscript. Tidal modulation in this time frame add an overall negative divergence after slack water, increasing the convergence area/period of the low-density filament, whereas at the beginning of the time frame they add divergence, both of half the order of the filament divergence signal. This analysis results in two main findings: 1) The low-density filament is present even without tidal modulation, the driving process hence is buoyancy (induced by freshwater input) and 2) tidal modulation amplifies/weakens the filament divergence signal (adding divergence during early flood, adding convergence during late flood).			
The manuscript repeatedly refers to freshwater input as a key driver, but the freshwater source and its spatial structure are never clearly described.	Please see the comment in the **Conceptual framing and terminology** section, **row 3**.	-	-	-
Statements regarding heat transport and heat uptake are speculative unless directly supported by quantitative	Thank you for hinting towards this. I rephrased the paragraph, so that the focus is more on stratification due	466-471	533-538	"Once filamentogenesis was established in the upper meter, the system became more efficient at absorbing heat, with uptake doubling despite only weak net temperature changes. This enhanced capacity highlights the importance of low-density filaments as effective, short-lived hotspots of exchange at the ocean-atmosphere interface. Tidal modulation, salinity redistribution and rapid phase transitions

analysis. If such analysis is not included, these claims should be toned down (Line ~465 and other places).	to the freshwater-driven buoyancy that may be impacting heat flux. Additionally, please see the comment in this section, **row 7**.			may make them mediators of vertical exchange. While dense filaments dominate in the open ocean, low-density filaments may represent a likely important, yet less frequent, pathway for near-surface fluxes in shelf and estuarine seas.”
The conclusion that light filaments are more ephemeral than dense filaments is not sufficiently demonstrated. There is no comparison of lifetimes or statistics that would support a general claim.	Thank you again for your comment. I removed the phrases about life-span, because our data set is not synoptic enough in time in space to resolve the full evolution of the filament, so that we can’t compare it entirely with dense/temperature-driven filaments. But what we can state is the main impact of freshwater contrasts on the filament and the tidal modulation, so I changed the focus on those two processes again.	480-491	548-564	“Unlike the dense, temperature-driven filaments commonly described in the open ocean, the low-density filament observed here was associated with strong freshwater-driven buoyancy contrasts, highlighting a distinct estuarine pathway to filament formation. The observations further suggest that tidal modulation strongly influenced the filament structure and surface divergence patterns, with different tidal phases associated with amplification or weakening of the frontal signal. This tidal influence may also contribute to local filament processes such as the asymmetric erosion of filament flanks and the transition from strong lateral buoyancy gradients toward restratification. Restratification during filamentogenesis coincided with enhanced surface warming, suggesting a potential link between submesoscale circulation and upper-ocean heat storage. Our observations further indicate that freshwater-driven buoyancy contrasts play a central role in filament formation, while tidal modulation can amplify or weaken the surface divergence signal depending on tidal phase. However, the use of sea surface height for the estimation of tidal modulation of the divergence budget only provides a simplified model that is restricted to the surface. Since dense North Sea water and less dense water mixed with freshwater originating from rivers such as Elbe and Weser create a vertical tidal phase shift, it is crucial to also incorporate tidal modulation in the deeper layers. Further, more synoptic spatial and temporal assessments are necessary to resolve the background and tidal flow accompanying the filament. These results thus are a first approach in coupling freshwater-driven buoyancy and tidal impact on a how low-density filament that may contribute to vertical exchange and air-sea coupling in the ocean. More broadly, resolving the transient dynamics of buoyancy-driven filaments and their tidal modulation may improve our understanding of upper-ocean stratification and regional climate feedbacks.”
Minor Comments and Editorial Issues				
Line ~24: please indicate chapter and page number for the cited book reference.	Thank you for this hint, but I am not sure, if you mean for the reference in the text or in the references section, because there I added the chapter and page numbers.	24	-	-
Line ~114: typographical correction for “~2 km”.	Typographical correction was applied.	114	-	-
Line ~214: sentence structure is unclear and should be revised.	Thank you for the comment, I rephrased the sentence.	214	241-242	“Vertical velocities in the water column were derived from the continuity equation including the term for divergence, which was previously calculated for drifters and ADCP […]”
When introducing rotated	Thank you for this comment,	-	216-	“[…] where *u** and *v** are the cross- and along-front velocity components, obtained by rotating

coordinates, explicitly state that x′ refers to the rotated reference frame.	I marked the rotated velocities for the drifting sensor chain. For the ASV ADCP velocities no rotation was necessary, since along-track velocity already resembled across-front velocity. I added this information in brackets.	 -	217 226-227	earth-referenced velocities into the chain’s azimuthal frame.” “[…] along-track velocity component was extracted (along-track velocities resemble across-front velocities) […]”
Line ~270: Avoid starting paragraphs with phrases such as “Figure X shows”	Thank you for your comment. I adjusted the sentence.	270	298	“Drifter triplet centroid trajectories over SSS isohalines (CMEMS, 2024, panel a) are shown in Figure 3, […]”

Figures				
Figure captions should be self-contained. Several figures rely heavily on the main text to explain what is shown.	I tried to add some more detail to the figure captions.	-	-	-
All units should be written using square brackets, for example [kg m−3], rather than separated by slashes.	Thank you for the hint, I updated all figures according to this.	-	-	-
In Figure 5, the density panels would benefit from adding a grid to improve readability.	I added a grid to the density sections.	-	-	-