

Supporting Information for "Sensitive dependence of trajectories on tracer seeding positions - coherent structures in German Bight backward drift simulations"

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1 Example trajectories initialized at low FTLE values

Fig. S1 copies Fig. 3b, except that the example trajectories being shown are now initialized at locations away from any FTLE ridge. It can be seen that in this case the trajectories stay near together.

2 FTLE fields for different integration times

- 5 All examples in this study were evaluated using a trajectory integration time of -250 h. It turns out, however, that results are not particularly sensitive to this choice. This is illustrated in Fig. S2. Referring to the example in Fig. 3b, the figure shows analyses that were obtained for shorter integration times -125 h or -50 h. Locations of the main FTLE ridges remain unaffected by the particular choice of integration time.

3 Forward simulations including leeway

- 10 The forward FTLE fields in Fig. S3 are based on marine currents from exactly the same 250 h time period that also underlies the backward FTLE field in Fig. 4a. Accordingly, wind vectors shown are the same, apart from their chronology. Similar to the backward FTLE field (Fig. 4a), its forward counterpart (Fig. S3a) again shows a couple of sharp ridges. In backward simulations, drifter separation in the forward mode would translate into a confluence of initially separated tracers, which cannot be displayed as a local property.
- 15 Fig. S3b shows the same analysis with, however, a leeway of 0.6 % of 10 m wind being included. Due to strong westerly winds at the time of the plot, wind driven tracers reach the coastal shallow waters more easily, which produces the wider corridor within which test trajectories were discarded. The corridor's width shrinks for a shorter integration time of only 125 h (Fig. S3c).

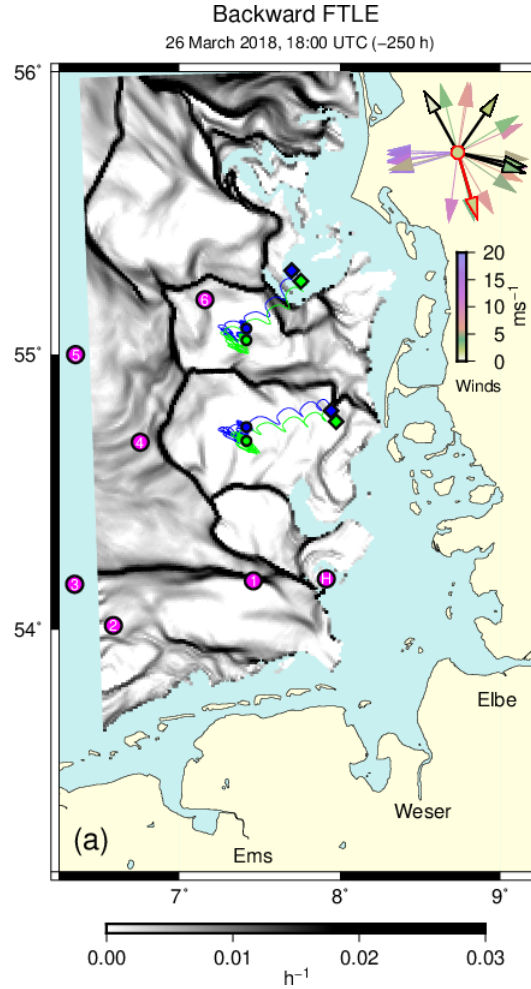


Figure S1. This figure supplements Fig. 3b. Unlike in Fig. 3b, pairs of example trajectories (green and blue) were initialized away from the FTLE ridges. Trajectory release points are indicated by circles, end points by diamonds. All trajectories were integrated 250 h backward in time. Magenta circles indicate locations of MARNET stations (1-6) and of the island of Heligoland (H). Vectors in the top-right corner show past wind directions (modelled for the location of MARNET station 4) at 10-hourly intervals. Different wind speeds are represented by a colour map. Wind vectors at the respective times of the plots are outlined in red, those during the last 50 h are outlined in black.

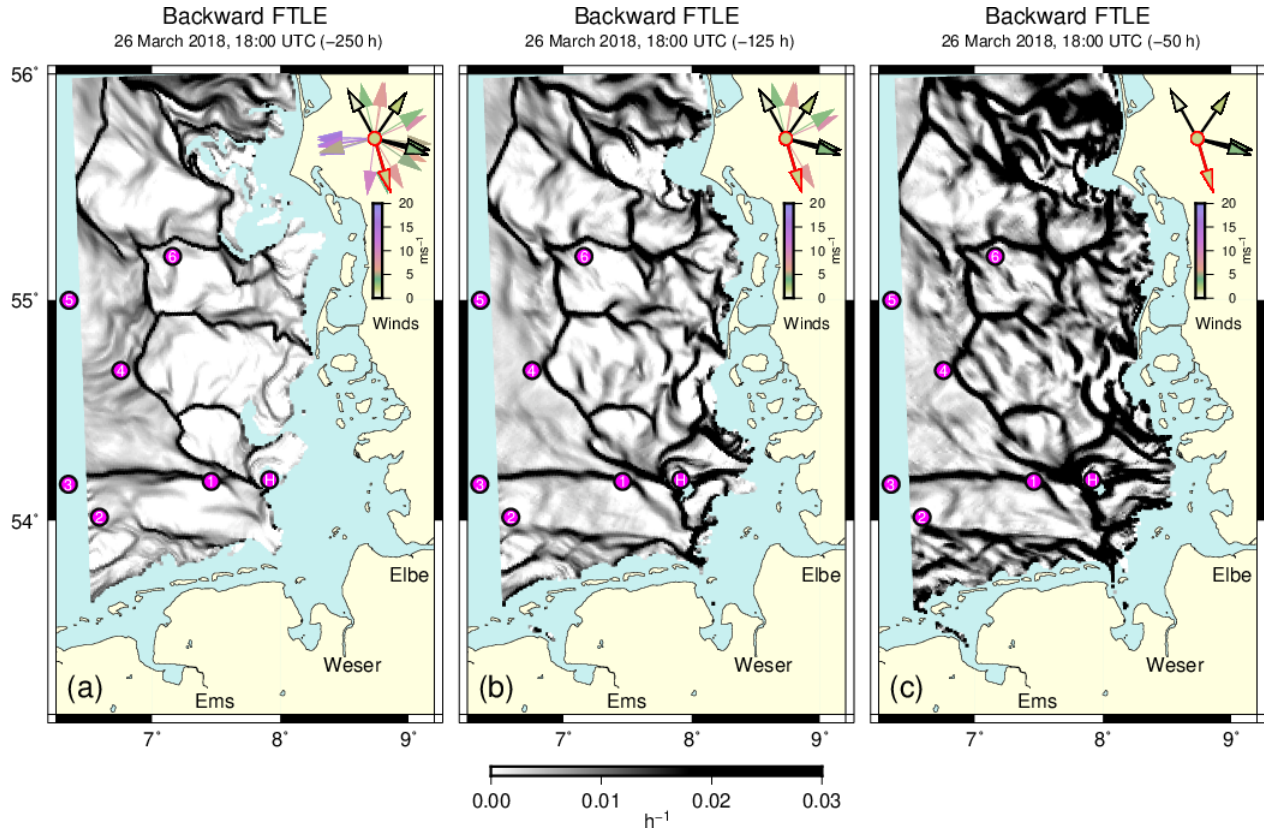


Figure S2. (a) Copy of Fig. 3b. (b) The same analysis based on trajectories integrated only 125 h back in time. (c) The same analysis based on trajectories integrated only 50 h back in time. Magenta circles indicate locations of MARNET stations (1-6) and of the island of Heligoland (H). Vectors in the top-right corner show past wind directions (modelled for the location of MARNET station 4) at 10-hourly intervals. Different wind speeds are represented by a colour map. Wind vectors at the time of the plot are outlined in red, those during the last 50 h are outlined in black.

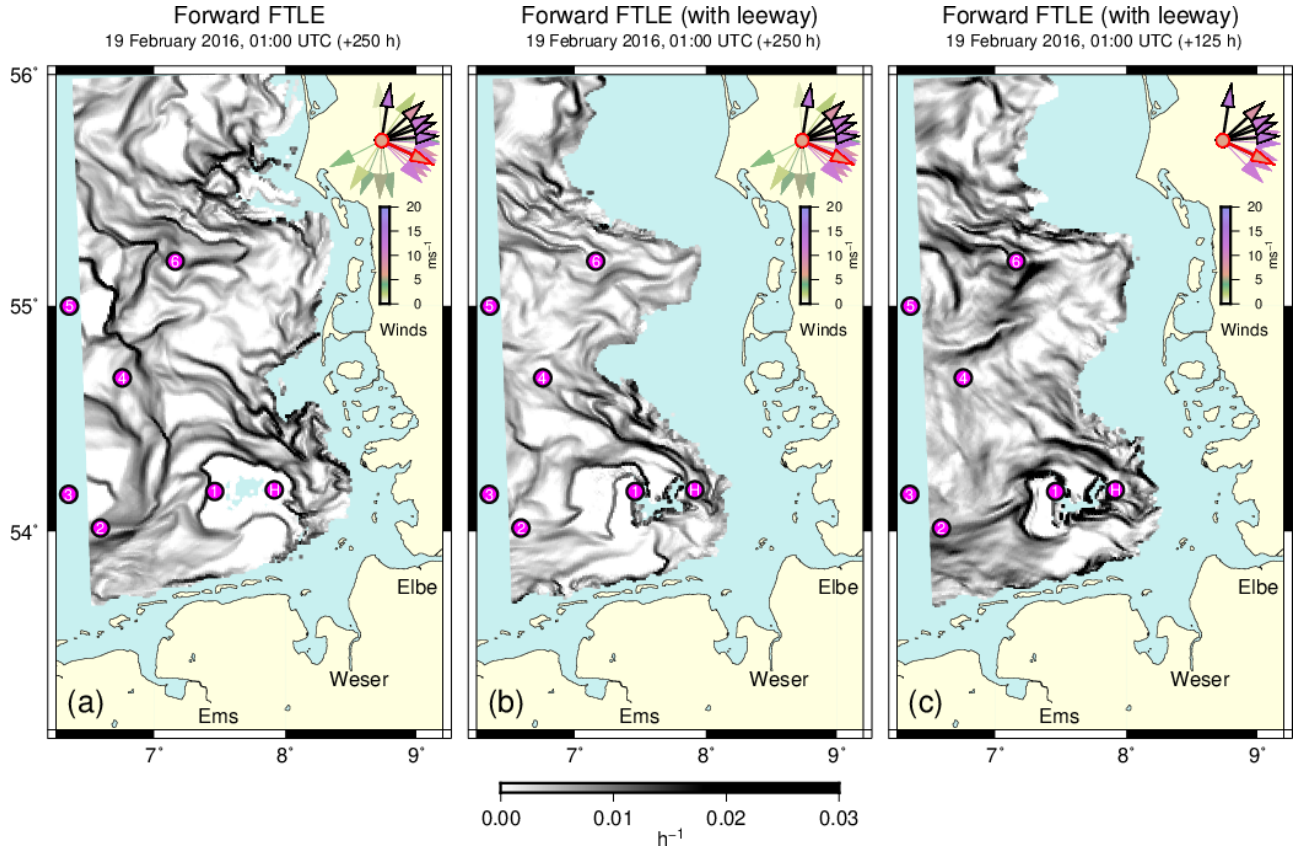


Figure S3. (a) Forward FTLE fields at the time when backward trajectories underlying Fig. 4 end. Vectors in the top-right corner show future wind directions (modelled for the location of station 4) at 10-hourly intervals. Different wind speeds are represented by a colour map. Wind vectors at the time of the plots are outlined in red, those during the next 50 h are outlined in black. Apart from their chronology, winds equal those shown in Fig. 4a. (b) As panel (a) but based on drift velocities augmented by a leeway of 0.6 % of local 10 m wind velocity. (c) As panel (b) but for a smaller integration period of only 125 h (instead of 250 h).