

# 1. Executive Summary

## OpenOil point seed - full forecast release

Launched by: Eysteinn Sigurðsson

### Analyst Interpretation

Drift is steady with a modest east-northeast bias (mean track near 19 degrees true) over 96 hours, totaling about 16 km at roughly 0.17 km/h. The most likely final position lies northeast of the last-known point, consistent with a persistent along-current component. Uncertainty has expanded rather than contracted: the modeled footprint grows through time to tens of thousands of square kilometers in the 50–90 km<sup>2</sup> range and a spatial spread around 20 km, indicating a broadening exposure corridor. Shoreline impact is projected to begin around 50 hours, so the dominant trajectory remains within a widening corridor rather than a tightly constrained path.

Shoreline interaction carries operational significance: at contact the oil shows a relatively high water-contact fraction (~0.77) and a measurable surface film (~0.23 mm) at the shoreline. Total stranded mass is about 5.86 million kg, with a final stranded percentage near 3.6%, increasing gradually through the window. The stranded-probability trajectory confirms nonzero shoreward risk that grows with time, but the dominant modeled outcome remains offshore, implying a low-to-moderate shore impact within the forecast horizon and a need to maintain shoreline watch as the 50-hour mark approaches.

### Incident Inputs

- Last Known Position (WGS84): 26.620337°, 56.389389°
- Last Known Time (UTC): 2026-03-13 00:00:00
- Initial Uncertainty Radius: 1000 m
- Object Type: Oil spill (ARABIAN LIGHT)
- Ensemble Size: 10,000 particles

### Key Results

- Most Likely Position (Centroid): 26.756754°, 56.442054°
- Time of Estimate: 2026-03-17 00:00 UTC
- Drift Distance: 16.00 km
- Average Drift Speed: 0.17 km/h
- Mean Drift Direction: 19.1° True

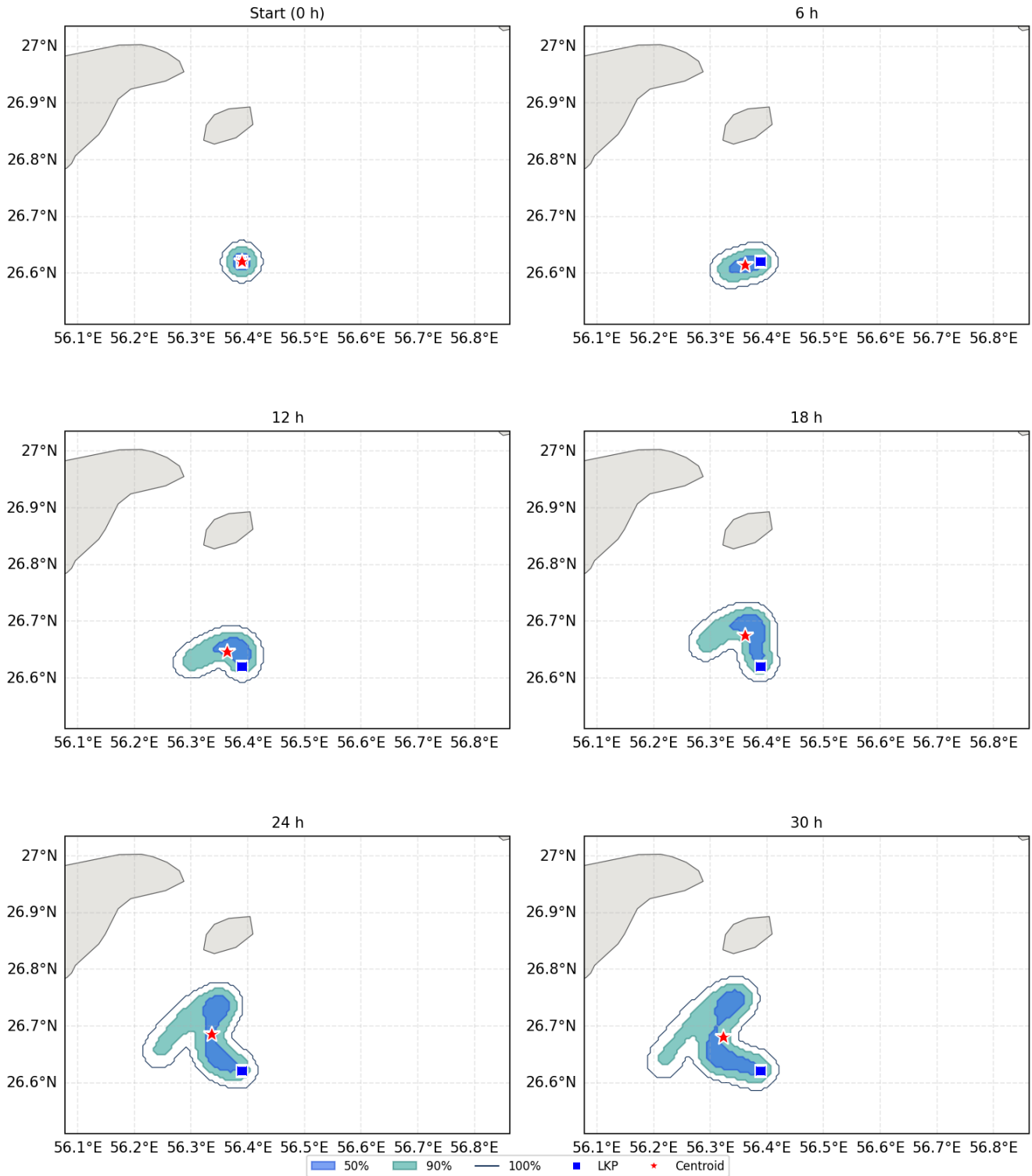
### Probability Areas

- 50% Probability Area: 273.89 km<sup>2</sup>
- 90% Probability Area: 769.20 km<sup>2</sup>

**Operational Note:** The 50% contour contains half of modeled outcomes and represents the highest-probability search region.

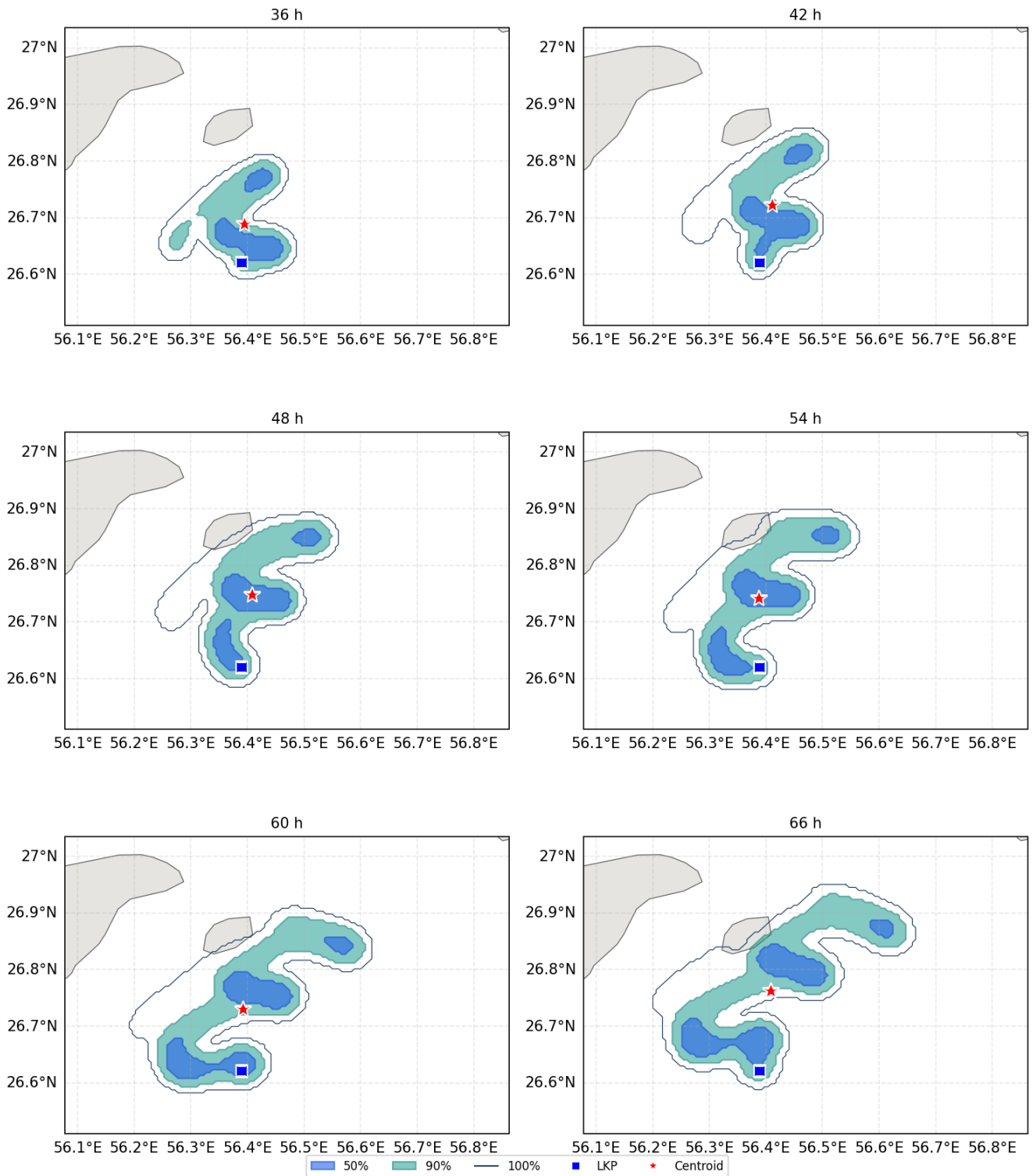
# 2. Probability Map

## Probability Map — Start, every 6 h, and Final



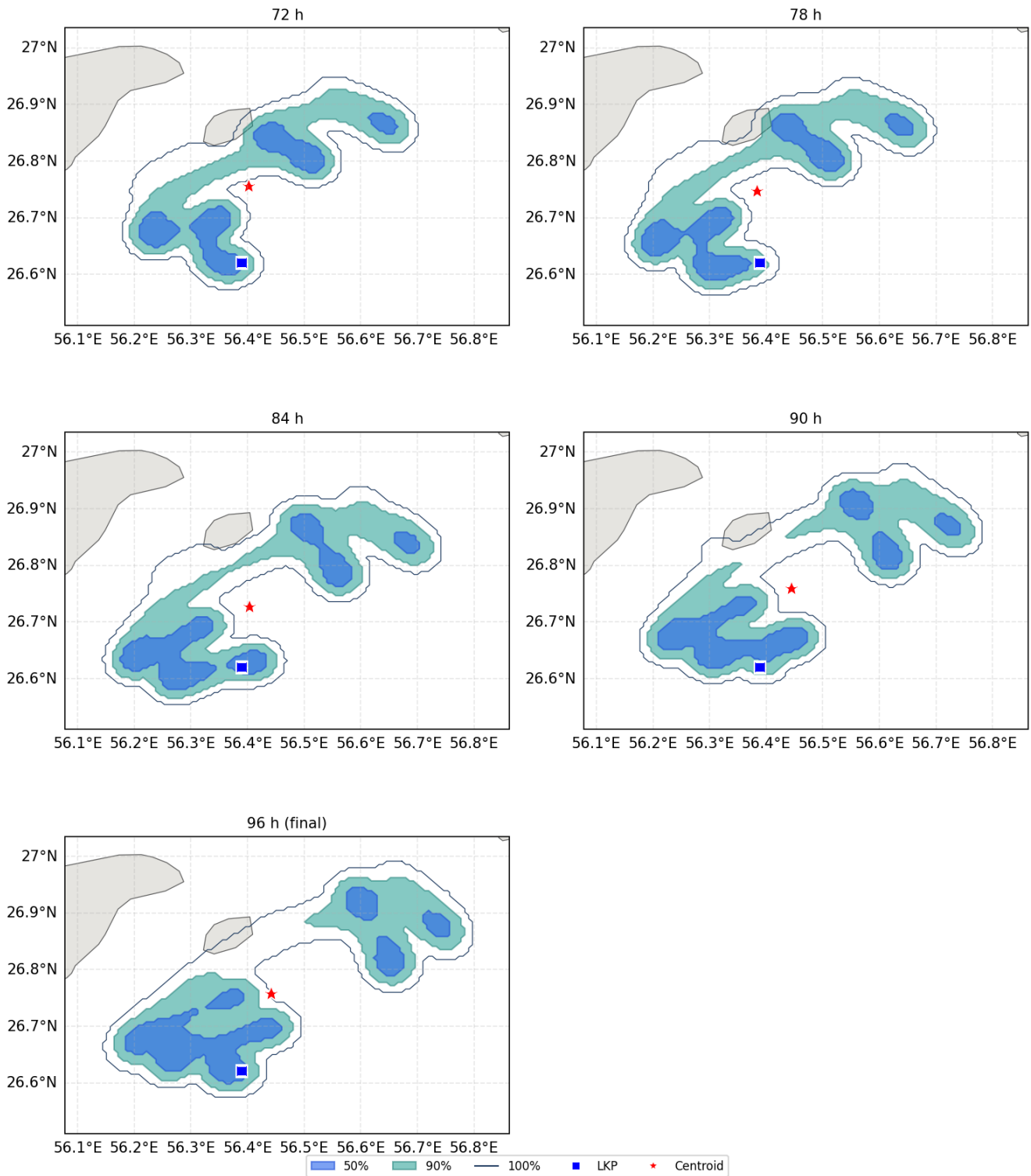
# 2. Probability Map

## Probability Map — Start, every 6 h, and Final



# 2. Probability Map

## Probability Map — Start, every 6 h, and Final



### 3. Summary by Time Slice

Time (UTC)	Hours	Centroid Lon	Centroid Lat	50% Area	90% Area	Dist. from LKP	Stranded %
2026-03-13 00:00	0.0h	56.389389°	26.620337°	7.92 km <sup>2</sup>	24.29 km <sup>2</sup>	0.00 km	0.0%
2026-03-13 04:00	6.0h	56.361956°	26.614251°	14.37 km <sup>2</sup>	43.69 km <sup>2</sup>	2.81 km	0.0%
2026-03-13 12:00	12.0h	56.364393°	26.645481°	21.88 km <sup>2</sup>	70.73 km <sup>2</sup>	3.74 km	0.0%
2026-03-13 16:00	18.0h	56.361800°	26.674130°	30.55 km <sup>2</sup>	94.64 km <sup>2</sup>	6.56 km	0.0%
2026-03-14 00:00	24.0h	56.336226°	26.685763°	45.74 km <sup>2</sup>	145.05 km <sup>2</sup>	8.98 km	0.0%
2026-03-14 04:00	30.0h	56.322825°	26.680803°	55.52 km <sup>2</sup>	175.02 km <sup>2</sup>	9.42 km	0.0%
2026-03-14 12:00	36.0h	56.394420°	26.688988°	64.79 km <sup>2</sup>	209.55 km <sup>2</sup>	7.62 km	0.0%
2026-03-14 16:00	42.0h	56.411901°	26.722026°	79.77 km <sup>2</sup>	243.58 km <sup>2</sup>	11.49 km	0.0%
2026-03-15 00:00	48.0h	56.408627°	26.747238°	100.00 km <sup>2</sup>	312.93 km <sup>2</sup>	14.19 km	0.0%
2026-03-15 04:00	54.0h	56.388173°	26.740785°	107.87 km <sup>2</sup>	353.24 km <sup>2</sup>	13.35 km	1.2%
2026-03-15 12:00	60.0h	56.392968°	26.730053°	129.48 km <sup>2</sup>	439.85 km <sup>2</sup>	12.16 km	1.3%
2026-03-15 16:00	66.0h	56.408771°	26.762258°	144.55 km <sup>2</sup>	489.93 km <sup>2</sup>	15.84 km	2.0%
2026-03-16 00:00	72.0h	56.402669°	26.755755°	171.05 km <sup>2</sup>	556.39 km <sup>2</sup>	15.06 km	2.2%
2026-03-16 04:00	78.0h	56.383909°	26.746600°	189.92 km <sup>2</sup>	605.55 km <sup>2</sup>	14.00 km	2.3%
2026-03-16 12:00	84.0h	56.403839°	26.726854°	215.14 km <sup>2</sup>	671.70 km <sup>2</sup>	11.89 km	2.6%
2026-03-16 16:00	90.0h	56.444620°	26.758348°	228.94 km <sup>2</sup>	690.06 km <sup>2</sup>	16.25 km	3.3%
2026-03-17 00:00	96.0h	56.442054°	26.756754°	273.89 km <sup>2</sup>	769.20 km <sup>2</sup>	16.00 km	3.6%

## 4. Simulation & Forcing Details

### Model Declaration

- Model Engine: OpenDrift — OpenOil v1.14.8
- Numerical Method: Lagrangian particle tracking
- Ensemble Size: 10,000 particles
- Time Step: 60 minutes
- Coastline Interaction: Stranding on land
- Stranding Treatment: Particles marked stranded, excluded from active count

### Environmental Forcing Data

- Wind: NOAA GDAS/GFS — NCEP Global Data Assimilation System
- Ocean Currents: Copernicus Marine Service (CMEMS) — GLOBAL\_ANALYSISFORECAST\_PHY\_001\_024
- Waves: Copernicus Marine Service (CMEMS) — GLOBAL\_ANALYSISFORECAST\_WAV\_001\_027
- Ocean Physics (SST/Salinity): Copernicus Marine Service (CMEMS) — GLOBAL\_ANALYSISFORECAST\_PHY\_001\_024

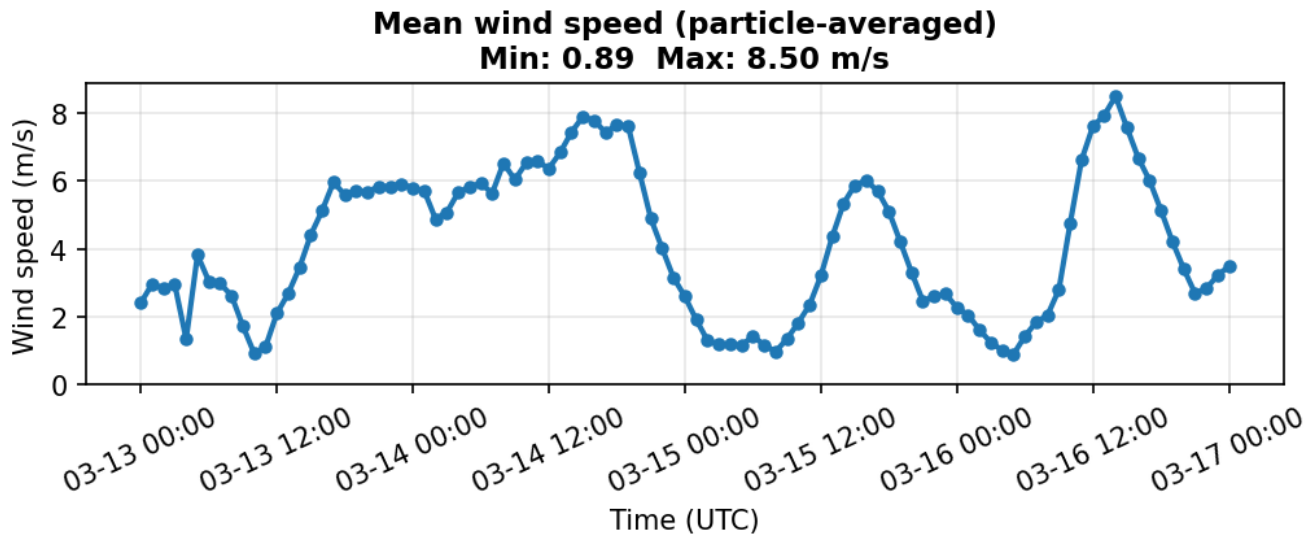
### Simulation Summary

- Simulation duration: 96.0 hours
- Requested forecast: 96.0 hours
- Active Particles: 9,638
- Stranded Particles: 362 (3.6%)
- Spatial Spread (Std Dev): 20.50 km
- Drift Direction: 19.1° True

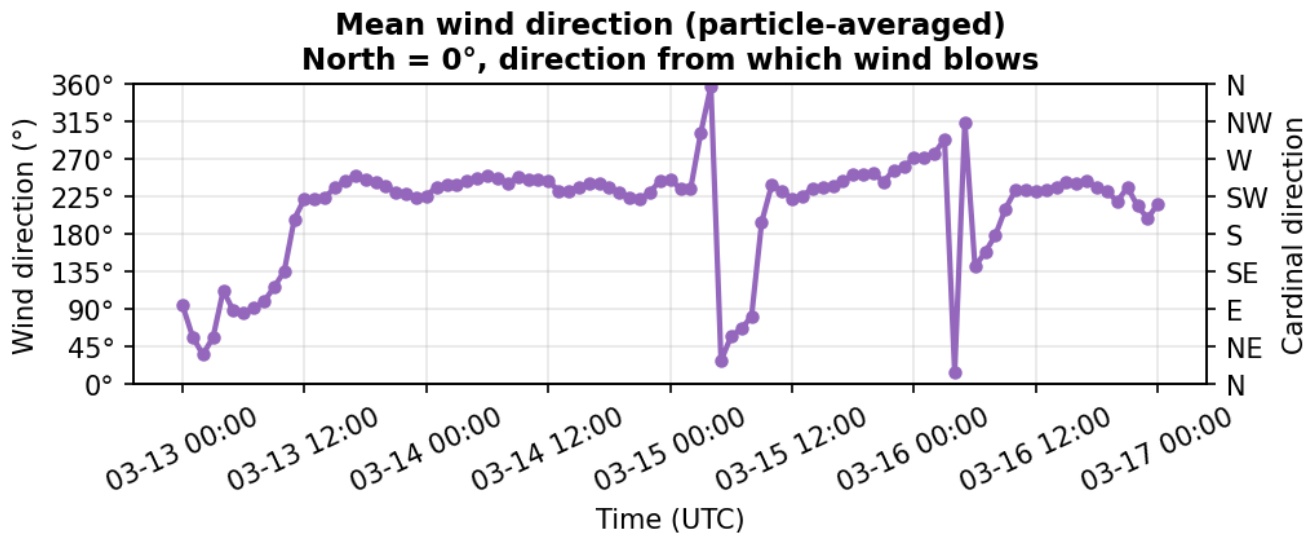
## 5. Environmental Forcing During Simulation

Time series of wind speed, wind direction, ocean current speed, significant wave height and sea surface temperature (when available) averaged over particles at each time step.

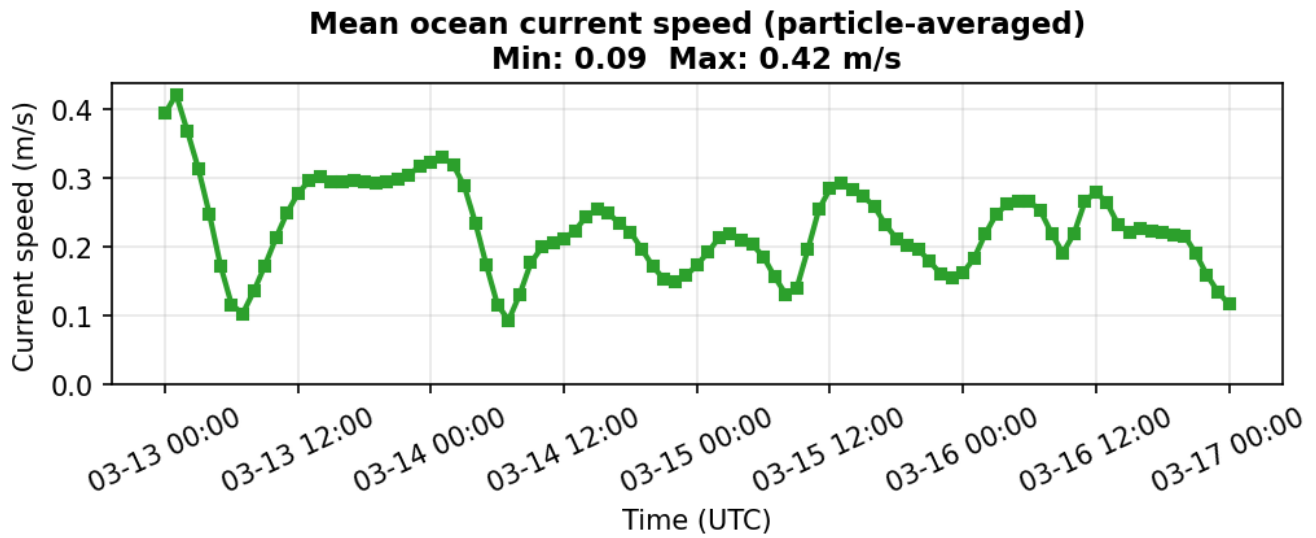
### Mean wind speed



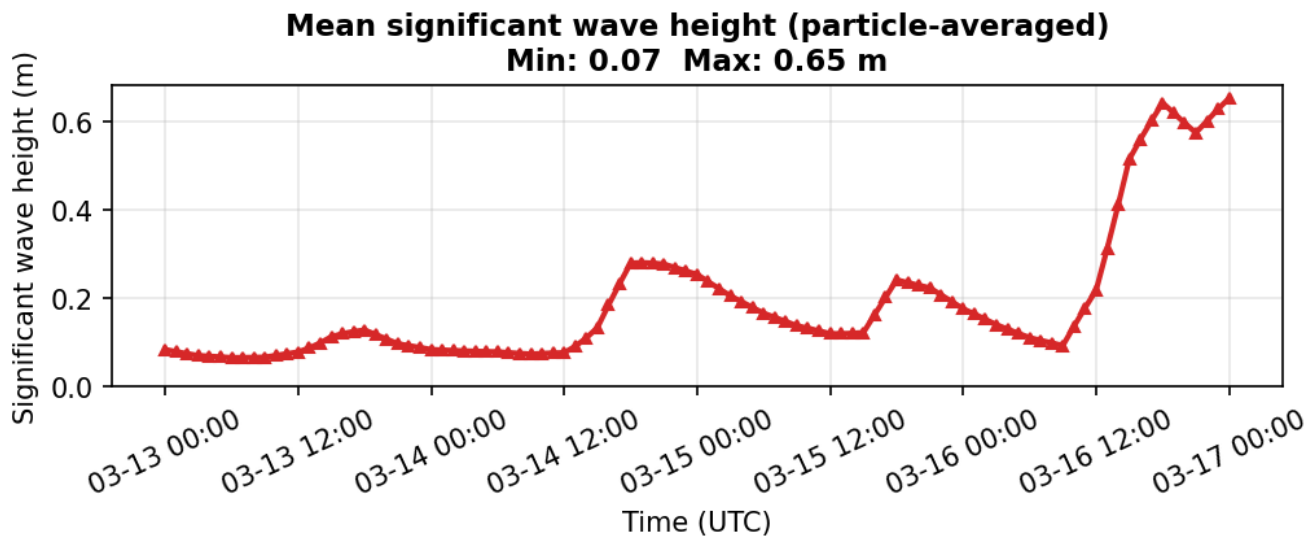
### Mean wind direction



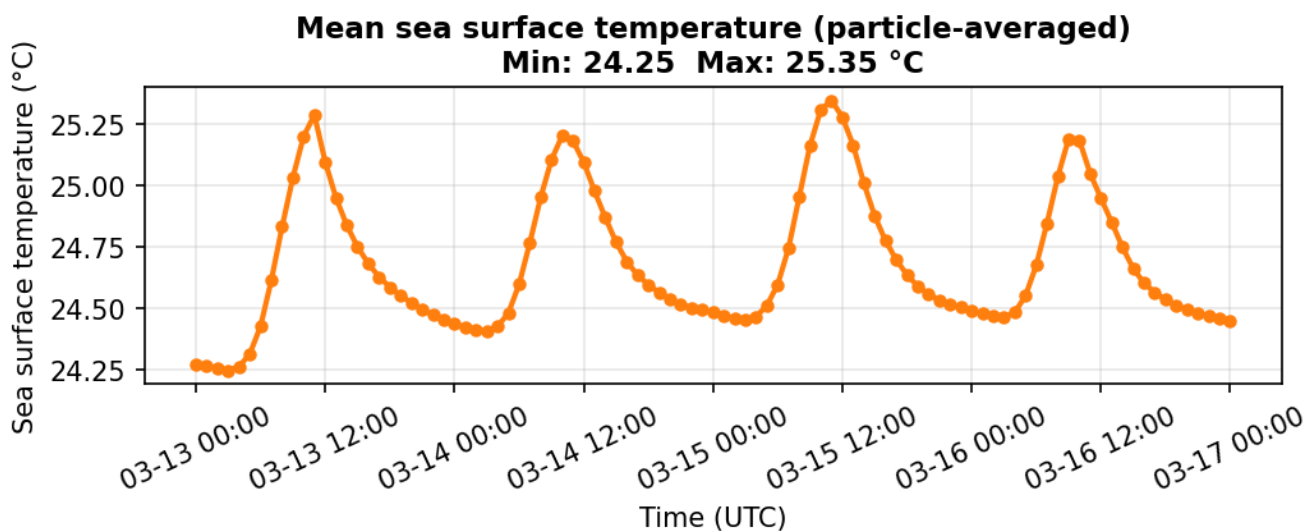
## Mean ocean current speed



## Mean significant wave height

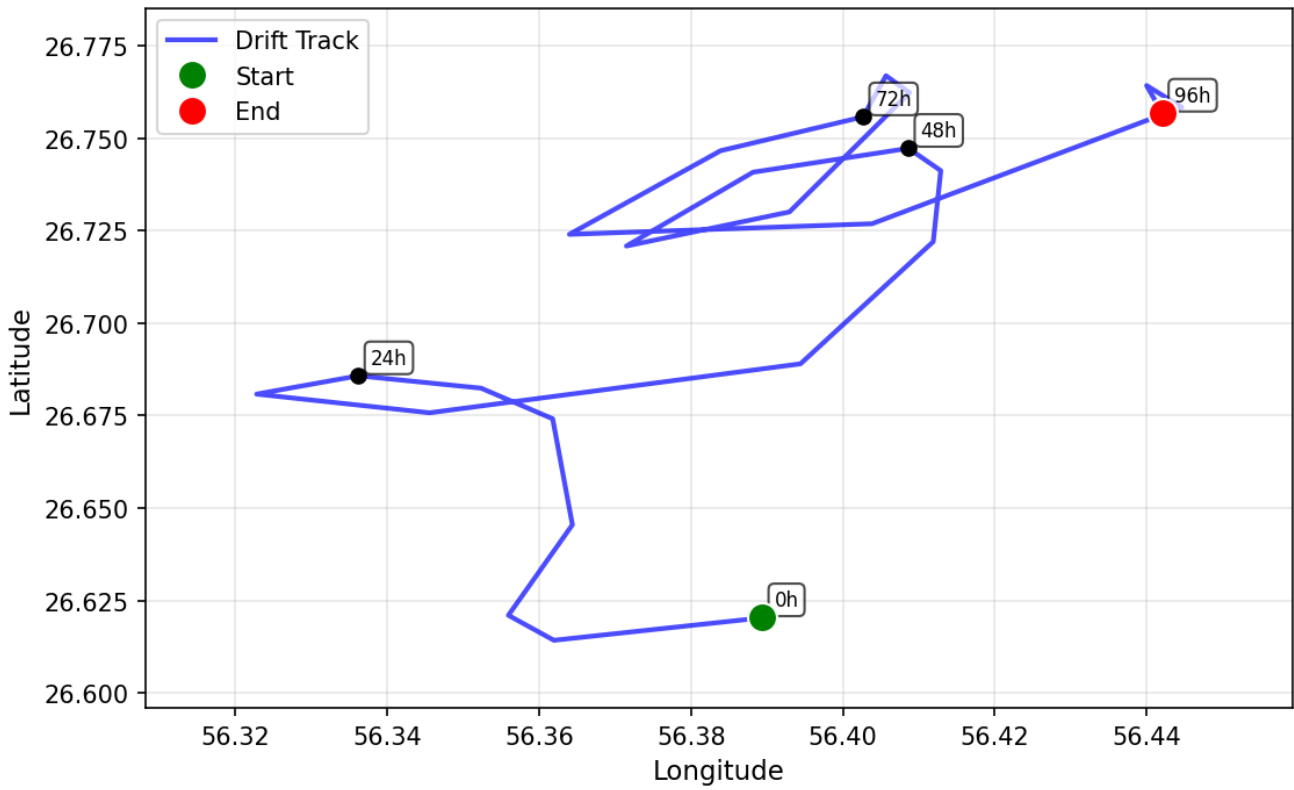


## Mean sea surface temperature

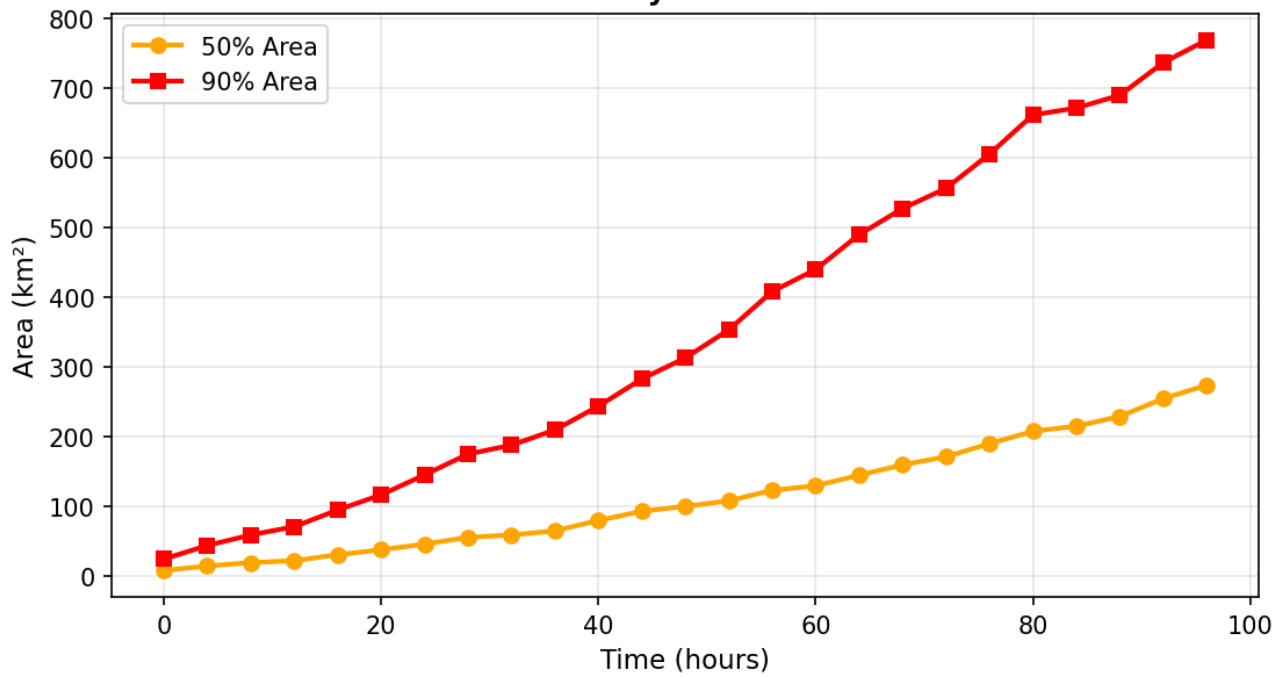


# 6. Drift Evolution

## Centroid Drift Track Over Time



## Probability Area Growth



## 7. Drift & Forcing Analysis

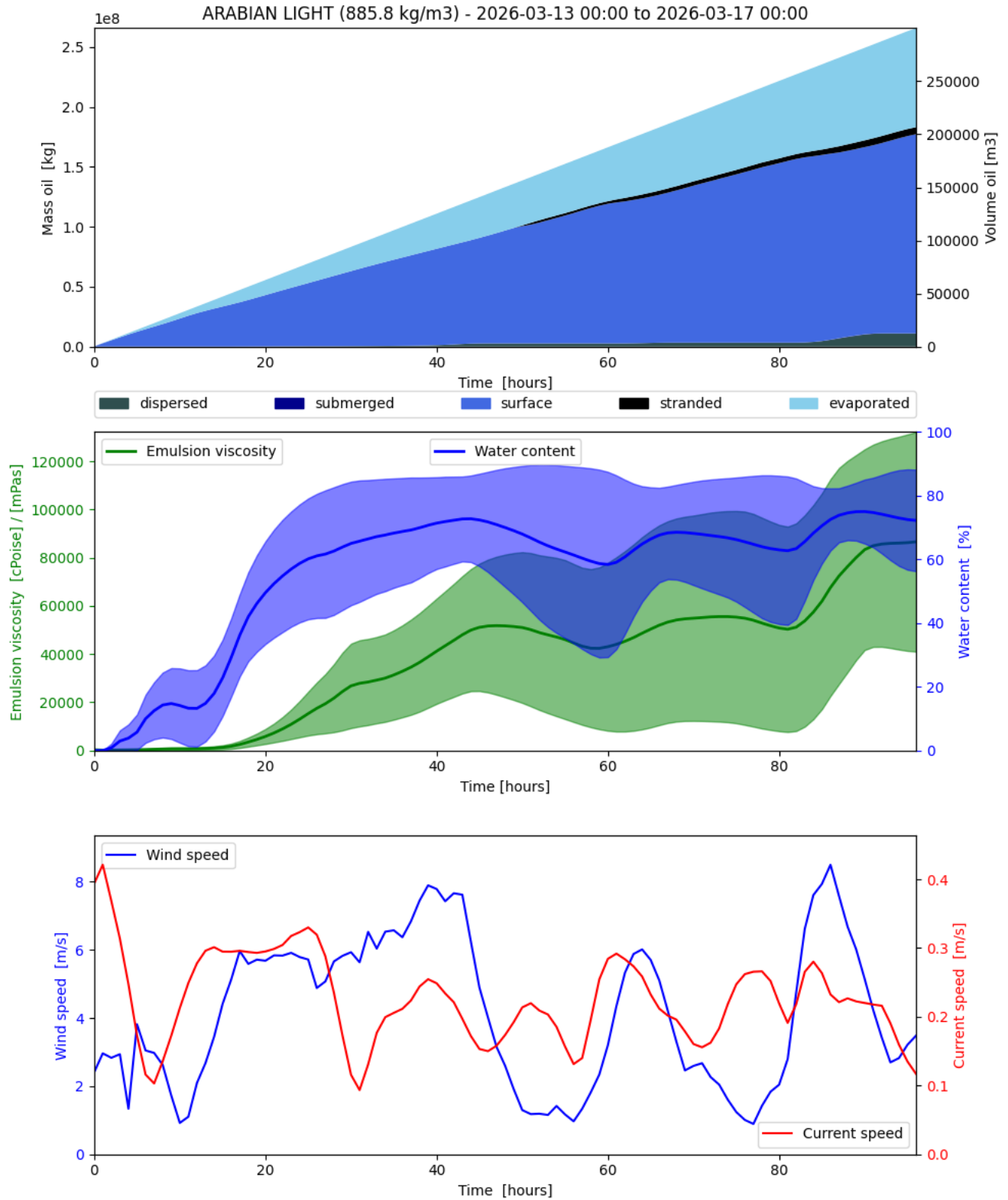
Open-ocean drift dominates early, with the centroid remaining offshore and its position showing modest latitudinal drift while longitude fluctuates. The footprint expands gradually, and the distance from the reference point increases through the first half of the window, but there is no sustained, monotonic move toward the coast. The early dispersion pattern is characterized by a roughly open-water trajectory with intermittent fluctuations in direction and modest net displacement.

Dispersion growth shows a clear inflection: the area covered by the footprint expands slowly at first, then accelerates notably in the middle to later portions of the window. The 50th and 90th percentile footprints increase more rapidly after roughly 40 hours, with continued rapid growth through the 60–90 hour interval, indicating that the spill extent is widening at an increasing rate even as drift remains predominantly offshore.

Wind and wave forcing align with these dispersion changes. Periods of elevated wind speed punctuate the timeline, with a pronounced surge around mid-window and another late in the window, while current speeds remain comparatively modest. Wave heights remain low in the early phase but rise markedly in the late portion of the record. The concurrence of stronger winds and higher waves with faster dispersion suggests wind- and wave-driven spreading as the primary driver of footprint growth during the latter half of the evolution.

Coastal interaction becomes operationally significant with the onset of beaching activity, beginning around the mid-window and accelerating thereafter. Stranded fraction starts to rise after about 52 hours and increases to multi-percent levels by the end, while cumulative beaching progression grows sharply in the 60–80 hour interval and continues onward. This pattern indicates a transition toward shoreline-influenced behavior, with beaching progressing even as the offshore drift footprint remains active, signaling a mixed regime where open-water transport and shoreline interaction coexist.

# 8. Oil Budget Summary



## Oil Volume Budget by Time Slice

Oil density used for mass-to-volume conversion: 886 kg/m<sup>3</sup>. To convert to mass: mass (kg) = volume (m<sup>3</sup>) × density.

<b>Time</b>	<b>Evaporated</b>	<b>Dispersed</b>	<b>Submerged</b>	<b>Surface</b>	<b>Stranded</b>
0h	0.000 m <sup>3</sup> (0.0%)	0.000 m <sup>3</sup> (0.0%)	0.000 m <sup>3</sup> (0.0%)	270.000 m <sup>3</sup> (0.1%)	0.000 m <sup>3</sup> (0.0%)
6h	2,523.447 m <sup>3</sup> (0.8%)	0.007 m <sup>3</sup> (0.0%)	0.000 m <sup>3</sup> (0.0%)	16,496.547 m <sup>3</sup> (5.5%)	0.000 m <sup>3</sup> (0.0%)
12h	6,170.913 m <sup>3</sup> (2.1%)	0.007 m <sup>3</sup> (0.0%)	0.000 m <sup>3</sup> (0.0%)	31,599.080 m <sup>3</sup> (10.5%)	0.000 m <sup>3</sup> (0.0%)
18h	12,505.609 m <sup>3</sup> (4.2%)	80.239 m <sup>3</sup> (0.0%)	0.000 m <sup>3</sup> (0.0%)	43,934.151 m <sup>3</sup> (14.6%)	0.000 m <sup>3</sup> (0.0%)
24h	17,583.595 m <sup>3</sup> (5.9%)	302.313 m <sup>3</sup> (0.1%)	0.000 m <sup>3</sup> (0.0%)	57,384.092 m <sup>3</sup> (19.1%)	0.000 m <sup>3</sup> (0.0%)
30h	22,842.689 m <sup>3</sup> (7.6%)	451.372 m <sup>3</sup> (0.2%)	0.000 m <sup>3</sup> (0.0%)	70,725.943 m <sup>3</sup> (23.6%)	0.000 m <sup>3</sup> (0.0%)
36h	28,792.199 m <sup>3</sup> (9.6%)	764.567 m <sup>3</sup> (0.3%)	0.000 m <sup>3</sup> (0.0%)	83,213.239 m <sup>3</sup> (27.7%)	0.000 m <sup>3</sup> (0.0%)
42h	35,263.500 m <sup>3</sup> (11.8%)	2,022.766 m <sup>3</sup> (0.7%)	0.000 m <sup>3</sup> (0.0%)	94,233.740 m <sup>3</sup> (31.4%)	0.000 m <sup>3</sup> (0.0%)
48h	40,885.996 m <sup>3</sup> (13.6%)	3,051.697 m <sup>3</sup> (1.0%)	0.000 m <sup>3</sup> (0.0%)	106,332.317 m <sup>3</sup> (35.4%)	0.000 m <sup>3</sup> (0.0%)
54h	45,448.287 m <sup>3</sup> (15.1%)	3,051.703 m <sup>3</sup> (1.0%)	0.000 m <sup>3</sup> (0.0%)	118,229.671 m <sup>3</sup> (39.4%)	2,290.345 m <sup>3</sup> (0.8%)
60h	50,762.995 m <sup>3</sup> (16.9%)	3,051.733 m <sup>3</sup> (1.0%)	0.000 m <sup>3</sup> (0.0%)	131,555.049 m <sup>3</sup> (43.9%)	2,400.226 m <sup>3</sup> (0.8%)
66h	59,553.714 m <sup>3</sup> (19.9%)	3,631.464 m <sup>3</sup> (1.2%)	22.460 m <sup>3</sup> (0.0%)	139,419.614 m <sup>3</sup> (46.5%)	3,862.746 m <sup>3</sup> (1.3%)
72h	65,294.778 m <sup>3</sup> (21.8%)	3,744.274 m <sup>3</sup> (1.2%)	22.422 m <sup>3</sup> (0.0%)	152,136.120 m <sup>3</sup> (50.7%)	4,042.419 m <sup>3</sup> (1.3%)
78h	70,565.315 m <sup>3</sup> (23.5%)	3,744.274 m <sup>3</sup> (1.2%)	22.422 m <sup>3</sup> (0.0%)	165,216.790 m <sup>3</sup> (55.1%)	4,441.192 m <sup>3</sup> (1.5%)
84h	78,424.722 m <sup>3</sup> (26.1%)	4,428.595 m <sup>3</sup> (1.5%)	22.337 m <sup>3</sup> (0.0%)	174,993.720 m <sup>3</sup> (58.3%)	4,870.619 m <sup>3</sup> (1.6%)
90h	87,176.209 m <sup>3</sup> (29.1%)	11,431.300 m <sup>3</sup> (3.8%)	206.426 m <sup>3</sup> (0.1%)	176,350.633 m <sup>3</sup> (58.8%)	6,325.451 m <sup>3</sup> (2.1%)
96h	93,237.152 m <sup>3</sup> (31.1%)	12,410.904 m <sup>3</sup> (4.1%)	101.135 m <sup>3</sup> (0.0%)	187,630.165 m <sup>3</sup> (62.5%)	6,620.662 m <sup>3</sup> (2.2%)

# 9. Stranding Impact Assessment

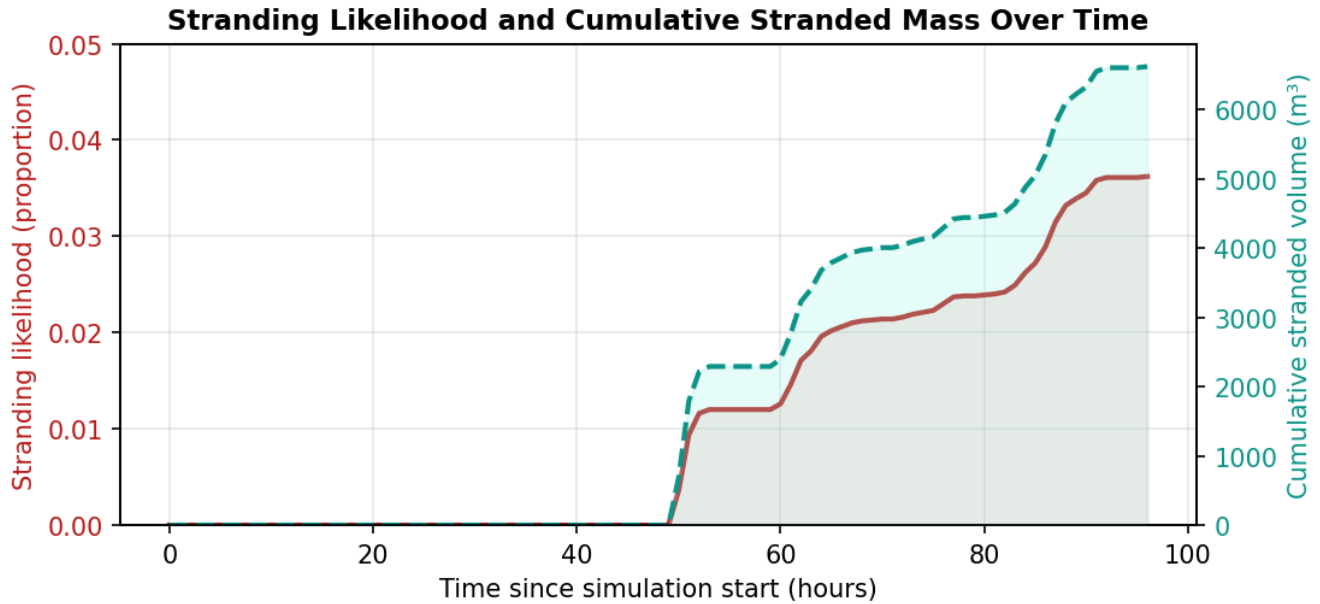
## 9.1 Time to First Shoreline Impact

First shoreline impact at **+50h** (2026-03-15 02:00 UTC).

## 9.2 Total Stranded Volume and Percentage

Total stranded mass: **5,864,730.8 kg**. Total stranded volume: **6,620.661 m<sup>3</sup>**.

Stranding likelihood (left axis) and cumulative stranded mass/volume (right axis) over time:



## Stranding probability milestones

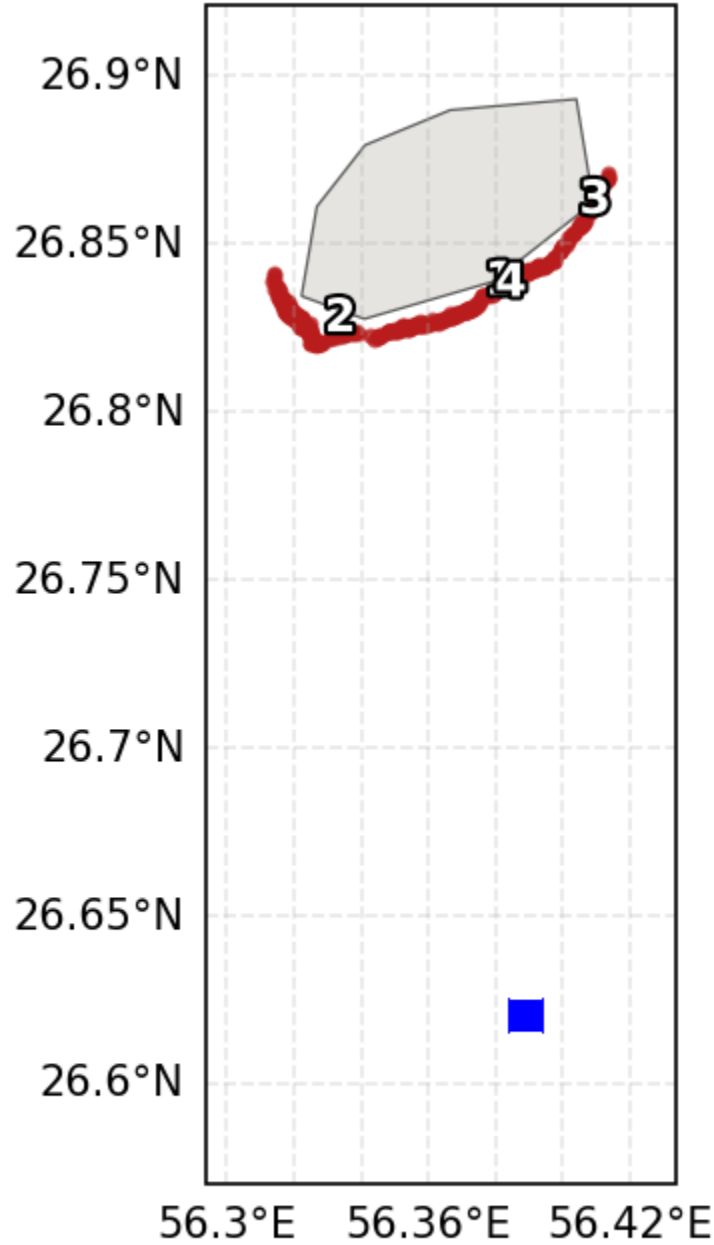
Time is measured from simulation start.

Event	Time	Probability
First grounding	+50h	0.36%
10% probability reached	Not reached	<10%
50% probability reached	Not reached	<50%
Final grounding probability	+96h	3.6%

## 9.3 Spatial Distribution of Shoreline Impact

Stranding locations (red) and release point (blue). Coastline from GSHHG.

# Spatial Distribution of Shoreline Impact



## Stranding events

Events are identified by clustering first-stranding positions and times: two particles belong to the same event if they are within 1 km (spatial) and 6 h (temporal). Impacted coast length is the length of shoreline within a 500 m buffer of each event's stranding points.

Event	Oil mass (kg)	Start	Duration (h)	Centre (lat°, lon°)	Coast (km)	Loading (m <sup>3</sup> /km)	Particles
1	2,028,839.09	+50.0h	3.0		9.434	242.7771	120

Event	Oil mass (kg)	Start	Duration (h)	Centre (lat°, lon°)	Coast (km)	Loading (m <sup>3</sup> /km)	Particles
				26.83889°, 56.38162°			
2	3,316,185.28	+60.0h	31.0	26.82780°, 56.33379°	11.354	329.7031	209
3	242,041.64	+75.0h	3.0	26.86300°, 56.40969°	4.013	68.0882	15
4	262,765.70	+89.0h	3.0	26.83826°, 56.38460°	4.793	61.8916	17

Total coastline impacted: **29.59 km**.

1 stranded particle(s) not assigned to any event (isolated in space or time).

## 9.5 Oil Condition at Shoreline Contact

Mean water fraction (emulsification) at shoreline contact: **77.2%**. Mean oil film thickness at shoreline contact: **0.23 mm**.

## 9.6 Uncertainty Envelope

Stranding estimates are derived from a Monte Carlo ensemble of **10,000** particles. Uncertainty is represented by the ensemble spread and probability contours; no additional parametric confidence intervals are applied.

## 10. Operational Implications

### Offshore Containment Viability

Offshore containment viability appears limited by the early onset of shoreline impact and the concentration of oil mass across segments. Shoreline impact begins around 50 hours, with about 29.6 kilometers of coastline affected and a final stranded fraction near 3.6%. The largest single-segment oil mass is in Segment 2 (approximately 3.32 million kg), followed by Segment 1 (about 2.03 million kg). Shoreline interaction is evident at the shoreline (mean water fraction  $\sim 0.77$ ) with a modest shoreline oil film ( $\sim 0.23$  mm), signaling substantial nearshore presence that containment assets would need to address promptly if aiming to limit beaching.

### Shoreline Cleanup Prioritization by numbered segment

- Segment 2: Highest priority. It carries the largest oil mass (about 3.32 million kg), the highest shoreline loading per km (about 329.7 m<sup>3</sup>/km), and the highest stranding probability (about 2.09%). It spans roughly 11.35 km of coastline.
- Segment 1: Next priority. It contains about 2.03 million kg oil, loading around 242.8 m<sup>3</sup>/km, and a stranding probability near 1.2%. It covers about 9.43 km of coastline.
- Segment 4: Moderate priority. It has about 0.263 million kg oil, loading about 61.9 m<sup>3</sup>/km, and a stranding probability of about 0.17%. It includes about 4.79 km of coastline.
- Segment 3: Lower priority. It holds about 0.242 million kg oil, loading about 68.1 m<sup>3</sup>/km, with a stranding probability about 0.15%. It encompasses about 4.01 km of coastline.

### Modeled shoreline loading

- Segment 1: 242.8 m<sup>3</sup> per km
- Segment 2: 329.7 m<sup>3</sup> per km
- Segment 3: 68.1 m<sup>3</sup> per km
- Segment 4: 61.9 m<sup>3</sup> per km

### Time Sensitivity of beaching progression

Beaching onset occurs around 50 hours, with the simulation proceeding to 96 hours. The final stranded fraction is 3.62%. There is no reported time to reach 50% stranding in the results. Overall, beaching progresses to a modest final shoreline involvement by 96 hours.

### Uncertainty Framing

Ensemble size is 10,000 runs, yielding a final stranded fraction of about 3.62% and total coastline impact of roughly 29.6 km. Segment 2 accounts for the largest oil mass and loading, while per-segment stranded probabilities range from about 0.15% to 2.09%. The mean water fraction at shore is about 0.77 and the mean shoreline oil film thickness is about 0.23 mm. These factors define a constrained outcome space with mass-distribution driving primary shoreline loading estimates; the lack of a defined 50% stranding time indicates limited information on mid-range progression.

# 11. Appendix — Polygon coordinates (audit/GIS)

## Start (0 h)

Point	50% Longitude	50% Latitude	90% Longitude	90% Latitude
1	56.397421°	26.634393°	56.397421°	26.646441°
2	56.389389°	26.634393°	56.381357°	26.646441°
3	56.381357°	26.634393°	56.371317°	26.640417°
4	56.377341°	26.630377°	56.365293°	26.630377°
5	56.375333°	26.624353°	56.363285°	26.616320°
6	56.375333°	26.616320°	56.367301°	26.604272°
7	56.377341°	26.610296°	56.377341°	26.598248°
8	56.381357°	26.606280°	56.389389°	26.594232°
9	56.389389°	26.606280°	56.401437°	26.598248°
10	56.397421°	26.606280°	56.411477°	26.604272°
11	56.401437°	26.610296°	56.415493°	26.616320°
12	56.403445°	26.616320°	56.413485°	26.630377°

## 6 h

Point	50% Longitude	50% Latitude	90% Longitude	90% Latitude
1	56.387571°	26.629904°	56.391842°	26.642184°
2	56.374759°	26.629904°	56.366217°	26.642184°
3	56.361946°	26.629904°	56.346999°	26.636044°
4	56.353405°	26.625811°	56.329915°	26.627857°
5	56.344863°	26.621717°	56.317103°	26.615577°
6	56.338457°	26.615577°	56.317103°	26.599203°
7	56.334186°	26.607390°	56.329915°	26.586923°
8	56.340592°	26.601250°	56.351269°	26.586923°
9	56.353405°	26.601250°	56.370488°	26.593063°
10	56.366217°	26.601250°	56.391842°	26.597157°
11	56.374759°	26.605343°	56.404654°	26.609437°
12	56.385436°	26.607390°	56.404654°	26.629904°

## 12 h

Point	50% Longitude	50% Latitude	90% Longitude	90% Latitude
1	56.381320°	26.671292°	56.390161°	26.679640°
2	56.365848°	26.669205°	56.354797°	26.679640°
3	56.354797°	26.662944°	56.330484°	26.669205°
4	56.343746°	26.656684°	56.308382°	26.656684°
5	56.341536°	26.646249°	56.290699°	26.639988°
6	56.354797°	26.642075°	56.292910°	26.617031°
7	56.368059°	26.637901°	56.319433°	26.617031°
8	56.376900°	26.629553°	56.341536°	26.629553°
9	56.385741°	26.621205°	56.368059°	26.621205°
10	56.399002°	26.625379°	56.390161°	26.608684°
11	56.405633°	26.635814°	56.412264°	26.621205°
12	56.403423°	26.650423°	56.414474°	26.652510°

## 18 h

Point	50% Longitude	50% Latitude	90% Longitude	90% Latitude
1	56.380679°	26.711265°	56.371793°	26.724300°
2	56.358465°	26.711265°	56.336250°	26.715610°
3	56.345136°	26.702575°	56.307372°	26.700402°
4	56.334029°	26.691712°	56.285157°	26.678677°
5	56.349579°	26.685195°	56.282936°	26.650434°
6	56.360686°	26.674332°	56.314036°	26.654779°
7	56.369572°	26.661297°	56.345136°	26.667814°
8	56.371793°	26.641744°	56.360686°	26.639572°

9	56.380679°	26.628709°	56.376236°	26.611329°
10	56.391786°	26.630881°	56.405115°	26.617846°
11	56.391786°	26.643917°	56.405115°	26.652607°
12	56.394008°	26.663469°	56.405115°	26.696057°

## 24 h

Point	50% Longitude	50% Latitude	90% Longitude	90% Latitude
1	56.355843°	26.753585°	56.355843°	26.767155°
2	56.328126°	26.744539°	56.309649°	26.749062°
3	56.323507°	26.717400°	56.275003°	26.719661°
4	56.325817°	26.683475°	56.247286°	26.683475°
5	56.325817°	26.647290°	56.249596°	26.649551°
6	56.341985°	26.626935°	56.281932°	26.681214°
7	56.369701°	26.617889°	56.307339°	26.660859°
8	56.376631°	26.638243°	56.330436°	26.620151°
9	56.358153°	26.656336°	56.378940°	26.604319°
10	56.344295°	26.678952°	56.399728°	26.638243°
11	56.351224°	26.708353°	56.365082°	26.667644°
12	56.367392°	26.728708°	56.372011°	26.710615°

## 30 h

Point	50% Longitude	50% Latitude	90% Longitude	90% Latitude
1	56.310111°	26.700644°	56.357399°	26.773753°
2	56.298289°	26.684651°	56.300653°	26.755476°
3	56.293560°	26.661804°	56.265187°	26.716637°
4	56.298289°	26.638958°	56.232086°	26.675512°
5	56.314840°	26.627534°	56.215535°	26.632104°
6	56.338484°	26.622965°	56.253365°	26.668658°
7	56.362128°	26.618396°	56.279374°	26.648096°
8	56.381043°	26.618396°	56.319569°	26.613826°
9	56.381043°	26.632104°	56.381043°	26.600118°
10	56.362128°	26.641242°	56.397594°	26.638958°
11	56.343213°	26.650381°	56.347941°	26.664089°
12	56.326662°	26.661804°	56.350306°	26.712067°

# 12. Assumptions, Limitations & Reproducibility

## Scope Statement

This report presents a probabilistic drift simulation based on user-provided inputs and forecast environmental forcing data. It does not constitute a full incident investigation.

## Model Assumptions

- No active propulsion modeled
- No survivor behavior modeling
- No manual environmental correction
- No real-time search data assimilation
- Environmental forcing limited to forecast resolution

## Known Limitations

- Sub-grid variability not resolved
- Wind/current forecast uncertainty
- Object-specific drift variability
- Coastal boundary discretization effects

## Automated Analytical Summaries

This report includes automated analytical summaries generated from the underlying simulation metrics. These summaries are designed to support operational interpretation and do not modify or replace the probabilistic results of the drift model.

## Reproducibility Metadata

- Mission ID: 5b3db453-c4ee-43c4-af65-87df46a311b2
- Model Engine: OpenDrift — OpenOil v1.14.8
- Object Type: Oil spill (ARABIAN LIGHT)
- Simulation duration: 96.0 hours
- Requested forecast: 96.0 hours
- Report Generated: 2026-03-15 11:32 UTC
- Dataset Versions: Not recorded in results
- Software Build Version: See deployment

## Closing Statement

Results represent probabilistic model estimates and should be interpreted within the stated assumptions and environmental uncertainties.