



Supplement of

Hydrographic transformation of the Persian/Arabian Gulf outflow over rough shelf bathymetry in the Gulf of Oman

Ahmed Abdelmaksoud et al.

Correspondence to: Ahmed Abdelmaksoud (ahmed.osman@ku.ac.ae, a.abdelmaksoud92@gmail.com)

The copyright of individual parts of the supplement might differ from the article licence.

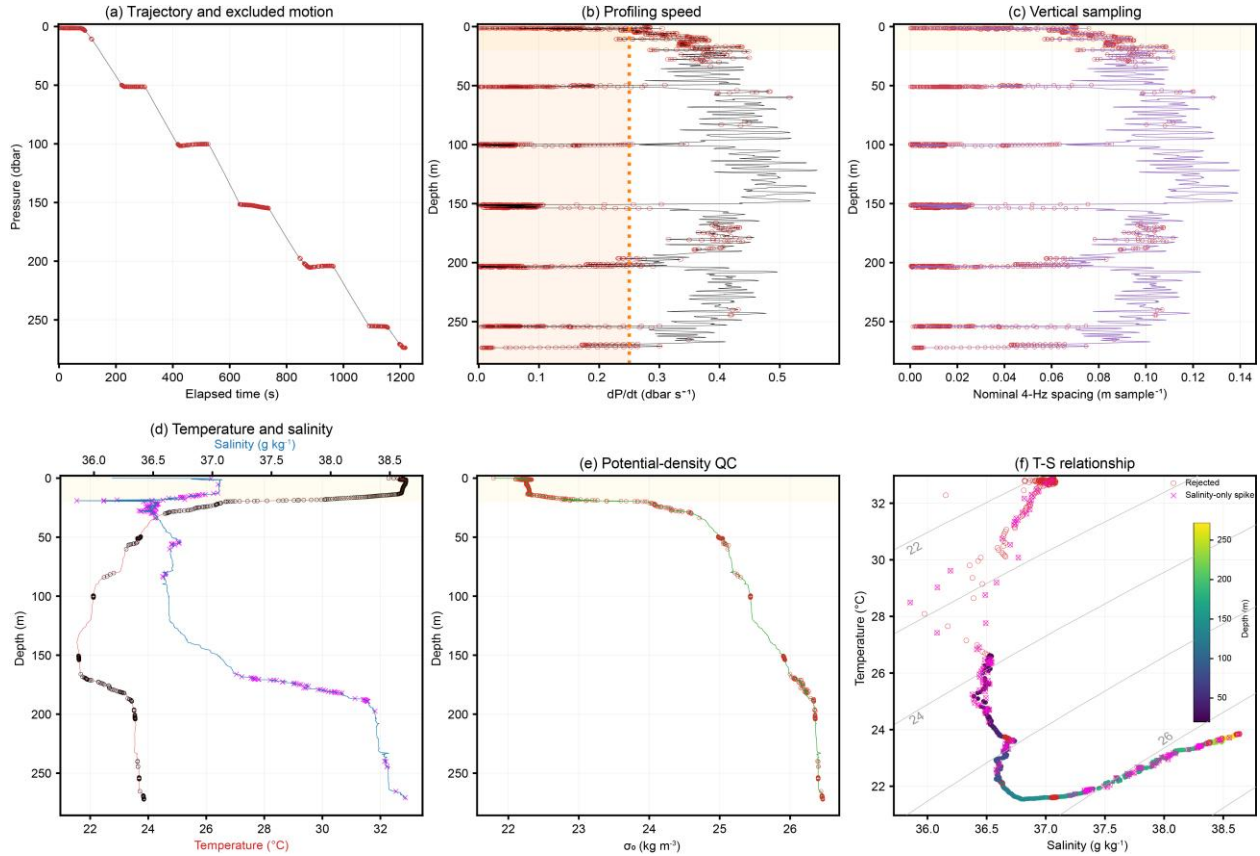


Figure S1. Data quality-control example for CTD station 29. The figure shows the points rejected by QC and excluded from the subsequent analysis, including salinity-only spikes, pressure reversals, and slow-speed points. It should be noted that the input data points from this station were 3903, and 1610 points (~41% of the input data) were removed (including 139 points of salinity-only spikes). The data points marked by hollow circles represent the points rejected by different filters, including pressure reversals, low-speed, and salinity-only spikes. Note that points removed at depths of around 165-185 m in the profiling speed plot (b) are related to salinity-only spikes (check the temperature and salinity plot, d, at the same depth interval). The first 20 m below the sea surface were excluded from the subsequent Thopre scale analysis because near-surface measurements are often highly contaminated, likely by turbulence generated by the hull.

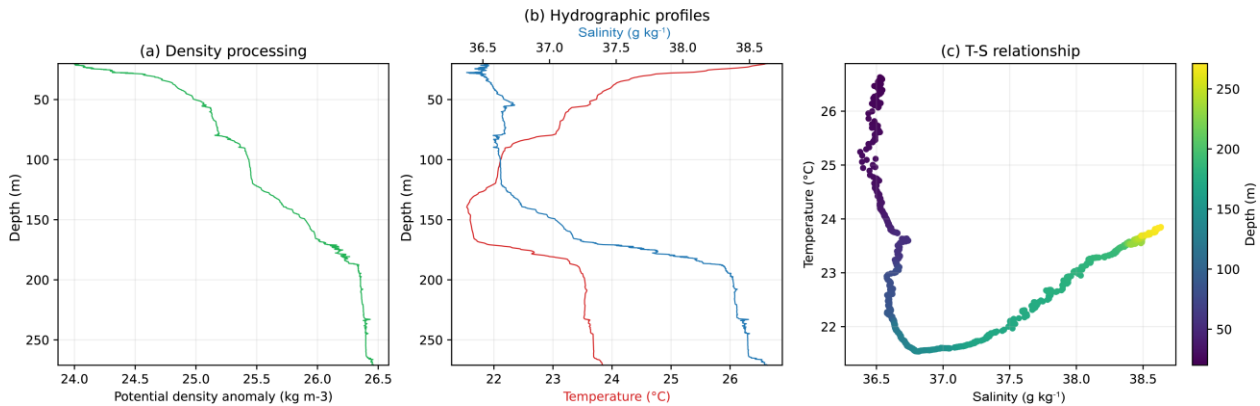


Figure S2. The resulting data from the quality-control example of CTD station 29. The figure shows the retained data points after QC, which were used for subsequent Thopre scale analysis.

Since we used the original vertical CTD resolution, the excluded points from the QC didn't affect the halocline. See Figure S1d, e, and f for visual comparison between the input and output.

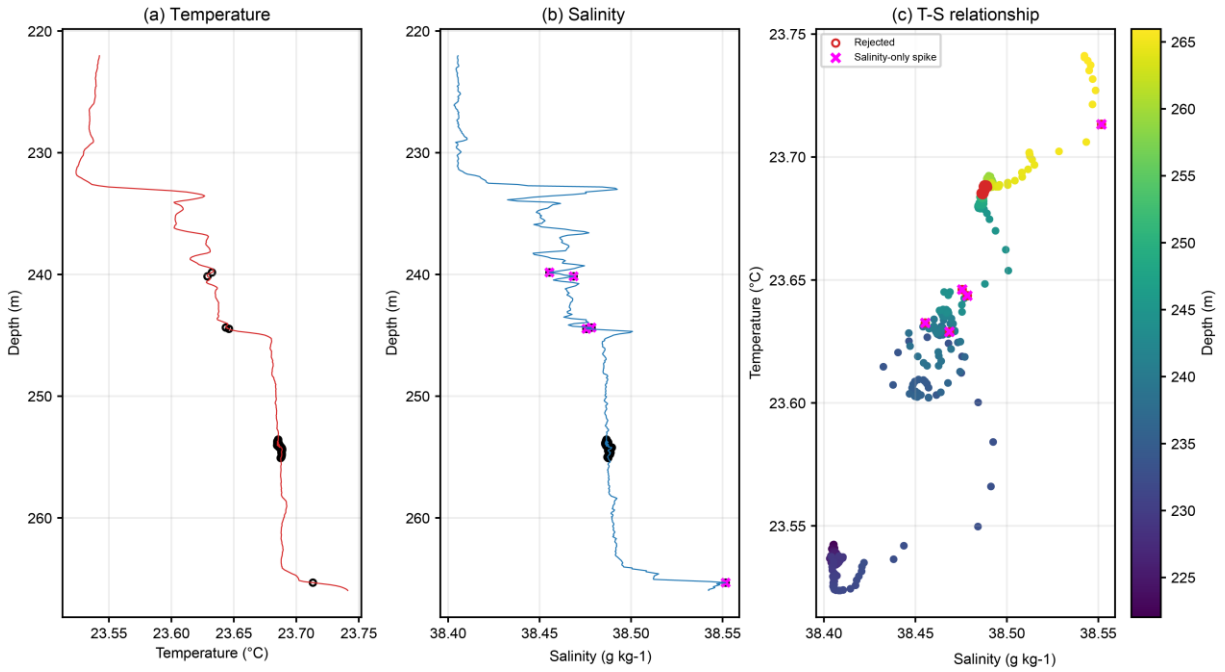


Figure S3. A close view of the 220-266 m depth interval from CTD station 29. The figure shows the points rejected by QC and not included in the subsequent analysis, including salinity-only spikes.

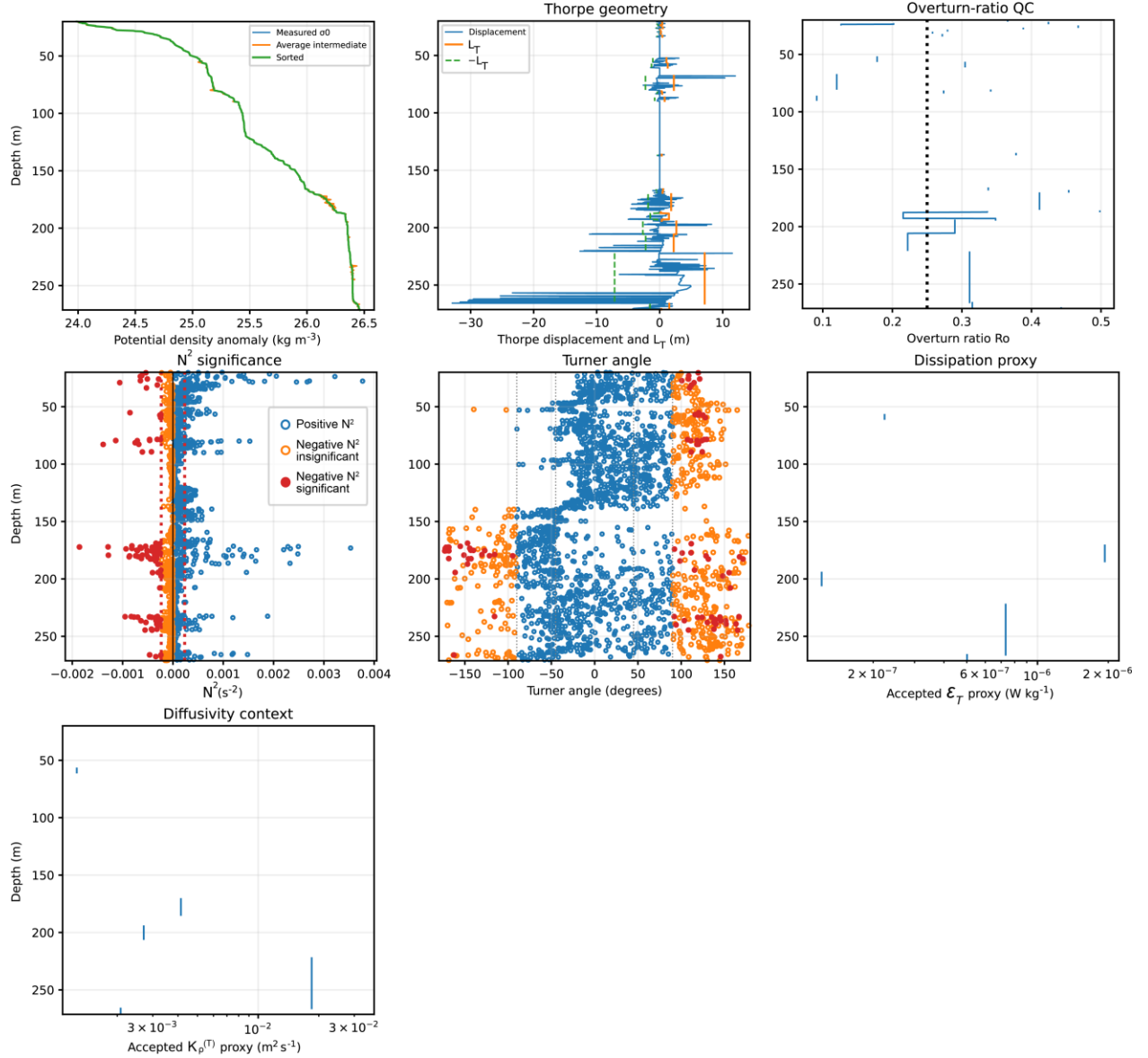


Figure S4. An example of the CTD-derived Thorpe-scale analysis of station 29. The plots include the potential density, Thorpe displacement, overturn-ratio QC, N^2 significance (where Negative N^2 values were considered significantly different from zero only when their magnitude exceeded a density-noise-derived threshold of $2.6 \times 10^{-4} \text{ s}^{-2}$), Turner angle, and accepted ϵ_T and $K_\rho(T)$ proxies.

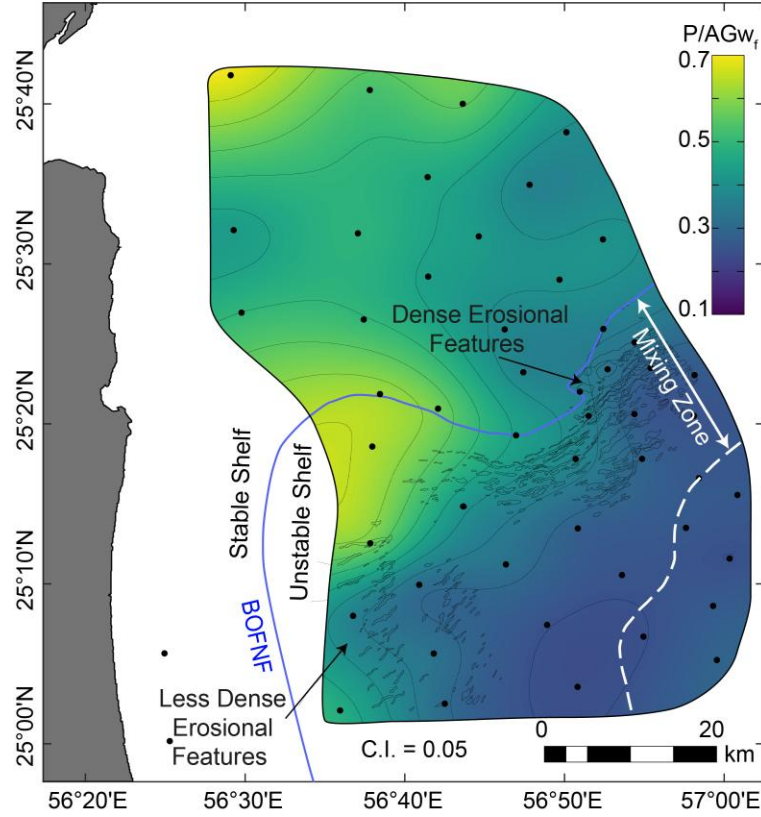


Figure S5. Map of the fraction of the Persian/Arabian Gulf water outflow (P/AG_{wf}) at $\sigma\theta = 26$ isopycnal. On this isopycnal surface, which removes the effect of outflow plume thickness and depth, the P/AG_{wf} field shows a lateral structure, indicating interfingering of P/AG-rich and P/AG-poor water across the shelf.

Table S1. A summary of candidate overturn patches of the Thorpe scale analysis of station 29.
The table shows the candidate patches and whether they passed the different Thorpe QC criteria.

Patch ID	Top Depth (m)	Bottom Depth (m)	Patch Thickness (m)	Thorpe L_T (m)	Ro	ϵ_t ($W\ kg^{-1}$)	$K_p^{(T)}$ ($m^2\ s^{-1}$)	Pass Density Noise	Pass Ro	Pass Minimum L_T	Pass Minimum Patch Thickness	Patch Accepted	Endpoint
1	20.17	20.82	0.65	0.387	0.366	-----	-----	✓	✓	✗	✗	✗	✗
2	22.22	23.06	0.84	0.424	0.424	-----	-----	✓	✓	✗	✗	✗	✗
3	23.41	23.71	0.3	0.175	0.202	-----	-----	✓	✗	✗	✗	✗	✗
4	23.79	24.16	0.37	0.272	0.126	-----	-----	✓	✗	✗	✗	✗	✗
5	25.49	26.28	0.79	0.493	0.467	-----	-----	✓	✓	✗	✗	✗	✗
6	27.35	27.43	0.08	0.078	0.388	-----	-----	✗	✓	✗	✗	✗	✗
7	29.06	29.42	0.37	0.215	0.279	-----	-----	✓	✓	✗	✗	✗	✗
8	30.92	31.22	0.3	0.176	0.258	-----	-----	✓	✓	✗	✗	✗	✗
9	32.87	33.73	0.86	0.434	0.272	-----	-----	✓	✓	✗	✗	✗	✗
10	52.32	55.91	3.59	1.079	0.178	-----	-----	✓	✗	✓	✓	✗	✗
11	57.09	60.65	3.56	1.285	0.304	2.23E-07	0.001259616	✓	✓	✓	✓	✓	✗
12	67.73	80.05	12.32	2.256	0.12	-----	-----	✓	✗	✓	✓	✗	✗
13	81.17	81.76	0.59	0.297	0.341	-----	-----	✓	✓	✗	✗	✗	✗
14	82.08	83.4	1.32	0.413	0.274	-----	-----	✓	✓	✗	✗	✗	✗
15	86.63	89.7	3.07	0.79	0.091	-----	-----	✓	✗	✓	✓	✗	✗
16	136.44	137.29	0.84	0.338	0.378	-----	-----	✗	✓	✗	✗	✗	✗
17	166.53	167.81	1.28	0.55	0.338	-----	-----	✓	✓	✓	✗	✗	✗
18	168.78	169.74	0.97	0.47	0.454	-----	-----	✓	✓	✗	✗	✗	✗
19	170.83	184.75	13.92	1.829	0.412	1.93E-06	0.00413858	✓	✓	✓	✓	✓	✗
20	186.6	186.79	0.19	0.19	0.498	-----	-----	✗	✓	✗	✗	✗	✗
21	187.2	187.3	0.1	0.103	0.337	-----	-----	✓	✓	✗	✗	✗	✗
22	187.61	192.79	5.18	1.48	0.216	-----	-----	✓	✗	✓	✓	✗	✗
23	192.88	194.09	1.21	0.339	0.348	-----	-----	✗	✓	✗	✗	✗	✗
24	194.55	205.68	11.13	2.662	0.29	1.21E-07	0.00270718	✓	✓	✓	✓	✓	✗
25	205.77	220.48	14.71	2.226	0.222	-----	-----	✓	✗	✓	✓	✗	✗
26	222.34	266.04	43.7	7.147	0.311	7.32E-07	0.018429151	✓	✓	✓	✓	✓	✗
27	266.22	270.53	4.31	1.53	0.315	5.02E-07	0.002079777	✓	✓	✓	✓	✓	✗
28	270.84	271.29	0.45	0.269	0.443	-----	-----	✓	✓	✗	✗	✗	✓