

Auxiliary material:

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Figure S1: Characterization and identification of mesoscale features using AVISO

4 merged sea level anomaly (*SLA*) observations. a) merged *SLA* observations for the North
5 Central Atlantic Ocean, b) second-order polynomial surface fit over the *SLA* observations, c)
6 long-term standard deviation of the *SLA* field for 713 weeks of observation, d) scale adjusted
7 *SLA* used to detect mesoscale eddies (defined as the difference between the AVISO fields and
8 the second-order polynomial surface divided by the long-term standard deviation field), e)
9 identified positive (anticyclonic) features using a criteria where the scale adjusted *SLA* is
10 greater than 3 (P3 eddies), and f) the next week's P3 eddies. A similar analysis is performed for
11 negative (cyclonic) eddy features (N3 eddies).

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Figure S2: Eddy tracks with ages greater than 3 weeks. Cyclones are shown in the

14 upper panel and anticyclones in lower.

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Figure S3: Plan-view depictions of log-transformed *CDM* retrievals (top panels),

17 the anomaly of log-transformed *CDM* anomaly (ΔCDM , middle panels) and the standard
18 deviation of the log-transformed *CDM* anomaly (bottom panels) for all cyclonic (left panels)
19 and anticyclonic (right panels) eddies for eddies identified with trajectories longer than 3
20 weeks. Panels are 500 km on a side centered on the eddy center. The black circle is the trace
21 of an average eddy size. A total of 8093 cyclonic and 6105 anticyclonic eddy-centric images
22 were used to construct these plan view depictions.

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Figure S4: Histograms of the alongtrack correlation coefficients (r) for the

25 difference in the inside vs. outside ΔChl and the eddy sea level anomaly (upper panels) and
26 wind speed (lower panels) for all cyclonic (left panels) and anticyclonic (right panels) eddies.
27 Only track lengths longer or equal to 15 weeks are used.

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Figure S: Histograms of the alongtrack correlation coefficients (r) for the the

30 large scale meridional slope of the Chl distribution and the differences in the inside vs. outside
31 ΔChl (upper panels) and the differences in the east vs. west ΔChl (signal lower panels) for all
32 cyclonic (left panels) and anticyclonic (right panels) eddies. Only track lengths longer or equal
33 to 15 weeks are used.

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Figure S6: Histograms of the alongtrack correlation coefficients (r) for the

36 difference in the inside vs. outside ΔCDM and the eddy sea level anomaly (upper panels) and
37 wind speed (lower panels) for all cyclonic (left panels) and anticyclonic (right panels) eddies.
38 Only track lengths longer or equal to 15 weeks are used.

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Figure S7: Histograms of the alongtrack correlation coefficients (r) for the large

41 scale meridional slope of the CDM distribution and the differences in the inside vs. outside
42 ΔCDM (upper panels) and the differences in the east vs. west ΔCDM (signal lower panels) for
43 all cyclonic (left panels) and anticyclonic (right panels) eddies. Only track lengths longer or
44 equal to 15 weeks are used.

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Table S1: In-Out & EaSst-West Statistics for CDM Following Eddy Tracks

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		Mean	95% c.i.	Mean	95% c.i.
		Tracks \geq 3 weeks		Tracks \geq 15 weeks	
ΔCDM_{in-}	Cyclones (N3)	0.0136	0.0063	0.0169	0.0121
ΔCDM_{out}	Anticyclones (P3)	-0.0208	0.0045	-0.0254	0.0079
ΔCDM_{E-}	Cyclones (N3)	-0.0326	0.0057	-0.0360	0.0075
ΔCDM_{W}	Anticyclones (P3)	0.0304	0.0078	0.0295	0.0113

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Table S2: Regression Statistics for ΔCDM Metrics vs. Environmental Parameters Over All Eddy Tracks

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		vs. SLA_{eddy}		vs. Wind Speed		vs. Latitudinal Gradient	
		<i>r</i>	p-value	<i>r</i>	p-value	<i>r</i>	p-value
ΔCDM_{in-}	Cyclones	-0.584	0	0.147	2.4e-4	0.155	1.1e-4
ΔCDM_{out}	Anticyclones	-0.032	0.488	-0.019	0.674	-0.077	0.093
ΔCDM_{E-}	Cyclones	0.036	0.377	-0.058	0.148	-0.462	0
ΔCDM_{W}	Anticyclones	0.303	1.4e-11	0.149	0.001	0.612	0

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(AnalRegressOverTracks2.m)

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Table S3: Mean Statistics of Alongtrack Correlations Between DCDM and Environmental Parameters

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Alongtrack Correlations (<i>r</i>)		vs. SLA_{eddy}		vs. Wind Speed		vs. Meridional Gradient	
		<i>Mean</i>	<i>95% c.i.</i>	<i>Mean</i>	<i>95% c.i.</i>	<i>Mean</i>	<i>95% c.i.</i>
ΔCDM_{in-}	Cyclones	0.0052	0.0574	-0.1017	0.0377	-0.0811	0.0573
ΔCDM_{out}	Anticyclones	-0.0570	0.0588	0.0697	0.0478	0.0726	0.0619
ΔCDM_{East}	Cyclones	-0.0088	0.0562	-0.0016	0.0395	-0.206	0.0498
ΔCDM_{West}	Anticyclones	-0.0126	0.0557	-0.0223	0.0545	0.189	0.0703

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Tracks \geq 15 weeks (145 cyclone tracks and 104 anticyclones)

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