

1 **Supplementary material**

2 **1. Supplementary table**

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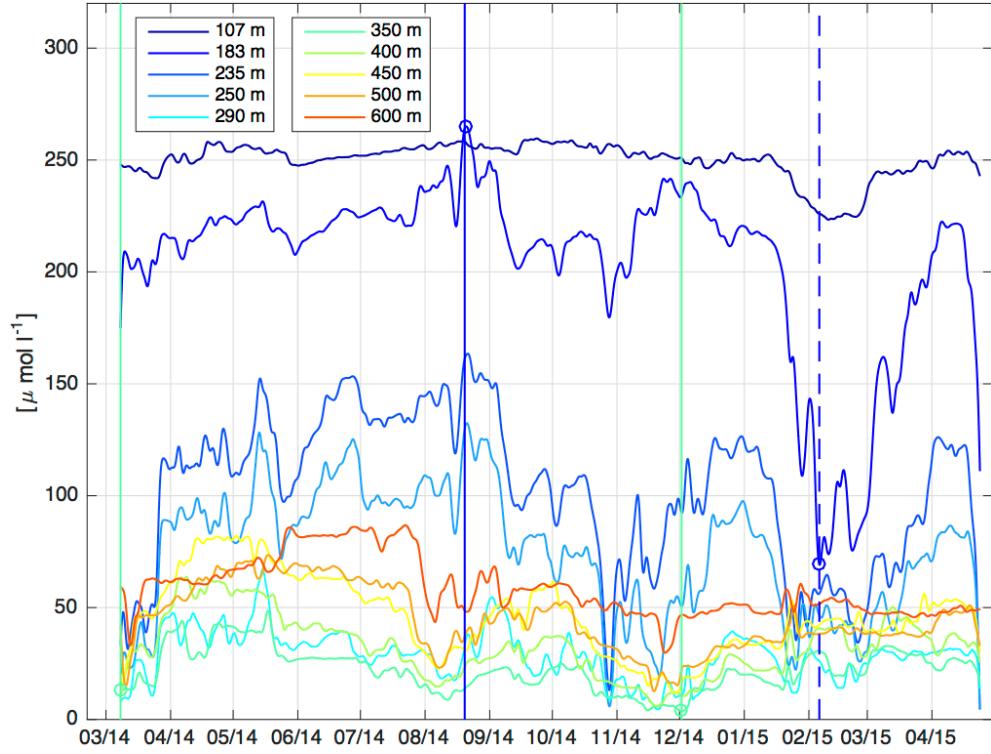
4 **Table S1.** Distribution of the instruments in the upper 601 m at the Stratus mooring 8 March
5 2014 to 25 April 2015.

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7	Depth (m)	Instrument	Velocity	Parameter
8	1	SBE37		T, S
9	4	SBE37		T, S
10	5	SBE39		T
11	7	SBE37		T, S
12	10	NORTEX	yes	
13	13	RCM11	yes	
14	16	SBE37		T, S
15	20	RCM11	yes	
16	25	SBE39		T
17	30	SBE37		T, S
18	32	RCM11	yes	
19	35	SBE39		T
20	40	SBE37		T, S
21	45	SeaGuard	yes	(O ₂ failed)
22	50	SBE39		T
23	55	SBE39		T
24	63	SBE37		T,S
25	70	SBE39		T
26	78	SBE39		T

1	85	SBE37		T, S (both until September 2014)
2	87	SeaGuard	partly	T (until August 2014), (O ₂ failed)
3	93	SBE39		T
4	100	SBE39		T
5	107	SeaGuard	yes	T, S, O ₂
6	115	SBE39		T
7	130	SBE37		T,S
8	135	RDI 300 KHZ	yes	
9	145	SeaGuard	yes	T, (O ₂ failed)
10	160	SBE37		T, S
11	175	SBE39		T
12	183	SeaGuard	yes	T, S, O ₂
13	190	SBE37		T, S
14	220	SBE37		T, S
15	235	SeaGuard	yes	T, O ₂
16	250	oxygen-logger		O ₂
17	280	SBE39		T
18	290	SeaGuard	yes	T, O ₂
19	295	SBE37		T, S
20	350	SeaGuard	yes	T, S, O ₂
21	400	SeaGuard	yes	T, O ₂
22	450	SeaGuard	yes	T, O ₂
23	500	oxygen-logger		O ₂
24	550	SBE37		T, S
25	600	SeaGuard	yes	O ₂
26	601	SBE37		T, S

1 **2. Supplementary figures**



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3 Fig. S1. Oxygen time series of the Stratus mooring ($19^{\circ}37'S$, $84^{\circ}57'W$) for the period 8
4 March 2014 to 25 April 2015. The depth of the oxygen instruments are color coded (see
5 insets). Solid (dashed) lines show the date of the passages of the anticyclonic (cyclonic)
6 eddies.

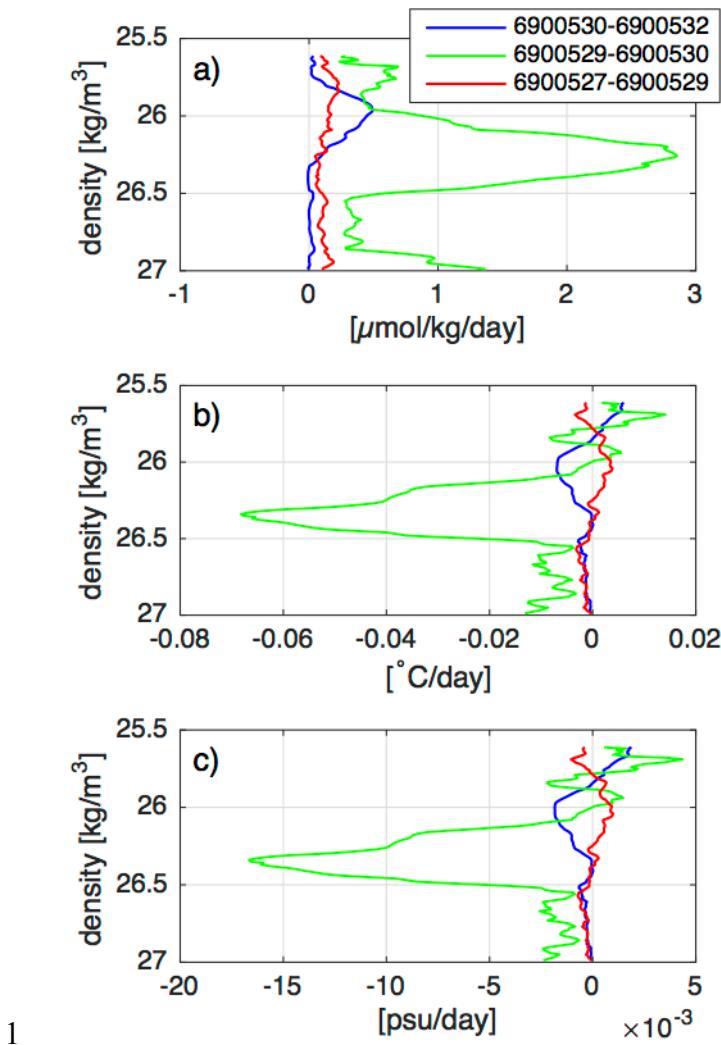


Figure S2. Profiles from data of four floats (6900527, -29, -30, and -32) showing the changes per day of a) oxygen, b) temperature, and c) salinity within the ACE2 on density surfaces during its westward propagation. The differences between float 6900532 (-30, -29) and 6900530 (-29, -27) are shown in blue (green, red).

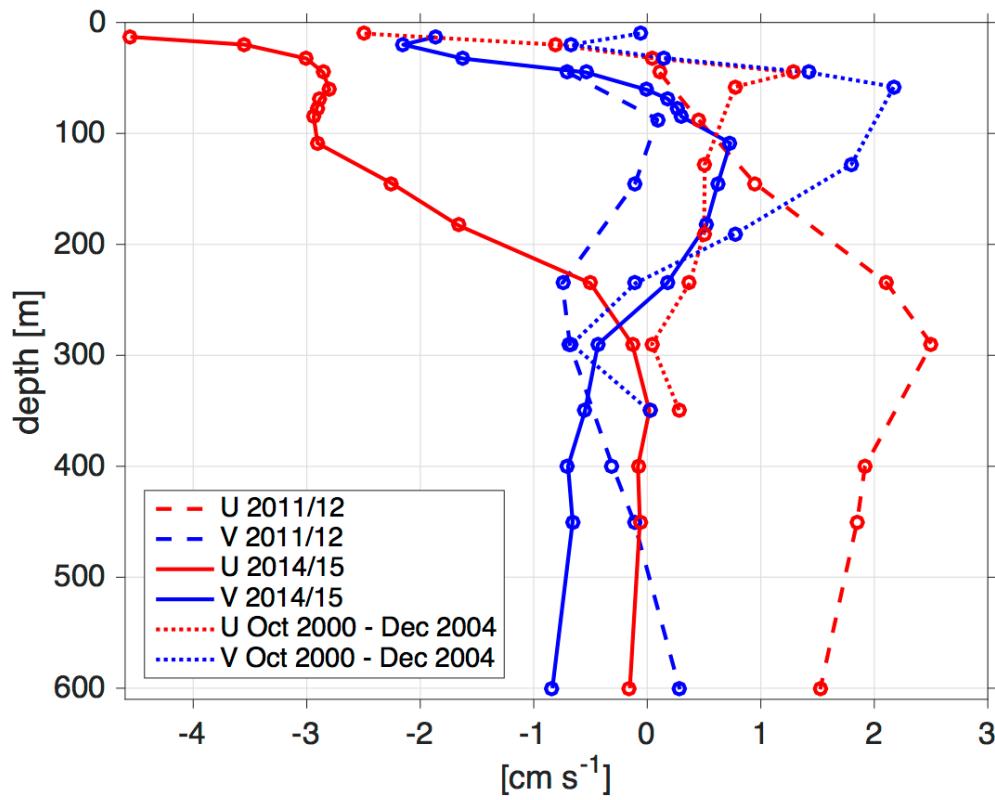


Figure S3. Zonal (red) and meridional (blue) velocity components in cm s^{-1} at the Stratus mooring for an annual mean from 10 April 2011 to 9 April 2012 ($19^{\circ}41'S$, $85^{\circ}34'W$; U2011/12, V2011/12; dashed lines), for 10 April 2014 to 9 April 2015 ($19^{\circ}37'S$, $84^{\circ}57'W$; U2014/15, V2014/15; solid lines), and for a multi-year mean from October 2000 to December 2004 (dotted lines) in the Stratus region (20°S , 85°W ; Colbo and Weller, 2007). For instrument distribution see Stramma et al. (2014; Table 1) for the 2011 to 2012 deployment period and Supplement Table S1 for the 2014 to 2015 deployment period.

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1 **3. Supplementary Movie**

2 **Movie M1**

3 Sea surface height anomaly (SSHA) in the eastern tropical South Pacific in cm for 1-day
4 intervals between 22 March 2014 and 30 April 2015. The white circle marks the Stratus
5 mooring location, the black symbols show the location of the floats with 400 m parking depth
6 and the cyan symbols the location of the float with 1000 m parking depth at the time of the
7 displayed SSHA. The float pairs with 400 m and 1000 m parking depth deployed at the same
8 location are marked with the same symbol.

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