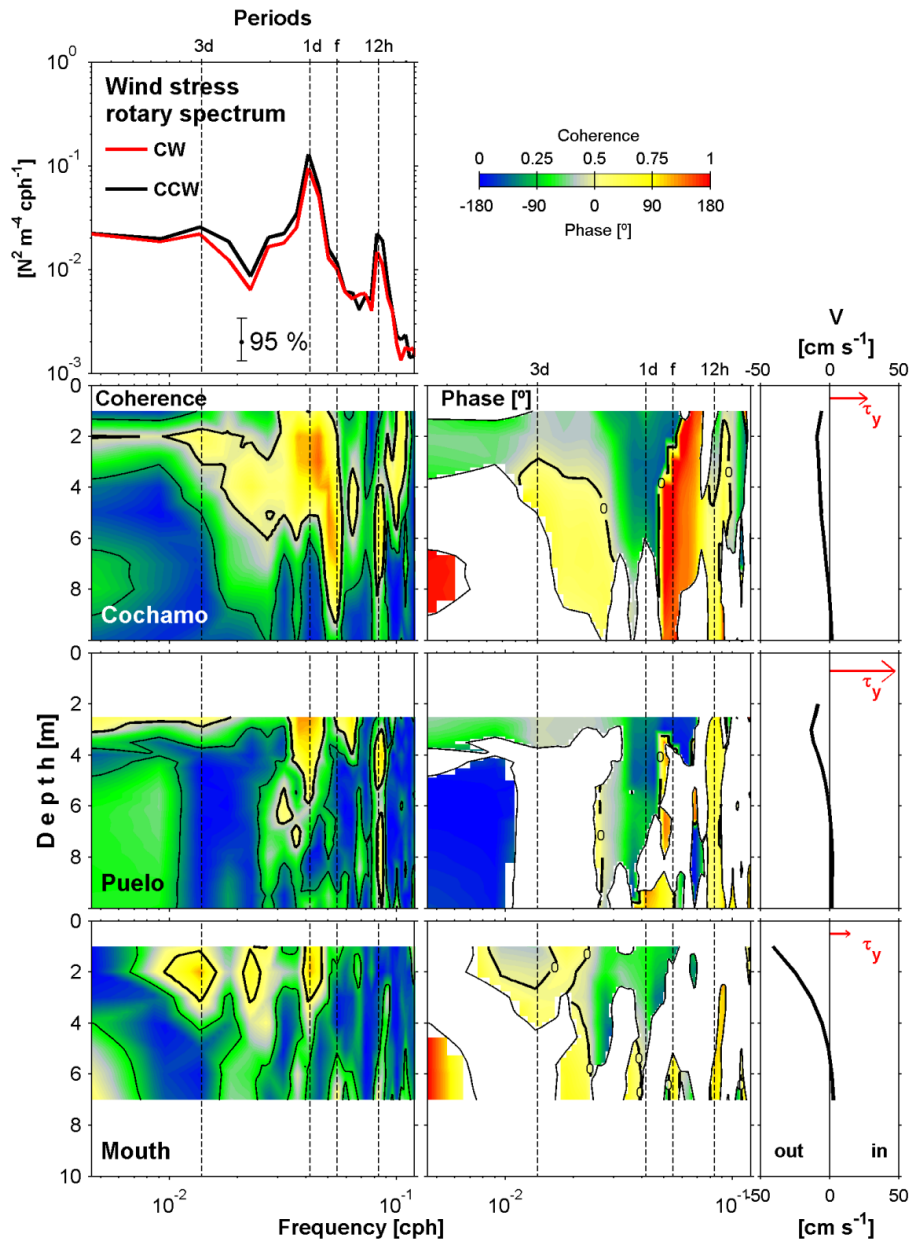
Supporting Information

S1 Figure: Relationship between wind stress and currents. The upper-left insert presents the rotary spectrum of the wind stress. Here, the red line indicates clockwise rotations (CW) and the black line counter-clockwise (CCW) rotations. The bar indicates the 95% confidence interval. The coherence and phase spectra between τ_y and the along-fjord component in the upper 10 m are presented in contour plots. In the coherence, black lines indicate coherences over 80% (thin) and 99% (wide) confidence levels. In the phase spectra, only phases with coherences over 80% confidence levels were plotted (the thin black line obtained from the coherence spectra). To emphasize the changes in phase, we included the 0º contour (wide black line) in the phase spectra. The mean profile of the along-fjord currents and the mean τ_y were included in the right inserts. Dashed vertical lines denote the three-day, one-day, inertial (*f*), and 12-hour periods.

S2 Table: Locations of the ADCP and sealevel moorings and the meteorological station. Here presents details of the time series measured on the Reloncavi fjord. You must notice that the error (*) on the ADCP, results from the measurement configuration whereas the accuracy and resolution came from factory.

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site	Instrument	depth [m]	Lat [ºS]	Lon [ºW]	dates	interval [min.]	depth cell [m]	error*	accuracy	resolution
Cochamo	ADCP 300 kHz	15	41.47	72.32	6 Aug. – 10 Oct. 2008	10	1.0	< 2 $[\text{cm s}^{-1}]$	± 0.5 $[\text{cm s}^{-1}]$	0.1 $[\text{cm s}^{-1}]$
	HOBO U-20	14	41.51	72.30	14 Aug. – 13 Nov. 2008	10	---	---	± 1.5 [cm]	0.21 [cm]
Puelo	ADCP 600 kHz	28	41.65	72.37	16 Aug. – 11 Nov. 2008	20	0.5	< 2 $[\text{cm s}^{-1}]$	± 0.3 $[\text{cm s}^{-1}]$	0.1 $[\text{cm s}^{-1}]$
	ADCP 300 kHz	34			16 Aug. – 11 Nov 2008	10	1.0	< 2 $[\text{cm s}^{-1}]$	± 0.5 $[\text{cm s}^{-1}]$	0.1 $[\text{cm s}^{-1}]$
	Davis Vantage Pro2	10 height	41.68	72.38	7 Jul. 2008 – 18 Feb. 2009	10	---	---	direction: 3º speed: 1 $[\text{m s}^{-1}]$	1º 0.4 $[\text{m s}^{-1}]$
mouth	ADCP 300 kHz	11	41.72	72.62	8 Aug. – 6 Nov. 2008	10	1.0	< 2 $[\text{cm s}^{-1}]$	± 0.5 $[\text{cm s}^{-1}]$	0.1 $[\text{cm s}^{-1}]$
	ADCP 75 kHz	430			8 Aug. – 6 Nov. 2008	20	8.0	< 2 $[\text{cm s}^{-1}]$	± 0.5 $[\text{cm s}^{-1}]$	0.1 $[\text{cm s}^{-1}]$.
	SBE-26	25	41.71	72.58	5 Sep. – 11 Nov.2008	10	---	---	± 2.5 [cm]	0.02 [cm]

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S3 Table: Summary of the along-fjord CTD stations in the Reloncavi fjord. In addition to the

position, the bottom depth of each station is indicated.

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CTD Nº	Lat [ºS]	Lon [ºW]	H [m]	CTD Nº	Lat [ºS]	Lon [ºW]	H [m]
1	41º 24.51'	72º 17.57'	43	11	41º 37.86'	72º 20.95'	177
2	41º 25.33'	72º 17.34'	59	12	41º 39.22'	72º 21.89'	152
3	41º 26.15'	72º 18.10'	62	13	41º 41.01'	72º 24.16'	220
4	41º 26.77'	72º 18.49'	63	14	41º 41.90'	72º 26.12'	266
5	41º 27.66'	72º 19.01'	76	15	41º 42.87'	72º 28.22'	268
6	41º 28.76'	72º 19.16'	92	16	41º 42.90'	72º 31.24'	440
7	41º 29.83'	72º 19.10'	104	17	41º 43.48'	72º 33.95'	450
8	41º 31.59'	72º 19.28'	190	18	41º 43.28'	72º 36.69'	457
9	41º 33.39'	72º 19.71'	200	19	41º 42.73'	72º 39.28'	457
10	41º 35.63'	72º 20.36'	197				

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