Table S1. Comparison of daily metabolic rates (respiration [R], net daytime production [NDP], gross primary production [GPP], and net ecosystem metabolism [NEM]) calculated with O_2 eddy fluxes using different approaches to calculate the storage term. The 1-point correction calculated the storage term from a single recording position at the same height as the eddy sensors (35 cm from the seafloor), while the 3-point correction independently resolved the storage term in each of the above (35 cm from the seafloor) and inside canopy (average of recordings at 5 and 15 cm from the seafloor) water compartments.

	Date	**Period**	**R**	**NDP**	**GPP**	**NEM**
			mmol O_2 m^{-2} d^{-1}			
1-point	08/08	Calm	–127.9	72.1	157.4	29.4
	09/08	Resuspension 1	–579.1	–291.7	70.3	–508.9
	10/08	Resuspension 2	–581.4	–321.8	3.2	–578.2
	14/08	Resettling 1	–24.4	28.4	43.6	19.2
	15/08	Resettling 2	–27.2	27.1	44.1	16.9
3-point	08/08	Calm	–134.6	69.6	159.3	24.7
	09/08	Resuspension 1	–592.6	–297.1	73.3	–519.3
	10/08	Resuspension 2	–496.9	–306.8	3.8	–493.1
	14/08	Resettling 1	–39.0	26.6	51.0	12.0
	15/08	Resettling 2	–50.1	36.8	68.1	18.0
Difference (%)	08/08	Calm	6.6 (5)	2.5 (4)	1.9 (1)	4.7 (19)
	09/08	Resuspension 1	13.5 (2)	5.4 (2)	3.0 (4)	10.5 (2)
	10/08	Resuspension 2	84.4 (17)	15.0 (5)	0.6 (16)	85.0 (17)
	14/08	Resettling 1	14.7 (38)	1.7 (7)	7.4 (15)	7.2 (60)
	15/08	Resettling 2	22.9 (46)	9.7 (26)	24.1 (35)	1.2 (6)

Table S2. Comparison of daily metabolic rates (respiration [R], gross primary production [GPP], and net ecosystem metabolism [NEM]) measured in seagrass ecosystems by eddy covariance and whole-sediment incubation at the same site.

Species	Site	Period	R	GPP	NEM	Technique	Reference
			mmol O_2 m^{-2} d^{-1}				
Z. marina	South Bay (USA)	Summer	–136.0	154.9	18.8	Eddy	(Hume et al. 2011)
Z. marina	South Bay (USA)	Summer	–19.2	10.4	–8.8	Core	(Rheuban et al. 2014a)
Z. marina	South Bay (USA)	Summer	–34.0	10.4	–23.6	Eddy	(Rheuban et al. 2014a)
Z. marina	South Bay (USA)	Seasonal	–237.8	263.5	14.8	Eddy	(Rheuban et al. 2014b)
Z. marina	South Bay (USA)	Seasonal	–100.7	96.1	–3.6	Eddy	(Berg et al. 2019)
Thalassia testudinum	Florida Bay (USA)	Summer	–129.8	158.0	27.0	Eddy	(Long et al. 2015)
Thalassia/ Halodule spp.	Florida Bay (USA)	Seasonal	–62.2	79.8	17.6	Chamber	(Yarbro & Carlson 2008)
Z. noltii	Byala (Bulgaria)	Spring	–40.0	23.0	–17.0	Eddy	_ENREF_44(Lee et al. 2017)
Z. marina	Hoopo Bay (Korea)	Fall	–18.0	54.0	36.0	Eddy	(Lee et al. 2017)
Z. marina	Hanko (Finland)	Seasonal	–34.7	36.9	2.2	Eddy	_ENREF_4(Attard et al. 2019b)
Z. marina	Hanko (Finland)	Summer	–21.0	38.0	17.0	Chamber	(Gustafsson & Norkko 2016)
Z. marina	Hanko (Finland)	Summer	–65.4	85.8	20.4	Chamber	This study (quiescent)
Z. marina	Hanko (Finland)	Summer	–85.8	86.3	0.4	Chamber	This study (overall)
Z. marina	Hanko (Finland)	Summer	–74.6	92.8	18.3	Eddy	This study (quiescent)
Z. marina	Hanko (Finland)	Summer	–262.7	71.1	–191.5	Eddy	This study (overall)

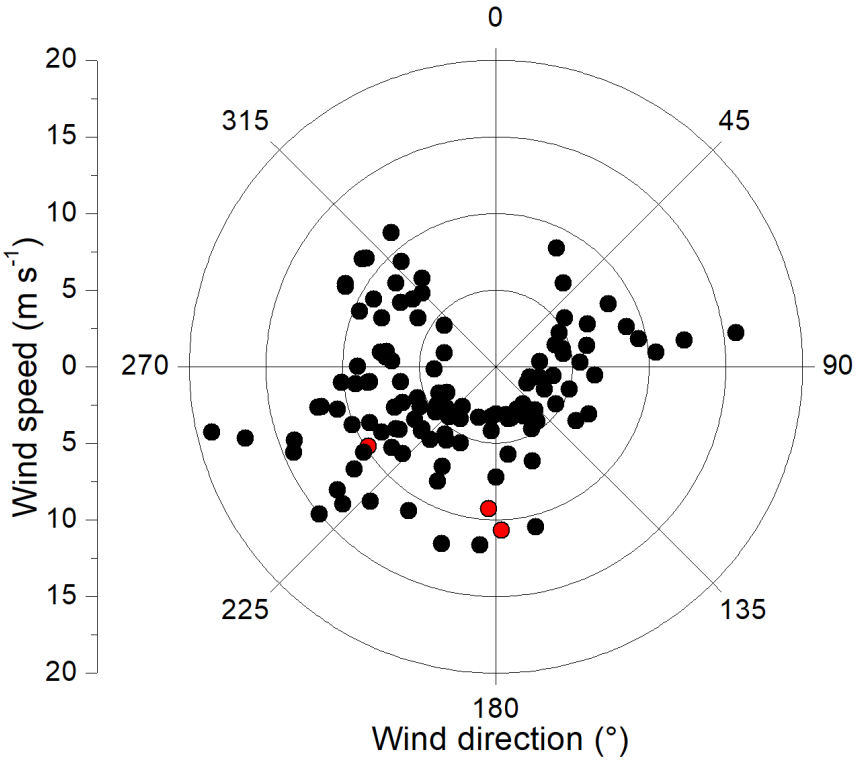

Fig. S1. Daily average wind direction (0, 90, 180, and 270° represent N, E, S, and W, respectively) and speed recorded at weather station in Hanko Russarö (https://en.ilmatieteenlaitos.fi/) from June to September 2018 (n = 122). The red circles show the wind conditions that induced sediment resuspension during the side-by-side chamber and eddy deployments (9th to 11th August), suggesting similar episodic events occurred when SW wind (180–270°) had speed ≥ 9 m s^{-1}.

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