The following supplement accompanies the article

Community metabolism in shallow coral reef and seagrass ecosystems, lower Florida Keys

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Supplement.

Derivation of the friction velocity (u_*)

The u_* estimate was derived from the moored ADCP data using a logarithmic law technique based on assumption that for a well developed turbulent boundary layer, an inertial sublayer region exists where mean velocities exhibit a logarithmic profile. Within this layer, the 'law of the wall' applies and u_* can be estimated as follows [*Wimbush and Munk*, 1970]:

$$\frac{U}{u^*} = \frac{1}{\kappa} \ln \frac{Z}{Z_0} \qquad \text{(S1)}$$

where U is velocity in (cm s^{-1}), Z (m) is height above the seafloor and Z_0 (m) is the distance from the seafloor at which the idealized velocity given by the law of the wall goes to zero (bottom roughness length scale). We applied a log-linear regression of lnZ over the U at the bottom 3 bins (1m, 2m, 3m above the seafloor) (e.g. $\ln Z = (\kappa / u_*) * U + \ln Z_0$). Above 3m from the seafloor, a deviation from a logarithmic profile occurred because of wind stress at the surface. For the set of velocity profiles whose log-linear R-square value approached 1, we estimated a slope (m) and intercept (ln Z_0) of the regression to determine u_* as $u_* = \kappa / m$ (Figure S1).

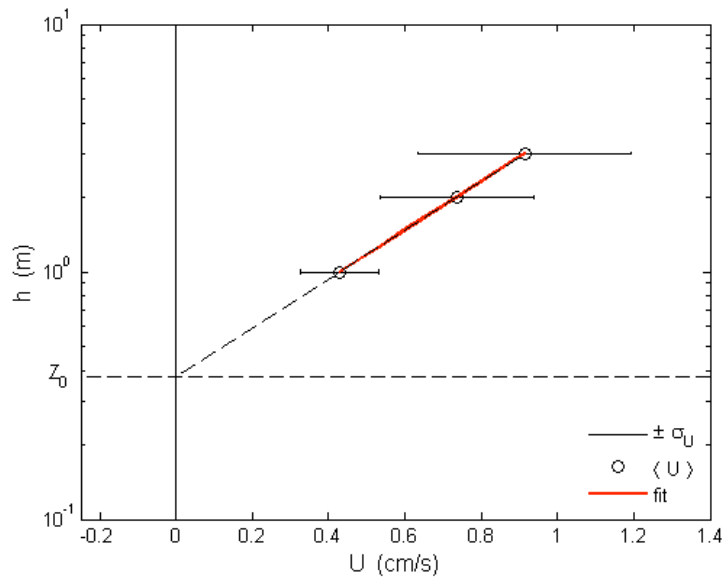

Figure S1: Open circles represent mean values of velocities (± SD) at the bottom 3 bins (1m, 2m, 3m above the seafloor) for the set of velocity profiles for which R-square value of log-linear regression ($\ln Z = (\kappa / u_*) * U + \ln Z_0$) approached 1. h is equivalent to Z and represents the hight above the bottom and Z_0 is the distance from the seafloor at which the idealized velocity given by the law of the wall goes to zero.