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

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Diurnal variation of net community production (NEP) and net community calcification (NEC) were measured in coral reef and seagrass biomes during October 2012 in the lower Florida Keys using a mesocosm enclosure and the oxygen gradient flux technique. Seagrass and coral reef sites showed diurnal variations of NEP and NEC with positive values at near-bottom light levels above 100-300 μEinstein m^{-2} s^{-1}. During daylight hours, seagrasses showed an average NEP of 12.3 mmol O_2 m^{-2} h^{-1} compared to daylight coral reef NEP of 8.6 mmol O_2 m^{-2} h^{-1}. At night, NEP at the seagrass was relatively constant, while in the coral reef, net respiration was highest immediately after dusk and decreasing during the rest of the night. NEC values were ranging from 0.20 g $CaCO_3$ m^{-2} h^{-1} during daylight to -0.15 g $CaCO_3$ m^{-2} h^{-1} at night at the seagrass site, and from 0.17 to -0.10 g $CaCO_3$ m^{-2} h^{-1} at the coral reef site. Similar NEC:NEP ratios were observed at the seagrass site and the coral site at the time of maximum daily irradiance. Average photosynthetic quotient (PQ) at the seagrass site was slightly lower in the morning and early afternoon than at the coral reef site, and higher at the seagrass site in the late afternoon. There were no significant differences in pH and aragonite saturation states (Ωar) between the seagrass and coral reef sites. Decrease in light levels during thunderstorms significantly decreased NEP, transforming the system from net autotrophic to net heterotrophic.