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In Situ Boundary Layer Coral Metabolism in the Atlantic Ocean Acidification Test Bed

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We present net ecosystem productivity (nep) and net ecosystem calcification (nec) in coral and seagrass ecosystems using the boundary layer gradient flux technique (CROSS). Coastal anthropogenic inputs and changes in global ocean chemistry in response to rising levels of atmospheric carbon dioxide has emerged in recent years as a topic of considerable concern. Coral reefs are particularly vulnerable from eroded environmental conditions including ocean acidification and water pollution. The Atlantic Ocean Acidification Testbed (AOAT) project monitors metabolism to ascertain the continuing health of coral reef ecosystems. The CROSS boundary layer nep/nec approach is one component of this diagnostic program. Certification of CROSS as an operational monitoring tool is underway in the AOAT. CROSS inspects a benthic community and measures productivity/respiration and calcification/dissolution over an area of 10 square meters. Being a boundary layer tool, advection and complex mesoscale flows are not a factor or concern and CROSS is autonomous and can be used at deep benthic sites. The interrogation area is not enclosed therefore exposed to ambient light, flow, and nutrient levels. CROSS is easy to deploy, unambiguous, and affordable. Repeated measurements have been made from 2011-2012 in reefal systems in La Parguera Puerto Rico and the Florida Keys, USA. Diurnal, seasonal and regional metabolism will be compared and discussed. The ability to accurately probe benthic ecosystems provides a powerful management and research tool to policy makers and researchers.