

Light And Motion Sensor Program: Low Cost Coral Reef Monitoring

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The “Light and Motion Sensor Program” is an observational network comprised of low cost sensor arrays deployed along the coral reef on the lee side of Bonaire. This effort is intended to observe variability of organic components in the water column over the reef that may indicate nutrient inputs or groundwater seepage into the water column over the reef. The arrays contain temperature and light sensors at three discrete depths, providing vertical temperature structure and downwelling light attenuation. Volunteer divers download the data weekly, transmit it to the laboratory where it is processed and posted on the web, making the data from the sensor network available in “semi-real time”. Data collected at each site enable us to follow daily temperature oscillations, and to evaluate processes that include upwelling, water column mixing, and along-coast propagation of variability. Downwelling irradiance in three ranges, broadband light, blue and green color bands, allows the calculation of the diffuse attenuation coefficient for those wave bands. By coupling measured light with temperature data, it is possible to evaluate the role of natural and anthropogenic sources affecting fluctuations of light attenuation. The choice of wavelengths provides an index of the presence of organic matter (Organic Index), including planktonic algae, dissolved organic matter and detrital material that can affect the fragile coral reef ecosystem. This unique, inexpensive monitoring network provides the scientific community and environmental managers with temporal and spatial information that can be used to assess environmental variability. It can also be used for recreational purposes by divers and tourists with near real-time observations of the Bonaire reef environment.