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Mapping Health of Bonaire Coral Reefs Using a Lightweight Hyperspectral Mapping System - First Results

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The Dutch Caribbean island of Bonaire is one of the world's top diving holiday destinations much due to its clear waters and the coral reefs. The coral reefs surrounds the island as approximately 50–150m band covering most of the the low-wave west side of the island. However, the general concencus is that extent and biodiversity of Bonairian coral reef is constantly decreasing due to anthropogenic pressure. The last extensive study of the health of the Bonaire coral reefs was performed in 1985 by Van Duyl. In order to update the underwater atlas the coral reefs, in October 2013, a hyperspectral mapping campaign was performed there using the WUR Hyperspectral Mapping System (HYMSY). Another dive validation campaign has been planned for early 2014.
The HYMSY consists of a custom pushbroom spectrometer (range 450–950nm, FWHM 9nm, ∼20 lines/s, 328 pixels/line), a consumer camera (collecting 16MPix raw image every 2 seconds), a GPS-Inertia Navigation System (GPS-INS), and synchronization and data storage units. The weight of the system at take-off is 2.0kg allowing us to mount it on a varying platforms. In Bonaire the system was flown on two platforms. (1) on a Cessna airplane to provide a coverage for whole west side of the island with a hyperspectral map in 2–4m resolution and a RGB orthomosaic in 15cm resolution, (2) on a kite pulled with boat/car to provide subset coverage in higher resolution. In this presentation we will present our mapping technique and the first results including a preliminary underwater atlas and conclusions on the reef development.

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