FUSION OF HYPERSPECTRAL AND BATHYMETRY DATA
FOR IMPROVED BENTHIC HABITAT MAPPING

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Bio-optical models are used in hyperspectral image processing for inversion procedures associated with benthic habitat mapping. Several algorithms have been described in the literature to remove the effects of the water column and extract information about the sea bottom based entirely on the measured hyperspectral image. However the availability of LiDAR derived bathymetry information opens the possibility of using this information for improved retrieval of the water properties and benthic habitat composition. We present results from a study using simulated and measured hyperspectral imagery that demonstrates the improvements in benthic habitat mapping that can be achieved by fusing bathymetry and hyperspectral imagery. Simulation results show that in clear water it is possible to obtain accurate bottom abundance estimates 5-10 meters beyond what can be obtained with hyperspectral imaging alone. Similarly, estimates from the measured imagery indicate increased accuracy with respect to ground truth data.

Keywords: Hyperspectral imagery, coastal remote sensing, underwater unmixing, benthic habitat mapping, data fusion.