



First hyperspectral survey of the deep seafloor: DISCOL area, Peru Basin

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Conventional hyperspectral seafloor surveys using airborne or satellite platforms are typically limited to shallow coastal areas. This limitation is due to the requirement for illumination by sunlight, which does not penetrate into deeper waters. For hyperspectral studies in deeper marine environments, such as the deep sea, a close-range, sunlight-independent survey approach is therefore required. Here, we present the first hyperspectral data from the deep seafloor. The data were acquired in 4200 m water depth in the DISCOL (disturbance-recolonization) area in the Peru Basin (SW Pacific). This area is characterized by seafloor manganese nodules and recolonization by benthic fauna after a seafloor disturbance experiment conducted in 1989, and was revisited in 2015 by the JPI Oceans cruise SO-242. The acquisition setup consisted of a new Underwater Hyperspectral Imager (UHI) mounted on a remotely operated vehicle (ROV), which provided illumination of the seafloor. High spatial and spectral resolution were achieved by an ROV altitude of 1 m and recording of 112 spectral bands between 380 nm and 800 nm (4 nm resolution). Spectral classification was performed to classify manganese nodules and benthic fauna and map their distribution in the study area. The results demonstrate the high potential of underwater hyperspectral imaging in mapping and classifying seafloor deposits and habitats.