

Buried and Surface Polymetallic Nodule Distribution in the Eastern Clarion-Clipperton Zone: Main Distinctions and Similarities

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The distribution pattern, abundance variations, morphology, chemical and mineralogical composition of buried polymetallic nodules in the eastern Clarion-Clipperton Zone (CCZ) is presented. Our observations are based on data collected from 59 boxcore stations, which comprise about 22.6% of all sampled stations in the InterOceanmetal Joint Organization (IOM) exploration area site B2 in the eastern CCZ, with recorded buried and surface polymetallic nodules. The majority of stations with buried nodules (> 90%) is below 4300 m water depth and is associated mainly with seafloor hills and slopes of ridges and depressions. Buried nodules lie completely beneath the active sediment-water boundary layer (with thickness range from 0 to 15 cm), and they are vertically recorded down to the 45 cm in sediment cores. Abundance of buried nodules varies from 0.2 to 22.10 kg/m², average of 4.25 kg/m². By comparison, surface nodules are more abundant, varying from 0 to 20.2 kg/m², averaging 10.5 kg/m². As a general rule the size of buried nodules is larger than surface nodules, and > 60% of recovered buried nodules exceed 8 cm in diameter. The chemical composition of buried nodules is slightly different than those found on the seafloor surface or those within the active sediment-water boundary layer. Buried nodules show an overall increase of manganese and cobalt and reduction of nickel and molybdenum, as well as slight increases in concentration of copper. It is assumed that more 90% of analyzed buried nodules have diagenetic origin; however the identification of factors and conditions responsible for their formation still remain unknown.