GEOMORPHIC CHANGE ANALYSIS OF MONTEREY SUBMARINE CANYON HEAD, CALIFORNIA, BETWEEN 2002 AND 2015

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The Monterey Submarine Canyon presents an active behavior and is of great importance for the local littoral cell dynamics, since sediments from adjoining watersheds are continuously transported by various coastal processes and deposited in the interior of the canyon head. Periodically these accumulations of sediment collapse and cause submarine slides and turbidity currents, inducing depositional and erosive episodes. The identification of areas where these episodes are more frequent and the quantification of the intensity of the sedimentary transport are valuable subsides to understand the canyon dynamics and resulting adjustments on its geomorphology. This knowledge is essential to assist in the coastal management and decision making processes by government authorities. Digital elevation models of the canyon head for the last thirteen years (2002 to 2015) were obtained from multibeam bathymetric surveys performed by the Seafloor Mapping Laboratory - California State University Monterey Bay and were used to develop tridimensional spatial analysis using a GIS with the purpose to identify and quantify geomorphic changes that occurred during this period. Digital Shoreline Analysis System (DSAS) extension was used to determine the canyon lip behavior along the years. Raster subtractions were performed to recognize main areas where erosion and deposition are occurring. Hydrology Tools pack was used to trace the thalweg for each year. The results suggest that there is a liquid increase both in area and volume of the canyon head. The canyon thalweg presented an increase on its length, depth and declivity. In general, the calculated sedimentary budget indicates that long-term erosive processes are dominant. The north sector of the canyon head is constantly progressing in upstream direction, opposite to the existent sediment flow. Moss Landing Harbor proximity to the Monterey Submarine Canyon head puts it in a vulnerable situation and in attention state.

KEYWORDS: Multibeam Bathymetry, Sedimentary Budget, Spatial Analysis.