

Resolution of multibeam bathymetric mapping and the dimension of coral reef topography

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The complex reef topography such as spurs and grooves are difficult to visualize. This study attempts to observe 3D measuring and mapping of outer reef slope using high-resolution multibeam bathymetric sonar. The survey was carried out off the southern coast of Kume Island in the Ryukyu Islands, southwestern Japan. The minimum/maximum depth in the survey area was 0.2/284.7m in the measured area of 1.15 x 1.35 km. The reef topography was visualized with 2 m mesh-size for whole area, 1 m mesh-size for the area shallower than 60 m deep, and 0.2 m mesh-size at ~10 m deep. The bathymetric result was confirmed by SCUBA above the 40 m depth line.

The reef micro-topography (e.g., spurs and grooves) with the dimension ranges from units to tens of meters was visualized when 1 m mesh-size was adopted. The undulation associating with coral colonies which dimension is around tens of centimeters was not visible at the highest resolution map of 0.2 m mesh-size. The reef micro-topography was obscure when the mesh-size larger than 2 m was adopted. This comparison between the map resolution and the topographic dimension is useful for future bathymetric surveys.

Keywords: multibeam bathymetric survey, submarine topography, mapping, scale, coral reef, Kume Island