Mapping and comparing the geomorphological environments of designated conservation area and urban city in Majuro using drone data

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The Marshall Islands are located on the eastern Pacific Ocean in Micronesia region. The country consists of 29 atolls and 6 table reefs. Majuro atoll is the capital city, inhabiting more than half of the country' s population of more than 53,000 people. Like many other low-lying atoll nations, Majuro is only composed of coral cays and it is estimated to be about 3-meter above sea level therefore makes it vulnerable to coastal erosion due to rising sea level and coastal development. In addition to those factors, the increase in human population and degradation of natural resources are also influential factors, contributing to the vulnerability and sustainability of the city. During the summer of 2019, we conducted a research trip to Majuro and examine the physical features that contribute to island formation in designated conservation areas and urban area. The study's objectives are to map and compare the geomorphological features of locally-owned marine protected area (MPA) and urban city in Majuro atoll by utilizing the use of high-resolution image data derived from unmanned aerial vehicles (UAVs) integrated with a Real Time Kinematic (RTK) technology -Phantom 4 RTK. Topographic profile data was also considered to compliment the UAV dataset. We collected 14,555 UAV photos from three study sites then used Agisoft Metashape Pro software to generate the 3D models and orthomosaic dataset. The output data were transferred to ArcGIS software for spatial and classification analysis to determine different geomorphological environments. Various geomorphic within and outside the conservation area were classified according to the high-resolution dataset. We also observed healthy foram zones around the conservation area that played an important role in maintaining the island sustainability. The next field trip is scheduled to validate the output data, visit to other traditional area, then consult with stakeholder on the expectations.

Keywords: marine protected area (MPA), unmanned aerial vehicle (UAV), real-time kinematic (RTK), Marshall Islands, Majuro, Geomorphology

