

Latency effect on single beam echo-sounder bathymetry

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The global navigation satellite system (GNSS) is used for surface positioning during depth measurement using acoustic technology like single beam echo-sounder (SBE). The final bathymetry (x,y,d) is computed by the hydrographic data logging software. Latency is the time lapse between the actual observation time of a particular system and the time it is saved in the logging software in the logging computer. Latency error or time gap of the data has been one of the major problems in the hydrographic data collection. In multi beam echo-sounder systems (MBES), resolving the latency error is a must during the system calibration or special devices are used to time tag the data. In SBE data collection, most of the time, it is simply ignored as full bottom coverage is not possible. During this study, how the latency in a survey system effect to the final bathymetry is discussed. At first, the effects are simulated for various latency values from 0 to 1 second on a synthetic sea bed. Profile comparisons and contour matching was done to investigate the effect due to the latency in this study. The effects due to the various vessel speeds were also tested. Some real data sets collected at Colombo Port were used. A simple software application tool was developed to compute the latency value. According to the simulated results, with the increase of the latency value, the waviness of the depth contours increased. It is noticed that there is no effect from vessel speed to the latency value of the system. The obtained latency value for the system was 0.715 seconds in the real data set. Then after applying the corresponding latency corrections to the profile lines, the averaged mismatch was reduced from 3.8 to 0.3 m and the corresponding lines were matched.

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