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Validation of logbook catch records in offshore fishing vessels of Sri Lanka using VMS data

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Accurate information on fishing position is a timely need in the offshore fisheries, especially for preventing illegal, unregulated and unreported (IUU) fishing. Vessel monitoring system (VMS) is recognized as one of the effective mechanisms for validating the fishing positions of fishing vessels provided by logbook system. In the present study, an attempt is made for developing an approach to identify and validate the fishing locations of offshore vessels in Sri Lanka using VMS data. VMS data based on the speed, distance and angle filters were adopted to identify the fishing locations. Here, the best angle of the zig-zag shapes recorded in the cruise tracks of VMS was determined as $< 15^\circ$ using the flooding data of VMS. Similarly, speed level of < 3 knots was identified as the possible speed of fishing. Distance gaps of fishing locations were recorded and converted to distance buffers. Data from 1291 multiday vessels, operated from 21 fisheries harbors of Sri Lanka from May 2017 to April 2018 were analyzed in the present study. Predicted fishing locations based on VMS data were compared with fishing data of log sheets reported by skippers were compared using paired t-test. Results of the analysis showed that fishing occasions predicted using the speed and course angle of VMS alerts had a good agreement ($p < 0.05$) with the fishing locations reported by fishers. However, potential cruise occasions showed significant deviation from log-book records. Although the time differences of the locations of the two monitoring systems were > 4 hrs, most of the matched locations were recorded within 24 hrs. This may be due to the practice of skippers, who only record their fishing locations only once a day, which was found to be insufficient for reliable reporting. While the current manual logbook system is recognized as appropriate to comply with the enforcement and management needs, there is a need to adopt more appropriate method of reporting catch data by fishermen. Present analysis indicated that the use of VMS data provided an alternative approach for reporting fishing locations of offshore vessels with sufficient accuracy. Need for further improvement of the data recording system representing fishing duration, and species composition is discussed for preventing IUU fishing by offshore fishing vessels.

Keywords: Vessel monitoring system (VMS), Fisheries logbook data, Sri Lanka, offshore fishing vessels