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Rip current monitoring using GPS buoy system

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The occurrence of rip current in the Haeundae beach, which is one of the most famous beaches in South Korea, has been threatening beach-goers security in summer season annually. Many coastal scientists have been investigating rip currents by using field observations and measurements, laboratory measurements and wave tank experiments, and computer and numerical modeling. Rip current velocity is intermittent and may rapidly increase within minutes due to larger incoming wave groups or nearshore circulation instabilities. It is important to understand that changes in rip current velocity occur in response to changes in incoming wave height and period as well as changes in water level. GPS buoys have been used to acquire sea level change data, atmospheric parameters and other oceanic variables in sea for the purposes of vertical datum determination, tide correction, radar altimeter calibration, ocean environment and marine pollution monitoring. Therefore, we adopted GPS buoy system for an experiment which is to investigate rip current velocity; it is sporadic and may quickly upsurge within minutes due to larger arriving wave groups or nearshore flow uncertainties. In this study, for high accurate positioning of buy equipment, a Satellite Based Argumentation System DGPS data logger was deployed to investigate within floating object, and it can be acquired three-dimensional coordinate or geodetic position of buoy with continuous NMEA-0183 protocol during 24 hours. The wave height measured by in-situ hydrometer in a cross-shore array clearly increased before and after occurrence of rip current, and wave period also was lengthened around an event. These results show that wave height and period correlate reasonably well with long-shore current interaction in the Haeundae beach. Additionally, current meter data and GPS buoy data showed that rip current velocities, about 0.2 m/s, may become dangerously strong under specific conditions.

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