

Inter-comparison of ocean wave data from drifting buoys, moored GPS buoys and reanalysis data

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Observation of surface wave data such as wave height and period are important for practical and scientific purposes. However, wave observations by moored buoys around Japan are only by GPS buoys, which are located about 10 km from the coast. The observations of wave heights and periods by Japan Meteorological Agency (JMA) drifting buoys were conducted from 2000. Wave data from drifting buoys are inter-compared with GPS buoys and ERA-Interim reanalysis data. The GPS wave data are compared with those from drifting buoys and ERA-Interim data, when a drifting buoy is close to a GPS buoy position, and the number of comparison is limited. The data period of wave data of drifting buoys and ERA-Interim data is from 2000 to 2018. The agreement of wave heights between from GPS and drifting buoys is better than that between from GPS and ERA-Interim data. The agreement of wave periods between from GPS and drifting buoys is not much better than that between from GPS and ERA-Interim data. There are cases that wave periods by drifting buoys are much longer than those from GPS buoys. The dependency of wave parameter differences between from drifting buoys and ERA-Interim data on drifting buoy speeds is investigated.

The drifting current components to the mean wave directions are evaluated from the drifting currents estimated from the drifting buoy positions and the ERA interim mean wave directions.

The differences of wave heights between from drifting buoys and ERA-Interim data are larger as faster current speeds.

The ERA-Interim wave heights are underestimated when current directions are opposite to mean wave directions. The ERA-Interim wave heights are overestimated current directions are following to wave directions. The ratio as drifting wave period/ERA-Interim wave period is smaller as increasing opposing current component, which is consistent with the Doppler shift.

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