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Sea Surface Drag Coefficient Estimated with ADWAM from Field Data

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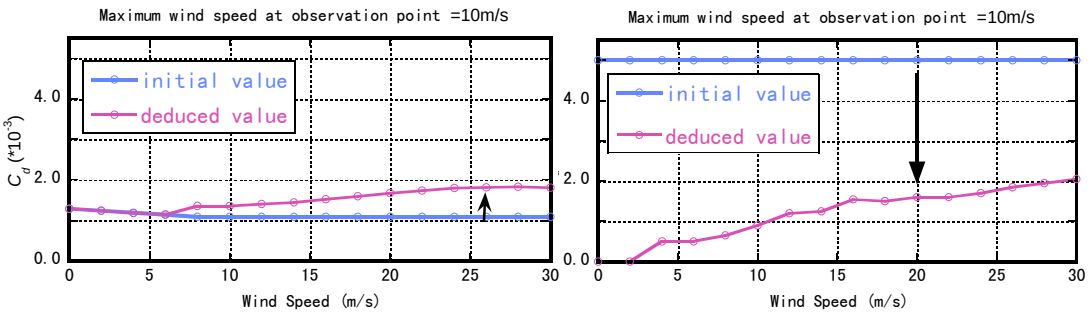
The sea surface drag coefficient, an important parameter of the energy transfer from winds to waves in wave prediction model, is generally described as a linear function of wind speed as seen in Wu (1980) or Mitsuyasu & Honda (1982), etc. However, it might be inadequate to apply their extrapolation to strong wind conditions (e.g. Powell et al. ,2003).

To investigate this fact, theoretical approach seems to be rather difficult due to their complicated physical processes of wave breaking and spray generated by the strong winds. As an alternative method in such cases, a wave model “ADWAM” including a data assimilation method seems to be effective. Hence, for the purpose of clarifying the reasonable value of the sea surface drag coefficient in high wind speed, the ADWAM was modified to deduce sea surface drag coefficients as its control variables from observational wave data. The validity of the method was already examined through identical twin experiments (Yokota et.al, ICCE 2010).

In this study, we apply the method to the actual wave observation data to investigate the sea surface drag coefficient under strong wind conditions. As a result, we confirm that the sea surface drag coefficient was automatically modified (corrected?) to appropriate values with the method although arbitrary initial values of the sea surface drag coefficient were used for the estimations. It was also confirmed that the possibility of the estimation of the sea surface drag coefficient under stormy conditions on the basis of the wave data remotely observed from storms.



parameters deduced from arbitrary initial values