ANALYSIS OF WIND-WAVE SPECTRA UNDER FETCH-LIMITED AND NON FETCH-LIMITED CONDITIONS

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The present study deals with the important task of how to improve the wind - wave spectra that is modelled in SWAN with measured spectra. The combined effect of wind and waves is considered in the present study taking into account their irregularity wherein the spectra of actual waves are used and the mean wind speed is the connecting link between the spectra. The comparisons bases on wave hindcast simulation runs in the area of the southern east part of the North Sea under partly fetch – limited and fetch-limited conditions. The results of these simulations are compared to wave measurements that have been performed by directional wave buoys off the coast during storm Xaver (December 2013) in water depths of 29, 24 and 15 meters, correspondently to the points of interests at FINO1, at the outer Elbe estuary and at Westerland.

Furthermore in this paper there are presented the results of wave measurements that have been performed by directional wave buoy (6 measurements during average conditions and 4 cases during typhoons) and carried out in the eastern Taiwan waters 250km to Taiwan coastline at the location of Taitung Open Ocean in water depth of 5500 meteres. This station is situated under non fetch – limited conditions.

Therefore in general we considered two situations: one in the shallow water area on the example of the North Sea and second in deep water of Taiwan waters. In deep water, progress in understanding wave growth resulted from observation that shape of growing wind wave spectra is, to a reasonable degree, regular and can be described by similarity laws(Phillips, 1958; Kitaigorodskii/,1962; Pierson and Moskowitz,1964; Hasselmann et al.,1973, 1976; Toba, 1972).

Wave growth in shallow seas is not well understood, particularly during storm events. Wave growth for deep water area is described by similarity laws of deep water JONSWAP spectrum and Pierson – Moskowitz spectrum. The shallow water situation is described also by deep JONSWAP spectrum and Ochi – Hubble.