

Bauer, E., M. Stolley and H. von Storch, 1996

On the response of surface waves to accelerating the wind forcing.

Abstract:

Observations of the last decades show a growth in mean significant wave height in the North Atlantic but no corresponding growth in the mean winds. With the third-generation wave model WAM, the hypothesis is tested whether an increased frequency of storms can explain such observations. To do so, a half yearly sequence of 6-hourly analysed wind fields is fed into WAM not only with the regular 6-hourly time increment but in two more simulations with reduced and enhanced time increments of 4 and 8 hours, respectively.

The model results are inconsistent with the contested hypothesis, which therefore is considered falsified. The faster succession of the wind fields in the "fast" run produces lower total significant wave heights instead of the hypothesized larger heights. This overall reduction can be traced back to lower energies of the non-fully developed sea states, which in turn may be related to the reduced duration of the forcing. A slight increase of the swell energy in the North Atlantic storm track due to a reduced duration of dissipation is overcompensated by the reduced wind sea energy. The reversed effect, an increase of the wind sea energy and a decrease of the swell energy in the storm track, is found in the "slow" run.
