
Dissertations

Aerosol emission due to the shore-line dissipation of wind-induced wave-energy

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This thesis discusses a model of the marine aerosol emission flux in the shore zone, based on the equation of the wave-energy budget there. The aerosol emission flux due to wave-energy dissipation in this zone was parametrised. The model was employed in simulation studies, which showed that

- the slope of the bottom affects the aerosol emission flux in the shore zone, and that the value of the flux decreases with steepening slope;
- the total aerosol emission flux in the shore zone increases more rapidly over a smooth bottom than over an uneven one;
- local values of the aerosol emission flux rise with steepening bottom slope and with increasing bottom unevenness.

The empirical validation of these simulations at the Lubiatowo shore station and from on board r/v ‘Oceania’ during the international BAEX–I experiment in 1993 enabled the components of the aerosol budget in the air at water level in the shore zone to be determined. In addition, the effect of wind velocity on the advection flux, the turbulent diffusion flux and the aerosol particle immission flux was defined.

Horizontal gradients of the aerosol concentration were found from these parallel measurements (at Lubiatowo and at sea (r/v 'Oceania')), as a result of which the aerosol flux above the shore zone could be balanced and the emission flux of marigenous particles from this zone determined.

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