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COMPUTATIONAL MODEL OF THE WIND SYSTEM IN A TROUGH OF LOW PRESSURE

/Summary/[x]

by

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Hydrological modelling often needs detailed information on the wind distribution and variation over the sea. In order to enable the precise computation of that important meteorological factor, a gradient field of an atmospheric pressure system moving over Baltic is approximated geometrically and the formulas for the computation of wind directions are derived. The wind speed is computed using the well known gradient wind equations. Fig.1 illustrates the constructional details of a low pressure trough with isobars curved cyclonically in the northern /area A_0/ and southeastern /area A_1/ parts, and of anticyclonic curvature in the rear /area A_2/. The areas distinguished have the wind speed and direction computed with respect to relevant centres of curvature. The centres of curvature are lying on one straight line and advancing in a definite direction, while the straight is rotating gradually, what makes the axis of

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[x] The full text of the paper will appear in the proceedings of the 9th Conference of Baltic Oceanographers in Kiel 1974

the trough turn by an angle, as needed. Successive changes of the position of the trough are accompanied by changes in the pressure gradient values, thus simulating the deepening or filling of the system. Fig. 2 shows the wind field of the trough, computed when the position of the centre was located near Gotska Sandon. It should be added that the transformation of the system, resulting in the variation of wind direction and speed can be easily identifield with changes occurring with respect to time. Thus a time interval can be taken as small as needed, by programming accordingly small the distance, covered by the centres between two computational steps. This enables to obtain a nearly continuous picture of the variation of the wind field. And this provides the possibility to realize a precise verification of the models of hydrological processes as for instance the wave motion, water circulation, or sea level changes.

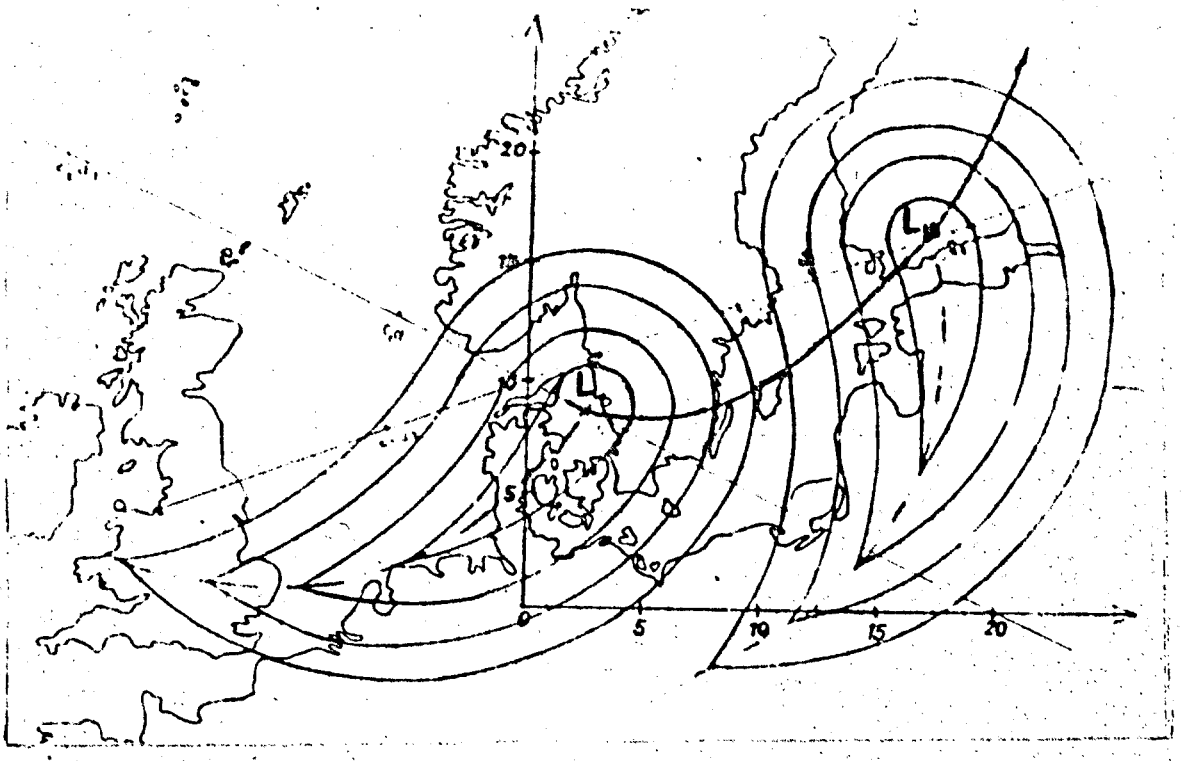

Fig. 1. Model of a trough advancing northeast, in two suocessive positions

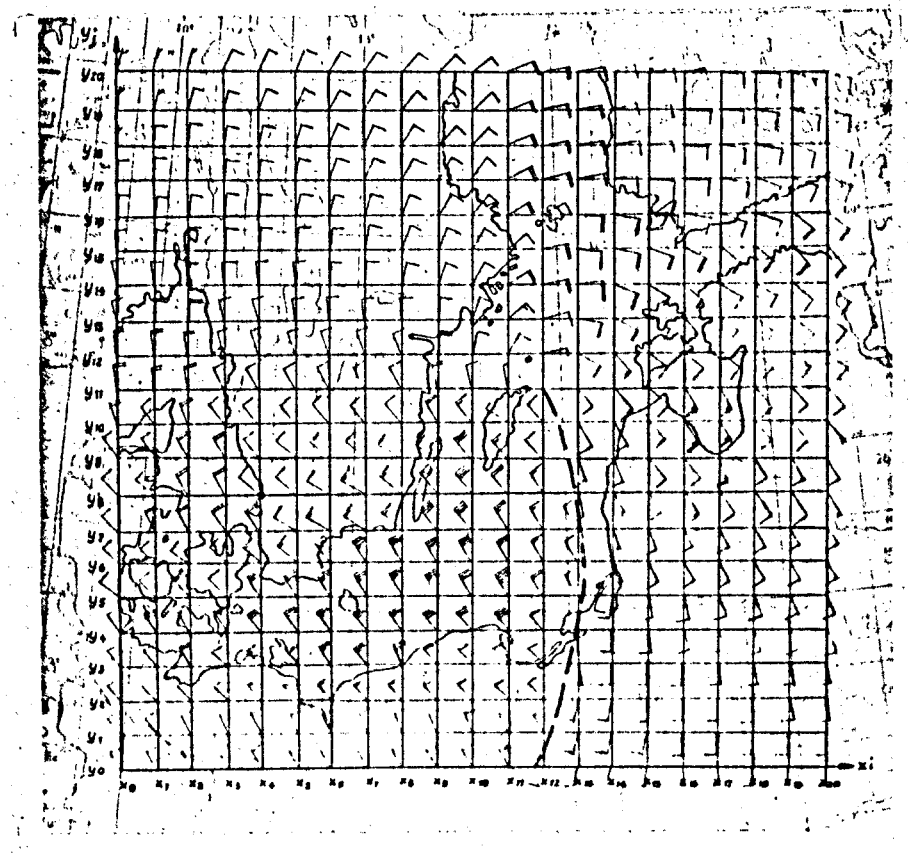

Fig. 2. Wind field corresponding to the model considered when the centre of the low was lying near Gotska Sandon