4.7. FORECAST MODELS FOR BIRD-MIGRATION INTENSITIES IN DENMARK.

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The Danish contribution to the developement of forecast models for bird-migration intensity has been described in a preliminary report (GEIL, NOER and RABØL 1974: Forecast Models for Bird Migration in Denmark. Duplicated report, 54 pp.). Here only a brief summary is given.

Basic information on bird-migration intensity was obtained from films (16 mm) of a PPI radar scope (L-band), using a 0-9 point intensity scale. The most important directions of migratory movements could be recorded, and for the analysis distinction was made between intensities of NORMAL, REVERSED and TOTAL migration. Maximum intensities were measured each day and night in the months March, April, May, August, September, October and November, during the years 1968-1971.

For each month, and for day and night separately the intensities (normal, reversed and total) were compared with the contemporary weather. Four different methods were used:

1) Intensity was compared with the general weather situation as illustrated in weather maps.
2) The simple correlation coefficients between intensity and a number of separate weather factors were calculated.
3) The corresponding partial correlation coefficients were found, because of the pronounced inter-correlation between weather factors.
4) By means of multiple regression analyses, predictions were calculated on the form $Y = a_o + a_1X_1 + - - - - + a_nX_n$ (Y = intensity, X_i = weather factors).

The methods 1 and 2 yielded very similar results, and can produce reasonably good forecasts. Method 3 is not yet thoroughly investigated, buts its usefulness seems doubtful. Method 4 often seems to produce useful predictions. It was originally assumed that the best prediction for TOTAL was obtained by addition of predictions for NORMAL and REVERSED, but this expectation was not met, and predictions were made directly on TOTAL.

The wind direction proved a very important factor, which caused some problems because of its cyclic variation. Several transformations on the form Cosinus (X_i - wind direction) were investigated until the X_i with the highest numerical correlation coefficient was found.