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HYDROLOGIC STUDIES IN THE LAKE ONTARIO BASIN USING HIGH ALTITUDE AND ERTS-1 IMAGERY

A. Falconer, *University of Guelph, Guelph, Ontario*

ABSTRACT

The Lake Ontario Test Site includes areas of both land and water. Studies of high altitude and ERTS-1 imagery show that inflow from the Niagara River and underwater discharge from effluent pipes can be delineated. Because these features are dynamic, the collection of adequate ground data for interpretative studies is very difficult. The imagery provides synoptic data of ephemeral features and the high altitude imagery is being used to define some surface movements of the lake. Sun glint on the RB-57 imagery has been used to define upwelling along the northern shore and the sequential photography resulting from successive flight paths allows the calculation of rates of movement in such features. Study of internal wave patterns revealed on RB-57 imagery is continuing but no internal waves have been detected on available ERTS imagery.

Over the land area of the test site, attempts to model the behavior of river basins have defined a requirement for soil moisture measurements and a definition of vegetation cover. RB-57 imagery has been used for vegetation mapping and measurements of soil moisture status appears possible. Soil moisture measurement is complicated by the effect of land use and soil type. Variability of the high altitude imagery is a further complicating factor. Correction of image density over the area of the test site has been achieved by fitting smoothing functions. Studies of soil types in the laboratory and in the field using various sensors and scales of resolution have defined the role played by soil parent material and landforms. High altitude data are being used to define land use, soil type, and landform regions. In a limited test area the corrected image density values have been correlated with moisture status and the regional scale use of this is being examined with reference to ERTS-1 data. As a bi-product from hydrologic studies the interpretation procedure gives regional scale land use data, soil maps, and physiographic information.