

CANADA

I. CURRENT INSTRUMENTS AND PRACTICES (As of 6 December 1990)

VIZ radiosondes (produced in Canada by Valcom) tracked by GMD radiotheodolite at most stations. At these stations, humidity data are not reported for temperatures below -65°C and relative humidities less than 9%. No temperature corrections are applied.

Väisälä RS80 and DigiCORA ground systems at some stations. At these stations, no humidity cutoffs are used, and temperature corrections are applied.

II. PAST CHANGES IN INSTRUMENTS AND PRACTICES

1945-55: Two groups of stations: (1) Canadian Meteorological Service stations using Canadian-designed Chronometric radiosondes. Windfinding, if any, was accomplished optically. (2) Joint Arctic Weather Stations (JAWS), operated jointly with United States. Radiosondes supplied by the U.S. Weather Bureau were used with Metox or SCR-685 radiotheodolite.

1955-56: Introduced 403 MHz radiosondes and Metox and SCR-658 radiotheodolites to replace Chronometric radiosondes. In any year, radiosondes were from the same manufacturer (VIZ Manufacturing Company) as those used by U.S. Weather Bureau.

1960: Began gradual (2 year) introduction of exposed, white-coated rod thermistor with no radiation correction applied. Data conversion identical to U.S. Weather Bureau.

1962: Began installation of GMD radiotheodolites at 20 (of 34) sites.

1963: Introduced VIZ (107 MHz) radiosondes at Ocean station "P" to replace Chronometric radiosonde.

1964-66: Completed conversion of all stations to GMD radiotheodolites.

1966-68: Introduced carbon element to replace lithium chloride humidity sensors.

1973: Introduced new humidity duct to improve readings at high solar elevation angle.

1974: Converted Ocean station "P" from 107 MHz to 403 MHz, which resulted in improved data.

1977: Introduced monolobe (solid state) antenna to replace mechanical Conscan Spinner in GMD radiotheodolites. No evidence of change in wind accuracy.

1978: Introduced ADRES minicomputer system. Wind data were calculated automatically, but an operator extracted the raw meteorological data.

1978: Changed humidity algorithm to allow computations for all temperatures above -65°C . Previously, humidity data were terminated at -40°C .

1980: Converted 18 of 33 stations to use transpondersondes. These were flown when the elevation angle in flight was expected to be less than 12° ; produced a considerable improvement in wind data.

1980: Introduced a new carbon hygistor. The supplied algorithms resulted in relative humidity readings 2 to 5% too low in the range 90 to 100%.

1980-82: Radiosondes were supplied by VIZ.

1983: Introduced a new humidity algorithm with ADRES to correct the values in the 90 to 100% range.

1985: Converted Prince George (71896) to Väisälä RS80 radiosondes and DigiCORA. Winds were computed using Omega, but a software problem produced erroneous winds. A temperature correction is applied to the data (as compared with the GMD/ADRES stations, which do not apply a temperature correction).

1986: Introduced pre-baselined radiosondes. Previously all sondes had undergone a manual baseline lock for temperatures and humidity. Discovered that the manual baseline technique was prone to producing an incorrect humidity lock at low relative humidity, which resulted in data below 60% being biased too high. It is estimated that at 20% relative humidity the relative humidity error could be as great as 10%.

1987: Closed station at Shelbourne, Nova Scotia. Opened one at Yarmouth (71603) using VIZ Mk I radiosondes and Beukers W8000 Navaid system; windfinding was accomplished using Loran-C.

1988: Converted station at Coral Harbour (71915) from GMD radiotheodolite to Väisälä DigiCORA. Same comments as for Prince George apply here. (See 1985 entry.)

1989: Converted station at Fort Nelson (71915) from GMD to Väisälä DigiCORA. Solved the Omega wind problem for all three DigiCORA stations. The RS80 radiosondes were no longer baselined for temperature and humidity; the values were accepted as accurate. Pressure was still baselined and corrected.

III. PLANNED CHANGES IN INSTRUMENTS AND PRACTICES

Yarmouth will be converted to the VIZ Zeemet system with the VIZ Mk II radionsonde in early 1991. Winds will be calculated using cross-chain Loran-C. Saskatoon (Saskatchewan) will become operational in mid-1991 using the VIZ Zeemet system. Starting in 1992, a gradual conversion of all stations to Navaid technology is planned.

IV. STATION HISTORIES

Station histories are available in (1) Station Inspection Report and (2) Station Information System (a computerized system) from the Atmospheric Environment Service, Attention: CCAA. In addition, station histories including station names, locations, and periods of record are available in the Climatological Station Catalogue (1989, six volumes). See microfiche Appendix 4 for additional information.

V. PUBLICATIONS

Atmospheric Environment Service (AES), 1987. Format Documentation for the Digital Archive of Upper Air Data Identification by Element.

AES, 1989. Documentation for the use of software to generate reports for the Digital Archive of Upper Air Data, UA User's Manual.

Department of Transport, Meteorological Branch, 1957: Maps of Upper Air Winds over Canada, Toronto.

Harley, W.S., 1980: Northern Hemisphere Monthly Mean 50 kPa and 100 kPa Height Charts, CLI-1-80, AES, Downsview.

Titus, R.L., 1965: Upper Air Climate of Canada - Average, Extreme, and Standard Deviation Values 1951-1960, AES, Toronto.