Canada Water Accounts: Evapotranspirtion

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OBJECTIVE
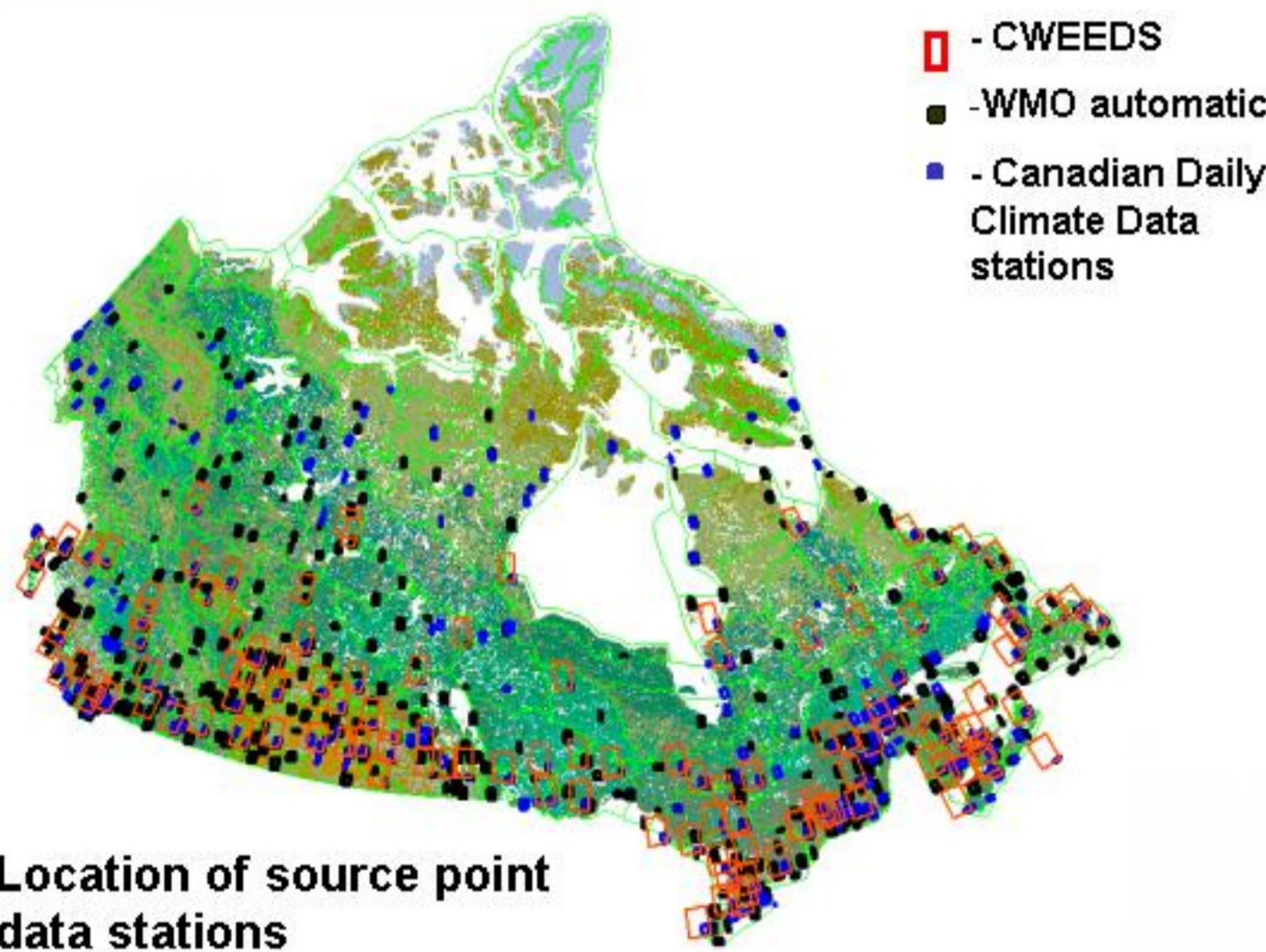
Monthly actual sub-sub-basin ET (historical and projections).

Phase 1 – Point historical ET using observed forcings.

Phase 2 – Spatial historical ET using gridded reanalysis forcings.

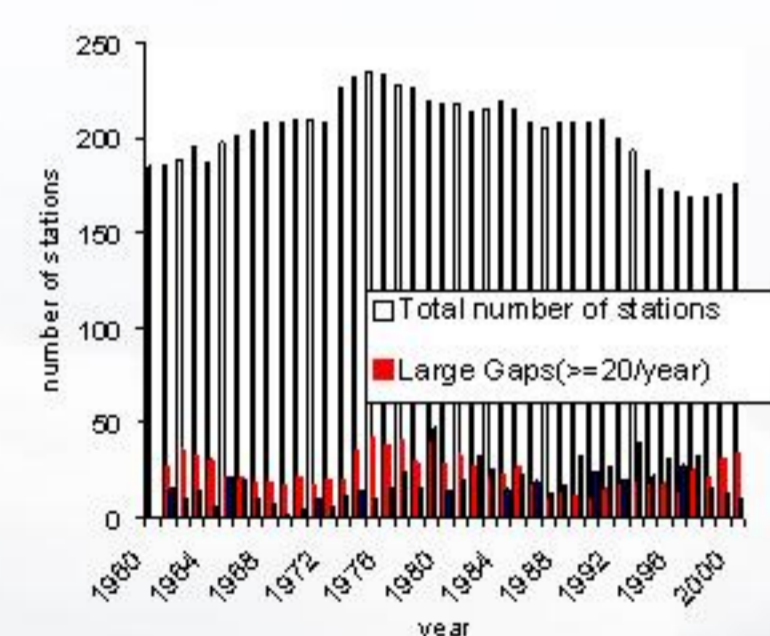Phase 3 – Apply GCM anomalies ET during climate change scenarios.

CLIMATE DATA PRE-PROCESSING

- CWEEDS
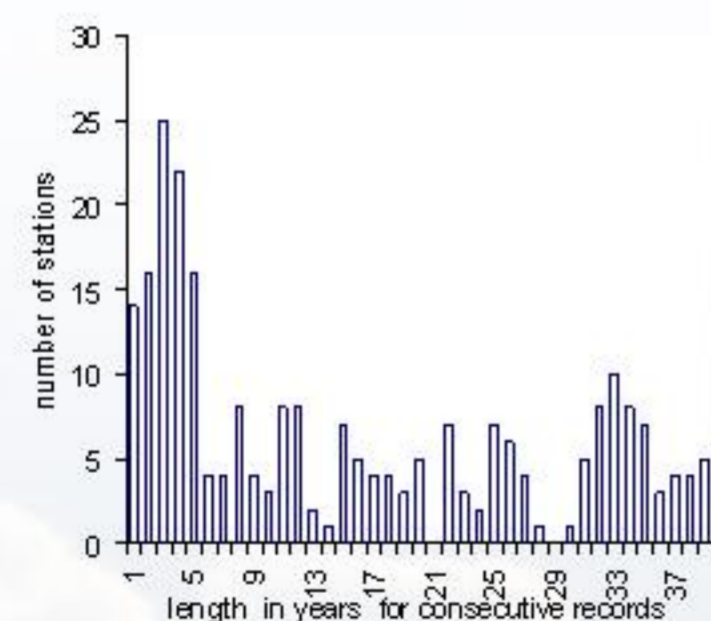- WMO automatic
- Canadian Daily Climate Data stations

Point Data:

Canadian Weather Engineering Database (CWEEDS) WEEDS stations (146) hourly radiation, pressure, windspeed, humidity, temp, weather and snow flags.

MSC Class A WMO stations (~400) – hourly precipitation, snowfall, rainfall, temperature, dewpoint,, snow depth.

Canadian Daily Climate Stations (~1000) – daily precipitation, snowfall, rainfall, temperature, , snow depth.

Gridded Data:

NCAR Global Reanalysis 2 (1948-present) ~150km,

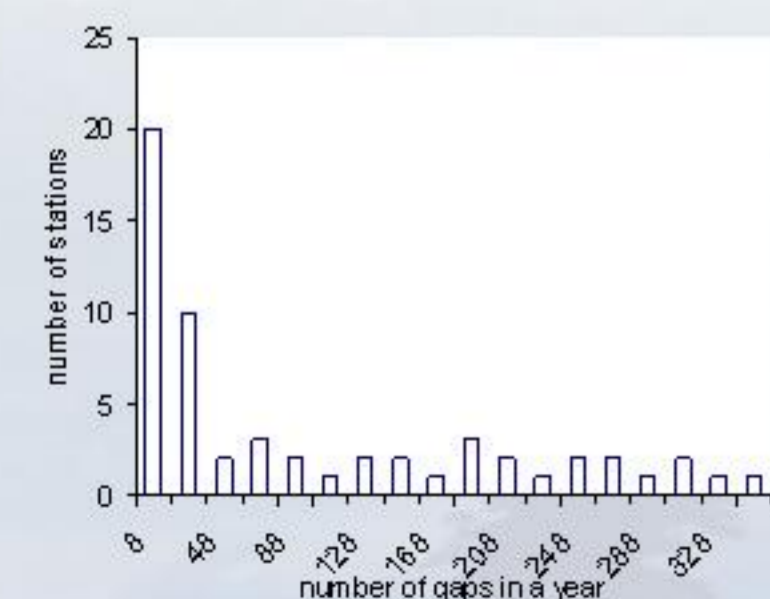NCAR Regional Reanalysis (1995 only) ~ 32km,

Location of source point data stations

CWEEDS and Nearest Neighbour MSC Stations: Consecutive Precipitation Records Quality

CWEEDS and Nearest Neighbouring MSC Stations: Incomplete Data Periods available within 1960-2000 (complete are records for other 91 stations)
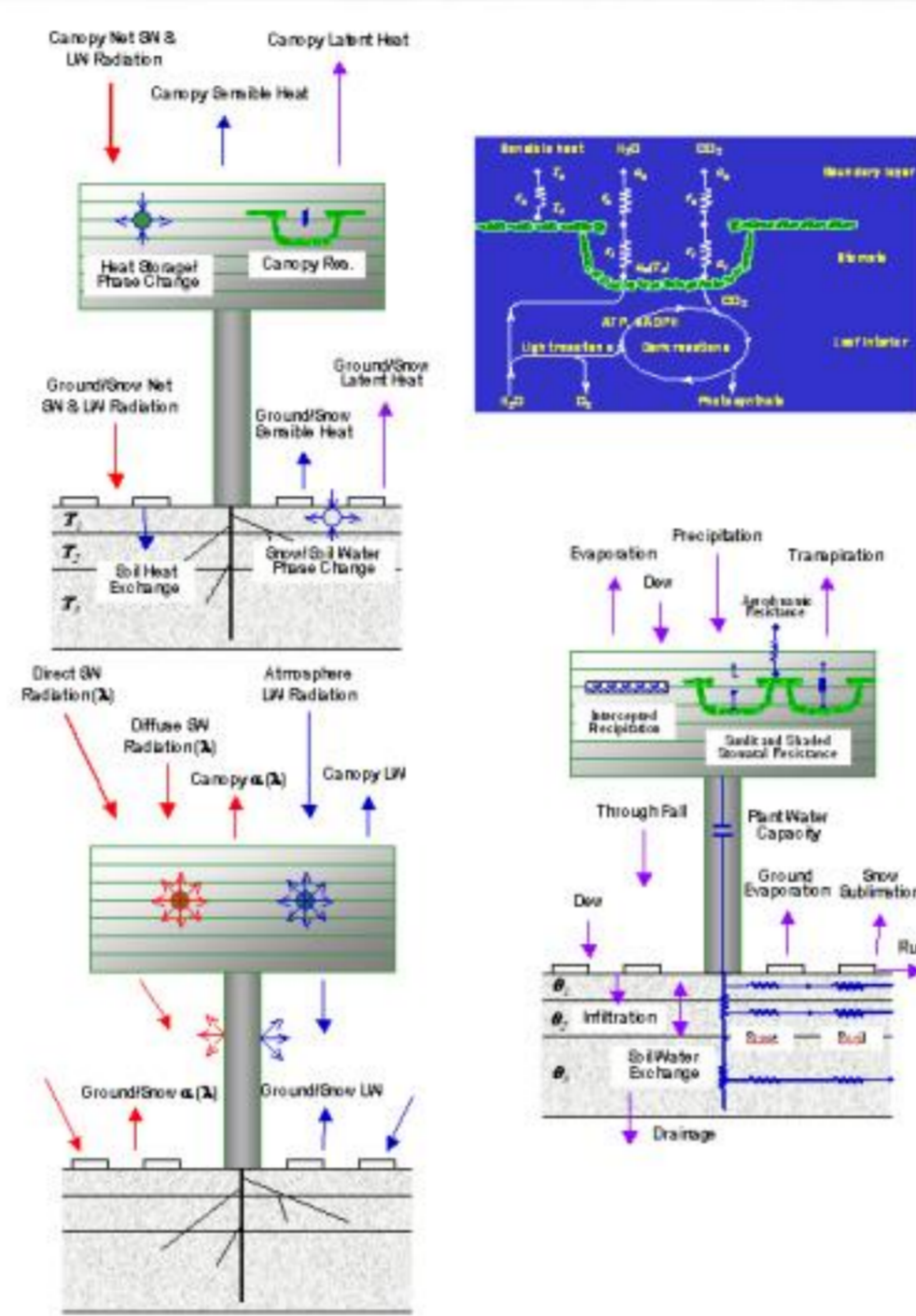
Gap identification and filling.

146 CWEEDS stations – hourly time series of radiation, pressure, wind speed, humidity, temp, weather

MSC daily stations –precipitation, snowfall, rainfall, temperature, snow depth

Precipitation data quality for CWEEDS locations: gaps distribution within each year of records (all stations)
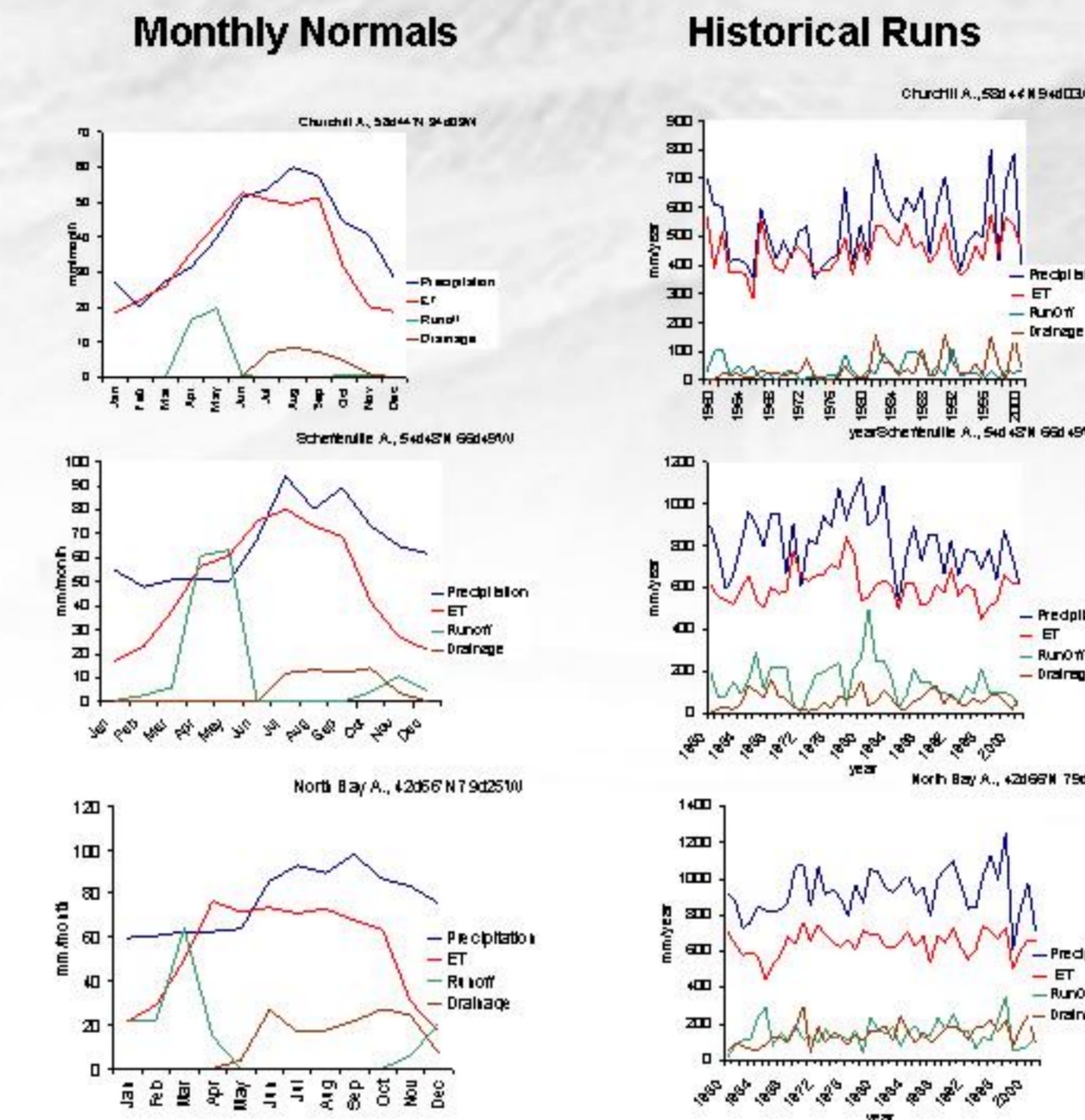
EALCO COUPLED MODEL

Fully coupled carbon-water-energy-nitrogen budget point model parameterized using remote sensing inputs and forced with hourly near surface meteorology.

Wang S., Yinsuo Z. Ecological Assimilation of Land and Climate Observations – the EALCO model (this Workshop);
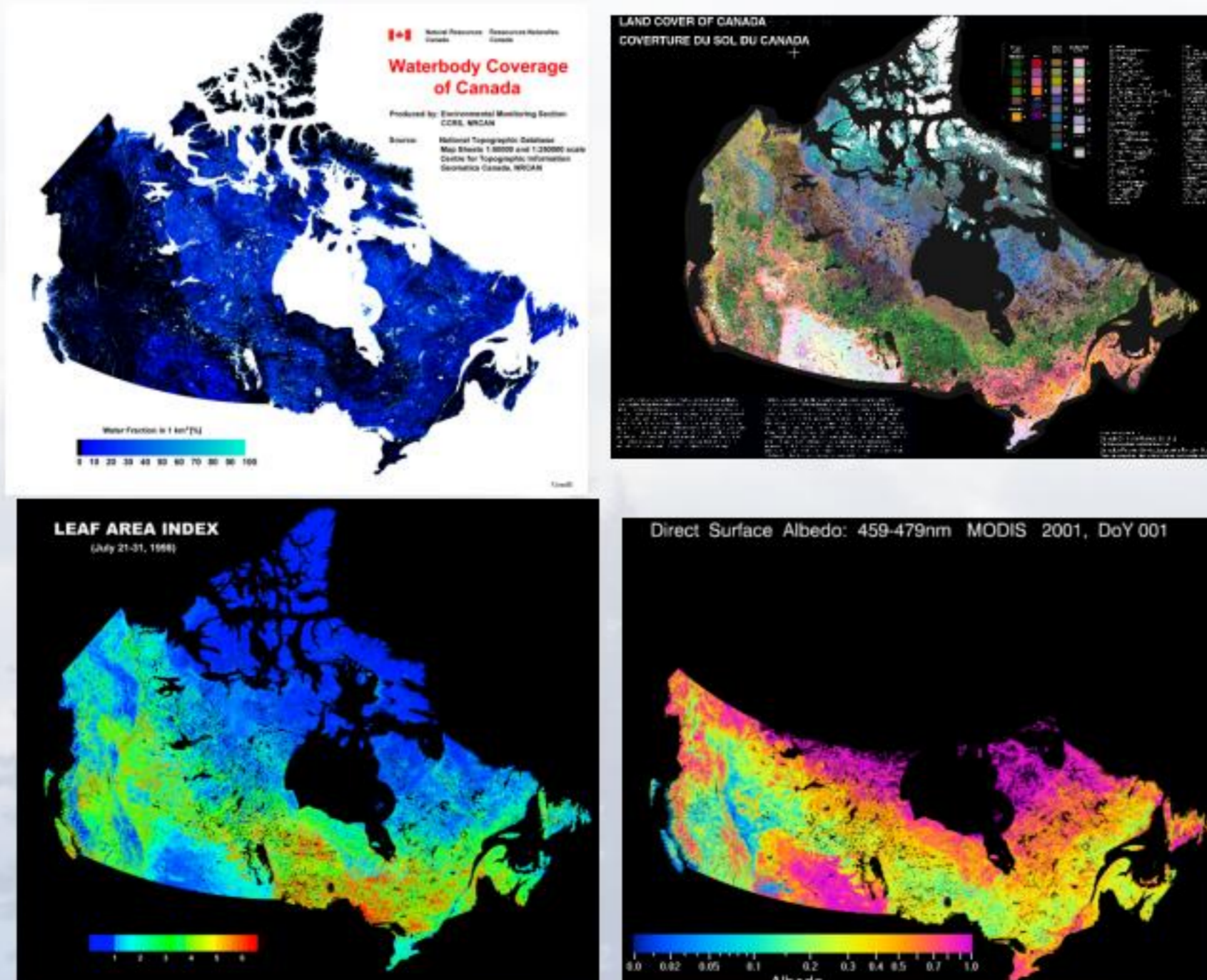
Wang S.,et al. 2002a, Climatic Change, 55: 451-477

PRELIMINARY POINT RESULTS

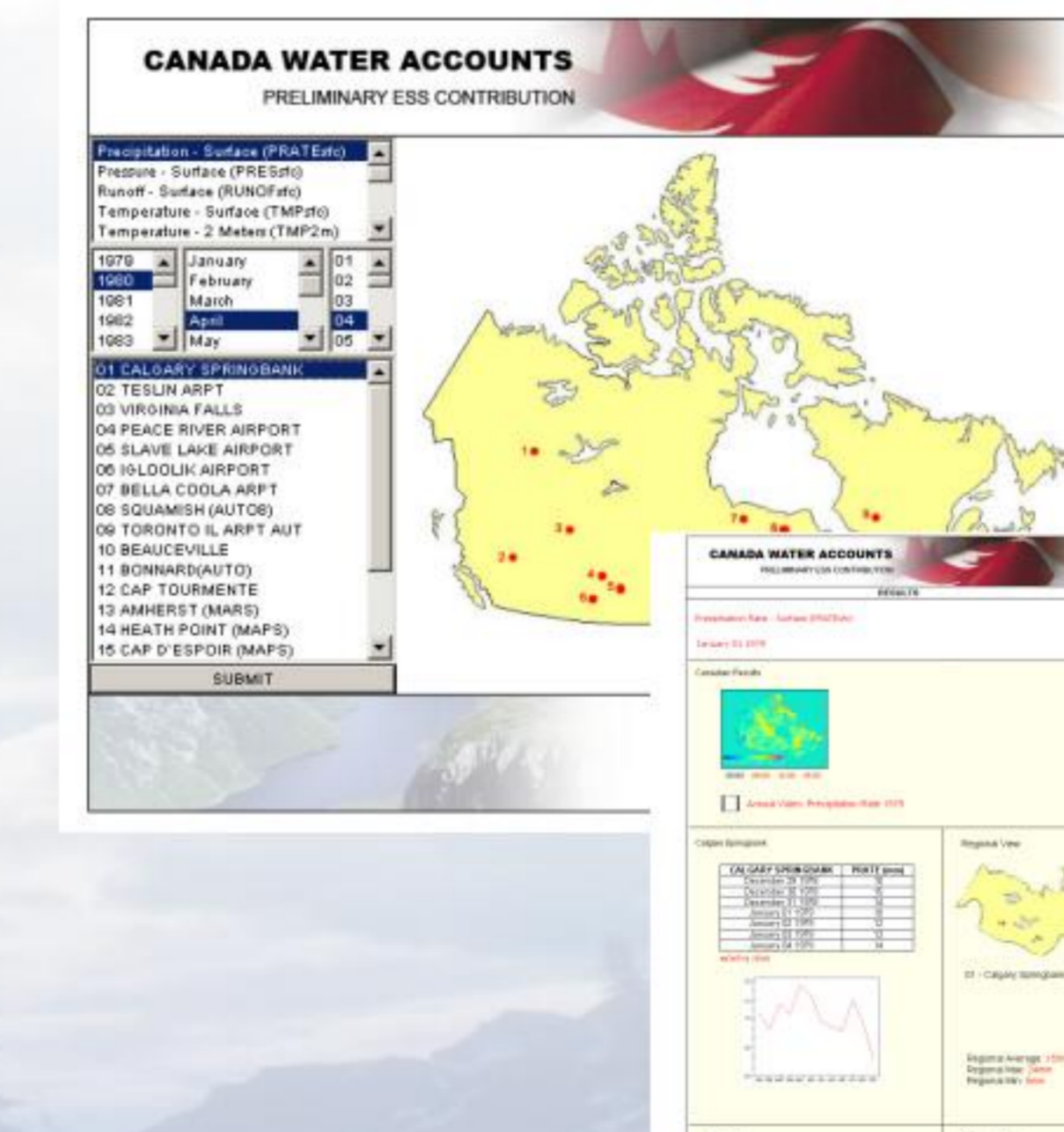**Monthly Normals**   **Historical Runs**

EALCO model water budgets assessment using continuous hourly forcings (1960-2000). Issues:

- Anomaly in Nov-Dec runoff;
- High snowpack sublimation;
- High evaporative fraction in Churchill

REMOTE SENSING INPUTS

WATER BUDGET OUTPUTS

Reducing Canada's vulnerability to climate change

OUTPUTS

Standardized gap-filling algorithms.

Gridded Reanalysis products.

Gap-filled hourly point meteorological data for 150+ (up to 1000) stations.

Point actual ET and water budgets for 150+ stations.

Interface for query and analysis of outputs+forcings.

OUTCOMES

Traceable actual ET being incorporated into water accounts.

Water budget closure analysis underway with StatsCan and MSC

Use of AET within ESS Groundwater Programme.

ONGOING

Production of gridded AET using climate model forcings.

Water budget closure analysis.

Diagnosis using snow cover maps.

Comparison to published empirical ET estimates.