

**Séminaire ven 4 Fév 2011 11h / Seminar Fri Feb 4th 2011 11h**

**Conférencier/Lecturer:** Lei Wen (McGill)

**Sujet/Subject:** A Real Time Drought Monitoring and Forecasting System and its Application

**Présentation/Presentation:** Anglais / English

**Lieu/Room:** Salle des vents (Dorval)

**web:** <http://web-mrb.cmc.ec.gc.ca/mrb/rpn/SEM/>  
**web:** <http://collaboration.cmc.ec.gc.ca/science/rpn/SEM/index.php>

**Abstract**

A real time drought monitoring and forecasting system is developed, tested and implemented over the Canadian Prairies (1,964,000 km<sup>2</sup>). The system uses the VIC (Variable Infiltration Capacity) model to simulate daily soil moisture values starting from 1 January, 1950, and continuously running through present into the future with a lead time up to 35 days.

VIC is driven by daily maximum and minimum air temperature and precipitation from 1,167 prairie meteorological stations, the operational GEM forecast (0-6 days), the NAES (CMC+NCEP) 40-member ensemble forecast (7-15 days), and the operational CMC ensemble seasonal forecast (16-35 days). The novel feature of this methodology is the use of both gauge and model data to drive VIC for real time drought forecasting.

VIC-simulated soil moisture values are used to calculate the Soil Moisture Anomaly Percentage Index (SMAPI), as an indicator for the severity of agricultural and hydrological droughts. SMAPI values can be classified into nine categories that are similar to those of Palmer Drought Severity Index (PDSI; Palmer, 1965). In contrast to many other real time hydrological modeling, this system emphasizes the consistency between the real time and long term soil moisture simulations/conditions. The examination and interpolation of current model conditions in the context of the model's historical climatology can thus be legitimized through the introduction of SMAPI.

The SMAPI is qualitatively compared with three independent drought datasets, which are the North American Drought Monitor (NADM), the Palmer Drought Index (PDI) of Agriculture and Agri-Food Canada, and the PDSI of Environment Canada. The result shows that the SMAPI compares favorably with these datasets and is useful to quantify the most documented prairie drought events of the past 60 years. Our VIC prairie soil moisture simulation is updated daily. The SMAPI results with different temporal scales of daily, monthly, seasonal and annual are publicly accessible online:

<http://www.meteo.mcgill.ca/leiwen/vic/prairies/>