Séminaire **Mardi 15** avril 2014 **11:00h** / Seminar **Tuesday** April 15th 2014 **11:00h**

Subject/ Sujet : Simulations of icing and evaluation of its impact on wind plant power loss

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Abstract/Resumé :

Atmospheric icing on structures such as transmission lines and wind turbines is an important consideration both for design (to withstand the load) and operations. The objectives of this research project are 1) to demonstrate the feasibility of applying a high resolution mesoscale atmospheric model to icing prediction, 2) to develop a coupled atmospheric-ice load model for simulating the icing start-up, duration and amount of icing episodes, and 3) to quantitatively evaluate icing impact on power loss in wind plants.
The regional mesoscale model GEM-LAM was used to model three historical icing events on Mount Washington, where observational data were available. The GEM-LAM simulated cloud properties and other meteorological data compared well with available near-surface observational data. Icing rates from a cylindrical sleeve icing model were compared with the measured icing rates on a cylinder. GEM-LAM was further validated with observations from wind power plants in Gaspé region. Eight of the 27 icing episodes identified in the period of 2008-2010 were simulated with GEM-LAM. It was found that the simulated near surface temperature, relative humidity and wind speed compare well with in-situ observations. These variables, as well as precipitation and cloud related fields, were used as input to icing models to estimate the total ice load on a simple structure (cylinder), and the ice loads were compared with the power loss of a wind plant. The coupled model captures the start-up and duration of accretion ice well, and a good correlation was found between icing episode and reduction of wind power production in the wind plant.