

Séminaire Vendredi 21 Octobre 11h00 / Seminar Friday October 21, 11:00 AM

Conférencier/Lecturer: Debasish Pai Mazumder (Centre ESCER)

Sujet/Subject: Theoretical assessment of uncertainty in regional averages due to network density and design

Présentation/Presentation: Anglais / English

Lieu/Room: Salle des vents (Dorval)

wiki: [https://wiki.cmc.ec.gc.ca/wiki/RPN Seminars](https://wiki.cmc.ec.gc.ca/wiki/RPN_Seminars)

iweb: <http://web-mrb.cmc.ec.gc.ca/mrb/rpn/SEM/>

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

Résumé / Abstract:

Weather Research and Forecasting (WRF) model simulations are performed over Russia for July and December 2005, 2006 and 2007 to create a “dataset” to assess the impact of network density and design on regional averages. Based on the values at all WRF grid-points regional averages for various quantities are calculated for $2.8^{\circ} \times 2.8^{\circ}$ areas as the “reference”. Regional averages determined based on 40 artificial networks and 411 “sites” that correspond to the locations of a real network, are compared with the reference regional averages. The 40 networks encompass ten networks of 500, 400, 200, or 100 different randomly taken WRF-grid-points as “sites”.

The real network’s site distribution misrepresents the landscape. This misrepresentation leads to errors in regional averages that show geographical and temporal trends for most quantities: errors are lower over shores of large lakes than coasts and lowest over flatland followed by low and high mountain ranges; offsets in timing occur during frontal passages when several sites are passed at nearly the same time. Generally, the real network underestimates regional averages of sea-level pressure, wind-speed, and precipitation over Russia up to 4.8 hPa (4.8 hPa), 0.7m/s (0.5m/s), and 0.2mm/d (0.5mm/d) , and overestimates regional averages of 2-m temperature, downward shortwave radiation and soil-temperature over Russia up to 1.9K (1.4K), 19Wm^{-2} ,

(14Wm^{-2}), and 1.5K (1.8K) in July (December). The low density of the ten 100-sites-networks causes difficulties for sea-level pressure. Regional averages obtained from the 30 networks with 200 or more randomly distributed sites represent the reference regional averages, trends and variability for all quantities well.