

Séminaire vendredi le 8 janvier 2016 11:00 / Seminar Friday January 8th 2016
11:00h

Sujet/Subject: Internal variability of fine-scale components of meteorological fields in extended-range limited-area model simulations with atmospheric and surface nudging.

Langue/language : Anglais/English

Conférencier/Lecturer: Leo Separovic (RPN)

Résumé/Abstract:

Internal variability (IV) in dynamical downscaling with limited-area models (LAMs) represents a source of error inherent to the downscaled fields, which originates from the sensitive dependence of the models to arbitrarily small modifications. If IV is large it may impose the need for probabilistic verification of the downscaled information. Atmospheric spectral nudging (ASN) can reduce IV in LAMs as it constrains the large-scale components of LAM fields in the interior of the computational domain and thus prevents any considerable penetration of sensitively dependent deviations into the range of large scales. Using initial condition ensembles, the present study quantifies the impact of ASN on IV in LAM simulations in the range of fine scales that are not controlled by spectral nudging. Four simulation configurations that all include strong ASN but differ in the nudging settings are considered. In the fifth configuration, grid nudging of land surface variables toward high-resolution surface analyses is also applied. The results show that the IV at scales larger than 300 km can be suppressed by selecting an appropriate ASN setup. At scales between 300 and 30 km, however, in all configurations, the hourly near-surface temperature, humidity, and winds are only partly reproducible. Nudging the land surface variables is found to have the potential to significantly reduce IV, particularly for fine-scale temperature and humidity. On the other hand, hourly precipitation accumulations at these scales are generally irreproducible in all configurations, and probabilistic approach to downscaling precipitation is therefore recommended.