

**PARALLEL SESSION A : BENEFITS OF DOWNSCALING  
A1: ADDED VALUE OF DOWNSCALLING**

**Challenges in the quest for added value of climate dynamical downscaling: Evidence of added value in North American regional climate model simulations with increasing horizontal resolutions.**

**René LAPRISE**

Université du Québec (UQAM), Montréal - Canada

The added value afforded by the use high-resolution regional climate models (RCMs) to perform dynamical downscaling of coarse-resolution boundary conditions has not yet been fully explored and efforts in determining this added value are too few. This presentation will first review some of the challenges in determining RCMs' added value. Then, recent simulations performed with CRCM5 over North America using grid meshes of 0.44°, 0.22° and 0.11° will be compared with available observations, with a focus on five specific regional weather phenomena. The analysis shows that the orographic precipitation on the West Coast of North America is enhanced and more realistic, with two rainy bands in the finer resolution simulation. The spatial distribution of precipitation in August and the high frequency of summer precipitation extremes over southwestern United States reveal that the North American monsoon is improved with increasing resolution. Only the finer RCM simulation shows skill at producing snowbelts around the Great Lakes, as a result of an adequate simulation of lake-effect snow. A comparison of simulated wind roses in the St. Lawrence River Valley (SLRV) indicates that, due to an improved representation of complex orography, the finer mesh simulation is able to reproduce wind channeling, which is an important factor for freezing rain occurrence in the SLRV. Finally, the simulation of the summer land-sea breezes at higher resolution leads to added value in the diurnal cycle of precipitation over the Florida peninsula and the Caribbean islands. Overall, almost systematic improvements are found in the finer resolution simulations.

René Laprise<sup>1</sup>, Philippe Lucas-Picher<sup>1</sup>

<sup>1</sup> Université du Québec (UQAM), Montréal , Canada