Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09783, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09783
EGU General Assembly 2008

Climate Change Study on the Châteauguay River Watershed: Lessons Learned from a Multi Model Experiment

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Climate change (CC) is in progress and affects many economic, social and ecological developments. In Southern Québec Yagouti et. al (2007) show that the surface air temperature has increased over 1960-2005 and that this warming is significantly evident in the western, southern and central parts of the province. In the summer significant increasing temperature trends are found and precipitation indices indicate decreasing trends. Climate change scenarios produced at Ouranos show that in the future summer temperature shall increase while no significant change are obtained on precipitation amount. This could lead to dramatic consequences on water budget. Thus, reliable assessment of the potential CC-impacts is necessary on a regional level to develop suitable adaptation strategies to minimize adverse effects and to optimize possible benefits on water management issues. One of these issues, that is discussed in that paper, concerns increasing agriculture water requirements under stressed water conditions to optimize possible benefit.

The scope of the study is to investigate how a hydro-climatological modelling exercise could be used to assess specific water issues in a southern Québec watershed: the Châteauguay watershed. Thus, it aims to look at different model responses regarding summer water shortages and irrigation needs and to stimulate water authorities and managers thoughts about climate change adaptive planning options. The methodolo-

gies developed in this study involve (1) the use a regional climate model providing climate information that is subsequently incorporated as forcing input (a) to two hydrological models (Hydrotel (Fortin et al. 2001) and Promet (Mauser 2000) and (b) to the FAO irrigation model (Allen et al. 1998); (2) an assessment of climate change uncertainties via a sensibility analysis performed by using different climate scenarios techniques (delta from different GCMs vs direct RCM output).

Irregardless of the different climate scenarios techniques and the hydrological model used, results show that under 2050 climate change scenarios summer flows are projected to decrease while irrigation need might increase dramatically. Therefore, the lesson learned stemming from this modelling exercise reinforces the principle of forward thinking adaptive watershed management strategies (in this case irrigation) and also shows that before proposing any adaptive solution the issue needs to be assessed scientifically (in terms of water budget) as well as socio-economically thus respecting the multi-usage and integrated watershed management contexts in southern Quebec.