The authors would like to thank the anonymous reviewer for his/her comments. Herewith our answers to his/her specific comments:

Scientific issues

1. Disaggregation model calibration

The end of the sentence (P. 8184, lines 21-23) will be modified to clarify the idea: "the resolution of the observations might have a non-negligible impact **on the validation results**."

In response to the following comment: "*Then, the ideas in the subsequent sentences (lines 23-27) are not clearly expressed. These sentences seem to suggest that the resolution of the observations have an impact on the calibration of disaggregation model parameters. This is an important issue, and it should be more explicitly addressed in the paper.*", the authors would like to argue that calibration of model parameters always depends on the available data, no matter the modelling exercise. The authors think that this "issue" is common and that there is no need to develop more in the paper on this topic.

The paragraph (P. 8175, lines 9-13) will be more descriptive: "The parameter values were estimated for the southeast region of the United-States since there was a large amount of precipitation data at a high spatial resolution. **A total of 9216 3.8-km pixels, covering about 130,000 km^2, from the National Centers for Environmental Prediction (NCEP) Stage IV project (Lin and Mitchell, 2005) were used for the calibration. More than 5 million wet pixels-days were available during the four-year calibration period (2002-2005; Gagnon, 2012). The Stage IV dataset covers only a small part of the southernmost region of Québec (near the study area) with 4.4-km pixels. Parameter values estimated for about 60,000 wet pixel-days in summer in that region of Québec were similar to** ~~A comparison with a small dataset covering southern Québec (near the study area) suggested that the parameters~~ those estimated for ~~the~~ south-eastern United-States ~~could be used for summer precipitation in southern Québec~~ (Gagnon, 2012). **In this work, the parameter values from south-eastern United-States are used due to the larger calibration dataset.**"

The mention of the four-year calibration period in section 4.1 (P. 8178, lines 18-20) is still relevant and will not be removed.

2. Increase in CRCM resolution

A paragraph will be added before the last paragraph of the Conclusion (before P.8185, Line 22): "Climate models are continuously improving their physical representation and their spatial resolution. For example, the CRCM now runs at a 15-km horizontal resolution. Nonetheless, stochastic disaggregation models will remain relevant since it

produces a distribution of results for a unique event and there will always be a need for high-resolution rainfall estimates."

Technical corrections

1. Language issues

   - P. 8172, lines 26-28: The sentence will be modified accordingly.

   - P. 8173, lines 1-3: "The simulated data come from three simulations~~, referenced as *afx*, *agr* and *aha*,~~ of the Canadian RCM version 4.2.3 (CRCM, Caya and Laprise, 1999; de Elía and Côté, 2010; Paquin, 2010)**, referred as *afx*, *agr* and *aha***."

   - P. 8177, lines 5-7: "**In this work,** ~~The first use of~~ the disaggregation model **is applied** ~~in this work is~~ to eliminate, or at least reduce the spatial resolution bias**. This would allow a proper evaluation of** ~~to properly evaluate~~ the physical bias of the climate simulation **in the area of interest**."

   - P. 8181, lines 18-20: "**Figure 4 illustrates AMDPs (May to October, 1961-2000) extracted from the observations, the raw climate simulations and the 5th, 50th and 95th percentiles of the disaggregated series.**"

   - P. 8182, lines 7-11 + entire Section 5.1: The reference to the corresponding term of Equation 6 will be added every time a source of bias is mentioned.

2. Precisions needed

   - P. 8172, line 16: "This grid has a 0.1 resolution **(approximately 10 km)** and …"

   - P. 8173, lines 18-20: "Five by five CRCM tiles, covering the Yamaska watershed, are disaggregated, but the outcomes of only one tile (tile (3,4) of the 5×5 computational domain), covering the studied watershed, are retained for the analyses (Fig. 1**, in red**)."

   - Color code will be systematically mentioned when referring to Fig.1.

   - Table 1: First sentence of the title will be modified: "Estimation of the sources of errors (Eq. 6) for the **highest** ~~maximum~~ daily precipitation **value** in the **entire** 1961–2000 period (May to October only).". The text (P.8181, Lines 26-28) will be modified as well: "In order to identify the bias of the climate simulations for the most extreme events, Table 1 summarizes for each simulation the values of the terms of Eq. (6) for the **highest** daily **precipitation** ~~maximum~~ over the **entire** 1961–2000 period."

- Figure 3: Difference will be expressed in relative terms with respect to the disaggregated data, as asked by the reviewer.

- Figure 5: Symbol will be added.

- Captions of Figures 3 and 6 will be modified according to the reviewer's suggestions.

3. Typing errors will be corrected.

Additional references

Lin, Y., and Mitchell, K.E.: The NCEP Stage II/IV hourly precipitation analyses: development and applications. Preprints, 19th Conf. on Hydrology, American Meteorological Society, San Diego, CA, 9-13 January 2005, Paper 1.2, 2005.