



An algorithm for integrating satellite precipitation estimates with in situ precipitation data on a pentad time scale

Achan Lin and Xiaolan L. Wang

Climate Research Division, Science and Technology Branch, Environment Canada, Toronto, Canada (xiaolan.wang@ec.gc.ca)

This study proposes a simple but efficient algorithm for constructing pentad precipitation maps for Canada by integrating the popularly-used GPCP 1dd v1.2 daily precipitation data with the Canadian in-situ gauge daily precipitation data. This algorithm consists of two major steps. First, the GPCP data were adjusted to remove biases using the gauge data with consideration of the differences between snowfall and rainfall data, and of the gauge station density. Then, a blended pentad precipitation field was constructed using the adjusted GPCP precipitation field and the differences between the gauge and adjusted GPCP precipitation fields (residual kriging). Using a set of standard statistical skill measures, the algorithm is evaluated with the evaluation data set being much larger than the training data set, to test the skill of the algorithm in producing precipitation fields over gauge sparse regions. The evaluation results show that the proposed algorithm gives better representation of the pentad precipitation field than using the gauge data or the GPCP precipitation estimates alone; it is associated smaller root mean square errors and higher correlation skill scores. This algorithm was used to produce a blended pentad precipitation data set for the period 1997-2007 for Canada. It can be used for other regions around the world. The results also show that GPCP always underestimates snowfall, while it overestimates rainfall in July-September but underestimate rainfall in all the other months.