



Analyses on transferability of Degree-Day Model and simple Energy Balance Model – in case of Urumqi Glacier No. 1

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Glacier mass balance is the direct reflection of local climate regime and links glacier with atmosphere/hydrology. In the context of global warming, glacial mass balance modeling in regional scale became a hotspot field. In this study, we chose Urumqi Glacier No. 1 (UG1) as the experimental site, setting up experiments to examine the transferability in space and time of Degree-Day Model (DDM) and simple Energy Balance Model (sEBM), respectively. As UG1 being composed by two separated branches and with systematic mass balance and meteorological observations longer than 50 years, it is an excellent experimental field to test the transferability of models. The performance of models was evaluated by comparing the simulated mass balance with observed data. The results indicated that the temporal transferability of sEBM is satisfying and its spatial transferability is not such good; for DDM, the transferability is bad both in space and time for UG1. Combining with theoretical analysis, (1) the reasons for the differences between the transferability of sEBM and DDM were investigated, (2) the preconditions to utilize sEBM/DDM to simulate glacier melting in regional scale were deduced, and (3) the potential error in regional modeling studies by both models were discussed.