



The Effect of Climate on Mean Annual Groundwater Recharge Estimation at Ungauged Watersheds

Ching-Fu Chang

University of California, Berkeley, Civil and Environmental Engineering, United States (chingfuyc@berkeley.edu)

Previous studies have reviewed and compared multiple methods for mean annual groundwater recharge estimation at regional scales, but the aforementioned methods rely on in-situ data, while a great amount of watersheds worldwide still remain effectively ungauged (*i.e.*, ungauged, poorly gauged, or previously gauged). Borrowing information from gauged watersheds, also known as regionalization, has received increasing popularity in hydrology for runoff prediction at ungauged watersheds, yet less attention has been paid to groundwater recharge. In this study, a Bayesian framework is adopted to condition recharge estimates upon recharge data from other gauged watersheds (the *ex-situ* data). Furthermore, the estimates are conditioned upon climate variables, which were found to be among the primary driving forces of large-scaled averaged hydrological responses, to show the effect of climate on recharge estimation. The results suggest that an important factor is the aridity of the ungauged watershed of interest. Conditioning on climate variables significantly reduces uncertainty of the estimates, but at arid watersheds with particularly low recharge values, such conditioning may lead to overestimation. A concluding remark presents the advantages and limitations of the Bayesian statistical model proposed in this study.