ABSTRACT

THE EFFECT OF UPWIND OROGRAPHIC BARRIERS ON
THE DISTRIBUTION OF SNOW WATER Equivalent
ON THE MAMMOTH CREEK WATERSHED

by

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An estimate of the spatial distribution of snow
water equivalent can help improve the simulation of a snow-
melt hydrograph from a mountainous watershed. Converting
point measurements of snow water content to an estimate of
the spatial distribution of snow water equivalent in a moun-
tainous watershed is a difficult problem. The usual ap-
proach is to develop a regression equation based on elevation.
However, orographic precipitation depends on terrain
slope, wind flow, and the number and height of topographic
barriers upwind of the measuring site. Therefore, the topog-
raphy outside of a watershed can influence the distribution
of snow within the watershed.

Some parameters are developed to assess the effect
of upwind topography on the spatial distribution of snow
water equivalent in a mountainous watershed. These parameters can be estimated from topographic maps or from Digital Elevation Models.

The method is applied to the Mammoth Creek watershed in the eastern Sierra Nevada of California. The results of the method are compared to a method that relies on within-basin elevation data only.