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Comparison of radar data versus rainfall data

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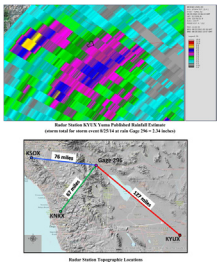
GRAPHICAL ABSTRACT



ABSTRACT

Doppler radar data are increasingly used in rainfall-runoff synthesis studies, perhaps due to radar data availability, among other factors. However, the veracity of the radar data are often a topic of concern. In this paper, three Doppler radar outcomes developed by the United States National Weather Service at three radar sites are examined and compared to actual rain gage data for two separate severe storm events in order to assess accuracy in the published radar estimates of rainfall. Because the subject storms were very intense rainfall events lasting approximately one hour in duration, direct comparisons between the three radar gages themselves can be made, as well as a comparison to rain gage data at a rain gage location subjected to the same storm cells. It is shown that topographic interference with the radar outcomes can be a significant factor leading to differences between radar and rain gage readings, and that care is needed in calibrating radar outcomes using available rain gage data in order to interpolate rainfall estimates between rain gages using the spatial variation observed in the radar readings. The paper establishes and describes

- the need for "ground-truthing" of radar data, and
- possible errors due to topographic interference.

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Rainfall data accuracy check

Method details

Doppler radar information is increasingly being used to estimate rainfall quantities. However, while the graphical outcomes are attractive, the data values may be questionable. Care is needed to "ground truth" the radar data by adjusting it to conform to available rain gage data where possible. In this paper, three Doppler radar site outcomes for two severe 1-h duration rainstorms that occurred in Southern California, USA, are examined as to consistency in their rainfall estimates. Considerable variation is seen in the radar estimates for the same storm and location. Ground interference of the radar is suggested as a possible cause in this case, but the variation between rainfall data and radar estimates of rainfall is shown to vary considerably even where there is little to no topographic interference.

Study location

The study site is located in the City of La Quinta, CA, a desert environment municipality at the foot of the Santa Rosa Mountains on the floor of the Coachella Valley (see Fig. 1). Average monthly temperature

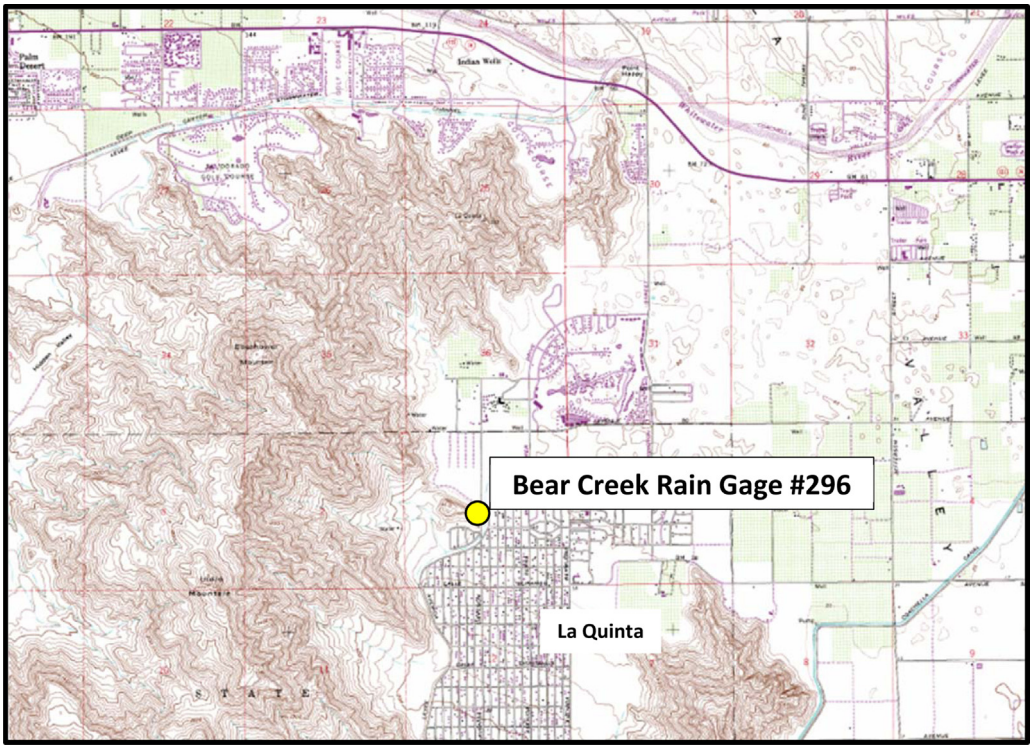

Fig. 1. Subject rain gage location.