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Hydrol. Earth Syst. Sci., 4, 531-543, 2000

[www.hydrol-earth-syst-sci.net/4/531/2000/](http://www.hydrol-earth-syst-sci.net/4/531/2000/)

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## Accuracy of rainfall measurement for scales of hydrological interest

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**Abstract.** The dense network of 49 raingauges over the 135 km<sup>2</sup> Brue catchment in Somerset, England is used to examine the accuracy of rainfall estimates obtained from raingauges and from weather radar. Methods for data quality control and classification of precipitation types are first described. A super-dense network comprising eight gauges within a 2 km grid square is employed to obtain a "true value" of rainfall against which the 2 km radar grid and a single "typical gauge" estimate can be compared. Accuracy is assessed as a function of rainfall intensity, for different periods of time-integration (15 minutes, 1 hour and 1 day) and for two 8-gauge networks in areas of low and high relief. In a similar way, the catchment gauge network is used to provide the "true catchment rainfall" and the accuracy of a radar estimate (an area-weighted average of radar pixel values) and a single "typical gauge" estimate of catchment rainfall evaluated as a function of rainfall intensity. A single gauge gives a standard error of estimate for rainfall in a 2 km square and over the catchment of 33% and 65% respectively, at rain rates of 4 mm in 15 minutes. Radar data at 2 km resolution give corresponding errors of 50% and 55%. This illustrates the benefit of using radar when estimating catchment scale rainfall. A companion paper (Wood *et al.*, 2000) considers the accuracy of rainfall estimates obtained using raingauge and radar in combination.

**Keywords:** rainfall, accuracy, raingauge, radar

[Final Revised Paper](#) (PDF, 5759 KB)

Citation: Wood, S. J., Jones, D. A., and Moore, R. J.: Accuracy of rainfall measurement for scales of hydrological interest, Hydrol. Earth Syst. Sci., 4, 531-543, 2000. [Bibtex](#) [EndNote](#) [Reference Manager](#)

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