

# Merged rainfall fields for continuous simulation modelling (CSM)

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## **Abstract**

Long sequences of rainfall at fine spatial and temporal detail are increasingly required, not only for hydrological studies, but also to provide inputs for models of crop growth, landfills, tailings dams, liquid waste disposal on land and other environmentally sensitive projects. Rainfall information derived from rain gauges, radar or satellites may not individually be adequate to meet the detail required by hydrological models or other water resource studies. Therefore, a suitable technique is required to estimate rainfall at finer spatial and temporal resolutions. Different techniques have been developed to merge rainfall information from rain gauges, radar and satellites in order to obtain the 'best' estimate of the 'true' rainfall field. However, the length of the radar and satellite estimated rainfall records is currently limited. In this study, the mean areal merged rainfall, derived from rain gauges and radar, was estimated for 26 subcatchments in the Liebenbergsvlei catchment, which is a research catchment, in South Africa for the period when radar data were available. By using the relationships derived between the merged rainfall and rain-gauge data, improved subcatchment rainfall may be estimated using the historical data from rain gauges located in and around the subcatchments. In most of the subcatchments the relationship between the daily mean areal merged rainfall of the subcatchment and the daily rainfall data from rain gauges is strong ( $R^2 \geq 0.5$ ). The relationship between the daily rain gauges and mean areal merged rainfall of the subcatchments is used to adjust the historical rainfall data from the daily rain gauges in order to estimate long sequences of subcatchment rainfall for input to continuous simulation models (CSMs).

**Keywords:** rain gauges, radar, rainfall, merged rainfall fields, catchment rainfall