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The effect of spatial correlation and variance of saturated conductivity on overland flow connection between hillslope and stream

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Experimental field measurements in SE Australian forests of plot-scale rainfall runoff generation and saturated hydraulic conductivity have shown high runoff rates despite the spatially averaged saturated hydraulic conductivity being higher than the spatially averaged rainfall rate. These results are attributed to the very high variance and spatial correlation of saturated hydraulic conductivity in these macroporus, but strongly water repellent, forest soils. The effect of variance and spatial correlation of saturated conductivity on plot scale runoff generation is explored numerically in this presentation, and compared to field data. In combination these soil properties alter the average "connected length" of overland flow pathways and strongly affect the runoff ratio. The implications for scaling of plot scale runoff experiments are explored.