

# *The RAL Seminar Series*



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## **A wavelet-based spatial verification approach to account for the variation in scale representativeness of observation networks**

by

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*Foothills Lab Building 2, Room 1022*  
*3:00 p.m.*

Forecasts defined over spatial domains are often characterized by a coherent spatial structure and the presence of features. Verification methods ought to account for this intrinsic spatial structure. When observations at specific geographical locations are used for the verification, this issue becomes particularly challenging because of the variation in scale representativeness of the observation network across the domain.

This study addresses some of the issues related to the verification of spatial precipitation forecasts against a network of gauges unevenly distributed in space. A new wavelet-based method to reconstruct a precipitation field from sparse gauge observations is introduced. The reconstructed field preserves the observed value at the observation location, reproduces precipitation features and represents the coherent spatial structure characterising the field, and accounts for the network density, so that more details are shown where the network is more dense. The reconstructed fields are used to perform a scale-oriented verification. Different scale components are isolated by 2D Haar wavelet transforms. To account for the variation in scale representativeness for unevenly located observations, in regions where the network is sparse the scales not represented in the observations are disregarded in the forecast prior verification. Scale-based verification statistics are then evaluated to compare the forecast and observation scale structure, to assess the scale dependency of the error and to analyse the no skill to skill transition scale.