# Analysis of complex soil variation in the landscape using wavelets. (S05-lark031449-Oral)

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## Abstract:

Many soil properties and processes vary in the landscape in a complex and intermittent way, and the nature of this variation may be scale dependent. It has been shown that wavelet transforms may be useful for the analysis of data on such complex variation. In this paper a recent study on the spatial variability of nitrous oxide fluxes from field soils will be presented. Wavelet analysis was used to characterize complex and intermittent variation in fluxes. This can be done in two ways. First, by partitioning the variance of flux over the whole data set into scale and location-specific components. Second, by testing each (location and scale-specific) wavelet coefficient for significance against the measurement error, intermittent processes are characterized by relatively sparse significant wavelet coefficients. It was shown that intermittency in nitrous oxide fluxes was linked to topography and parent material. Wavelet analysis of the covariation of nitrous oxide flux and soil properties showed that the relationship between a soil factor and this process may be localized and scale dependent. Some properties were shown to be correlated with nitrous oxide flux only at fine scales, while other properties were only correlated with flux at coarser scales. The implications of this analysis both for modelling complex processes and for sampling intermittent phenomena in the soil landscape will be discussed.

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