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Effect of spatial variability on solute velocity and dispersion in two soils of the Argentinian Pampas

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Predicting how solutes move through the unsaturated zone is essential to determine the potential risk of groundwater contamination (Costa et al., 1994). The estimation of the spatial variability of solute transport parameters, such as velocity and dispersion, enables a more accurate understanding of transport processes. Apparent electrical conductivity (ECa) has been used to characterize the spatial behavior of soil properties. The objective of this study was to characterize the spatial variability of soil transport parameters at field scale using ECa measurements. ECa measurements of 42 ha (Tres Arroyos) and 50 ha (Balcarce) farms were collected for the top 0-30 cm (ECa(s)) soil using the Veris® 3100. ECa maps were generated using geostatistical interpolation techniques. From these maps, three general areas were delineated, named high, medium, and low ECa zones. At each zone, three sub samples were collected. Soil samples were taken at 0-30 cm. Clay content and organic matter (OM) was analyzed. The transport assay was performed in the laboratory using undisturbed soil columns, under controlled conditions of T ° (22 ° C).Br- determinations were performed with a specific Br- electrode. The breakthrough curves were fitted using the model CXTFIT 2.1 (Toride et al., 1999) to estimate the transport parameters Velocity (V) and Dispersion (D). In this study we found no statistical significant differences for V and D between treatments. Also, there were no differences in V and D between sites. The average V and D value was 9.3 cm h-1 and 357.5 cm2 h-2, respectively. Despite finding statistically significant differences between treatments for the other measured physical and chemical properties, in our work it was not possible to detect the spatial variability of solute transport parameters.