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Comparison of multifractal parameters form adsorption isotherms, desorption isotherms and mercury intrusion curves

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The soil pore space is composed of a continuum of pores extremely variable in size, which range from equivalent diameter sizes smaller than nanometers to an upper limit of the order of centimeters. So, it is quite typical for soil pore space to display a size range of more than a factor of 10^6 in scale. Nitrogen sorption and mercury injection provide pores size distributions in the range from about 0.1 to 0.001 μm and 150 to 0.005 μm, respectively. The aims of this study were to evaluate the scaling properties of nitrogen adsorption isotherms (NAI), nitrogen desorption isotherms (NDI) and mercury intrusion porosimetry (MIP) curves of agricultural soils from "La Pampa húmeda", in the north of Buenos Aires and south of Santa Fé provinces, Argentina. Both NAIs, NDIs and MIPs exhibited multifractal behavior but its scaling properties were different so that the multifractality index, assessed by the width of the generalized dimension and the singularity spectra ranked as follows: NAI $>$ NDI $>$ MIP. Also, parameterization by the Hurst exponent indicates NAIs were less persistent than NDIs and in turn, these were less persistent than MIPs. The multfractal approach was useful to characterize the heterogeneity of various domains of the soil nano- micro- and mesopore system at the scale of small aggregates.