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Strength regain in soil aggregate beds by swelling and shrinkage

(get PDF )

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abstract Strength regain in aggregate beds as a consequence of wetting and drying cycles was studied in two Andisols and one Mollisol from Chile, collected at two depths (0-10 and 40-60 cm). In the Mollisol, wetting and drying cycles promoted an increase of mechanical parameters (cohesion and precompression stress value), associated with increase of bulk density. The Andisols showed the same tendency, but in some coarse aggregate beds the measured values decreased or remained constant. After six cycles of wetting and drying, the restructuring of the aggregate beds from the Mollisol resembled more the measured properties of non-disturbed samples than the identically prepared samples from the Andisols. The change of pore water pressure during mechanical tests depends on the soil development: the Mollisol is sensitive to external load, during compression and shear tests the pore water pressure changed intensely, while in the younger Andisol, irrespective of the stress applied, the pore water pressure did not change significantly. It is possible to find a strength regain in natural aggregate beds, but further investigations are necessary to understand the processes of pore formation and functioning in Andisols and their role in the pore water pressure behaviour.

keywords precompression stress, cohesion, angle of friction, soil structure, bulk density