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Effects of long-term irrigation with treated wastewater on the hydraulic properties of a clayey soil

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With increasing water scarcity, treated wastewater (TW) appears as an attractive alternative source of water for irrigation, especially in arid and semi-arid regions where freshwater is naturally scarce. However, it seems that long-term use of TW for irrigation of orchards planted on heavy soils cause to yield reduction and crop damages.
The working assumption of this study is that long-term use of TW for irrigation of clayey soils causes significant changes in the soil hydraulic properties. Such changes might affect the water regime in the root zone, and the hydrological balance components at the field scale.
Combining between analysis of data from a set of complementary laboratory experiments involving infiltration, evaporation, swelling and saturated hydraulic conductivity measurements, and HYDRUS simulations provide quantitative estimates of the impact of TW for irrigation on the soil hydraulic properties.
Significant reduction of saturated hydraulic conductivity and infiltrability as well as changes in water retention curve parameters of TW-irrigated soils compared to freshwater irrigated ones are observed.