



Spatio-temporal soil moisture dynamics in Plastic Mulched Fields: a study with Hydrus-2D and Electrical Resistivity Tomography

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Extreme hydrological events in dry-land lead to a high risk of soil degradation and to adjust the associated intense soil moisture fluctuations (SMF) in agricultural systems, it is necessary to evaluate the influences of different agricultural practices. Partial plastic mulching (PM) is a widely used practice in dry-land. However, the spatial variation of soil moisture dynamics in field with plastic mulching and its influence on SMF in different positions of the soil profile is not well documented. In this study, Hydrus-2D and electrical resistance tomography (ERT) were used to address those two questions in a rain-fed, semi-arid field on the Loess Plateau of China. Results obtained from Hydrus-2D and ERT suggested that application of plastic film lead to relative stable SMF in mulched strip compared to the bare strip in the surface layer, however, the difference between mulched strip and bare strip is not obvious in the subsurface layer. Nevertheless, the comparison between PM and no-mulch filed (NM) with Hydrus-2D clearly showed that the PM treatment stabilized the SMF both in the covered and bare parts of the field. We therefore conclude that PM is an effective agricultural practice to alleviate the stress caused by intense SMF in rain-fed, semi-arid areas.