Supplement material

Do surface lateral flows matter for data assimilation of soil moisture observations into hyperresolution land models?

Yohei Sawada[1,2],

[1] Institute of Engineering Innovation, the University of Tokyo, Tokyo, Japan

[2] Meteorological Research Institute, Japan Meteorological Agency, Tsukuba, Japan

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Figures S1 to S7

Introduction

This supporting information provides the figures which support the findings shown in the main article.

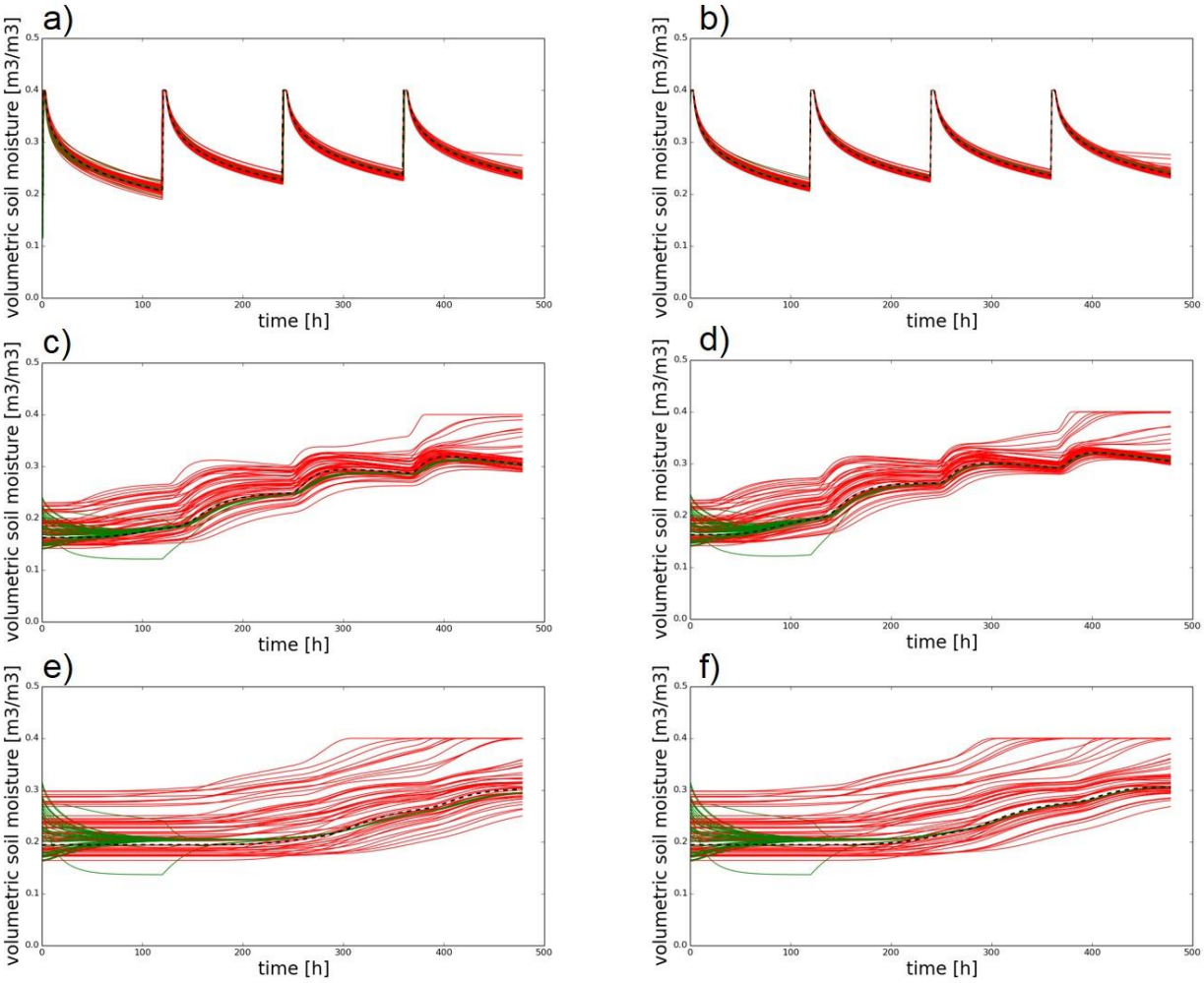

Figure S1. Time series of volumetric soil moisture simulated by the synthetic reference run (black dashed line), the NoDA experiment (red lines), and the DA experiment (green lines) in the LOW_K-UP_O experiment at a) x=1500m, z=0.05m; (b) x=2500m, z=0.05m; c) x=1500m, z=1.0m; (d) x=2500m, z=1.0m; e) x=1500m, z=1.5m; (f) x=2500m, z=1.5m. . In the DA experiment, initial guesses are used for this figure.

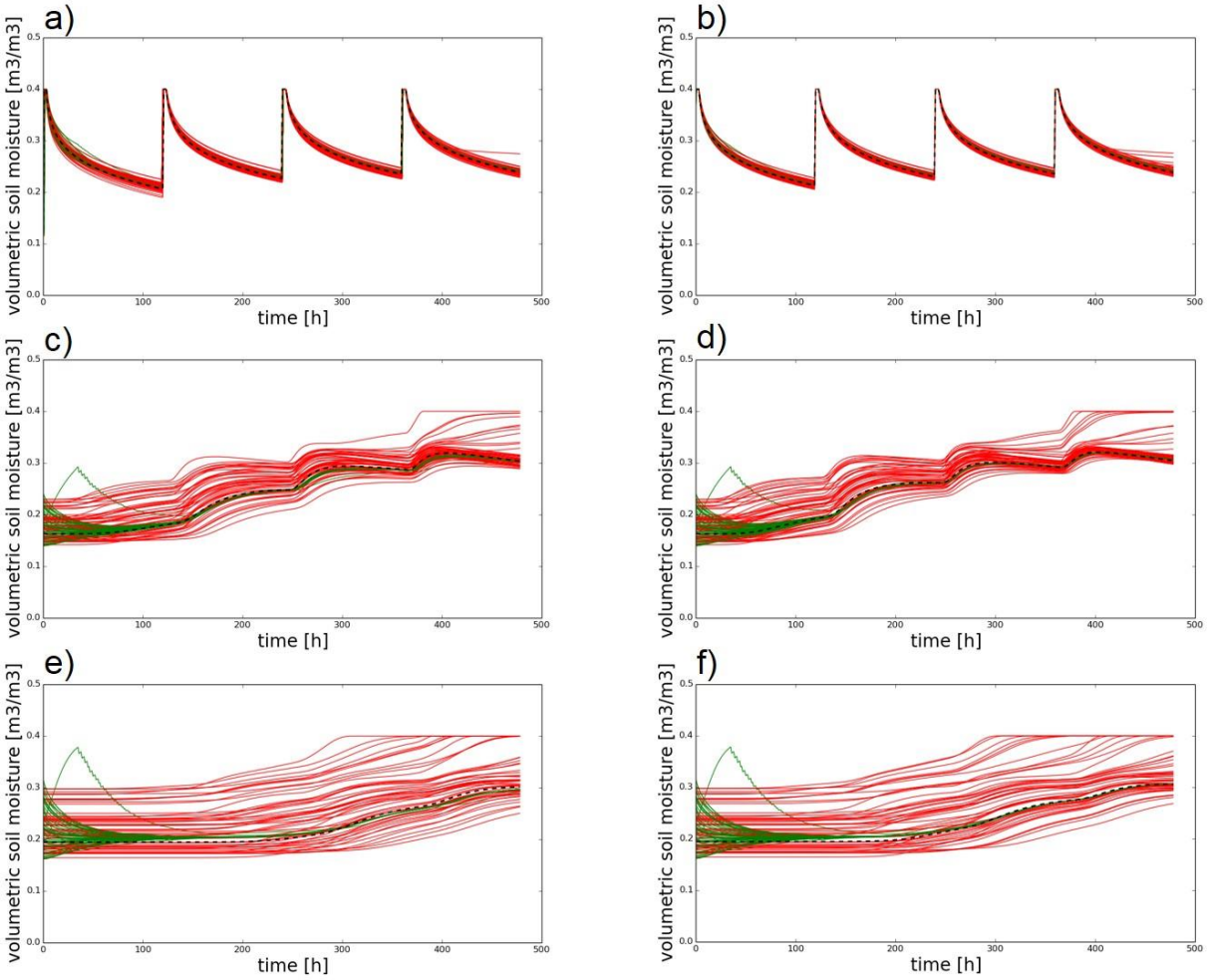

Figure S2. Same as Figure S1 but for the LOW_K-DOWN_O experiment.

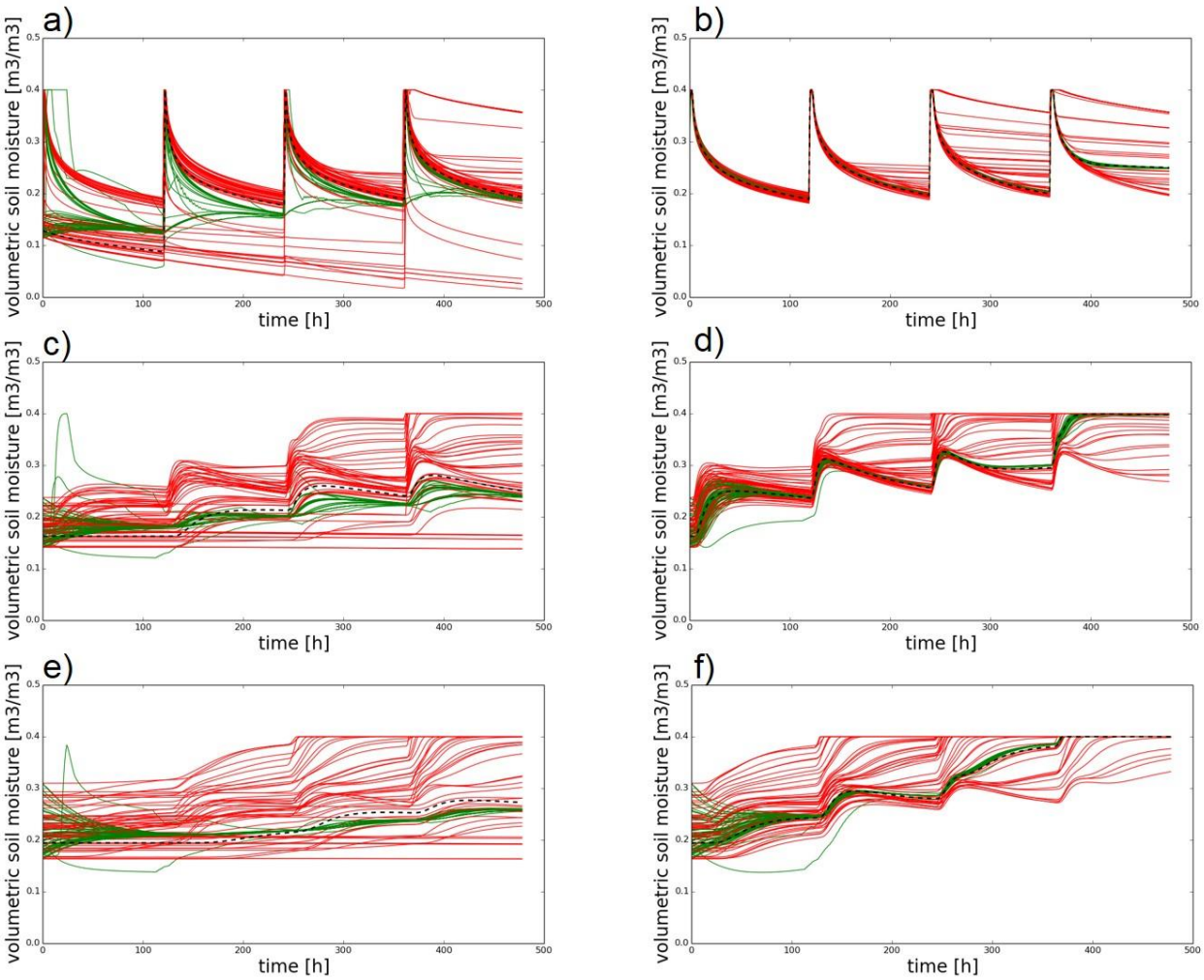

Figure S3. Same as Figure S1 but for the HIGH_K-UP_O experiment.

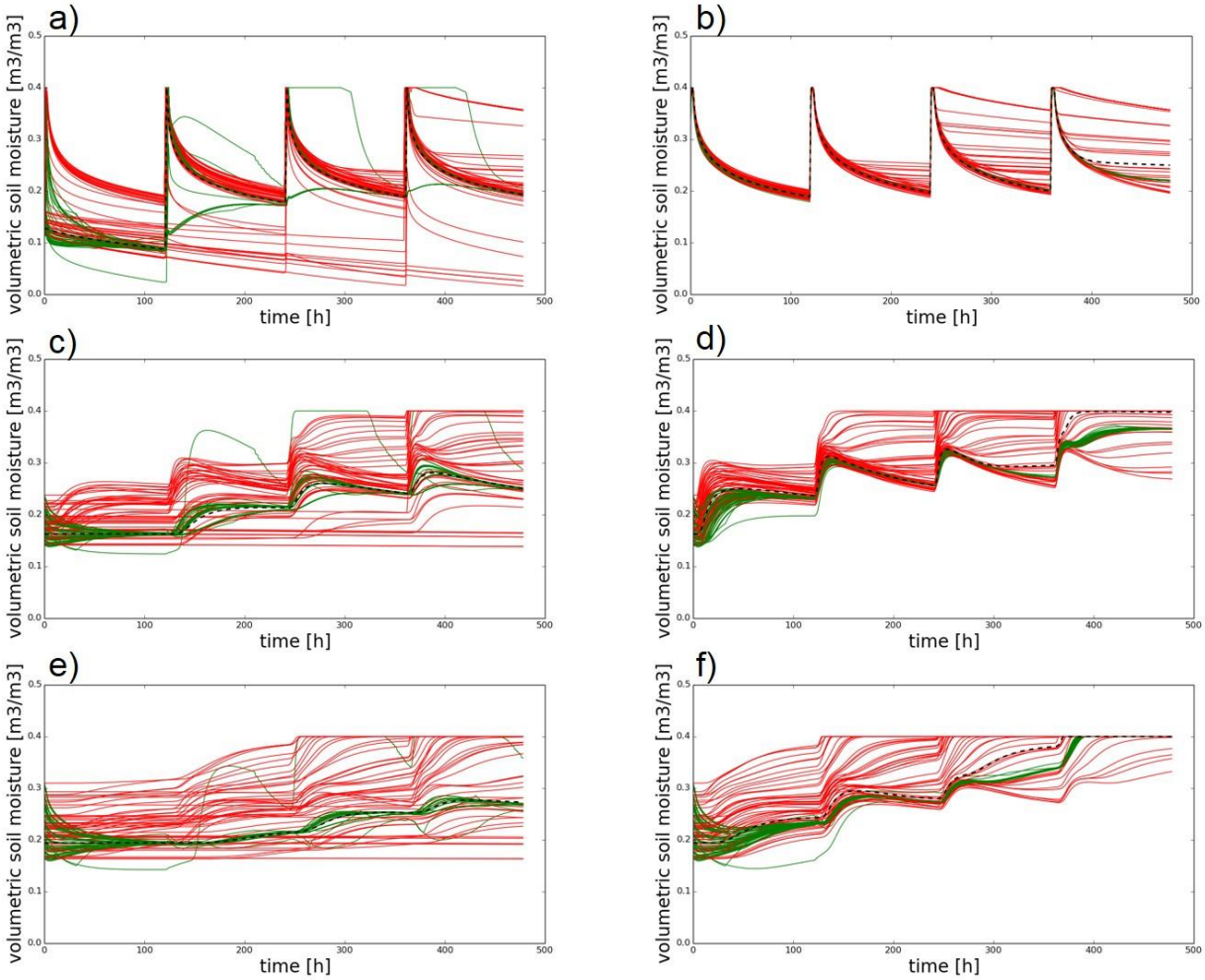

Figure S4. Same as Figure S1 but for the HIGH_K-DOWN_O experiment.

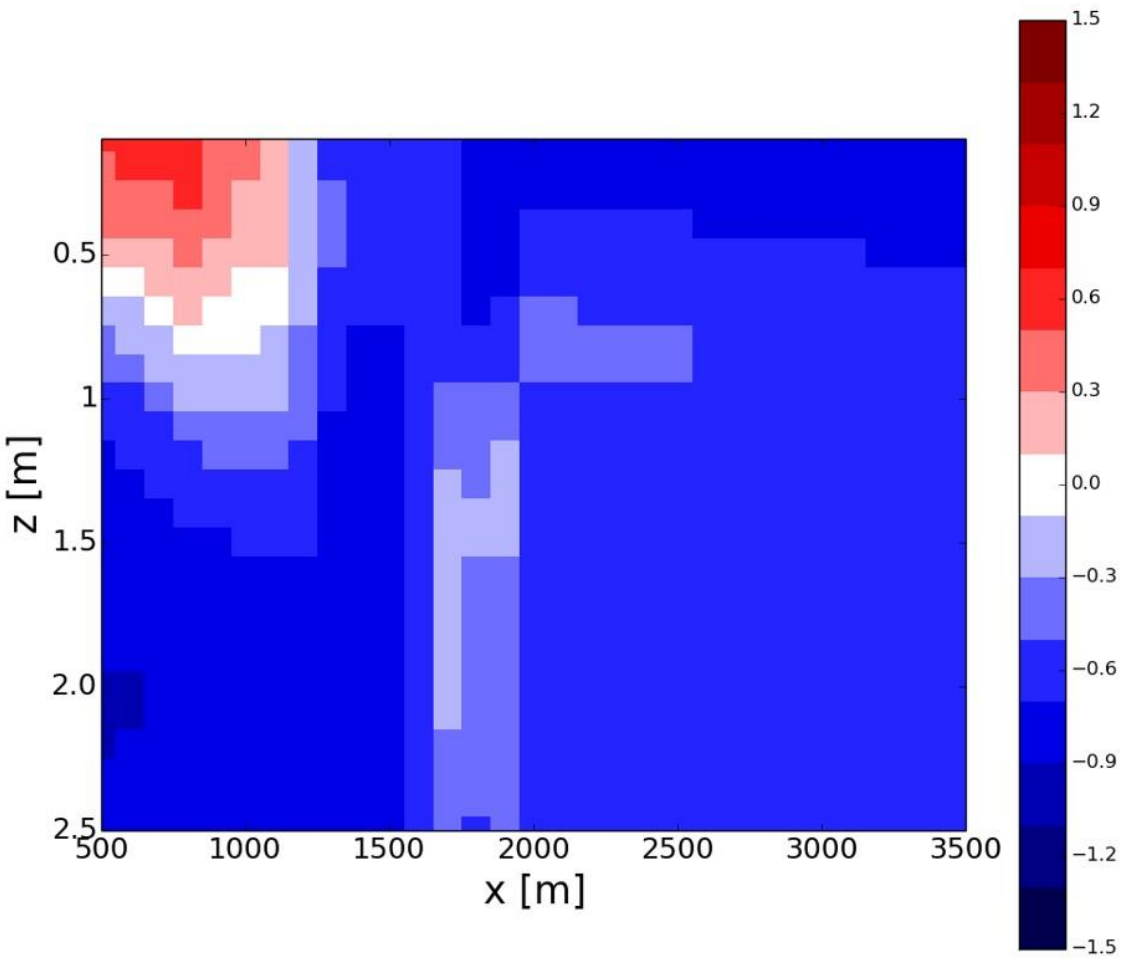

Figure S5. The improvement rates of the HIGH_K-DOWN_O experiment without a parameter optimization.

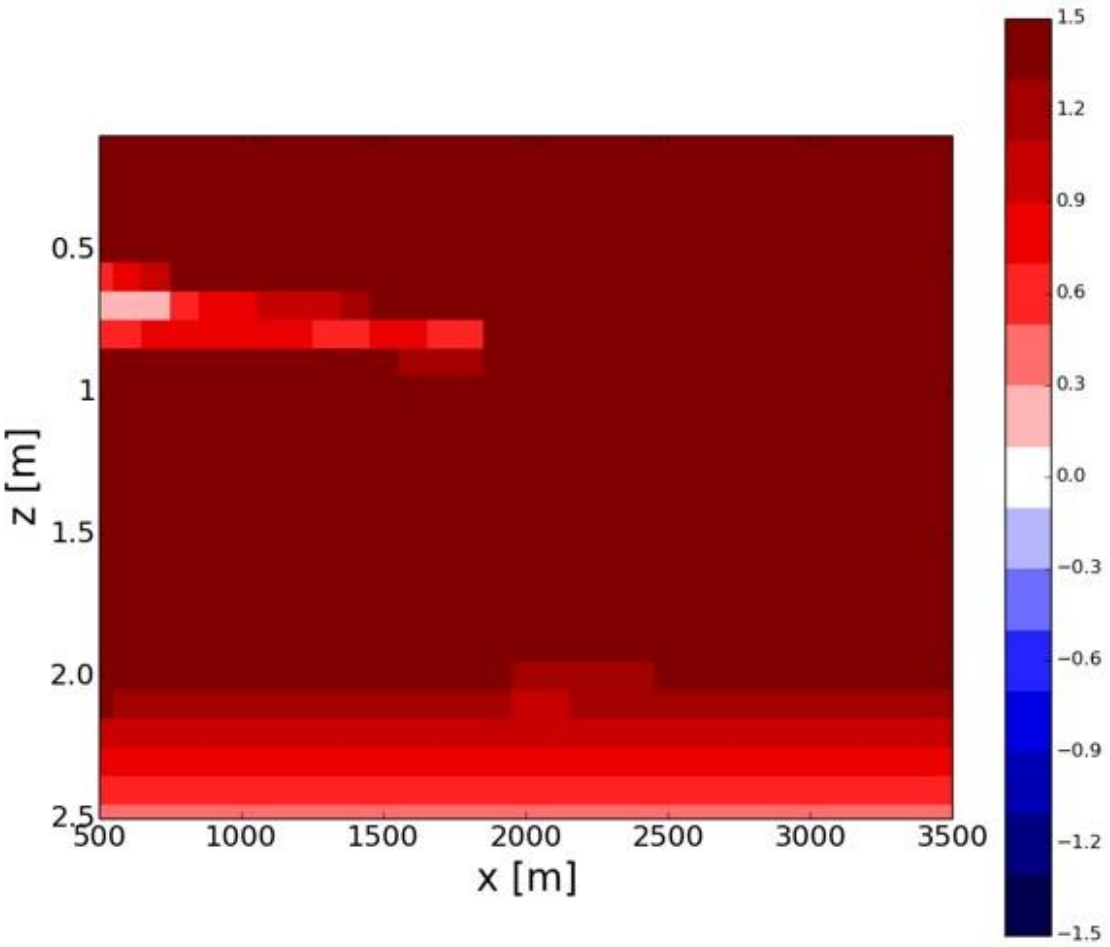

Figure S6. The improvement rates of the LOW_K-DOWN_O experiment where the topography-driven surface flow is neglected in ParFlow.

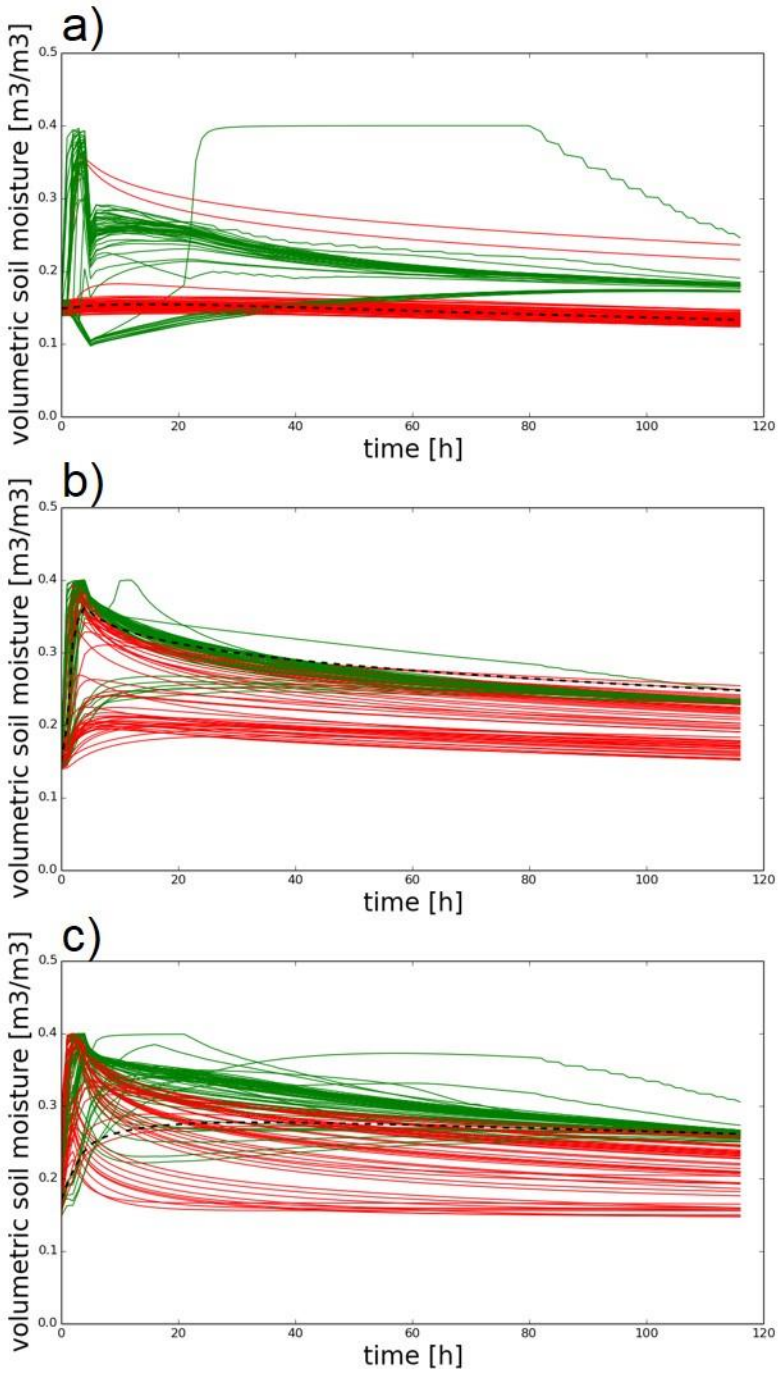

Figure S7. Time series of volumetric soil moisture simulated by the synthetic reference run (black dashed line), the OF_NoDA experiment (red lines), and the OF_DA_obs361 experiment (green lines) at a) x=200m, y=200m. z=0.15m; b) x=1200m, y=1200m, z=0.15m; c) x=2200m, y=2200m, z=0.15m.