Supplement of Hydrol. Earth Syst. Sci. Discuss., 12, 7353–7403, 2015
http://www.hydrol-earth-syst-sci-discuss.net/12/7353/2015/
doi:10.5194/hessd-12-7353-2015-supplement

Hydrology and Earth System Sciences
Open Access
Discussions

Supplement of

Comparing the Ensemble and Extended Kalman Filters for in situ soil moisture assimilation with contrasting soil conditions

D. Fairbairn et al.

Correspondence to: J.-C. Calvet (jean-christophe.calvet@meteo.fr)

Supplement 1

Table S1.1: Sites used for the experiments in order of modelled clay percentage. Also shown are the $WG1$ and $WG2$ ACC between the observed and modelled soil moisture volume (over 2008-2010), and the time-averaged biases normalized by the RMSE for the Ens experiment and the $EnSRF_{R1}$ experiment.

Site	Model % Clay	Obs. % clay	WG1 ACC	WG2 ACC	Ens $\lvert\frac{Bias}{RMSE}\rvert$	$EnSRF_{R1}$ $\lvert\frac{Bias}{RMSE}\rvert$
SABRES	17.6	3.9	0.70	0.54	0.38	0.14
CREON	20.5	5.7	0.53	0.56	0.44	0.47
URGONS	20.6	15.7	0.51	0.41	0.33	0.03
MOUTHOUMET	20.7	29.4	0.39	0.41	0.57	0.52
SAVENES	21.1	19.4	0.37	0.70	0.50	0.29
LEZIGNAN	21.6	27.3	0.71	0.74	0.73	0.24
MONTAUT	22.4	15.0	0.51	0.62	0.57	0.31
NARBONNE	22.5	46.4	0.62	0.85	0.79	0.40
CONDOM	23.8	41.0	0.56	0.59	0.44	0.21
SAINTFELIX	23.9	22.8	0.51	0.68	0.57	0.22
PEYRUSSE	23.9	41.7	0.45	0.47	0.57	0.12
LAHAS	25.0	35.3	0.51	0.69	0.75	0.29
MEDIAN	22.0	25.3	0.53	0.61	0.55	0.27

Table S1.2: Site-averaged $WG2$ RMSE, ACC and bias between the perturbed simulation and the unperturbed simulation averaged over the period 2008-2010. The perturbations are randomly sampled from a Gaussian distribution with standard deviation ϵ. The results for hourly forcing perturbations are shown for precipitation (Pr), Short-wave/Long-wave radiation (SW/LW), specific humidity (Hum), wind and air temperature ($Tair$). The results for daily additive perturbations are presented for $WG1$ and $WG2$ with the same order of magnitude as the values used to calibrate the EnSRF.

Parameter	ϵ std	$WG2$ RMSE $(\mathrm{m}^3/\mathrm{m}^3)\times10^3$	$WG2$ ACC	$WG2$ Bias $\mathrm{m}^3/\mathrm{m}^3\times10^3$
Pr ($\mathrm{kg/m^2}$)	$50\%Pr$	2.2	1.00	-0.28
SW ($\mathrm{Wm^{-2}}$)	60	0.4	1.00	0.05
LW ($\mathrm{Wm^{-2}}$)	30	0.3	1.00	0.04
Hum (kg/kg)	0.0005	0.2	1.00	0.01
$Wind$ ($\mathrm{ms^{-1}}$)	2	0.1	1.00	-0.02
$Tair$ (K)	2	0.1	1.00	0.005
$WG1$ ($\mathrm{m}^3/\mathrm{m}^3$)	$0.2(w_{fc}-w_{wilt})$	0.5	1.00	0.07
$WG1$ ($\mathrm{m}^3/\mathrm{m}^3$)	$0.8(w_{fc}-w_{wilt})$	2	1.00	-0.44
$WG2$ ($\mathrm{m}^3/\mathrm{m}^3$)	$0.005(w_{fc}-w_{wilt})$	4	1.00	0.07
$WG2$ ($\mathrm{m}^3/\mathrm{m}^3$)	$0.025(w_{fc}-w_{wilt})$	20	0.78	-5.22