Table 9. Input Parameters for Modified van Genuchten Model

Parameter	Variable	Description
		Relative Permeability Function
IRP	11	select van Genuchten relative permeability model
RP(1)	S_{lrk}	residual liquid saturation for relative permeability functions, if negative, $S_{lrk} = 0$ for calculating gas relative permeability, absolute value is used for calculating liquid relative permeability
RP(2)	S_{gr}	residual gas saturation if negative, $S_{gr} = 0$ for calculating liquid relative permeability, absolute value is used for calculating gas relative permeability
RP(3)	(flag)	if zero, use (14b), if non-zero, use (14c)
RP(4)	η	exponent in (14a), default = ½
RP(5)	ε_k	use linear function between $k_{rl}(S_e = 1 - \varepsilon_k)$ and 1.0.
RP(6)	a_{fm}	Constant fracture-matrix interaction reduction factor, in combination with Active Fracture Model (see Section 8)
RP(7)	ζ	exponent in (10b), default = 1/3
		Capillary Pressure Function
ICP	11	select van Genuchten capillary pressure model
CP(1)	n	parameter related to pore size distribution index (see also *CP(4)*)
CP(2)	$1/\alpha$	parameter related to gas entry pressure [Pa] USERX(4,N)>0 : $1/\alpha_i$=USERX(4,N) USERX(4,N)<0 : $1/\alpha_i$=USERX(4,N)·CP(2) CP(2)<0: apply Leverett scaling rule: $1/\alpha_i = 1/\alpha_{ref} \cdot \sqrt{k_{ref}/k_i}$ where: $1/\alpha_{ref} = \lvert$CP(2)$\rvert$ k_{ref} = PER(NMAT) USERX(1,N)>0 : k_i= USERX(1,N) USERX(1,N)<0 : k_i= USERX(1,N)·PER(NMAT)
CP(3)	ε or $p_{c,\max}$	CP(3)=0 : $p_{c,\max} = 10^{50}$, $\varepsilon = -1$ 0<CP(3)<1 : ε=CP(3); use linear extension (13b) CP(3)≥1 : $p_{c,\max}$=CP(3), $\varepsilon = -1$ –1<CP(3)<0 : $\varepsilon = \lvert$CP(3)$\rvert$; use log-linear extension (13c)
CP(4)	m	if zero then m=1-1/CP(1), else m=CP(4) and n=1/(1-m)
CP(5)	ω	Zero: Use original van Genuchten curve near full saturation Positive: Use cubic spline for $S_l > 1 - \omega$ Negative: Use "linear" interpolation for $S_l > 1 - \lvert\omega\rvert$
CP(6)	γ	parameter of Active Fracture Model (see Section 8)
CP(7)	S_{lrc}	if zero, then $S_{lrc} = S_{lrk}$