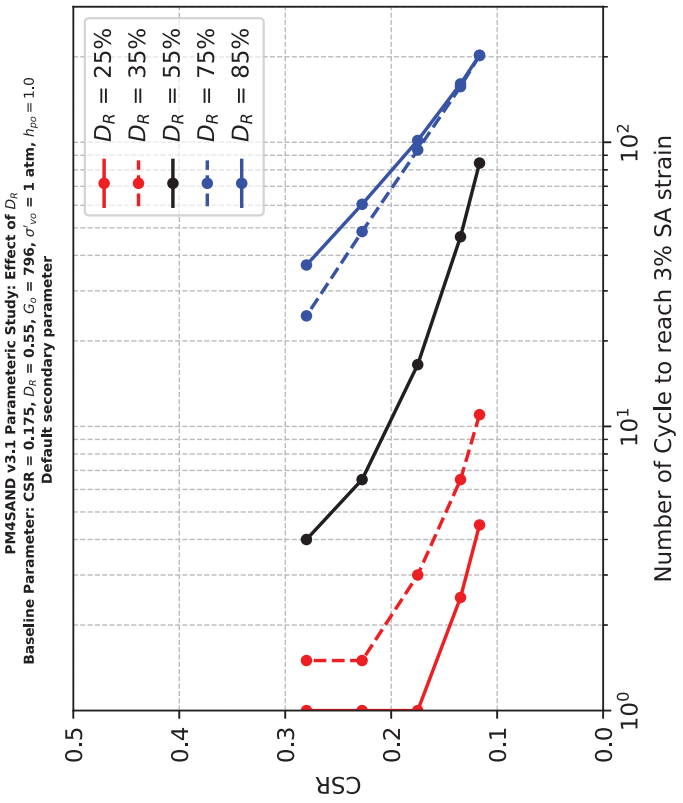
APPENDIX D: PM4Sand and PM4Silt Parameters: Parametric Study

This appendix section contains the following materials:

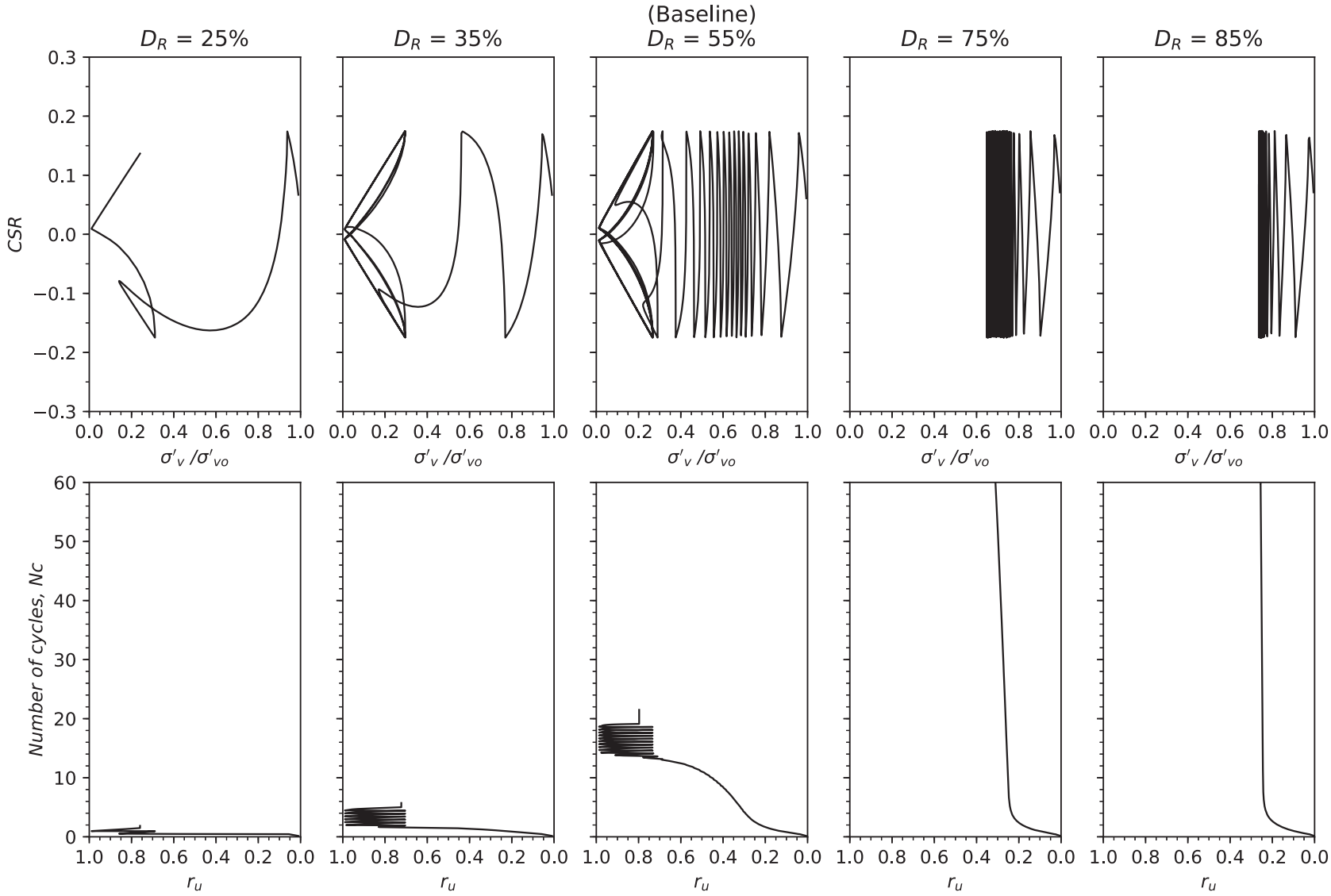
- Effect of each PM4Sand primary and secondary parameters on the cyclic behavior.
- Effect of each PM4Silt primary and secondary parameters on the cyclic behavior.

Note:

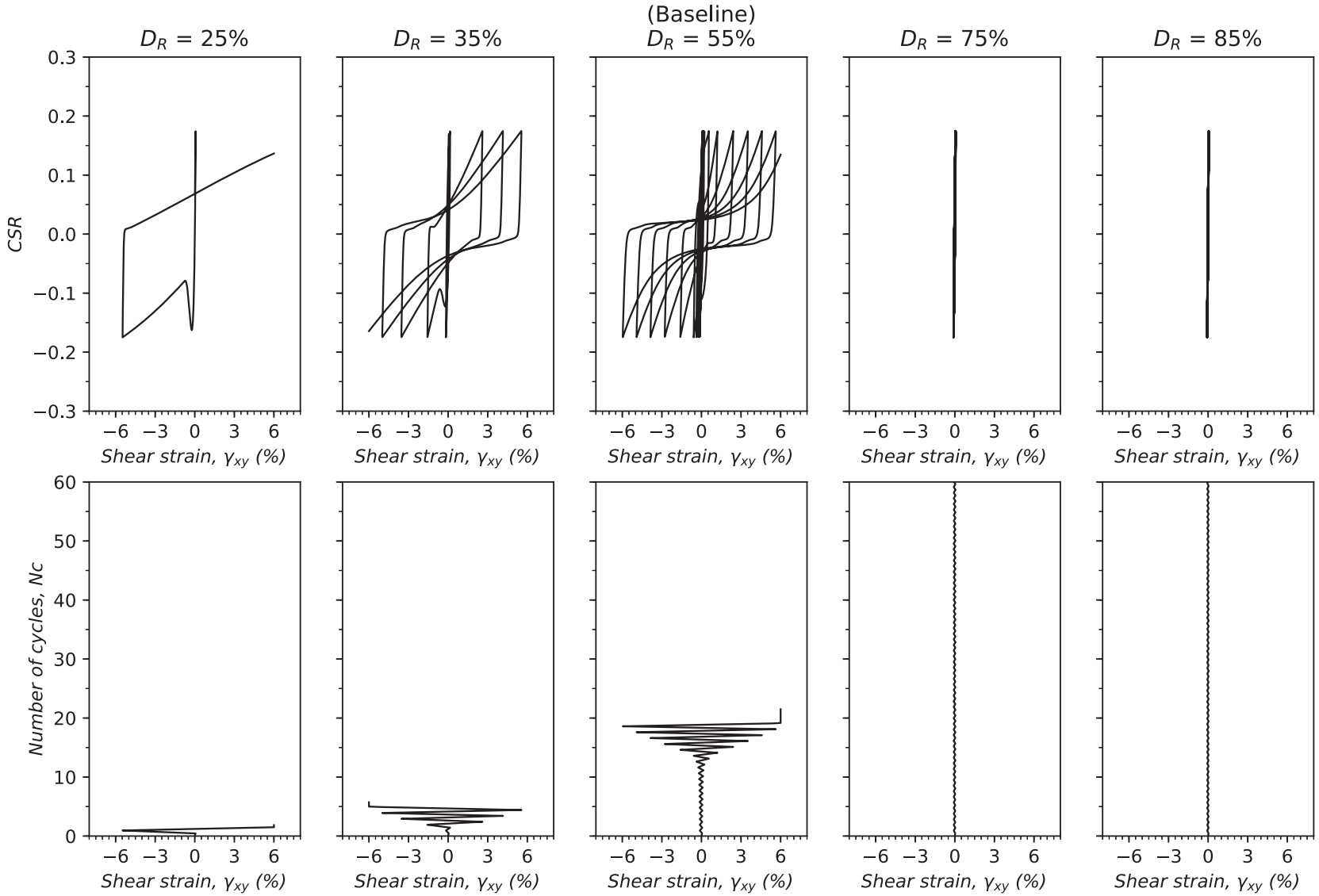
Each plot represents a singular effect of each PM4Sand and PM4Silt parameters on the cyclic resistance vs. number of cycles to reach 3% single-amplitude shear strain, stress path, rate of pore pressure generation, cyclic shear stress vs. strain, and rate of shear strain accumulation.

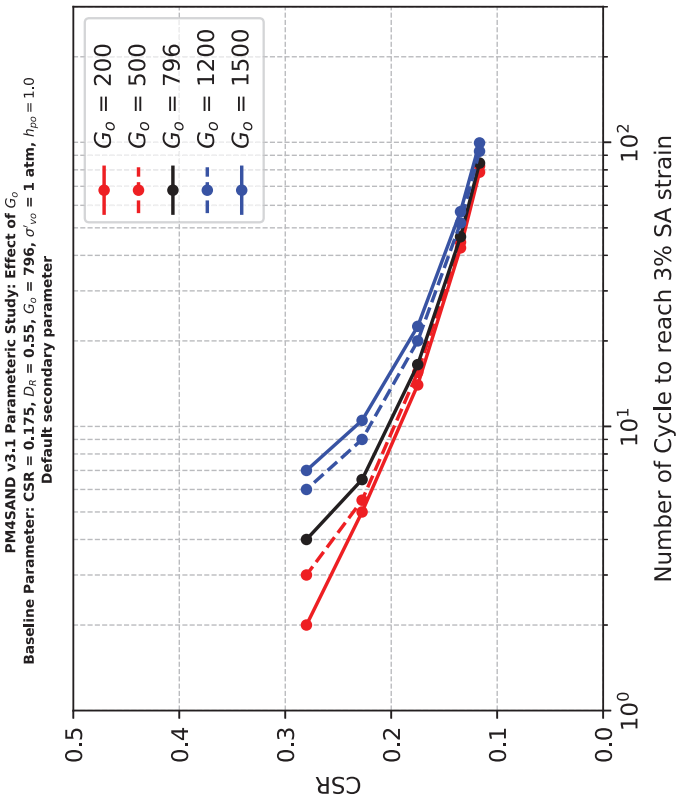

PM4SAND v3.1 Parameteric Study: Effect of D_R
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
D_R = 25%
D_R = 35%
D_R = 55%
D_R = 75%
D_R = 85%
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of D_R
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

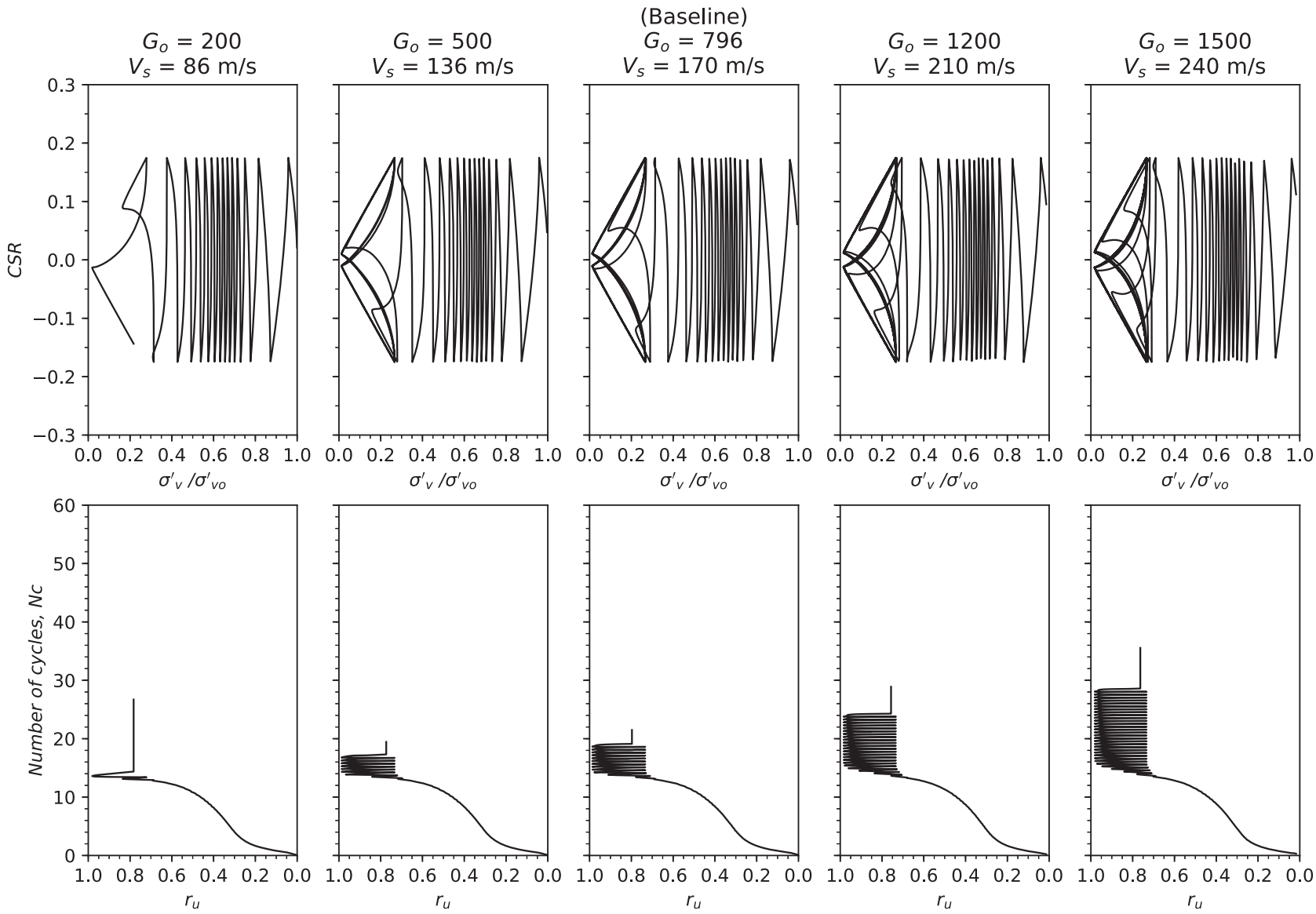


PM4SAND v3.1 Parameteric Study: Effect of D_R
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

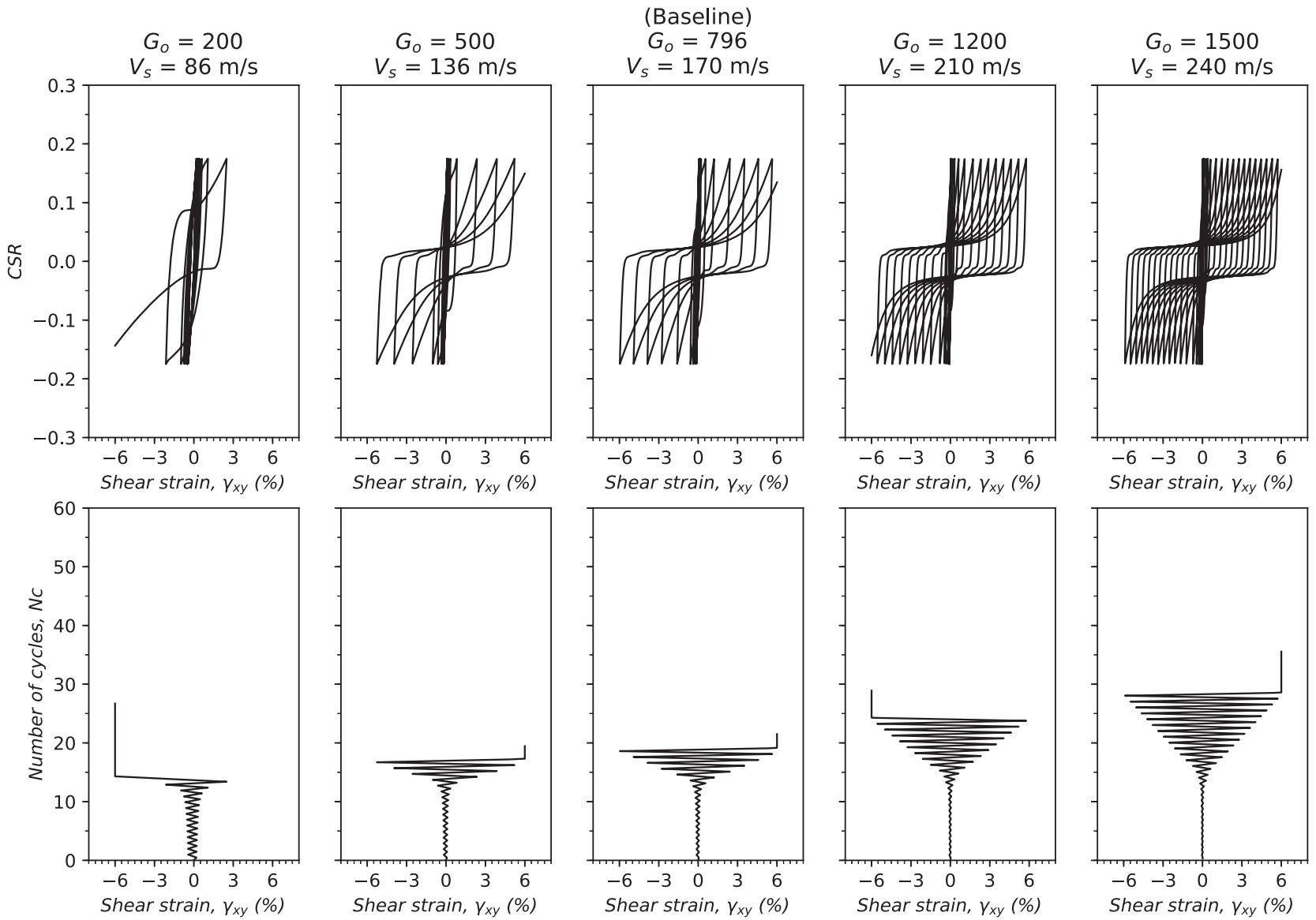


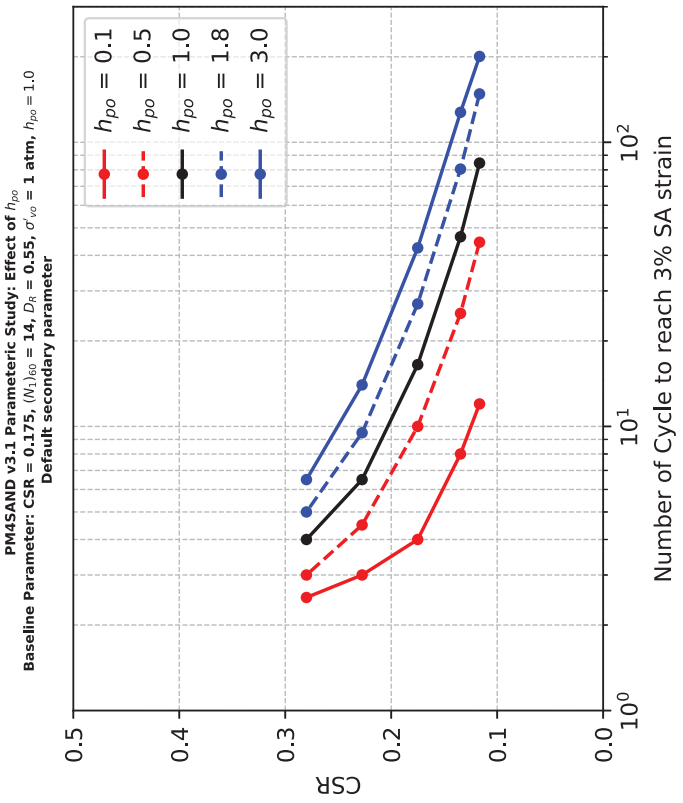

PM4SAND v3.1 Parameteric Study: Effect of G_o
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
G_o = 200
G_o = 500
G_o = 796
G_o = 1200
G_o = 1500
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of G_o
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

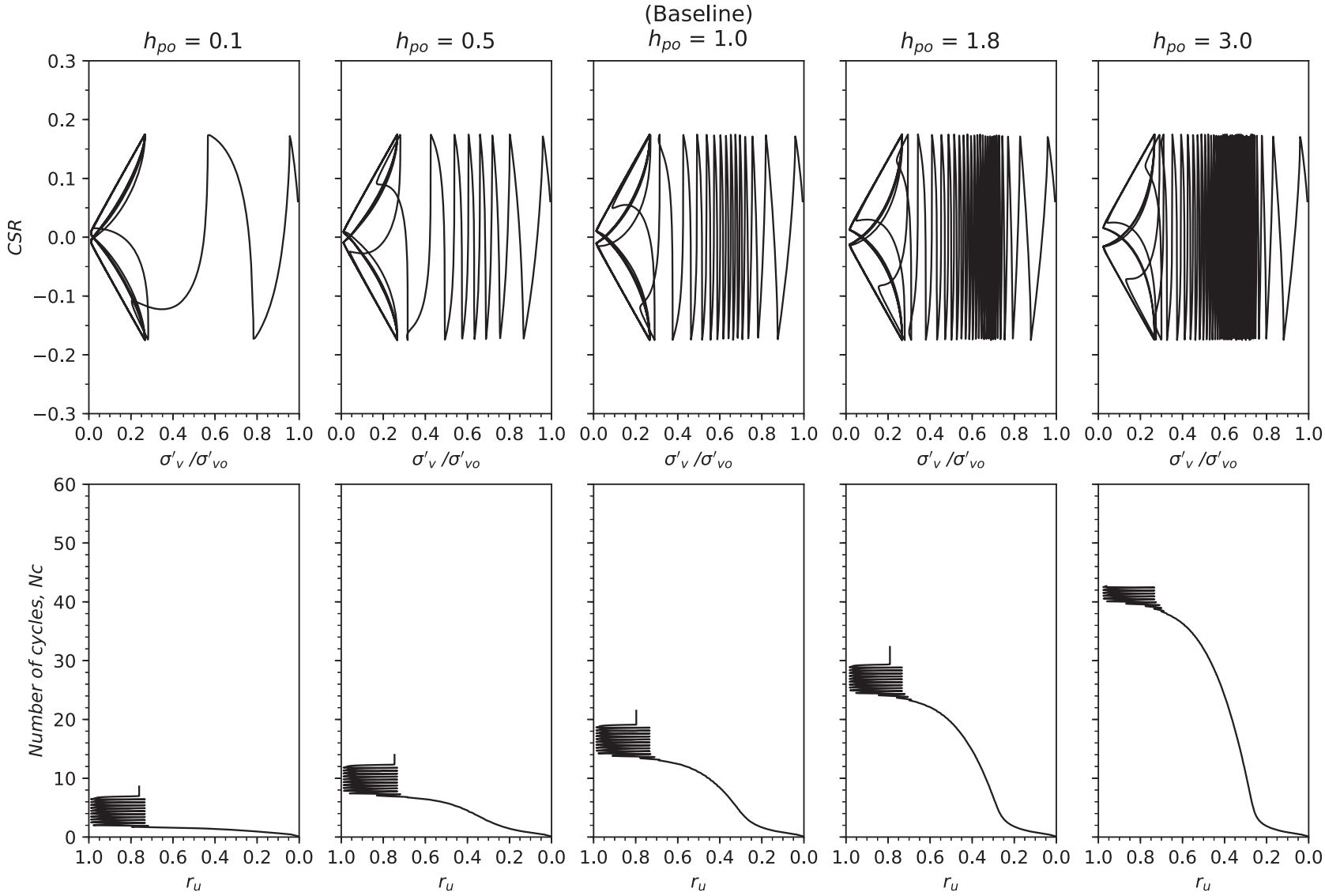


PM4SAND v3.1 Parameteric Study: Effect of G_o
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

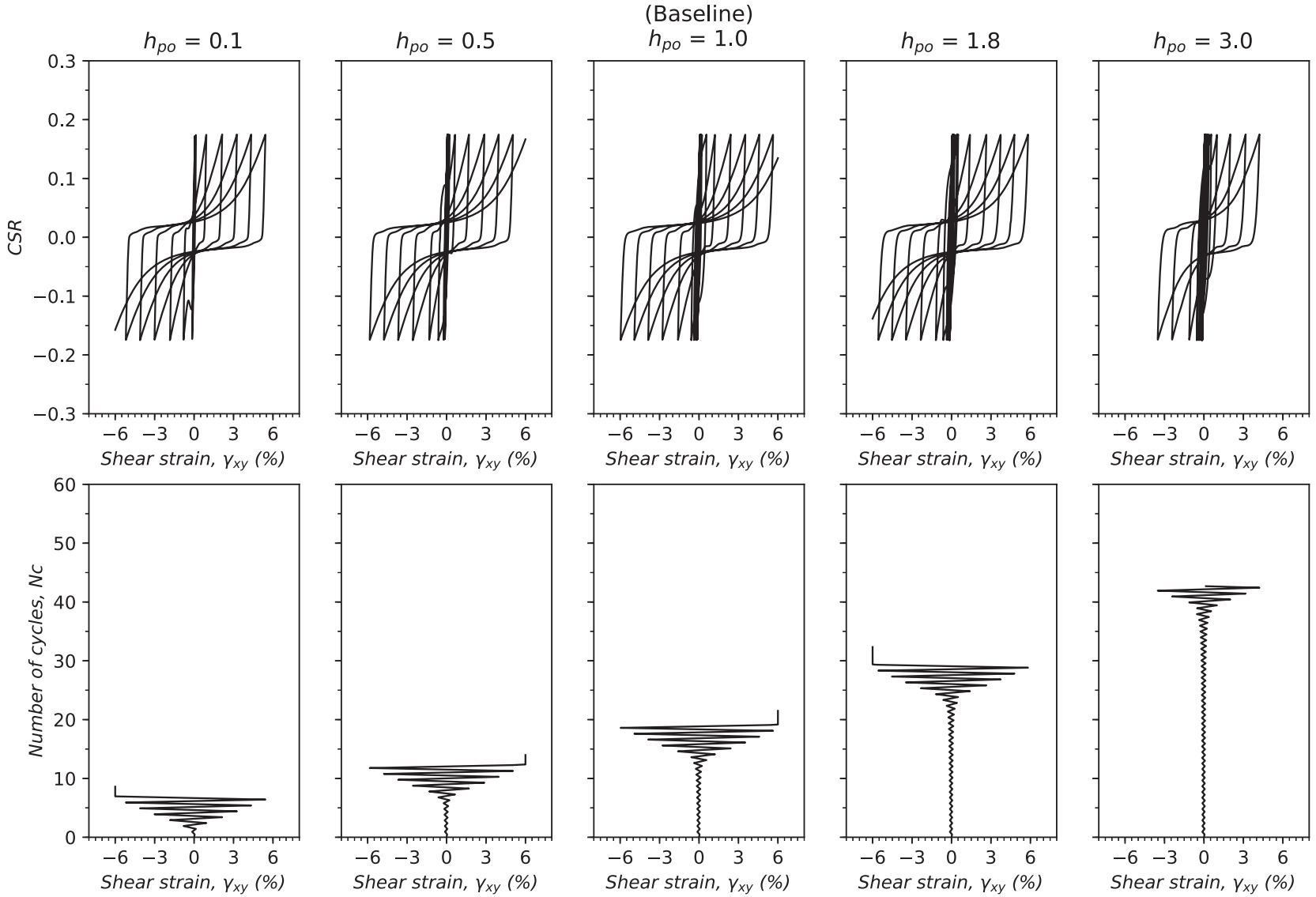


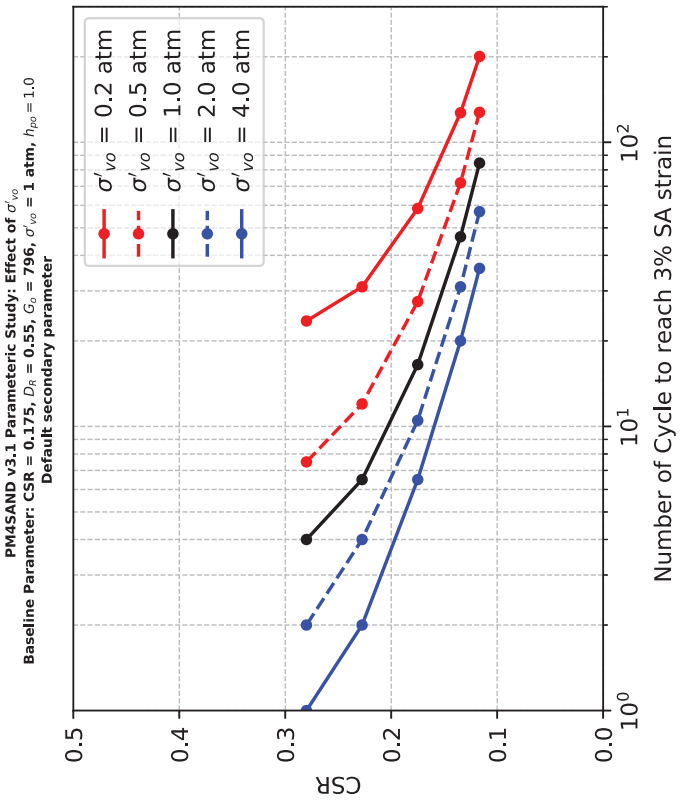

PM4SAND v3.1 Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
h_{po} = 0.1
h_{po} = 0.5
h_{po} = 1.0
h_{po} = 1.8
h_{po} = 3.0
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

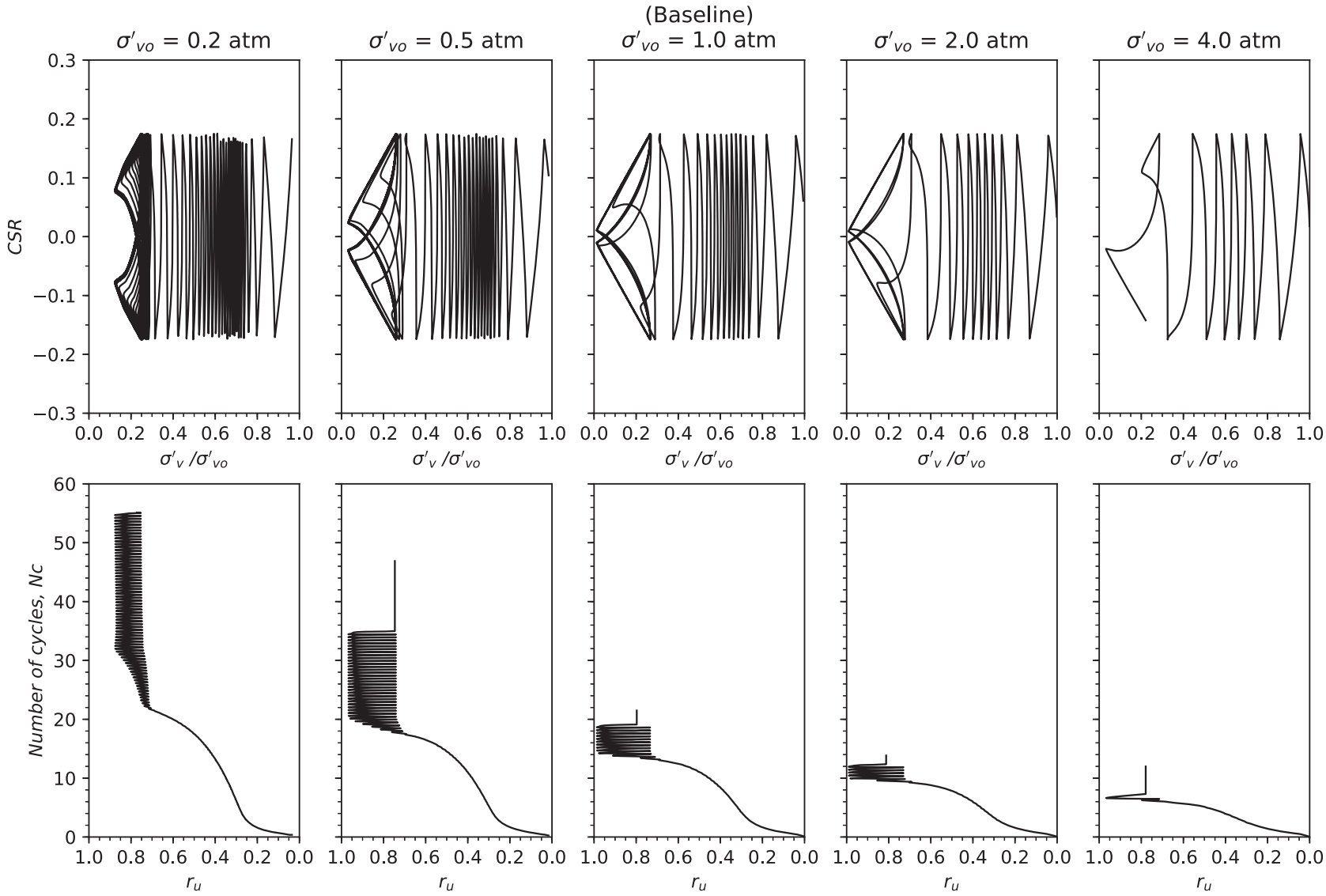


PM4SAND v3.1 Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

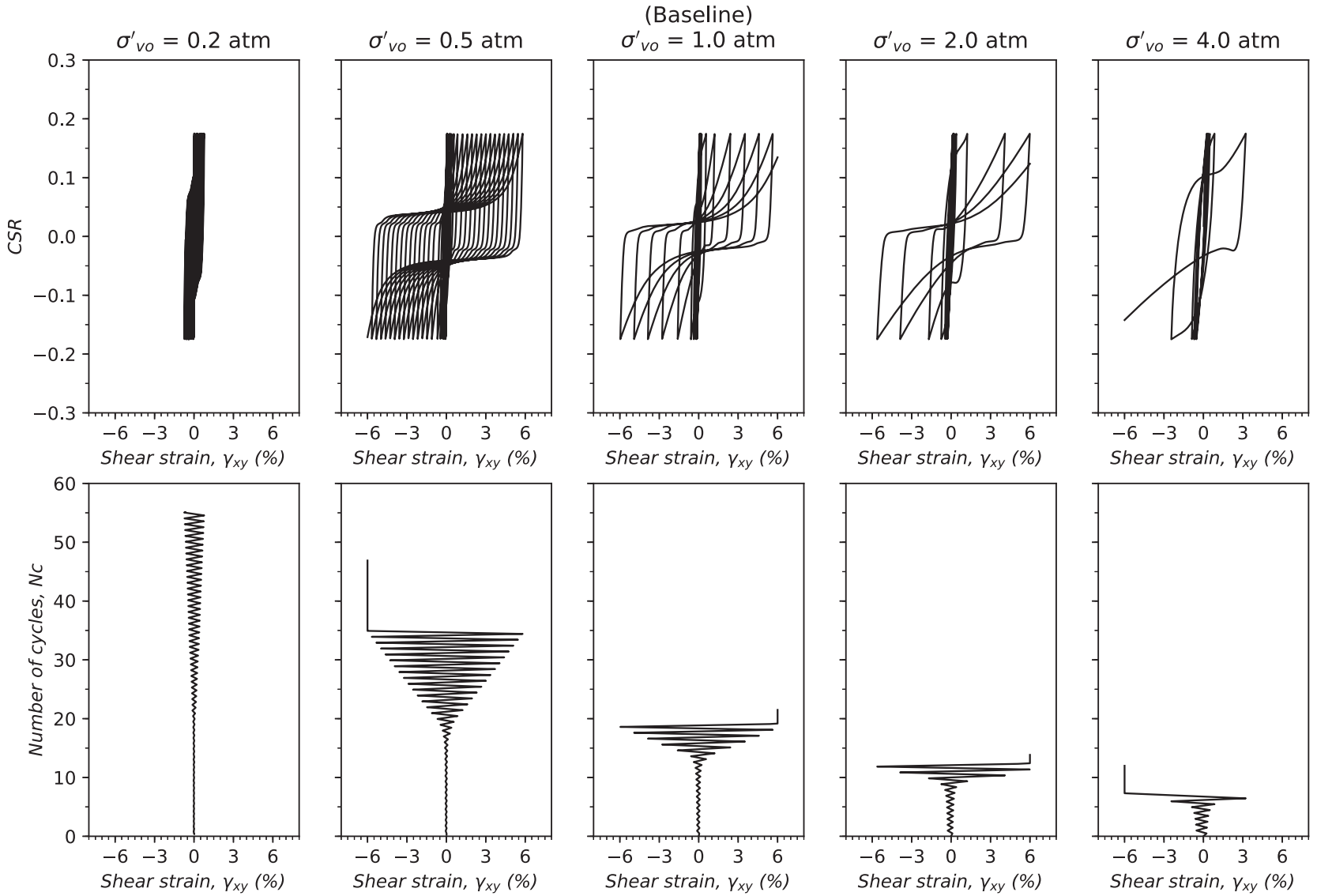


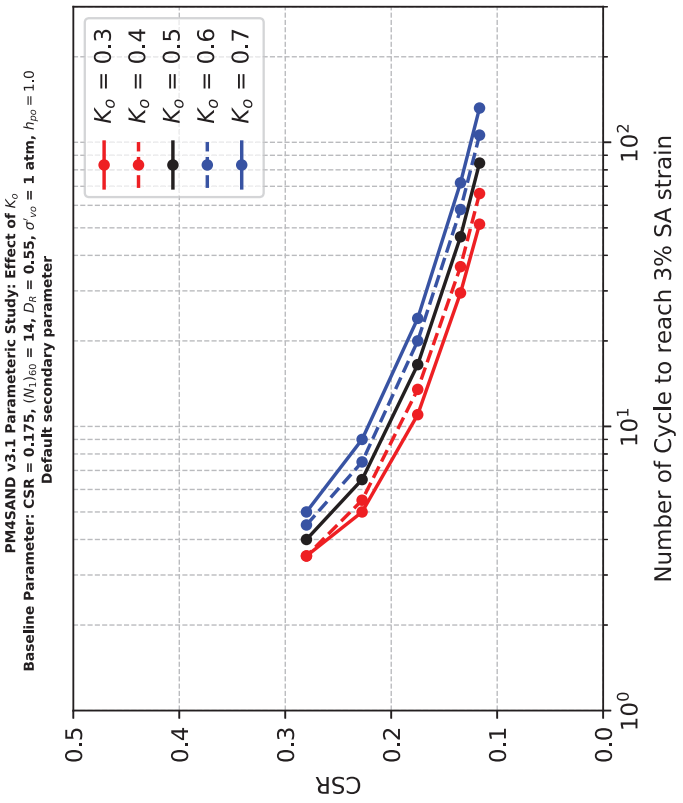

PM4SAND v3.1 Parameteric Study: Effect of σ'_{vo}
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
σ'_{vo} = 0.2 atm
σ'_{vo} = 0.5 atm
σ'_{vo} = 1.0 atm
σ'_{vo} = 2.0 atm
σ'_{vo} = 4.0 atm
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of σ'_{vo}
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

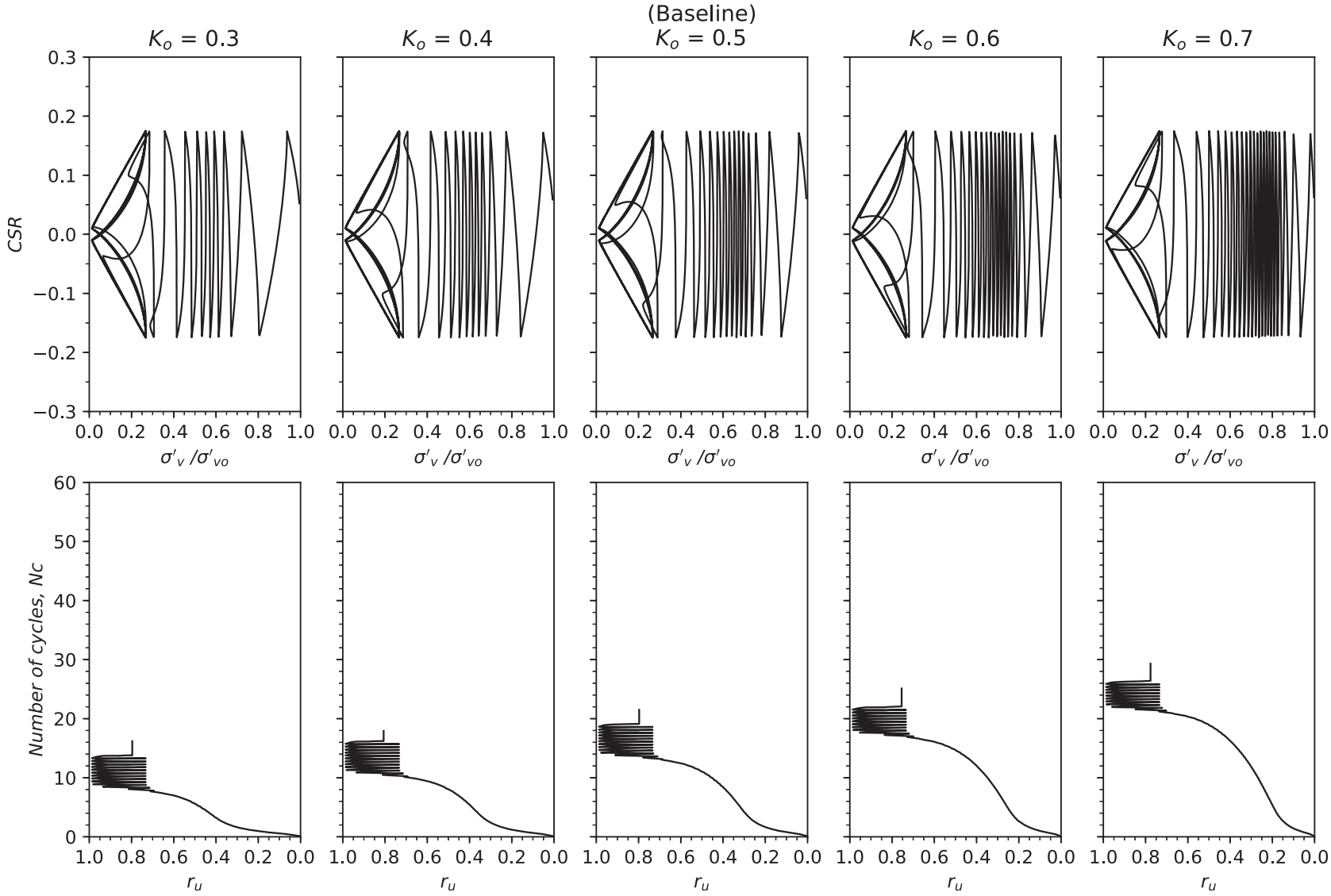


PM4SAND v3.1 Parameteric Study: Effect of σ'_{vo}
Baseline Parameter: CSR = 0.175, D_R = 0.55, G_o = 796, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

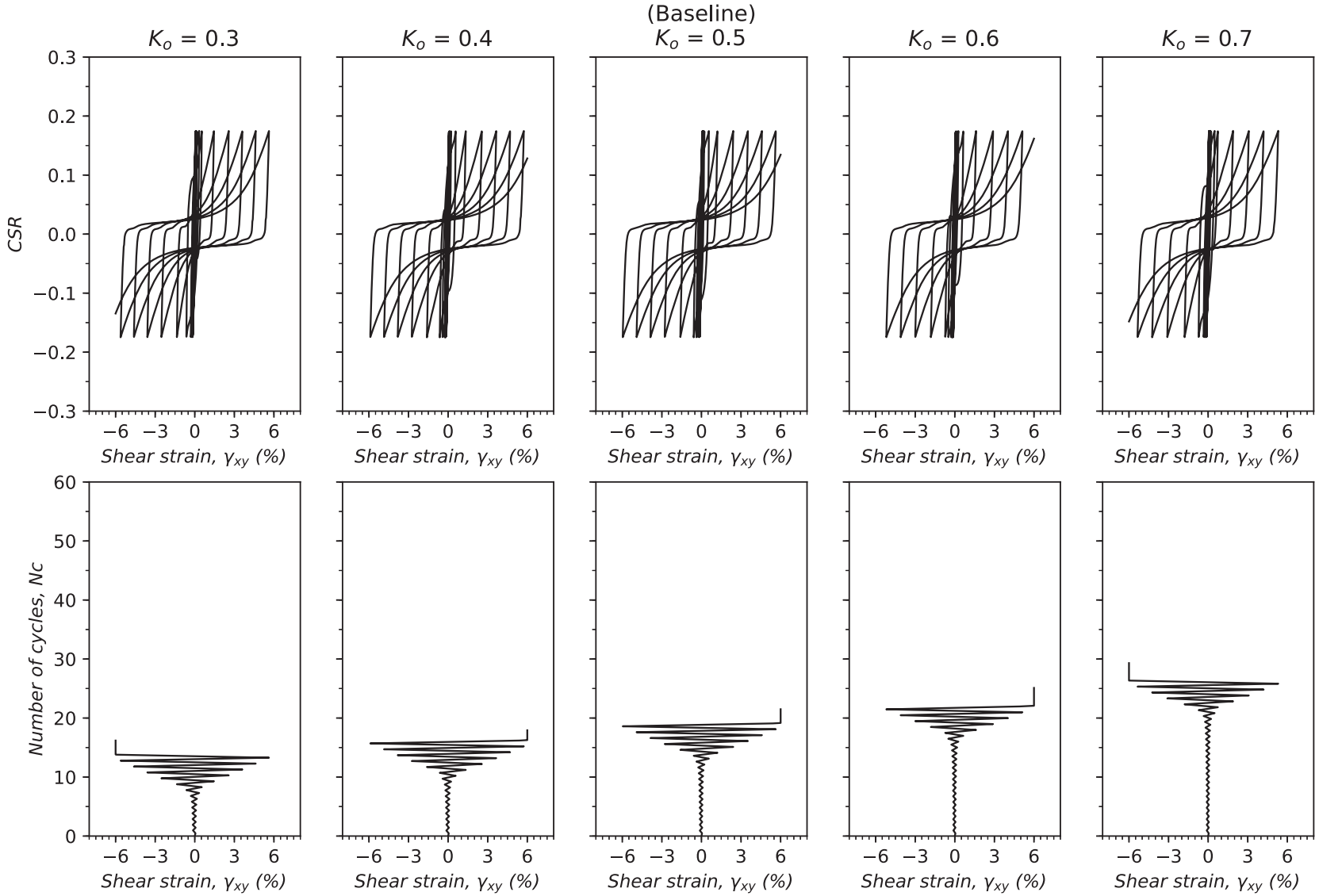


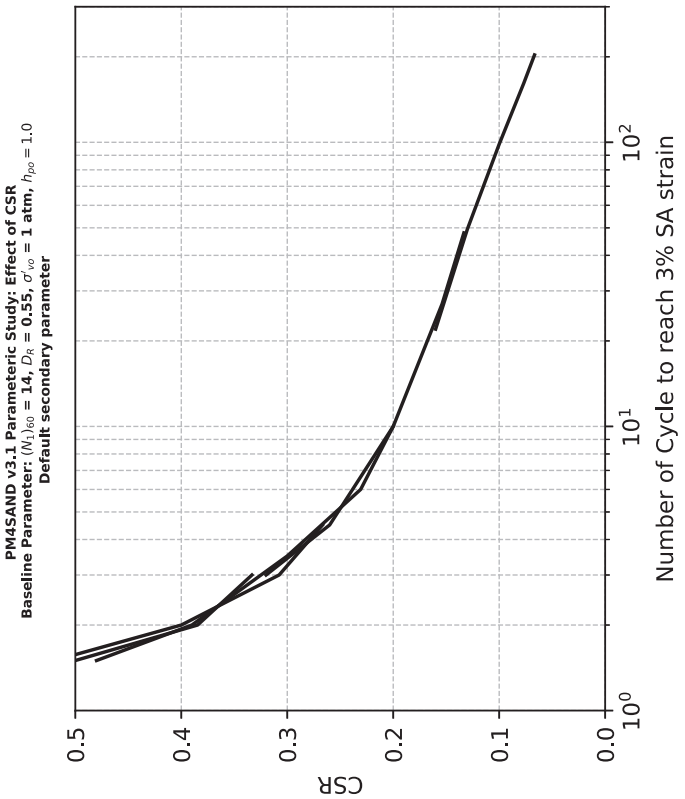

PM4SAND v3.1 Parameteric Study: Effect of K_o
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
K_o = 0.3
K_o = 0.4
K_o = 0.5
K_o = 0.6
K_o = 0.7
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of K_o
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

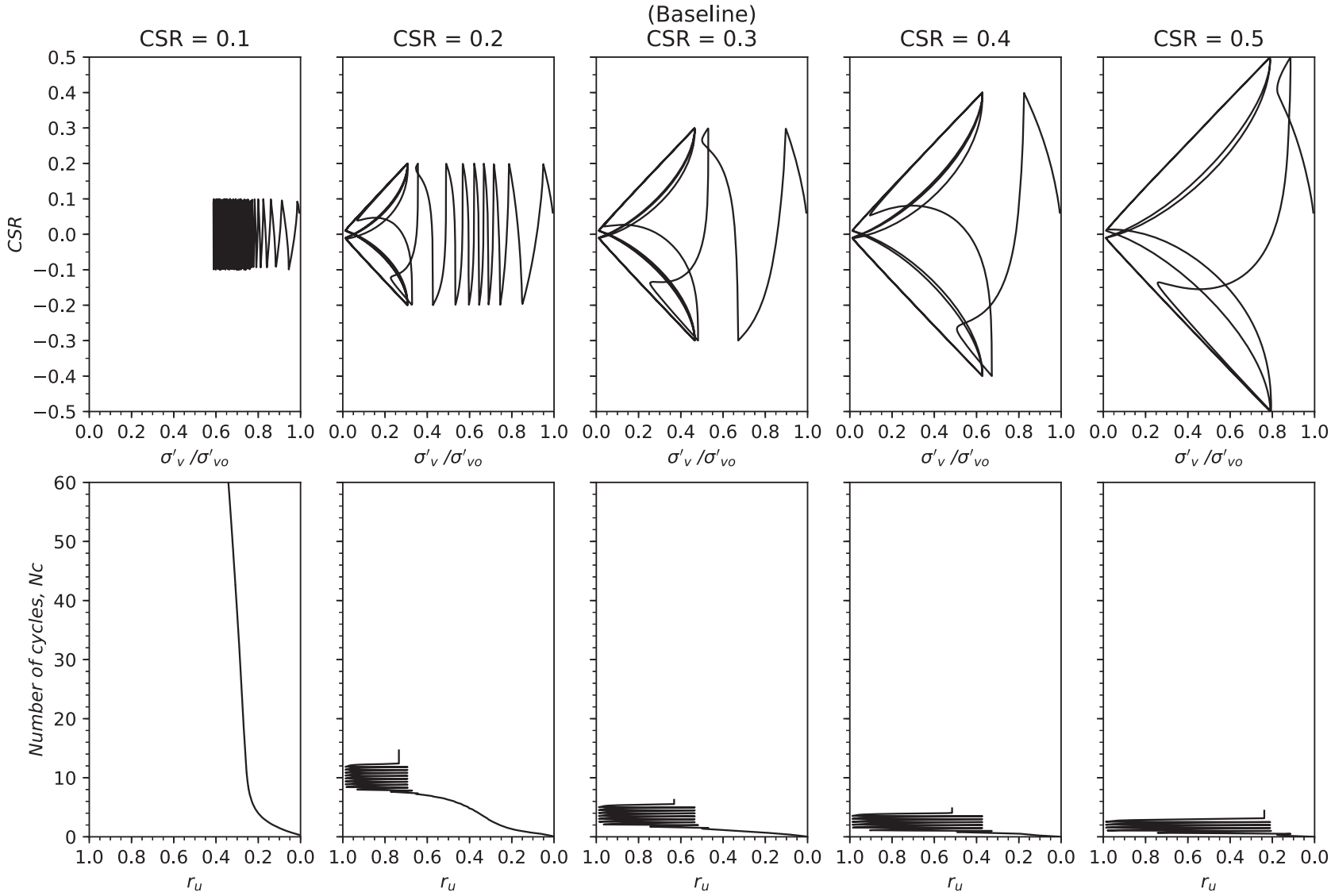


PM4SAND v3.1 Parameteric Study: Effect of K_o
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

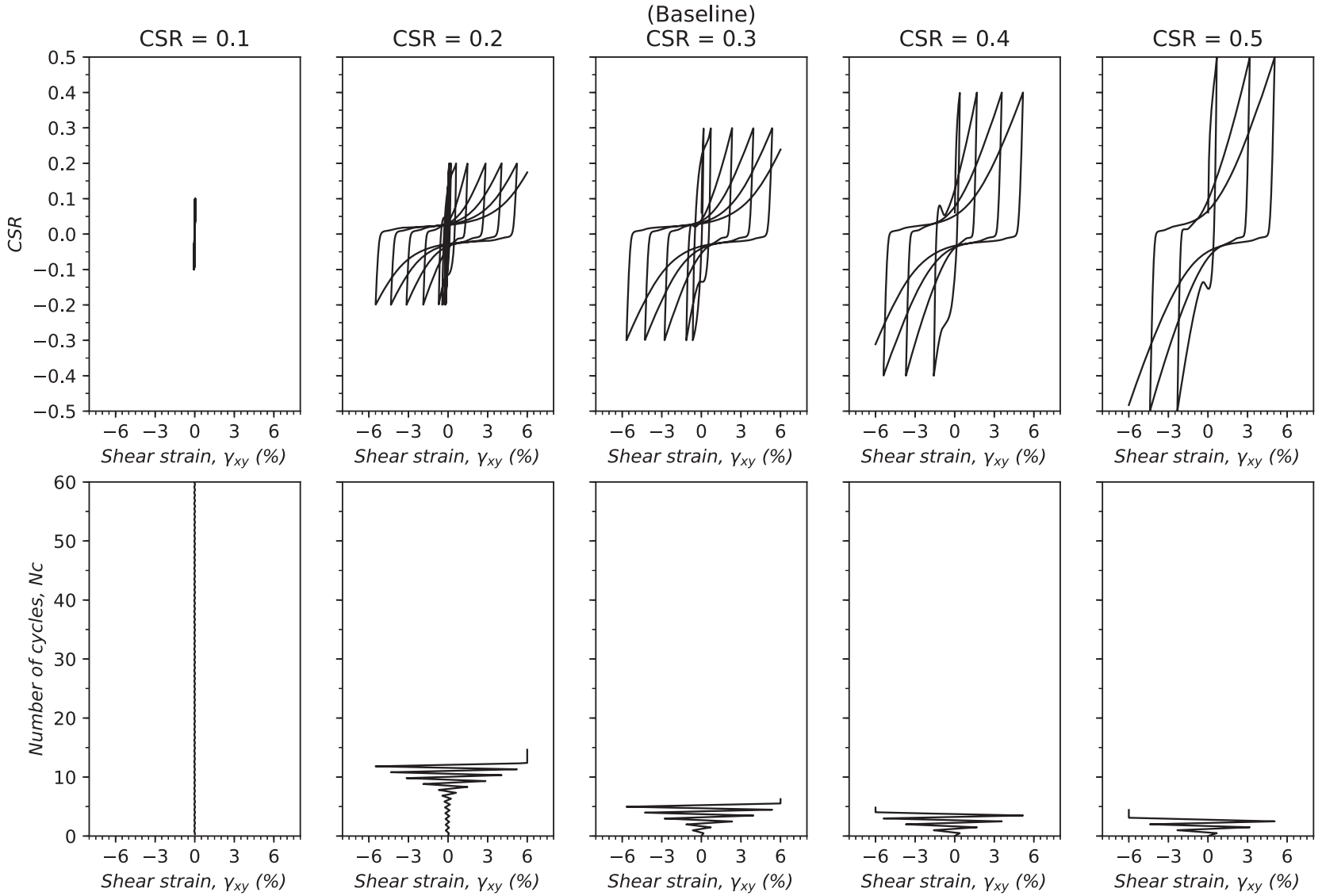


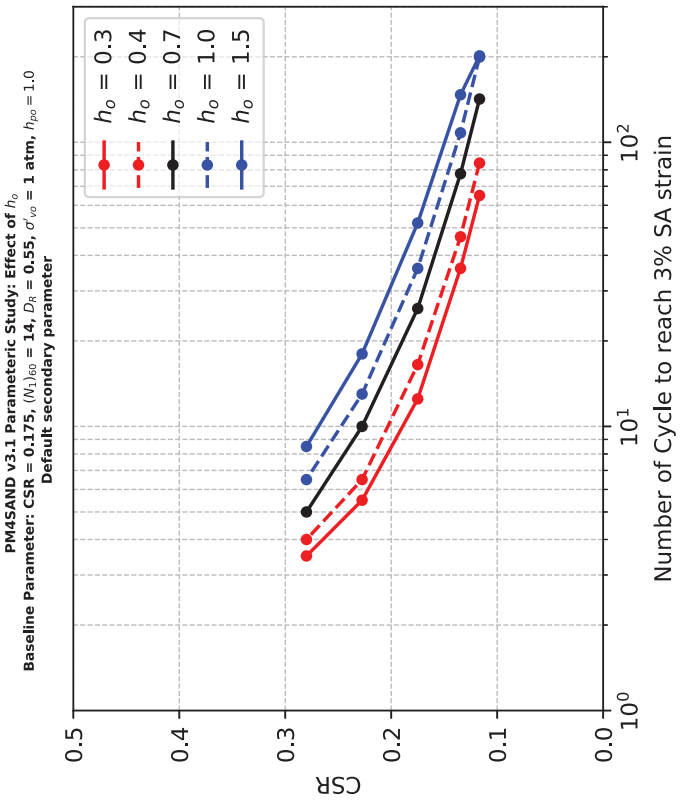

PM4SAND v3.1 Parameteric Study: Effect of CSR
Baseline Parameter: $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of CSR
Baseline Parameter: $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter

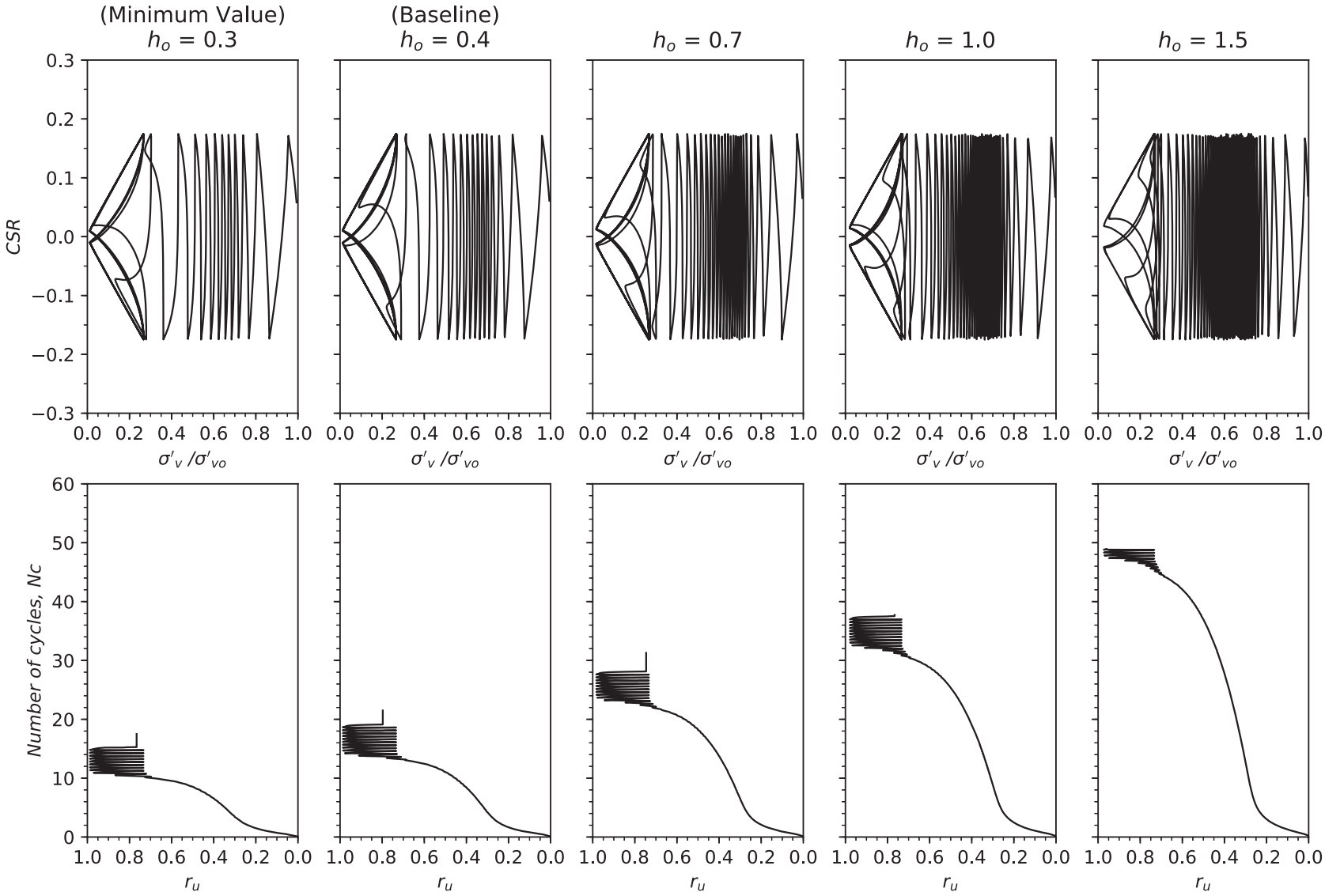


PM4SAND v3.1 Parameteric Study: Effect of CSR
Baseline Parameter: $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter

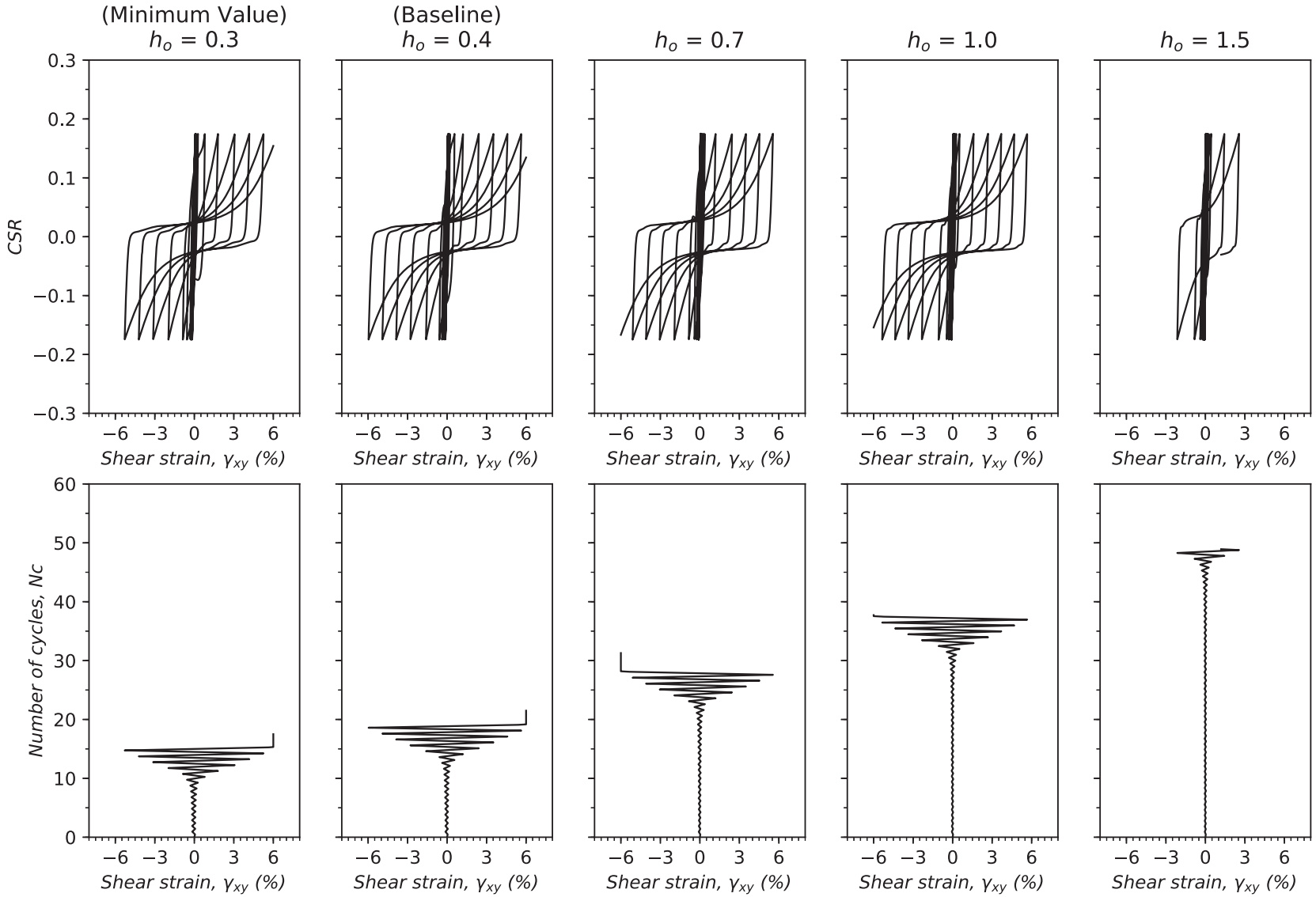


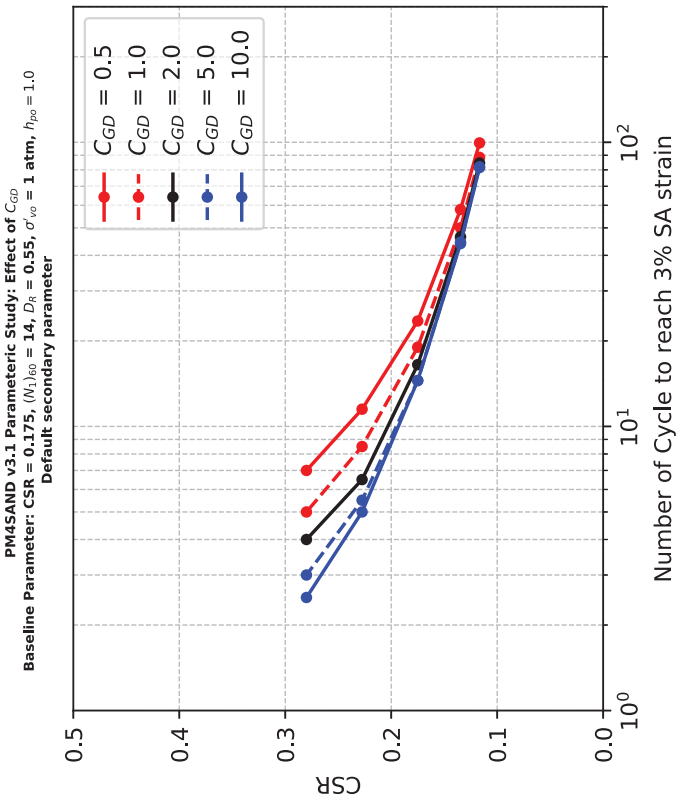

PM4SAND v3.1 Parameteric Study: Effect of h_o
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
h_o = 0.3
h_o = 0.4
h_o = 0.7
h_o = 1.0
h_o = 1.5
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of h_o
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

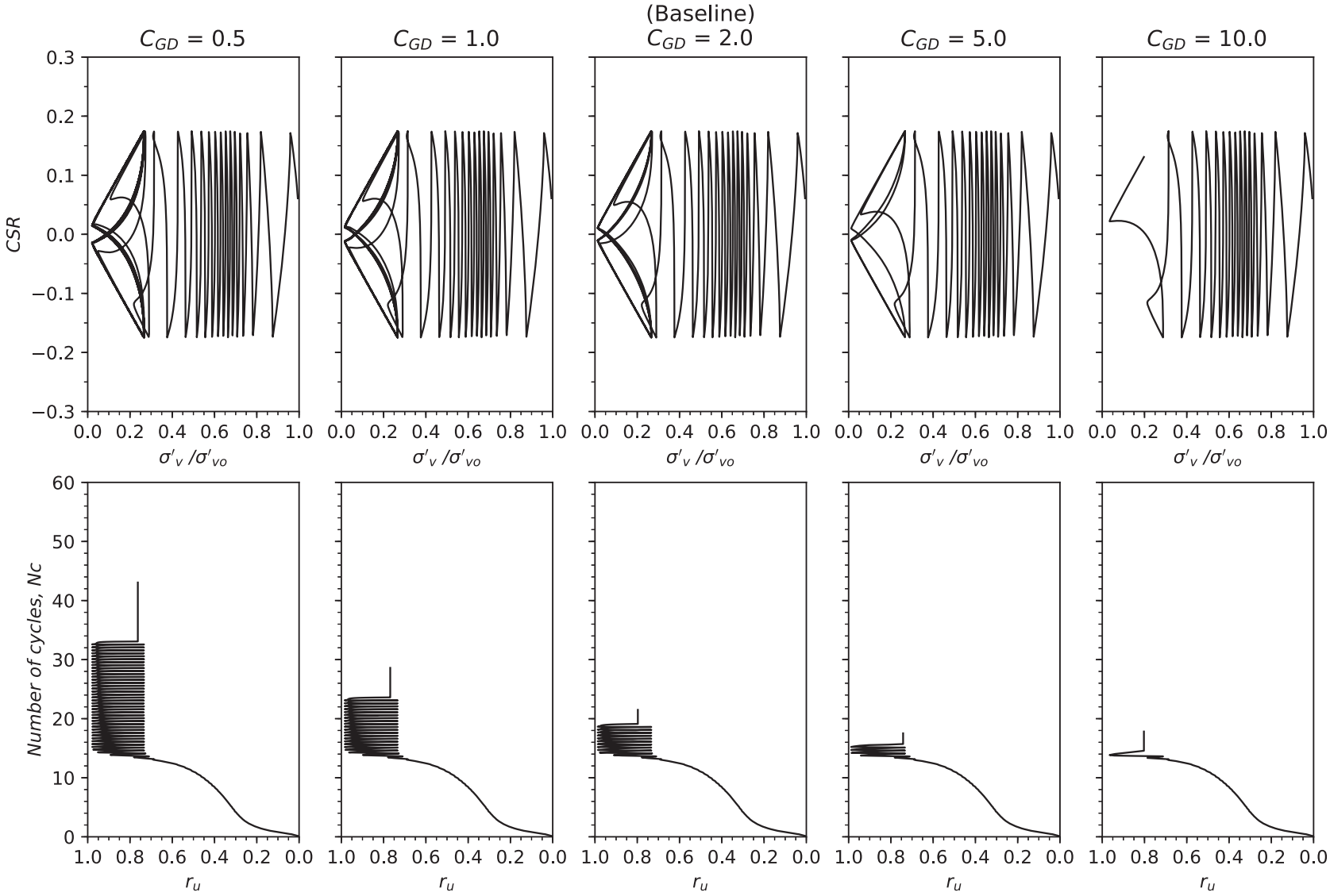


PM4SAND v3.1 Parameteric Study: Effect of h_o
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

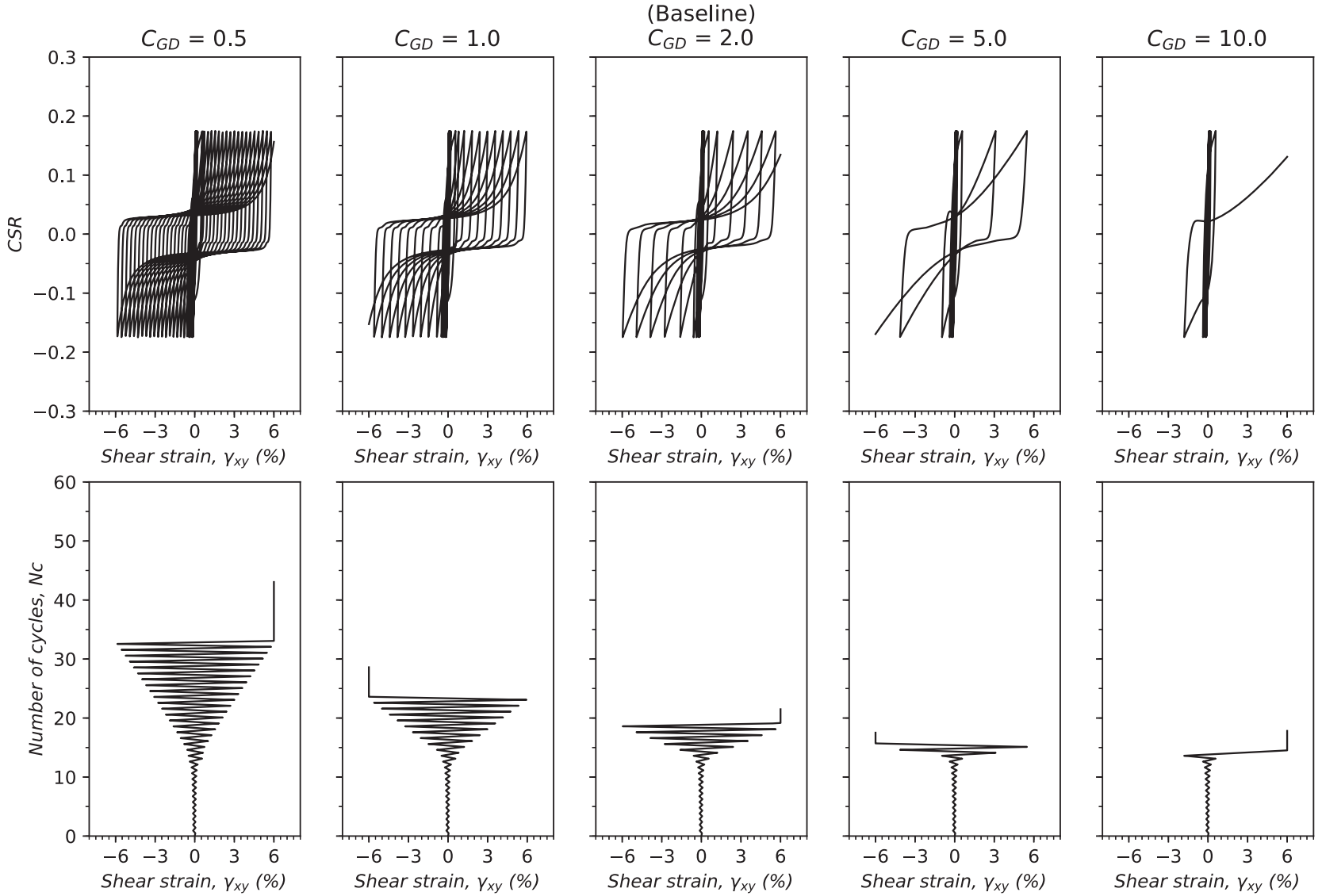


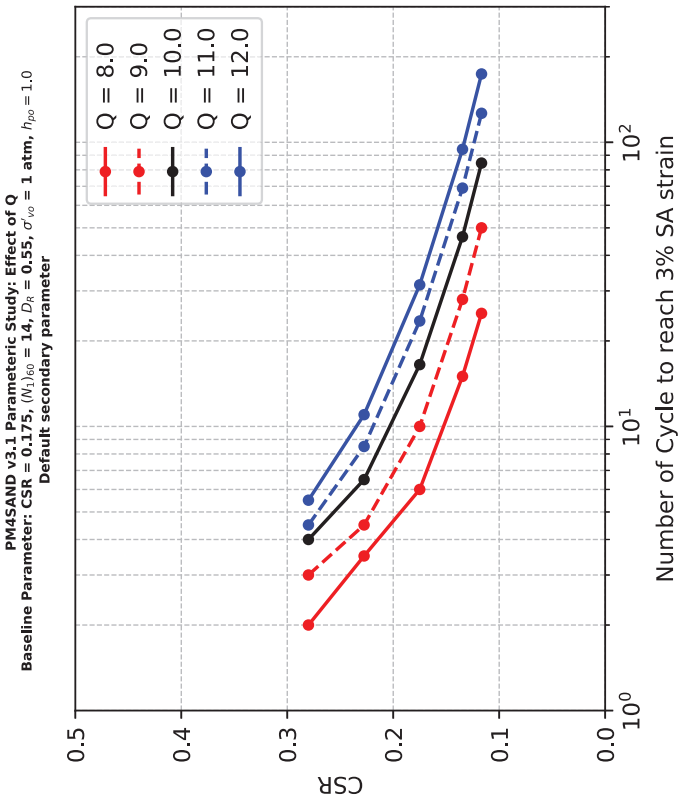

PM4SAND v3.1 Parameteric Study: Effect of C_{GD}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
C_{GD} = 0.5
C_{GD} = 1.0
C_{GD} = 2.0
C_{GD} = 5.0
C_{GD} = 10.0
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of C_{GD}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

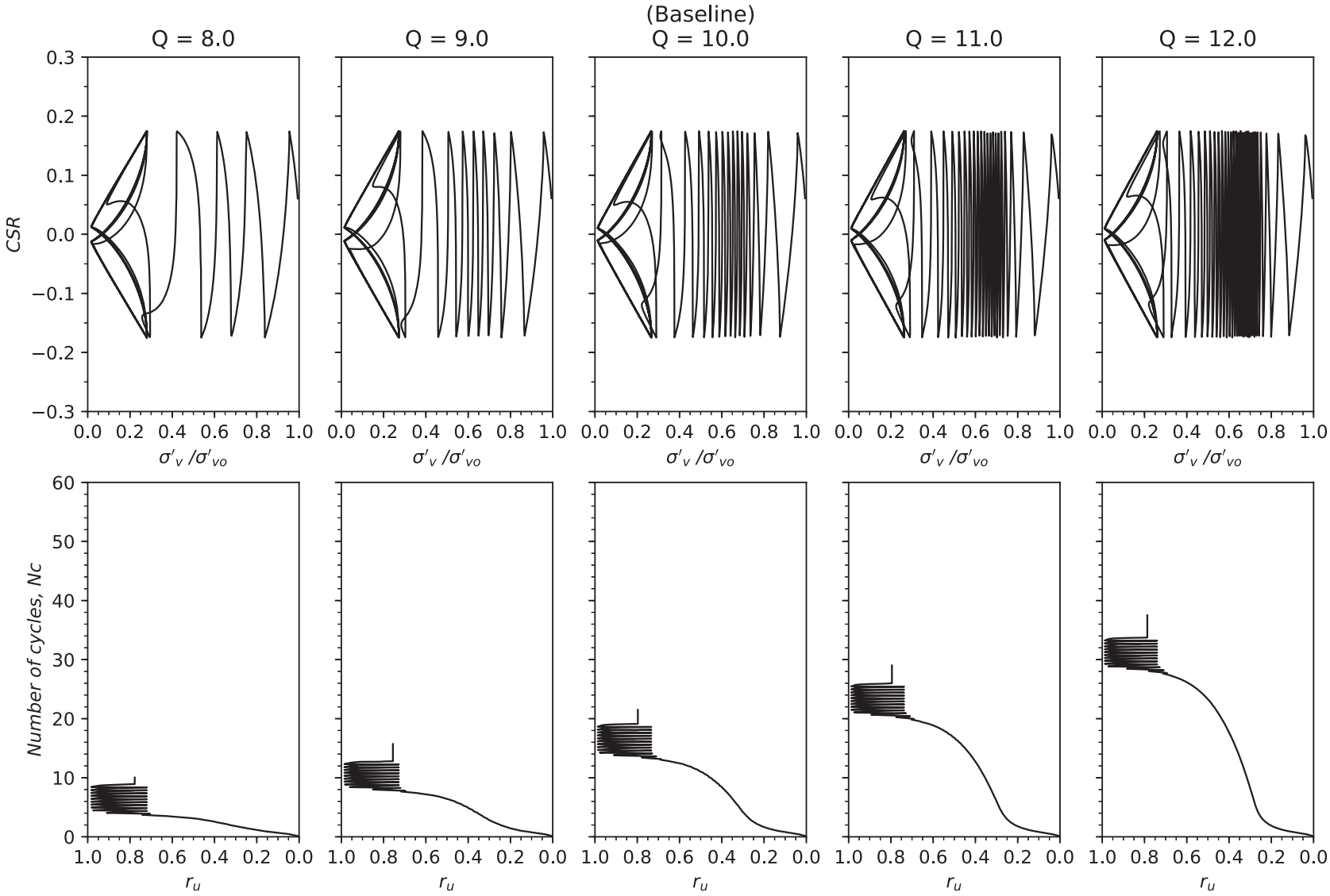


PM4SAND v3.1 Parameteric Study: Effect of C_{GD}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

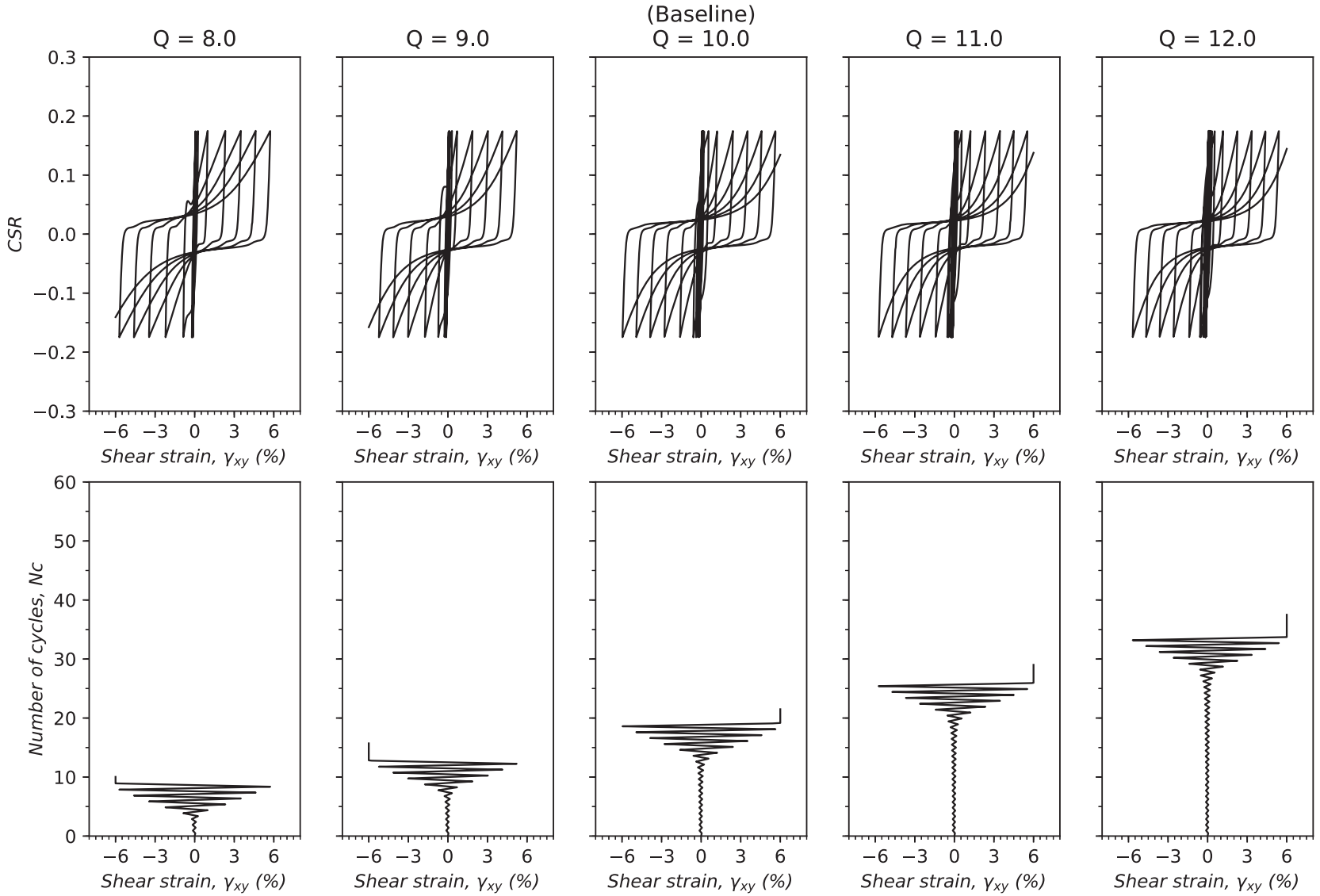


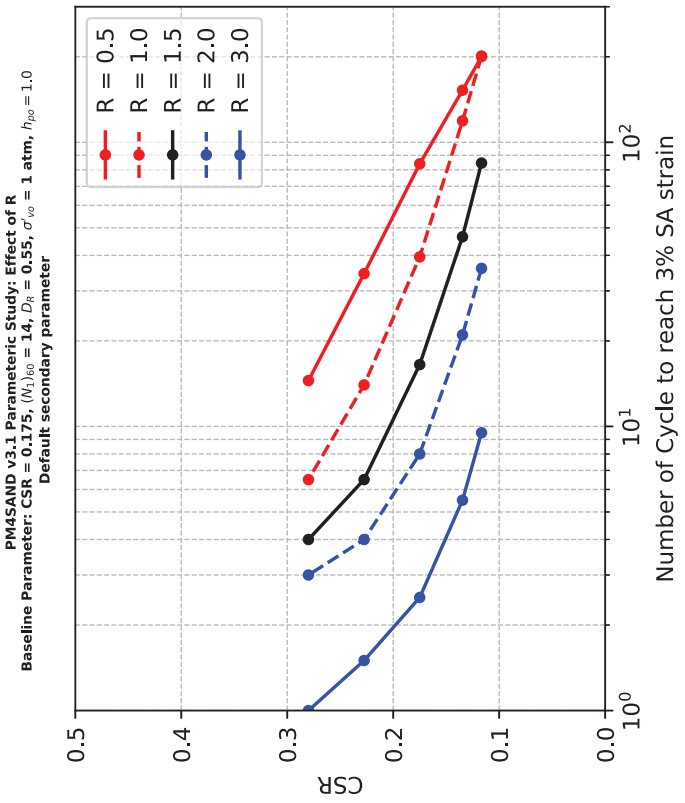

PM4SAND v3.1 Parameteric Study: Effect of Q
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
Q = 8.0
Q = 9.0
Q = 10.0
Q = 11.0
Q = 12.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of Q
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

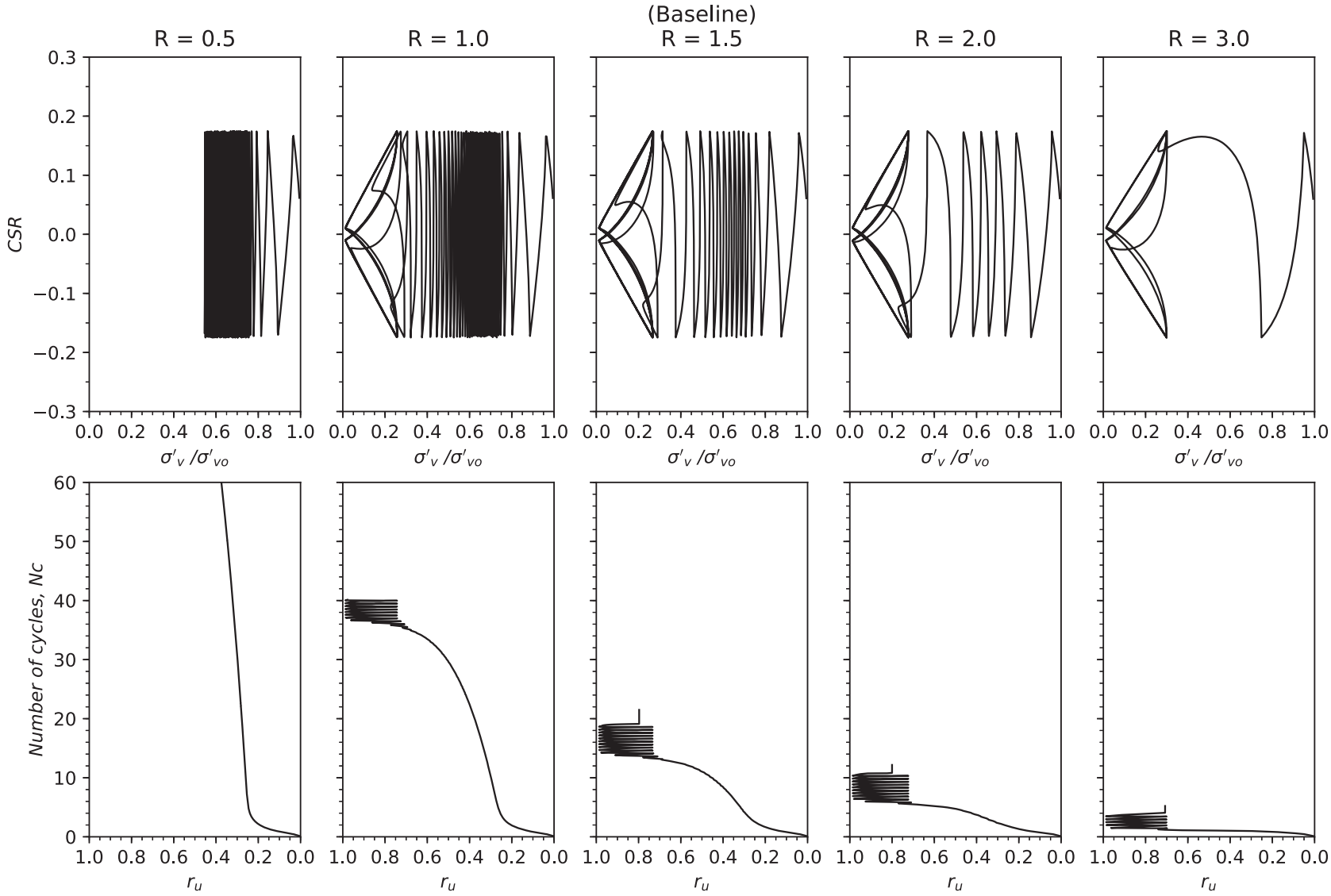


PM4SAND v3.1 Parameteric Study: Effect of Q
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

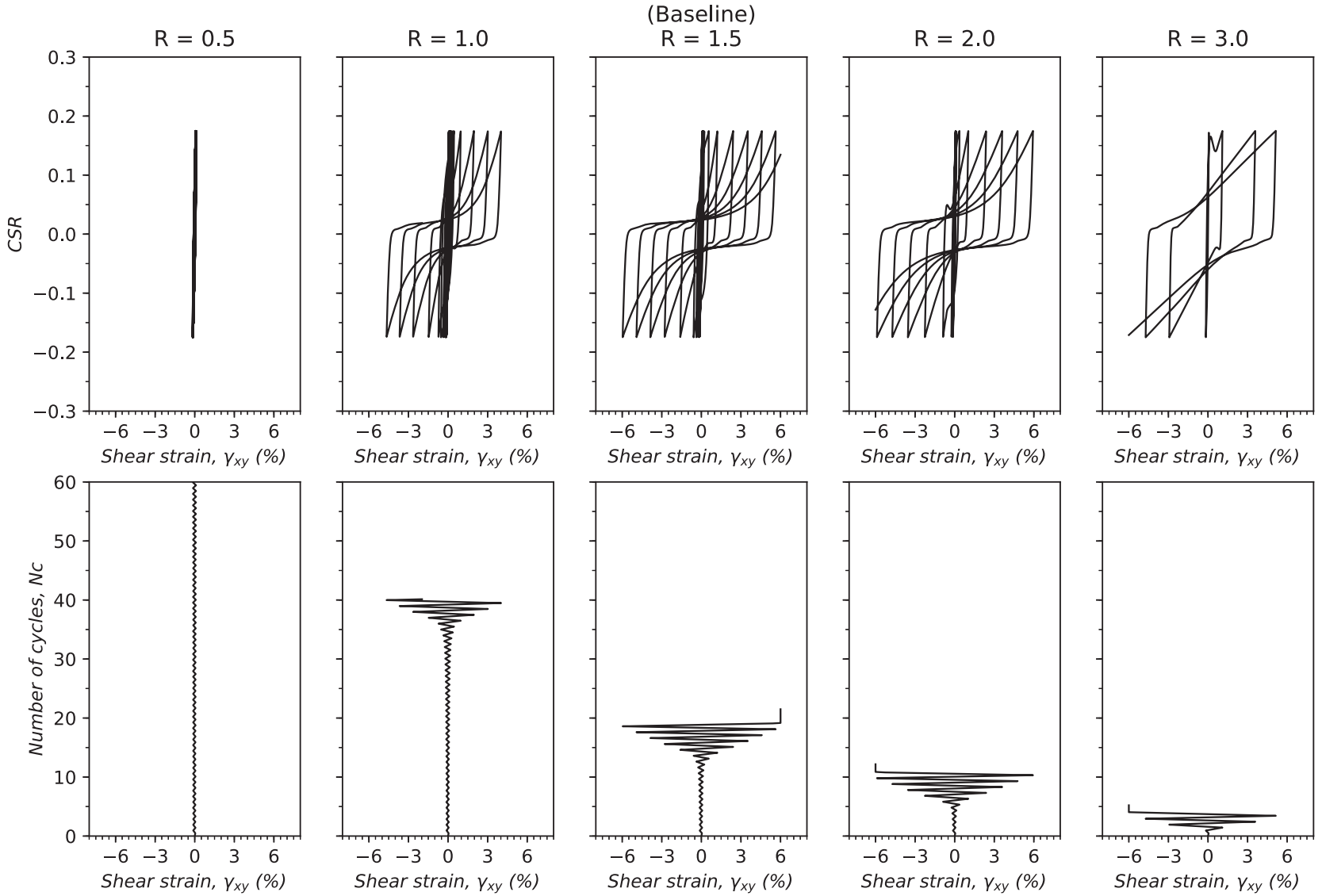


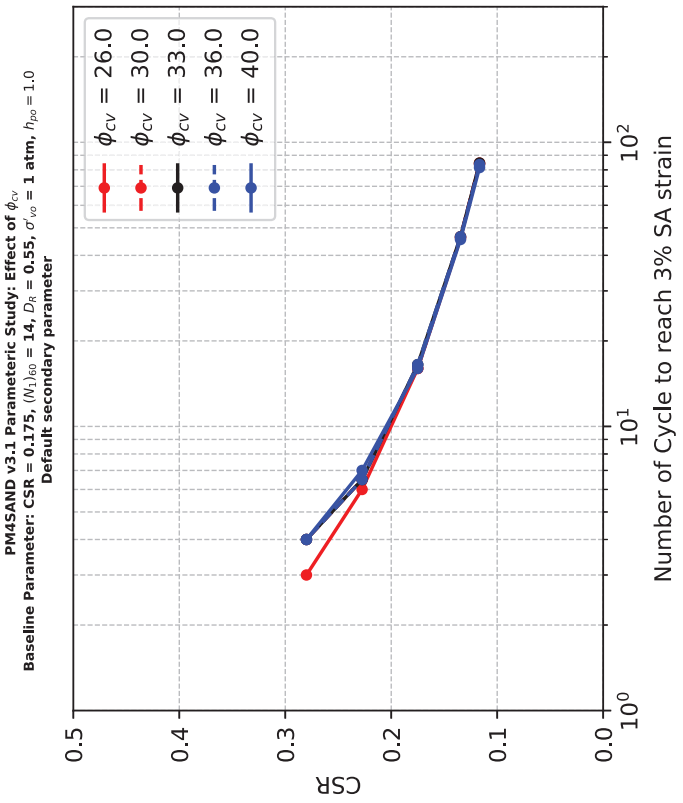

PM4SAND v3.1 Parameteric Study: Effect of R
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
R = 0.5
R = 1.0
R = 1.5
R = 2.0
R = 3.0
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of R
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

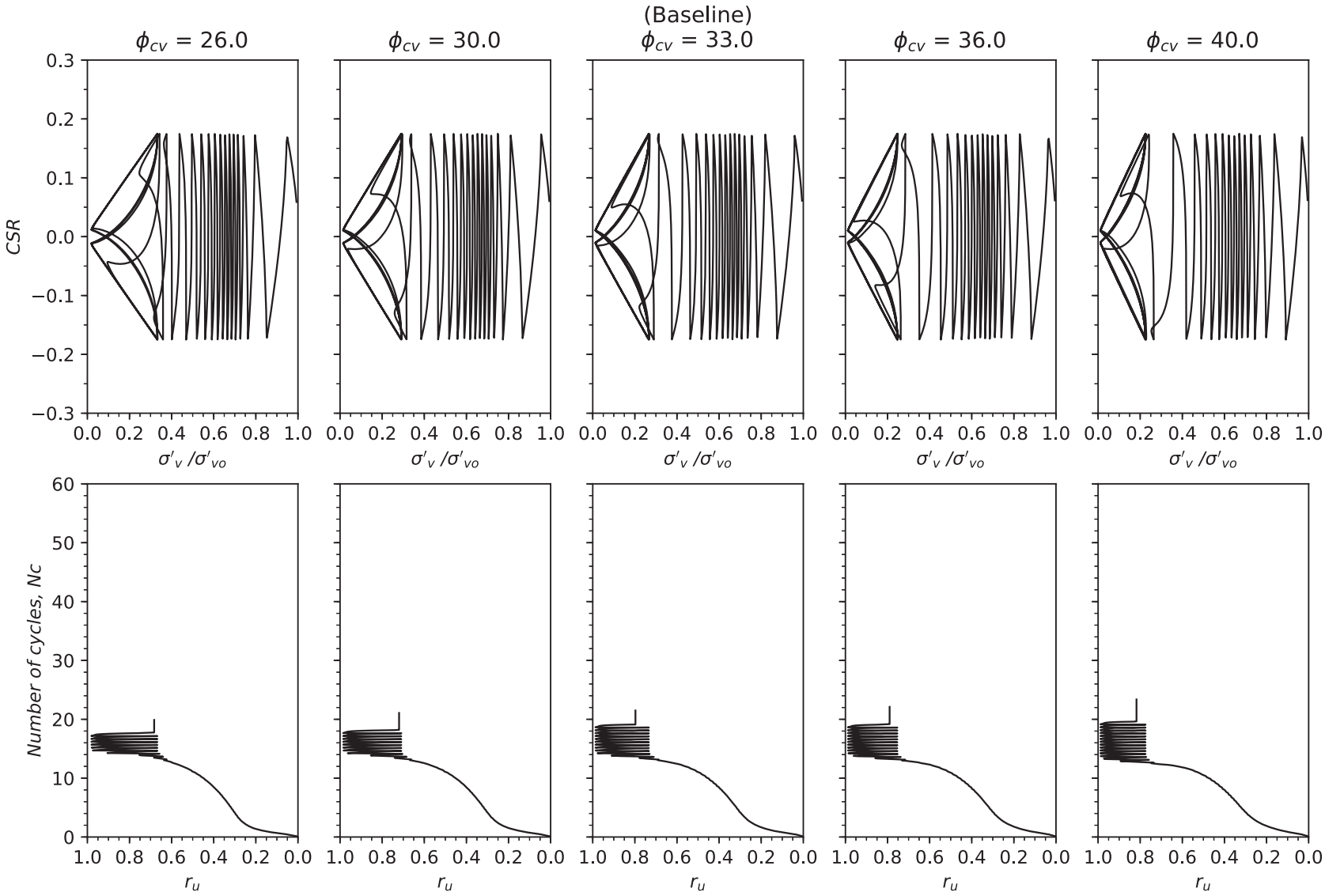


PM4SAND v3.1 Parameteric Study: Effect of R
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

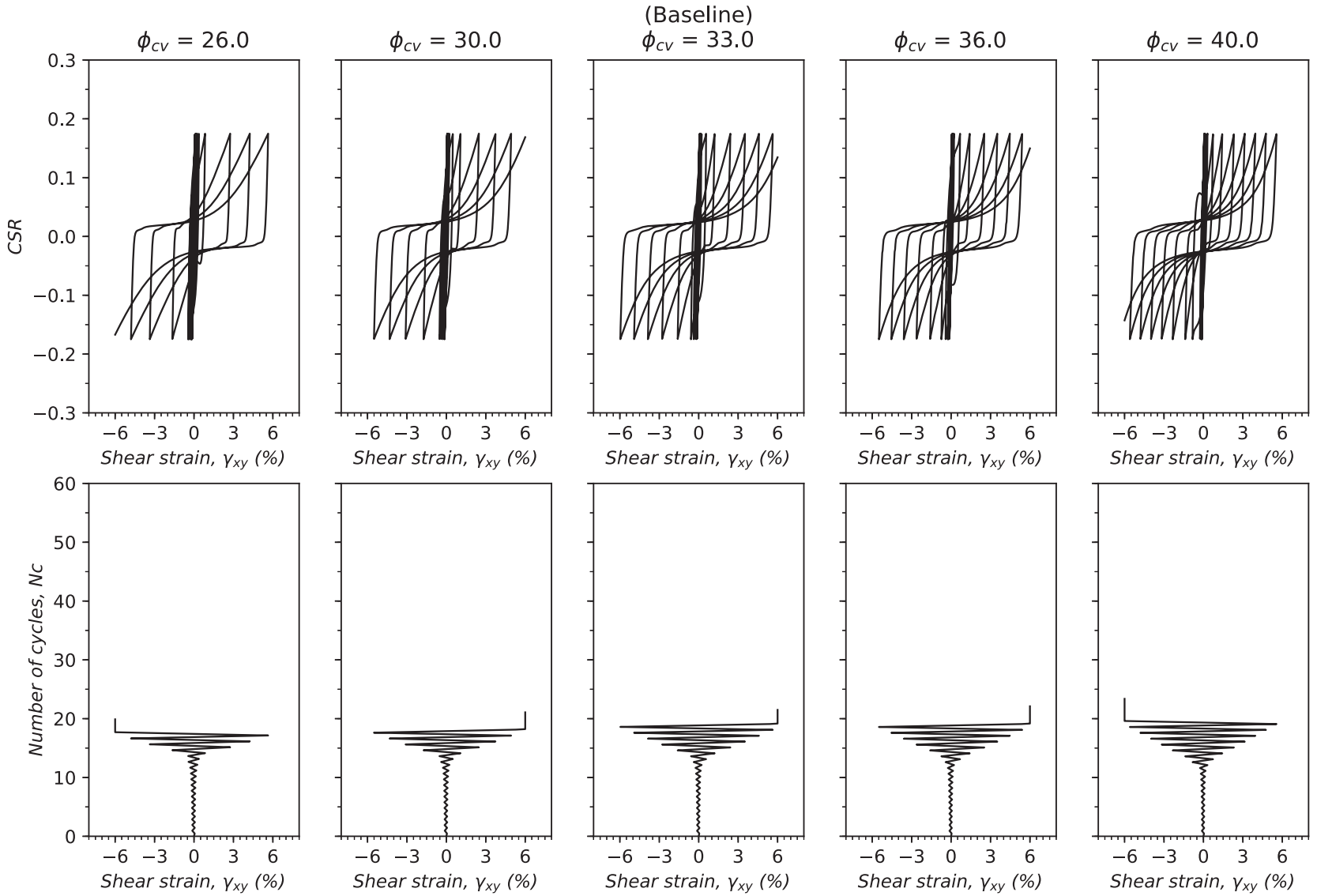


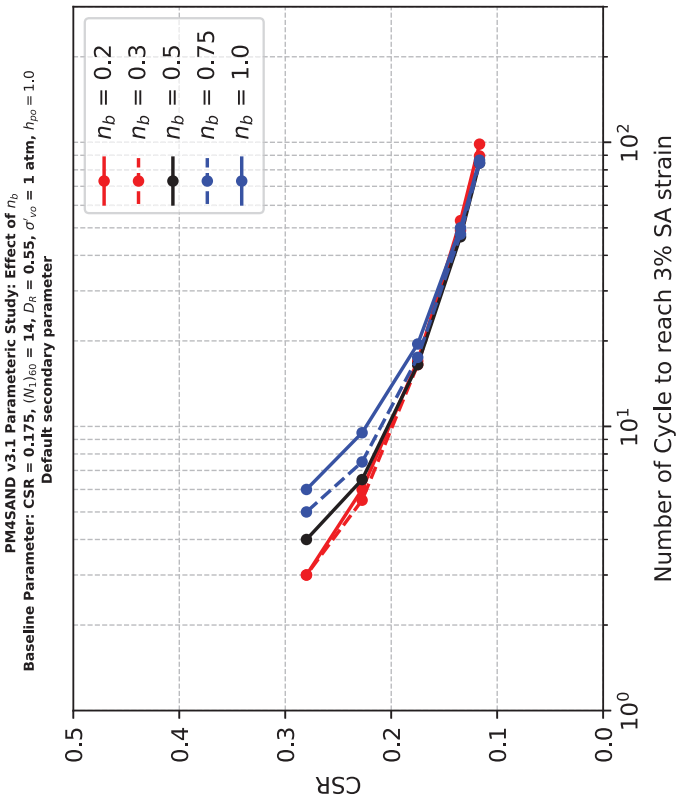

PM4SAND v3.1 Parameteric Study: Effect of ϕ_{cv}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
ϕ_{cv} = 26.0
ϕ_{cv} = 30.0
ϕ_{cv} = 33.0
ϕ_{cv} = 36.0
ϕ_{cv} = 40.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of ϕ_{cv}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

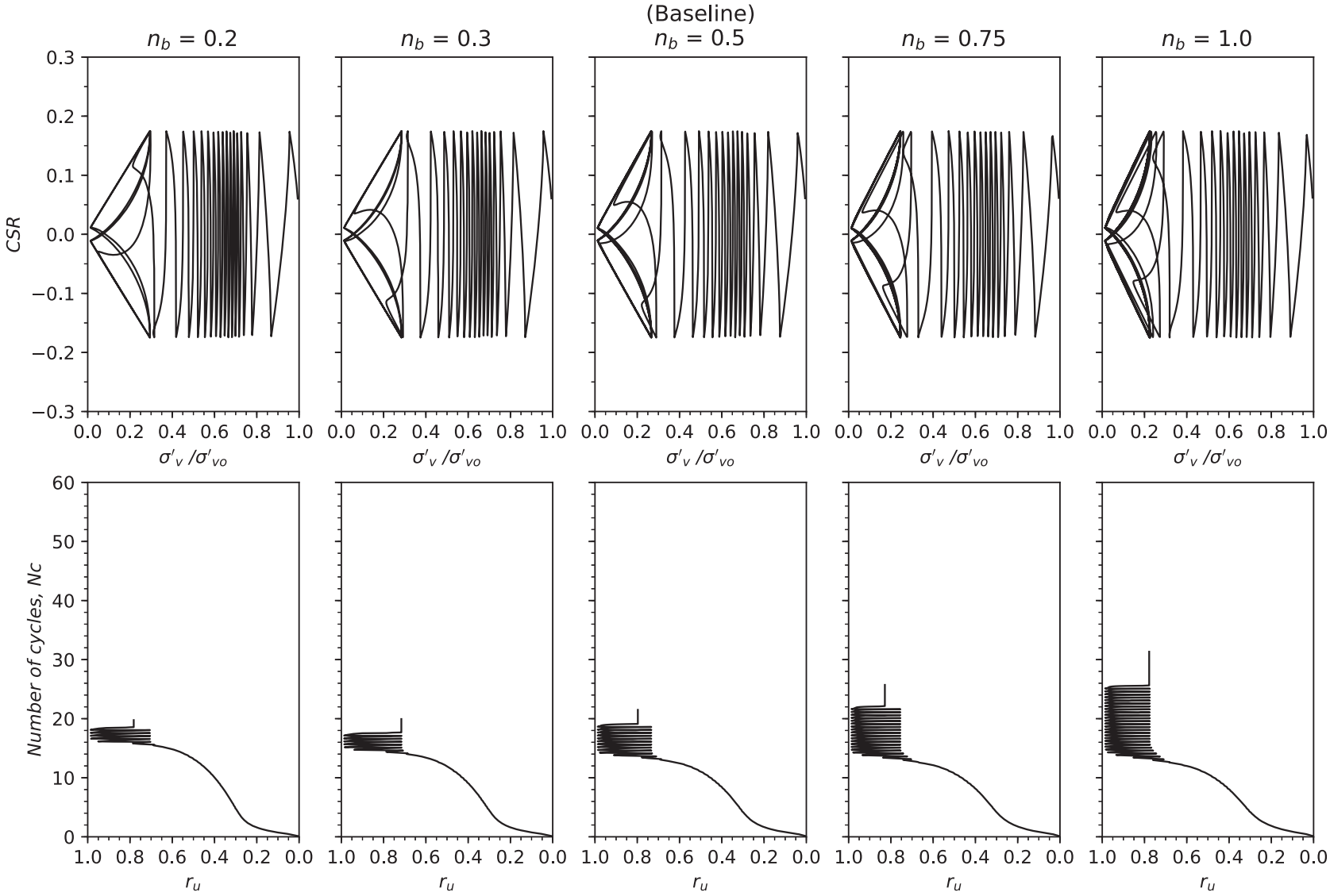


PM4SAND v3.1 Parameteric Study: Effect of ϕ_{cv}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

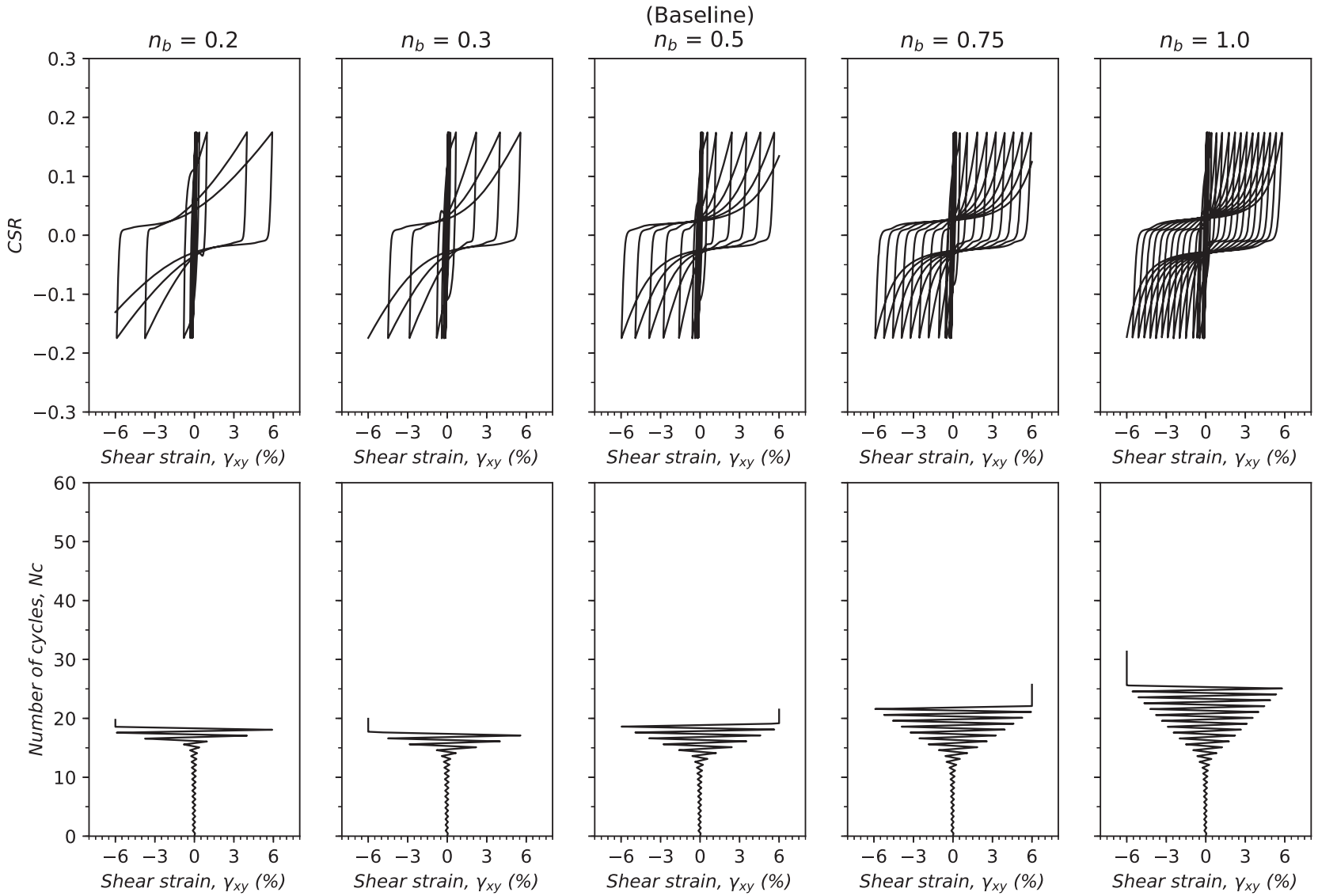


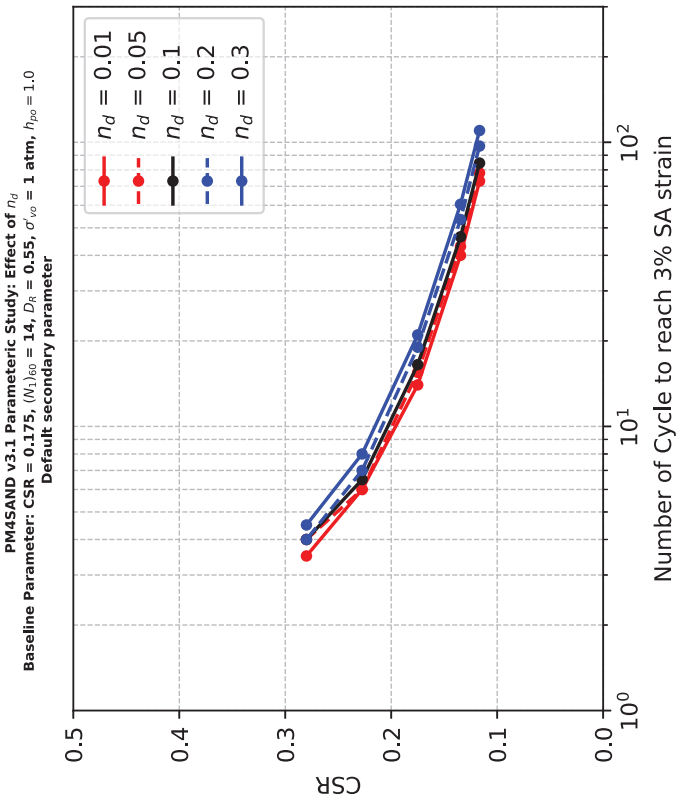

PM4SAND v3.1 Parameteric Study: Effect of n_b
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
n_b = 0.2
n_b = 0.3
n_b = 0.5
n_b = 0.75
n_b = 1.0
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of n_b
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

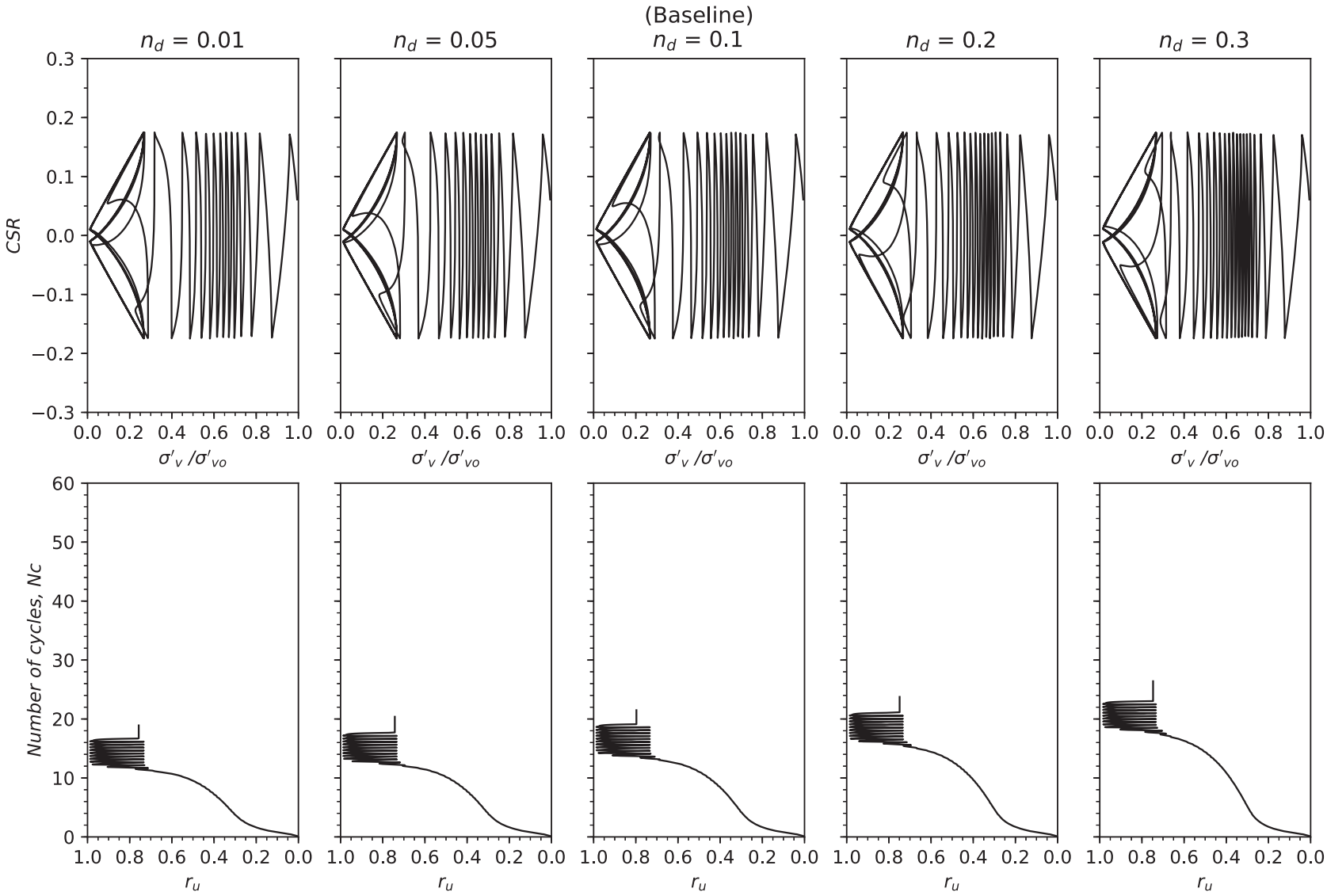


PM4SAND v3.1 Parameteric Study: Effect of n_b
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

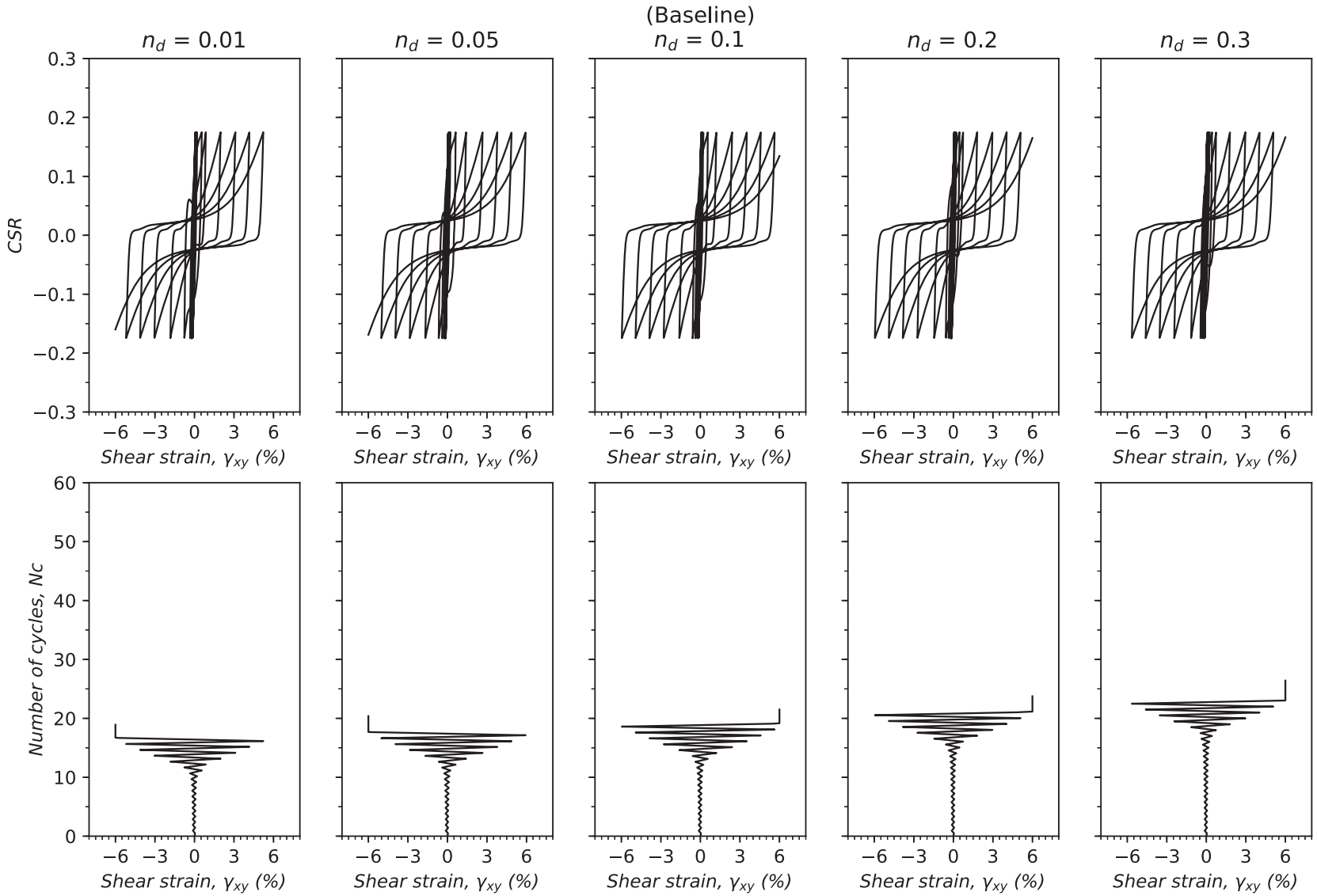


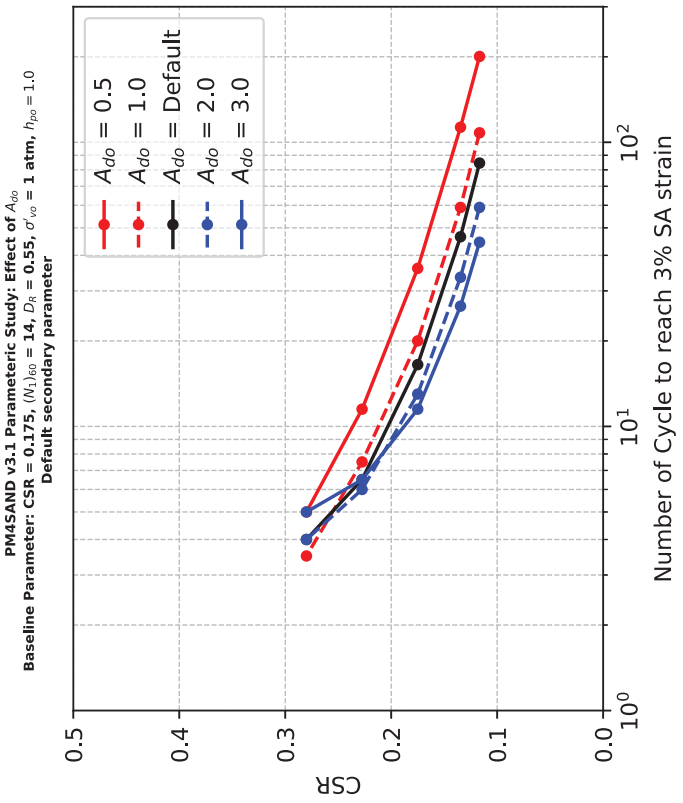

PM4SAND v3.1 Parameteric Study: Effect of n_d
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
n_d = 0.01
n_d = 0.05
n_d = 0.1
n_d = 0.2
n_d = 0.3
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of n_d
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

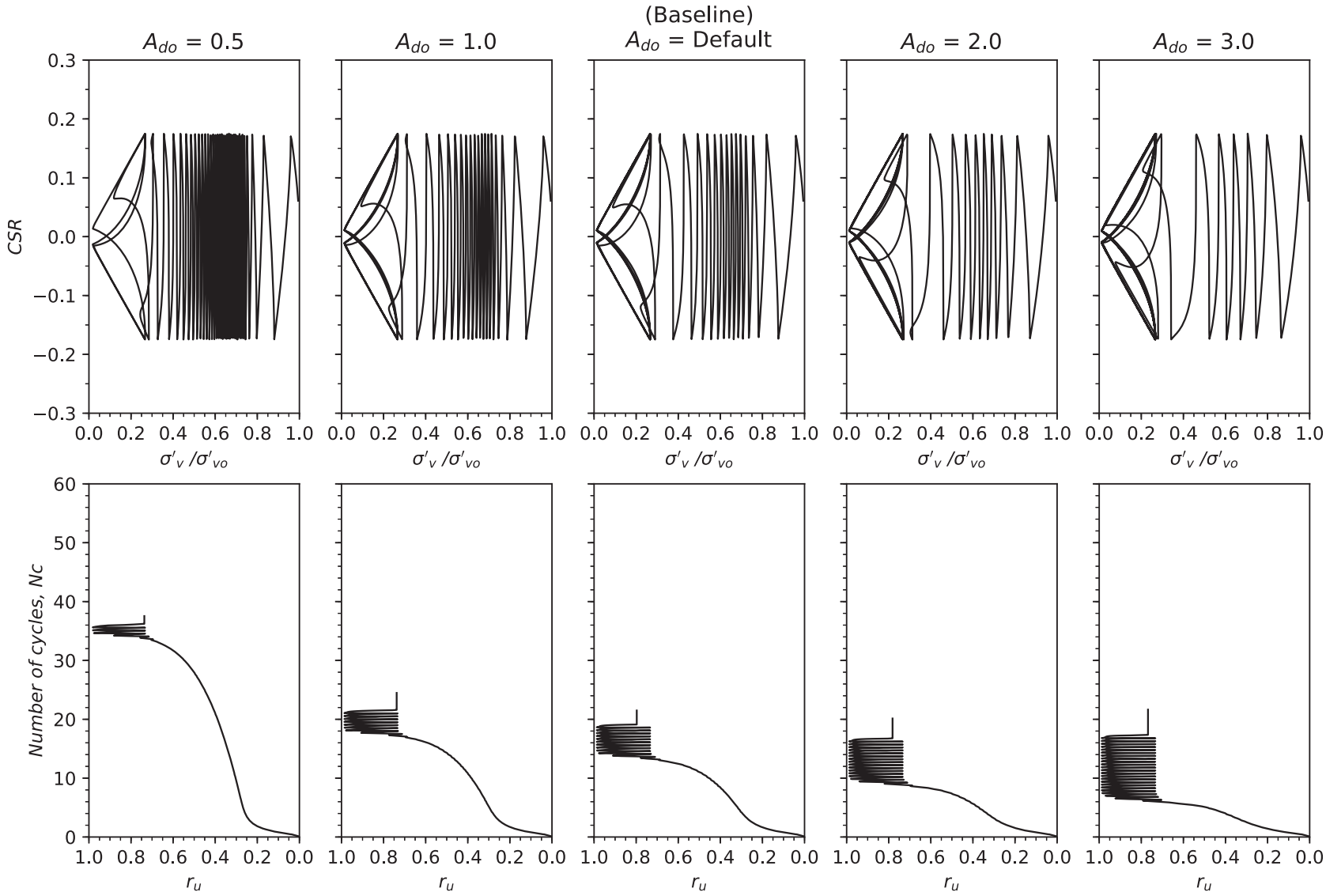


PM4SAND v3.1 Parameteric Study: Effect of n_d
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

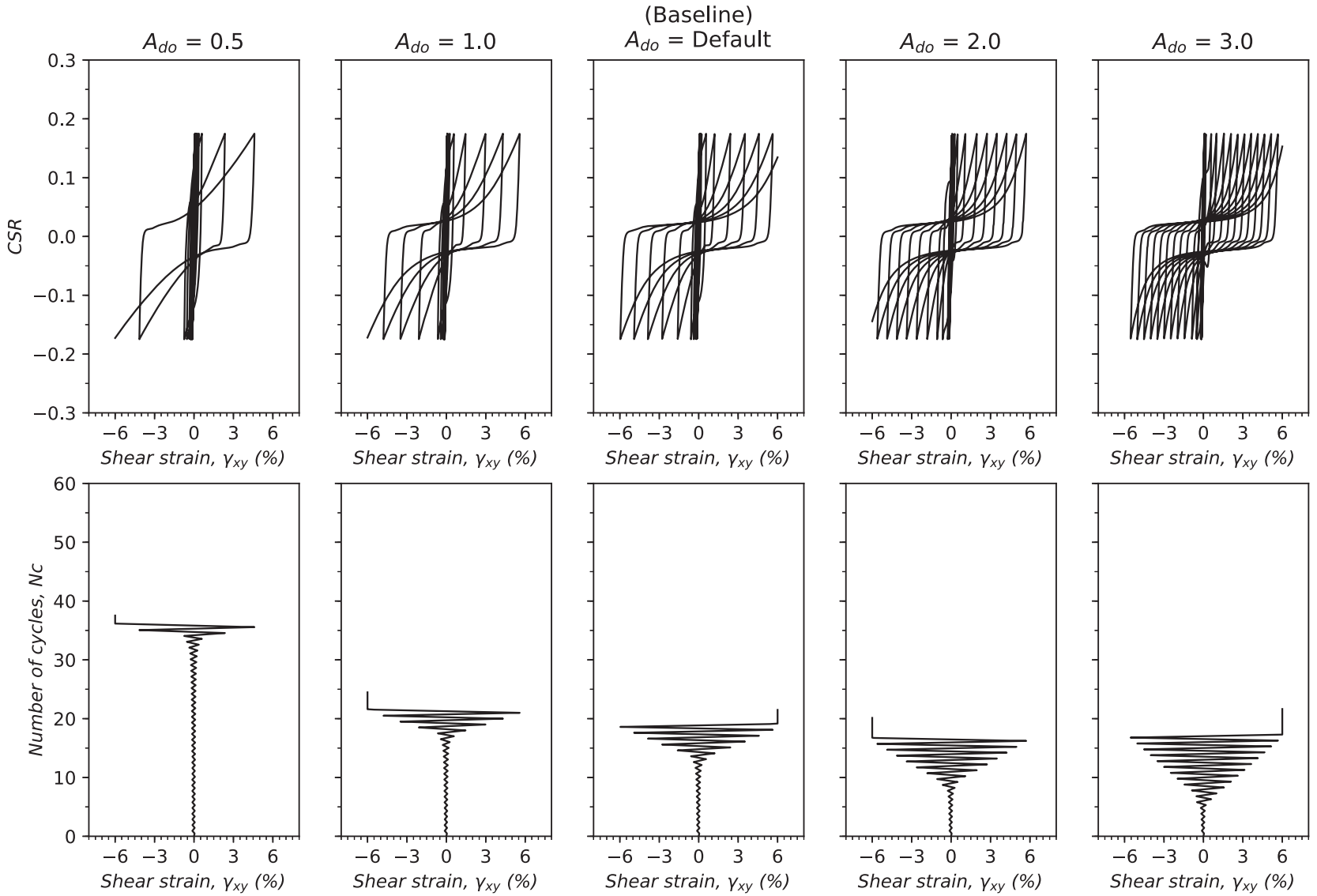


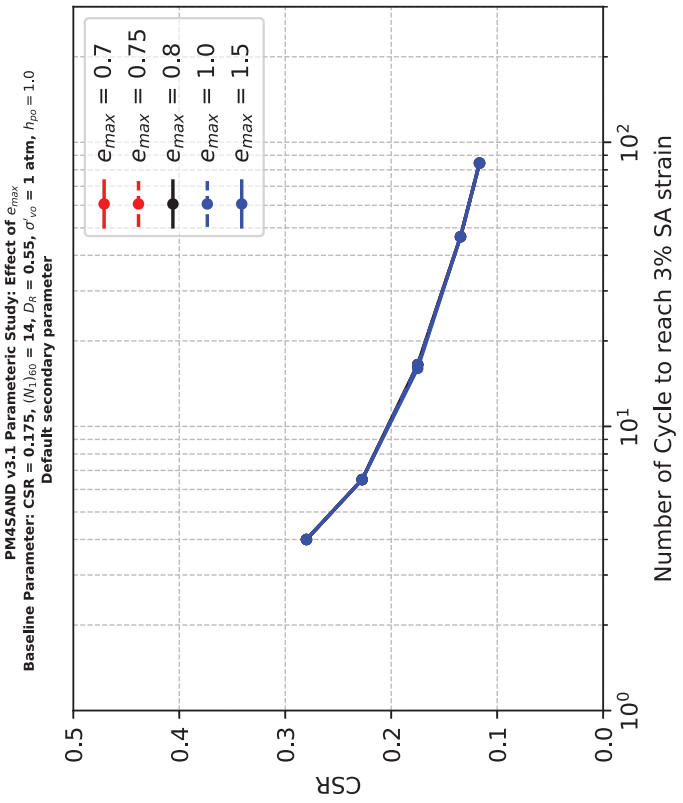

PM4SAND v3.1 Parameteric Study: Effect of A_{do}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
A_{do} = 0.5
A_{do} = 1.0
A_{do} = Default
A_{do} = 2.0
A_{do} = 3.0
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of A_{do}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

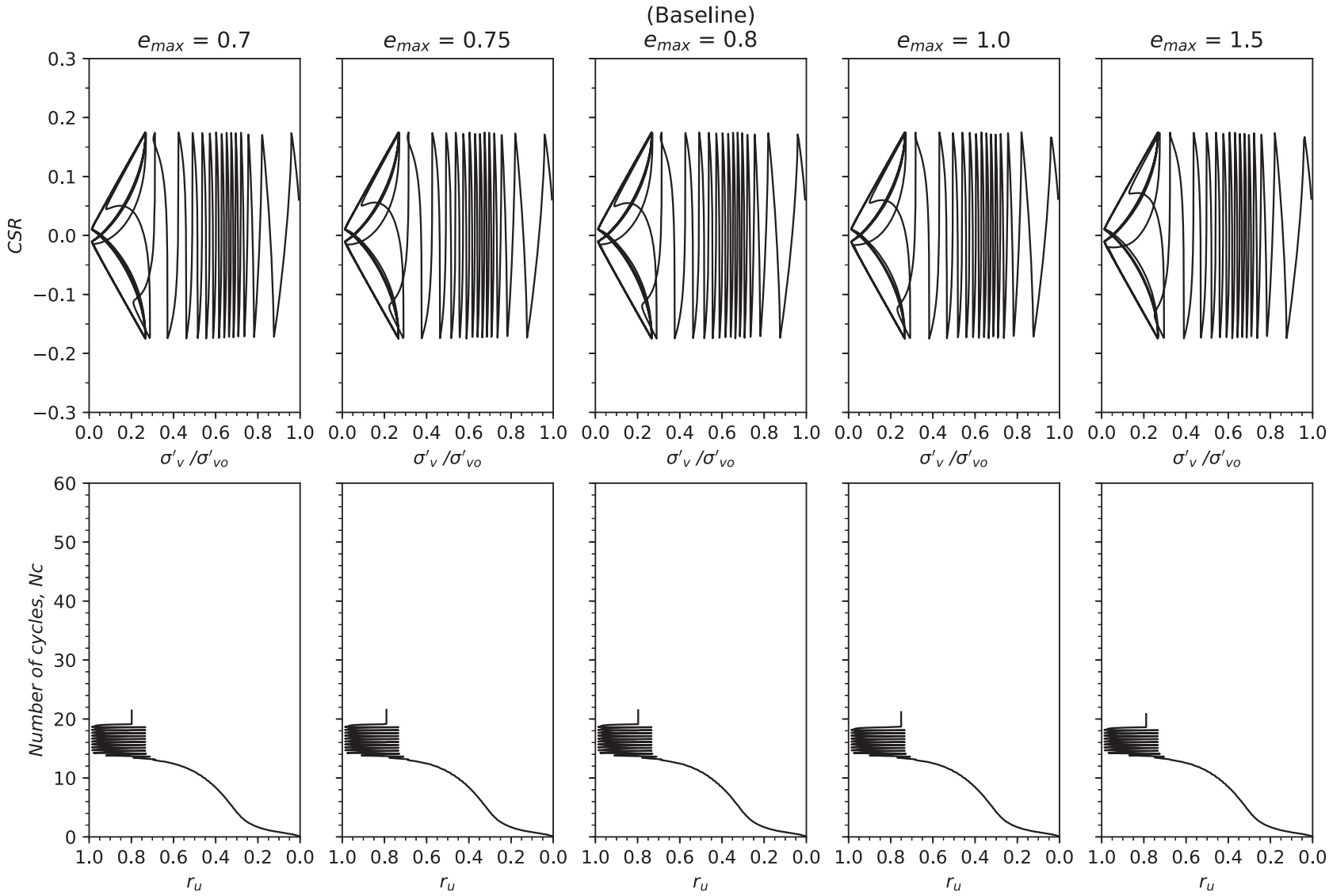


PM4SAND v3.1 Parameteric Study: Effect of A_{do}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

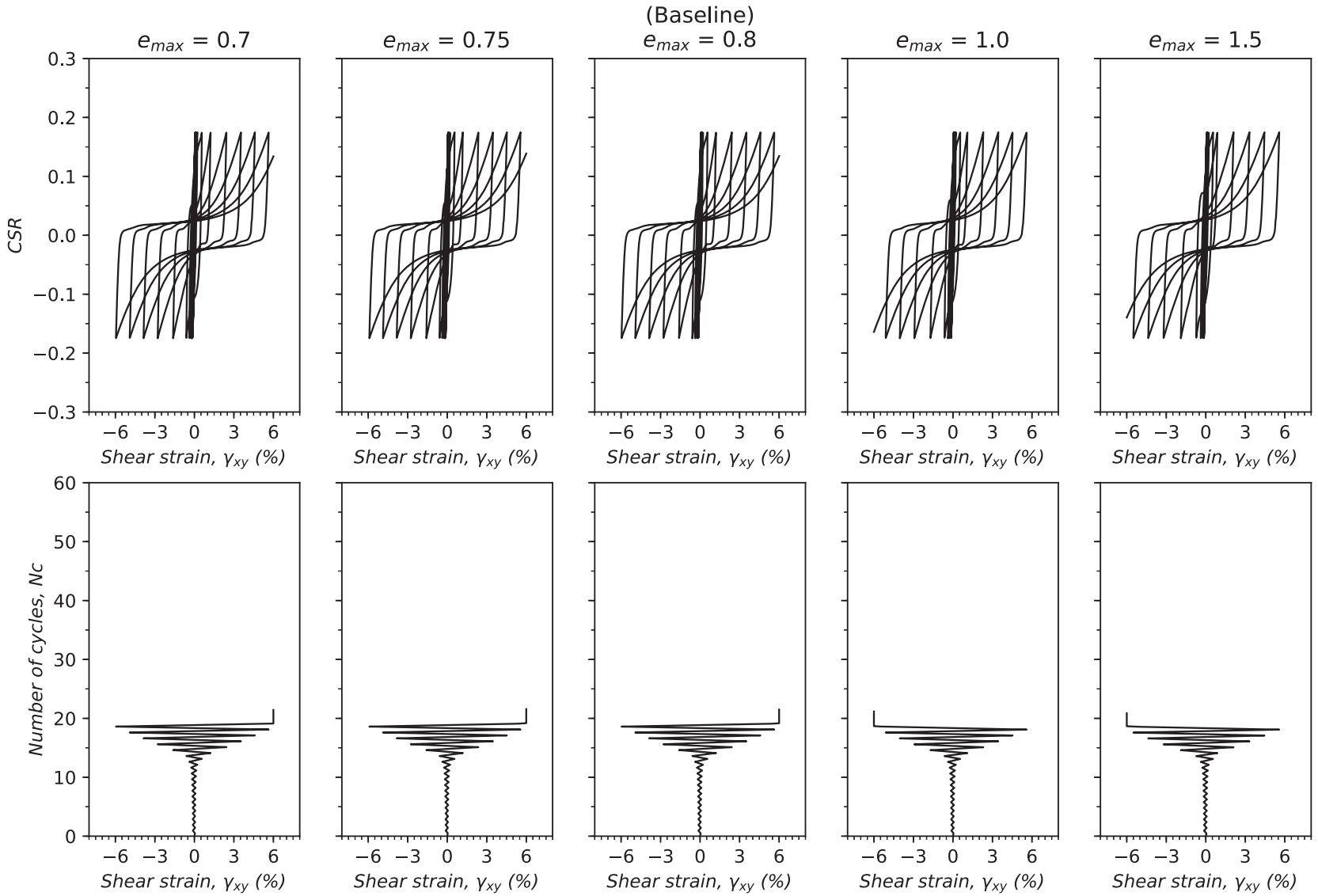


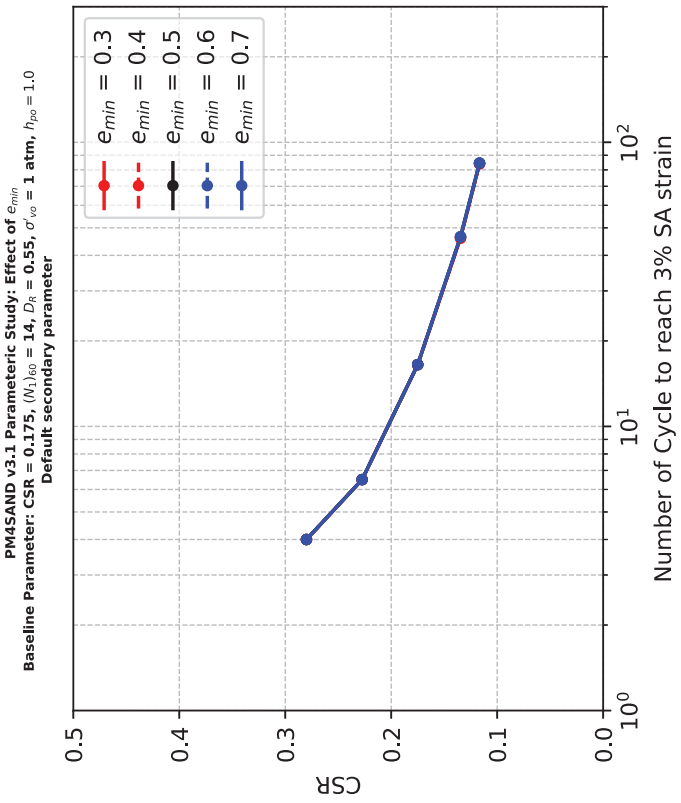

PM4SAND v3.1 Parameteric Study: Effect of e_{max}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
e_{max} = 0.7
e_{max} = 0.75
e_{max} = 0.8
e_{max} = 1.0
e_{max} = 1.5
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of e_{max}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

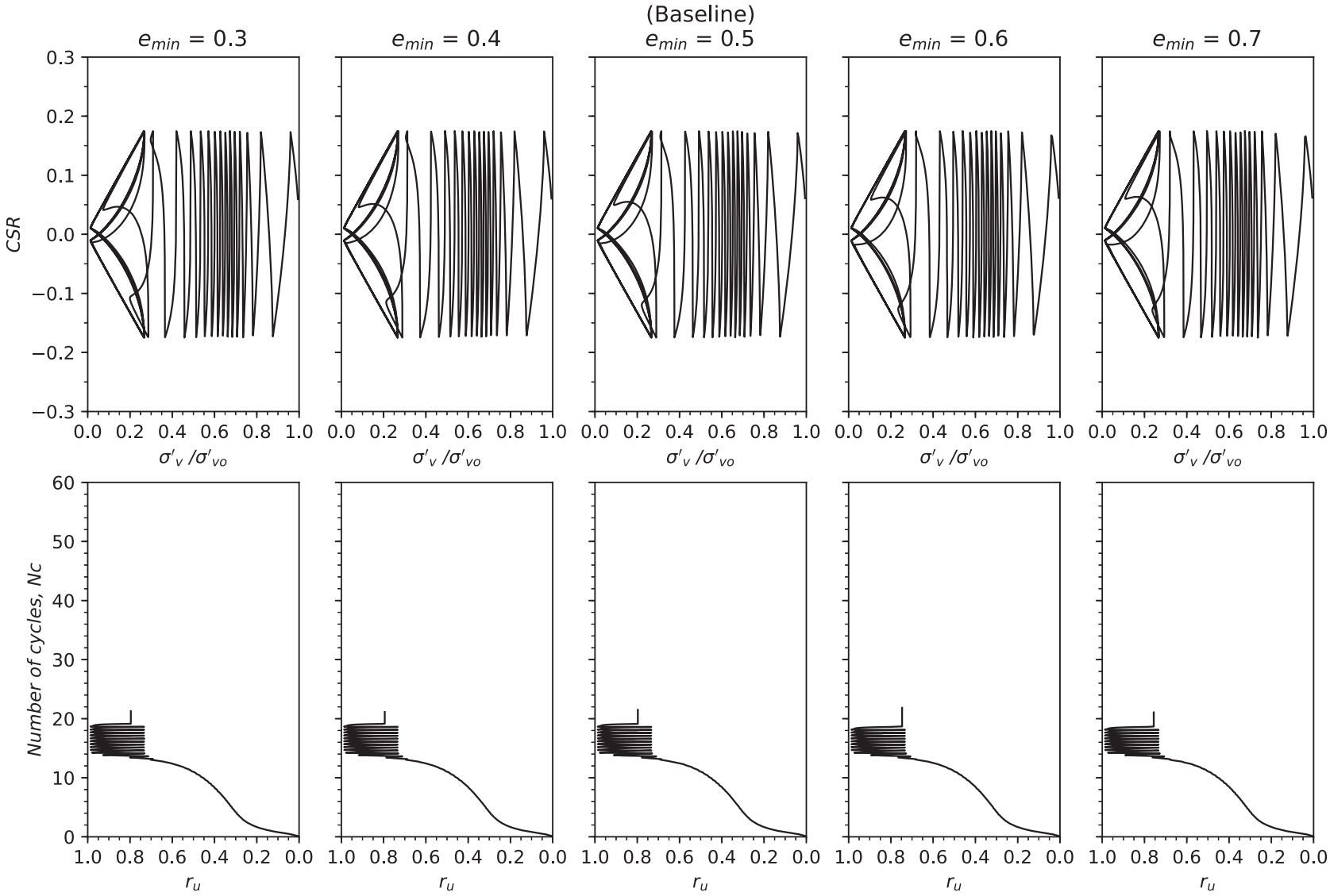


PM4SAND v3.1 Parameteric Study: Effect of e_{max}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

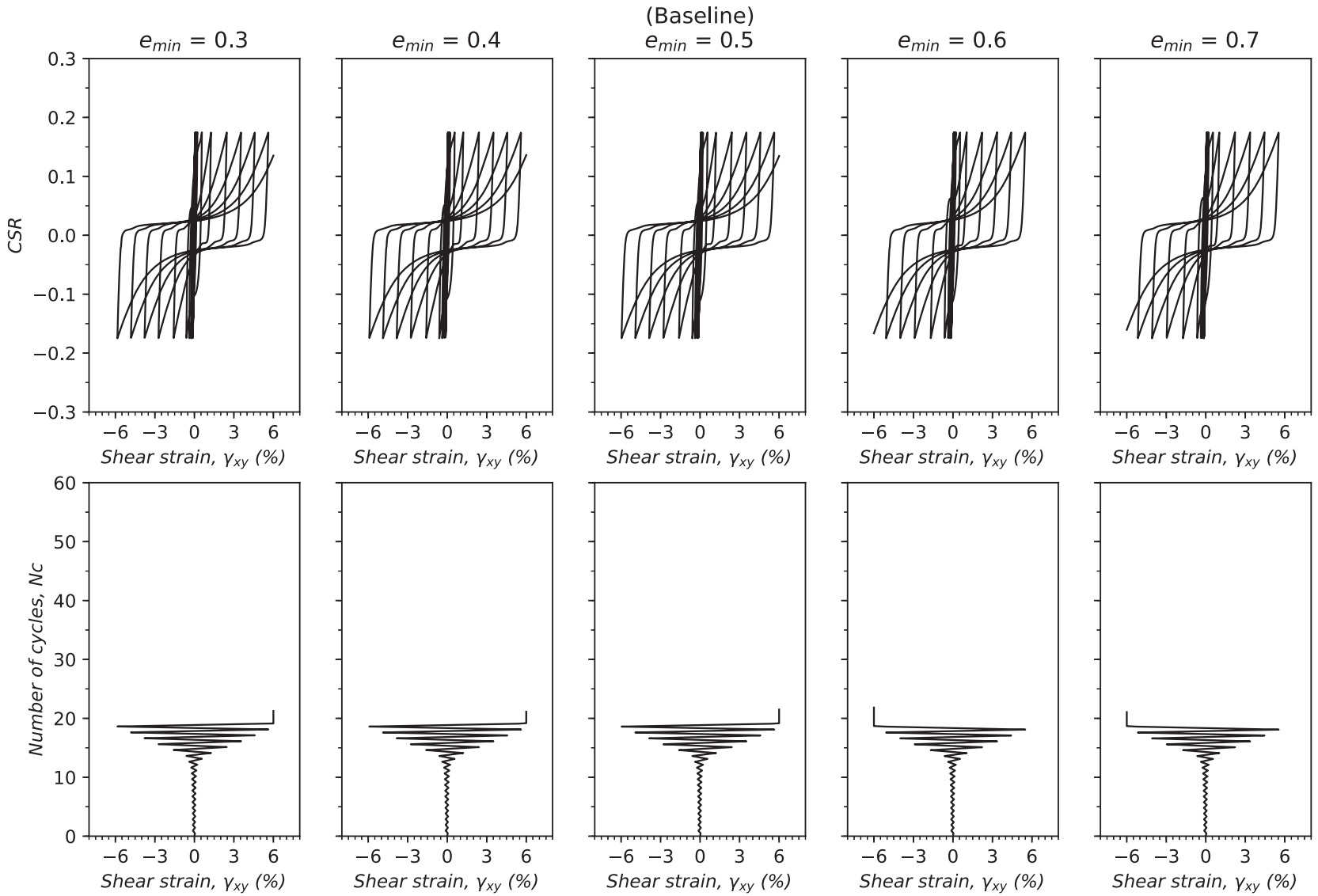


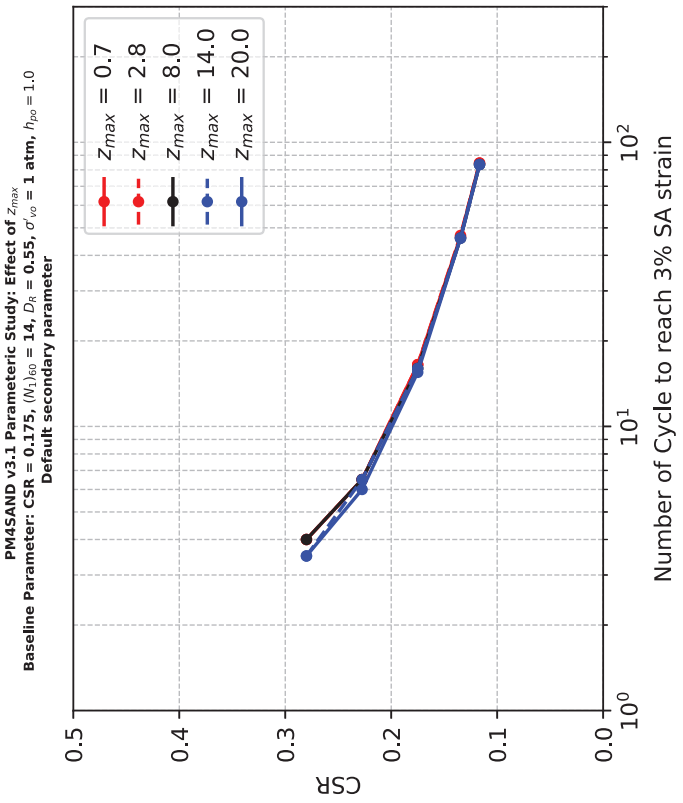

PM4SAND v3.1 Parameteric Study: Effect of e_{min}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
e_{min} = 0.3
e_{min} = 0.4
e_{min} = 0.5
e_{min} = 0.6
e_{min} = 0.7
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of e_{min}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

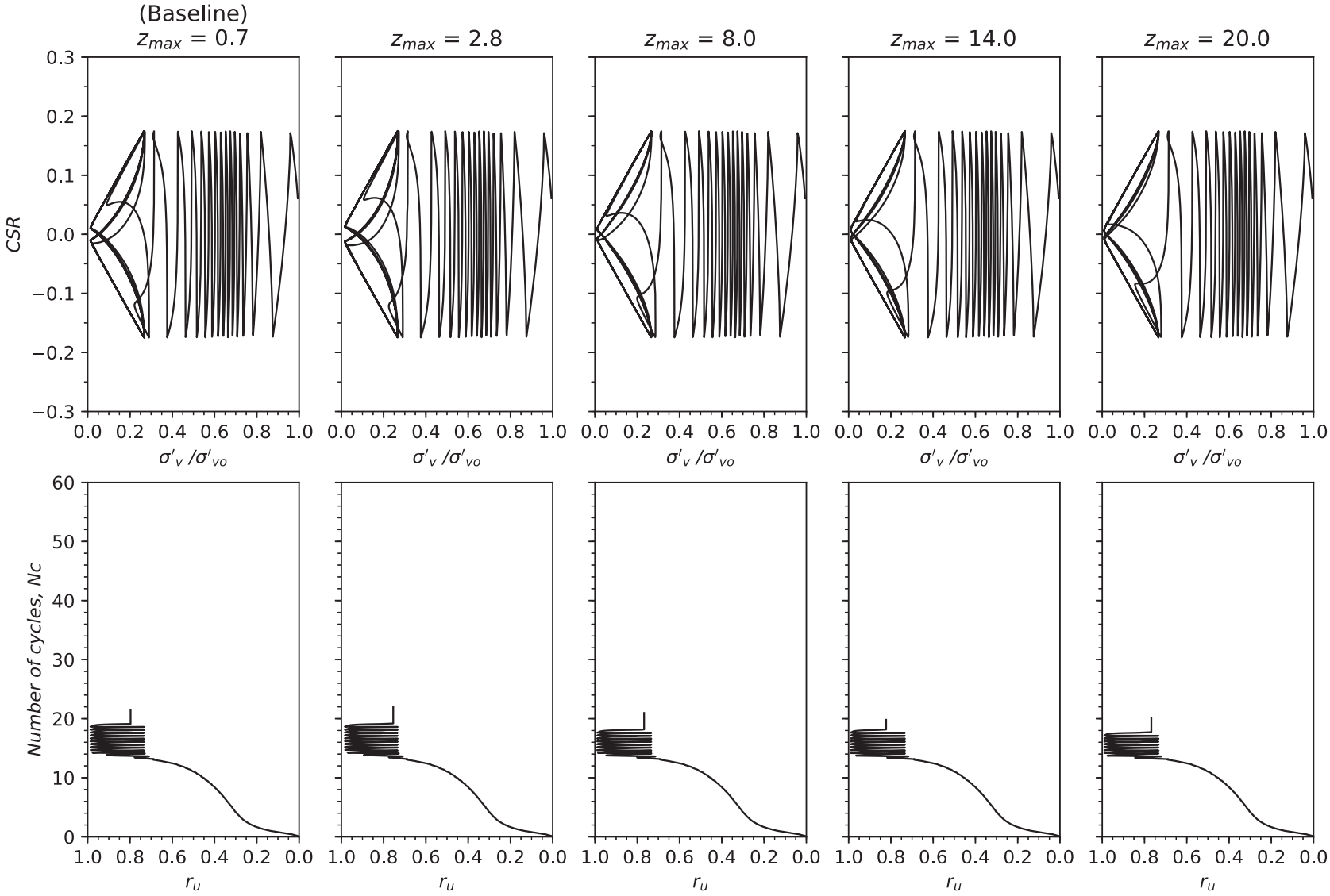


PM4SAND v3.1 Parameteric Study: Effect of e_{min}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

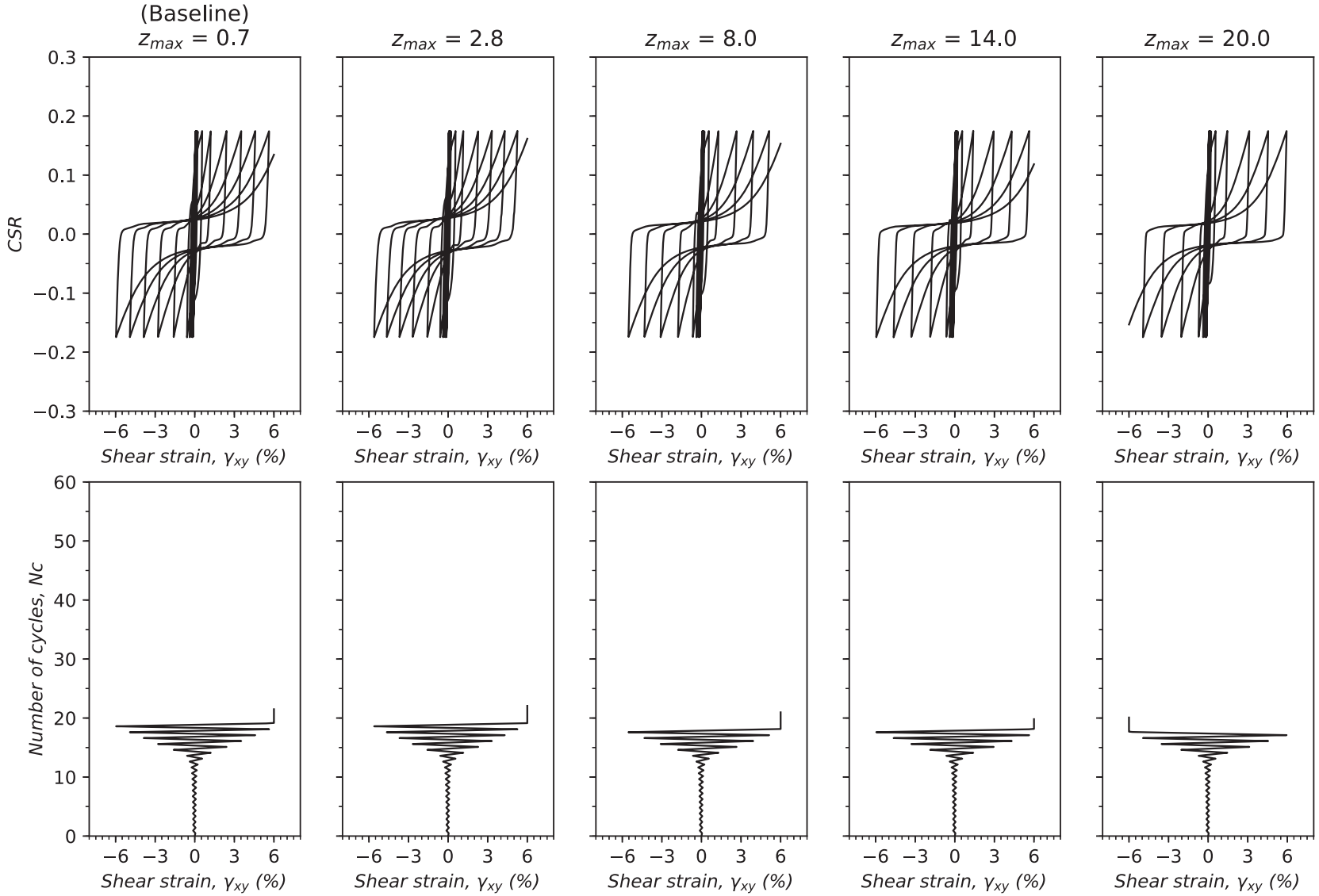


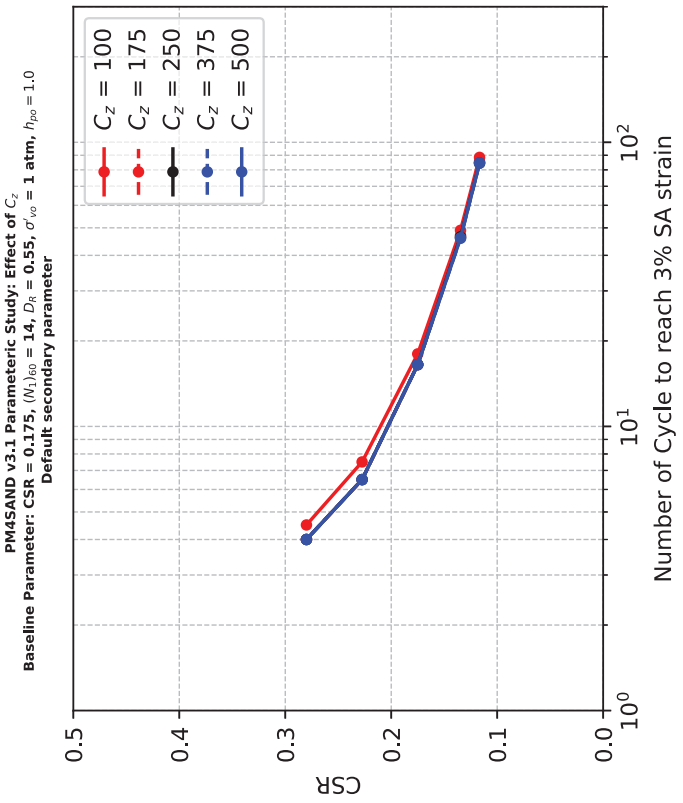

PM4SAND v3.1 Parameteric Study: Effect of z_{max}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
z_{max} = 0.7
z_{max} = 2.8
z_{max} = 8.0
z_{max} = 14.0
z_{max} = 20.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of z_{max}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

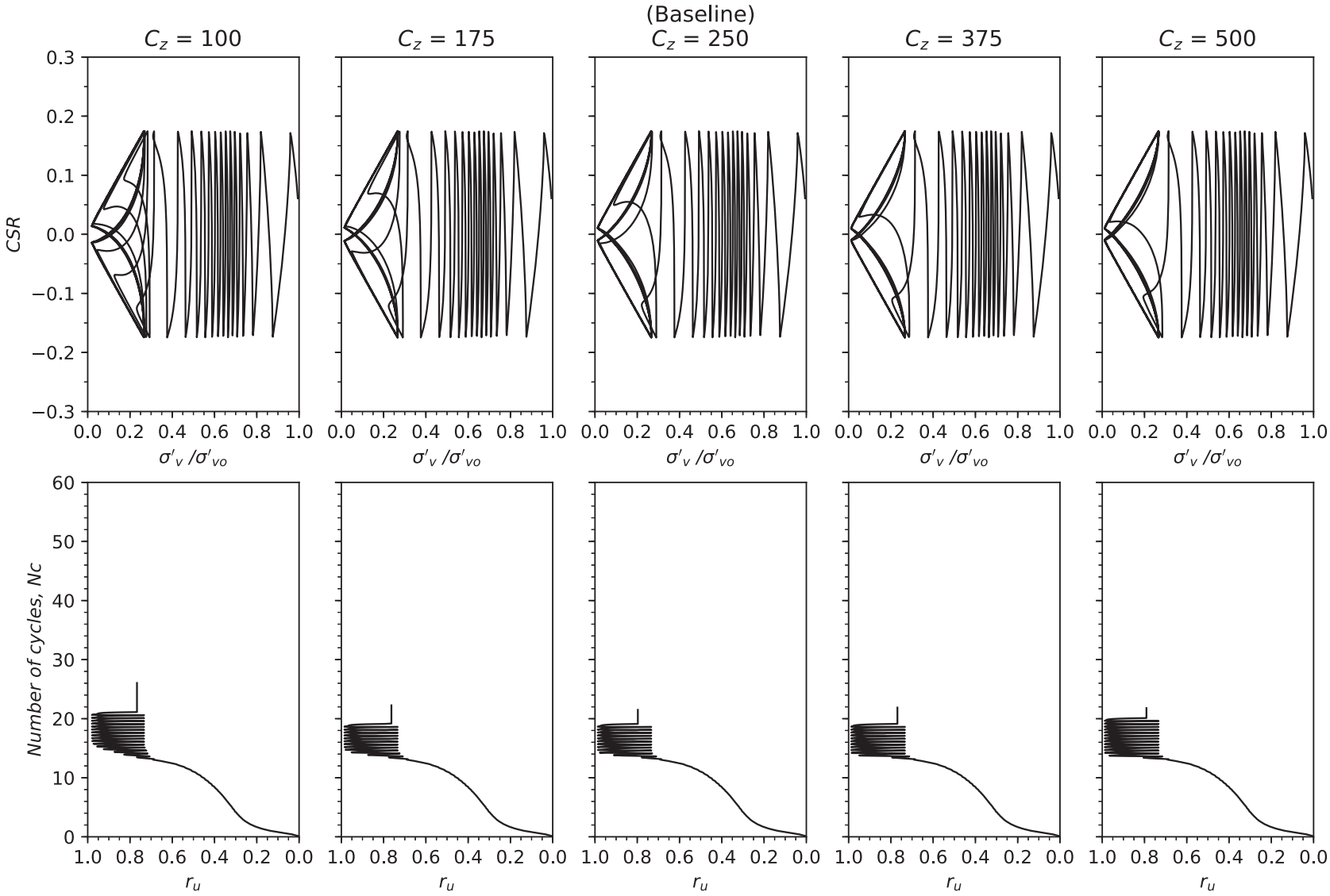


PM4SAND v3.1 Parameteric Study: Effect of z_{max}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

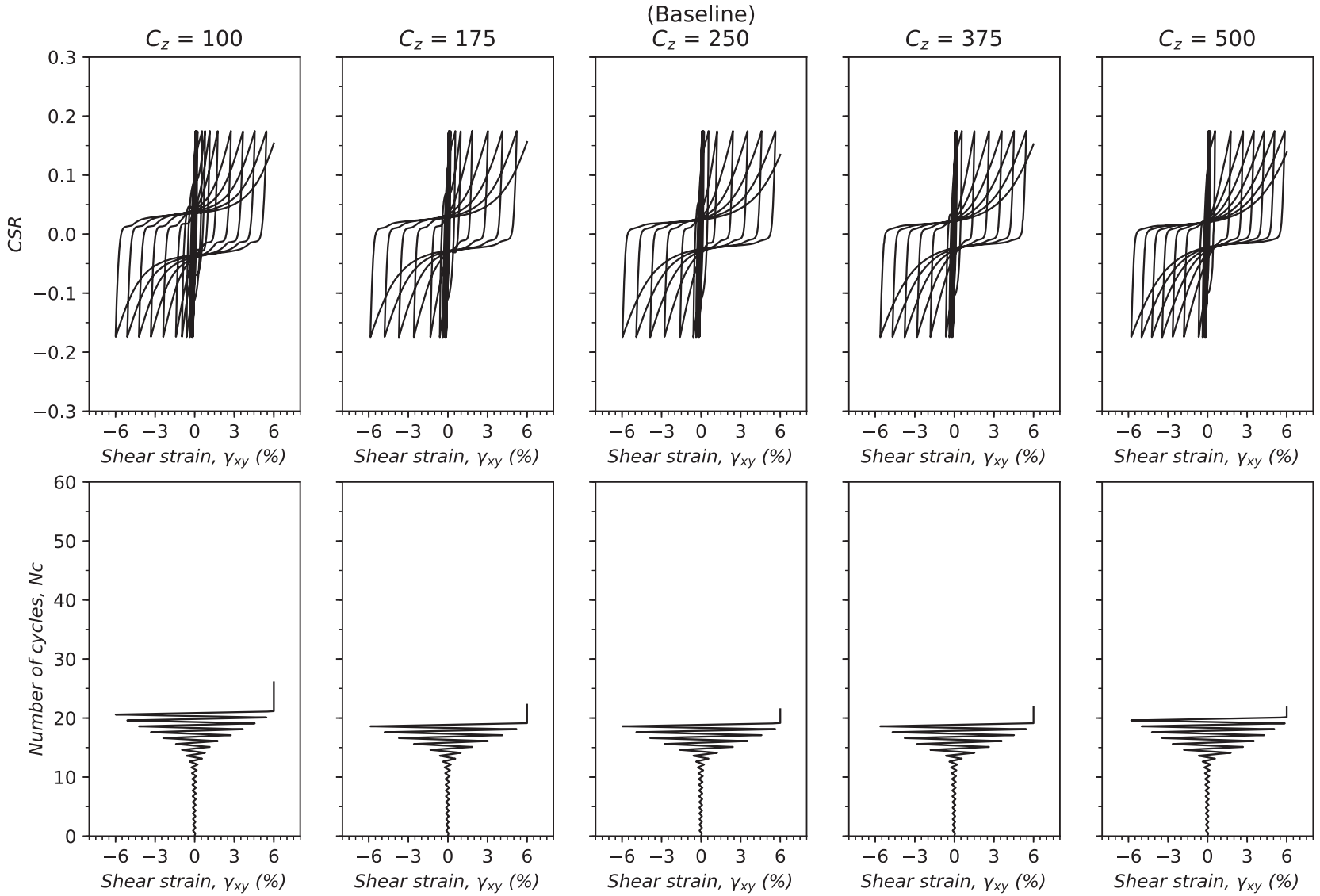


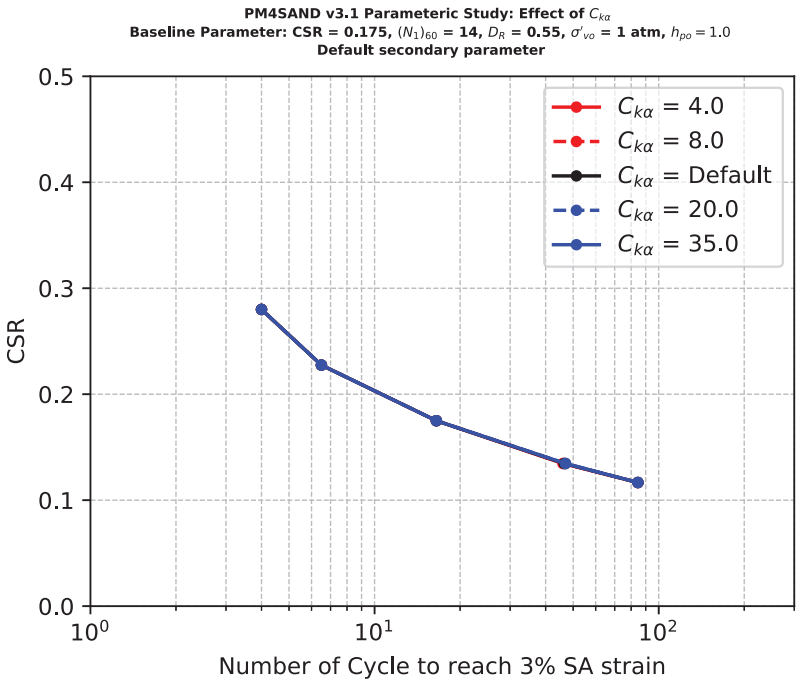

PM4SAND v3.1 Parameteric Study: Effect of C_z
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
C_z = 100
C_z = 175
C_z = 250
C_z = 375
C_z = 500
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of C_z
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

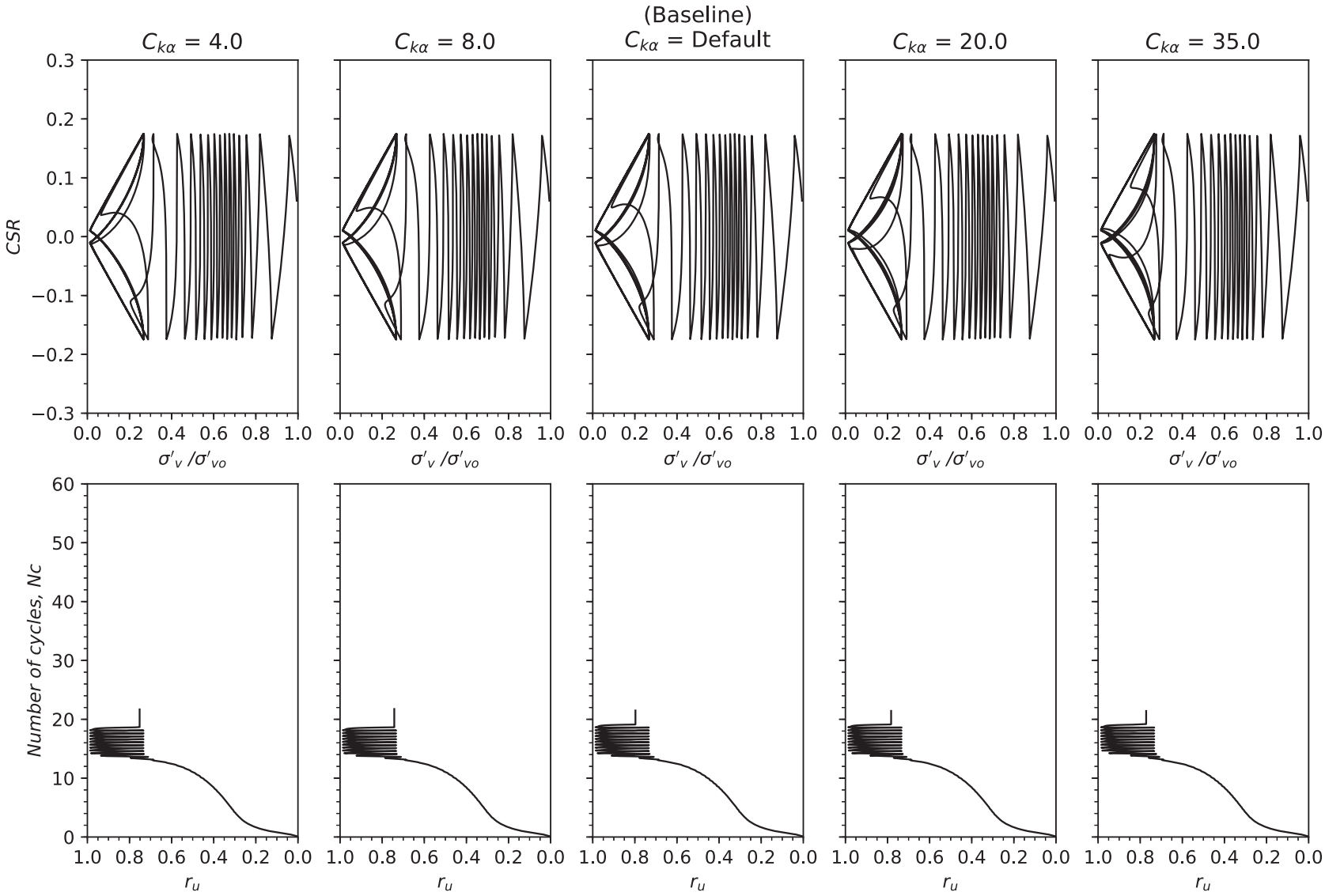


PM4SAND v3.1 Parameteric Study: Effect of C_z
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

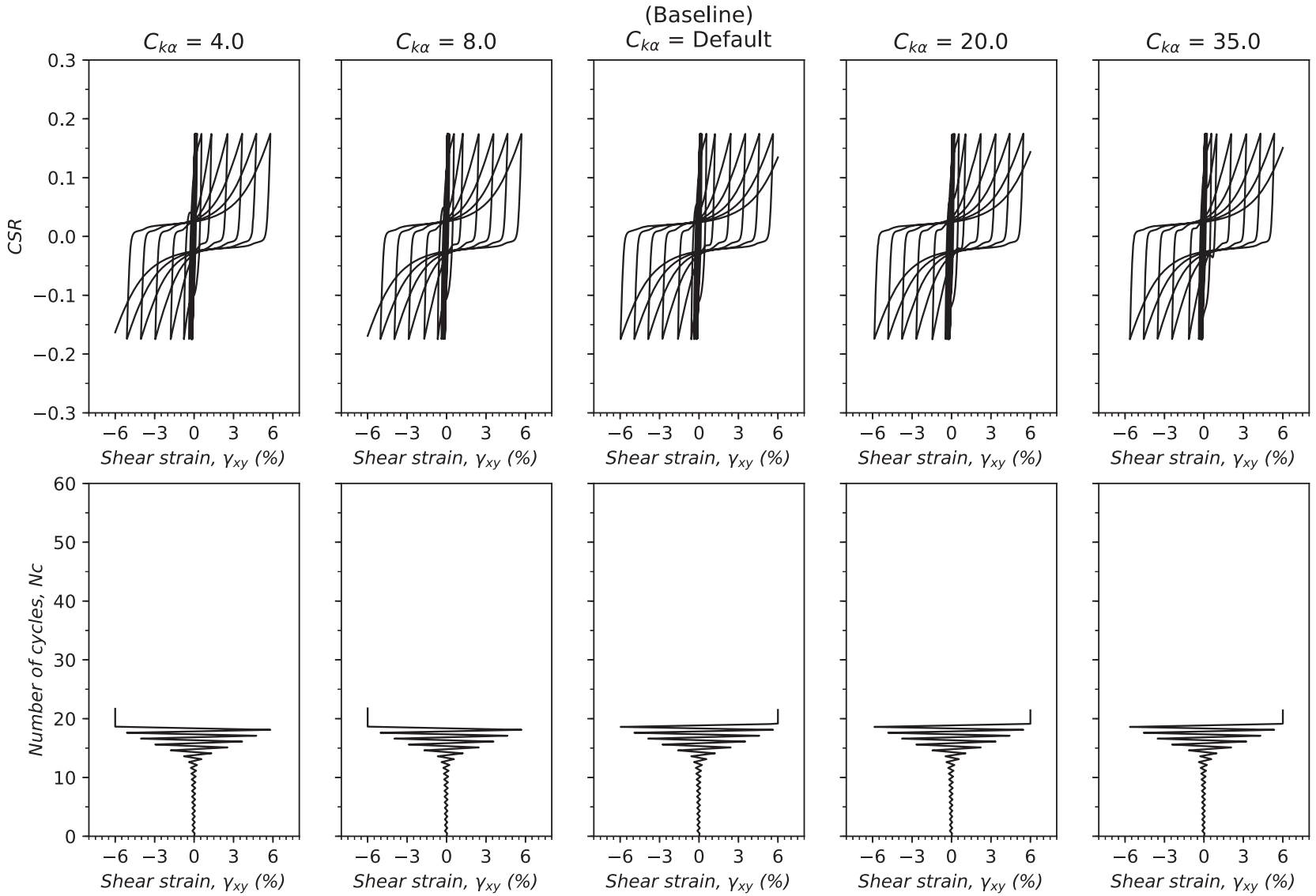


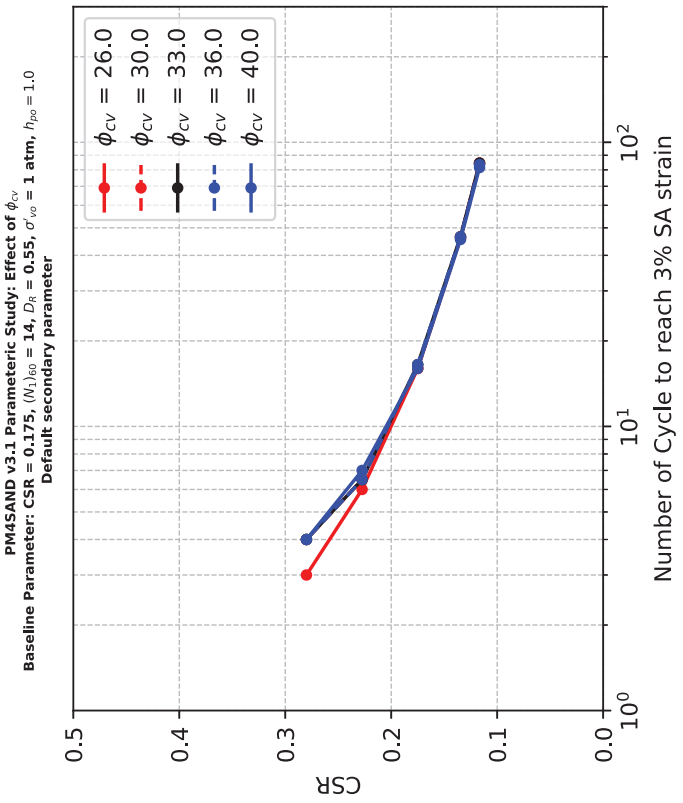

PM4SAND v3.1 Parameteric Study: Effect of $C_{k\alpha}$
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
$C_{k\alpha}$ = 4.0
$C_{k\alpha}$ = 8.0
$C_{k\alpha}$ = Default
$C_{k\alpha}$ = 20.0
$C_{k\alpha}$ = 35.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of $C_{k\alpha}$
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

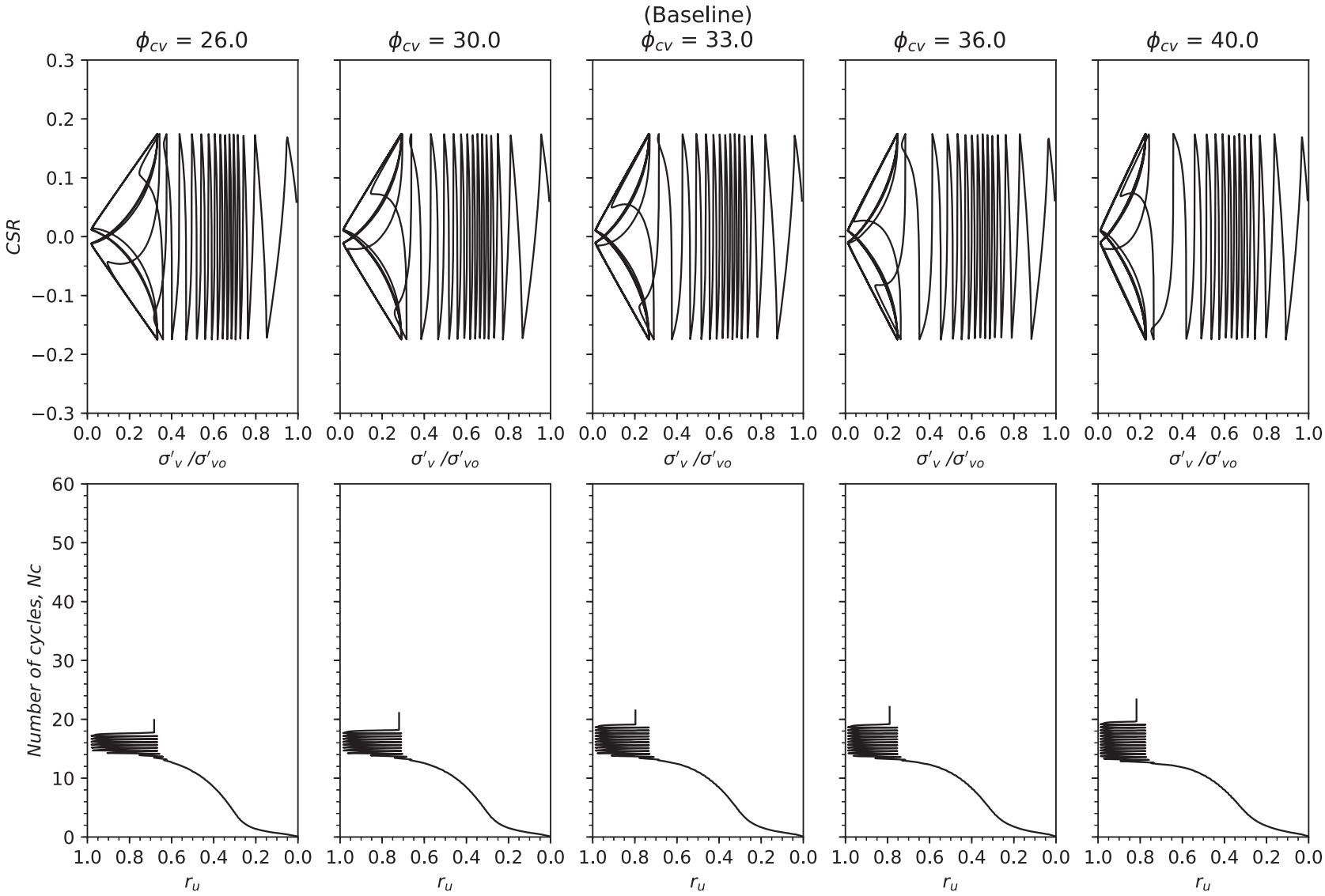


PM4SAND v3.1 Parameteric Study: Effect of $C_{k\alpha}$
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

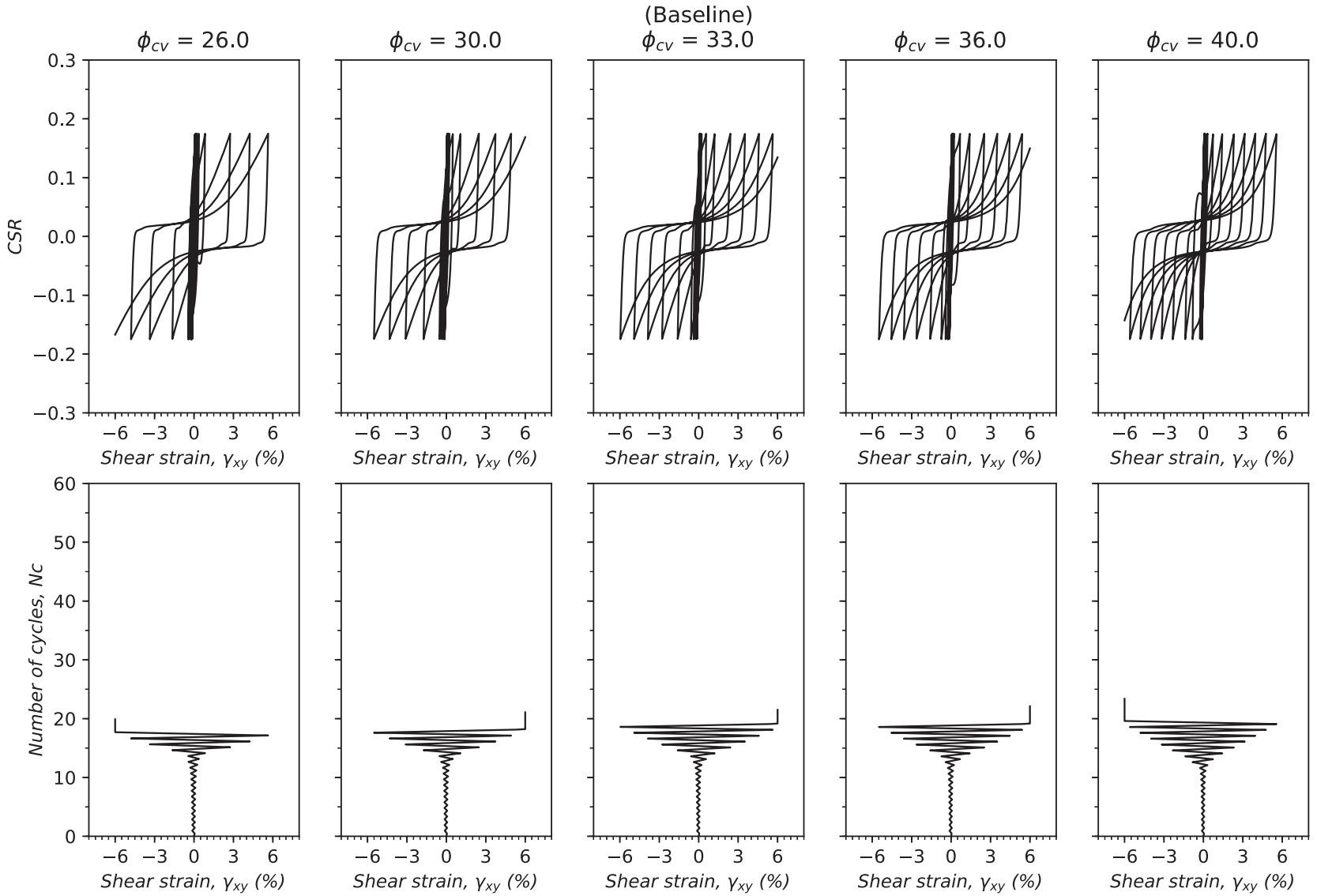


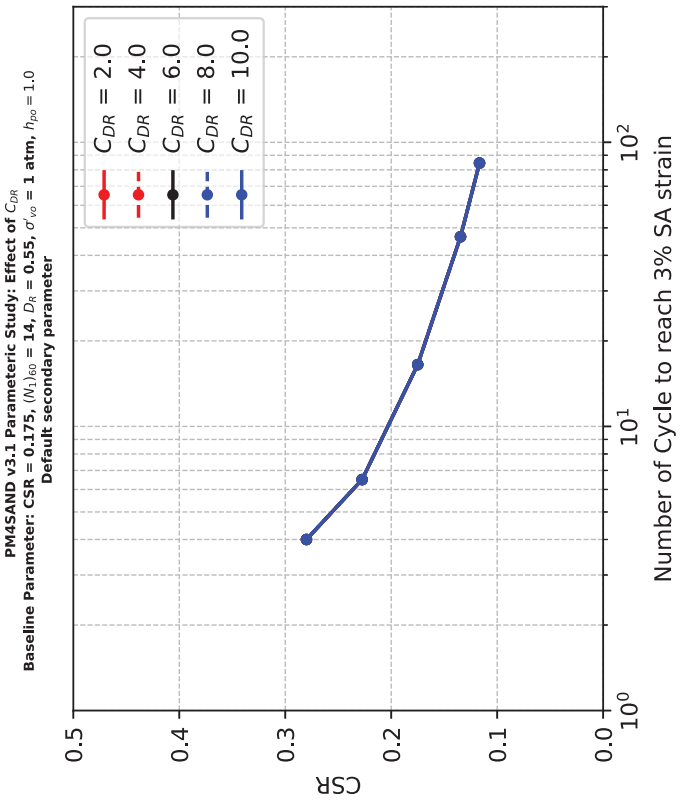

PM4SAND v3.1 Parameteric Study: Effect of ϕ_{cv}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
ϕ_{CV} = 26.0
ϕ_{CV} = 30.0
ϕ_{CV} = 33.0
ϕ_{CV} = 36.0
ϕ_{CV} = 40.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of ϕ_{cv}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

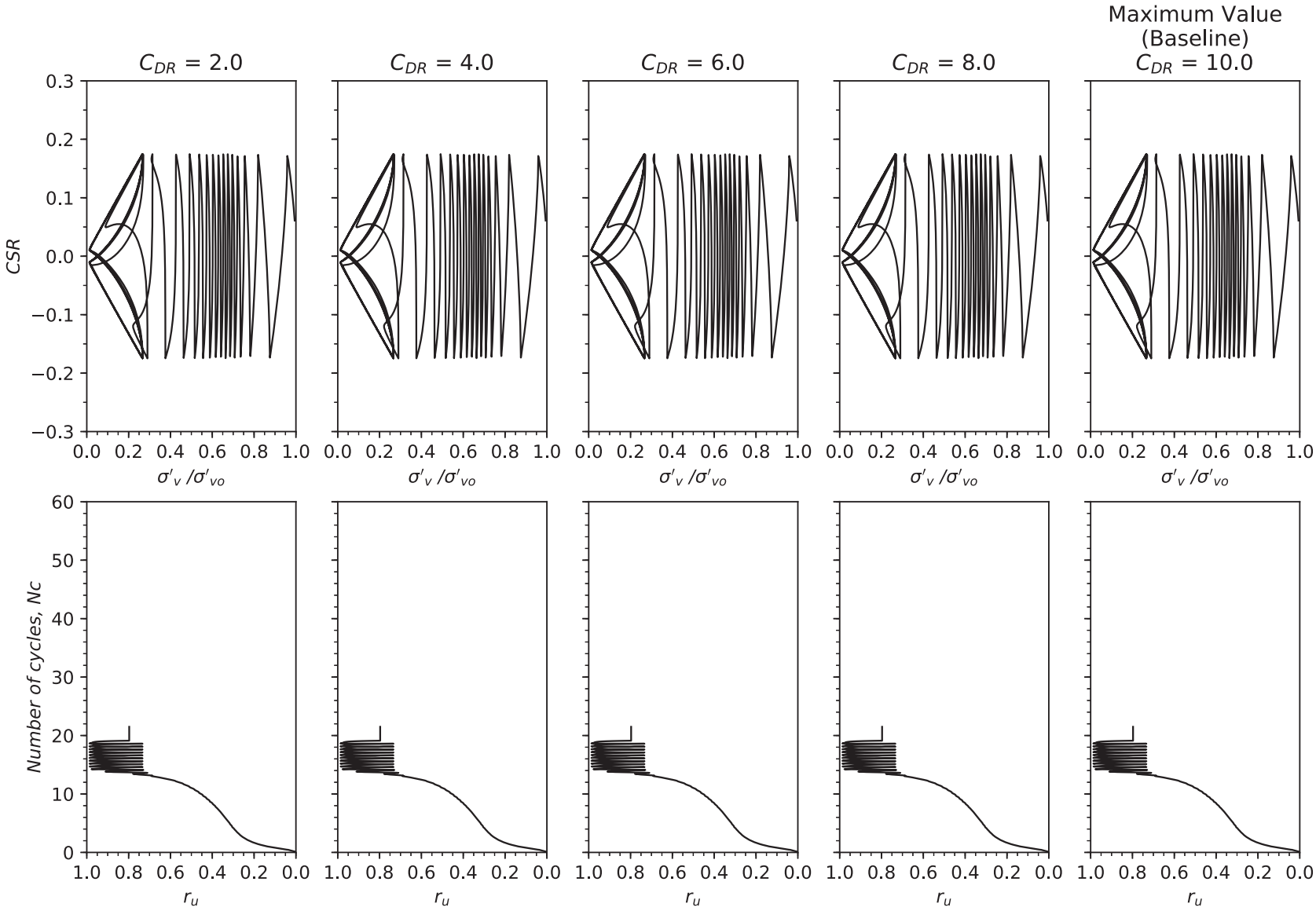


PM4SAND v3.1 Parameteric Study: Effect of ϕ_{cv}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

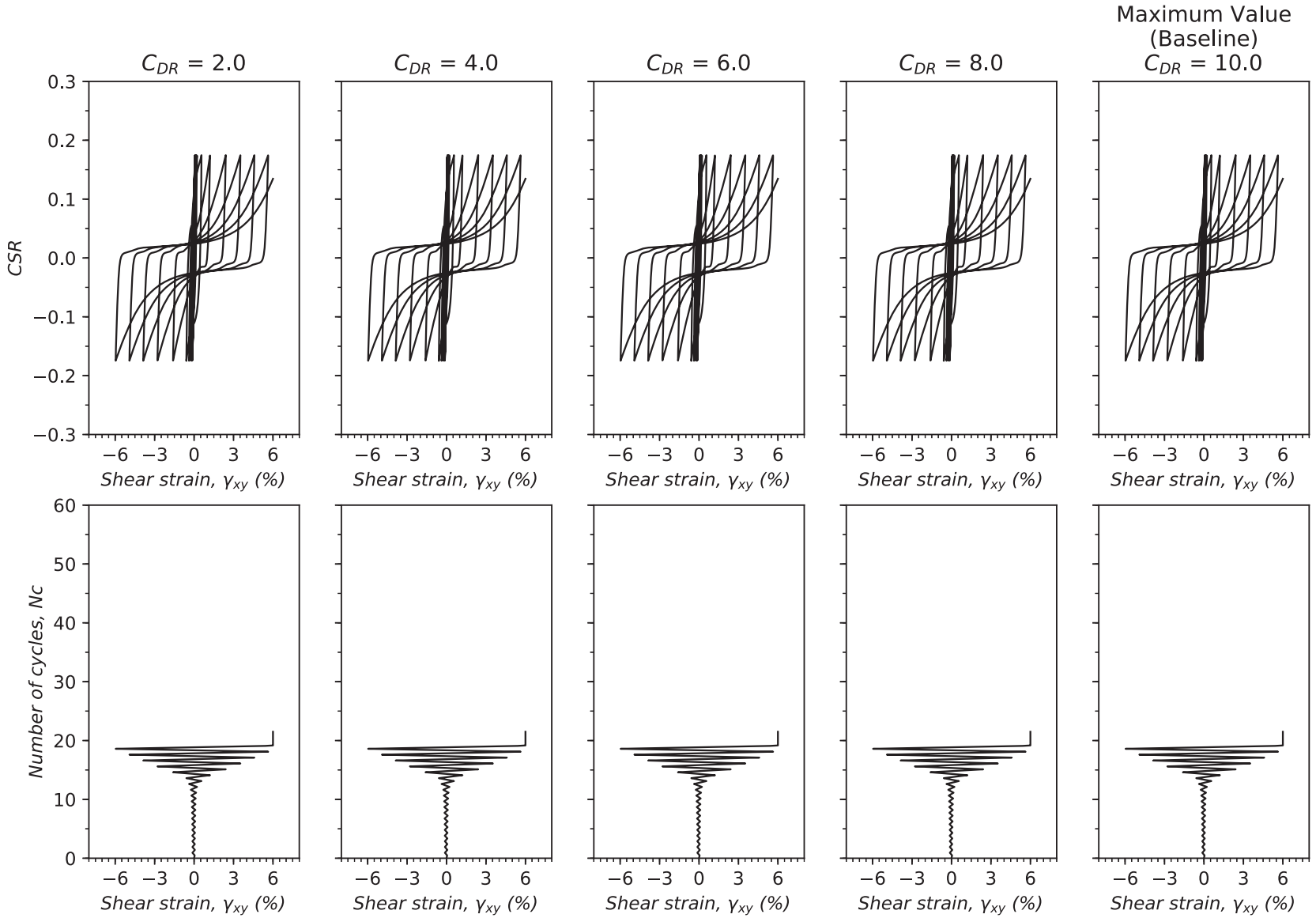


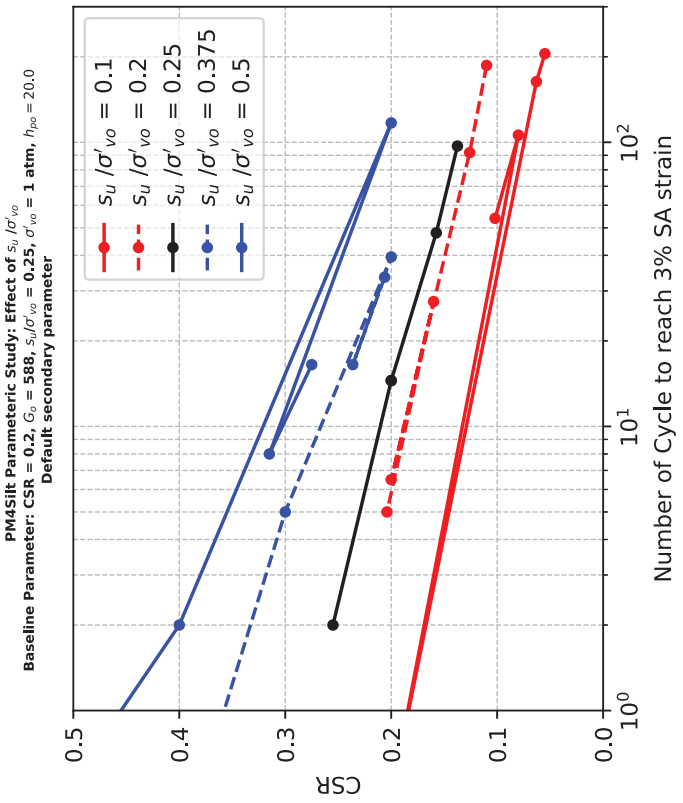

PM4SAND v3.1 Parameteric Study: Effect of C_{DR}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, h_{po} = 1.0
Default secondary parameter
C_{DR} = 2.0
C_{DR} = 4.0
C_{DR} = 6.0
C_{DR} = 8.0
C_{DR} = 10.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4SAND v3.1 Parameteric Study: Effect of C_{DR}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

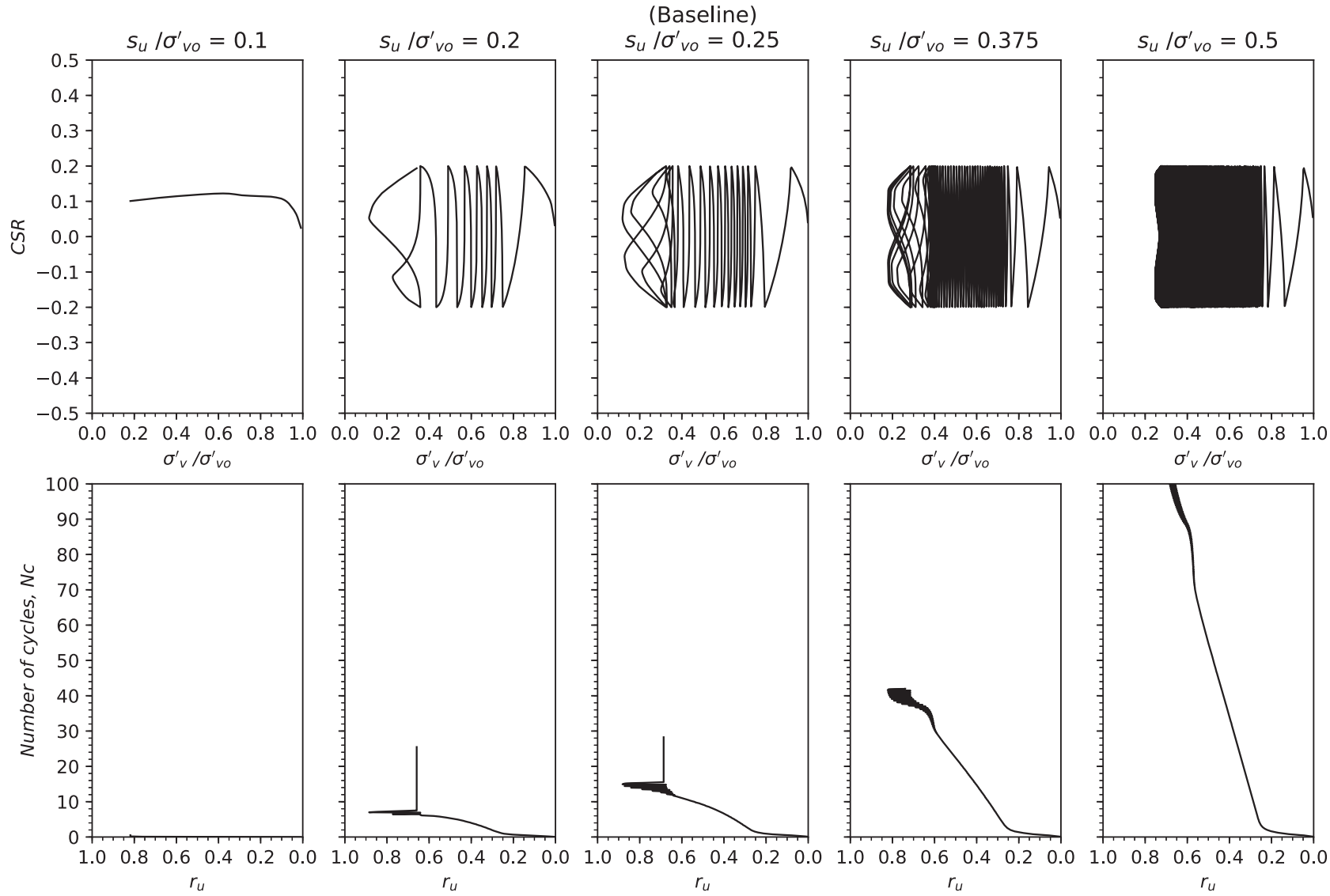


PM4SAND v3.1 Parameteric Study: Effect of C_{DR}
Baseline Parameter: CSR = 0.175, $(N_1)_{60}$ = 14, D_R = 0.55, σ'_{vo} = 1 atm, $h_{po} = 1.0$
Default secondary parameter

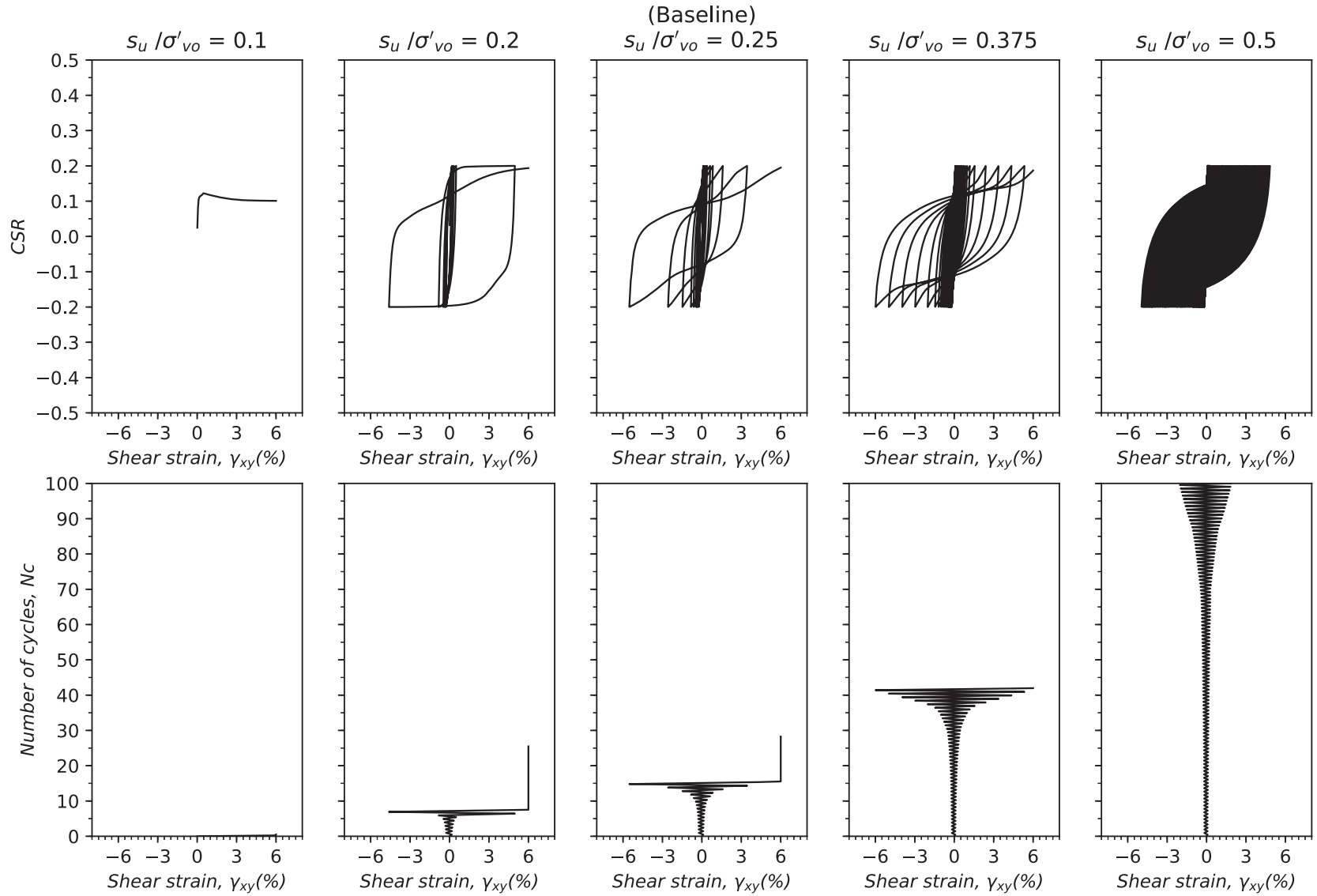


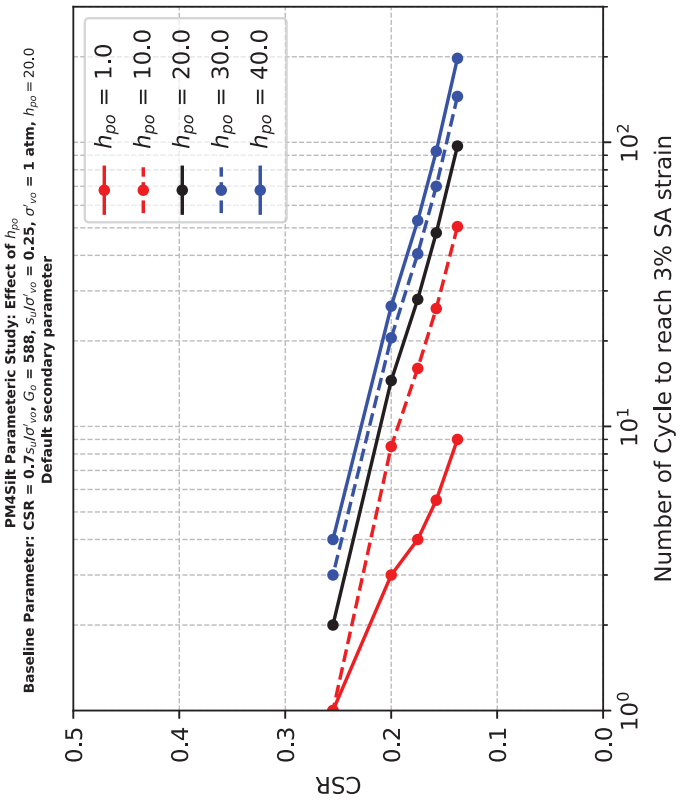

PM4Silt Parameteric Study: Effect of s_u/σ'_{vo}
Baseline Parameter: CSR = 0.2, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter
s_u/σ'_{vo} = 0.1
s_u/σ'_{vo} = 0.2
s_u/σ'_{vo} = 0.25
s_u/σ'_{vo} = 0.375
s_u/σ'_{vo} = 0.5
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of s_u /σ'_{vo}
Baseline Parameter: CSR = 0.2, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, $h_{po} = 20.0$
Default secondary parameter

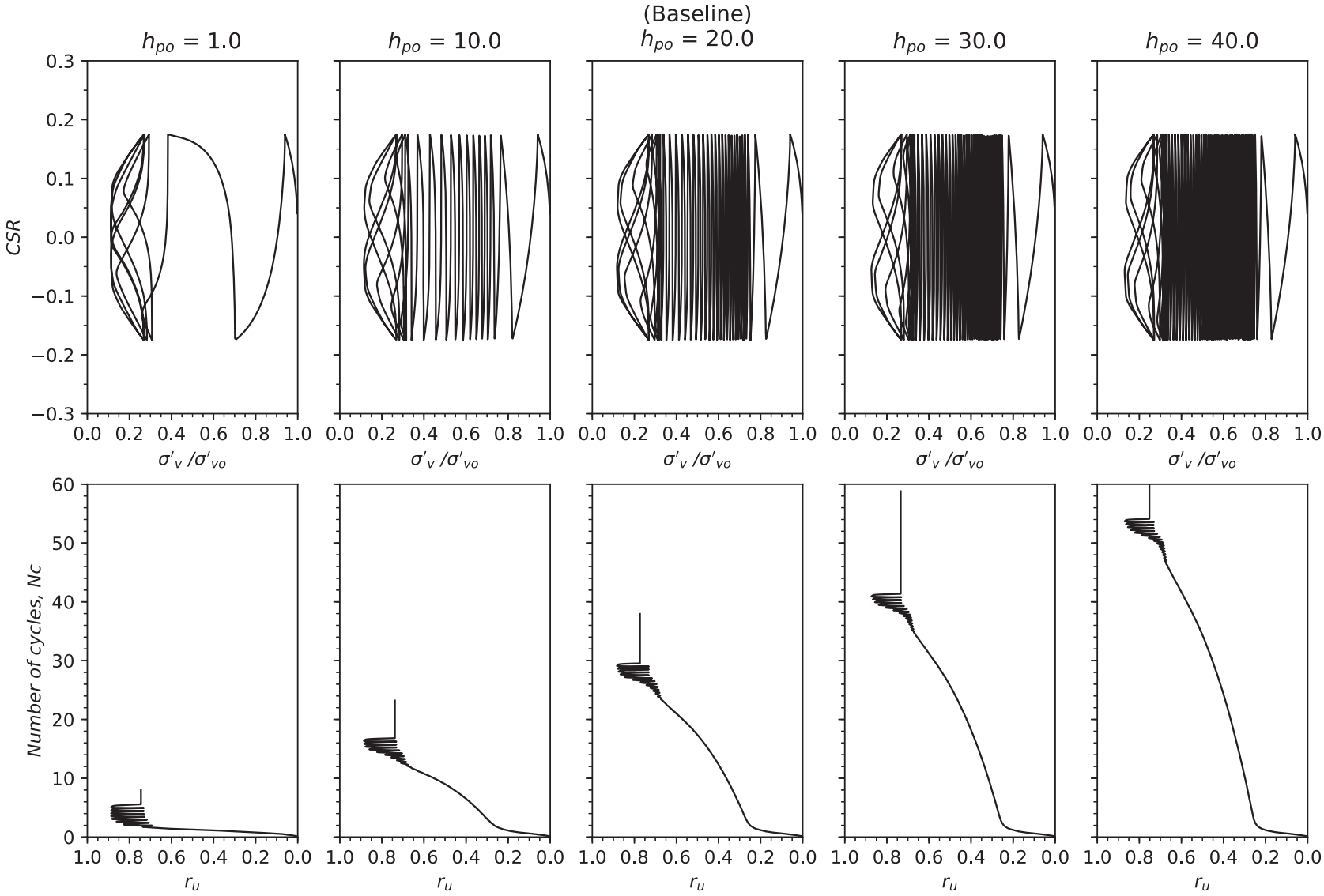


PM4Silt Parameteric Study: Effect of s_u /σ'_{vo}
Baseline Parameter: CSR = 0.2, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, $h_{po} = 20.0$
Default secondary parameter

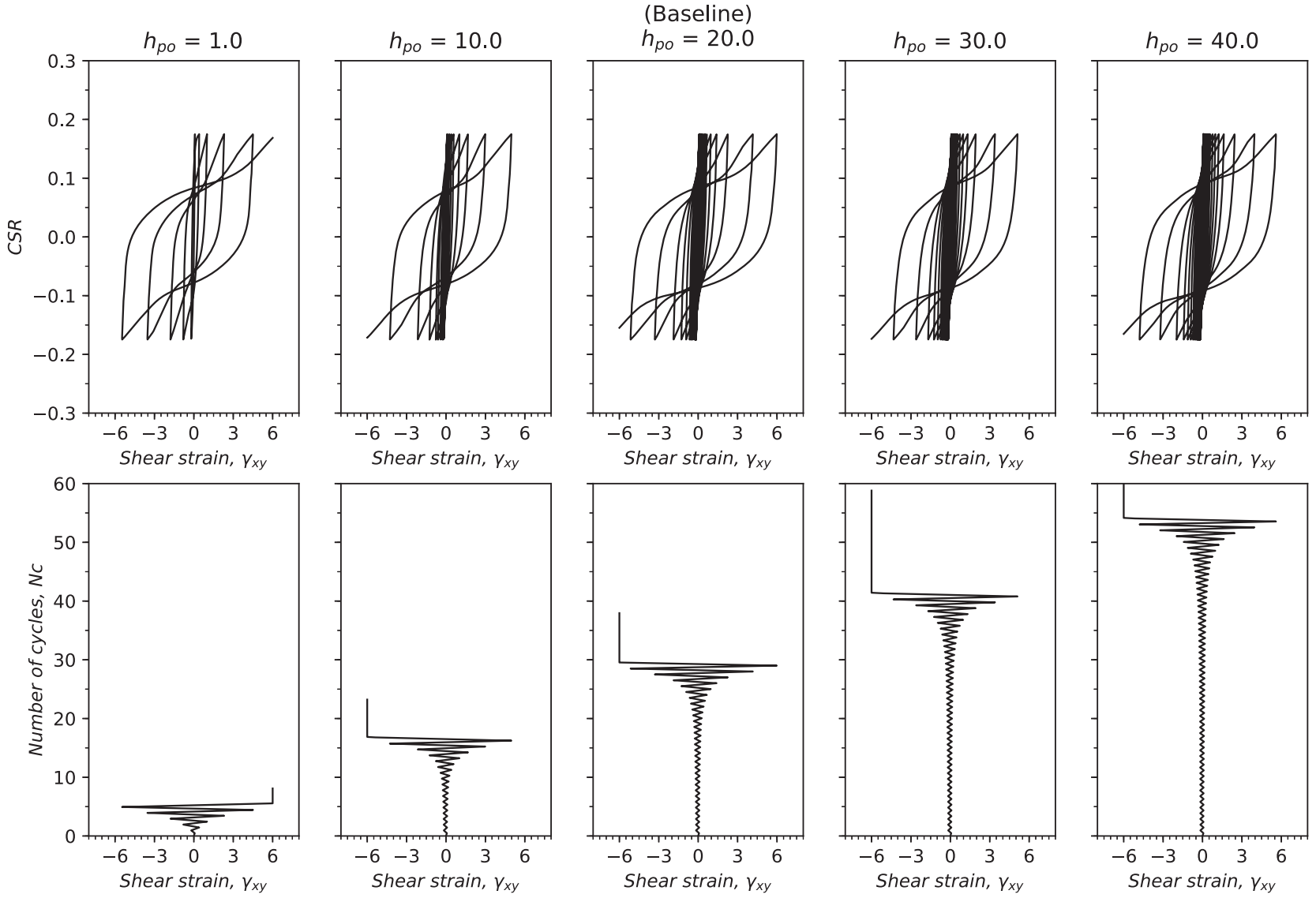


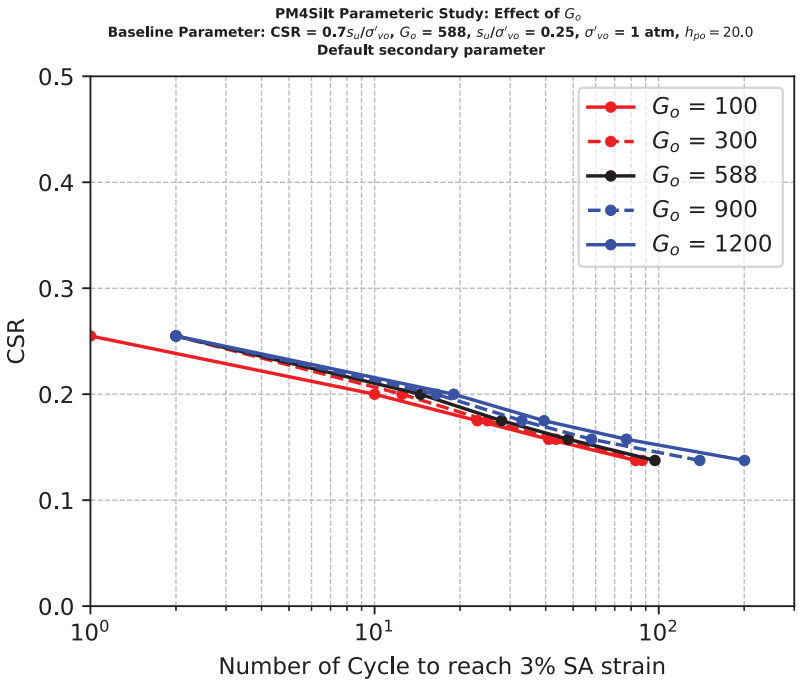

PM4Silt Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter
h_{po} = 1.0
h_{po} = 10.0
h_{po} = 20.0
h_{po} = 30.0
h_{po} = 40.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter

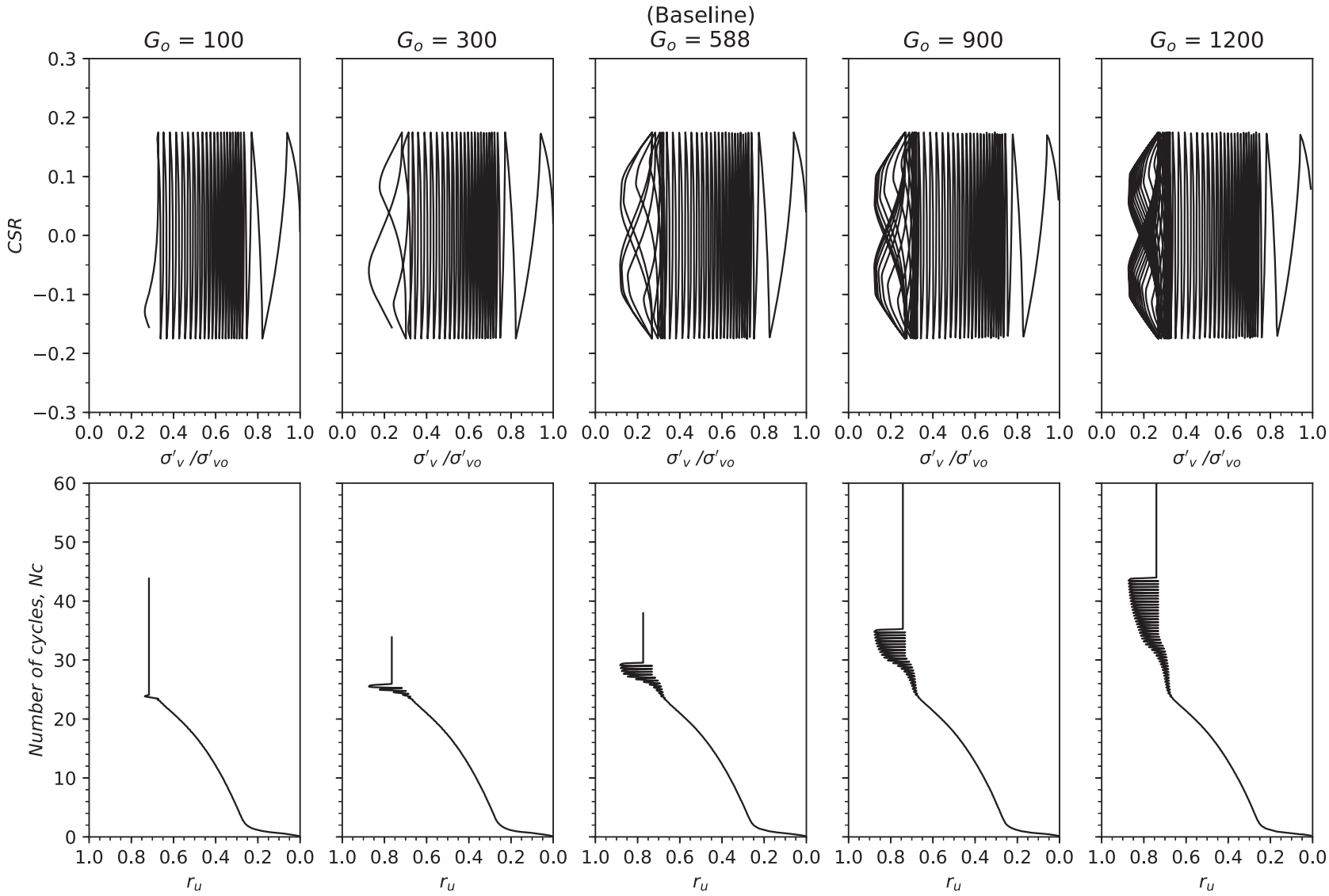


PM4Silt Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter

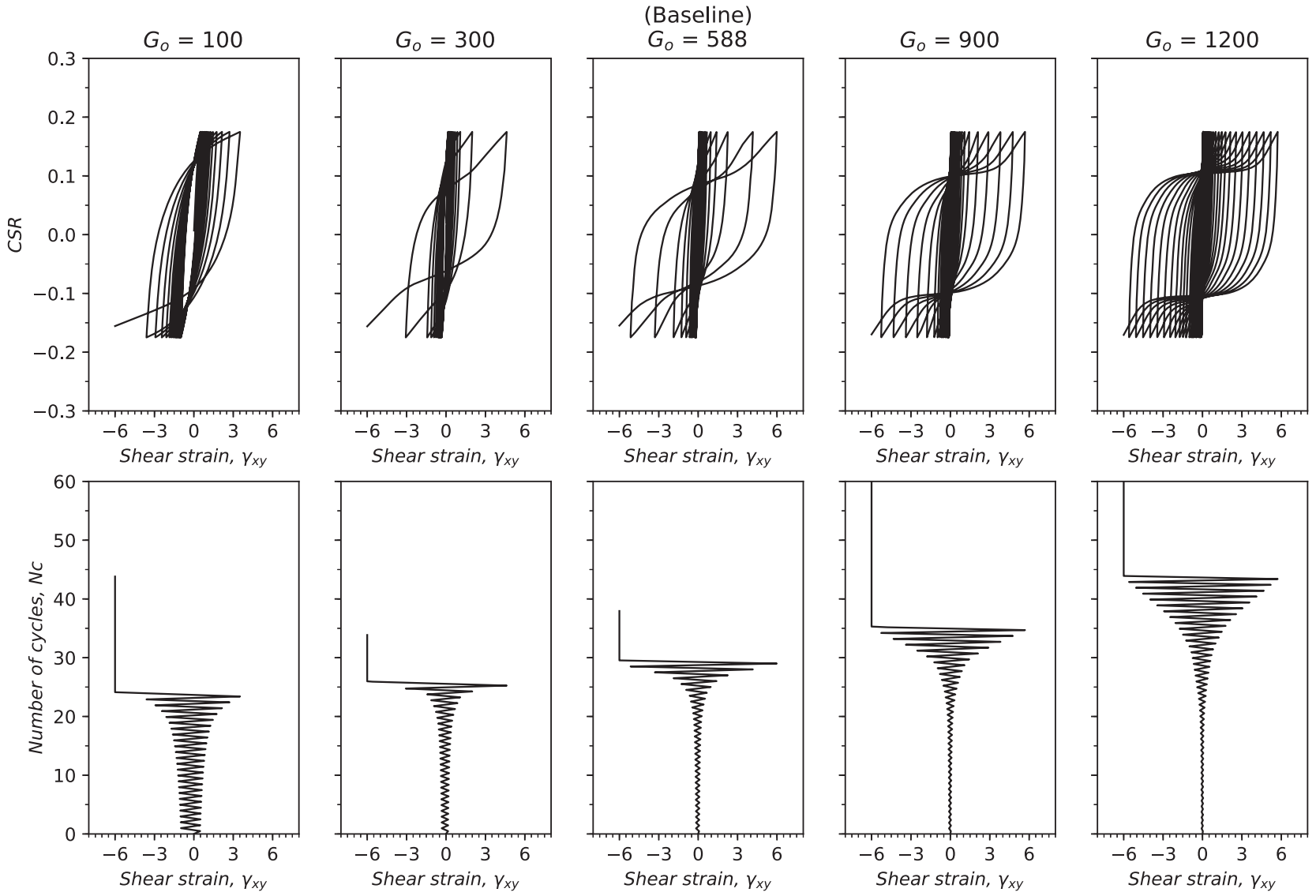


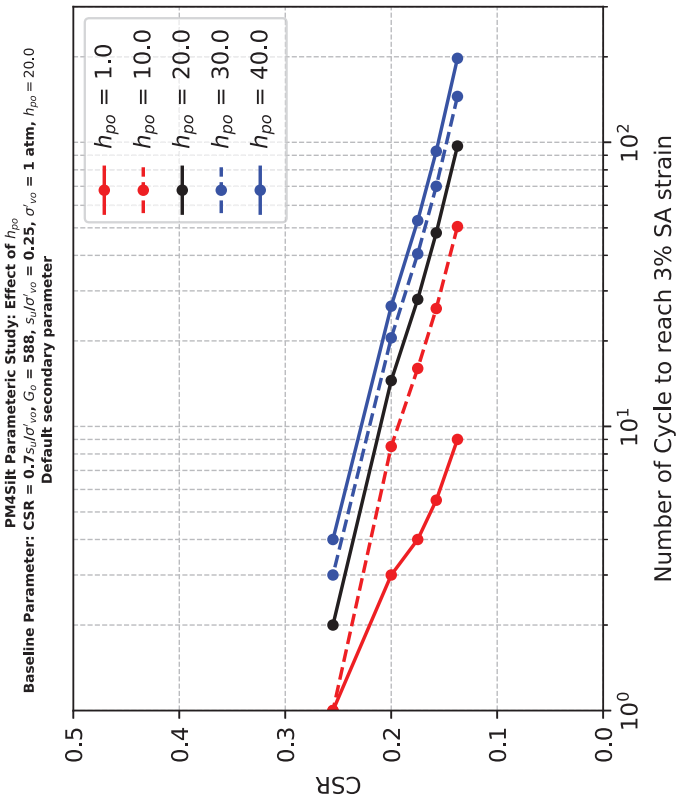

PM4Silt Parameteric Study: Effect of G_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter
G_o = 100
G_o = 300
G_o = 588
G_o = 900
G_o = 1200
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of G_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, $h_{po} = 20.0$
Default secondary parameter

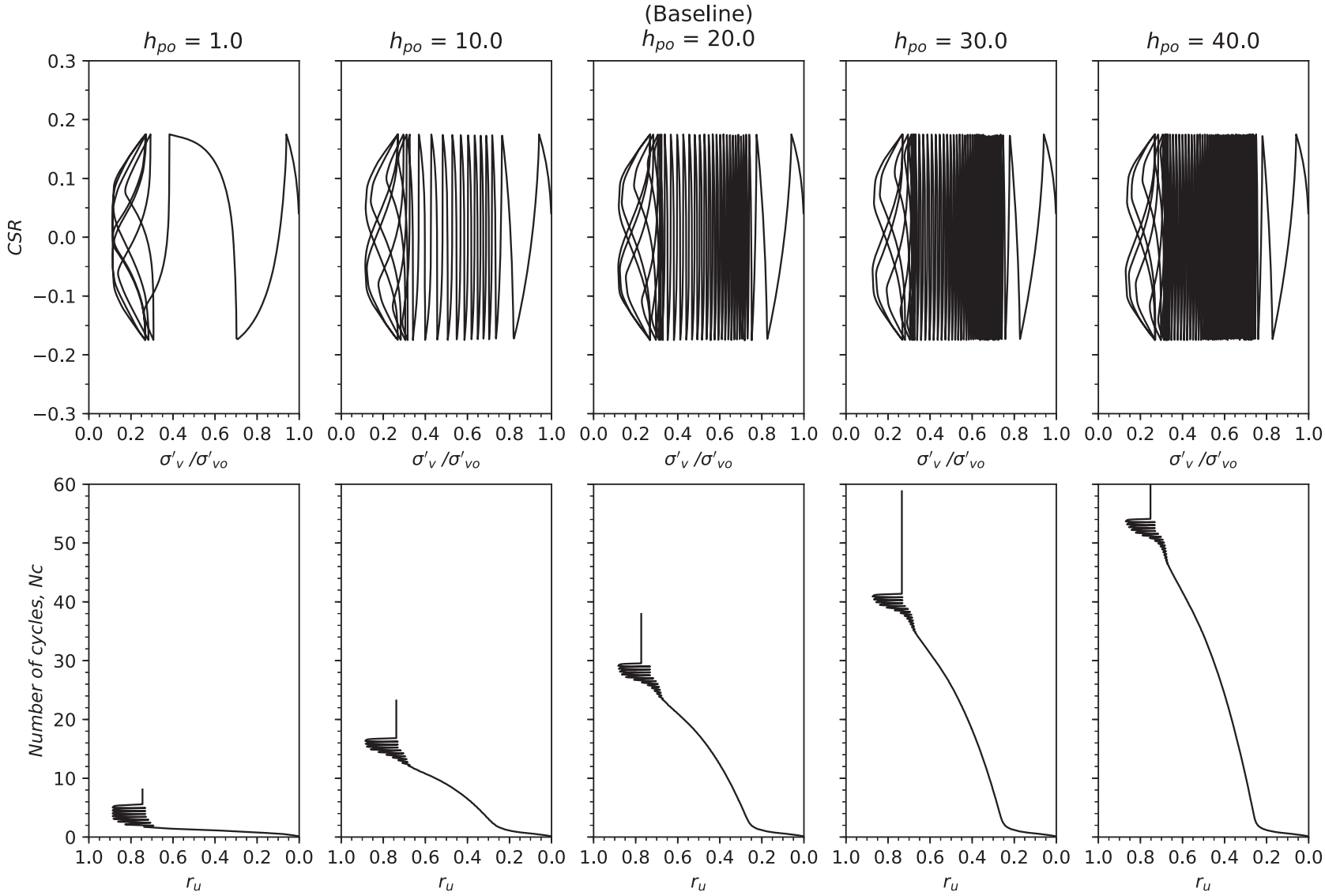


PM4Silt Parameteric Study: Effect of G_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, $h_{po} = 20.0$
Default secondary parameter

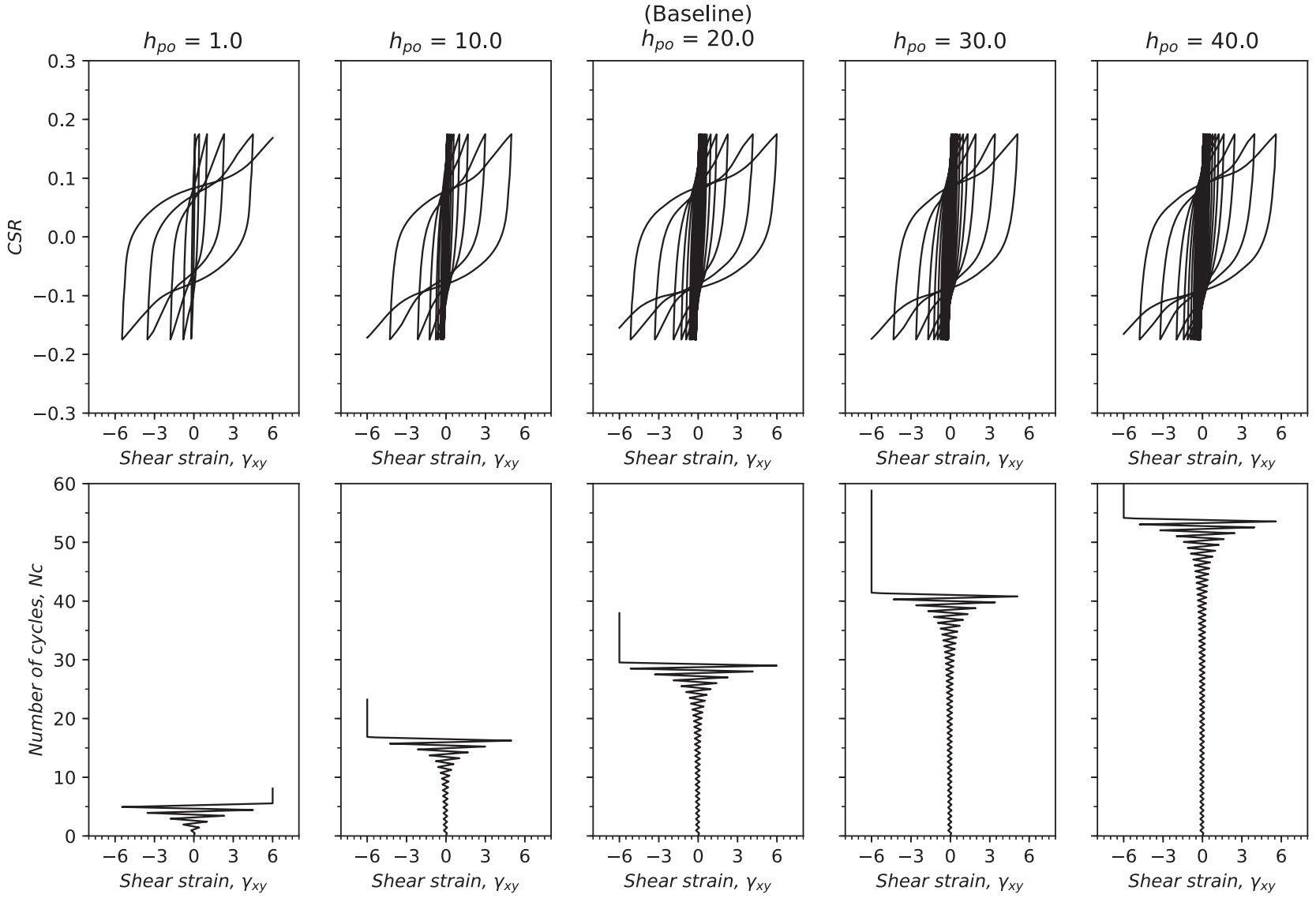


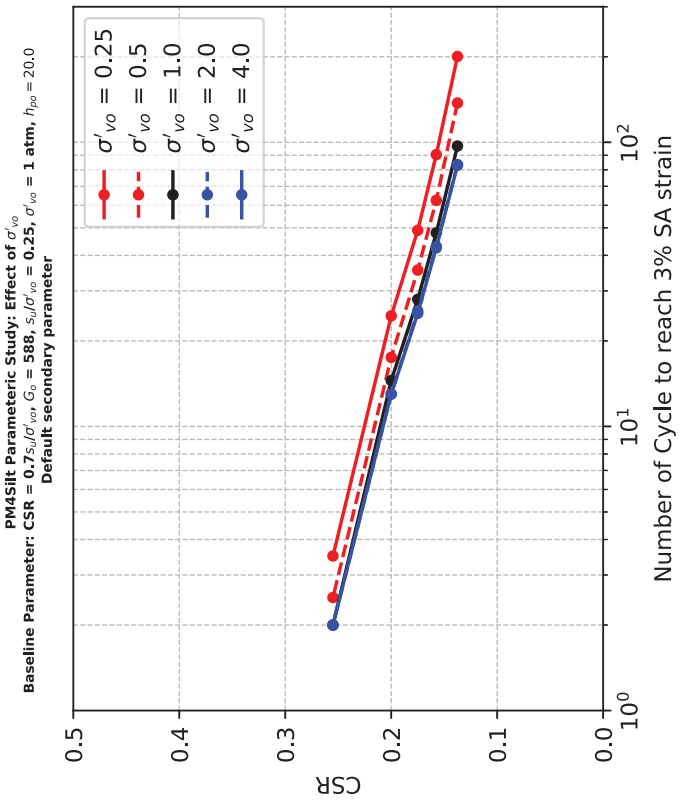

PM4Silt Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter
h_{po} = 1.0
h_{po} = 10.0
h_{po} = 20.0
h_{po} = 30.0
h_{po} = 40.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter

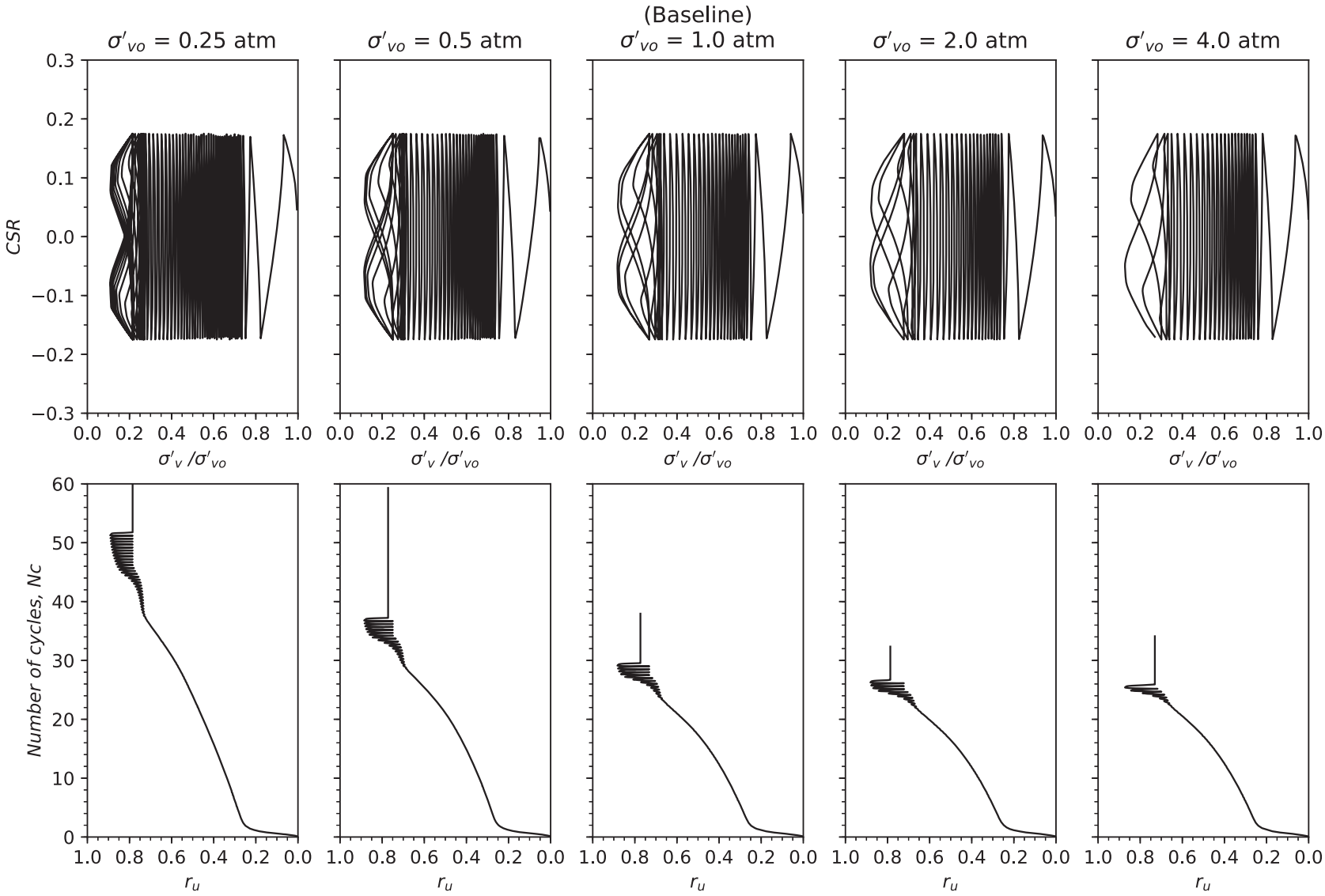


PM4Silt Parameteric Study: Effect of h_{po}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter

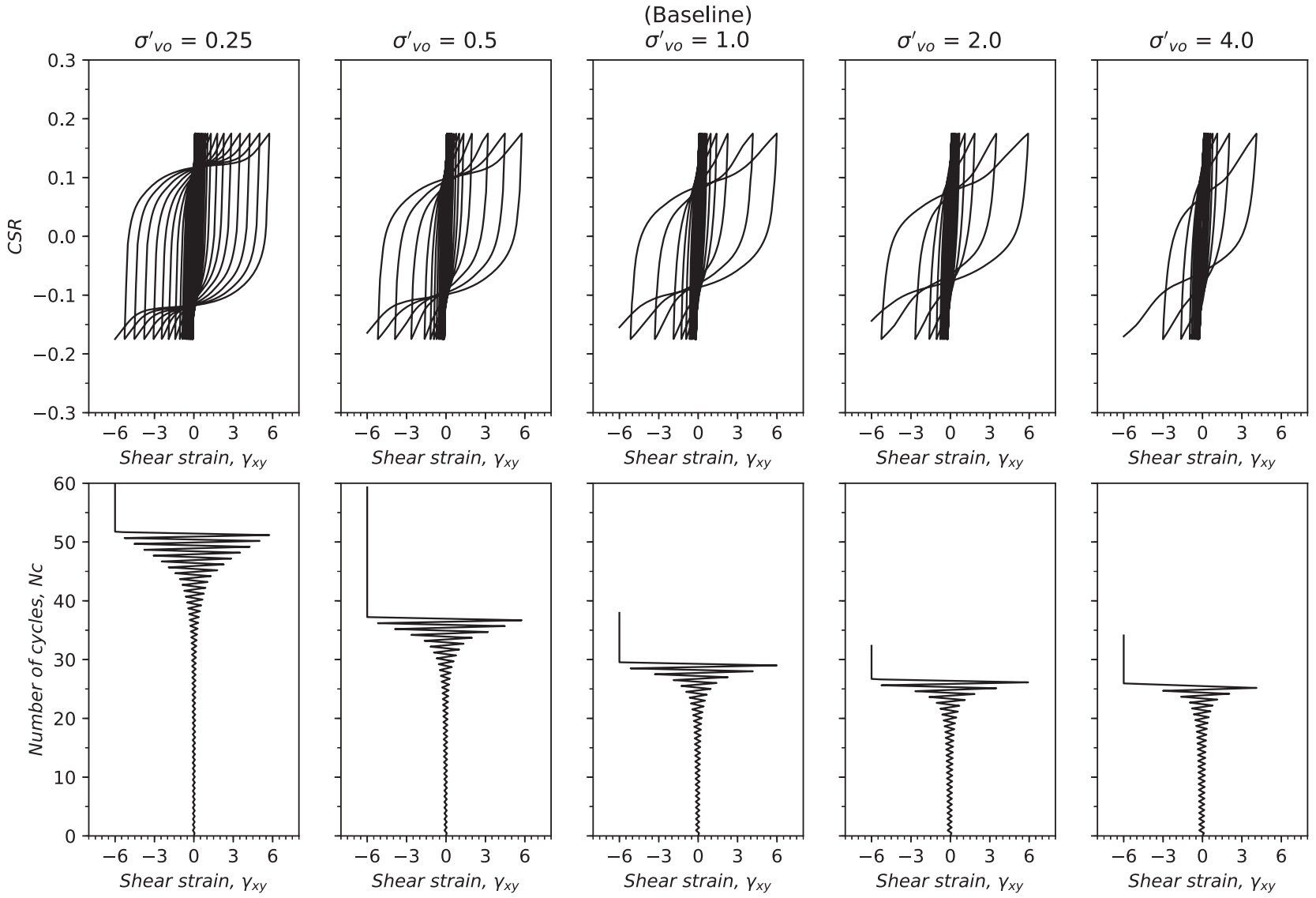


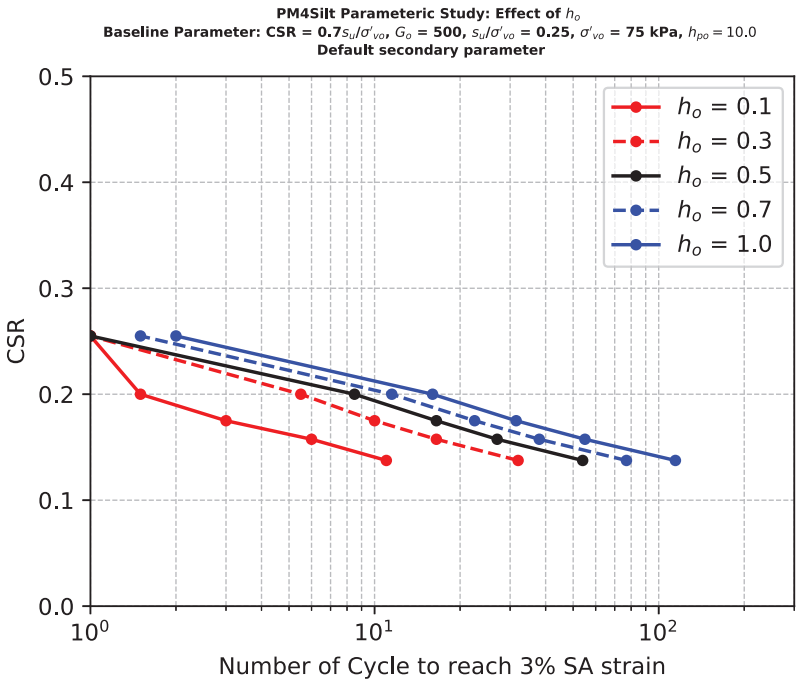

PM4Silt Parameteric Study: Effect of σ'_{vo}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, h_{po} = 20.0
Default secondary parameter
σ'_{vo} = 0.25
σ'_{vo} = 0.5
σ'_{vo} = 1.0
σ'_{vo} = 2.0
σ'_{vo} = 4.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of σ'_{vo}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, $h_{po} = 20.0$
Default secondary parameter

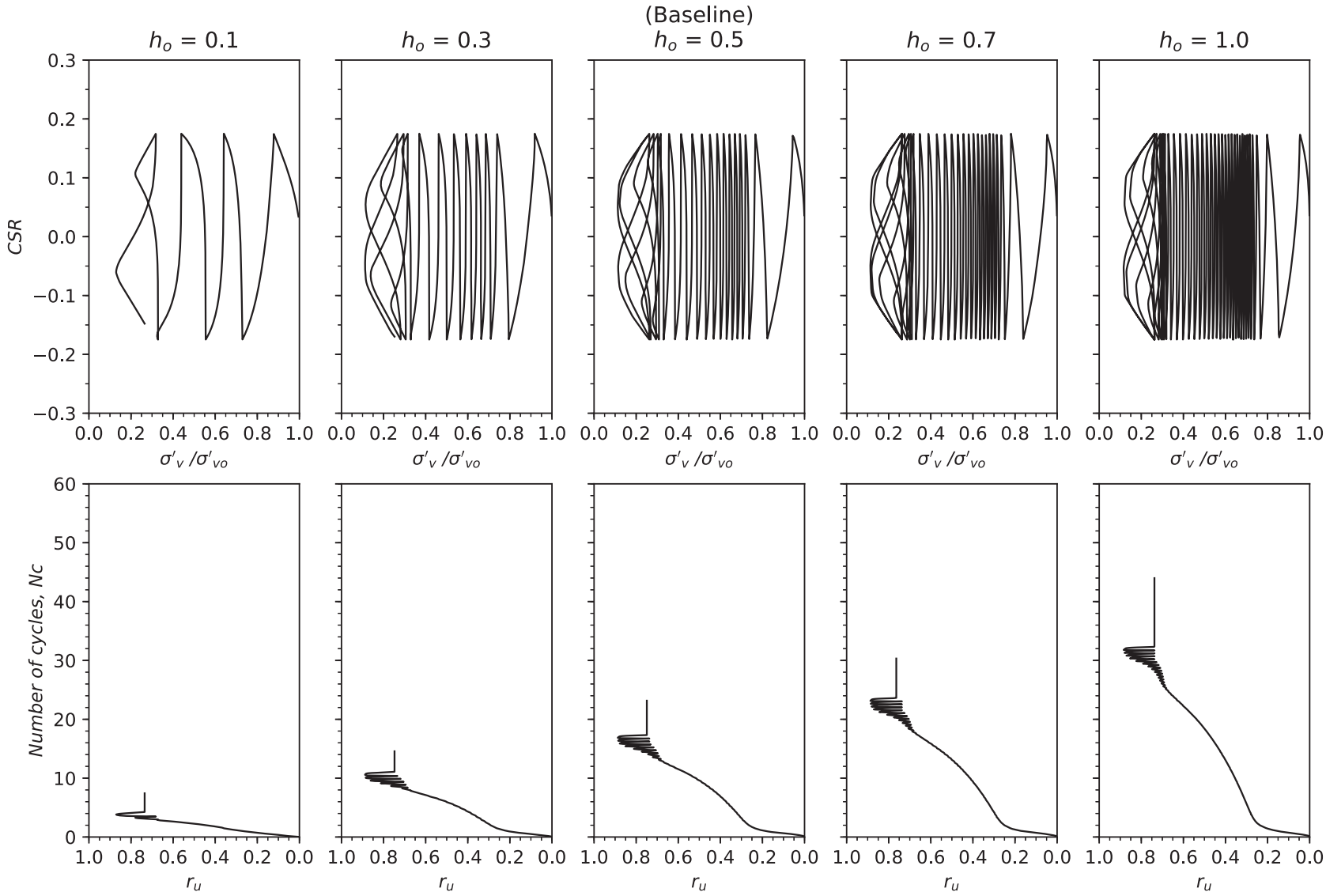


PM4Silt Parameteric Study: Effect of σ'_{vo}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 588, s_u/σ'_{vo} = 0.25, σ'_{vo} = 1 atm, $h_{po} = 20.0$
Default secondary parameter

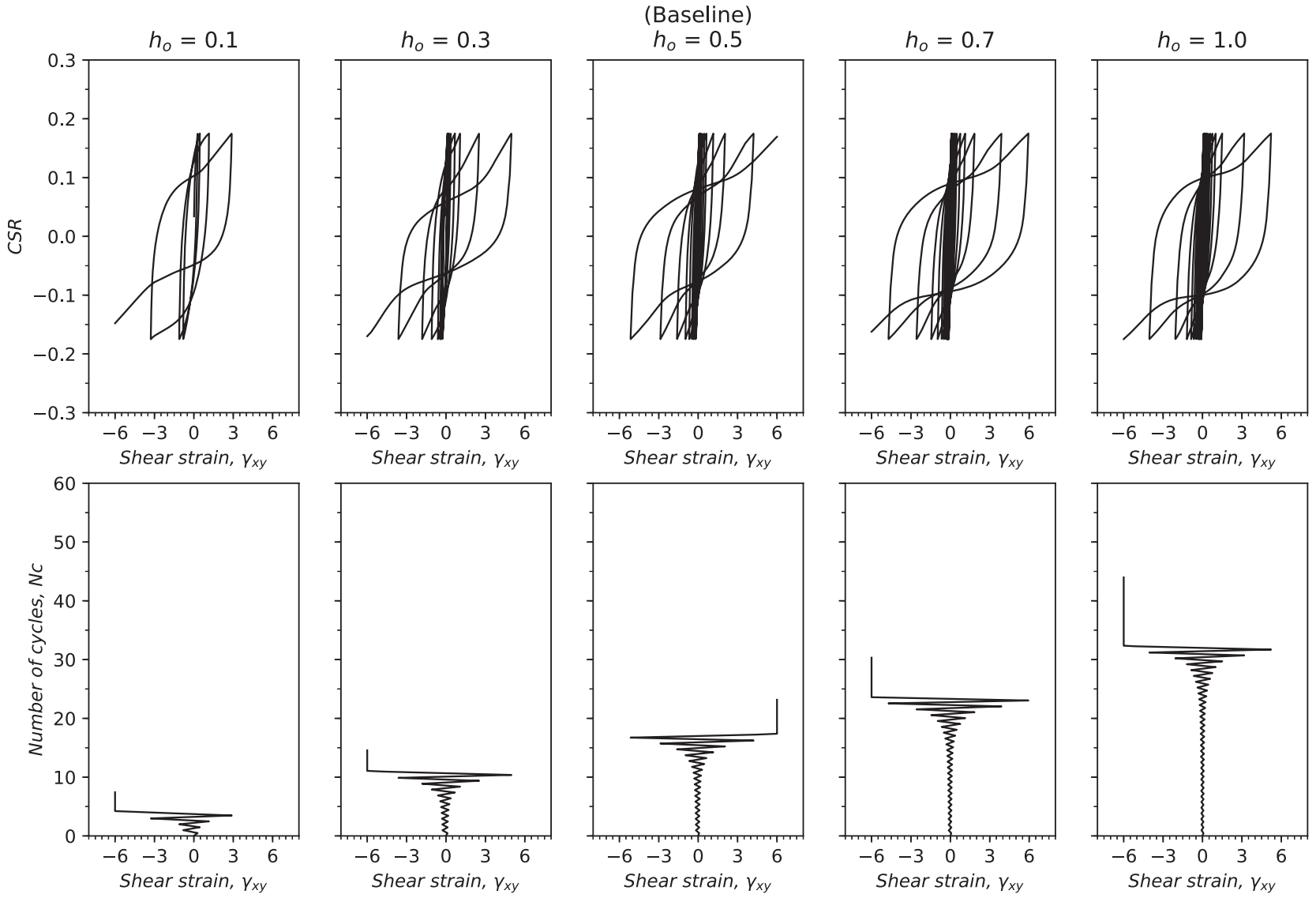


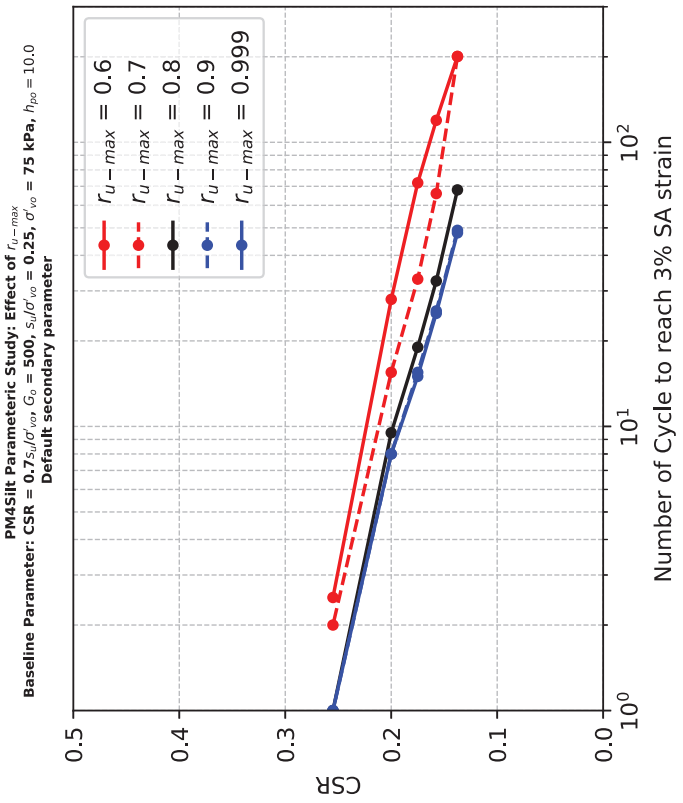

PM4Silt Parameteric Study: Effect of h_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
h_o = 0.1
h_o = 0.3
h_o = 0.5
h_o = 0.7
h_o = 1.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of h_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

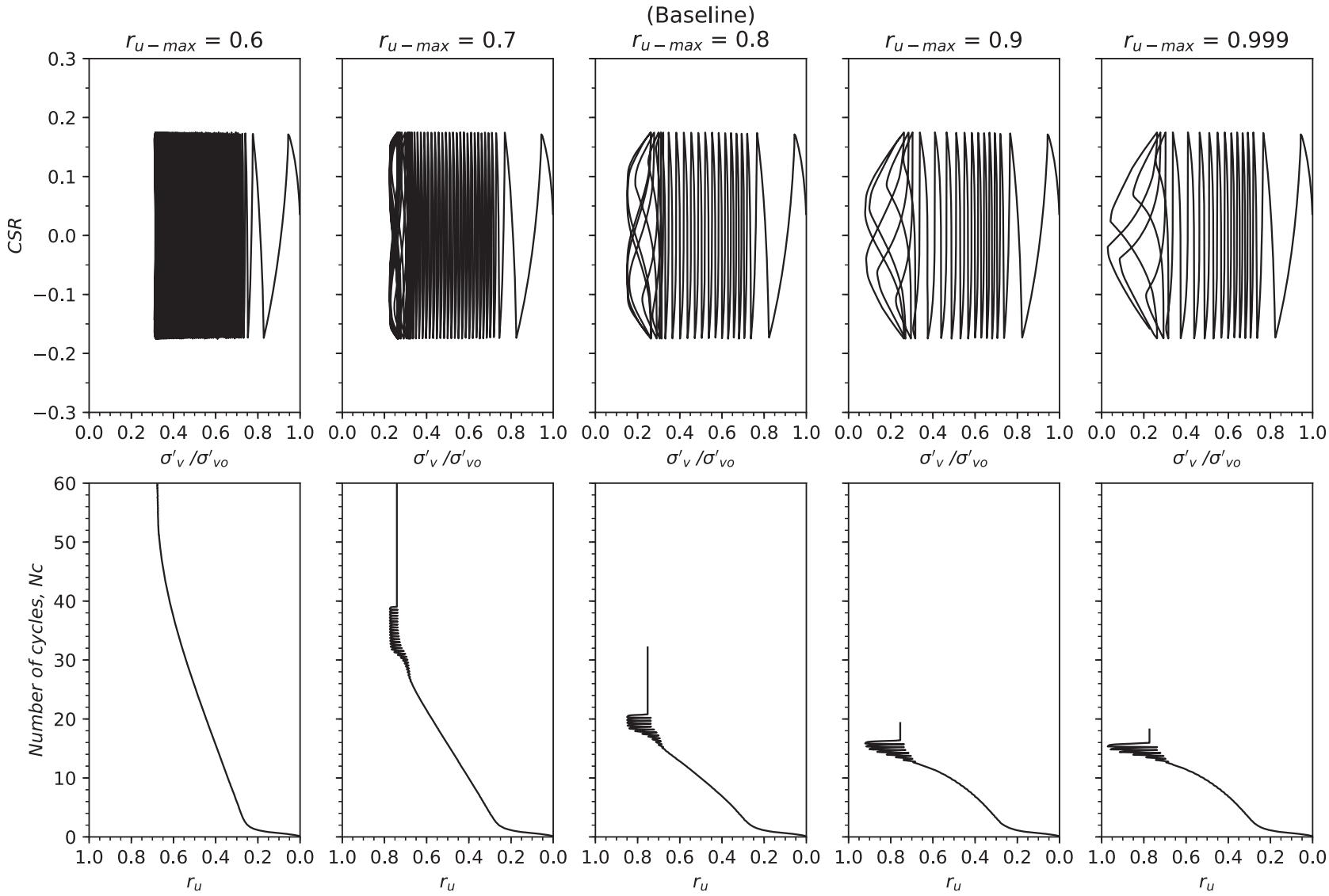


PM4Silt Parameteric Study: Effect of h_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

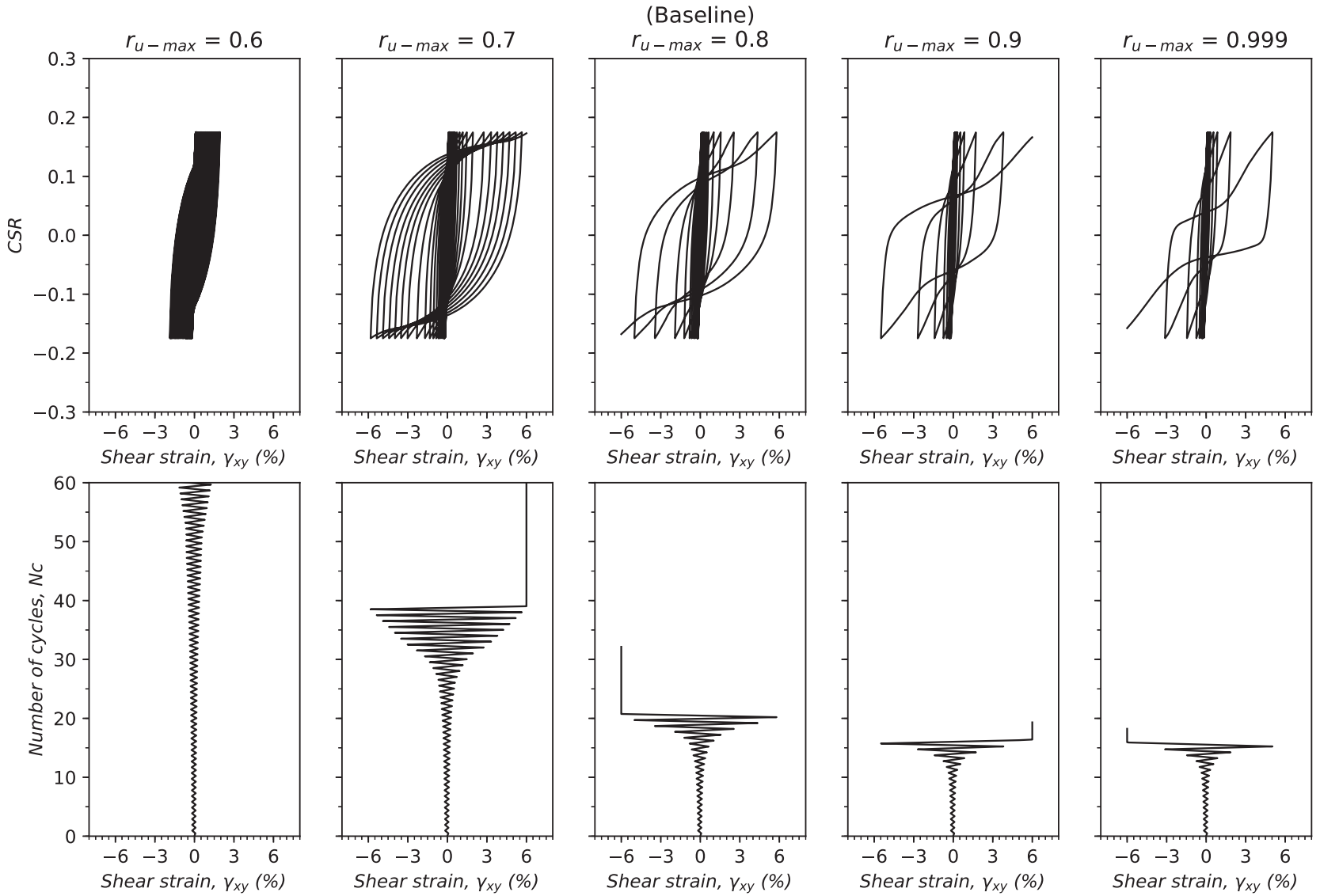


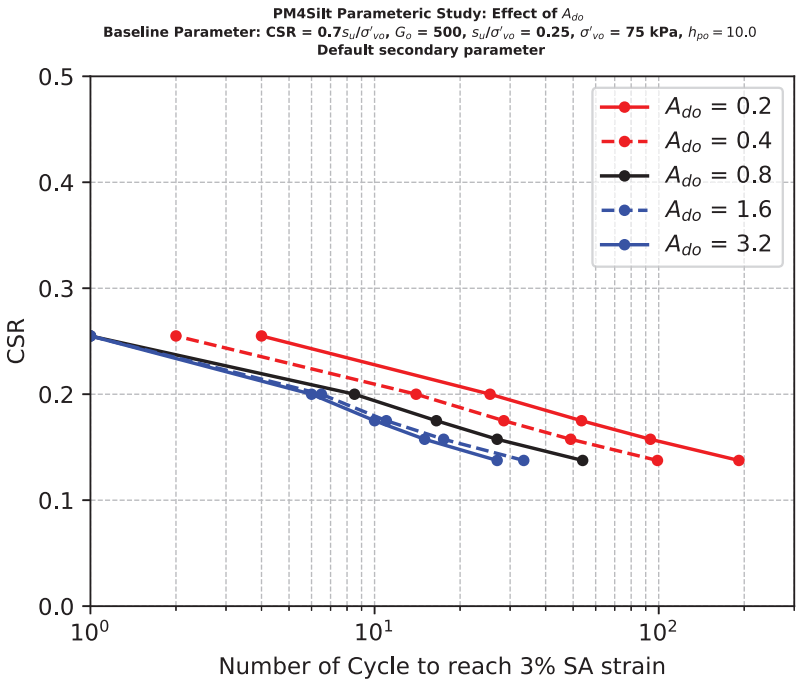

PM4Silt Parameteric Study: Effect of r_{u-max}
Baseline Parameter: CSR = 0.7 s_{u}/σ'_{vo}, G_o = 500, s_{u}/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
r_{u-max} = 0.6
r_{u-max} = 0.7
r_{u-max} = 0.8
r_{u-max} = 0.9
r_{u-max} = 0.999
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of r_{u-max}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

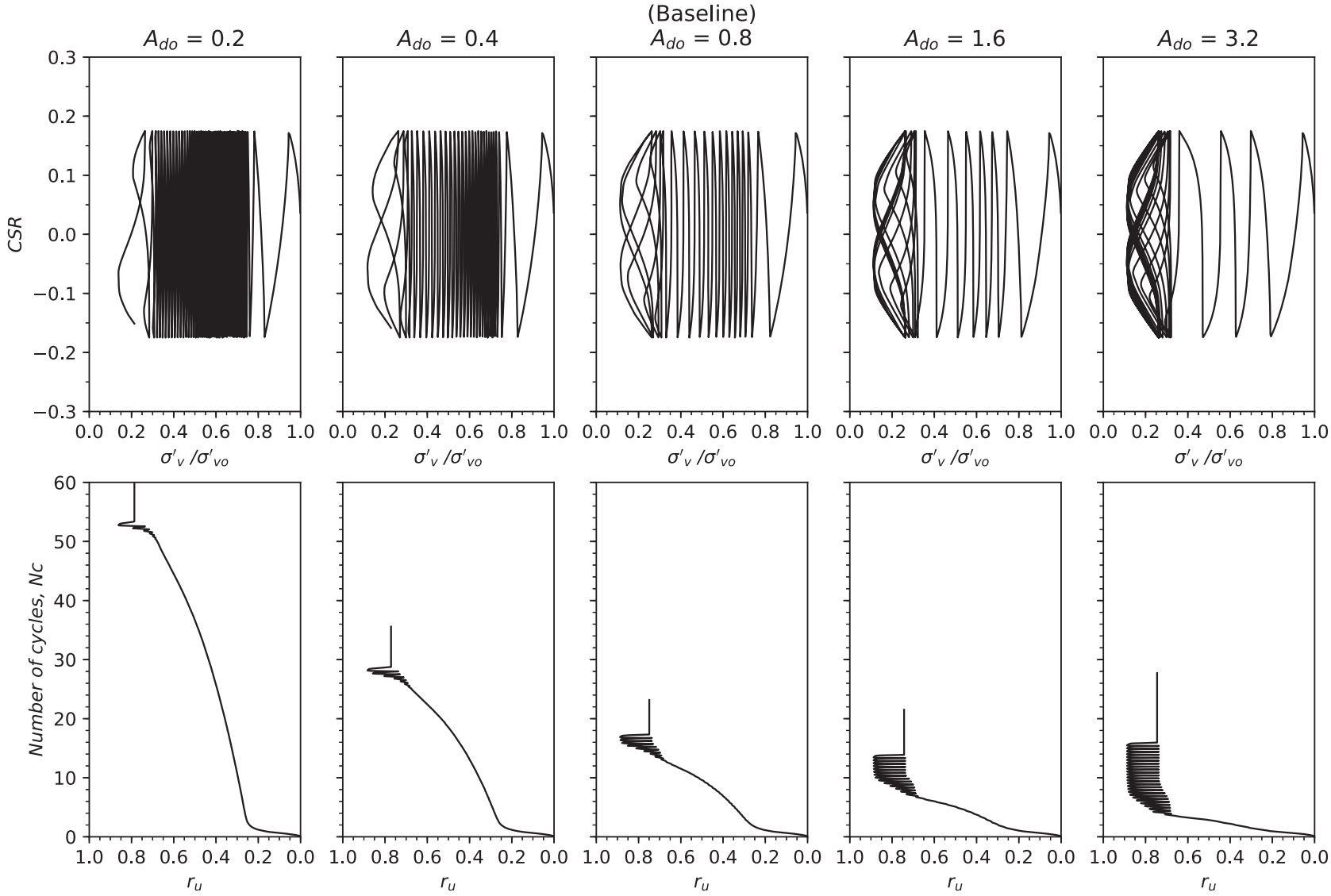


PM4Silt Parameteric Study: Effect of r_{u-max}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

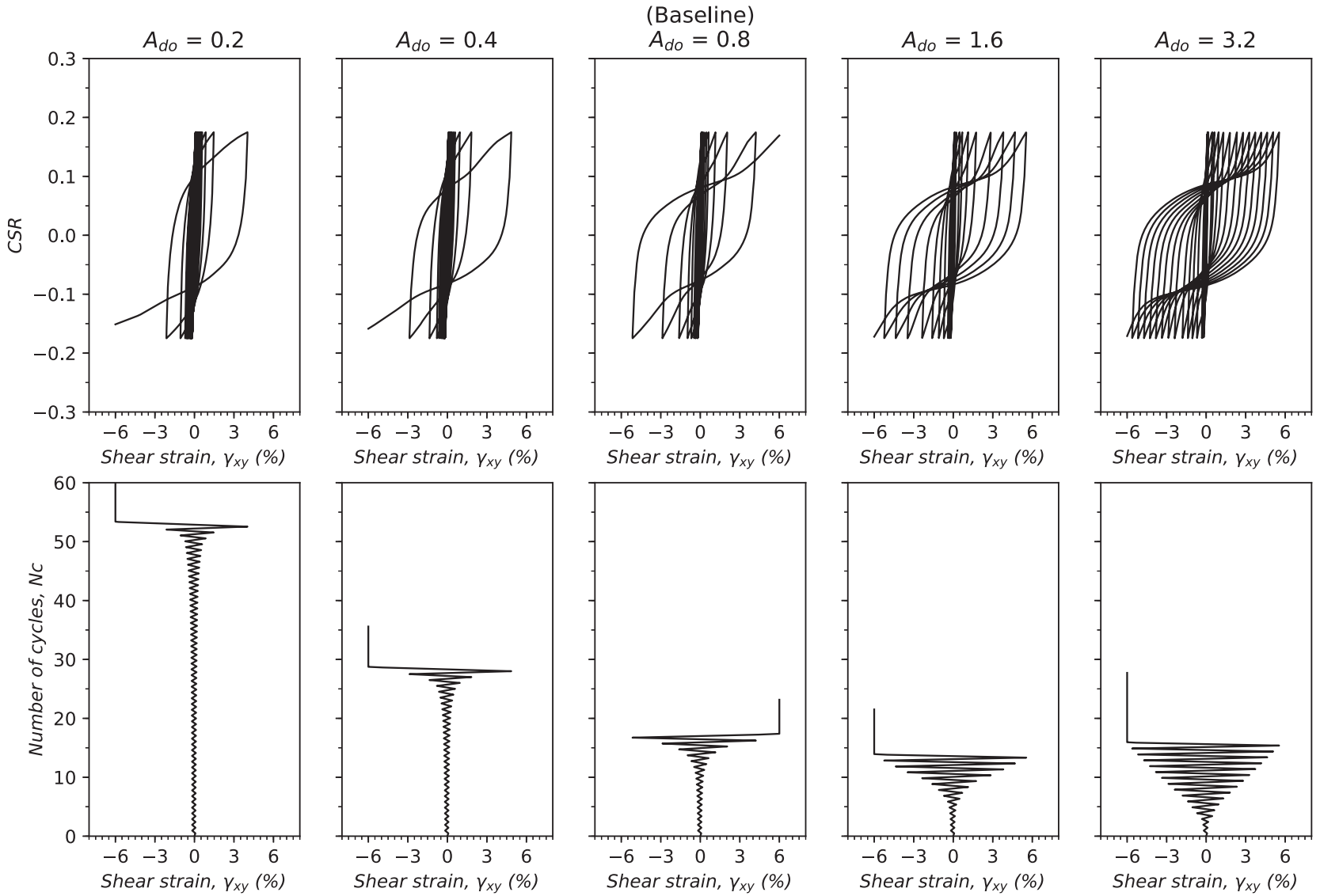


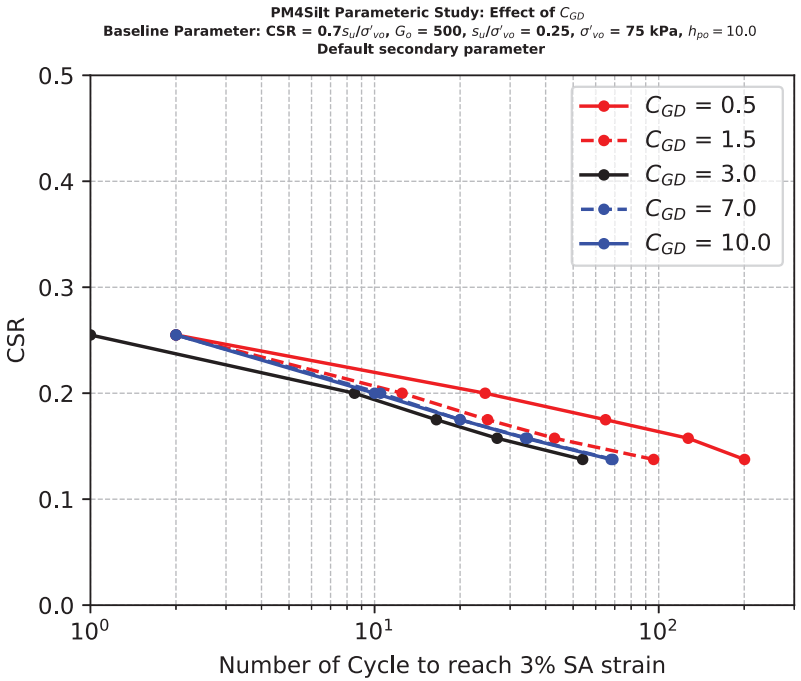

PM4Silt Parameteric Study: Effect of A_{do}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
A_{do} = 0.2
A_{do} = 0.4
A_{do} = 0.8
A_{do} = 1.6
A_{do} = 3.2
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of A_{do}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

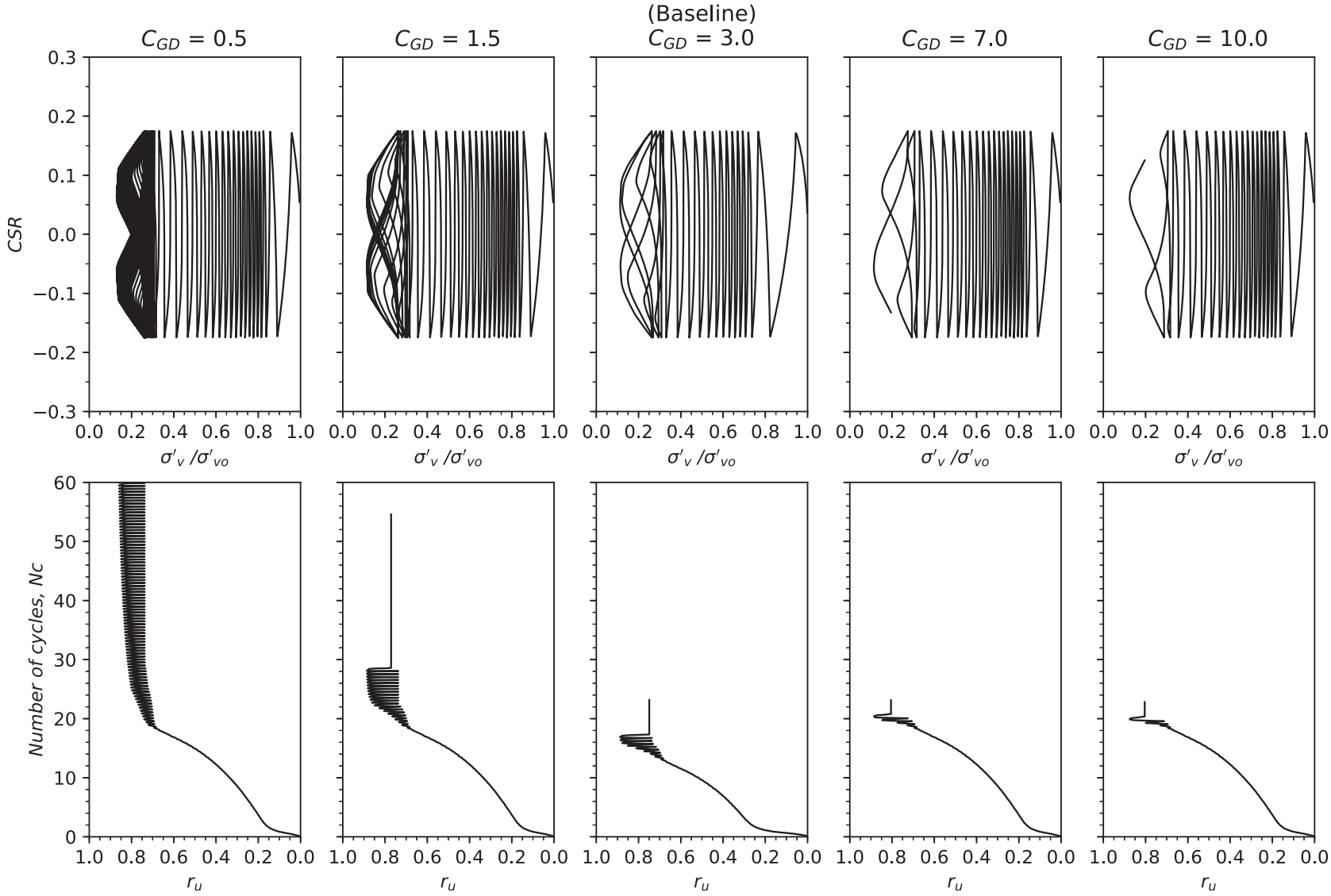


PM4Silt Parameteric Study: Effect of A_{do}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

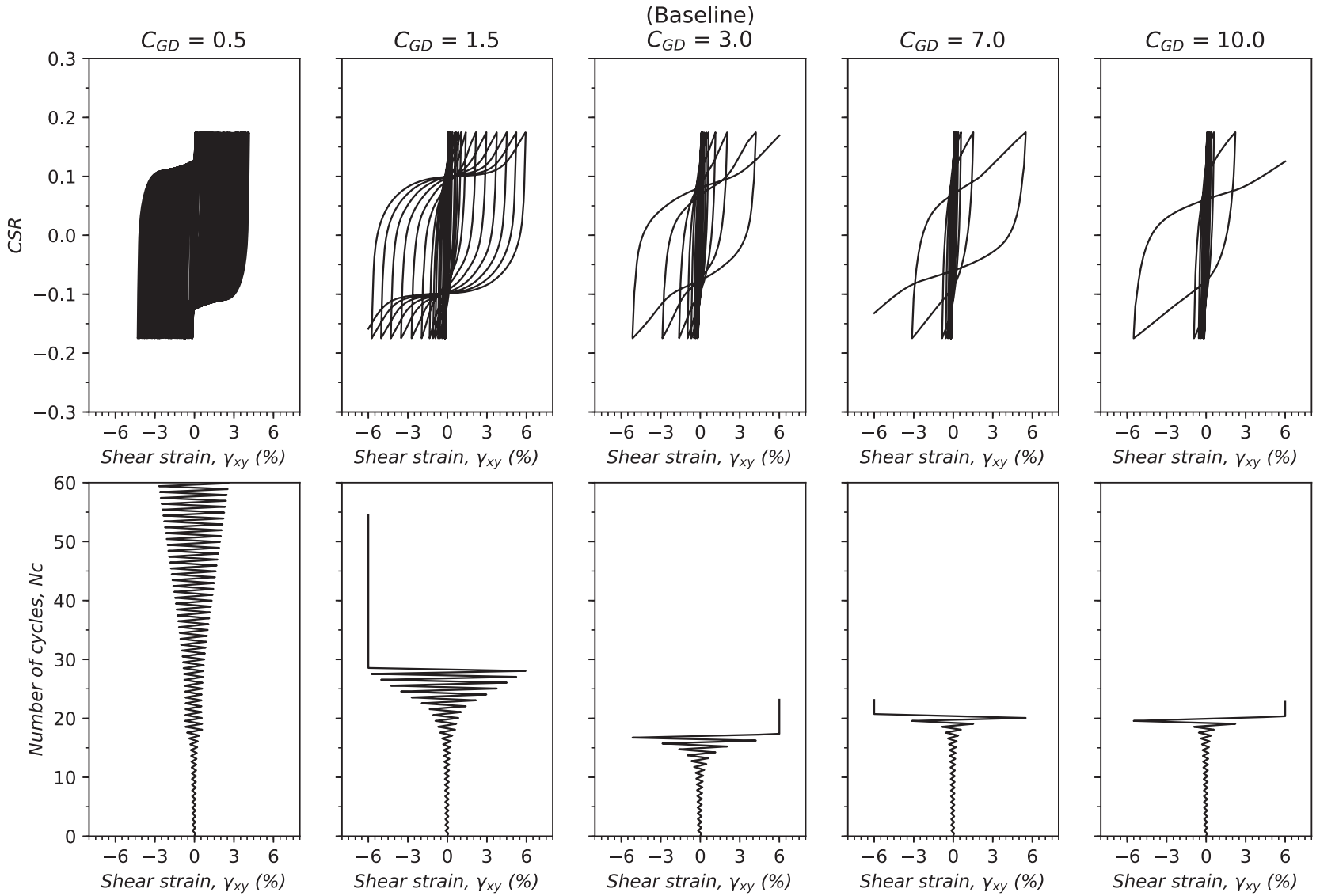


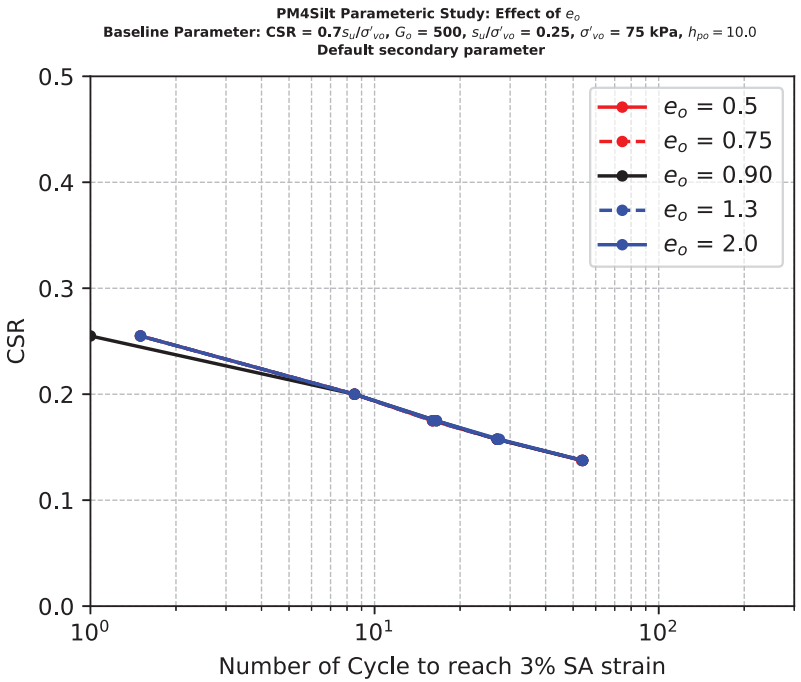

PM4Silt Parameteric Study: Effect of C_{GD}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
C_{GD} = 0.5
C_{GD} = 1.5
C_{GD} = 3.0
C_{GD} = 7.0
C_{GD} = 10.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of C_{GD}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

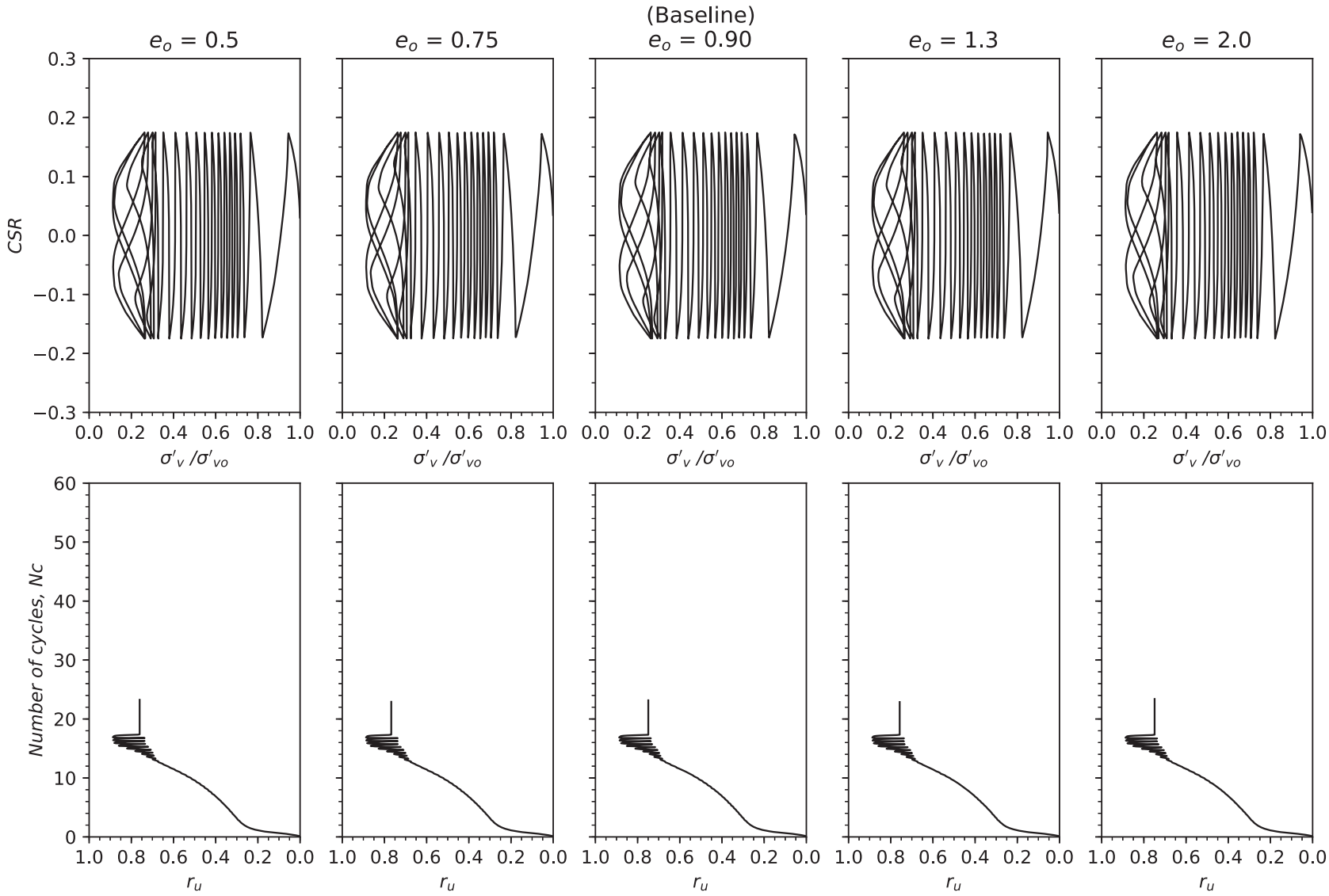


PM4Silt Parameteric Study: Effect of C_{GD}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

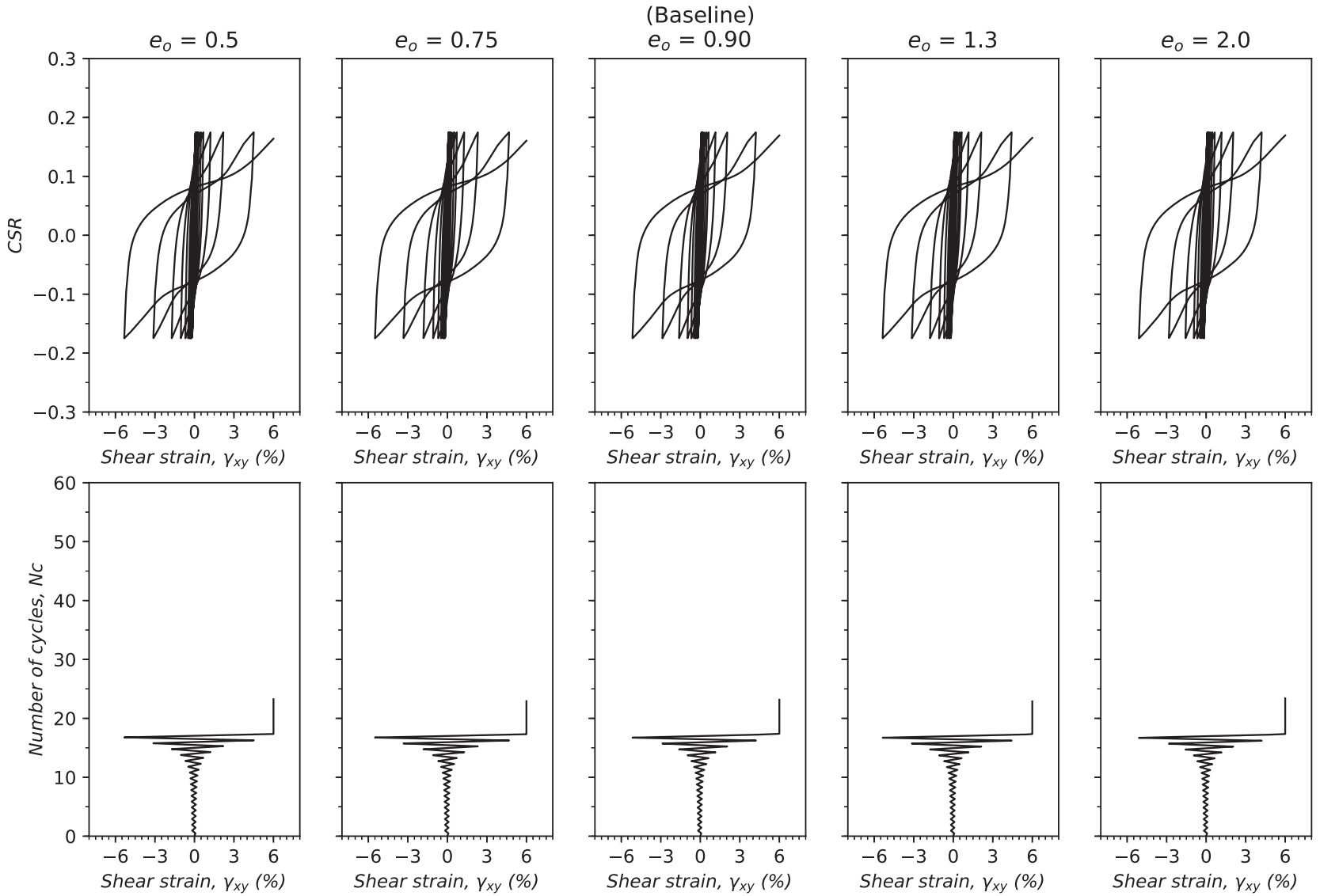


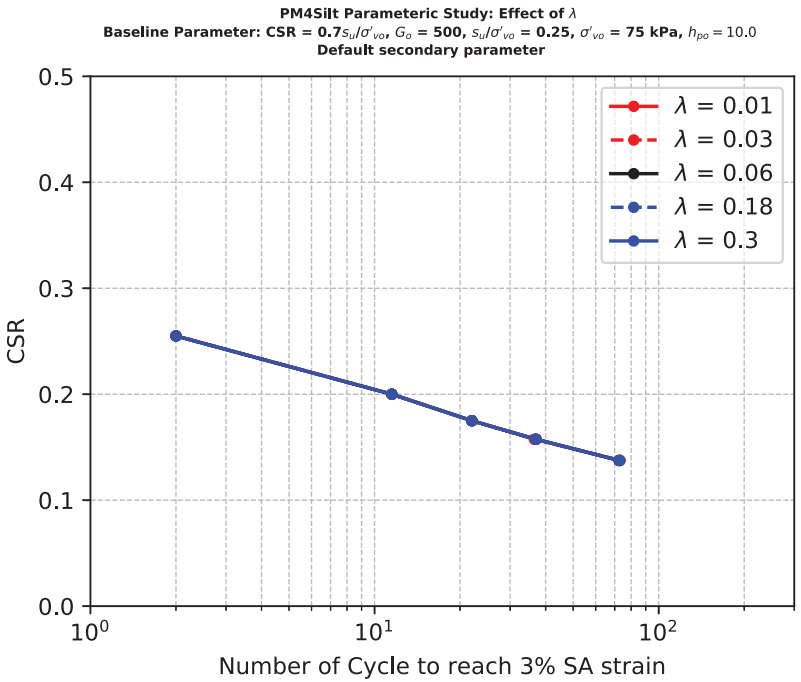

PM4Silt Parameteric Study: Effect of e_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
e_o = 0.5
e_o = 0.75
e_o = 0.90
e_o = 1.3
e_o = 2.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of e_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter

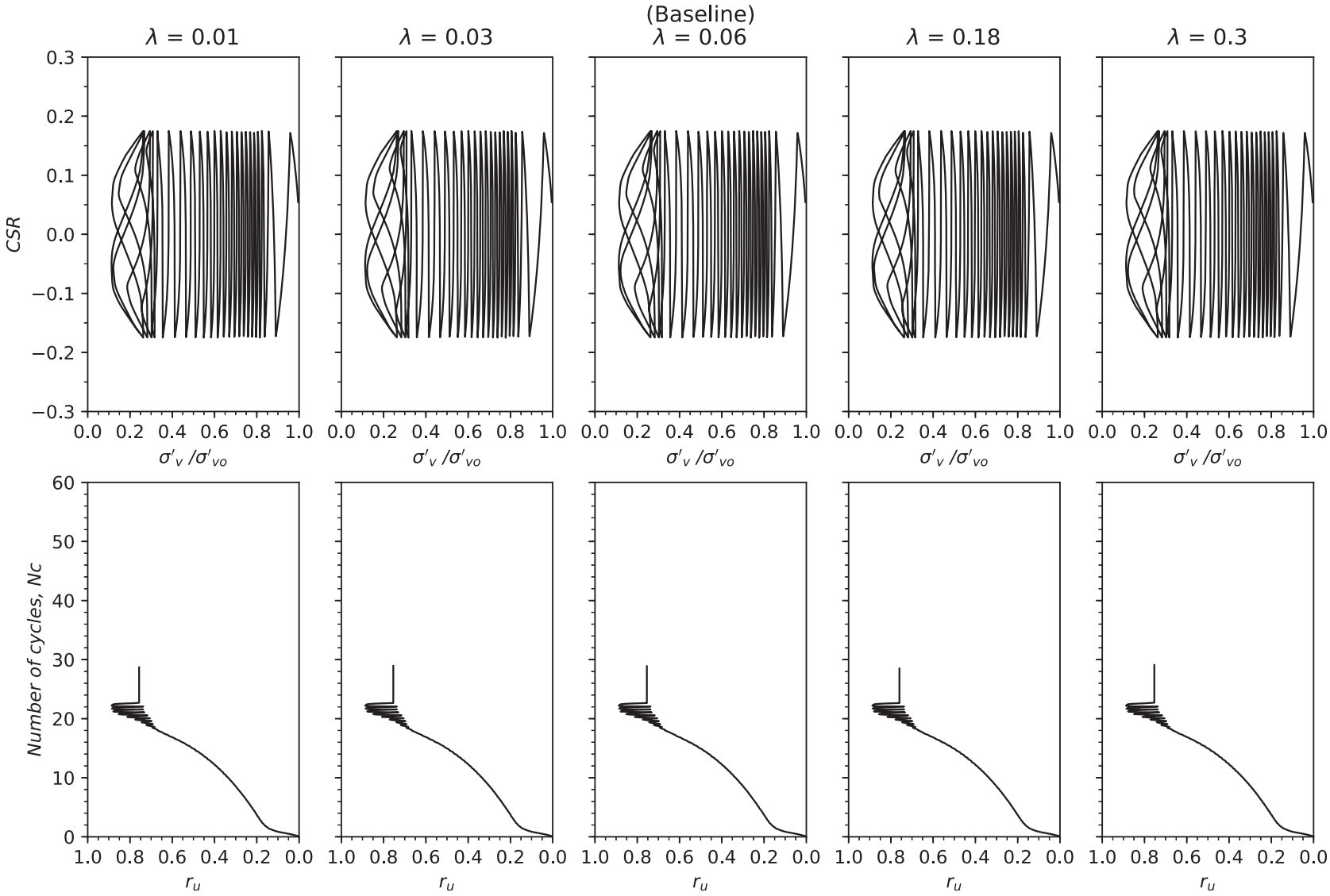


PM4Silt Parameteric Study: Effect of e_o
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter

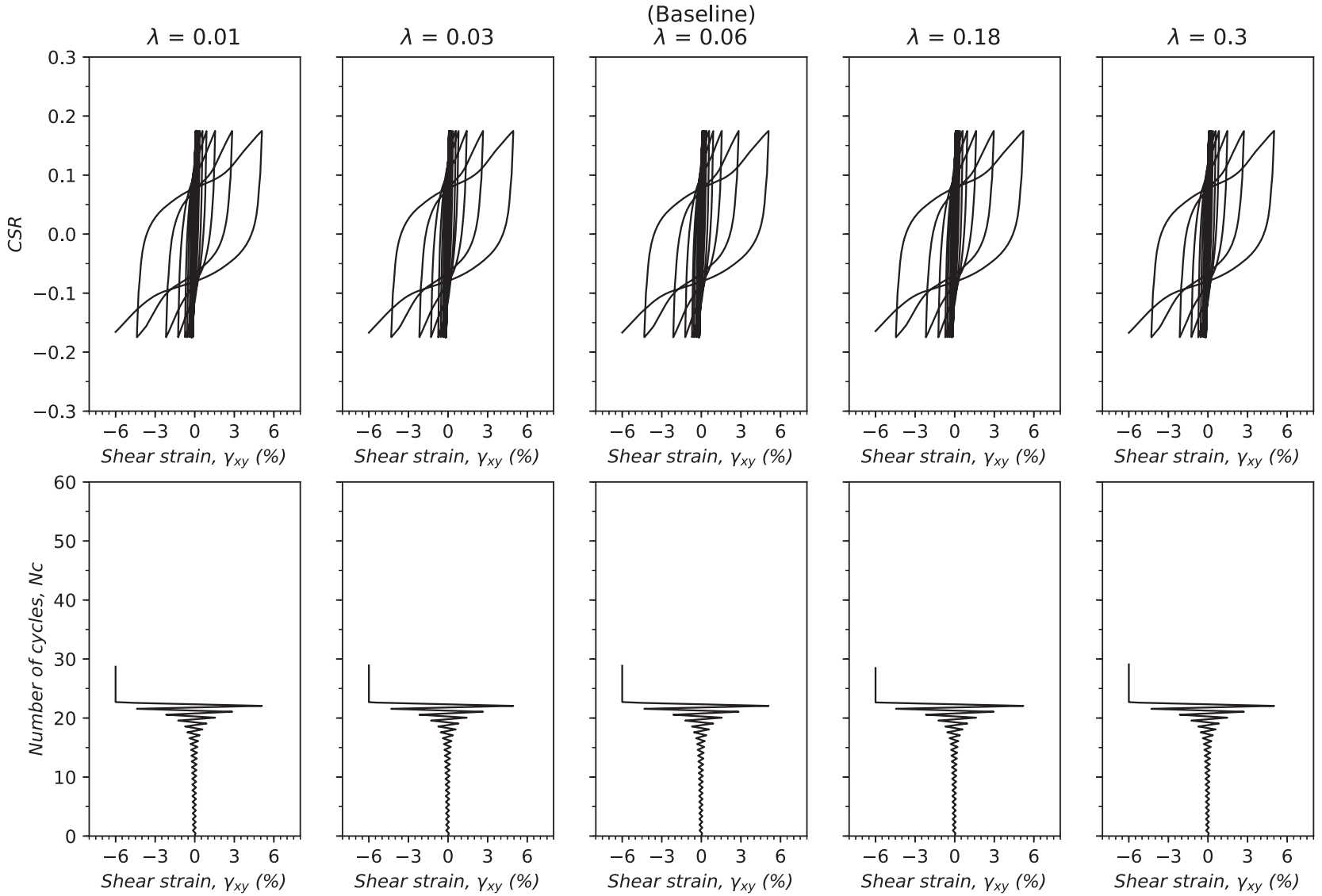


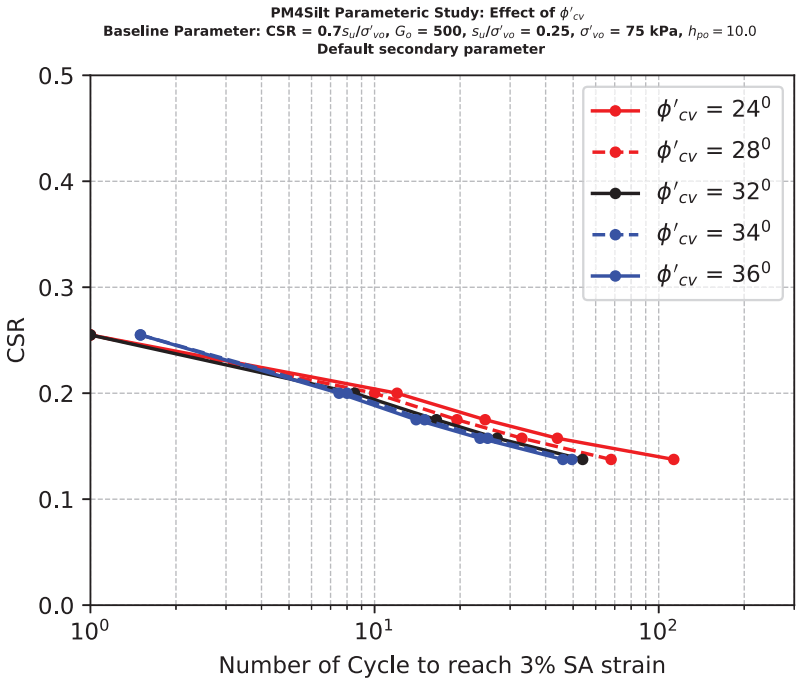

PM4Silt Parameteric Study: Effect of λ
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
λ = 0.01
λ = 0.03
λ = 0.06
λ = 0.18
λ = 0.3
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of λ
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter

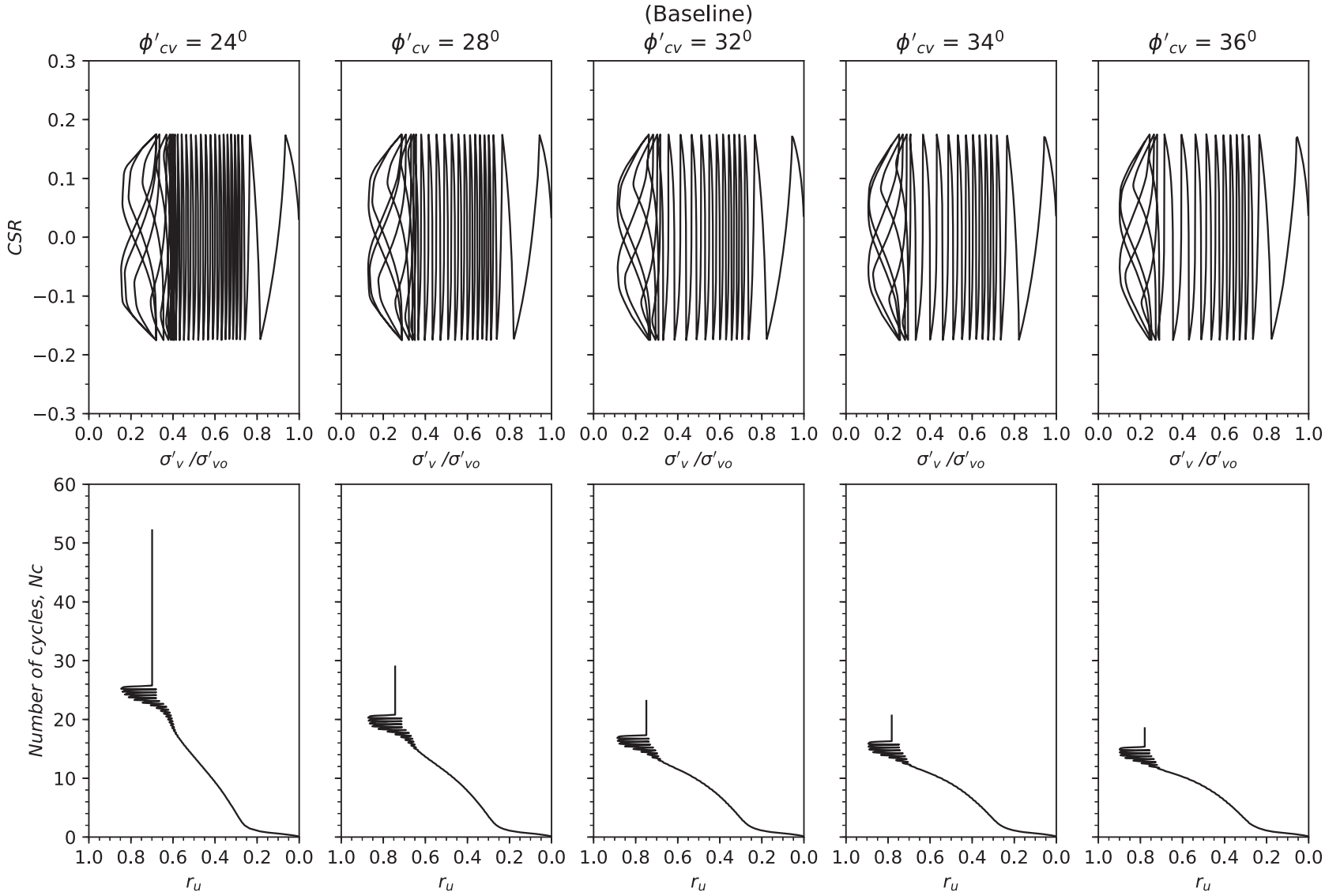


PM4Silt Parameteric Study: Effect of λ
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

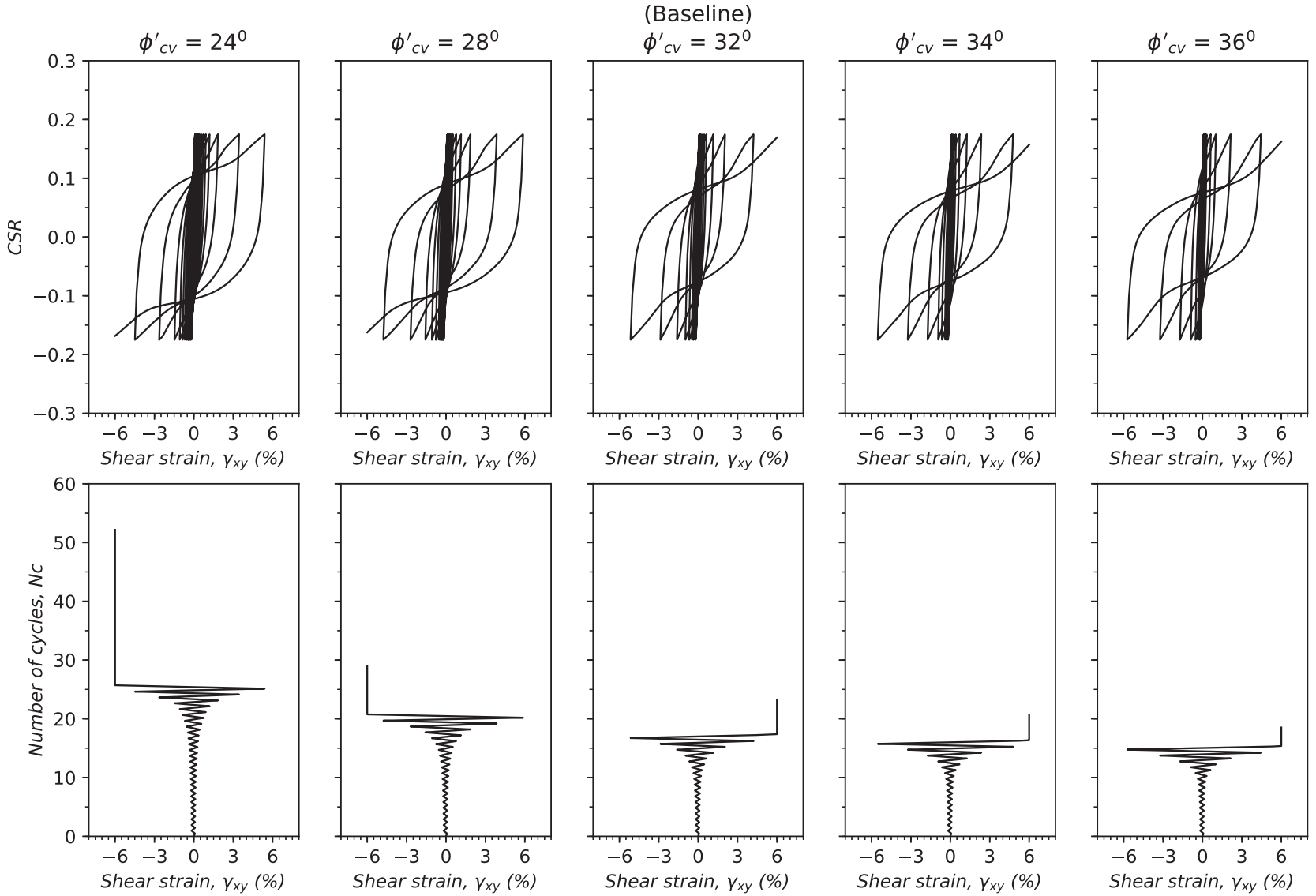


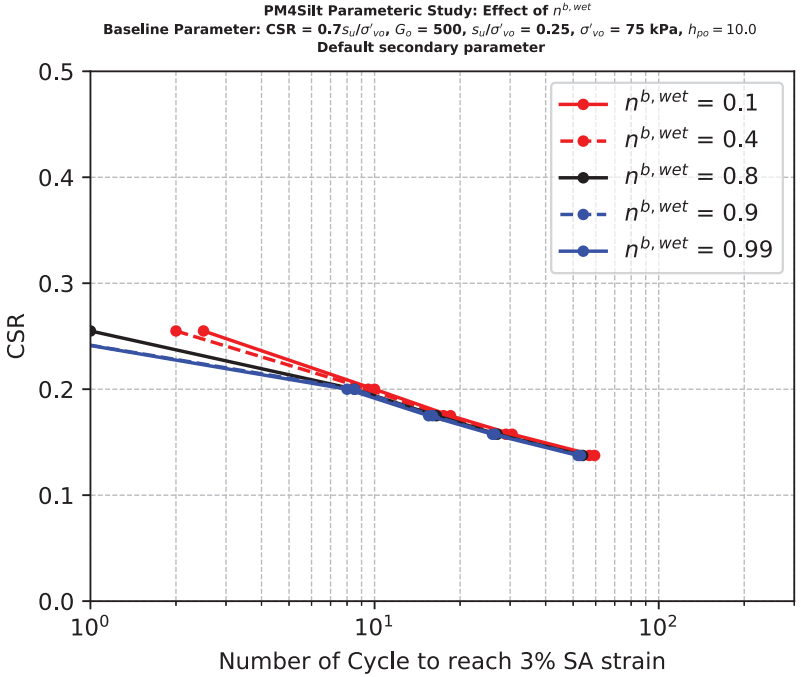

PM4Silt Parameteric Study: Effect of ϕ'_{cv}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
$\phi'_{cv} = 24^0$
$\phi'_{cv} = 28^0$
$\phi'_{cv} = 32^0$
$\phi'_{cv} = 34^0$
$\phi'_{cv} = 36^0$
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of ϕ'_{cv}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

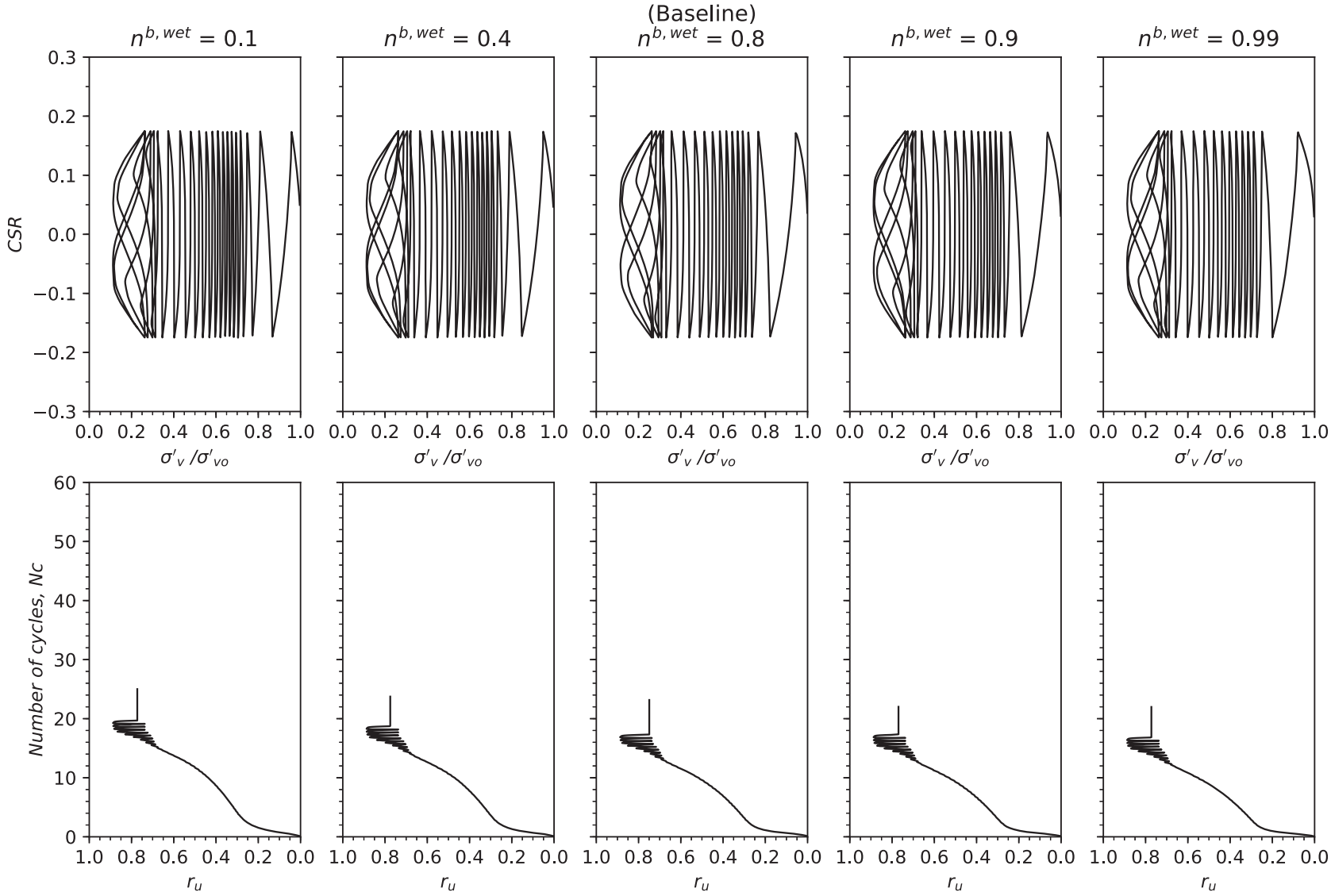


PM4Silt Parameteric Study: Effect of ϕ'_{cv}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

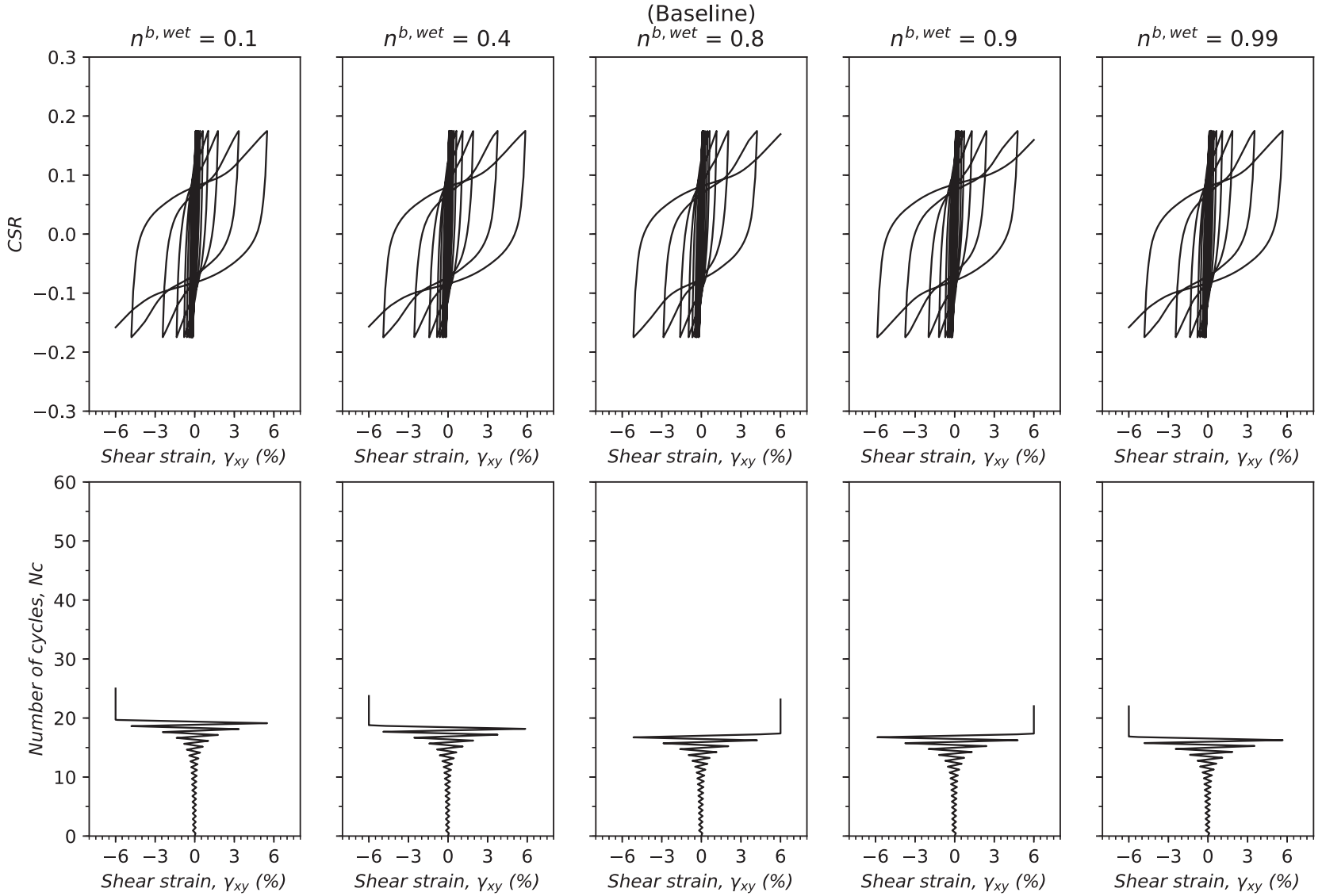


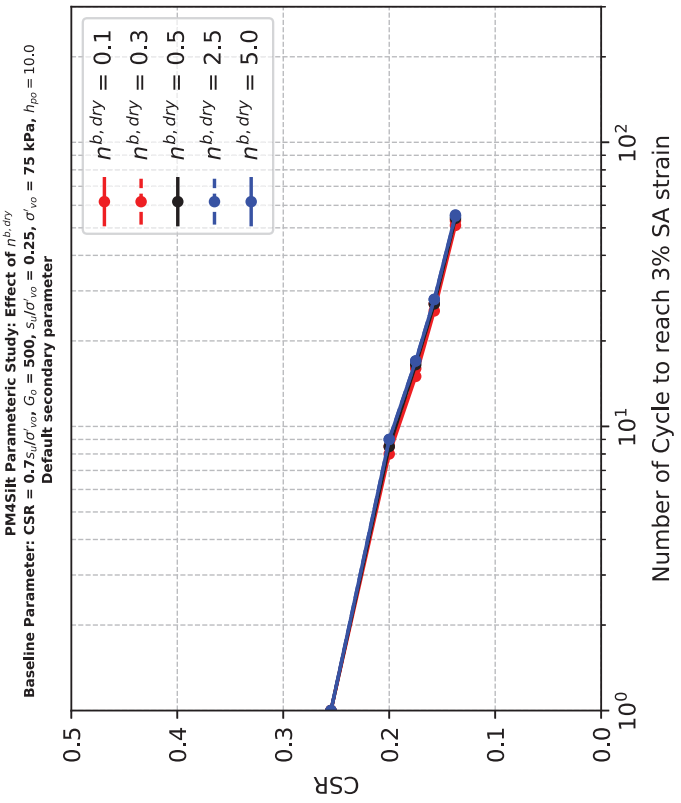

PM4Silt Parameteric Study: Effect of $n^{b,wet}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
$n^{b,wet}$ = 0.1
$n^{b,wet}$ = 0.4
$n^{b,wet}$ = 0.8
$n^{b,wet}$ = 0.9
$n^{b,wet}$ = 0.99
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of $n^{b,wet}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

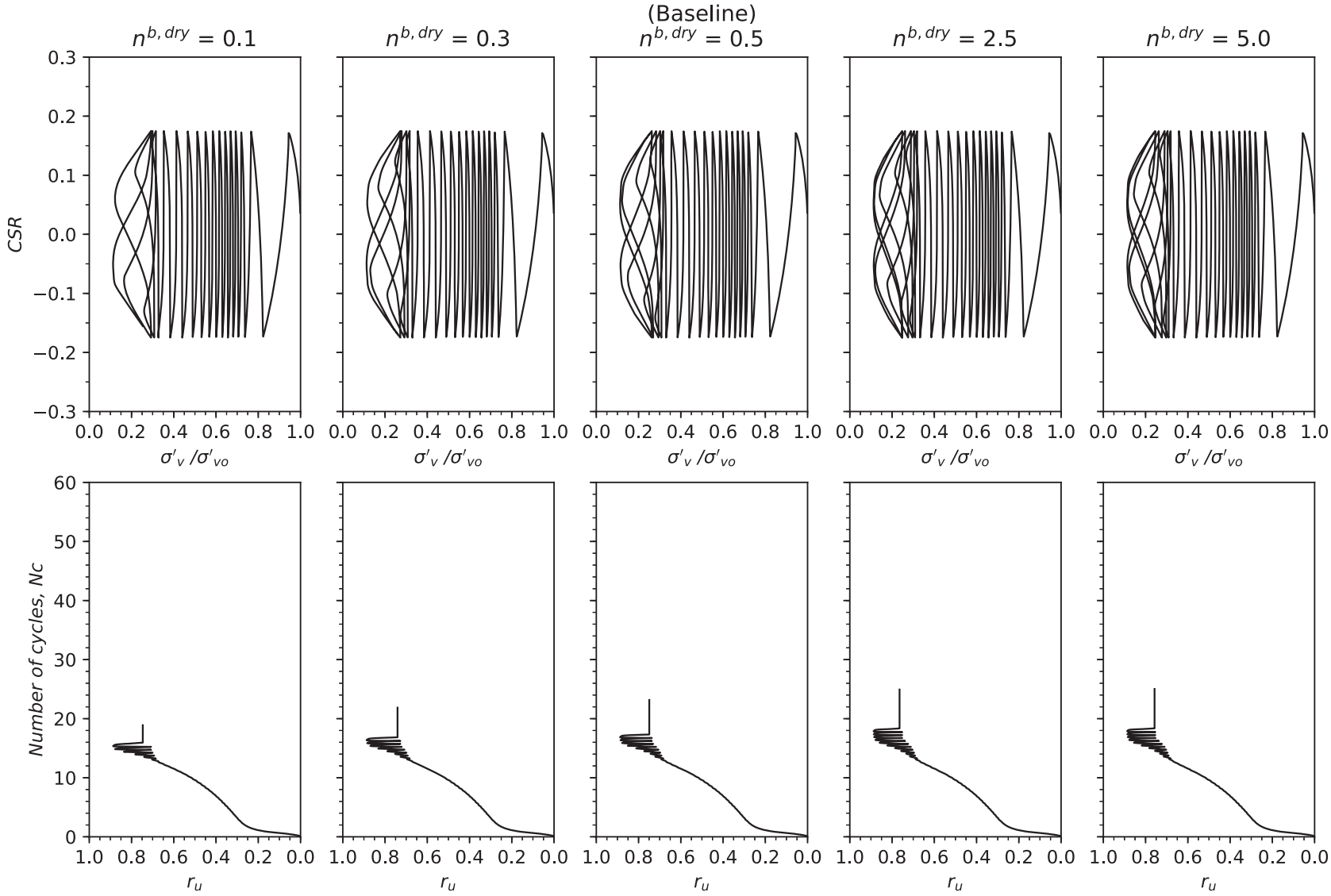


PM4Silt Parameteric Study: Effect of $n^{b,wet}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

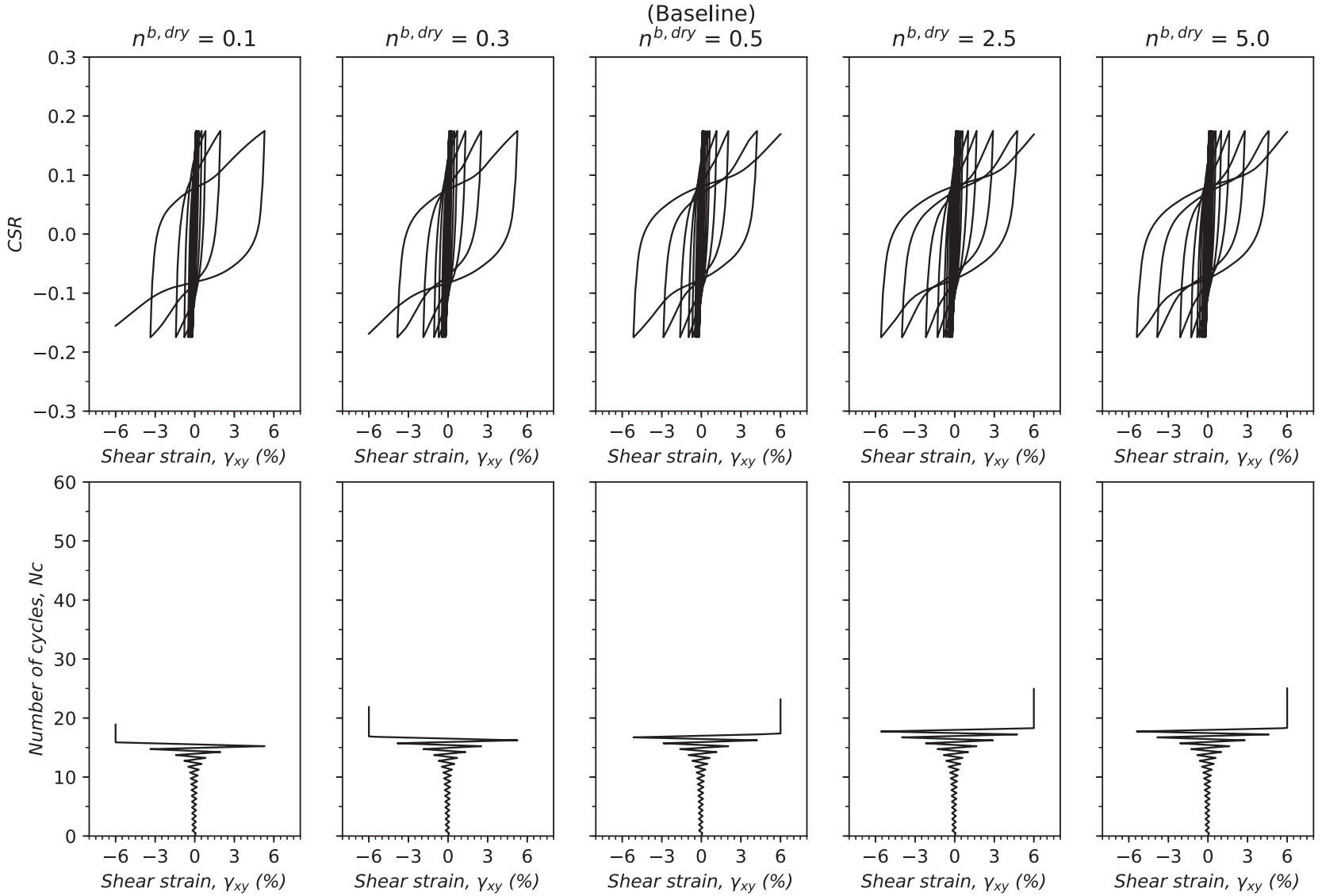


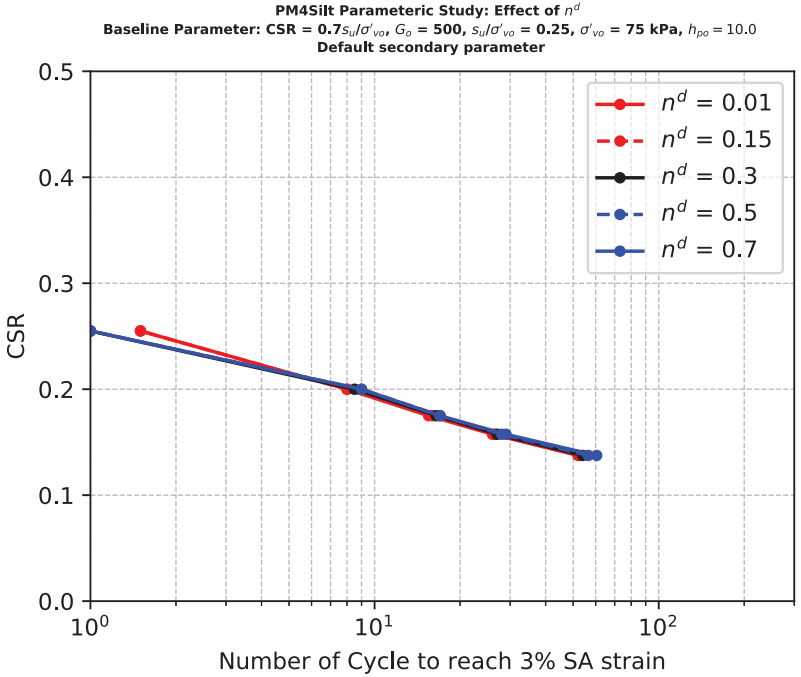

PM4Silt Parameteric Study: Effect of $n^{b,dry}$
Baseline Parameter: CSR = 0.75s_{u}/σ'_{vo}, G_o = 500, s_{u}/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
$n^{b,dry}$ = 0.1
$n^{b,dry}$ = 0.3
$n^{b,dry}$ = 0.5
$n^{b,dry}$ = 2.5
$n^{b,dry}$ = 5.0
CSR
0.5
0.4
0.3
0.2
0.1
0.0
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of $n^{b,dry}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

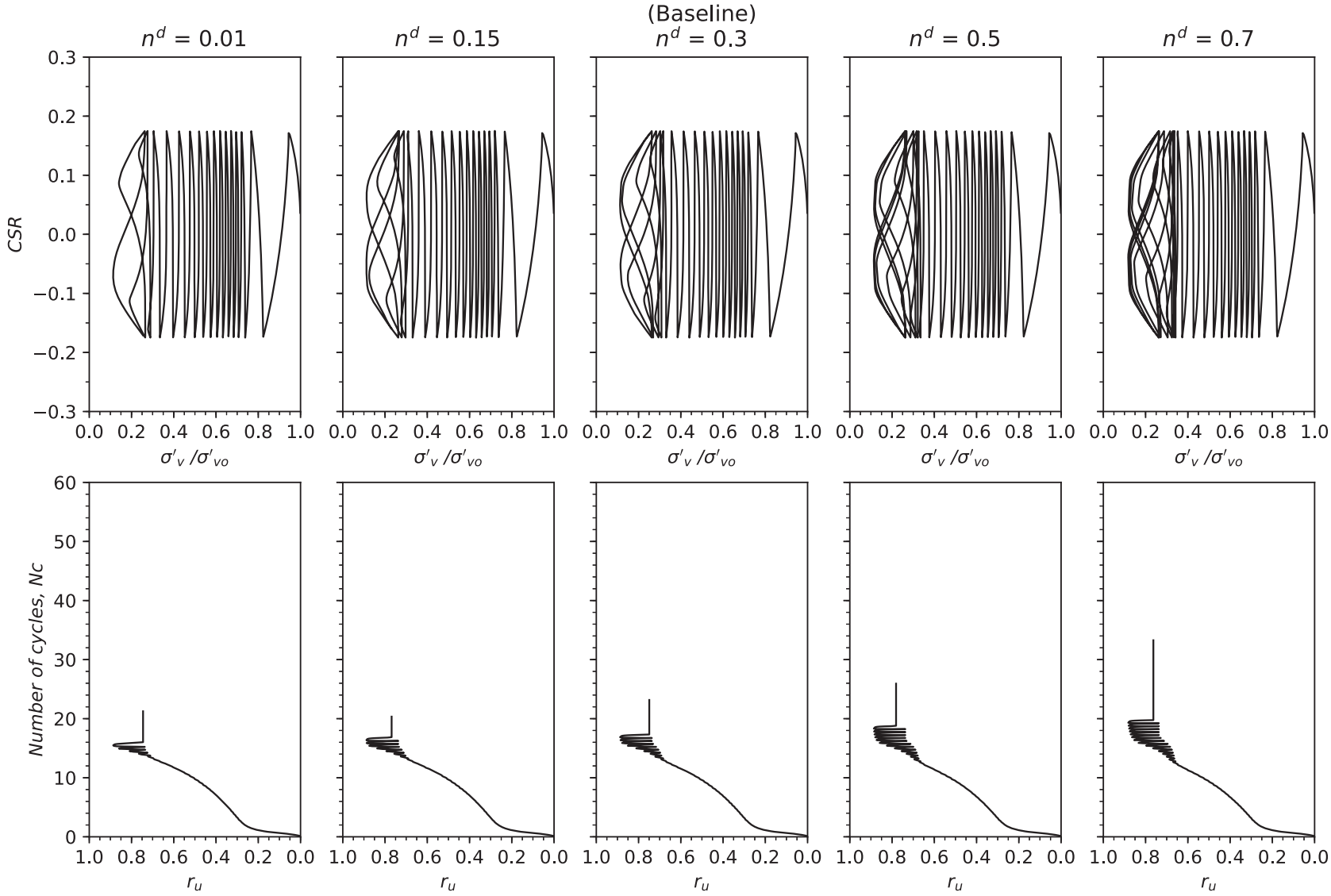


PM4Silt Parameteric Study: Effect of $n^{b,dry}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

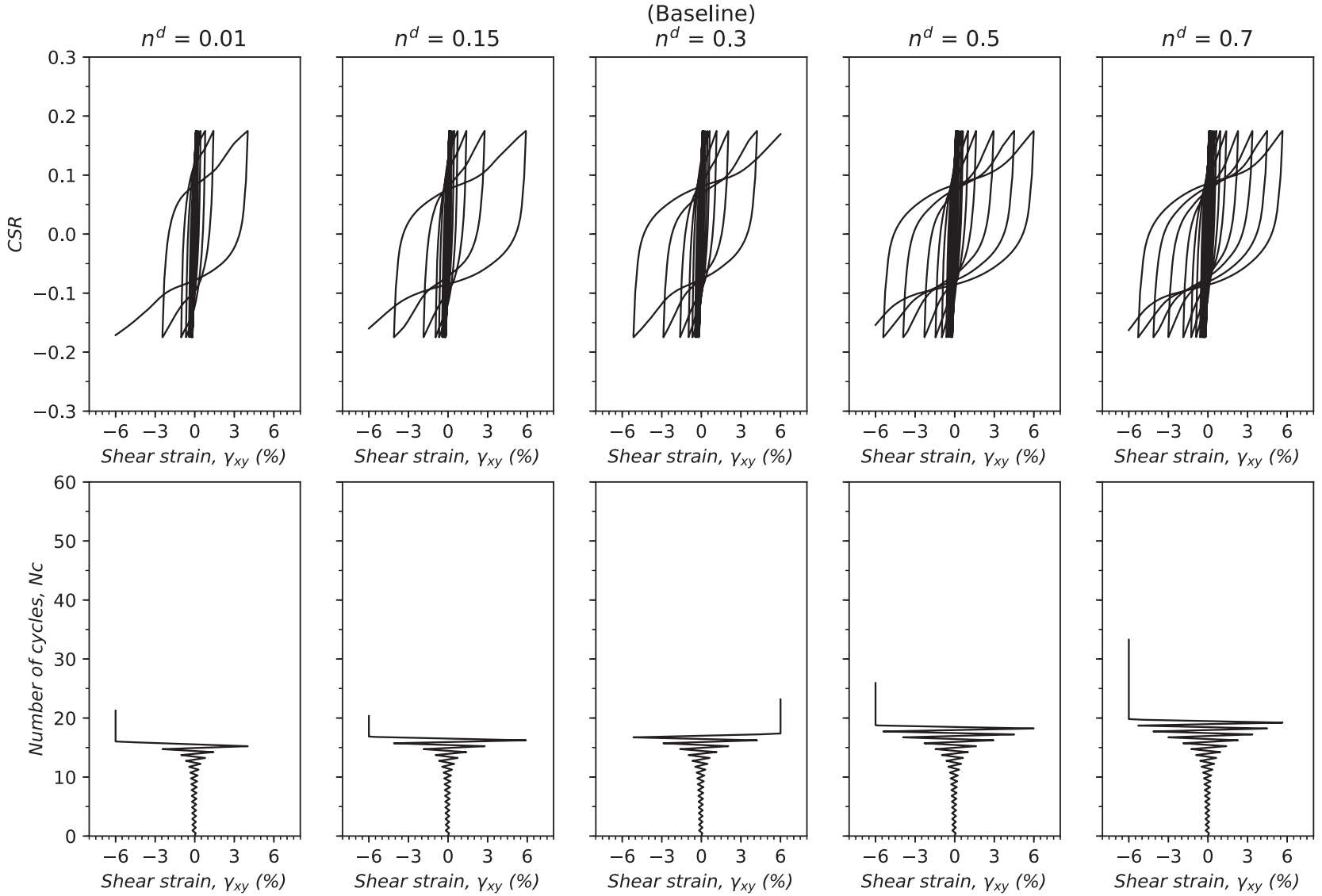


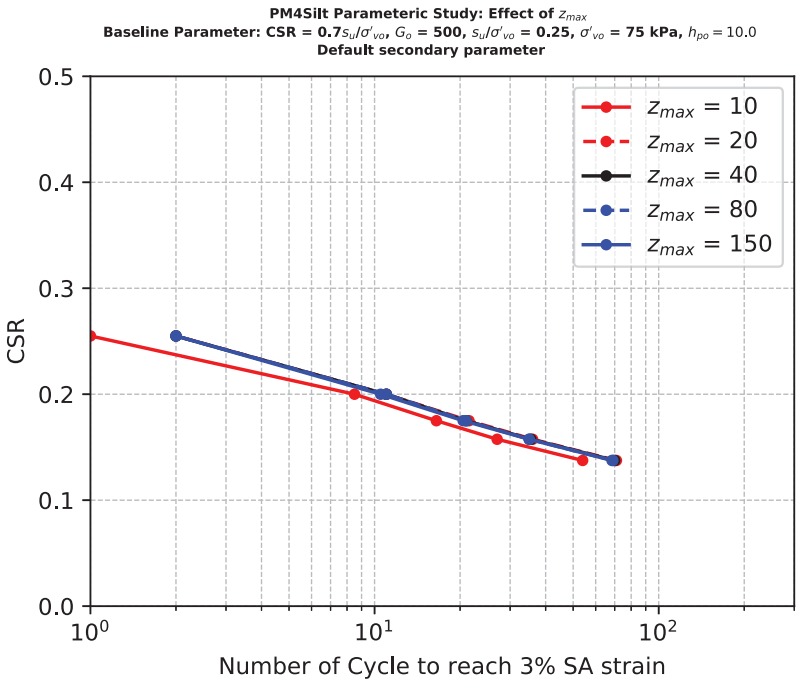

PM4Silt Parameteric Study: Effect of n^d
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
n^d = 0.01
n^d = 0.15
n^d = 0.3
n^d = 0.5
n^d = 0.7
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of n^d
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

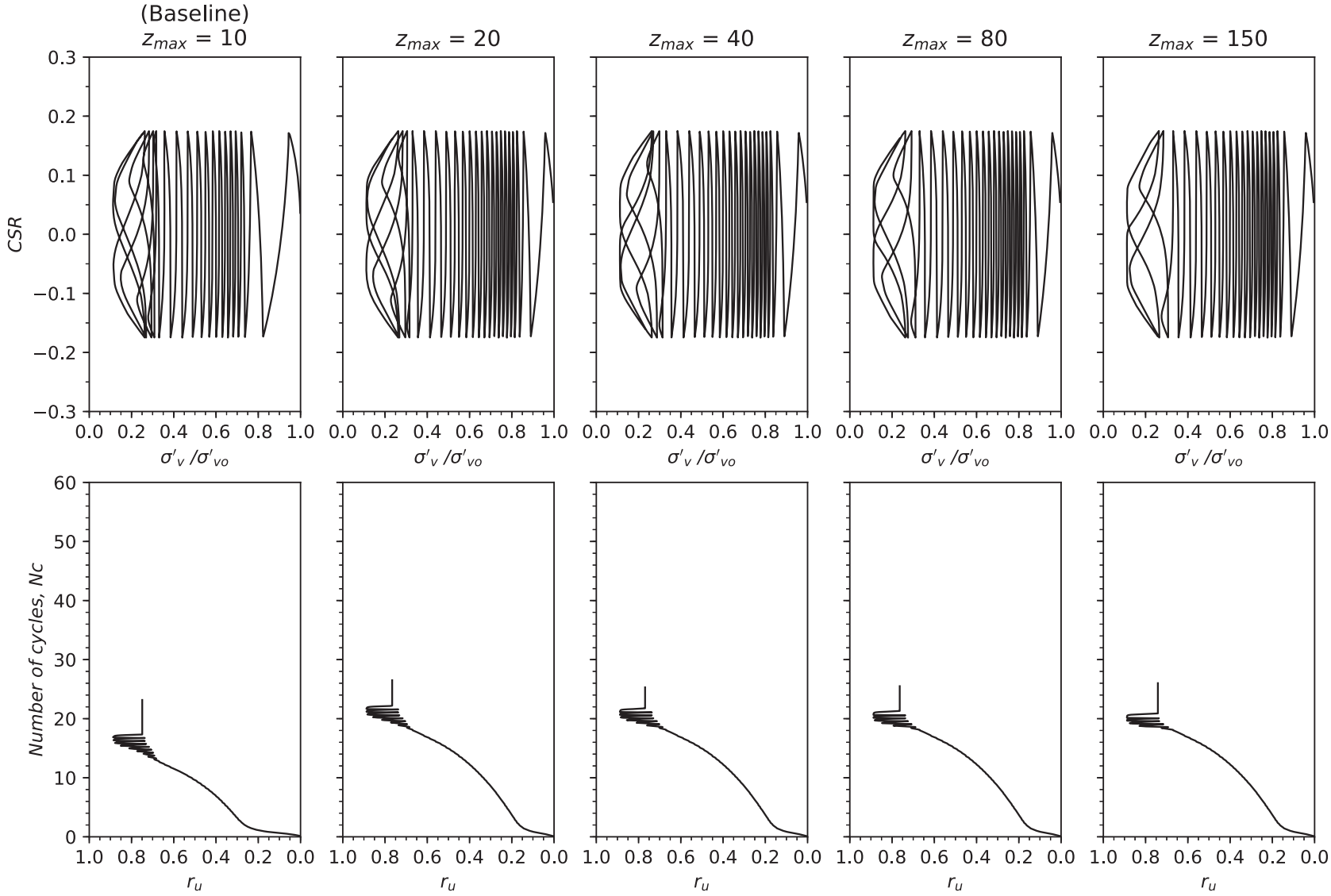


PM4Silt Parameteric Study: Effect of n^d
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

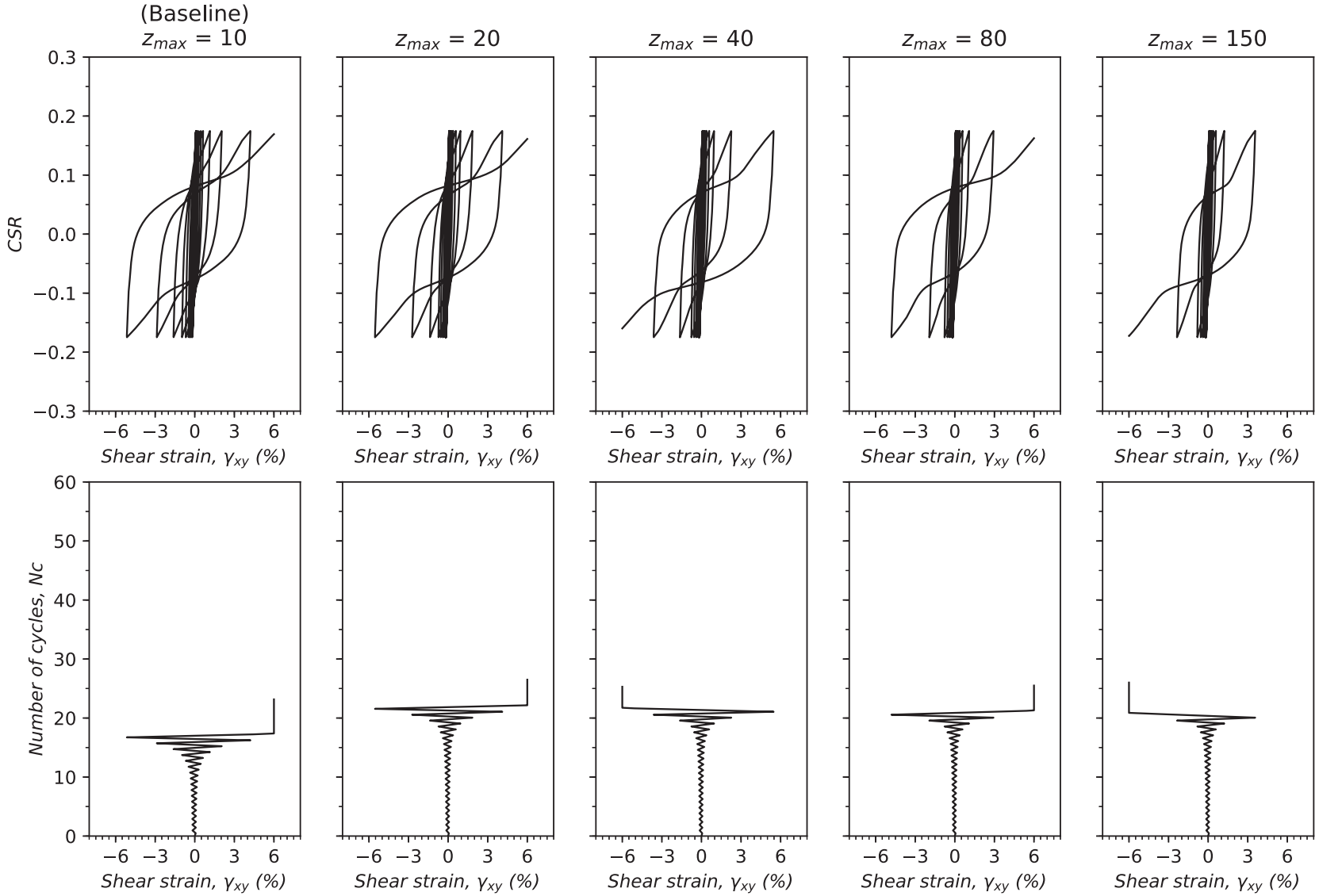


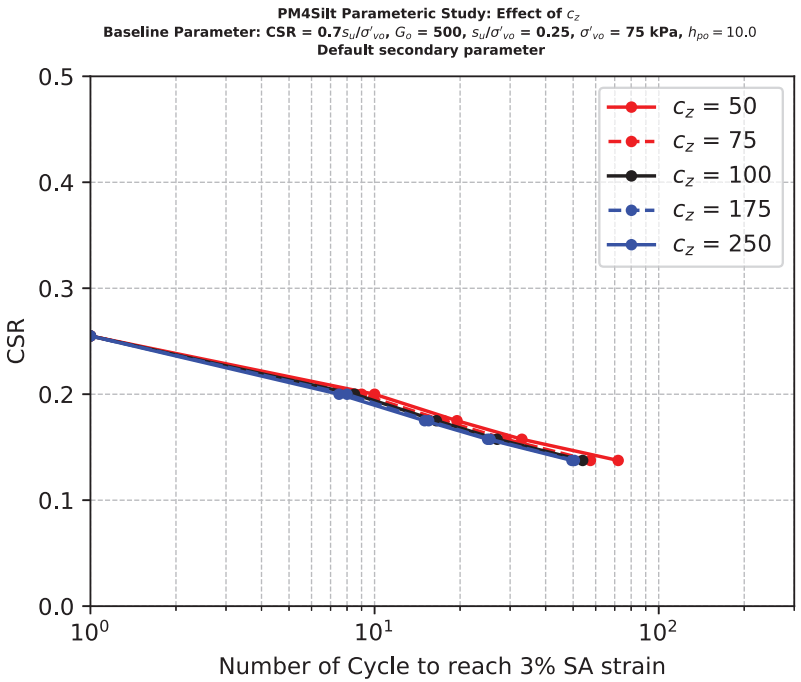

PM4Silt Parameteric Study: Effect of z_{max}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
z_{max} = 10
z_{max} = 20
z_{max} = 40
z_{max} = 80
z_{max} = 150
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of z_{max}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter

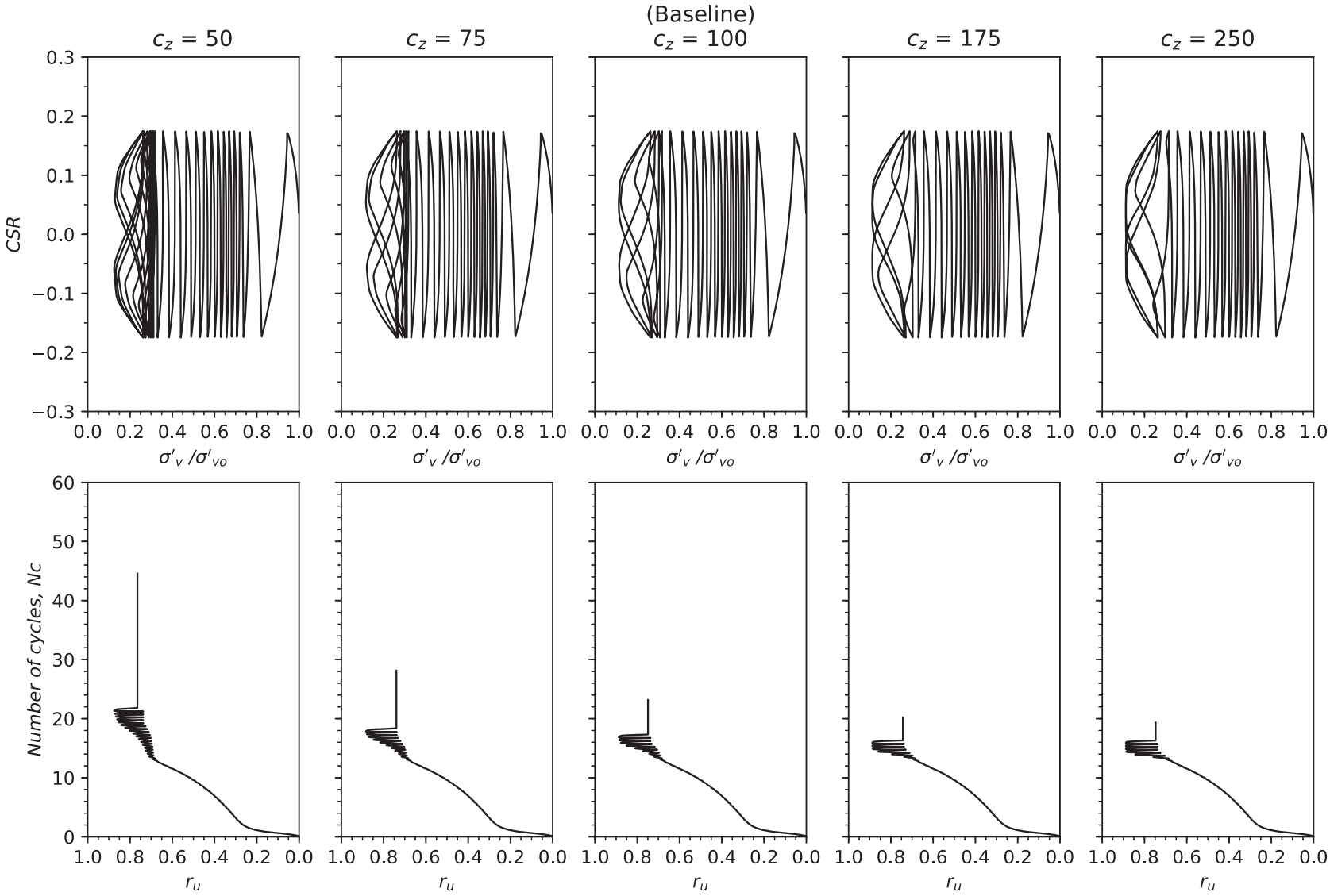


PM4Silt Parameteric Study: Effect of z_{max}
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

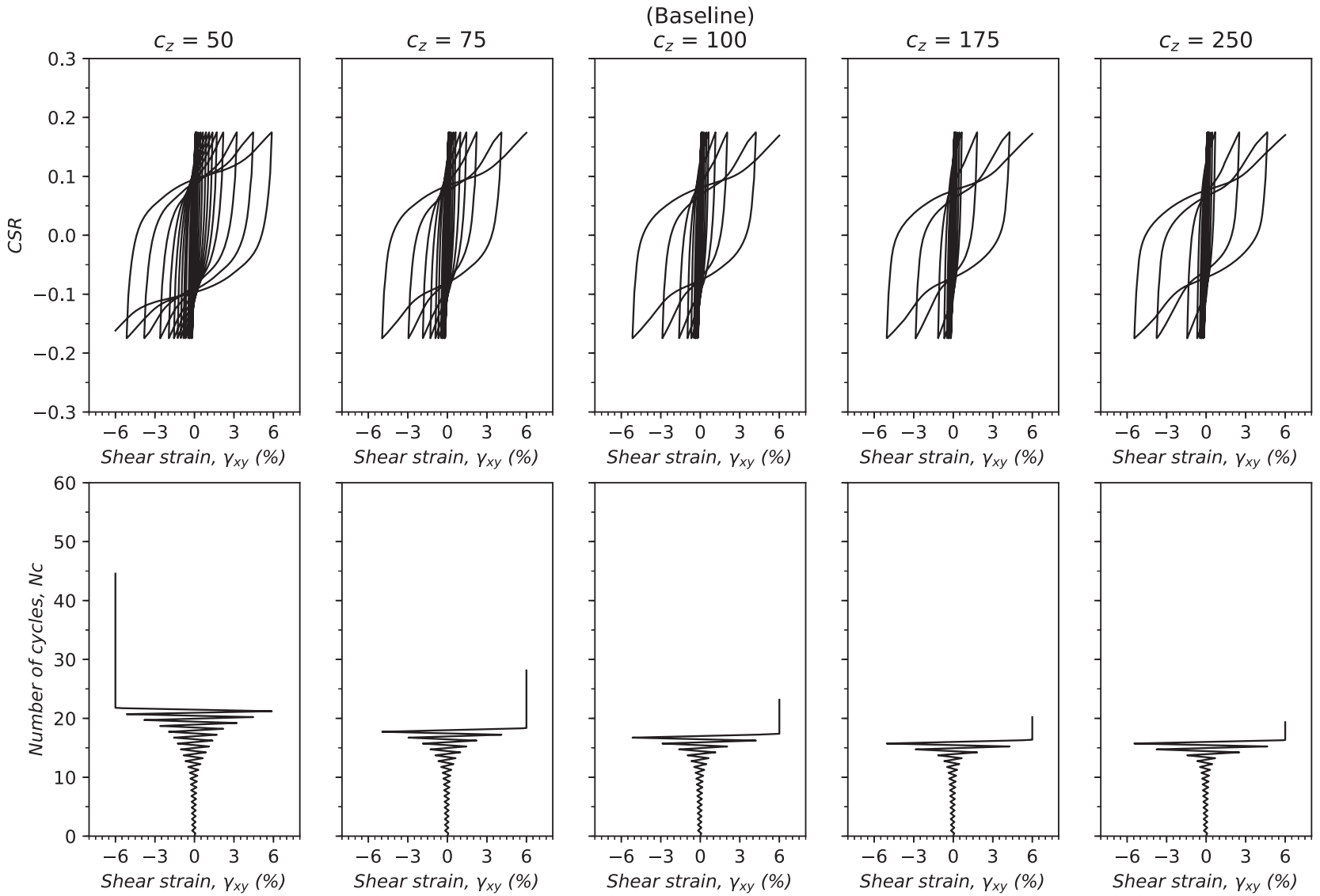


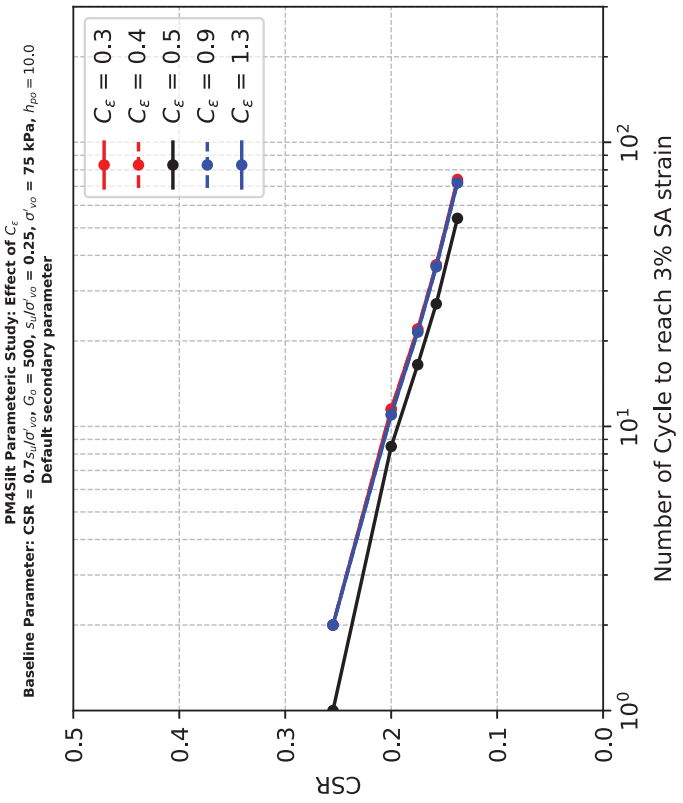

PM4Silt Parameteric Study: Effect of c_z
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
c_z = 50
c_z = 75
c_z = 100
c_z = 175
c_z = 250
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of c_z
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

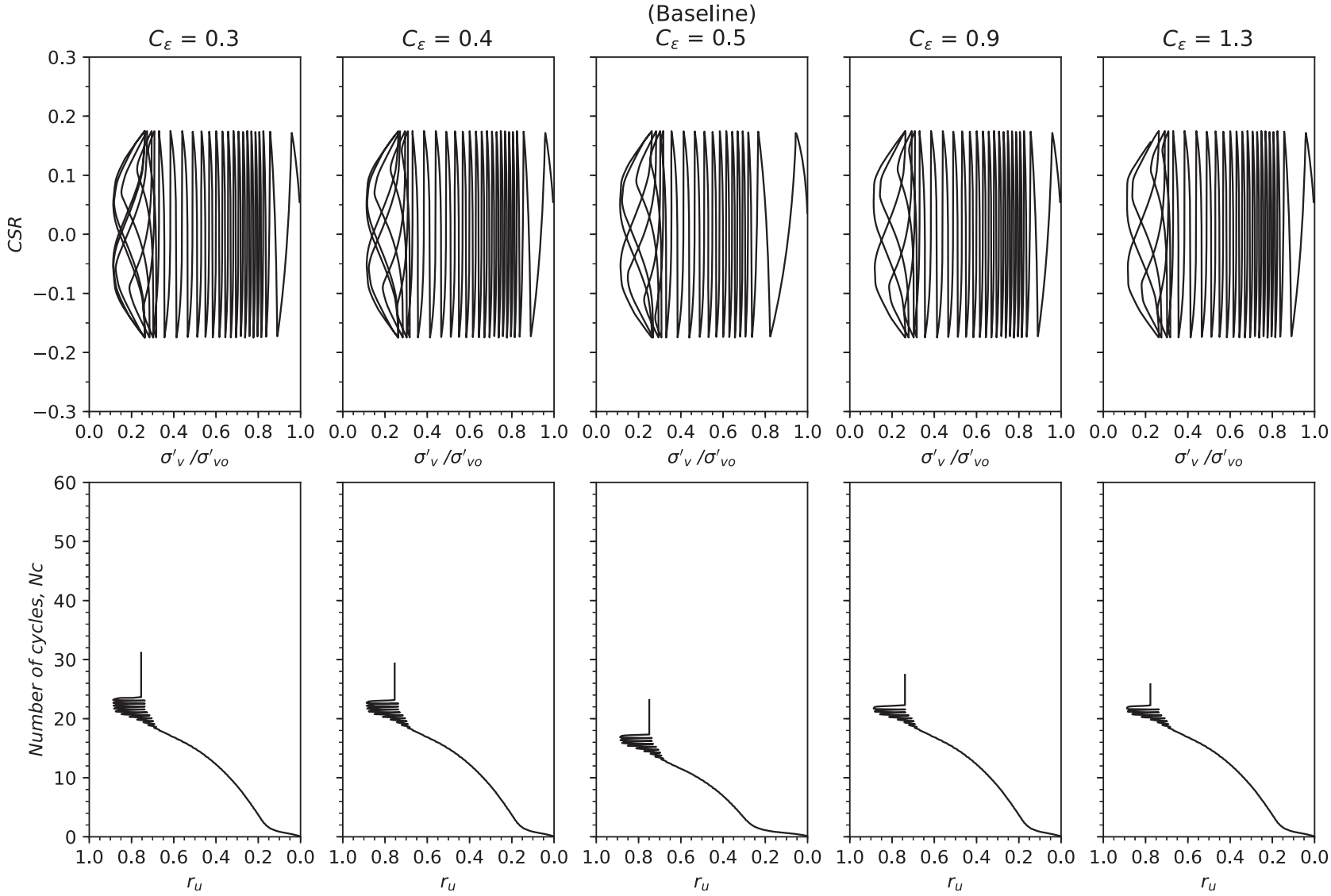


PM4Silt Parameteric Study: Effect of c_z
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

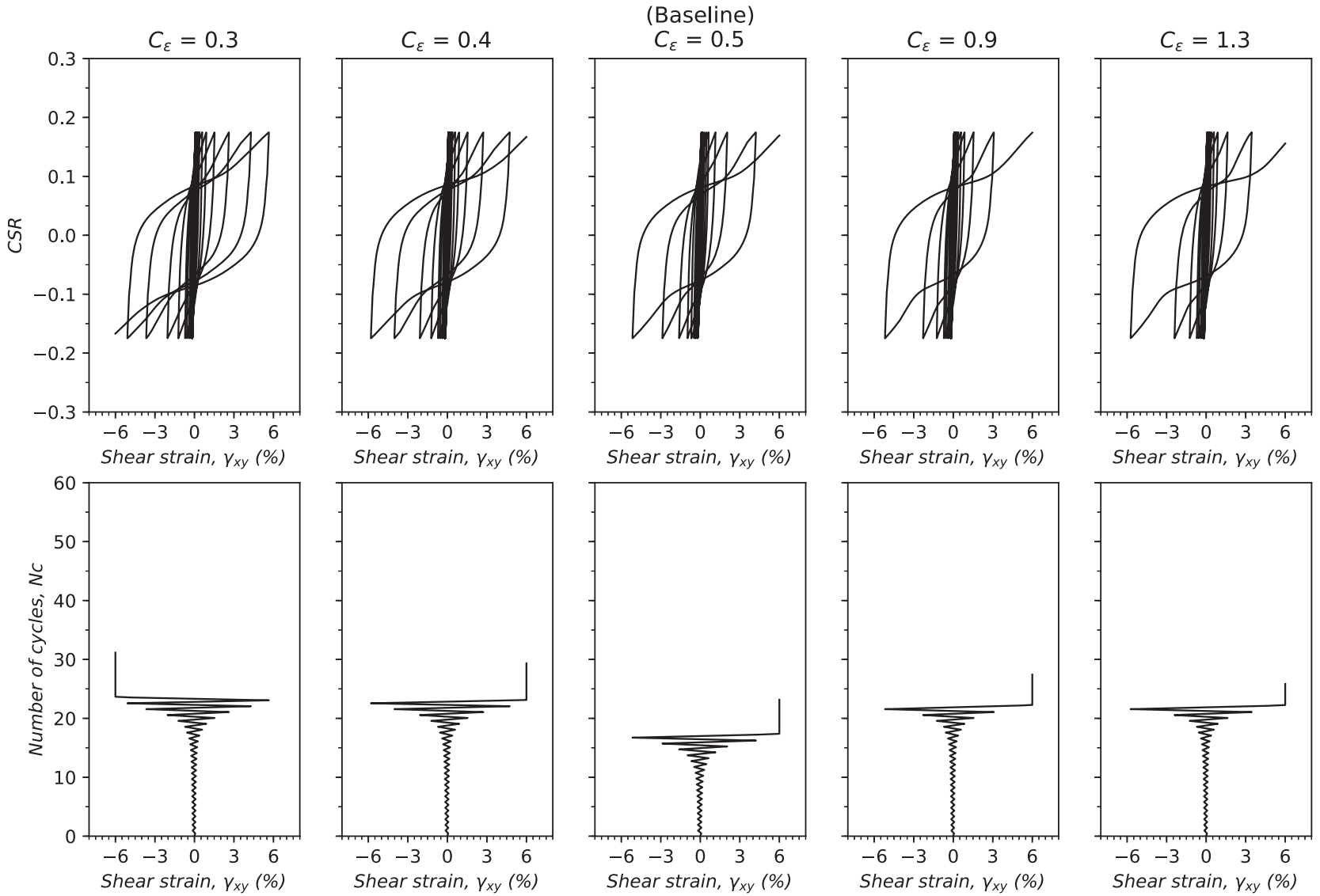


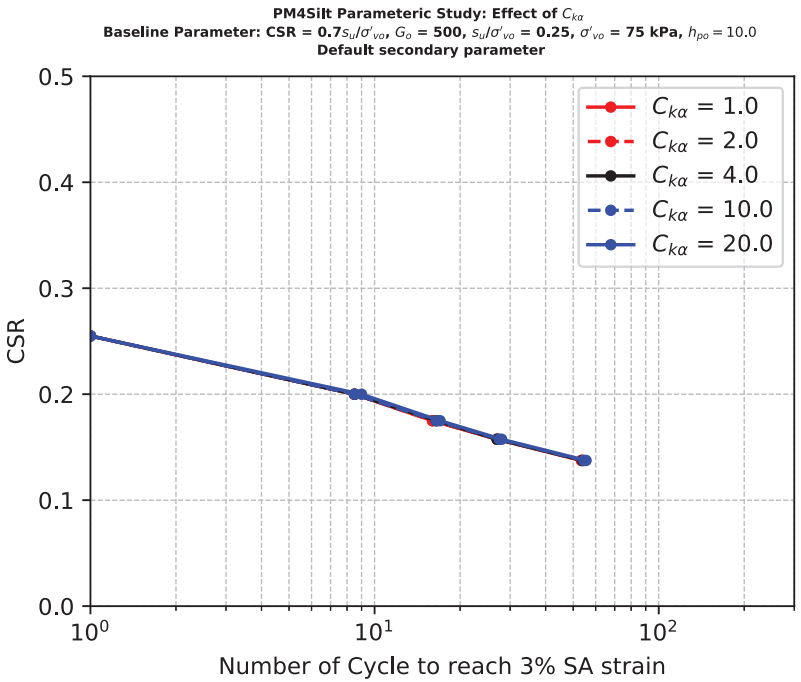

PM4Silt Parameteric Study: Effect of C_ε
Baseline Parameter: CSR = 0.7 s_{u}/σ'_{vo}, G_o = 500, s_{u}/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
C_ε = 0.3
C_ε = 0.4
C_ε = 0.5
C_ε = 0.9
C_ε = 1.3
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of C_ε
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter

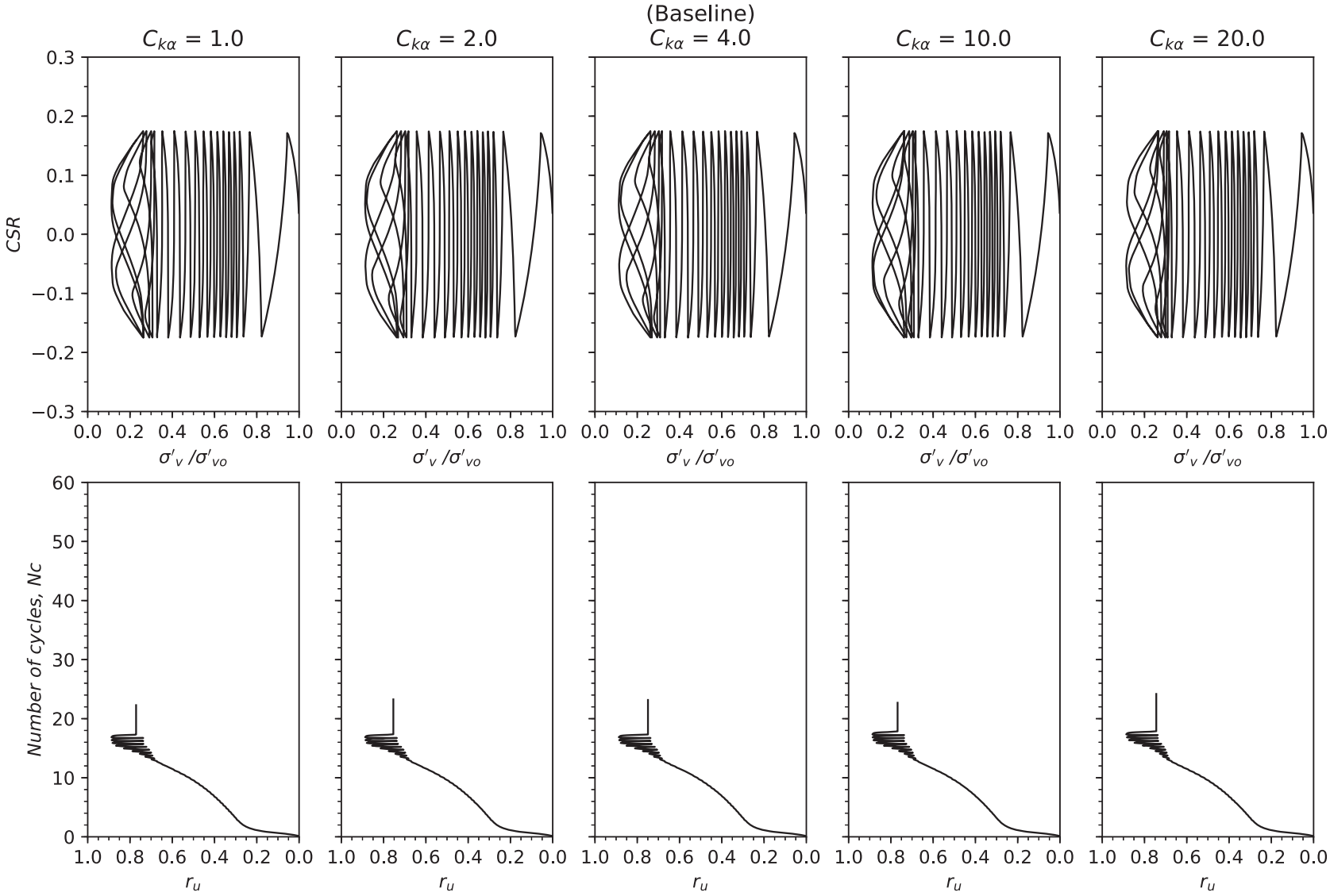


PM4Silt Parameteric Study: Effect of C_ε
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter




PM4Silt Parameteric Study: Effect of $C_{k\alpha}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, h_{po} = 10.0
Default secondary parameter
$C_{k\alpha}$ = 1.0
$C_{k\alpha}$ = 2.0
$C_{k\alpha}$ = 4.0
$C_{k\alpha}$ = 10.0
$C_{k\alpha}$ = 20.0
CSR
0.0
0.1
0.2
0.3
0.4
0.5
10^0
10^1
10^2
Number of Cycle to reach 3% SA strain

PM4Silt Parameteric Study: Effect of $C_{k\alpha}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter



PM4Silt Parameteric Study: Effect of $C_{k\alpha}$
Baseline Parameter: CSR = 0.7s_u/σ'_{vo}, G_o = 500, s_u/σ'_{vo} = 0.25, σ'_{vo} = 75 kPa, $h_{po} = 10.0$
Default secondary parameter