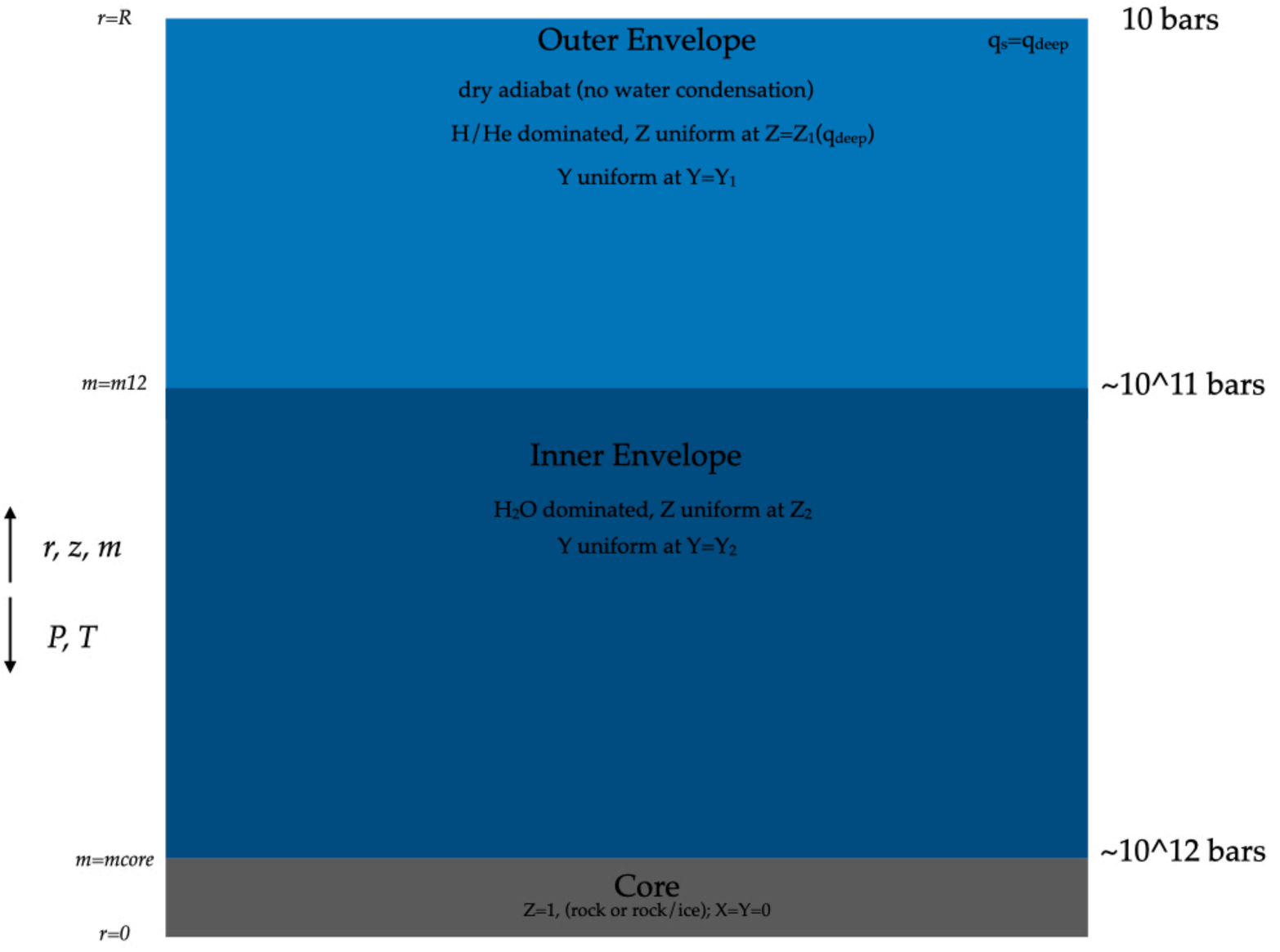
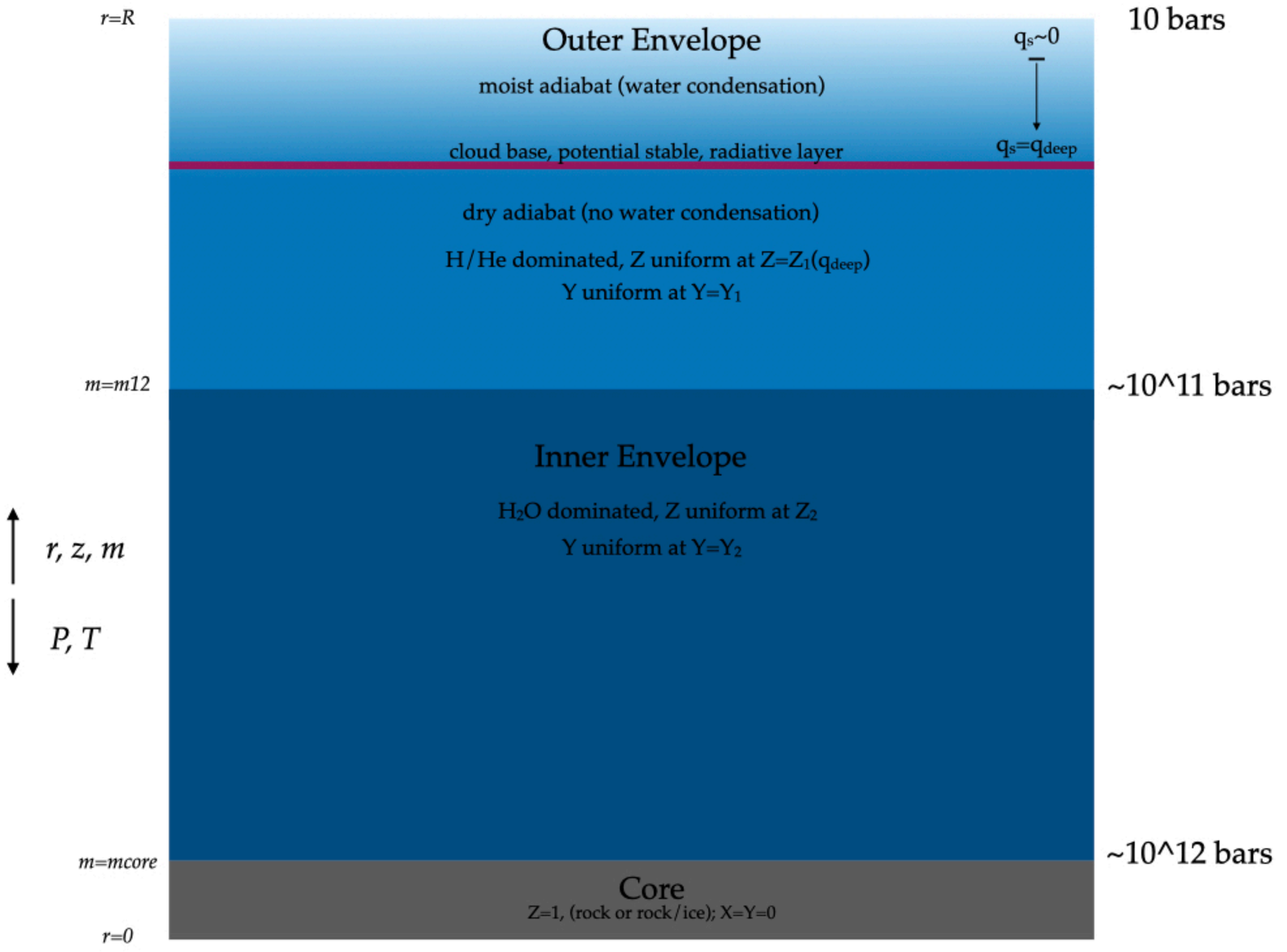
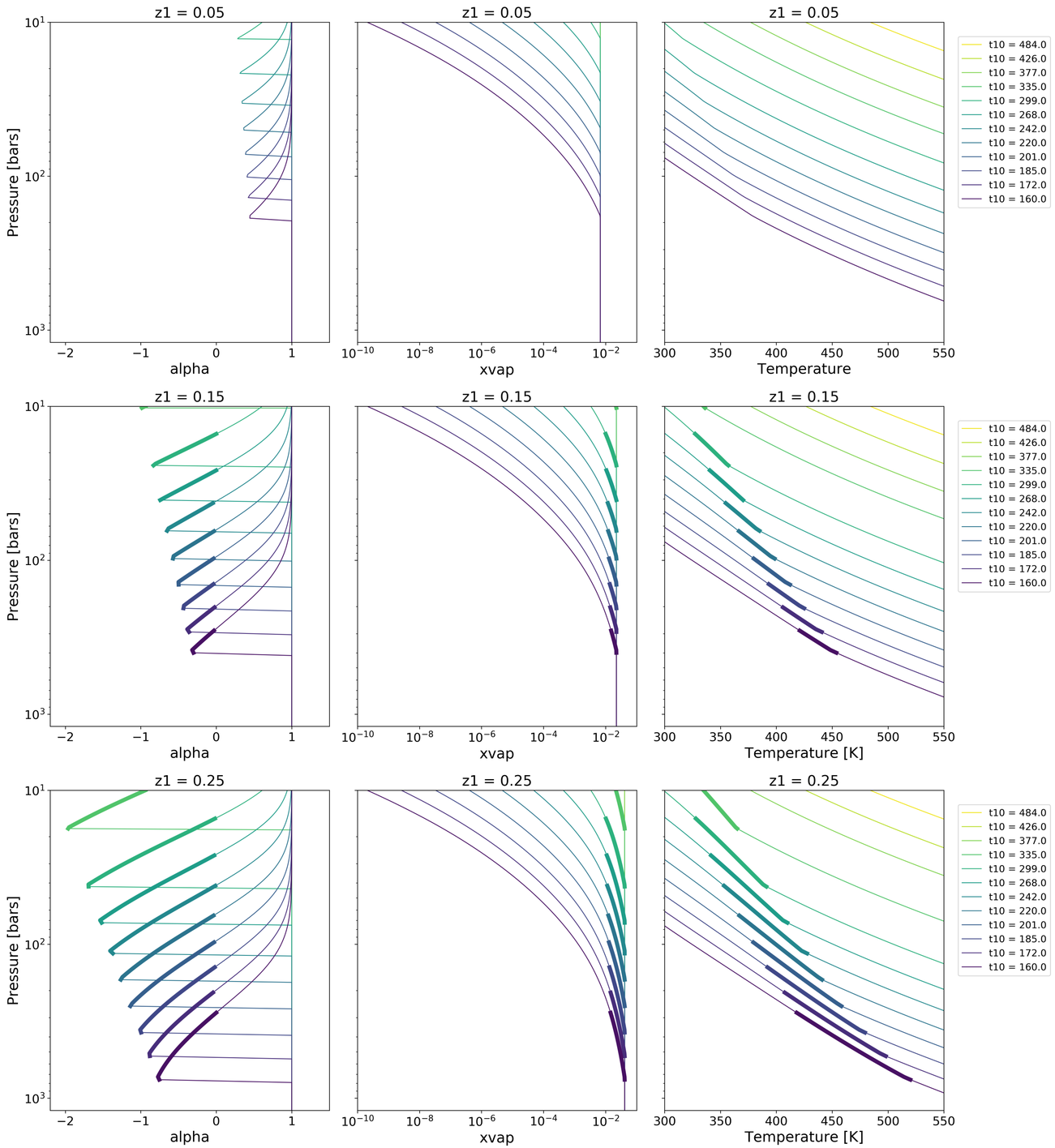
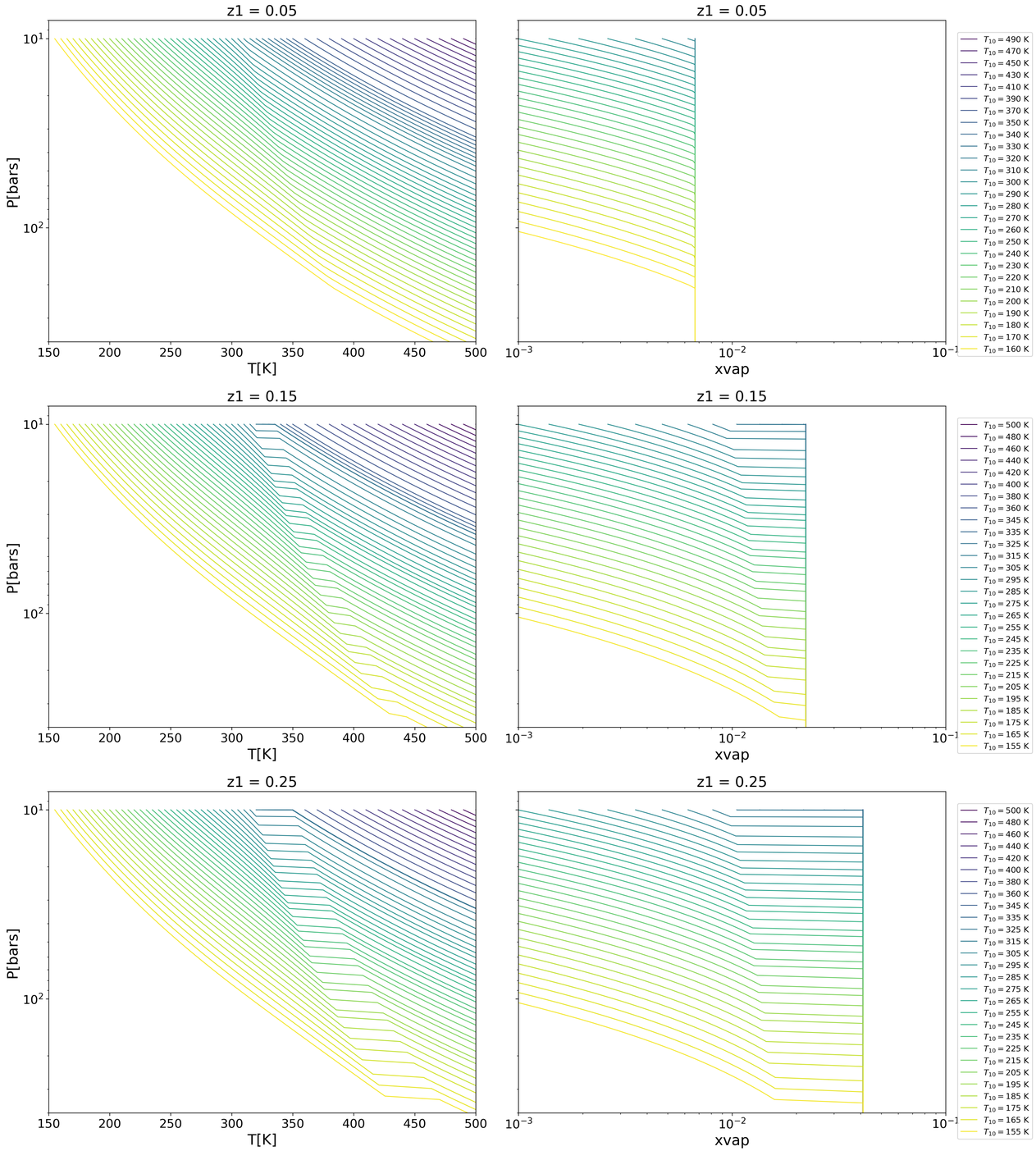
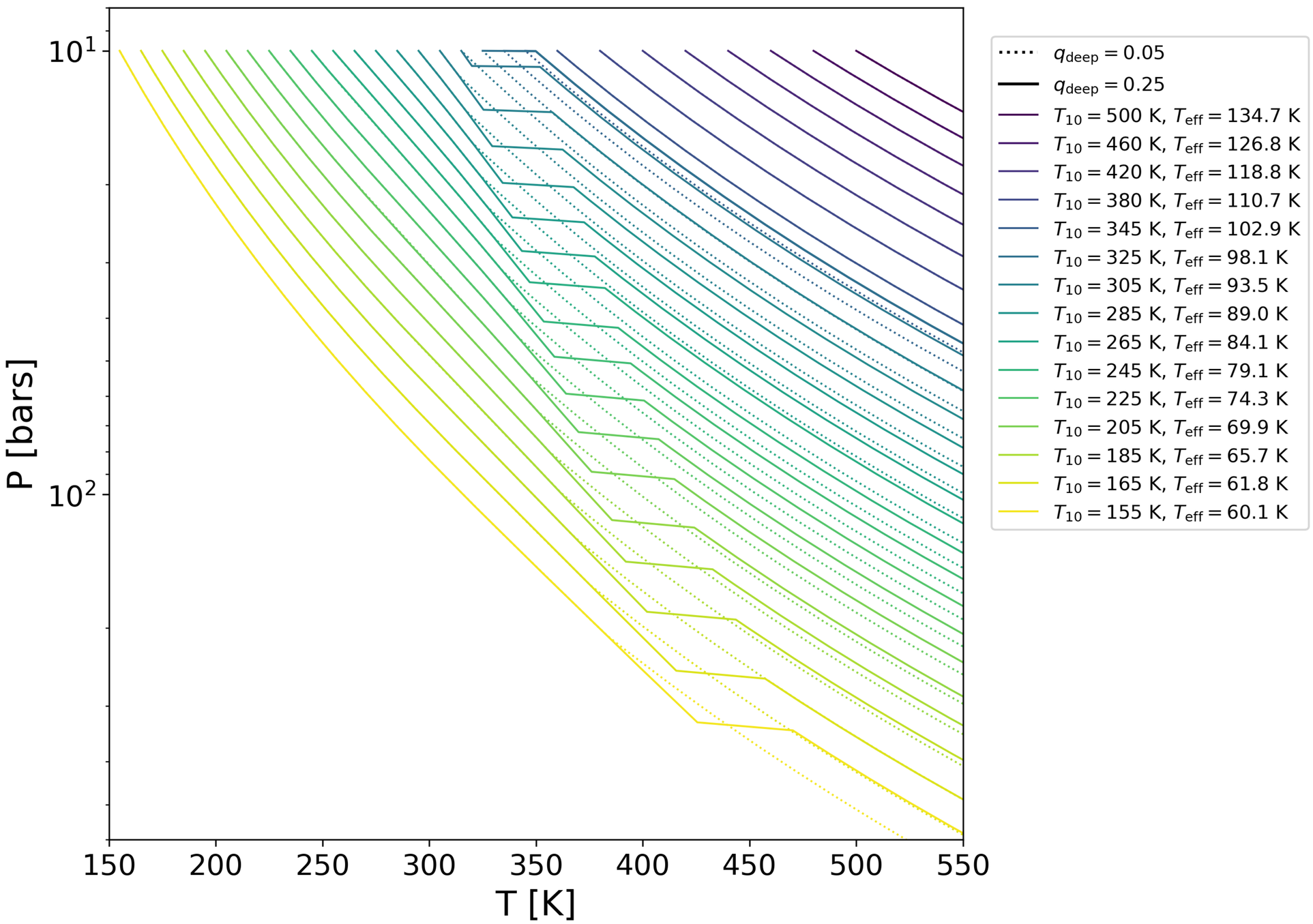
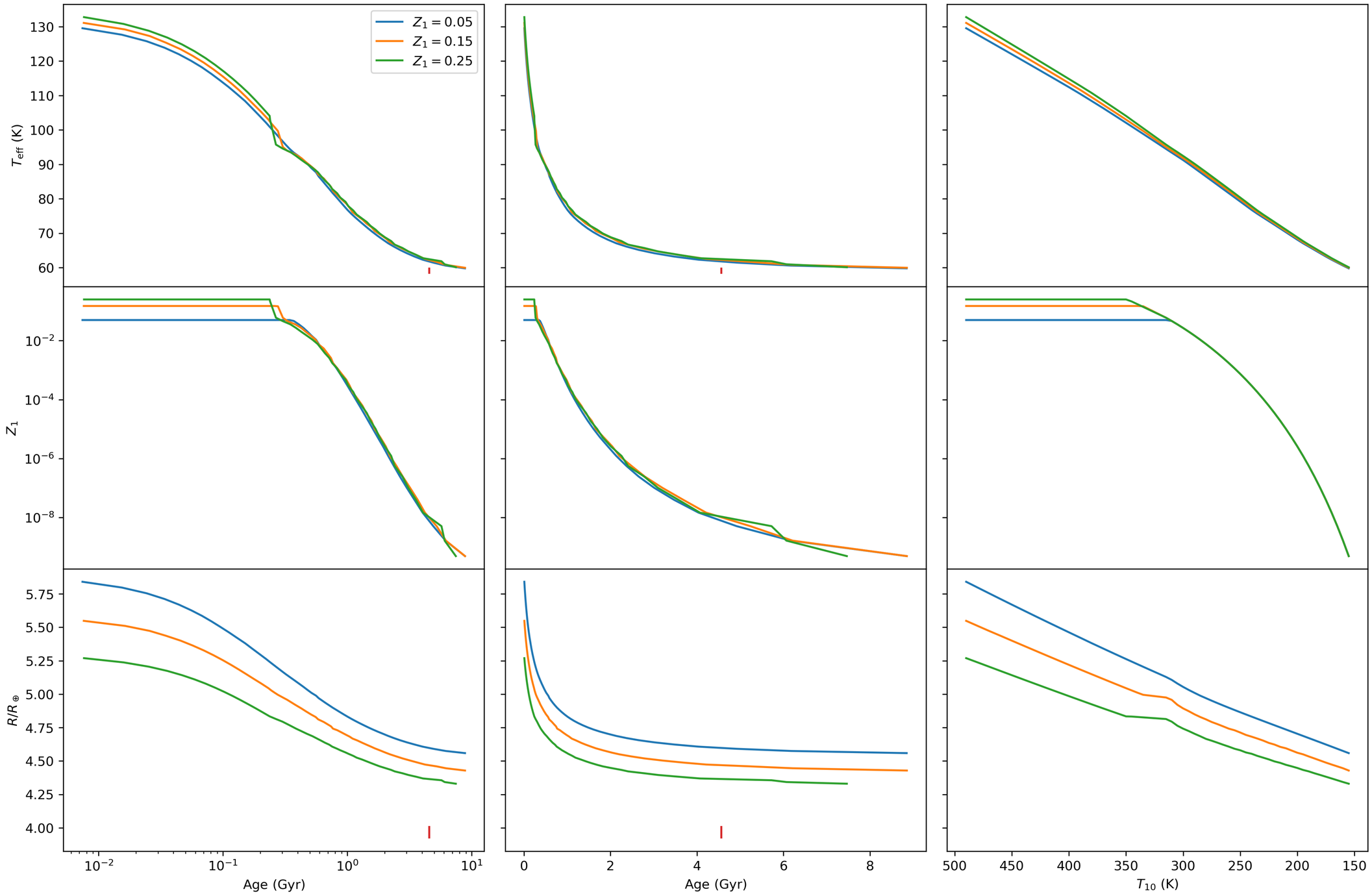

r=R
10 bars
Outer Envelope
$q_s=q_{deep}$
dry adiabat (no water condensation)
H/He dominated, Z uniform at $Z=Z_1(q_{deep})$
Y uniform at $Y=Y_1$
m=m12
~10^11 bars
Inner Envelope
H_2O dominated, Z uniform at Z_2
Y uniform at $Y=Y_2$
r, z, m
P, T
m=mcore
~10^12 bars
Core
Z=1, (rock or rock/ice); X=Y=0
r=0

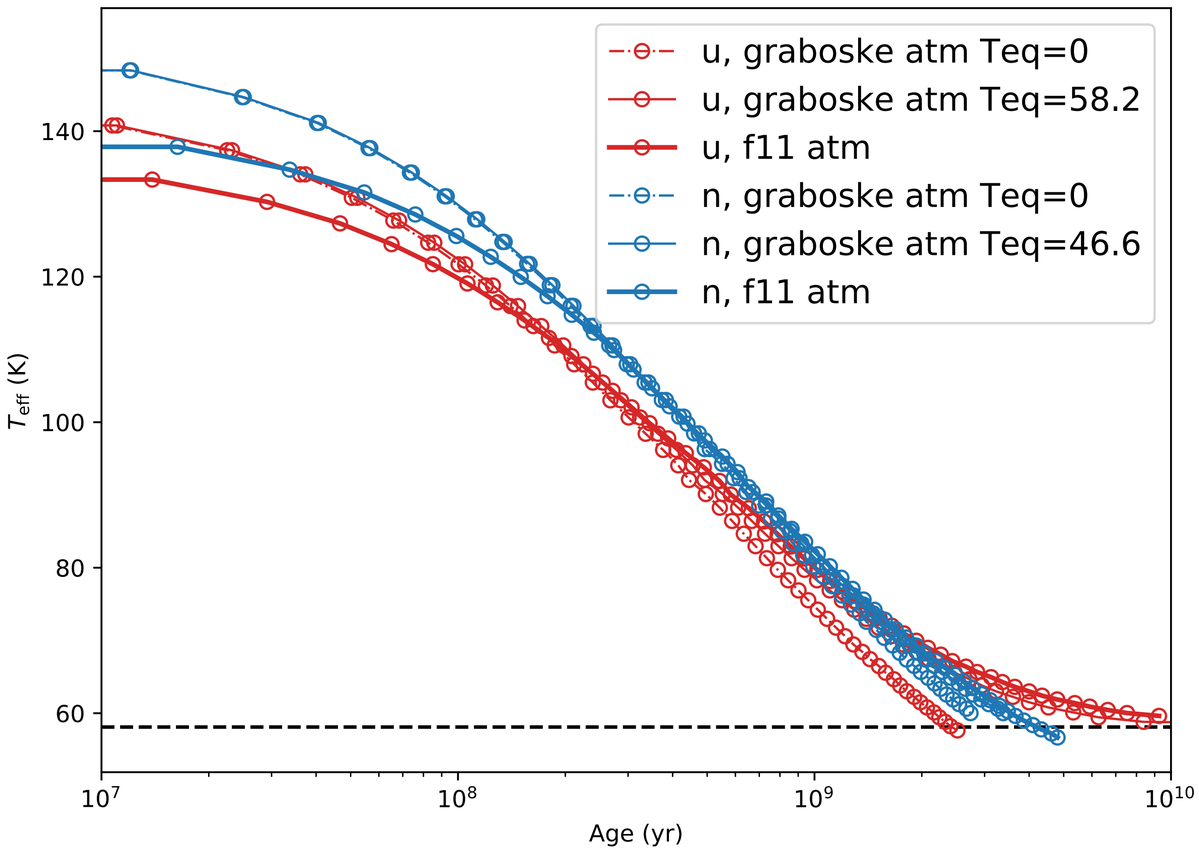

r=R
Outer Envelope
moist adiabat (water condensation)
cloud base, potential stable, radiative layer
qs~0
qs=qdeep
10 bars
dry adiabat (no water condensation)
H/He dominated, Z uniform at Z=Z1(qdeep)
Y uniform at Y=Y1
m=m12
~10^11 bars
Inner Envelope
H2O dominated, Z uniform at Z2
Y uniform at Y=Y2
r, z, m
P, T
m=mcore
~10^12 bars
Core
Z=1, (rock or rock/ice); X=Y=0
r=0

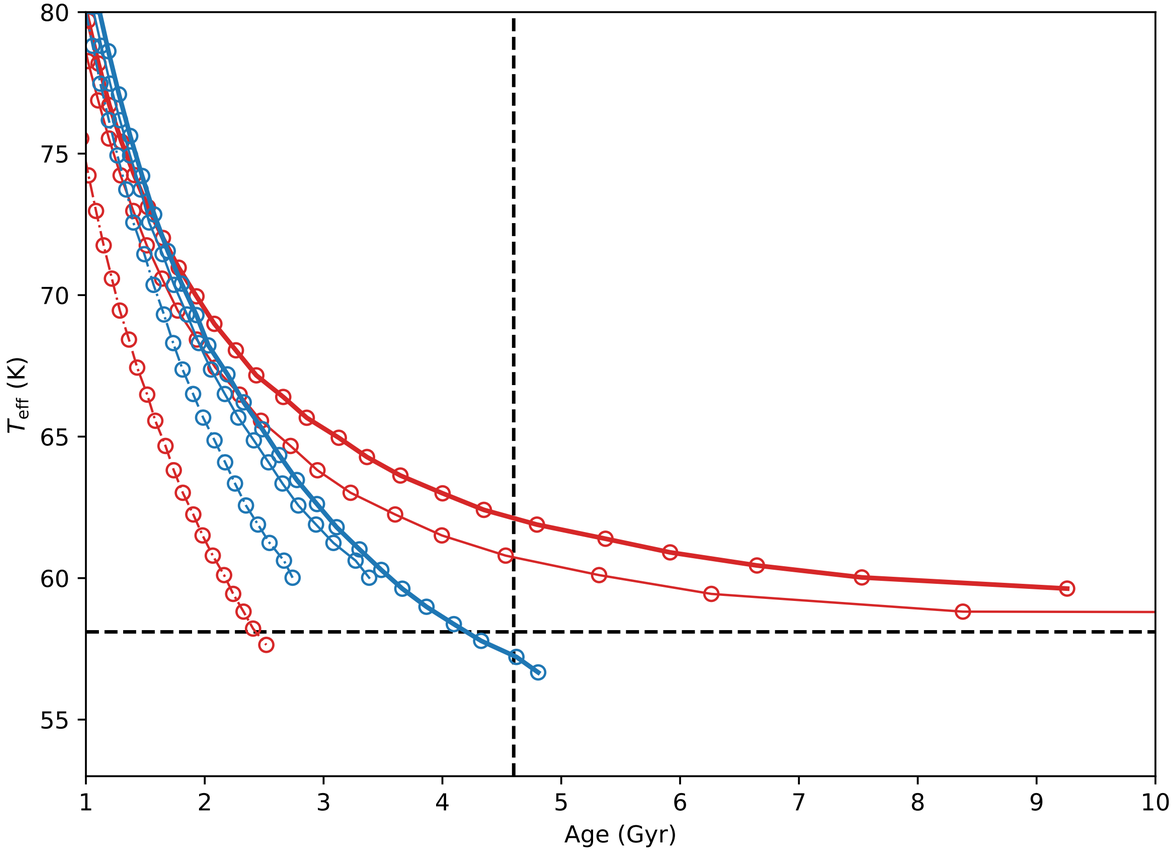

z1 = 0.05
z1 = 0.15
z1 = 0.25
Pressure [bars]
alpha
xvap
Temperature
Temperature [K]
t10 = 484.0
t10 = 426.0
t10 = 377.0
t10 = 335.0
t10 = 299.0
t10 = 268.0
t10 = 242.0
t10 = 220.0
t10 = 201.0
t10 = 185.0
t10 = 172.0
t10 = 160.0

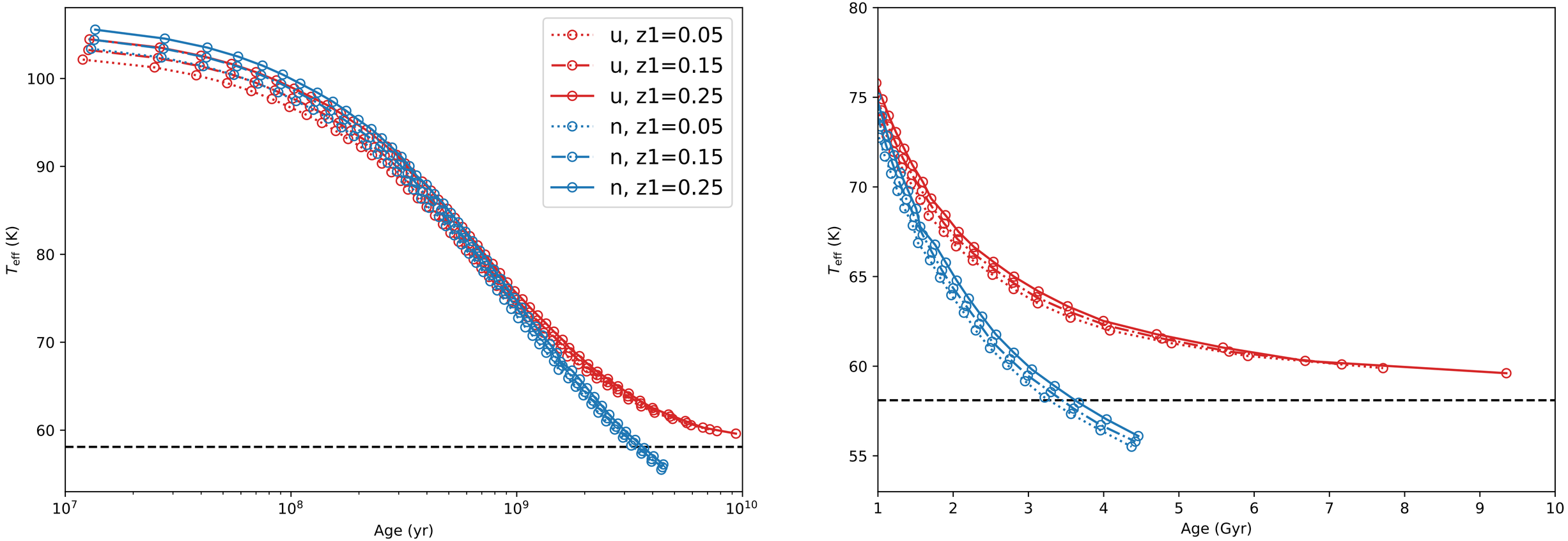

z1 = 0.05
z1 = 0.05
z1 = 0.15
z1 = 0.15
z1 = 0.25
z1 = 0.25
P[bars]
T[K]
xvap
10^1
10^2
150
200
250
300
350
400
450
500
10^{-3}
10^{-2}
10^{-1}
$T_{10} = 490$ K
$T_{10} = 470$ K
$T_{10} = 450$ K
$T_{10} = 430$ K
$T_{10} = 410$ K
$T_{10} = 390$ K
$T_{10} = 370$ K
$T_{10} = 350$ K
$T_{10} = 340$ K
$T_{10} = 330$ K
$T_{10} = 320$ K
$T_{10} = 310$ K
$T_{10} = 300$ K
$T_{10} = 290$ K
$T_{10} = 280$ K
$T_{10} = 270$ K
$T_{10} = 260$ K
$T_{10} = 250$ K
$T_{10} = 240$ K
$T_{10} = 230$ K
$T_{10} = 220$ K
$T_{10} = 210$ K
$T_{10} = 200$ K
$T_{10} = 190$ K
$T_{10} = 180$ K
$T_{10} = 170$ K
$T_{10} = 160$ K
$T_{10} = 500$ K
$T_{10} = 480$ K
$T_{10} = 460$ K
$T_{10} = 440$ K
$T_{10} = 420$ K
$T_{10} = 400$ K
$T_{10} = 380$ K
$T_{10} = 360$ K
$T_{10} = 345$ K
$T_{10} = 335$ K
$T_{10} = 325$ K
$T_{10} = 315$ K
$T_{10} = 305$ K
$T_{10} = 295$ K
$T_{10} = 285$ K
$T_{10} = 275$ K
$T_{10} = 265$ K
$T_{10} = 255$ K
$T_{10} = 245$ K
$T_{10} = 235$ K
$T_{10} = 225$ K
$T_{10} = 215$ K
$T_{10} = 205$ K
$T_{10} = 195$ K
$T_{10} = 185$ K
$T_{10} = 175$ K
$T_{10} = 165$ K
$T_{10} = 155$ K


10^1
10^2
P [bars]
150
200
250
300
350
400
450
500
550
T [K]
$q_{deep} = 0.05$
$q_{deep} = 0.25$
$T_{10} = 500$ K, $T_{eff} = 134.7$ K
$T_{10} = 460$ K, $T_{eff} = 126.8$ K
$T_{10} = 420$ K, $T_{eff} = 118.8$ K
$T_{10} = 380$ K, $T_{eff} = 110.7$ K
$T_{10} = 345$ K, $T_{eff} = 102.9$ K
$T_{10} = 325$ K, $T_{eff} = 98.1$ K
$T_{10} = 305$ K, $T_{eff} = 93.5$ K
$T_{10} = 285$ K, $T_{eff} = 89.0$ K
$T_{10} = 265$ K, $T_{eff} = 84.1$ K
$T_{10} = 245$ K, $T_{eff} = 79.1$ K
$T_{10} = 225$ K, $T_{eff} = 74.3$ K
$T_{10} = 205$ K, $T_{eff} = 69.9$ K
$T_{10} = 185$ K, $T_{eff} = 65.7$ K
$T_{10} = 165$ K, $T_{eff} = 61.8$ K
$T_{10} = 155$ K, $T_{eff} = 60.1$ K


$Z_1 = 0.05$
$Z_1 = 0.15$
$Z_1 = 0.25$
$T_{\rm eff}$ (K)
Z_1
$R/R_\oplus$
Age (Gyr)
Age (Gyr)
T_{10} (K)


u, graboske atm Teq=0
u, graboske atm Teq=58.2
u, f11 atm
n, graboske atm Teq=0
n, graboske atm Teq=46.6
n, f11 atm
$T_{\rm eff}$ (K)
Age (yr)


$T_{\rm eff}$ (K)
Age (Gyr)


u, z1=0.05
u, z1=0.15
u, z1=0.25
n, z1=0.05
n, z1=0.15
n, z1=0.25
$T_{\rm eff}$ (K)
Age (yr)
$T_{\rm eff}$ (K)
Age (Gyr)