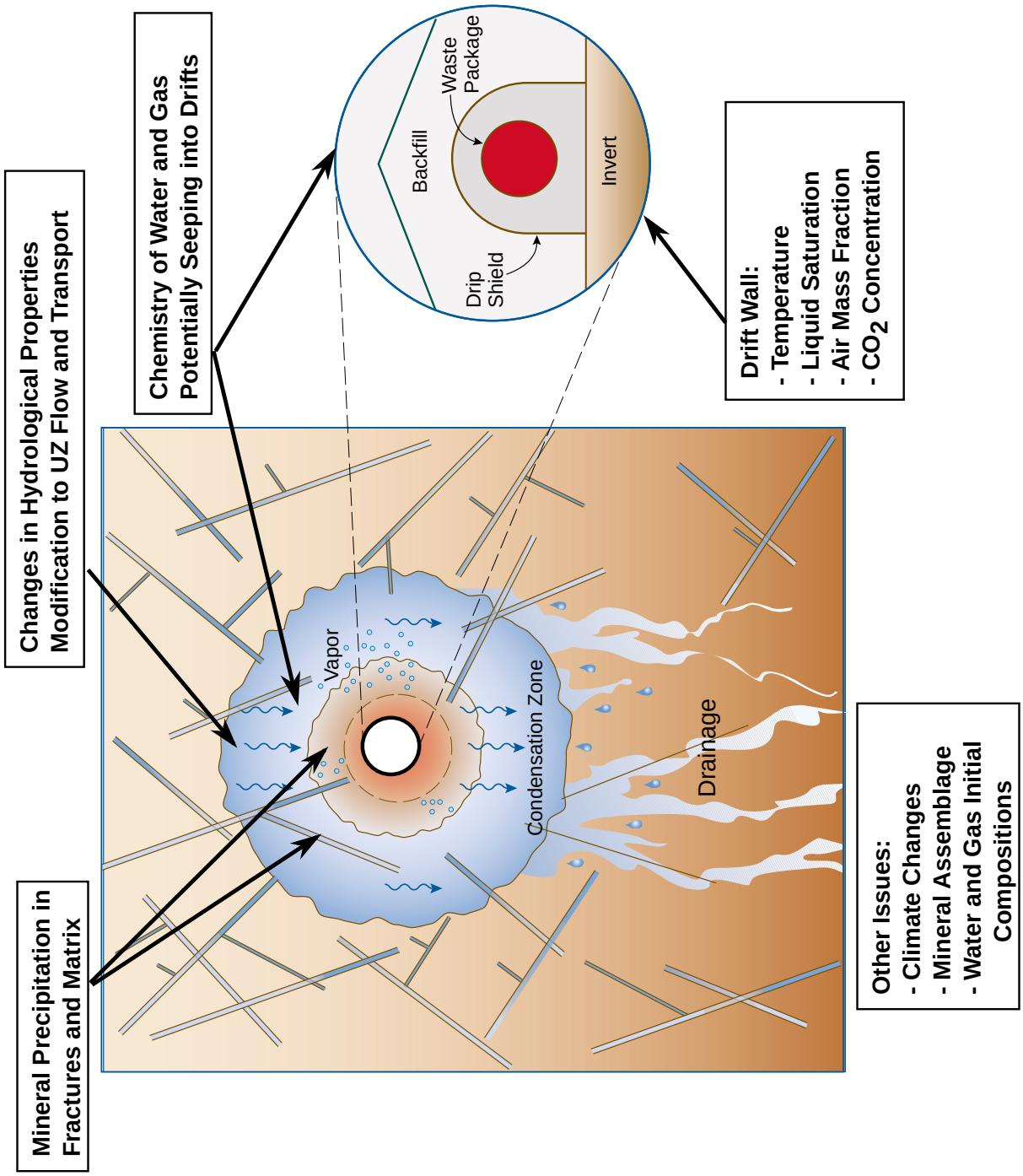
Changes in Hydrological Properties
Modification to UZ Flow and Transport
Chemistry of Water and Gas
Potentially Seeping into Drifts
Mineral Precipitation in
Fractures and Matrix
Vapor
Condensation Zone
Drainage
Backfill
Waste
Package
Drip
Shield
Invert
Drift Wall:
- Temperature
- Liquid Saturation
- Air Mass Fraction
- CO_2 Concentration
Other Issues:
- Climate Changes
- Mineral Assemblage
- Water and Gas Initial
Compositions

Figure 3.10-1.

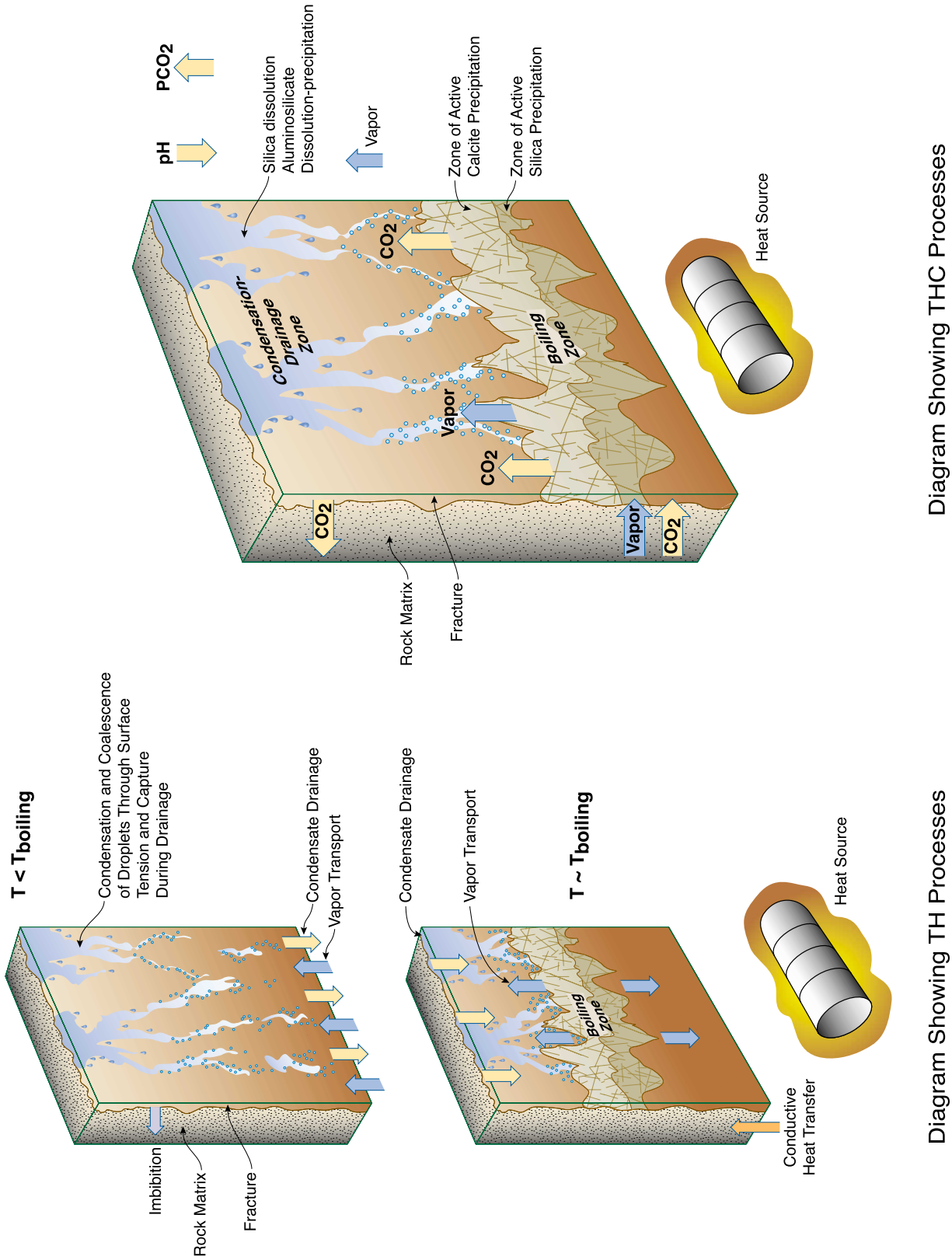
pH
PCO2
Silica dissolution
Aluminosilicate
Dissolution-precipitation
Vapor
Zone of Active
Calcite Precipitation
Zone of Active
Silica Precipitation
Condensation-
Drainage
Zone
CO2
Boiling
Zone
Vapor
CO2
Heat Source
CO2
Rock Matrix
Fracture
Vapor
CO2
Diagram Showing THC Processes
T < Tboiling
Condensation and Coalescence
of Droplets Through Surface
Tension and Capture
During Drainage
Condensate Drainage
Vapor Transport
Imbibition
Rock Matrix
Fracture
Condensate Drainage
Vapor Transport
T ~ Tboiling
Boiling
Zone
Heat Source
Conductive
Heat Transfer
Diagram Showing TH Processes

Figure 3.10-2.

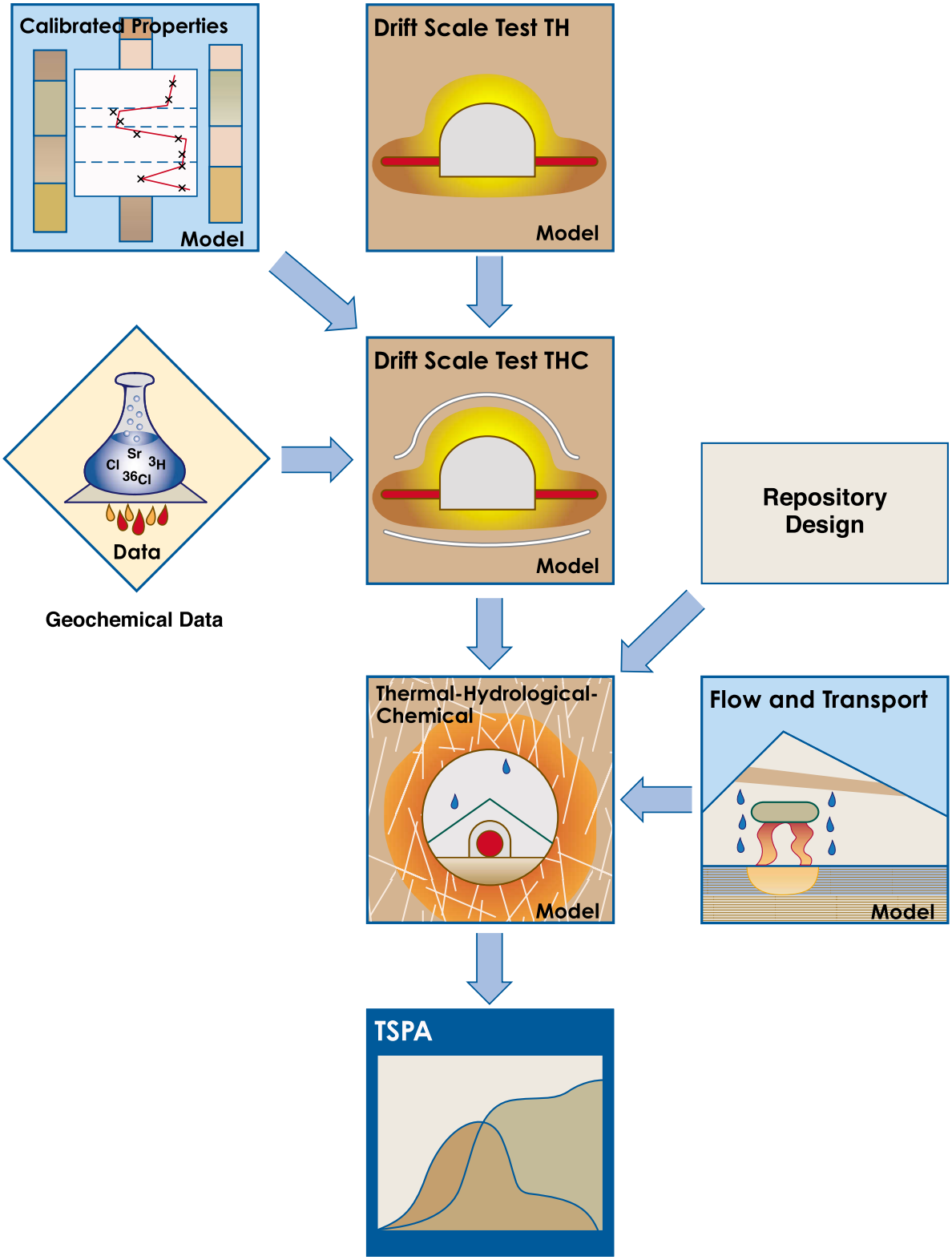
Calibrated Properties
Model
Drift Scale Test TH
Model
Sr
3H
Cl
36Cl
Data
Geochemical Data
Drift Scale Test THC
Model
Repository Design
Thermal-Hydrological-Chemical
Model
Flow and Transport
Model
TSPA

Figure 3.10-3.

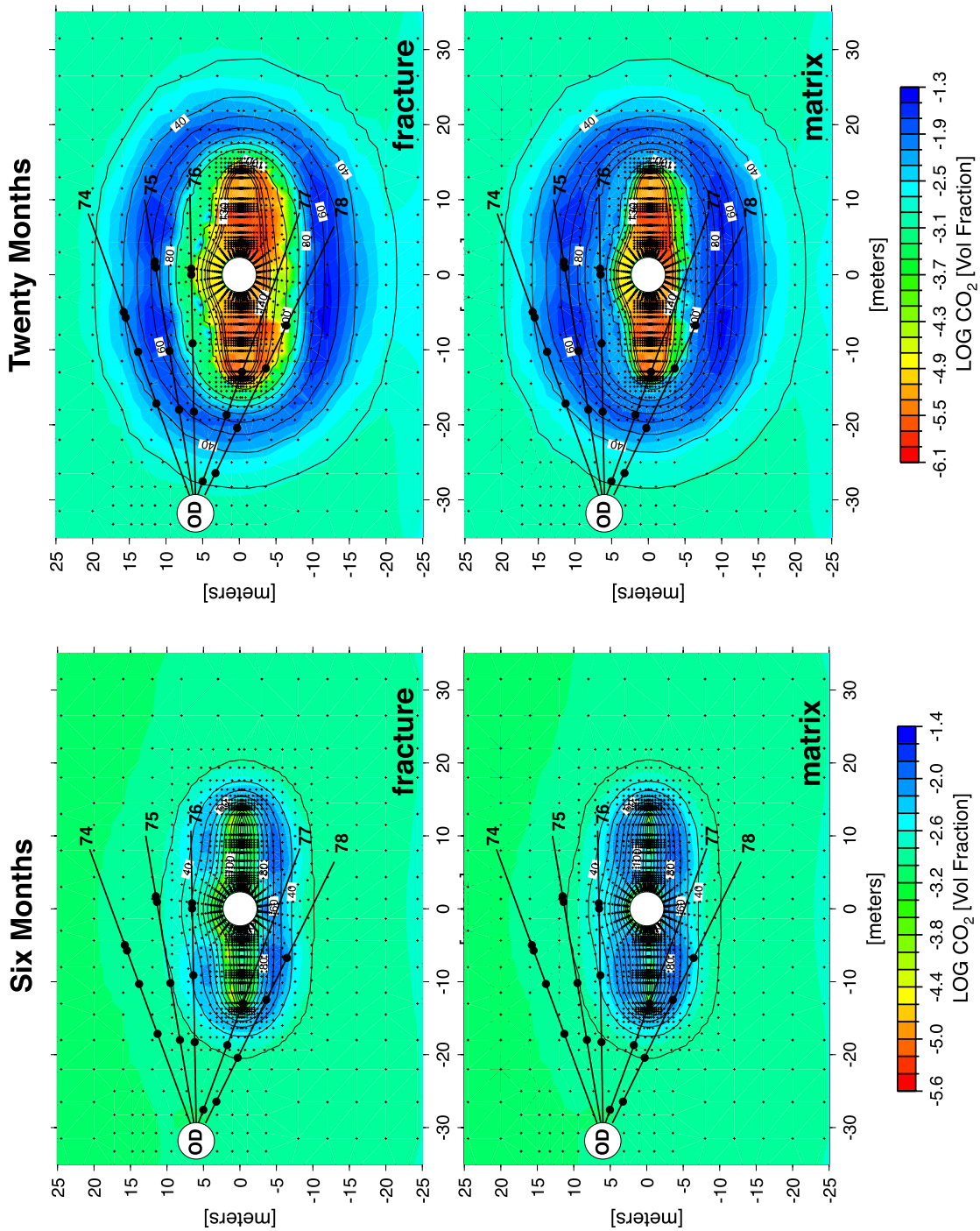
Twenty Months
Six Months
fracture
matrix
[meters]
LOG CO_2 [Vol Fraction]
-6.1 -5.5 -4.9 -4.3 -3.7 -3.1 -2.5 -1.9 -1.3
-5.6 -5.0 -4.4 -3.8 -3.2 -2.6 -2.0 -1.4
74
75
76
77
78

Figure 3.10-4.

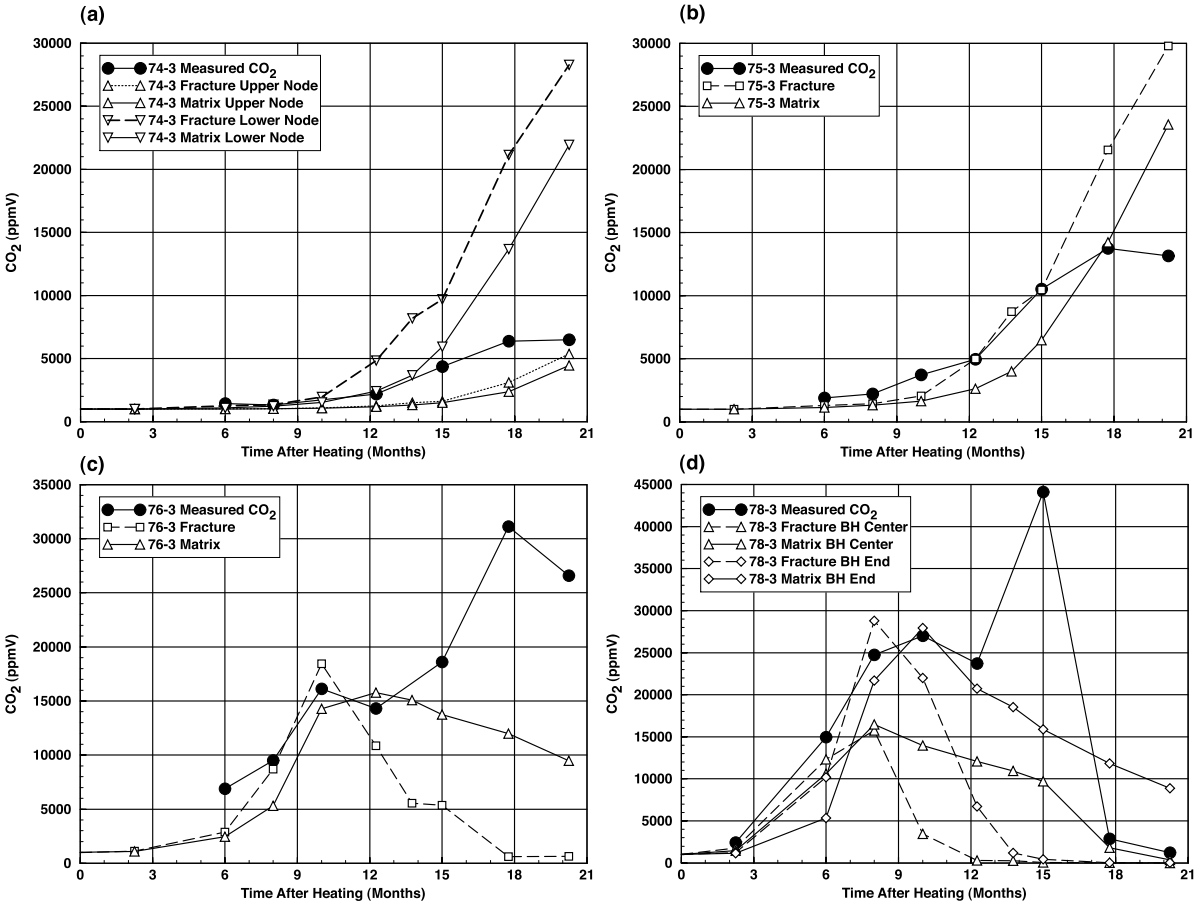
(a)
74-3 Measured CO2
74-3 Fracture Upper Node
74-3 Matrix Upper Node
74-3 Fracture Lower Node
74-3 Matrix Lower Node
CO2 (ppmV)
Time After Heating (Months)
(b)
75-3 Measured CO2
75-3 Fracture
75-3 Matrix
CO2 (ppmV)
Time After Heating (Months)
(c)
76-3 Measured CO2
76-3 Fracture
76-3 Matrix
CO2 (ppmV)
Time After Heating (Months)
(d)
78-3 Measured CO2
78-3 Fracture BH Center
78-3 Matrix BH Center
78-3 Fracture BH End
78-3 Matrix BH End
CO2 (ppmV)
Time After Heating (Months)

Figure 3.10-5.

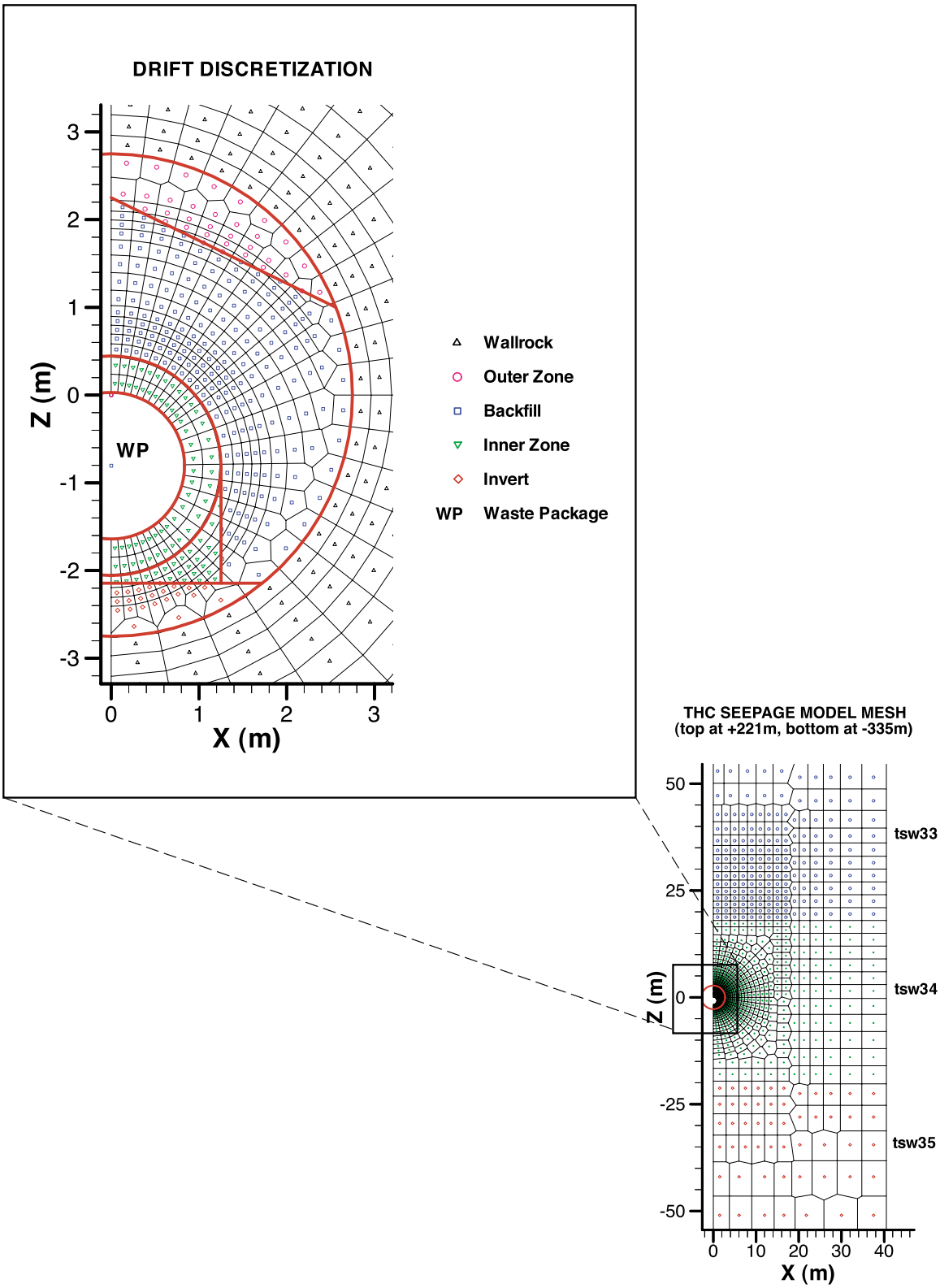
DRIFT DISCRETIZATION
Z (m)
X (m)
WP
Wallrock
Outer Zone
Backfill
Inner Zone
Invert
WP Waste Package
THC SEEPAGE MODEL MESH
(top at +221m, bottom at -335m)
tsw33
tsw34
tsw35

Figure 3.10-6.

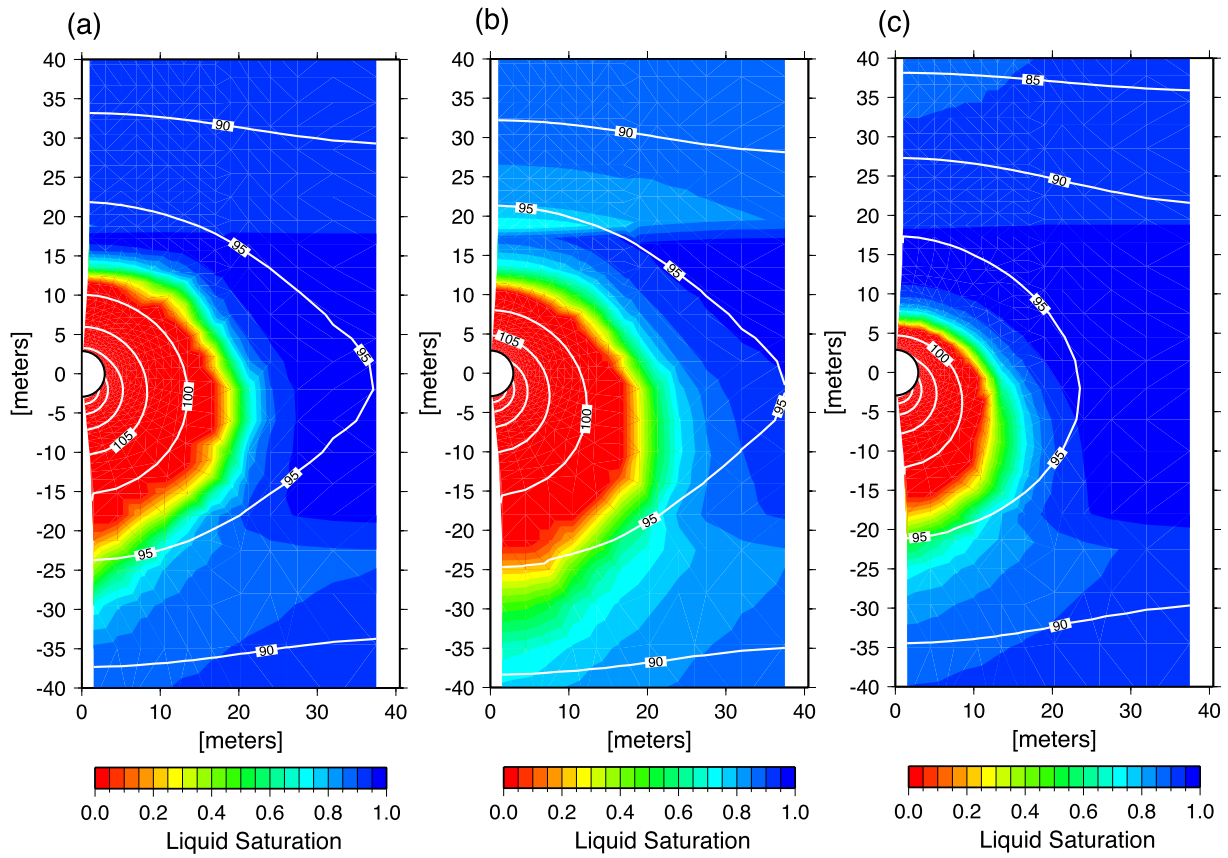
(a)
(b)
(c)
[meters]
[meters]
Liquid Saturation
0.0 0.2 0.4 0.6 0.8 1.0
85
90
95
100
105

Figure 3.10-7.

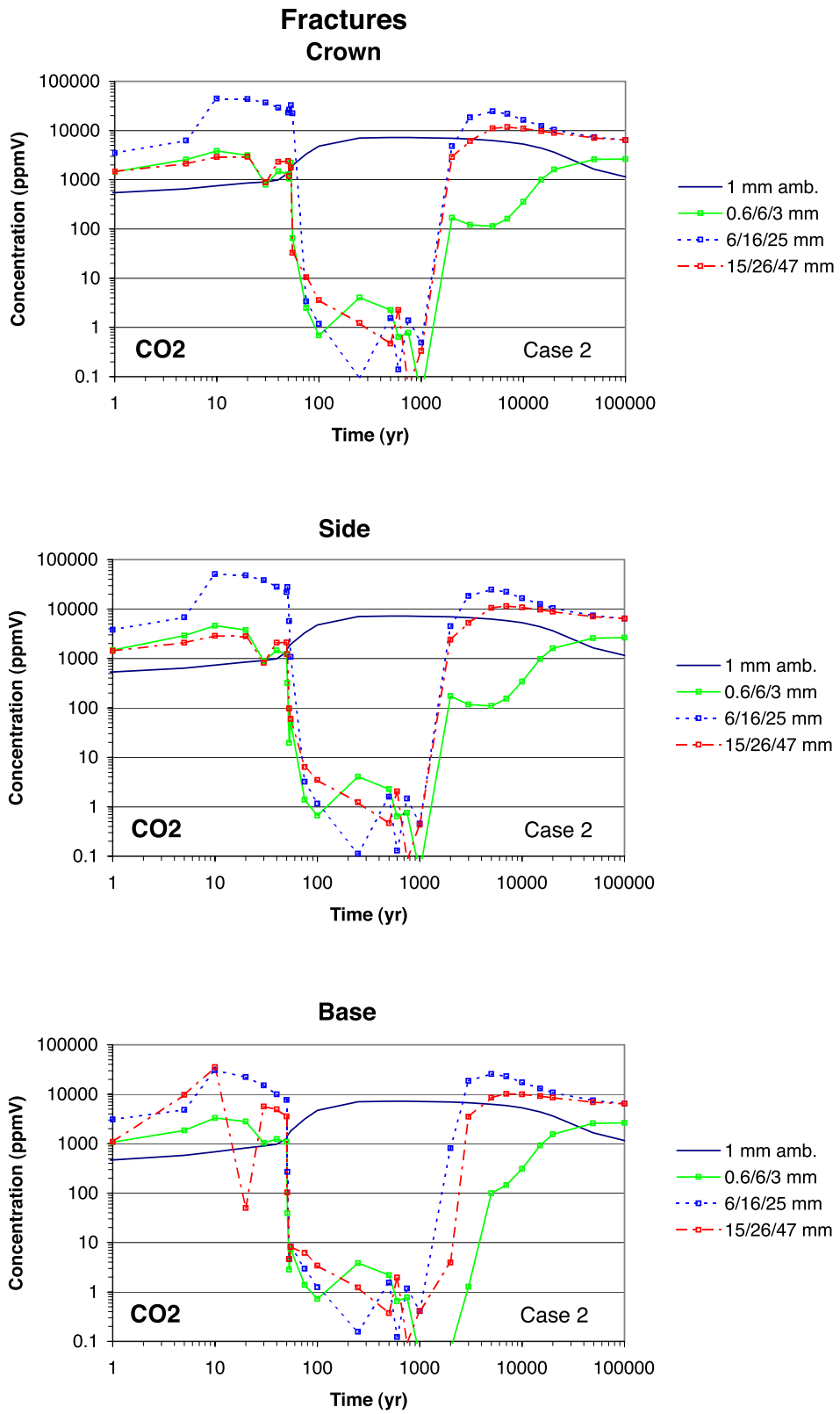
Fractures
Crown
Concentration (ppmV)
100000
10000
1000
100
10
1
0.1
CO2
Case 2
1
10
100
1000
10000
100000
Time (yr)
1 mm amb.
0.6/6/3 mm
6/16/25 mm
15/26/47 mm
Side
Concentration (ppmV)
CO2
Case 2
Time (yr)
1 mm amb.
0.6/6/3 mm
6/16/25 mm
15/26/47 mm
Base
Concentration (ppmV)
CO2
Case 2
Time (yr)
1 mm amb.
0.6/6/3 mm
6/16/25 mm
15/26/47 mm

Figure 3.10-8.

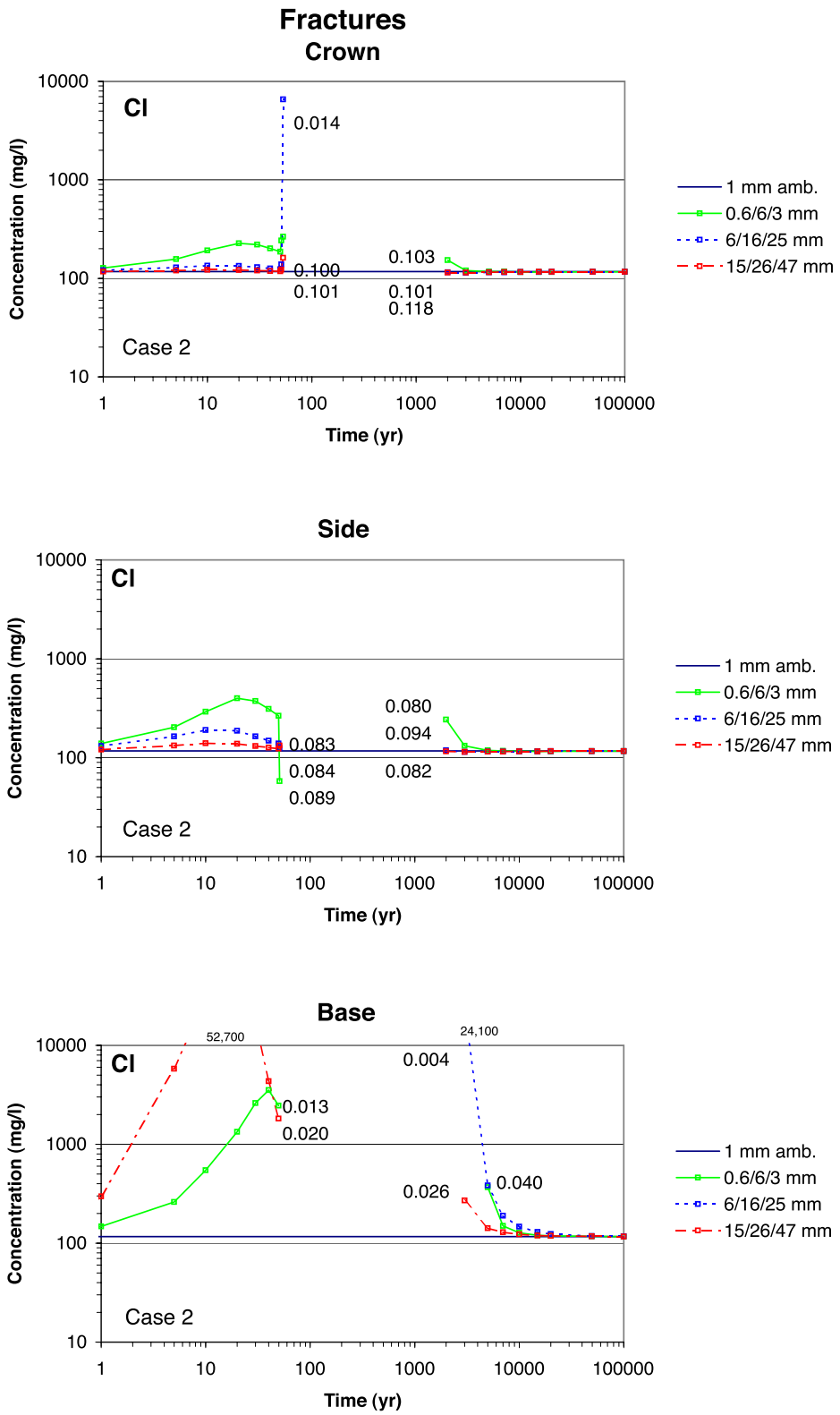
Fractures
Crown
Cl
0.014
0.100
0.101
0.103
0.101
0.118
Case 2
Concentration (mg/l)
Time (yr)
1 mm amb.
0.6/6/3 mm
6/16/25 mm
15/26/47 mm
Side
Cl
0.080
0.094
0.083
0.084
0.089
0.082
Case 2
Concentration (mg/l)
Time (yr)
1 mm amb.
0.6/6/3 mm
6/16/25 mm
15/26/47 mm
Base
Cl
52,700
24,100
0.004
0.013
0.020
0.026
0.040
Case 2
Concentration (mg/l)
Time (yr)
1 mm amb.
0.6/6/3 mm
6/16/25 mm
15/26/47 mm

Figure 3.10-9.

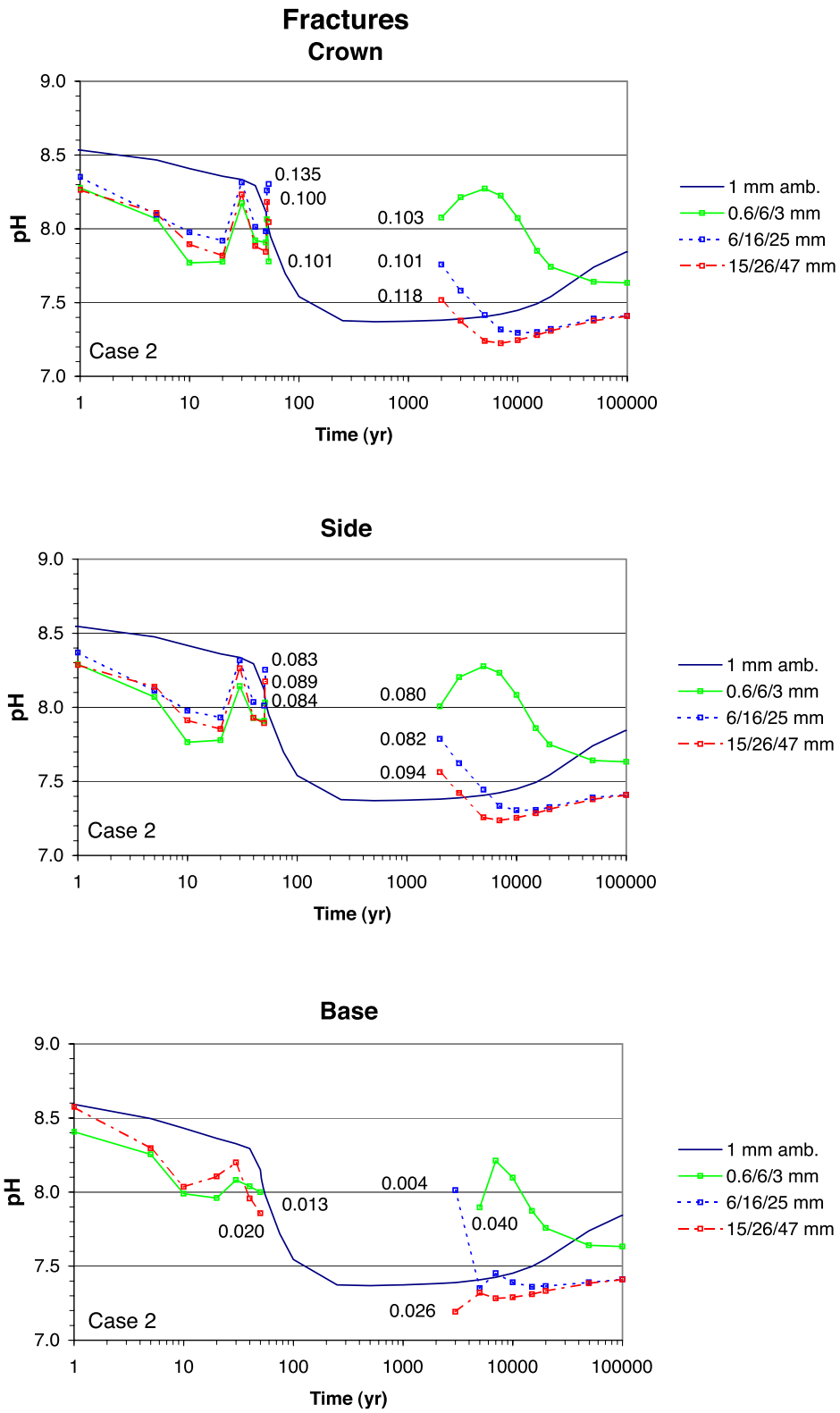

Figure 3.10-10.

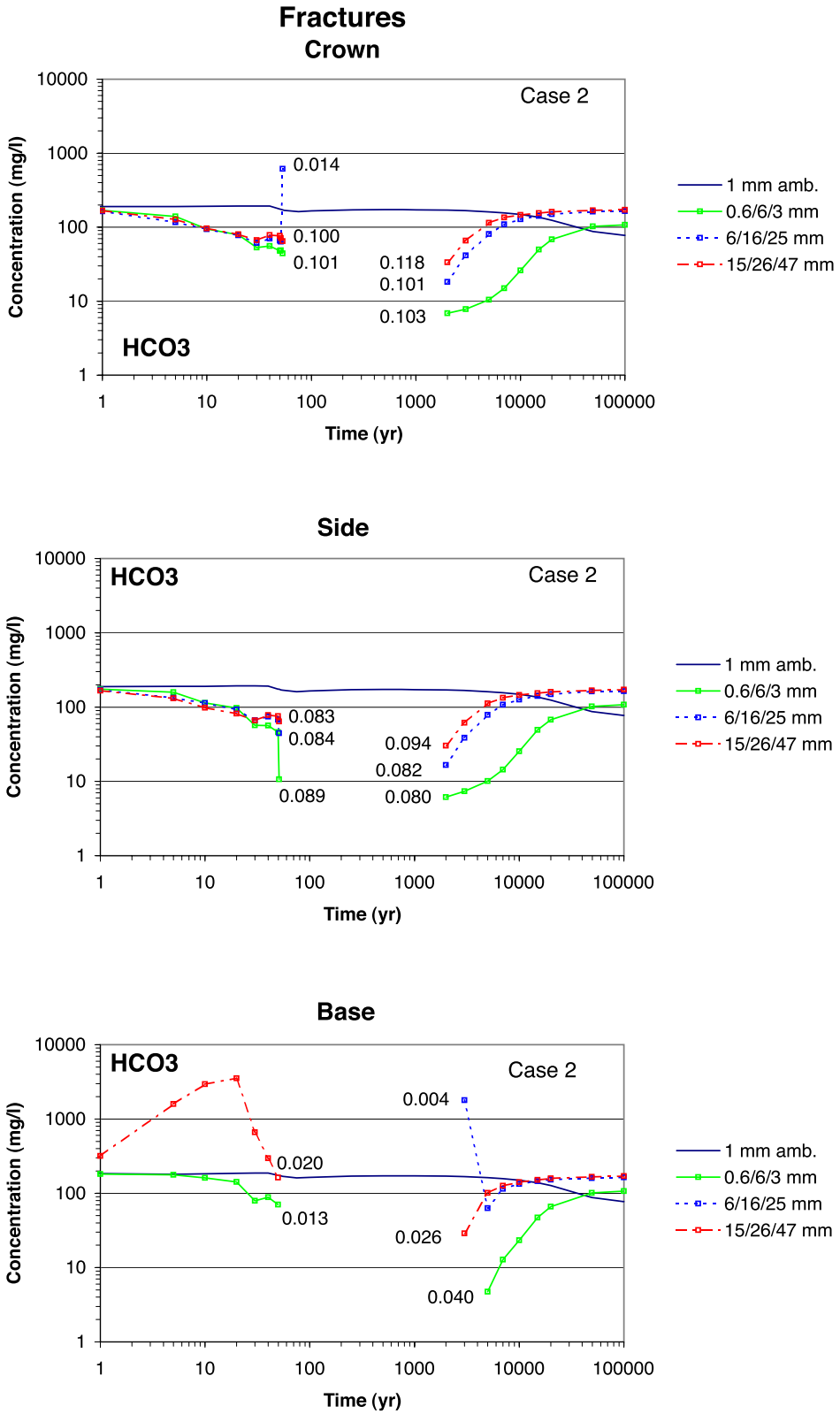

Figure 3.10-11.

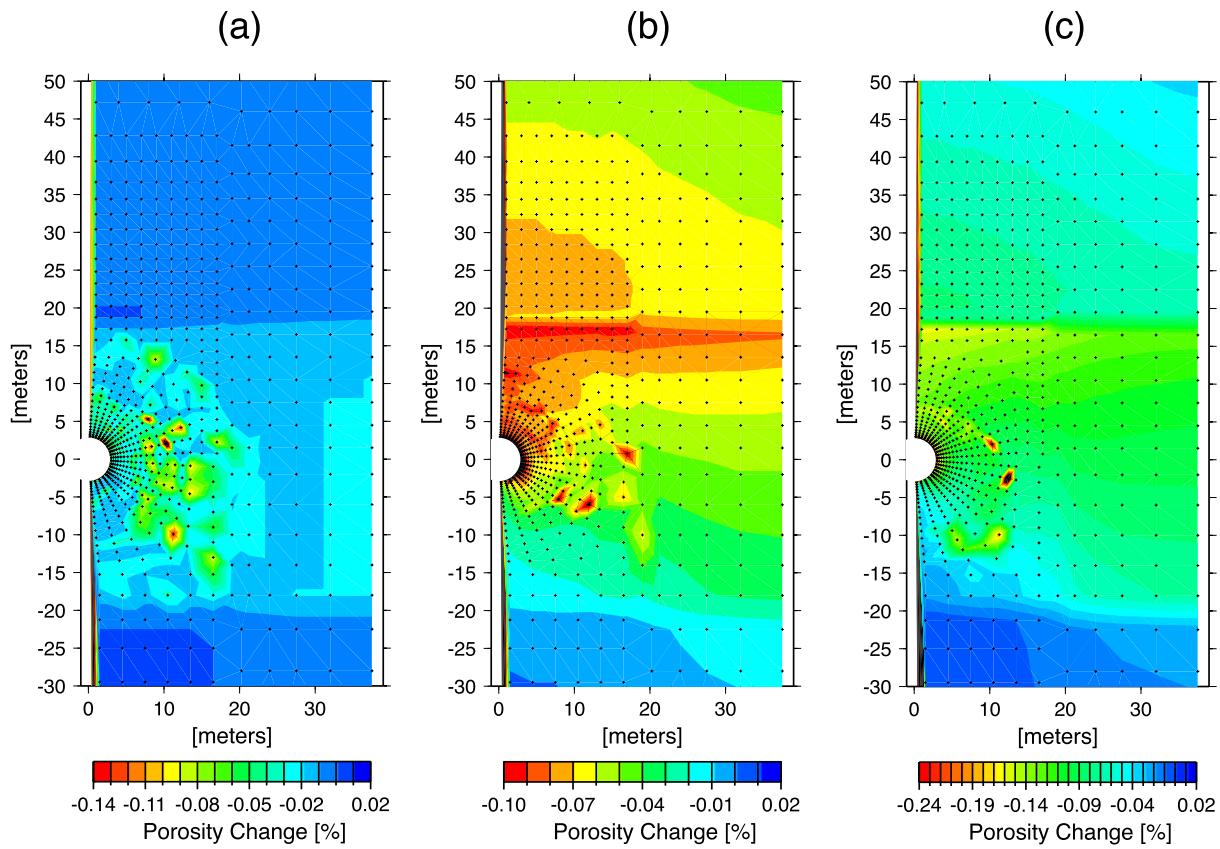

Figure 3.10-12.

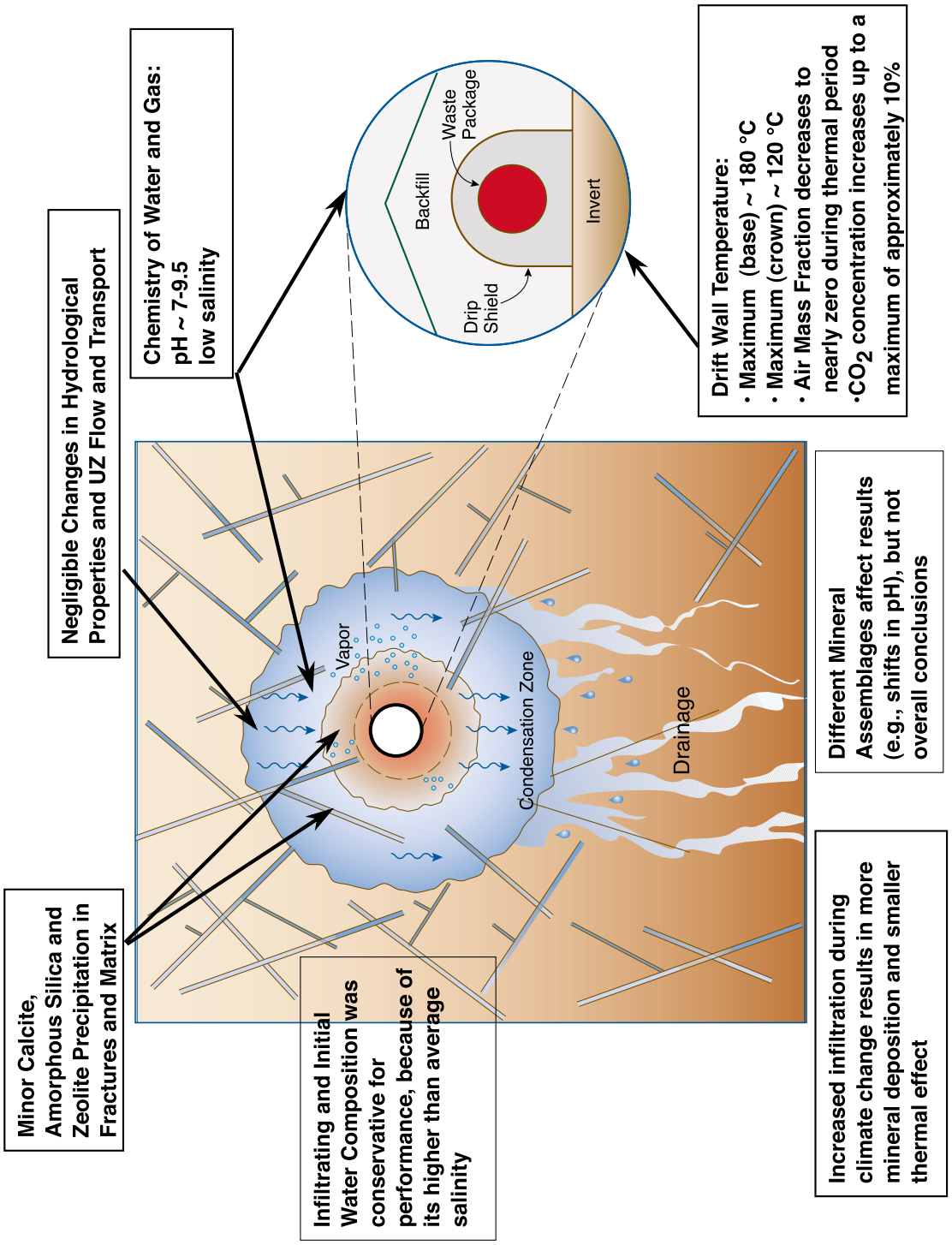

Figure 3.10-13.