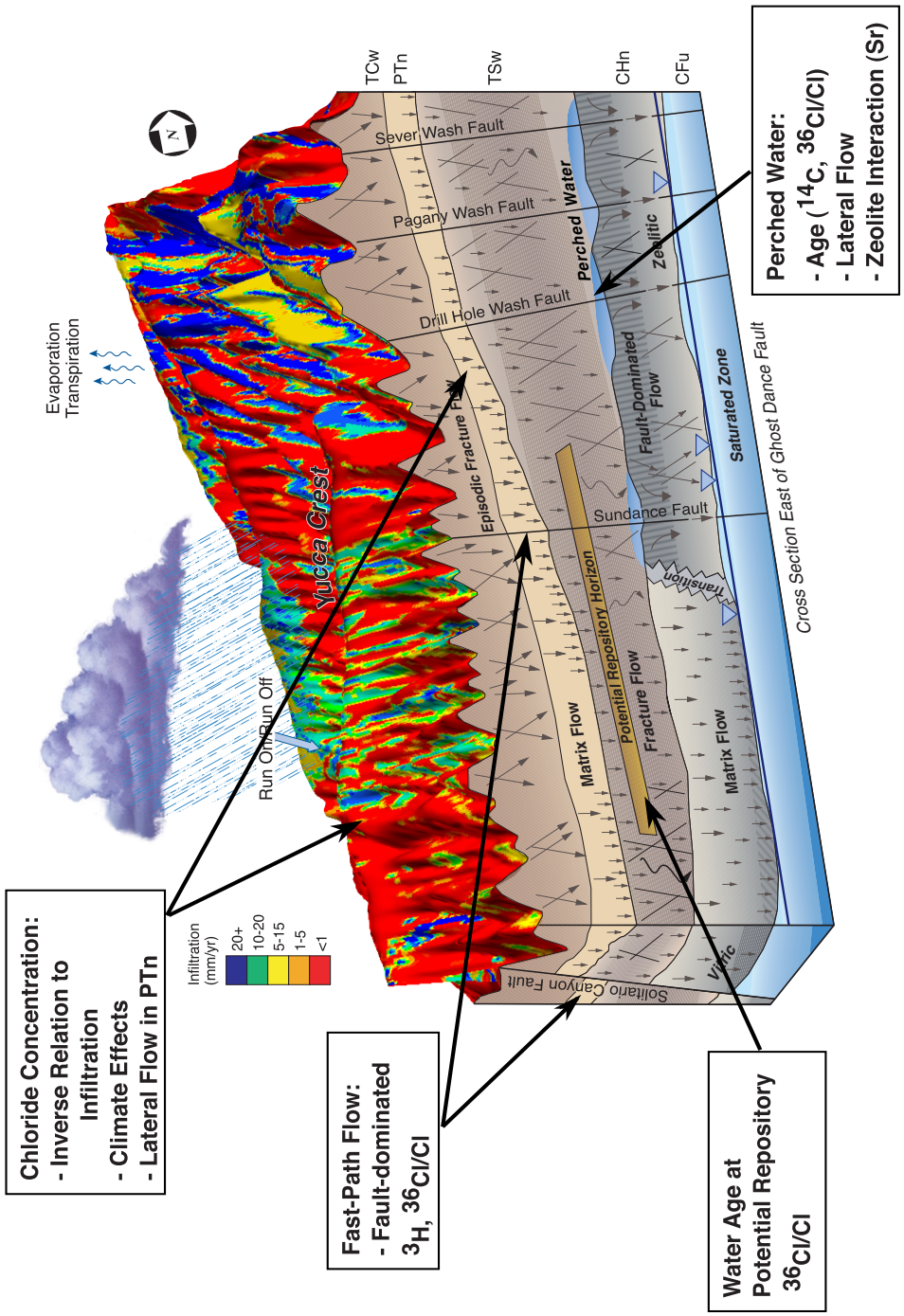

Chloride Concentration:
- Inverse Relation to Infiltration
- Climate Effects
- Lateral Flow in PTn
Fast-Path Flow:
- Fault-dominated
^{3}H, $^{36}Cl/Cl$
Water Age at Potential Repository
$^{36}Cl/Cl$
Perched Water:
- Age (^{14}C, $^{36}Cl/Cl$)
- Lateral Flow
- Zeolite Interaction (Sr)
Infiltration (mm/yr)
20+
10-20
5-15
1-5
<1
Evaporation
Transpiration
Run On/Run Off
Yucca Crest
TCw
PTn
TSw
CHn
CFu
Sever Wash Fault
Pagany Wash Fault
Drill Hole Wash Fault
Sundance Fault
Solitario Canyon Fault
Perched Water
Zeolitic
Fault-Dominated Flow
Saturated Zone
Episodic Fracture Flow
Matrix Flow
Potential Repository Horizon
Fracture Flow
Transition
Vitric
Cross Section East of Ghost Dance Fault

Figure 3.8-1.

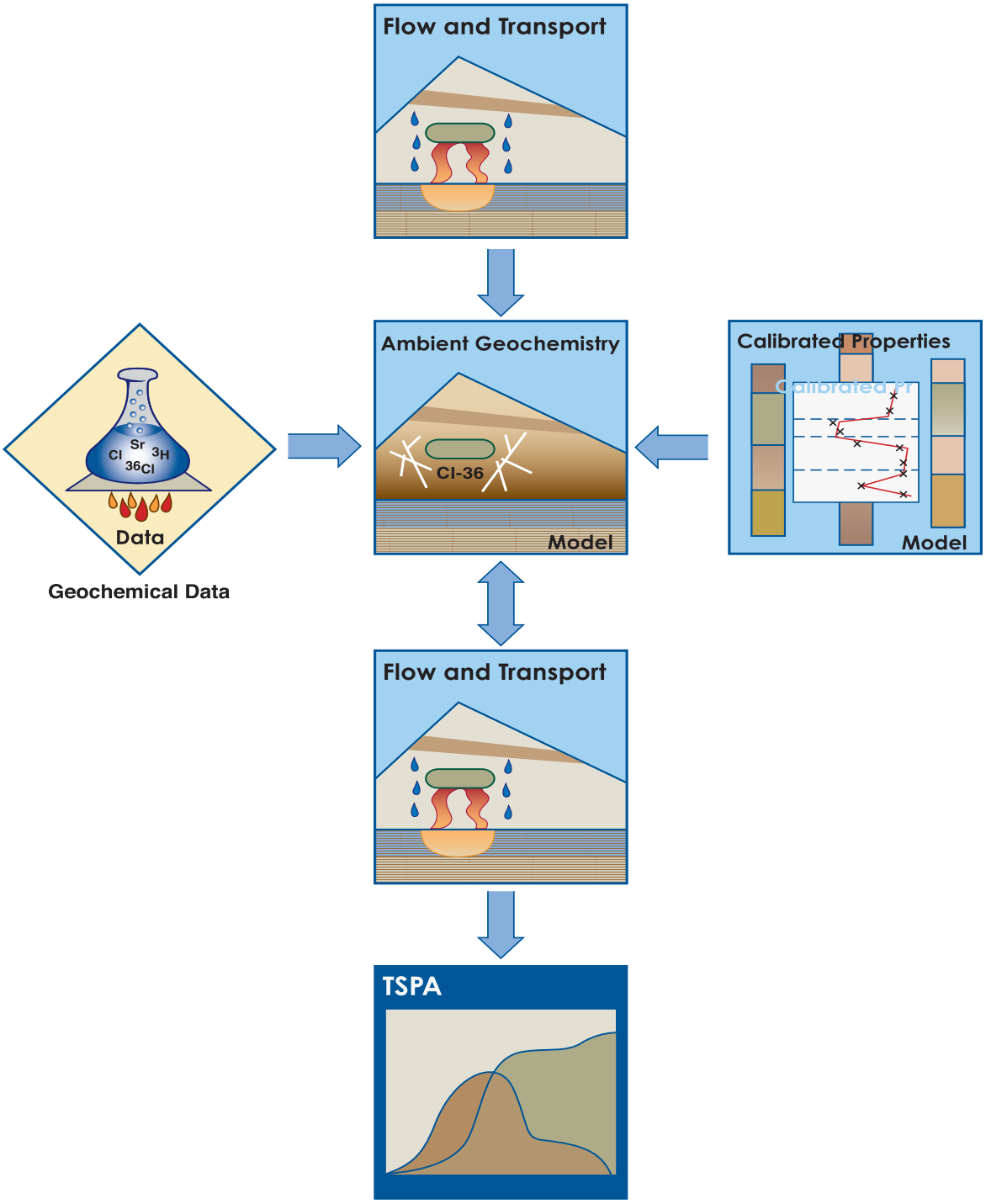

Flow and Transport
Ambient Geochemistry
Cl-36
Model
Calibrated Properties
Model
Sr
Cl
3H
36Cl
Data
Geochemical Data
Flow and Transport
TSPA

Figure 3.8-2.

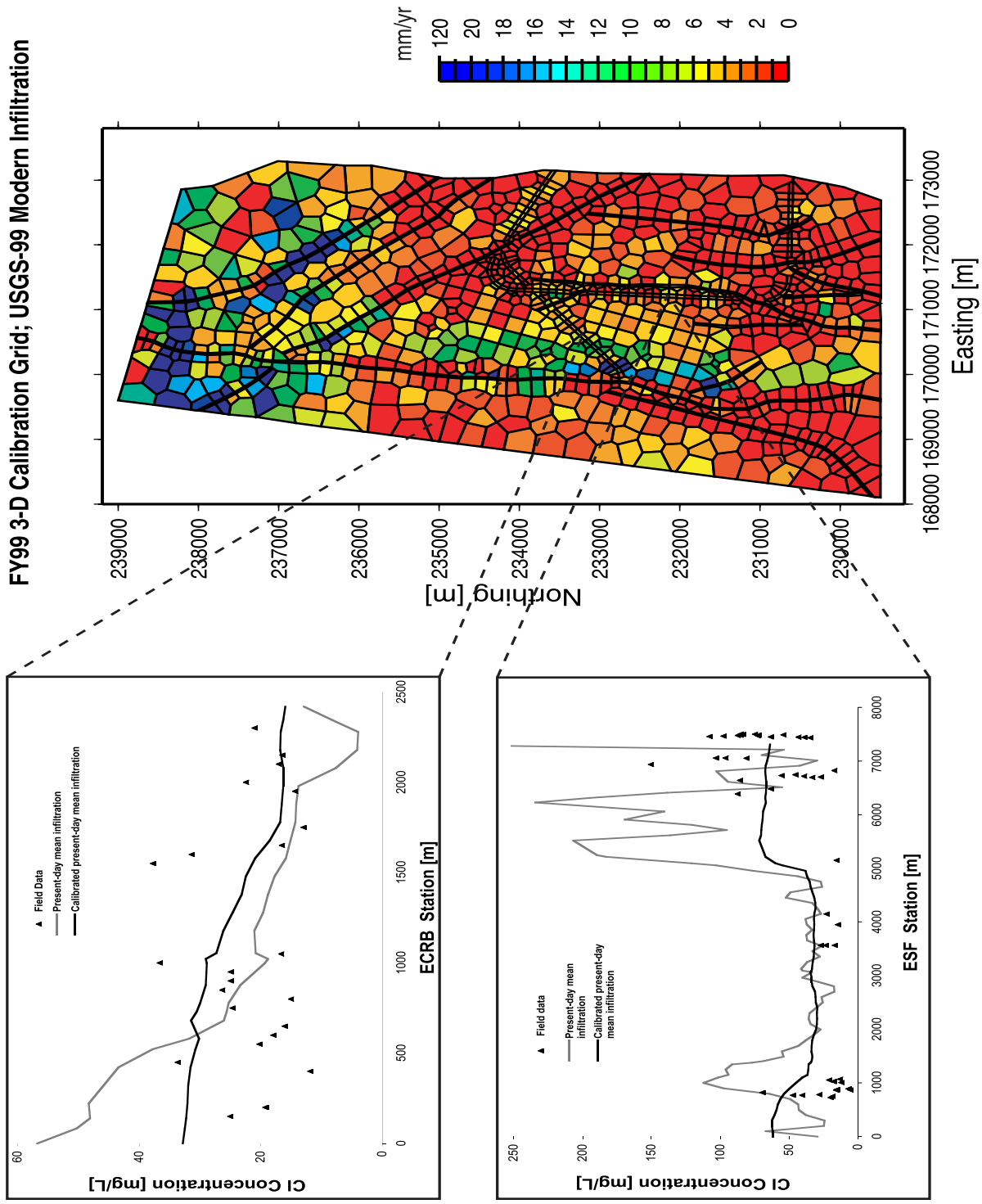

FY99 3-D Calibration Grid; USGS-99 Modern Infiltration
mm/yr
120
20
18
16
14
12
10
8
6
4
2
0
Northing [m]
239000
238000
237000
236000
235000
234000
233000
232000
231000
230000
168000 169000 170000 171000 172000 173000
Easting [m]
Field Data
Present-day mean infiltration
Calibrated present-day mean infiltration
Cl Concentration [mg/L]
ECRB Station [m]
Field data
Present-day mean infiltration
Calibrated present-day mean infiltration
Cl Concentration [mg/L]
ESF Station [m]

Figure 3.8-3.

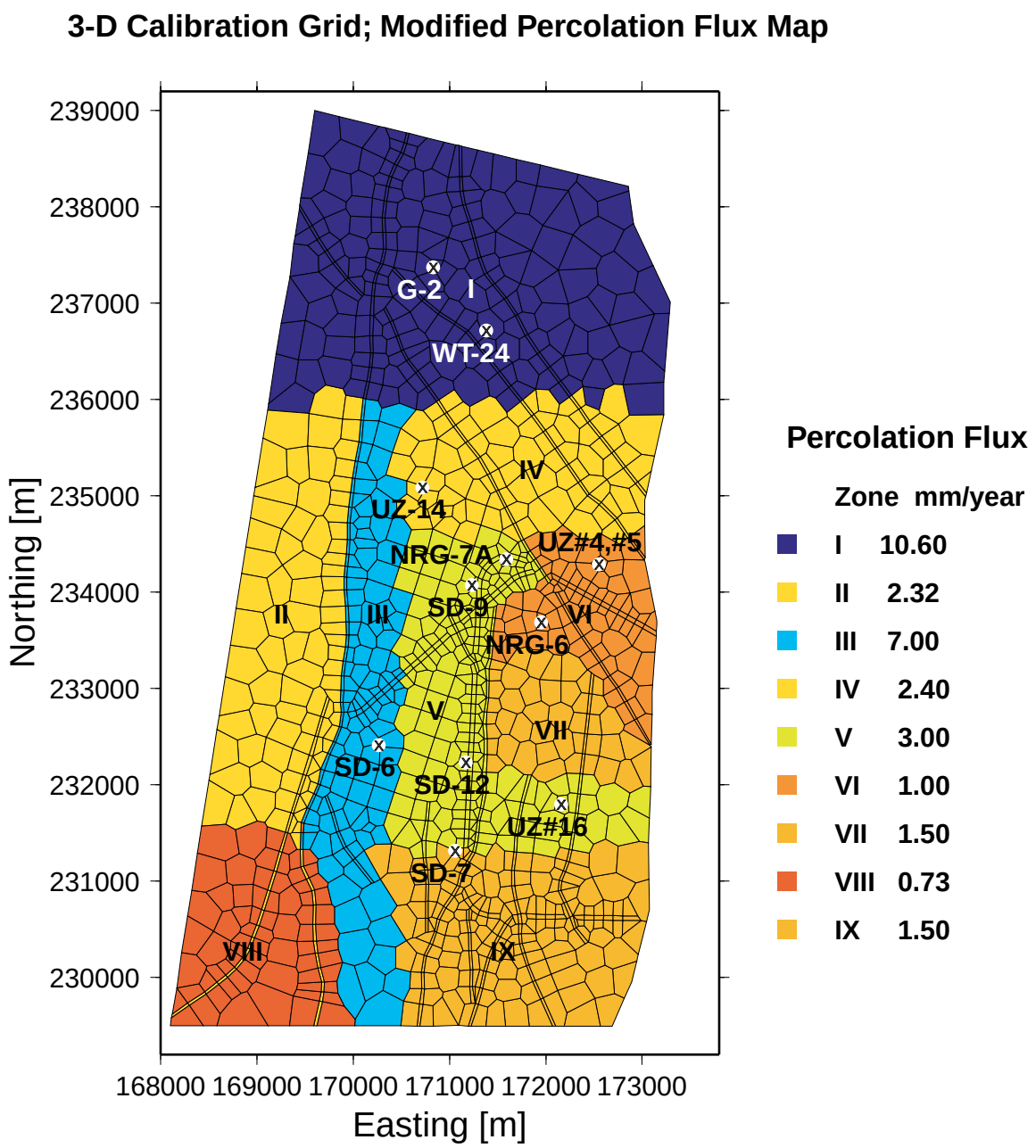
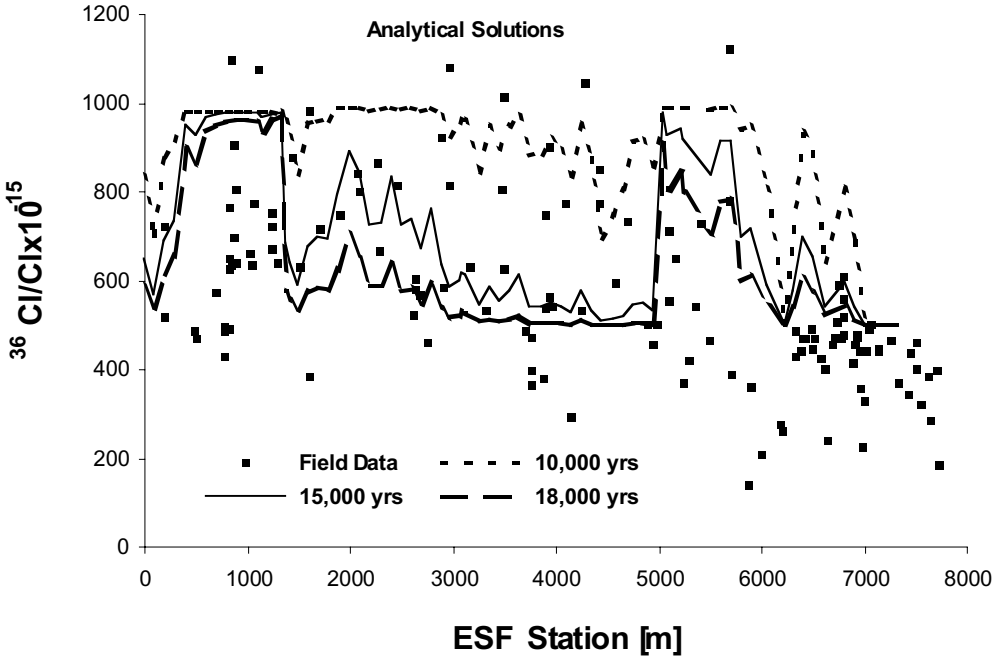

3-D Calibration Grid; Modified Percolation Flux Map
Northing [m]
239000
238000
237000
236000
235000
234000
233000
232000
231000
230000
Easting [m]
168000 169000 170000 171000 172000 173000
G-2
I
WT-24
IV
UZ-14
NRG-7A
UZ#4,#5
II
III
SD-9
VI
NRG-6
V
VII
SD-6
SD-12
UZ#16
SD-7
VIII
IX
Percolation Flux
Zone mm/year
I 10.60
II 2.32
III 7.00
IV 2.40
V 3.00
VI 1.00
VII 1.50
VIII 0.73
IX 1.50

Figure 3.8-4.



(DTN: LASL831222AQ98.002 and DTN: LA9910JF12213U.013)

Figure 3.8-5

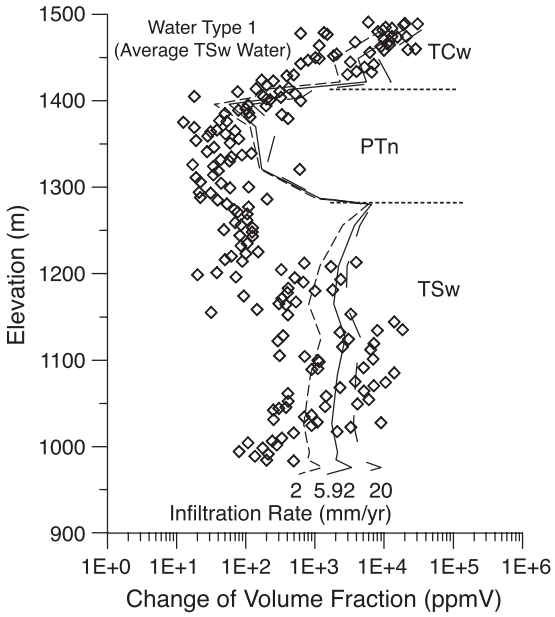

Water Type 1
(Average TSw Water)
TCw
PTn
TSw
Elevation (m)
1500
1400
1300
1200
1100
1000
900
2 5.92 20
Infiltration Rate (mm/yr)
1E+0 1E+1 1E+2 1E+3 1E+4 1E+5 1E+6
Change of Volume Fraction (ppmV)

Figure 3.8-6.

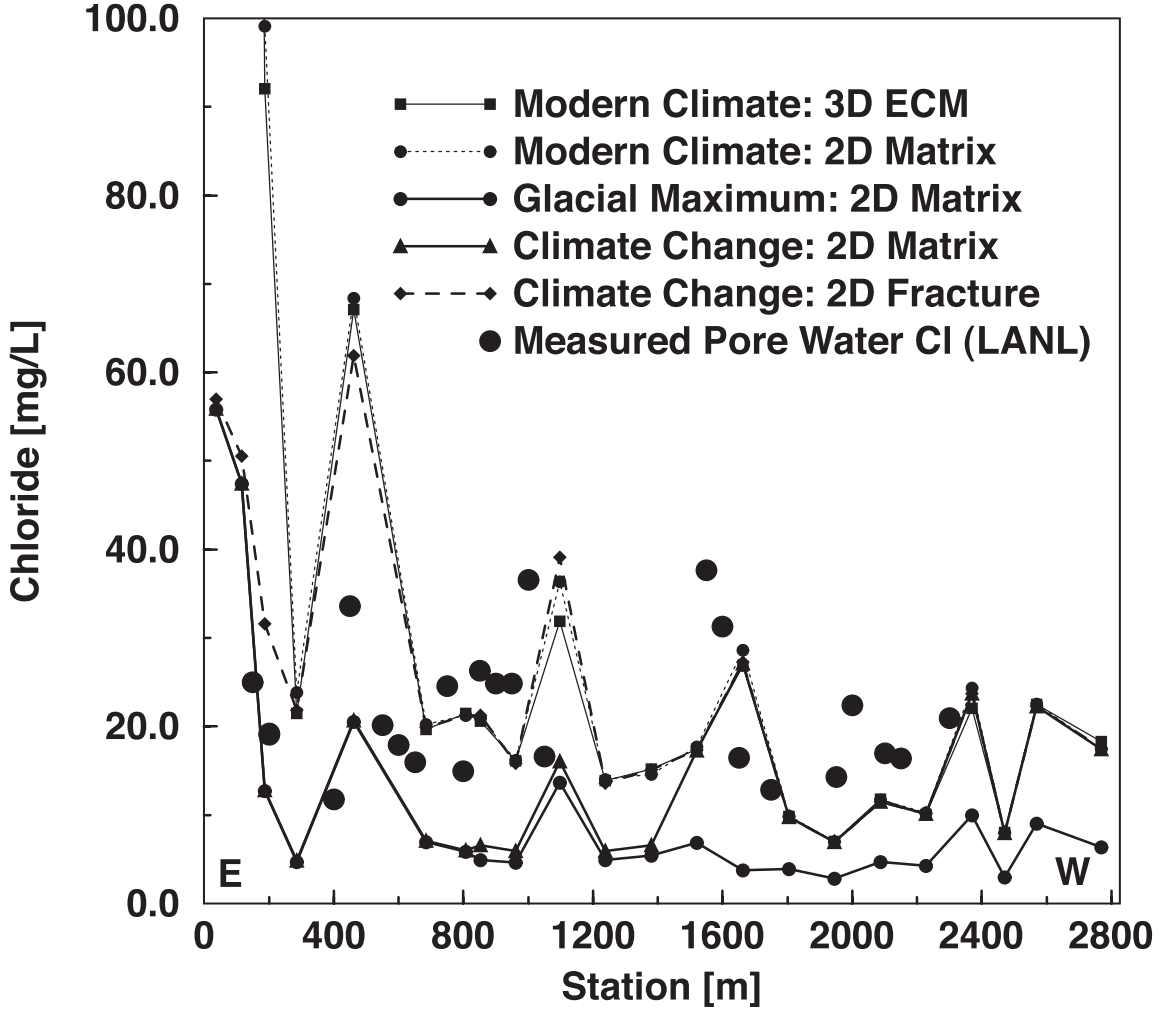

100.0
80.0
60.0
40.0
20.0
0.0
Chloride [mg/L]
0
400
800
1200
1600
2000
2400
2800
Station [m]
Modern Climate: 3D ECM
Modern Climate: 2D Matrix
Glacial Maximum: 2D Matrix
Climate Change: 2D Matrix
Climate Change: 2D Fracture
Measured Pore Water Cl (LANL)
E
W

Figure 3.8-7.

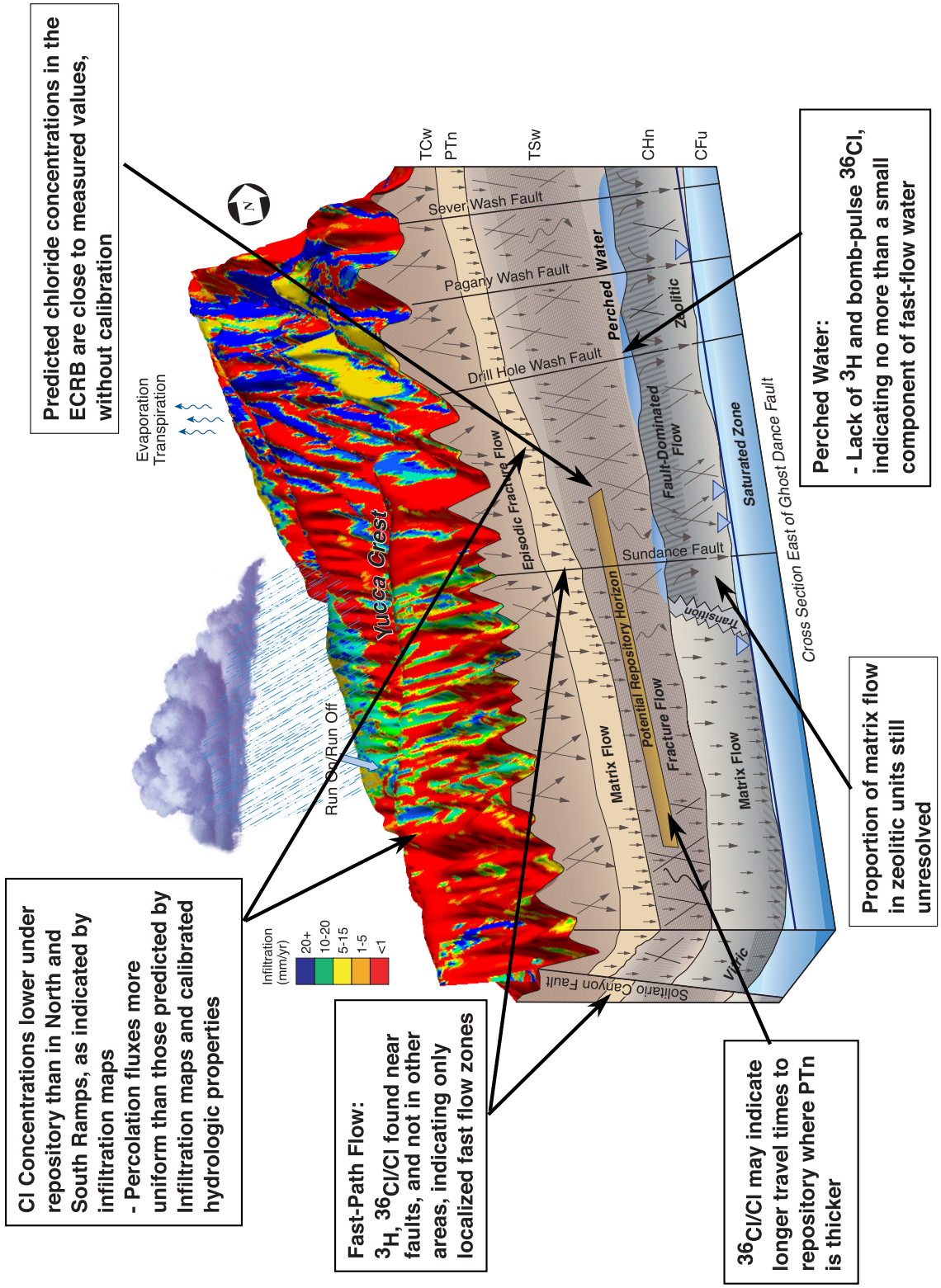

Predicted chloride concentrations in the ECRB are close to measured values, without calibration
Evaporation
Transpiration
N
Yucca Crest
Run On/Run Off
Infiltration (mm/yr)
20+
10-20
5-15
1-5
<1
TCw
PTn
TSw
CHn
CFu
Sever Wash Fault
Pagany Wash Fault
Drill Hole Wash Fault
Perched Water
Zeolitic
Episodic Fracture Flow
Fault-Dominated Flow
Saturated Zone
Sundance Fault
Transition
Matrix Flow
Potential Repository Horizon
Fracture Flow
Matrix Flow
Vitric
Solitario Canyon Fault
Cross Section East of Ghost Dance Fault
Perched Water:
- Lack of 3H and bomb-pulse 36Cl, indicating no more than a small component of fast-flow water
Cl Concentrations lower under repository than in North and South Ramps, as indicated by infiltration maps
- Percolation fluxes more uniform than those predicted by Infiltration maps and calibrated hydrologic properties
Fast-Path Flow: 3H, 36Cl/Cl found near faults, and not in other areas, indicating only localized fast flow zones
Proportion of matrix flow in zeolitic units still unresolved
36Cl/Cl may indicate longer travel times to repository where PTn is thicker

Figure 3.8-8.