GL00824

ABSTRACT

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Plots of data are compatible with three sources of gaseous species, magmatic, crustal, and meteoric. The reservoir gaseous species are interpreted to be a mixture of magmatic and evolved crustal fluid sources with a deceasing magmatic contribution going outward from the high temperature part of the reservoir. Ternary plots of CH_4, He, N_2, and Ar indicate the distal sample from southern part of the field appears to have a contribution of volatiles from shallow circulating meteoric water.

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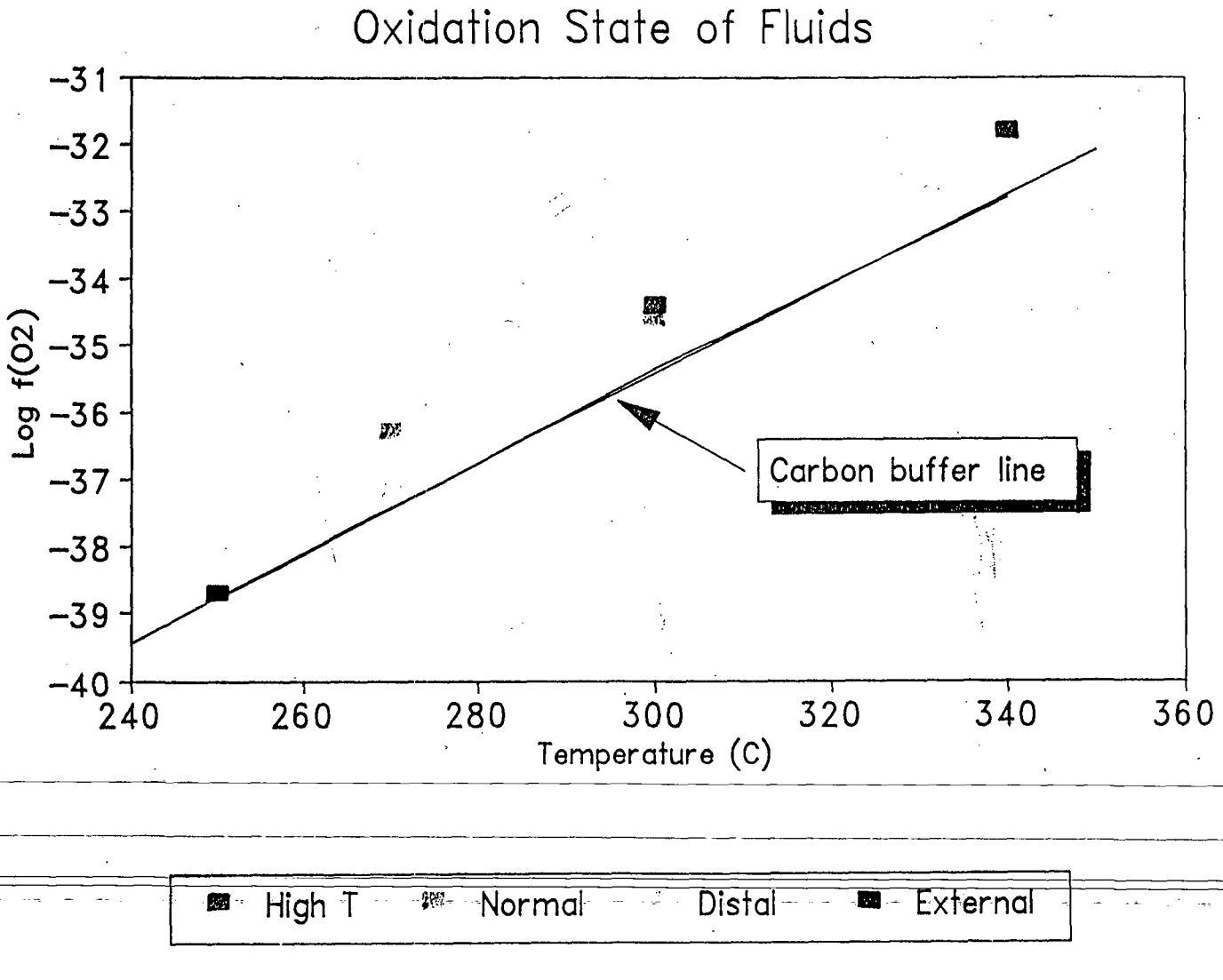
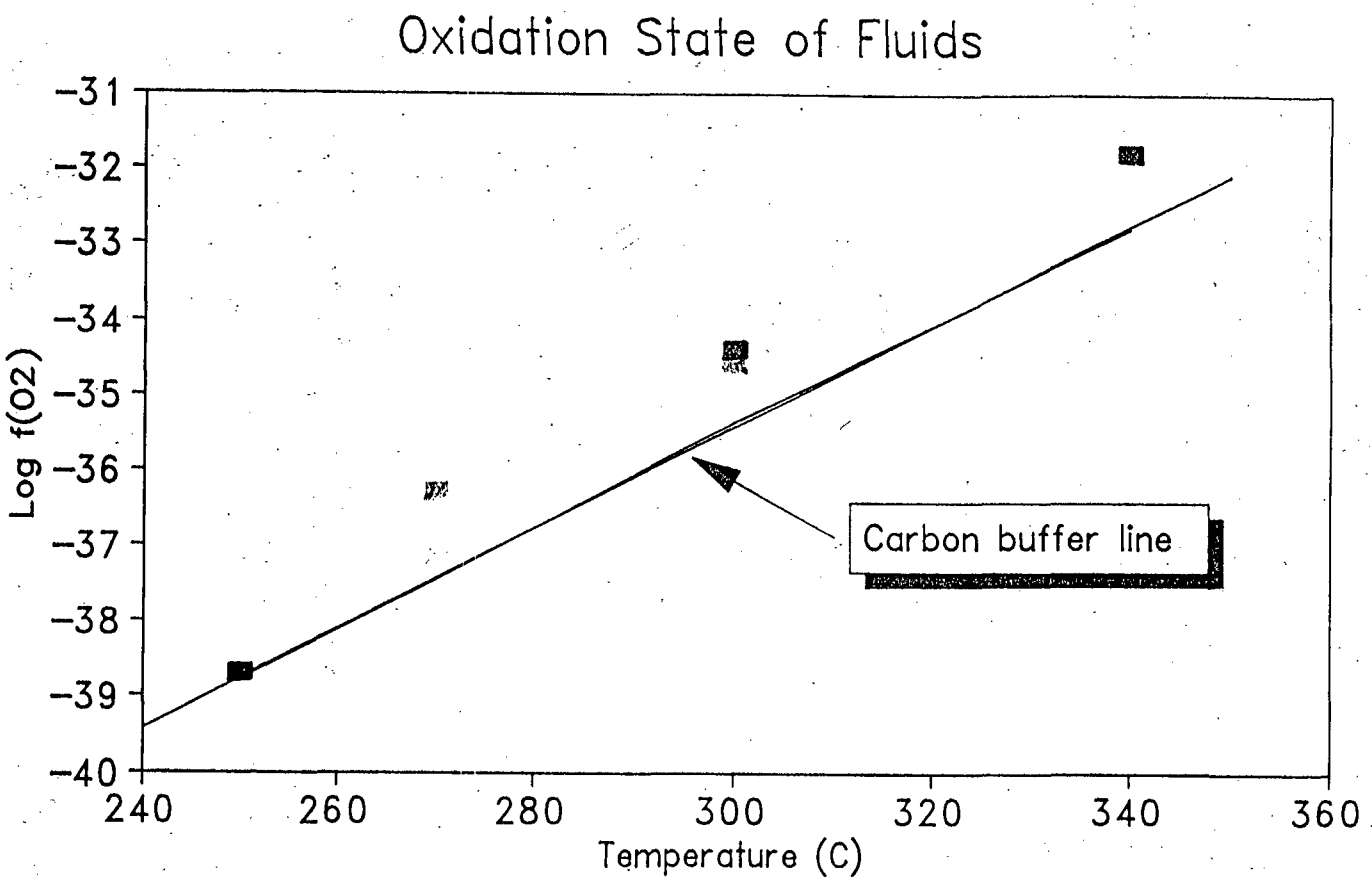

Oxidation State of Fluids
-31
-32
-33
-34
-35
-36
-37
-38
-39
-40
Log f(O2)
240
260
280
300
320
340
360
Temperature (C)
Carbon buffer line
High T
Normal
Distal
External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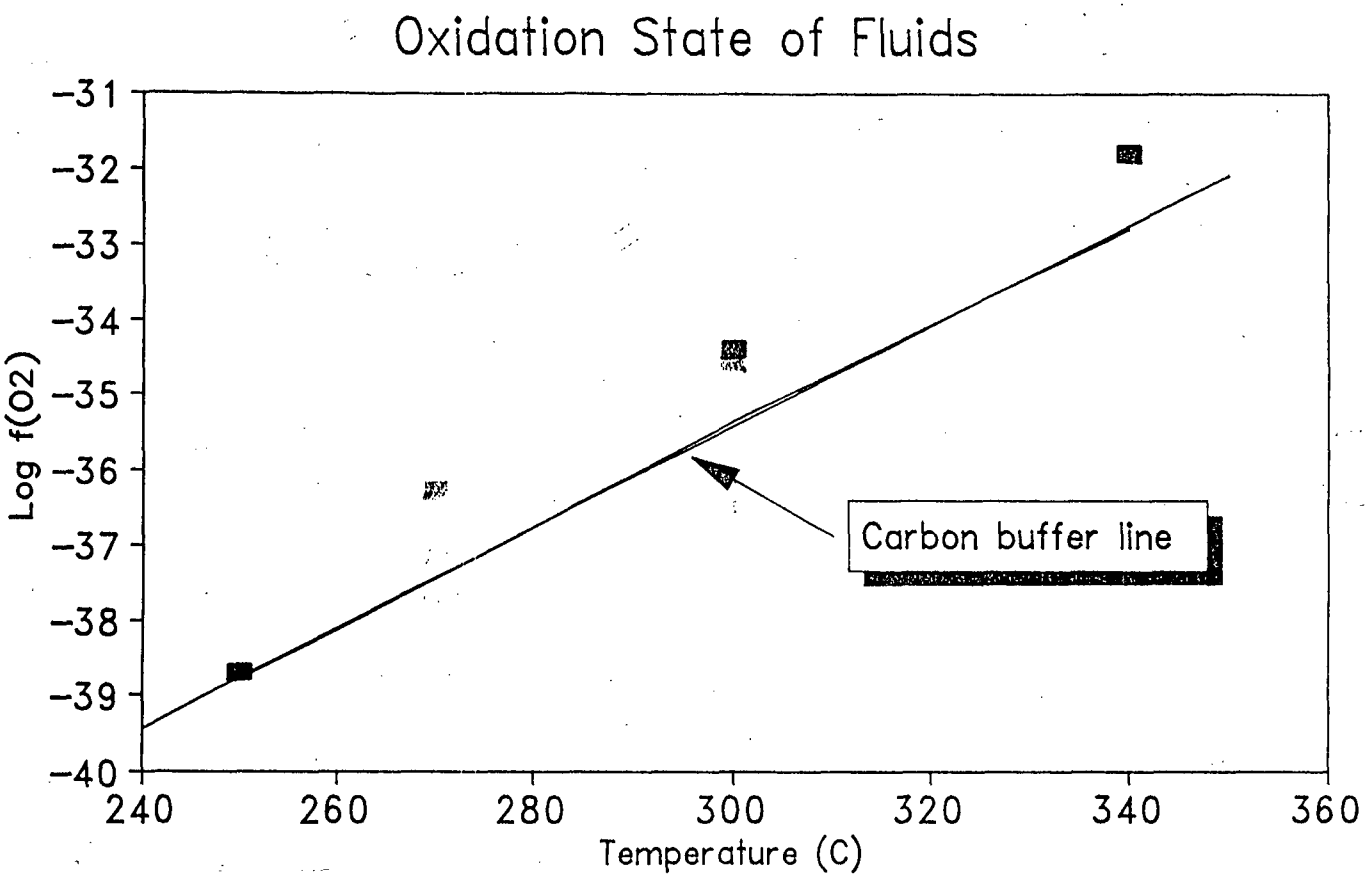
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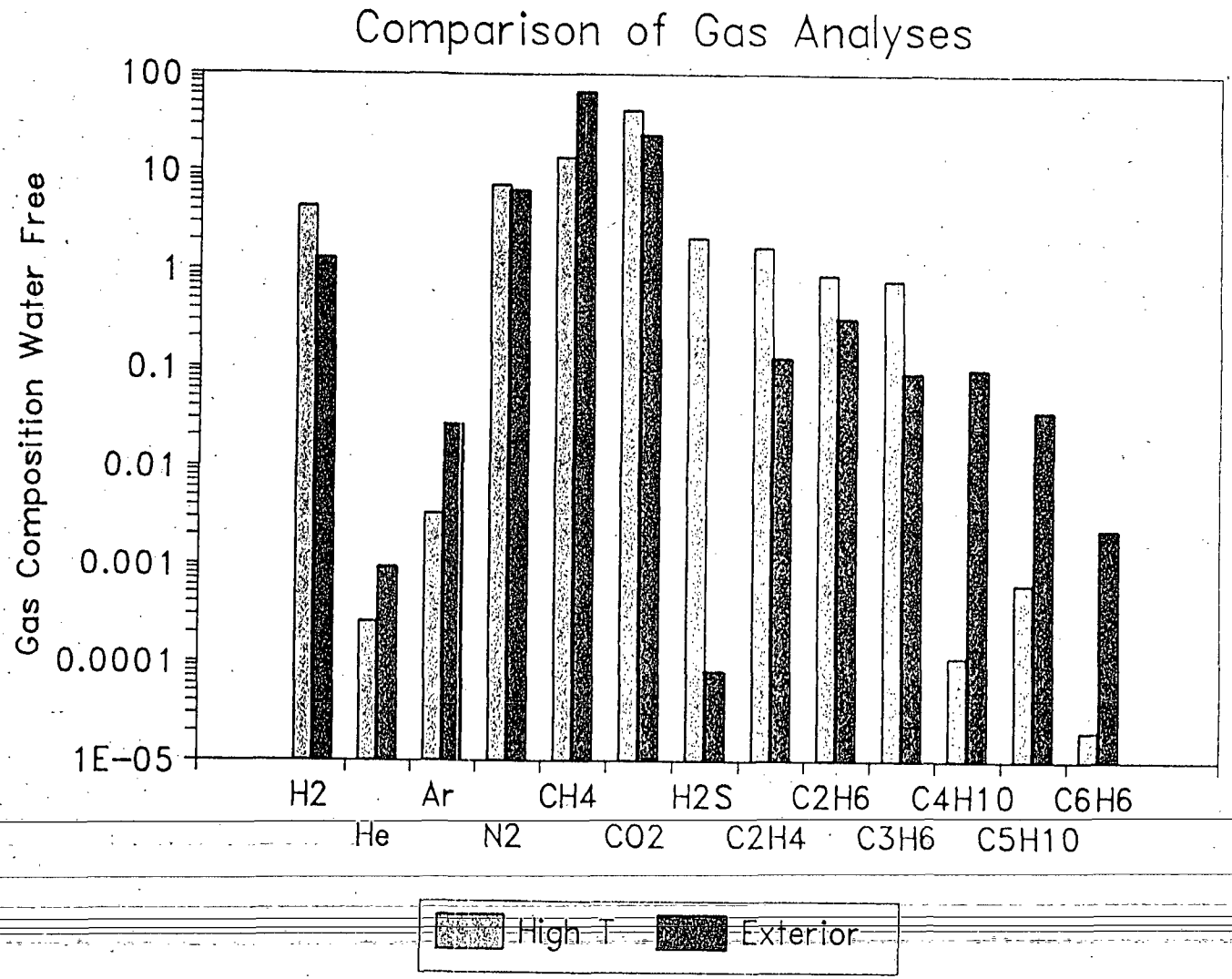
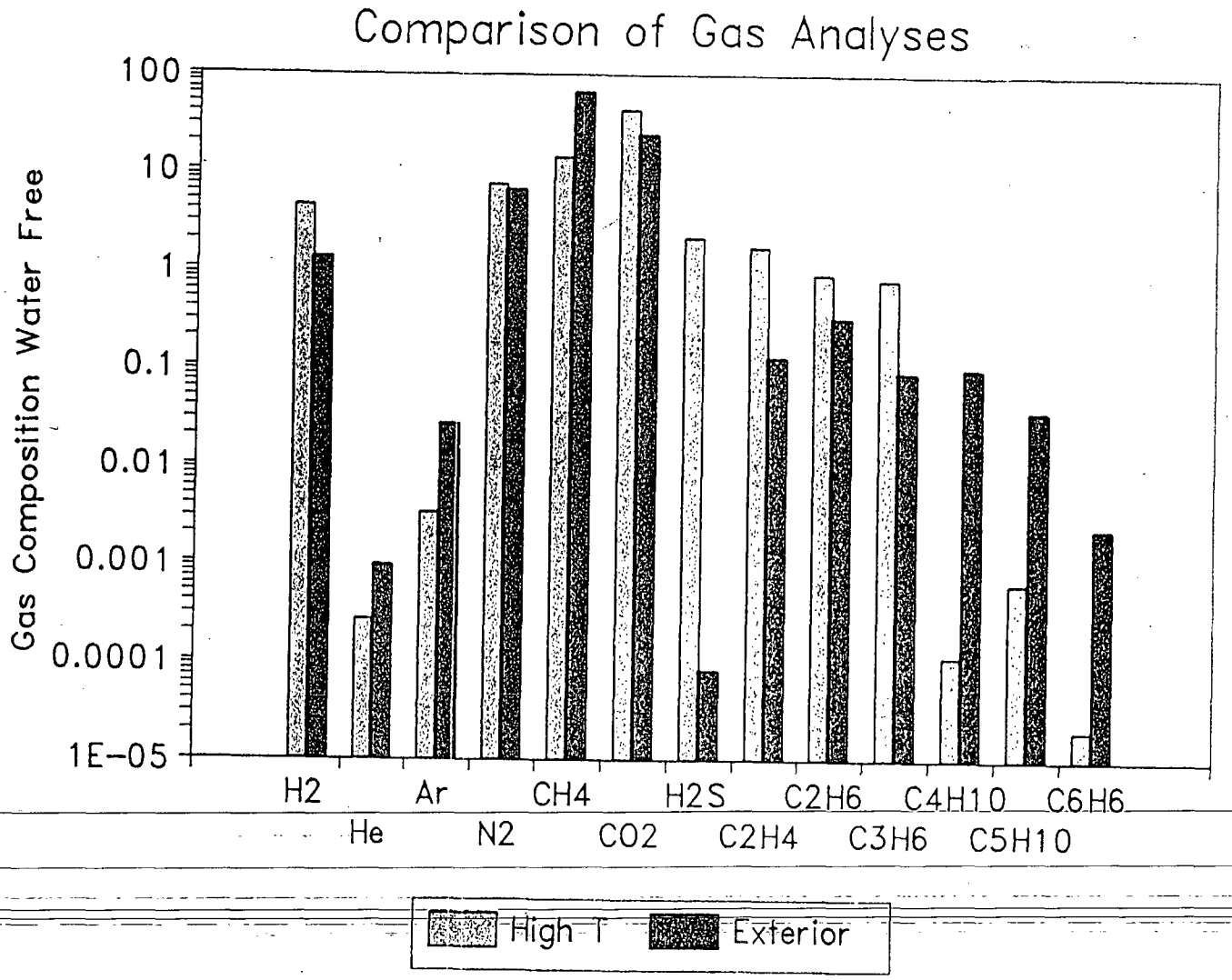

Comparison of Gas Analyses
Gas Composition Water Free
100
10
1
0.1
0.01
0.001
0.0001
1E-05
H2
He
Ar
N2
CH4
CO2
H2S
C2H4
C2H6
C3H6
C4H10
C5H10
C6H6
High T
Exterior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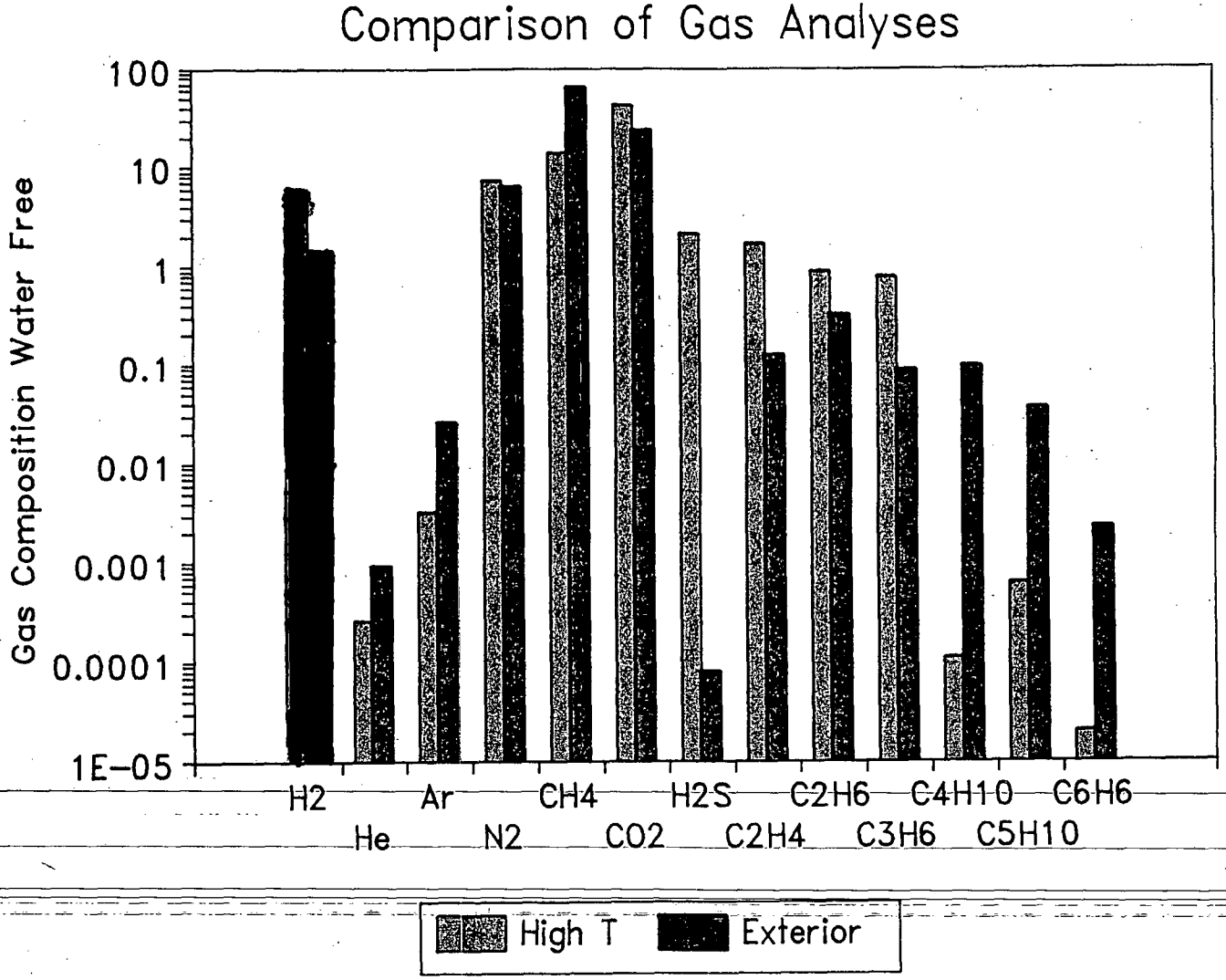
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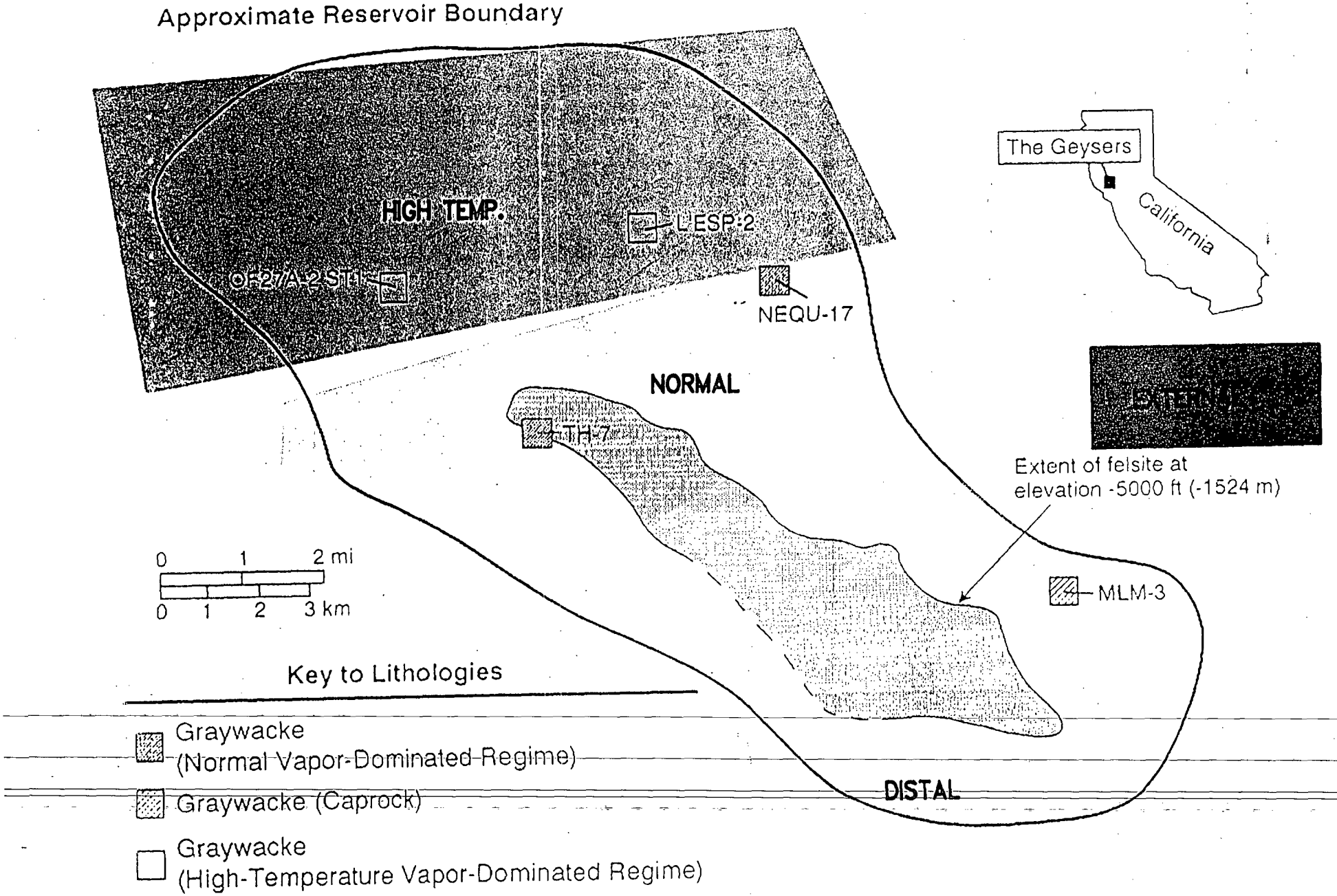
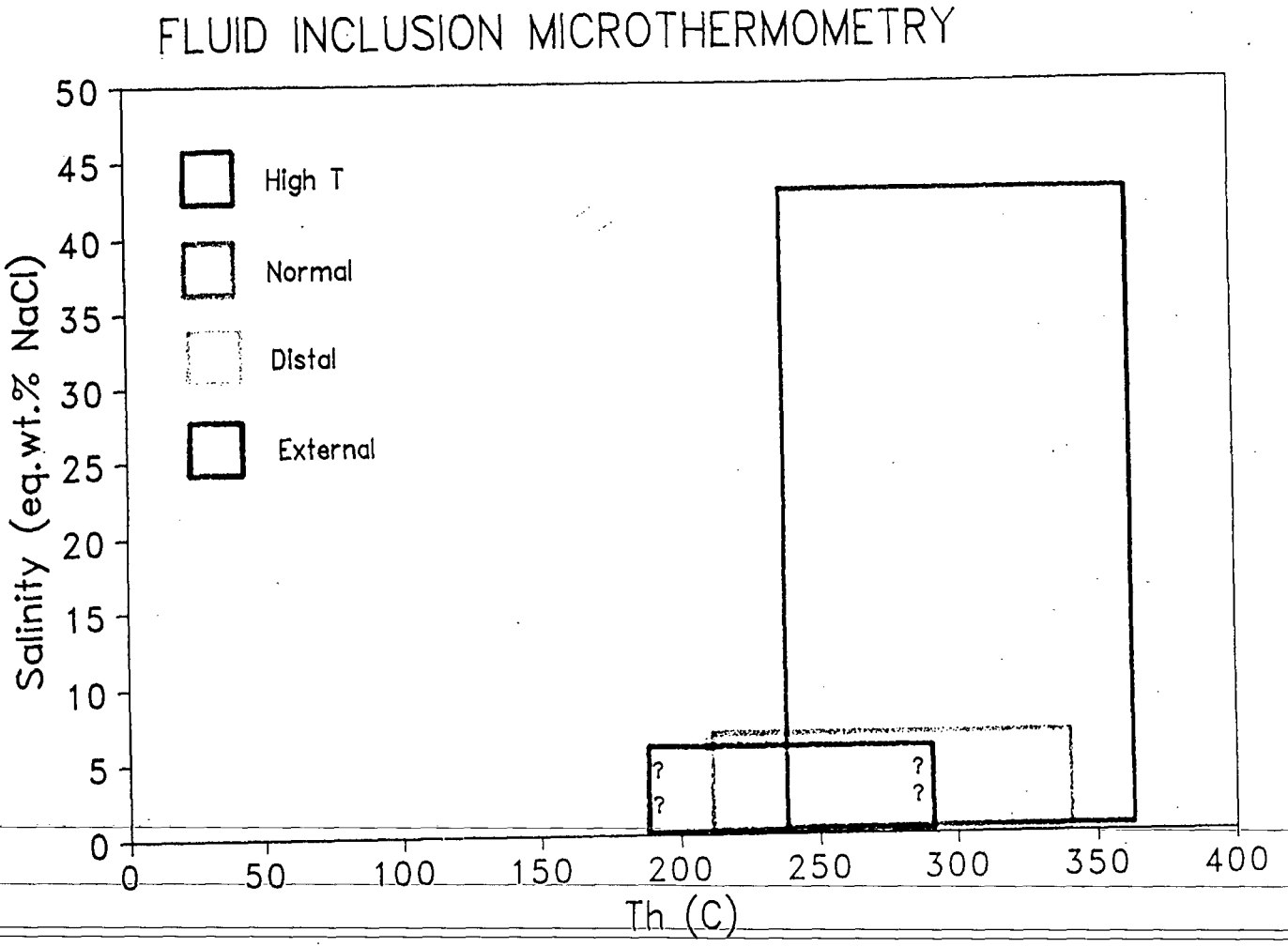
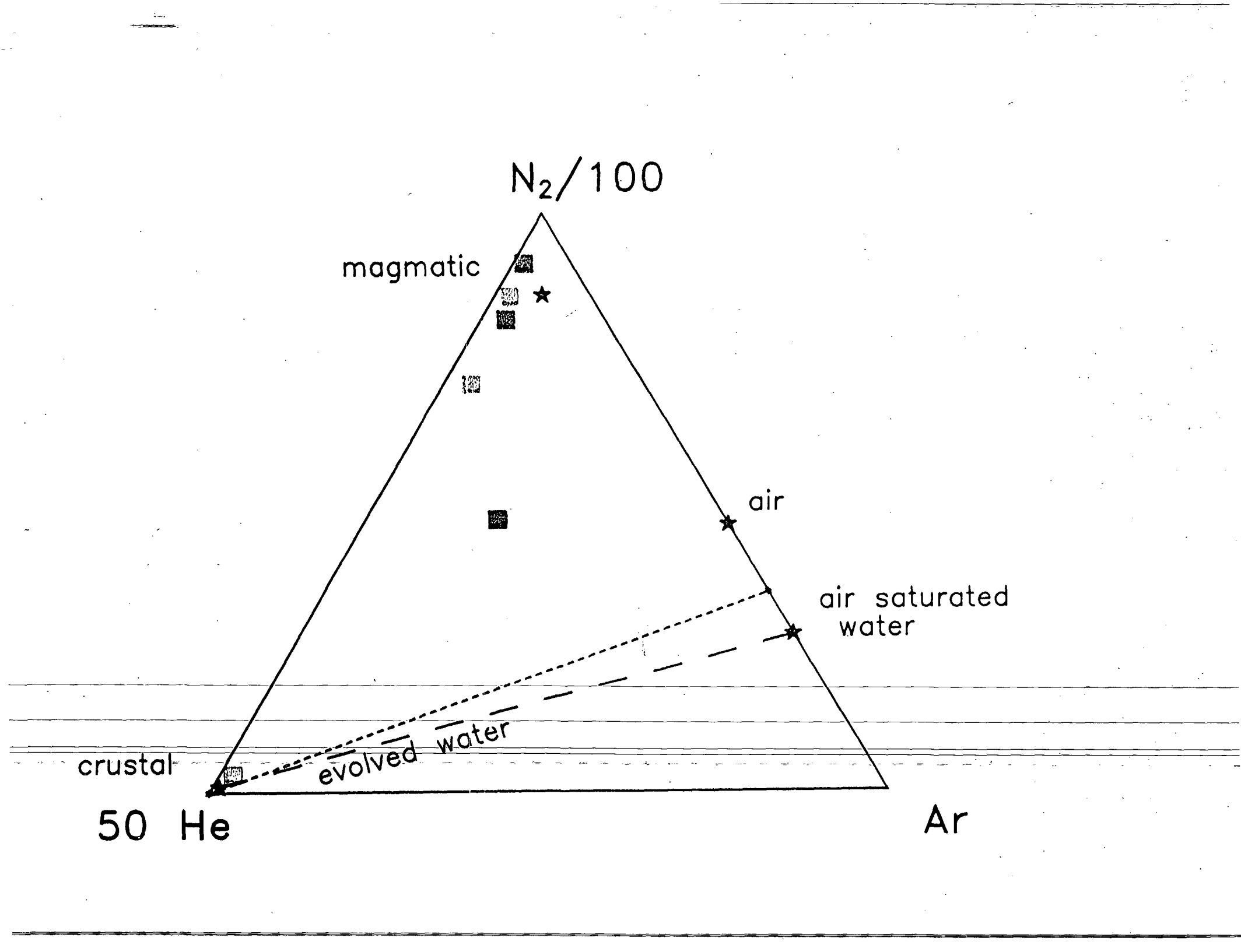
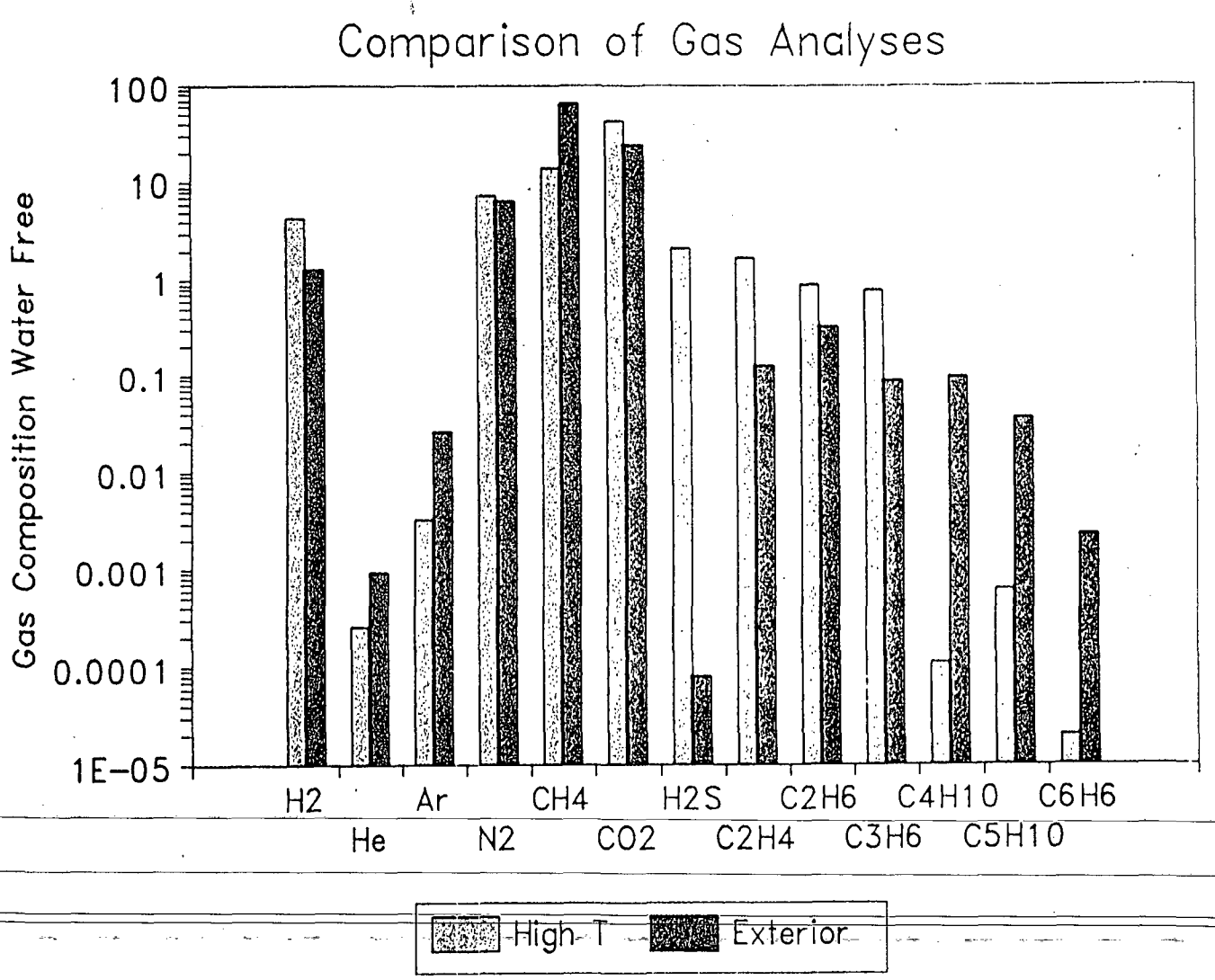
C4H10
C5H10
C6H6
High T
Exterior


Approximate Reservoir Boundary
HIGH TEMP.
OF27A-2ST1
LESP-2
NEQU-17
The Geysers
California
NORMAL
TH-7
Extent of felsite at
elevation -5000 ft (-1524 m)
MLM-3
0 1 2 mi
0 1 2 3 km
Key to Lithologies
Graywacke
(Normal Vapor-Dominated Regime)
Graywacke (Caprock)
Graywacke
(High-Temperature Vapor-Dominated Regime)
DISTAL


FLUID INCLUSION MICROTHERMOMETRY
High T
Normal
Distal
External
Salinity (eq.wt.% NaCl)
Th (C)
0
5
10
15
20
25
30
35
40
45
50
0
50
100
150
200
250
300
350
400
?
?
?
?


$N_2/100$
magmatic
air
air saturated
water
evolved water
crustal
50 He
Ar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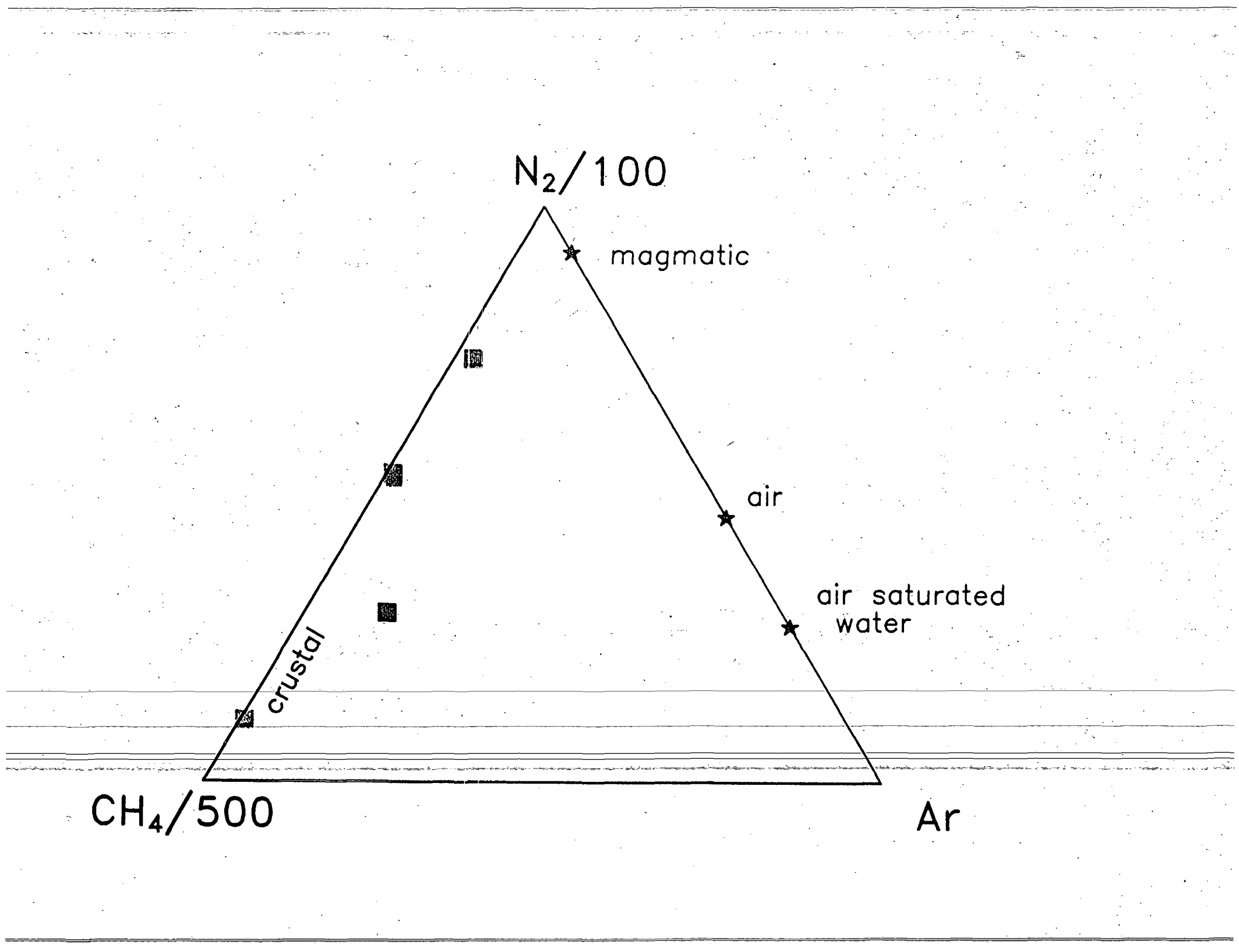
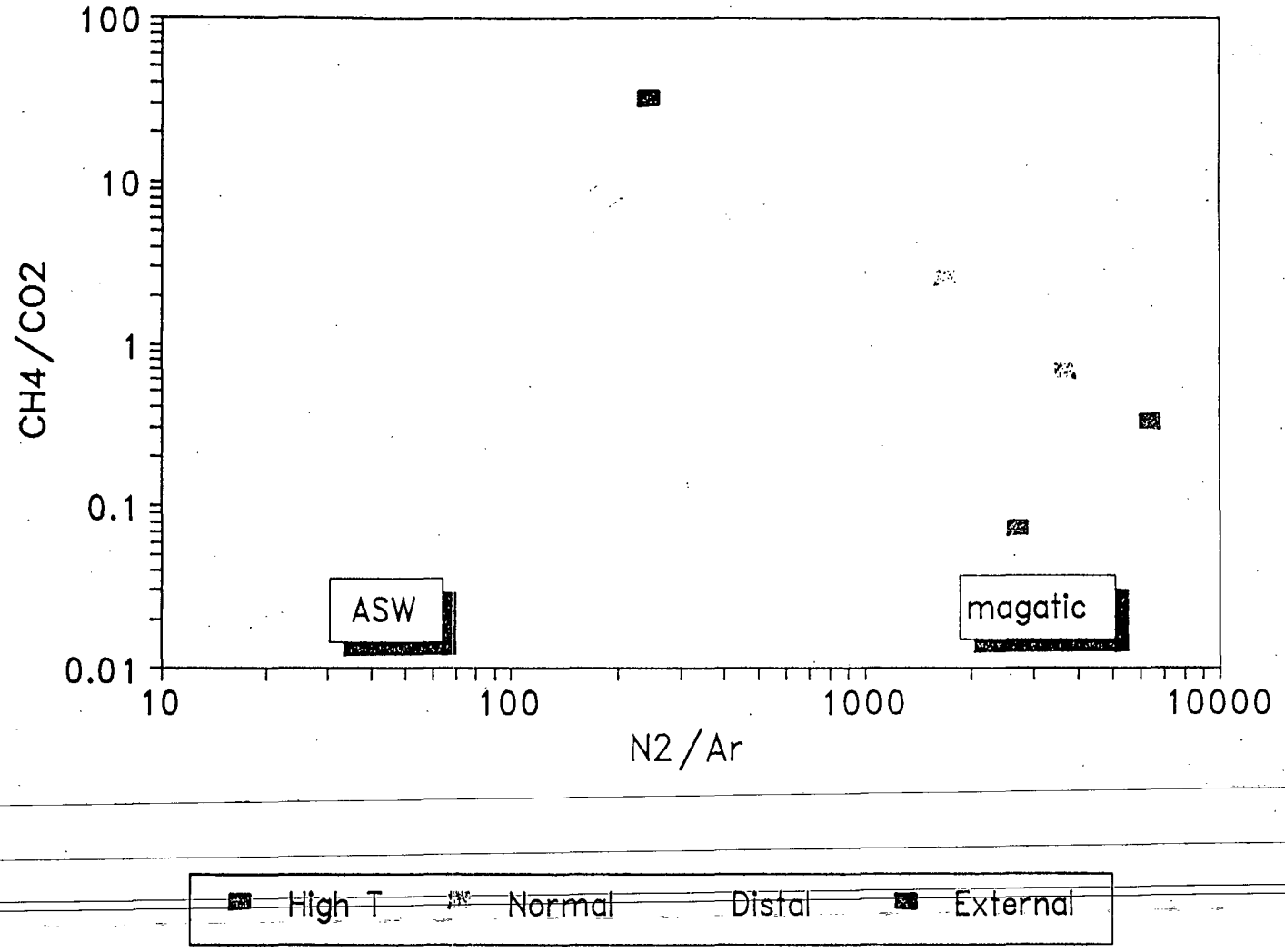
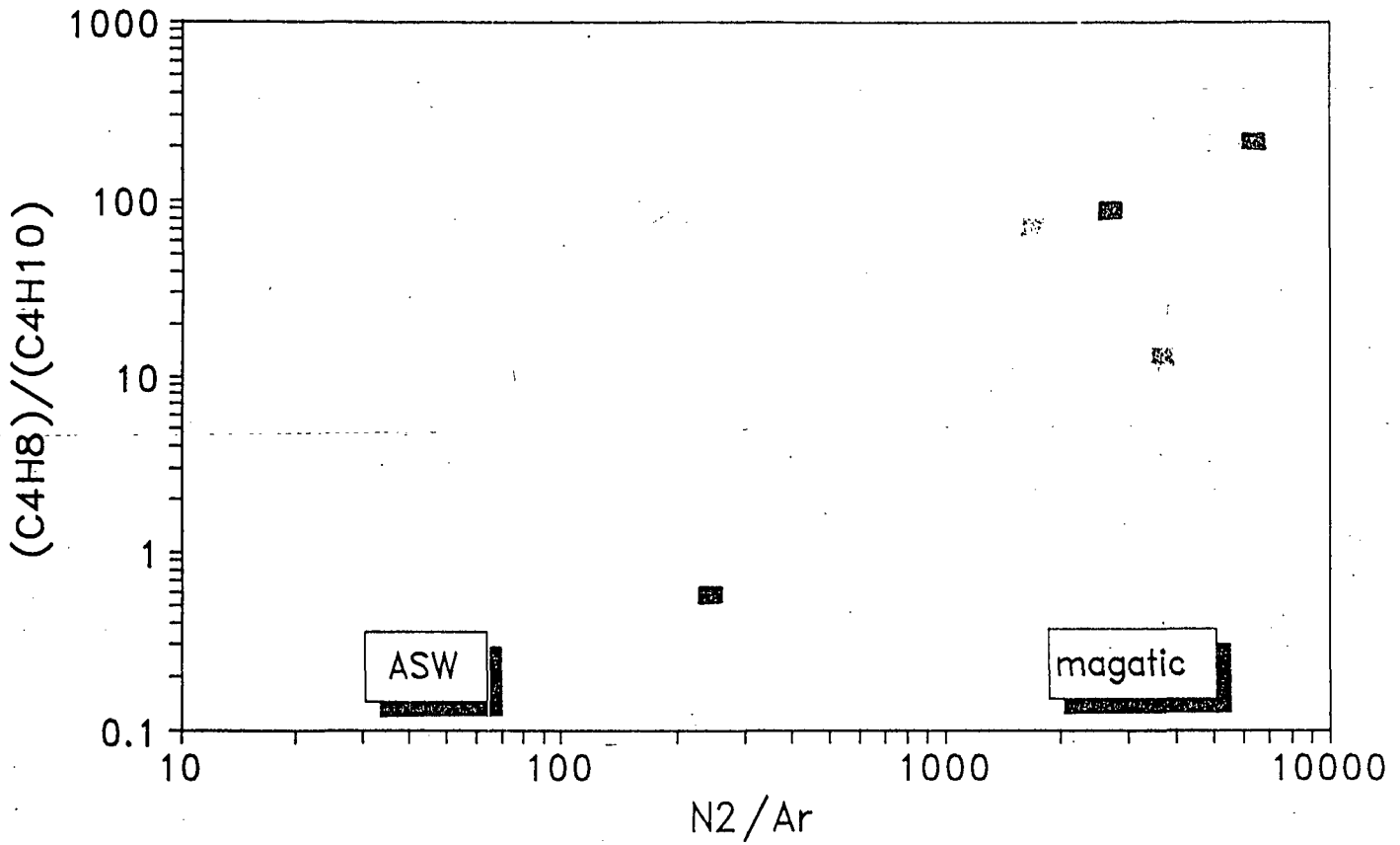
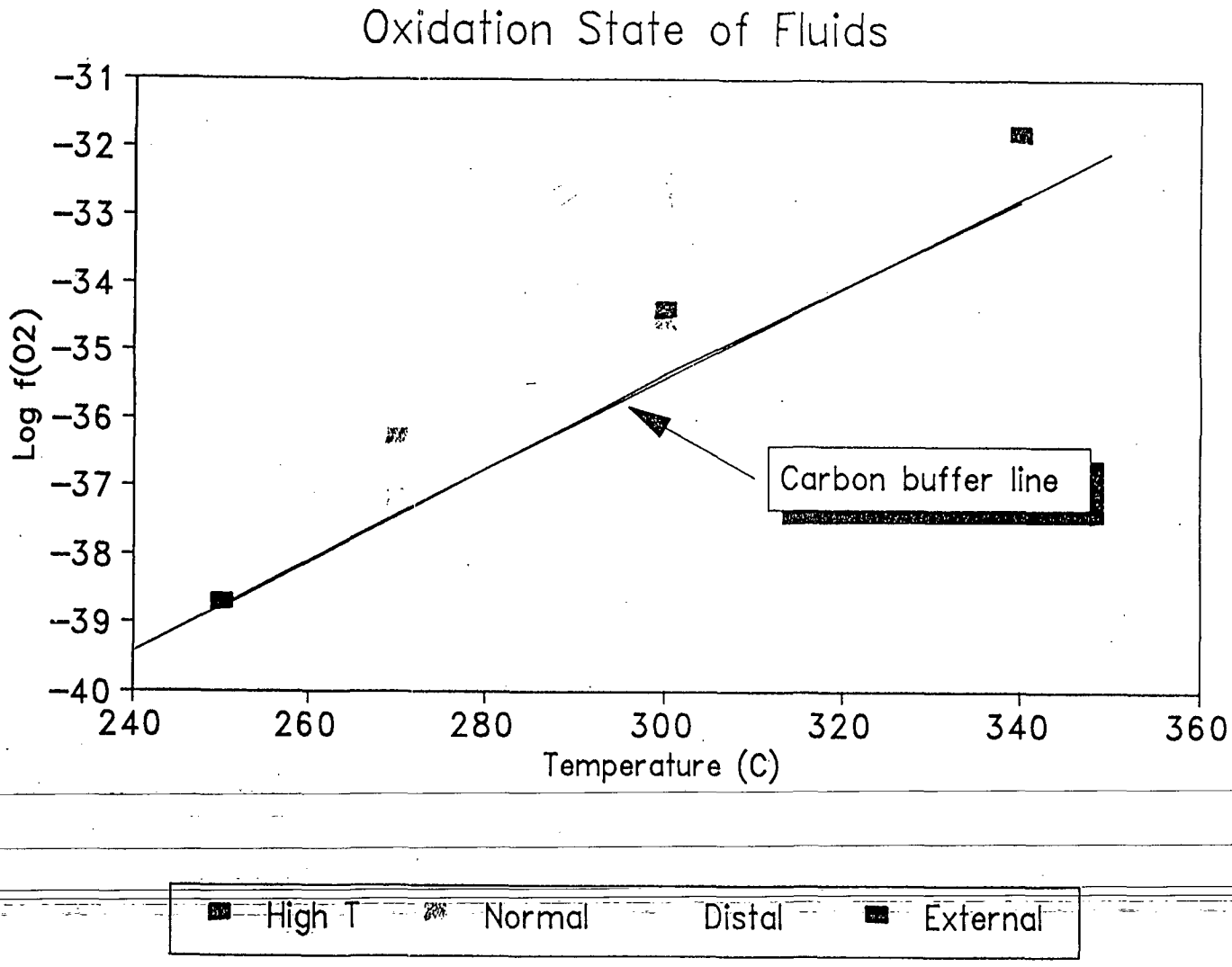
C4H10
C5H10
C6H6
High T
Exterior


$N_2/100$
magmatic
air
air saturated
water
crustal
$CH_4/500$
Ar


100
10
1
0.1
0.01
CH4/CO2
10
100
1000
10000
N2/Ar
ASW
magatic
High T
Normal
Distal
External



High T Normal Distal External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-31
-32
-33
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-39
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Temperature (C)
Carbon buffer line
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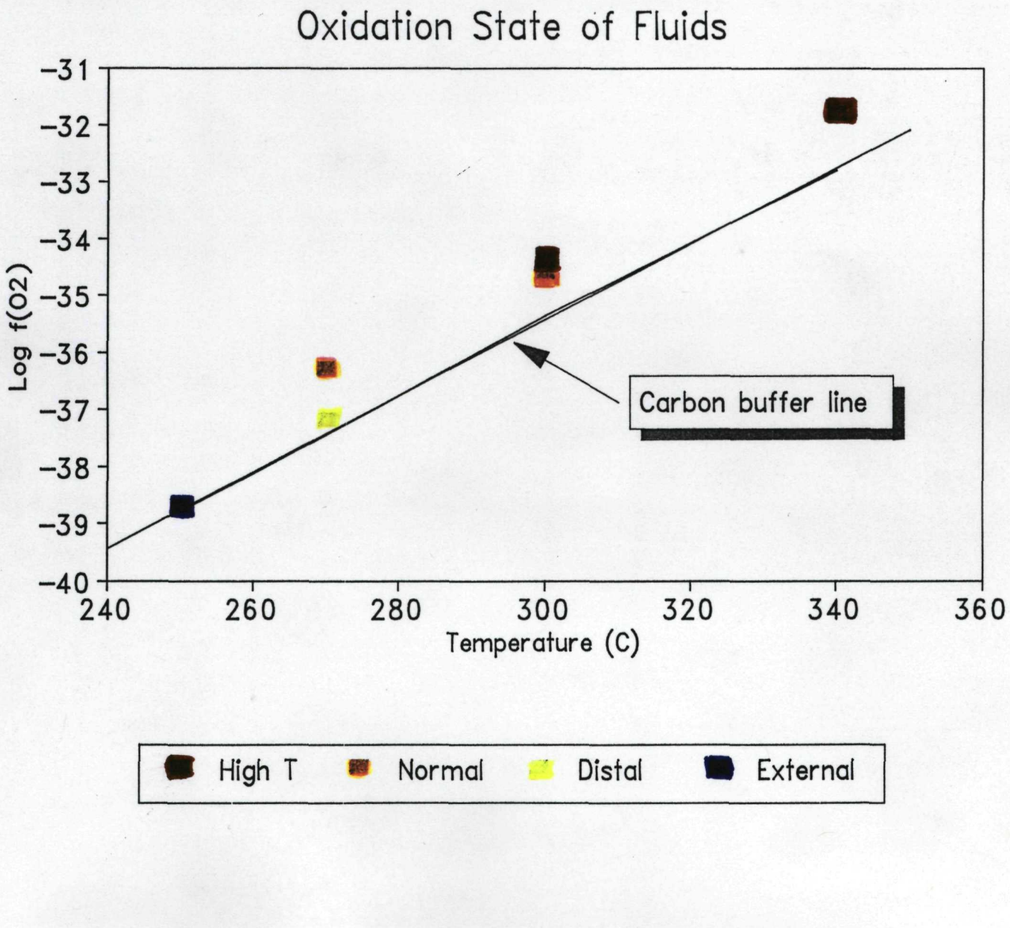
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Distal
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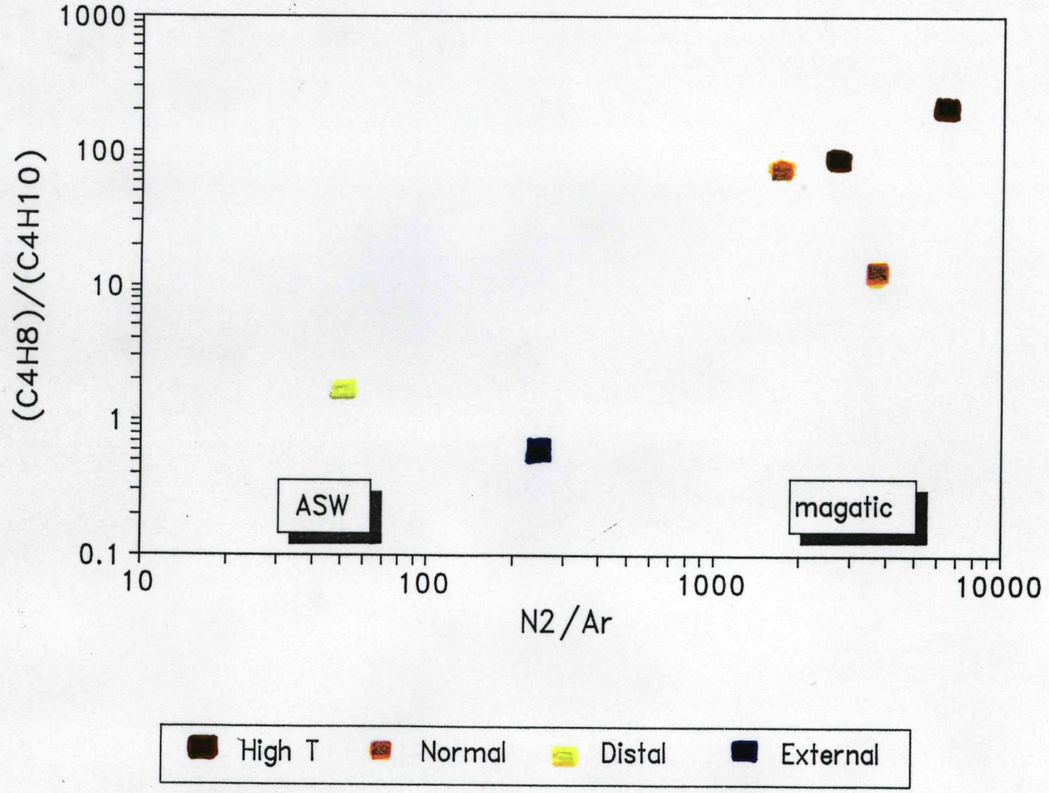
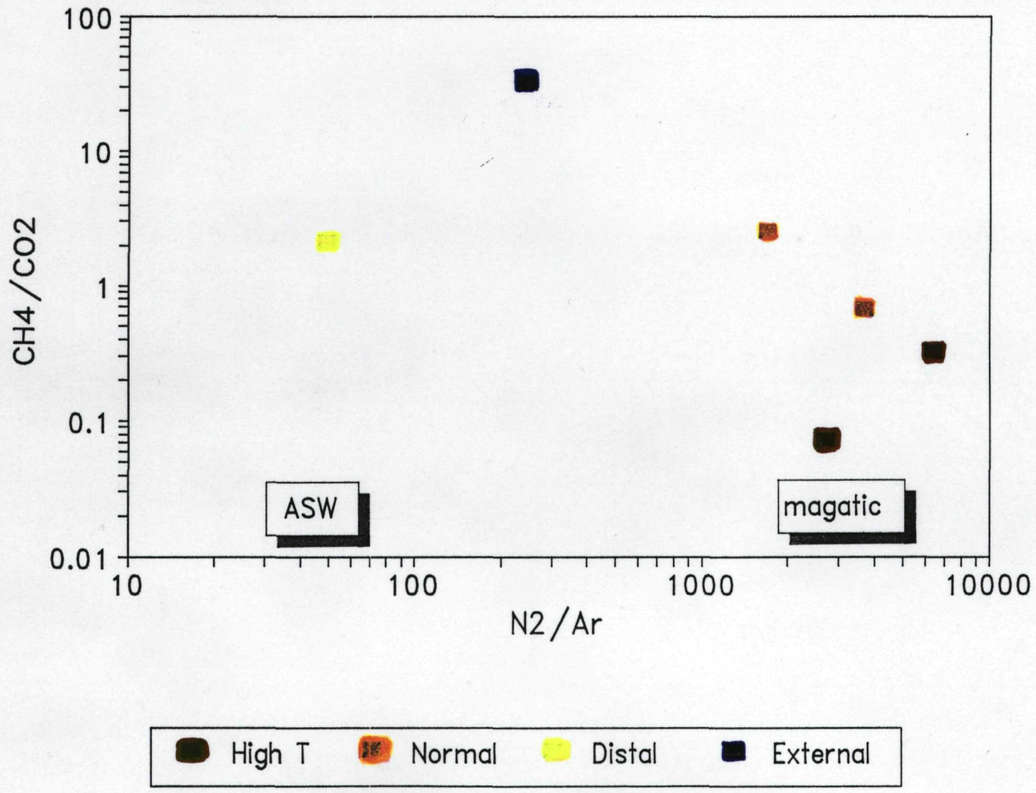
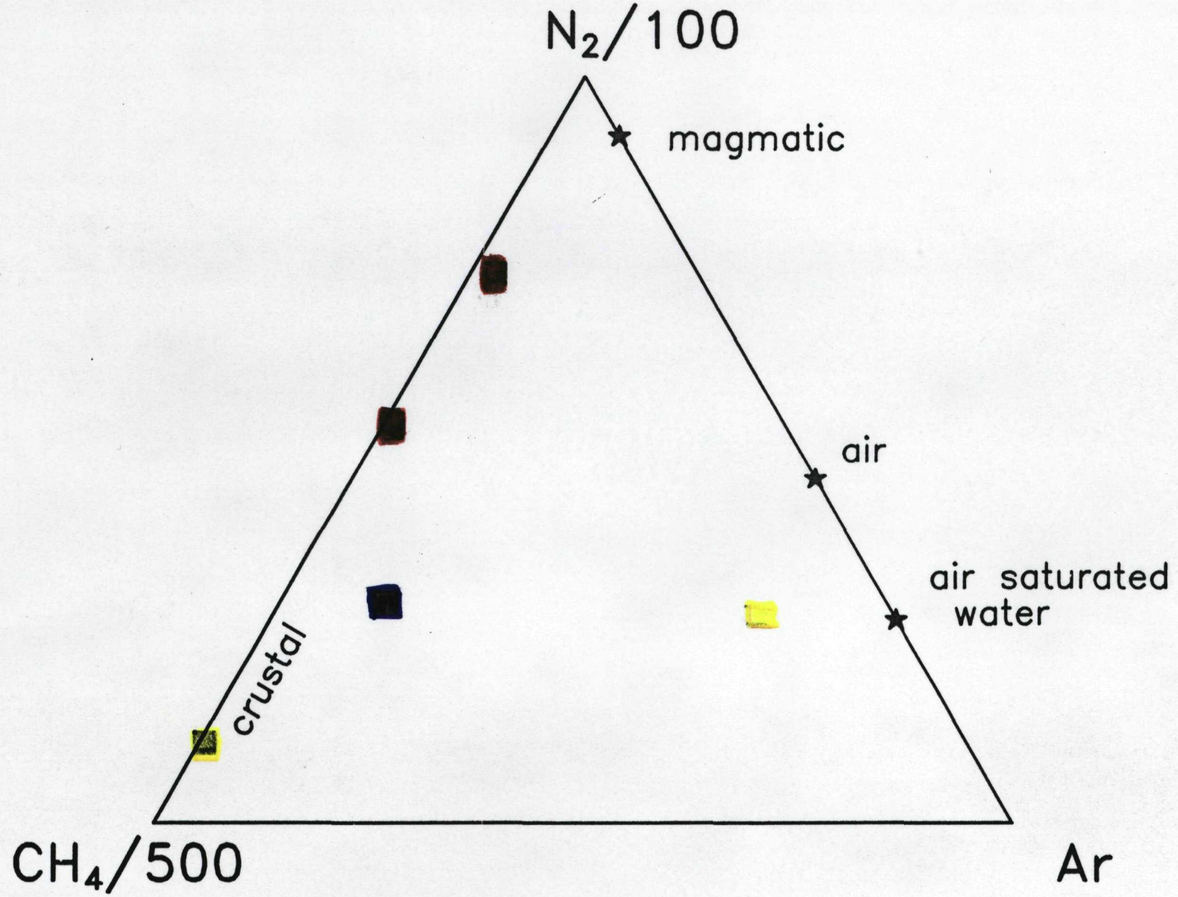

1000
100
10
1
0.1
(C4H8)/(C4H10)
10
100
1000
10000
N2/Ar
ASW
magatic
High T
Normal
Distal
External


100
10
1
0.1
0.01
CH4/CO2
10
100
1000
10000
N2/Ar
ASW
magatic
High T
Normal
Distal
External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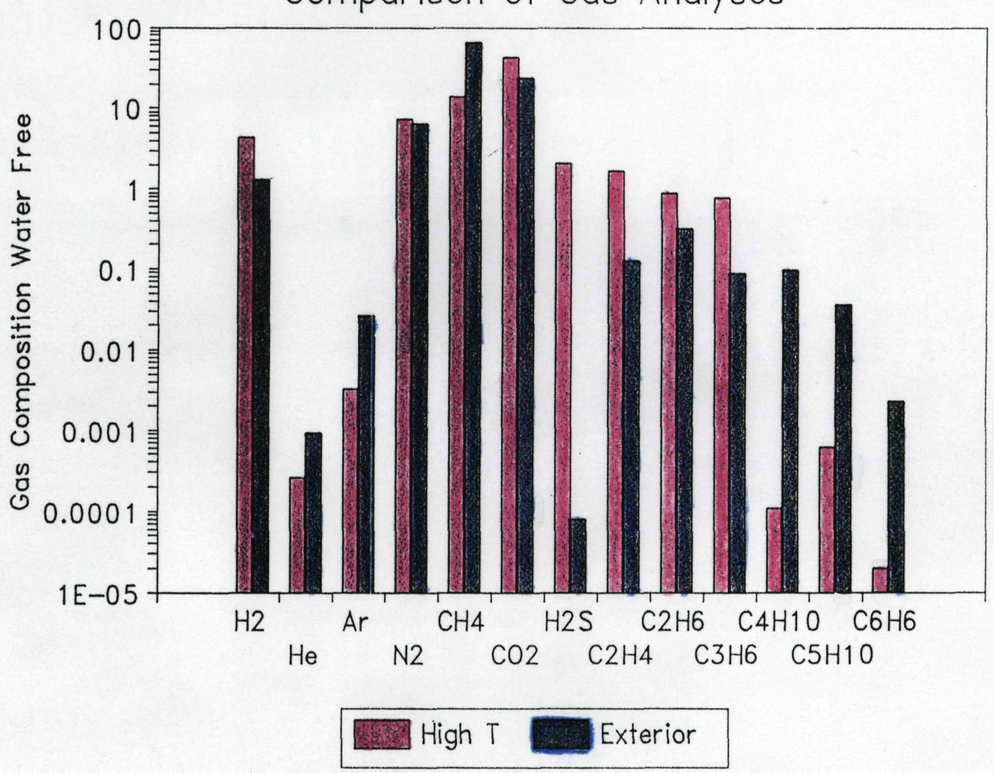
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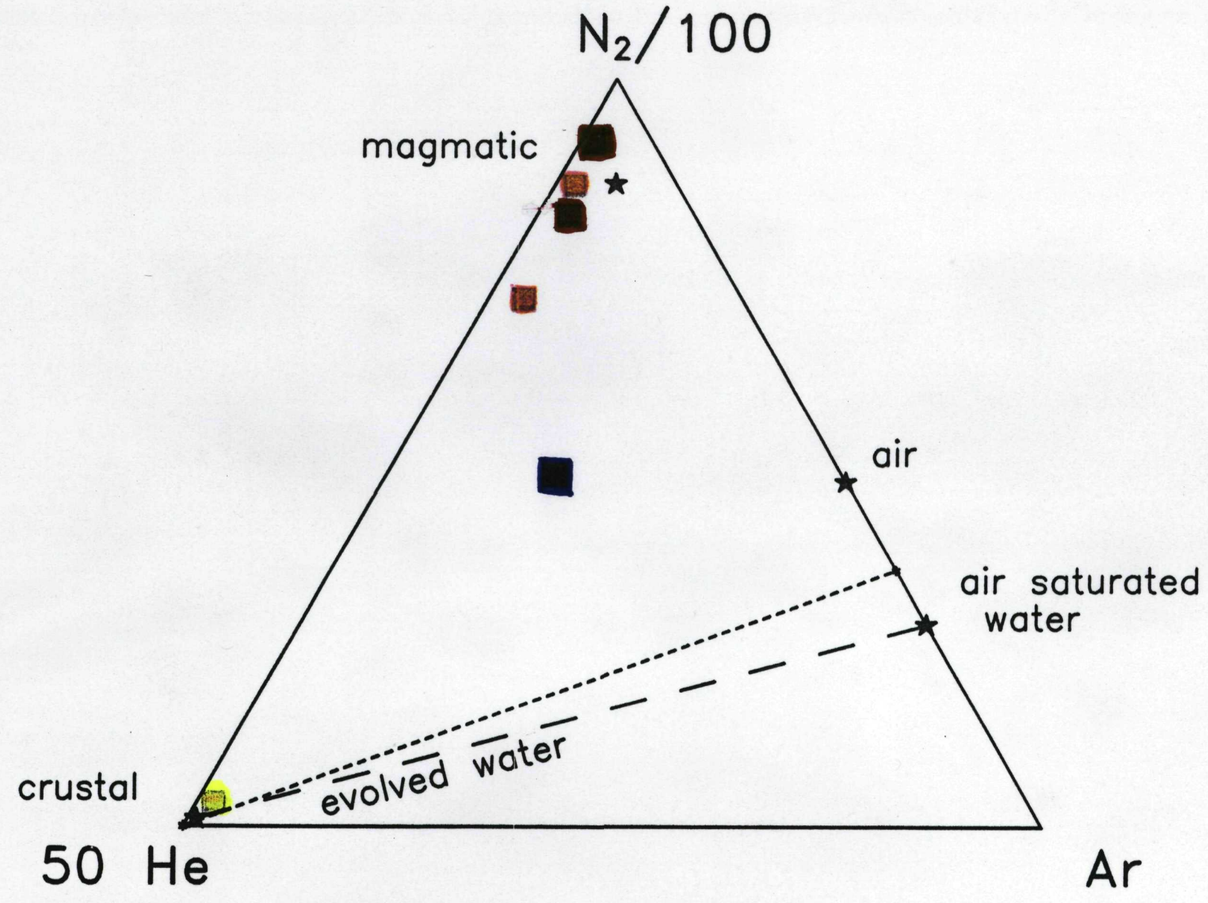
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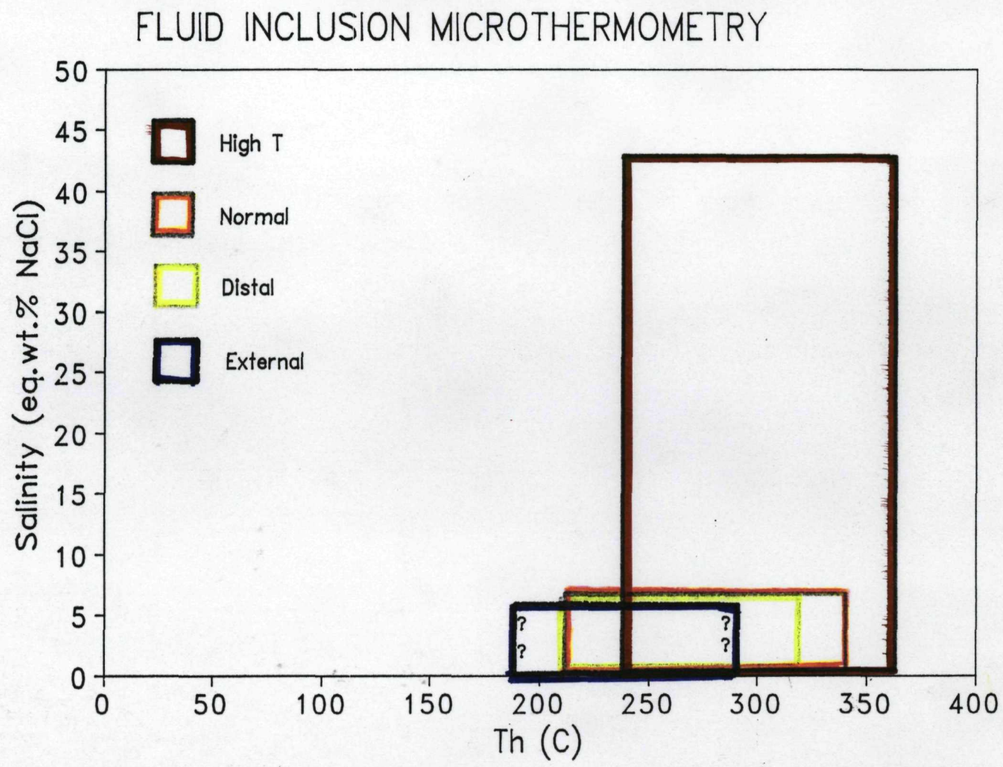
magmatic
air
air saturated
water
evolved water
crustal
50 He
Ar

Fluid inclusion characteristics. See footnote for abbreviations.

Sample	Th (l-v) (L +V)	Ave. (no	Salinity (L +V)	Ave. (no	Th (t) (L + V + H)	Ave. (no	Salinity (L + V + H)	Ave. (no	Depth (msl	Dis fel.	T Trap.
L'ESP - 2	269 - 363	326 (26)	0 -16.8	14.2 (6)	319 - 333	326 (2)	29-31	30 (2)	-2462	282	329 - 438
MLM - 3	211 - 320	249 (82)	0.2 - 6.9	3.2 (87)					-676	1306	220 - 325
NEGU - 17	257 - 340	299 (29)	1.2 - 6.9	3.6 (15)					-1599	1145	273 - 354
OF27A - 2 ST1	238 - 343	306 (87)			238 - 308	322 (8)	34-43	38 (38)	-2203	236	290 - 409
TH - 7	212 - 276	251 (34)	0 - 3.5	1.3 (19)					226	1598	216 - 278

Abbreviations:

Th (l-v) (L+V); temperature in degrees Celsius of vapor disappearance in two phase (liquid + vapor) inclusions;
Ave. (no): average and number of analyses;
Salinity: expressed as weight percent NaCl equivalent;
Th(t) (L + V + H): total homogenization temperature in degrees Celsius of three phase (liquid + vapor + halite) inclu
Depth (msl): depth in meters relative to mean sea level;
P (bars): trapping pressure in bars based on a surface elevation of 940 m above sea level.
Pressures calculated for L'ESP-2 and OF27A-2 ST1 assume lithostatic conditions; pressures calculated for the remaining samples are based on hydrostatic conditions;
Dis fel. m.: vertical distance from the felsite in meters;
T Trap.: trapping temperature in degrees Celsius.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Distal
External
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200
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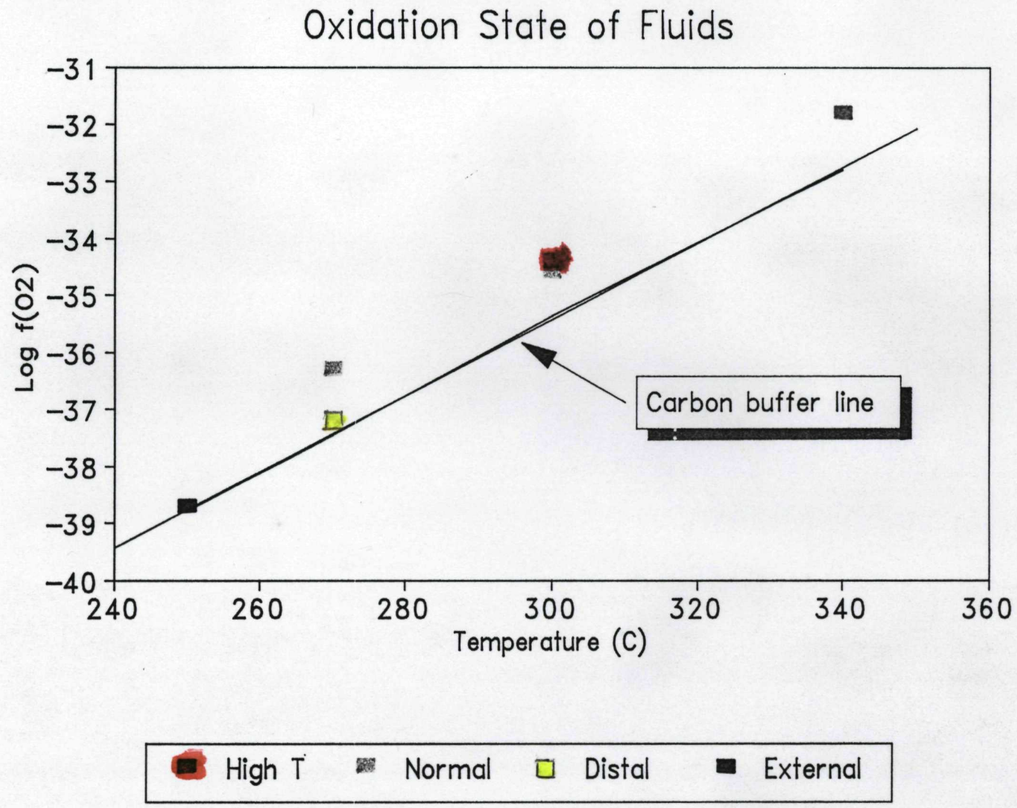
350
400
Th (C)
?
?
?
?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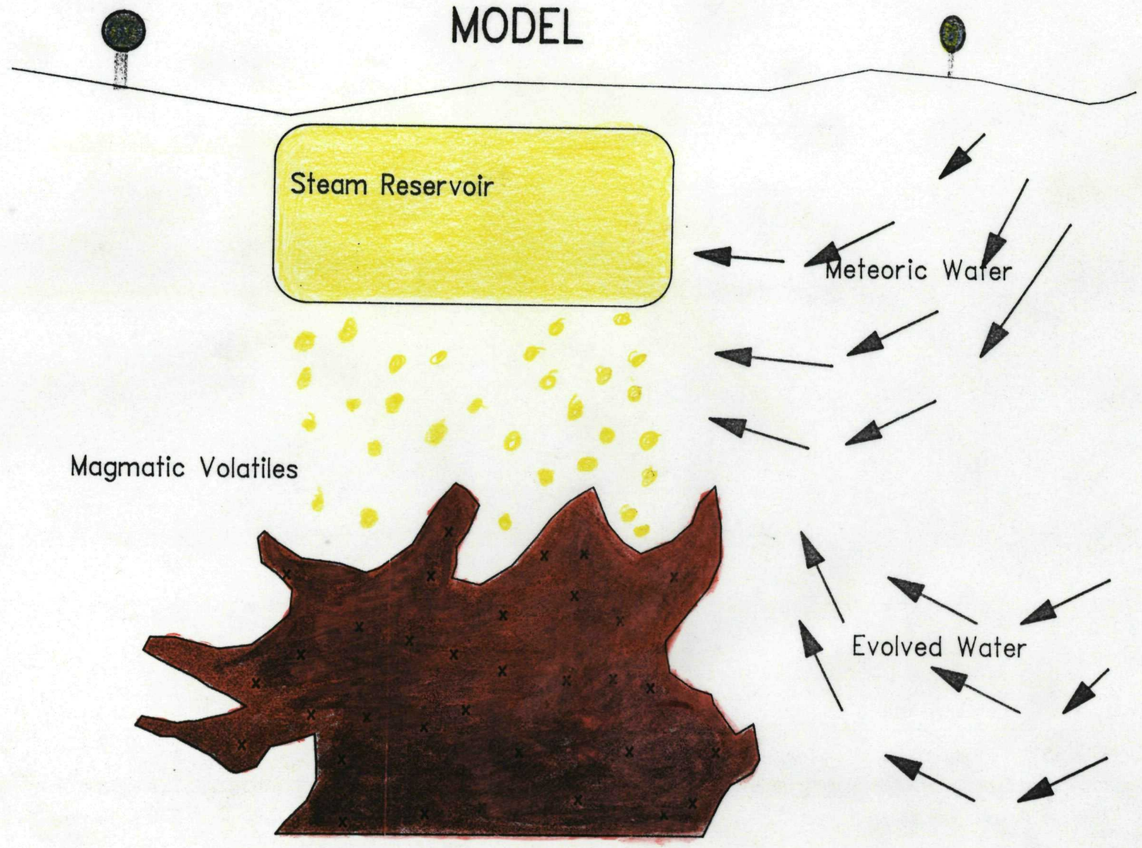
MODEL


Steam Reservoir
Meteoric Water
Magmatic Volatiles
Evolved Water