A Depth Integrated Dispersion Model Including Slope Effects

by

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Fluid Dynamics & Dispersion
Laboratory

- True depth averaged – (not section averaged)
- Finite Difference Solution by Second order upwind scheme
- Entrainment relation –

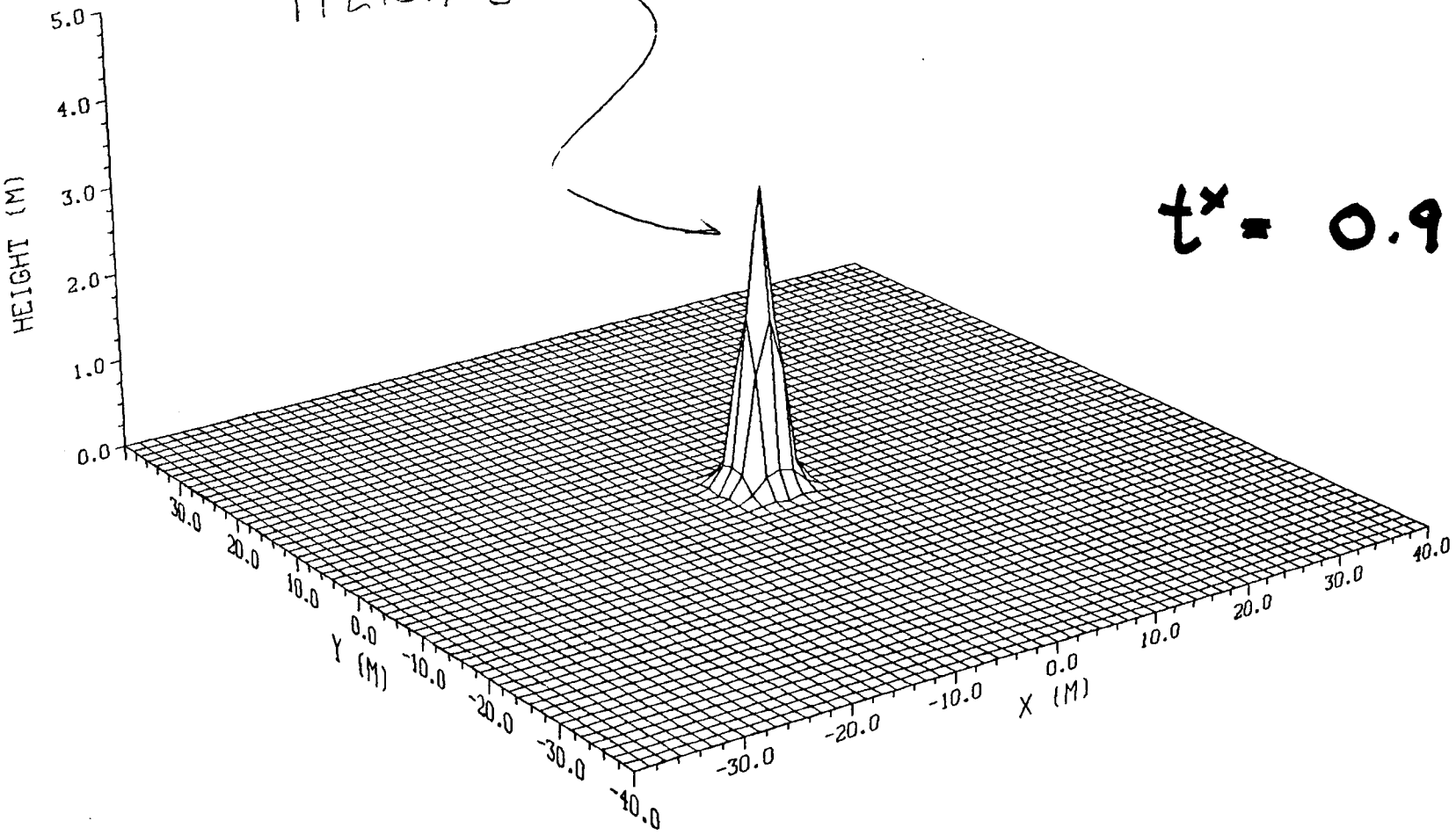
$$We = (0.12 + 0.2\,|U|)|U| + \alpha_4 u_* / (\alpha_4/\alpha_6 + Ri_* u_*^2)$$

- Emperical procedure to reduce numerical diffusion

porton trial no. 8

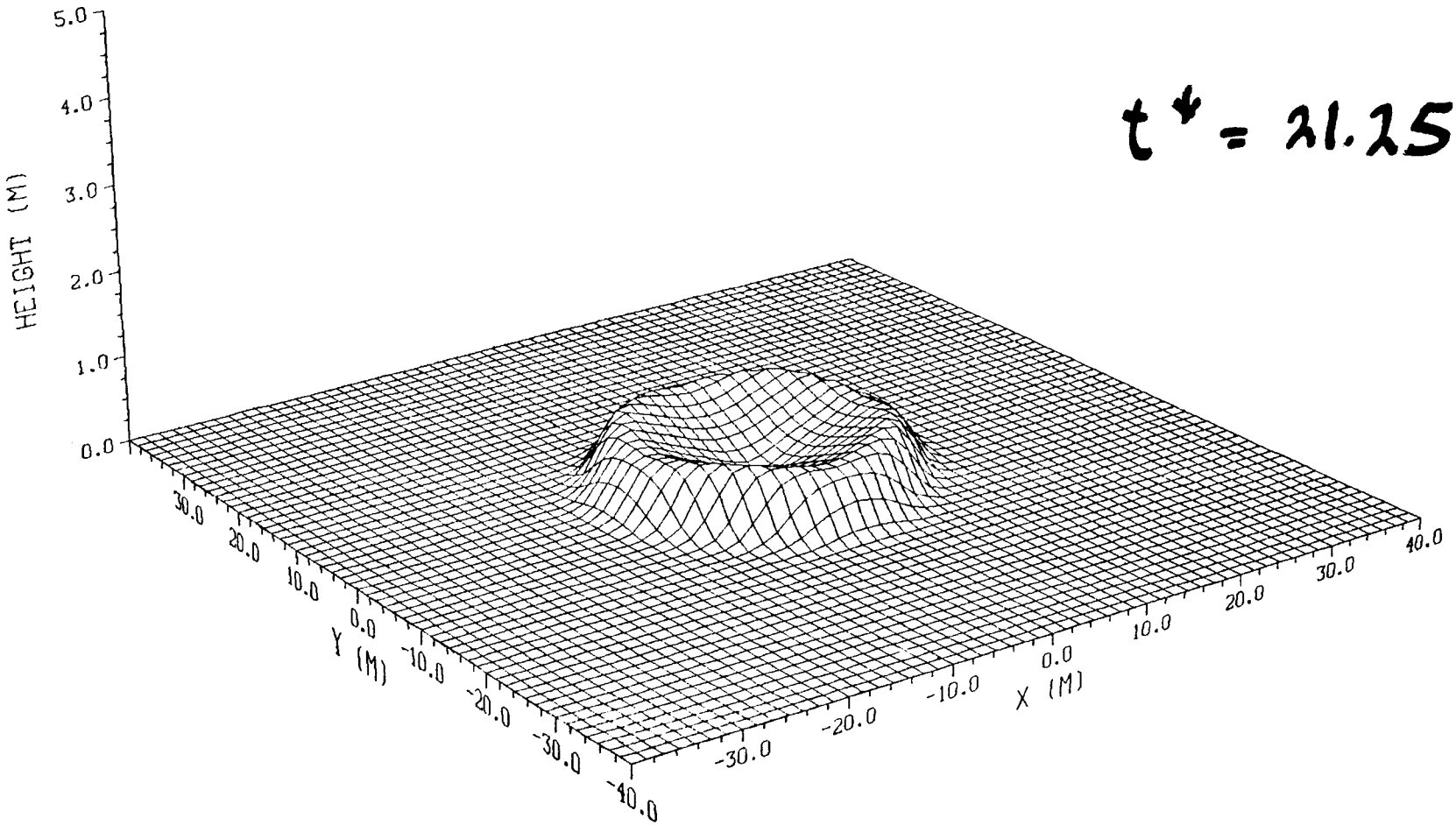
VOLUME = 40 m^3
SG = 2.0
u ~ 0-0.5 m/s

PLUME HEIGHTS



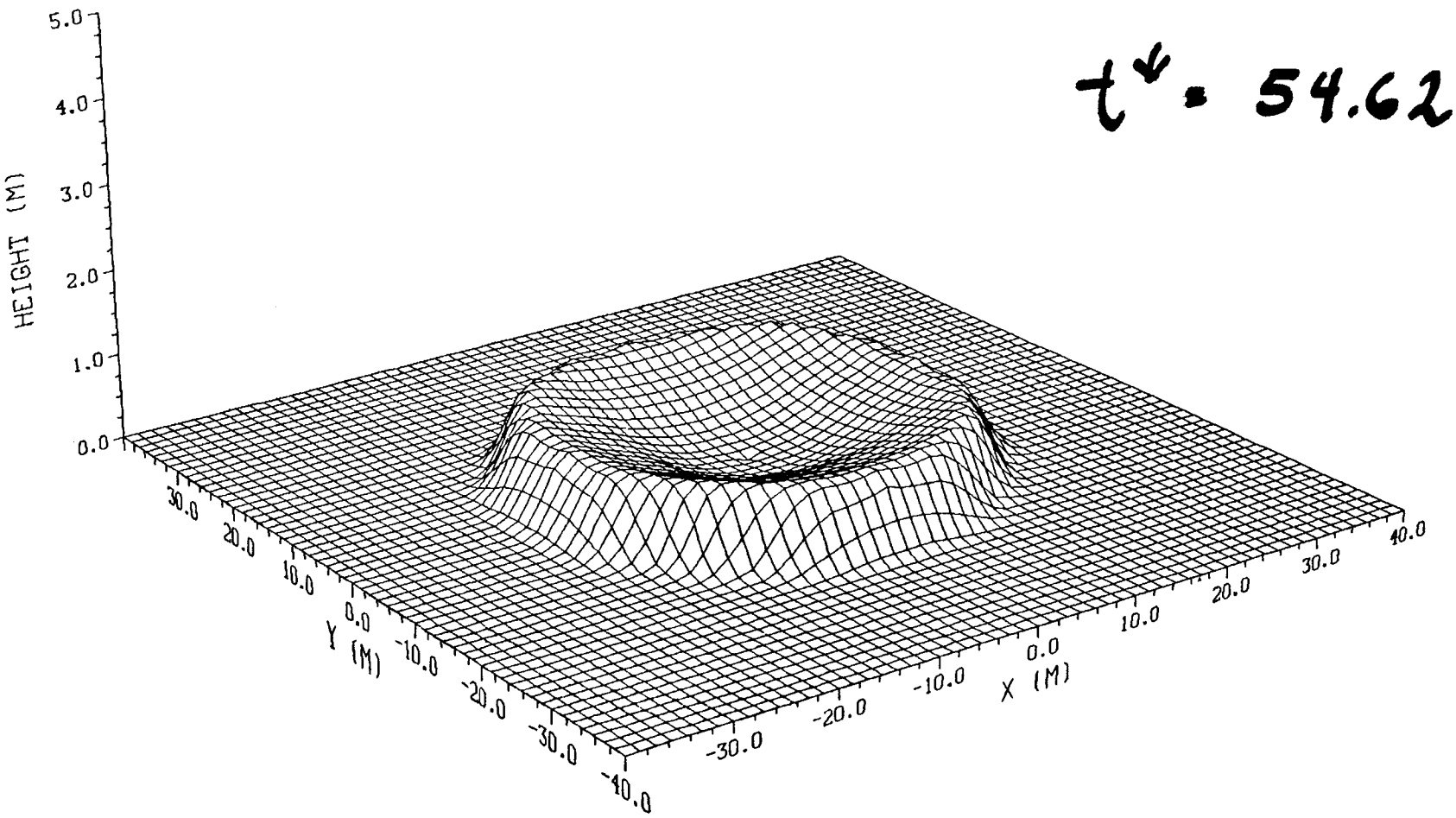
$t^* = 0.98$

porton trial no. 8



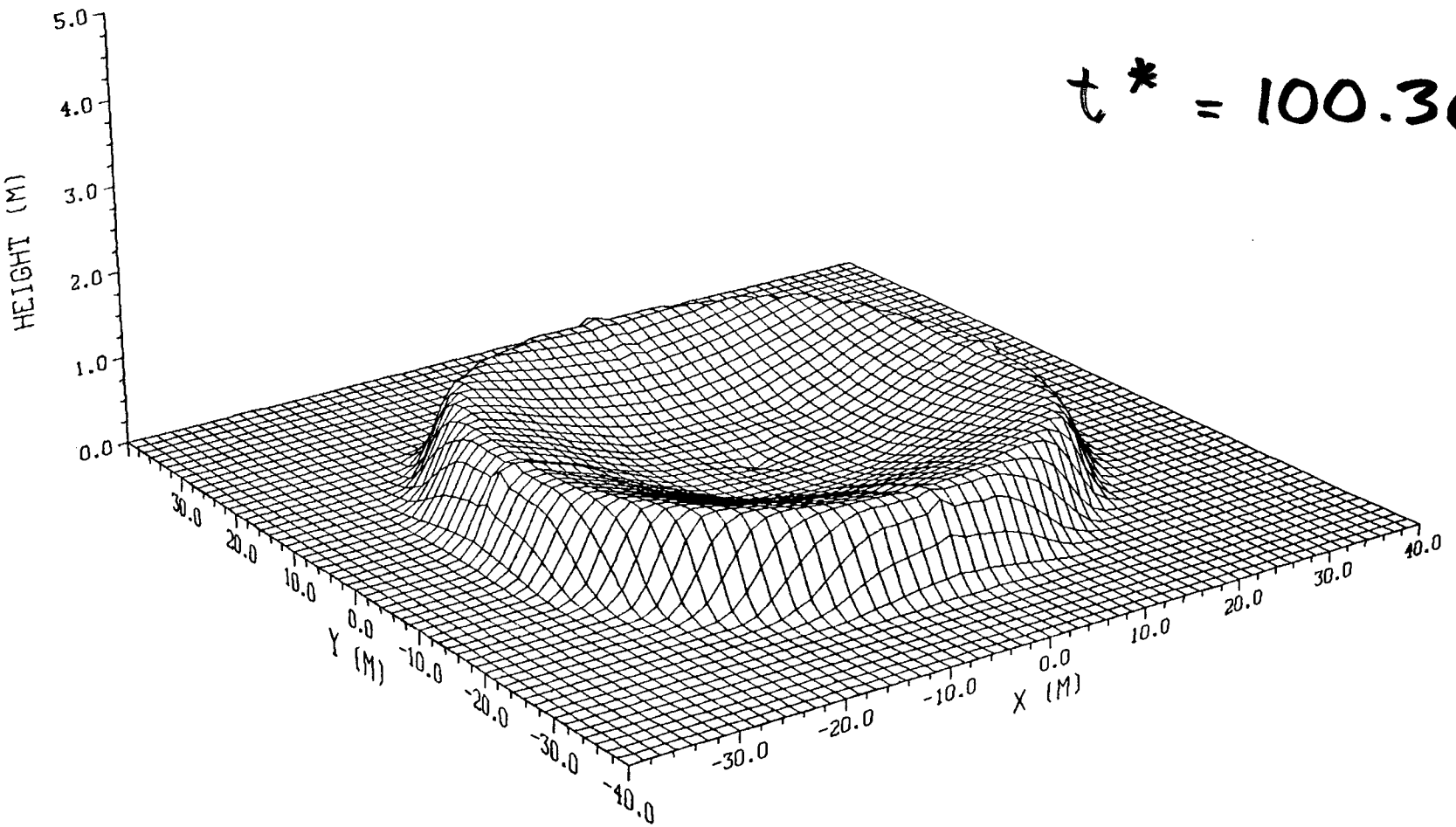
$t^+ = 21.25$

porton trial no. 8



$t^{*} = 54.62$

porton trial no. 8



$t^* = 100.36$

PLOT 2 00.37.07 THUR 23 JUL, 1987 JOB-TOHA , COLORADO STATE UNIVERSITY DISSPLA 10.0

slope1 1:20

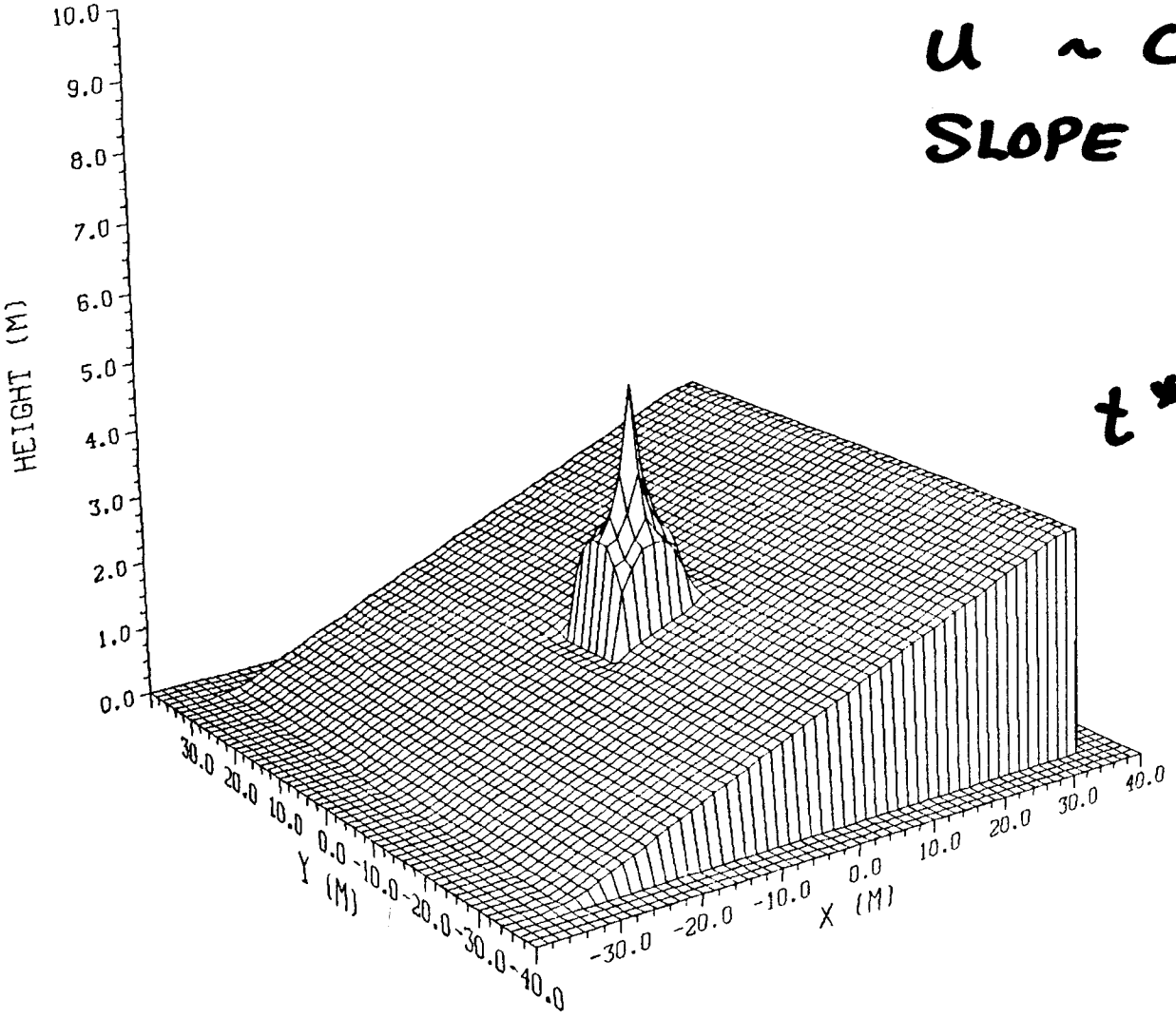
PORTON 8 - HYPOTHETICAL

VOLUME = 40 m^3

SG = 2.0

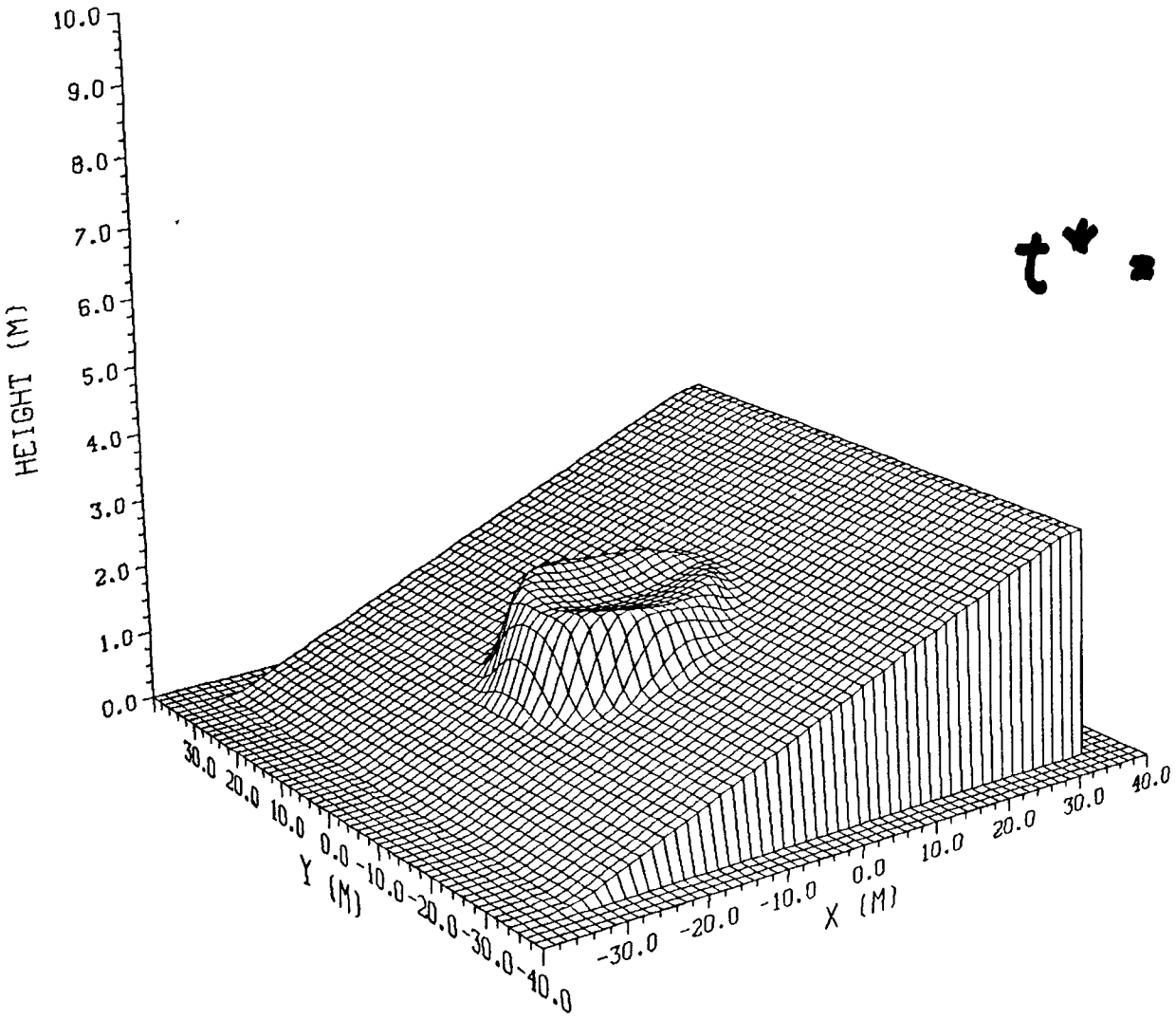
U ~ 0 m/s

SLOPE 1:20



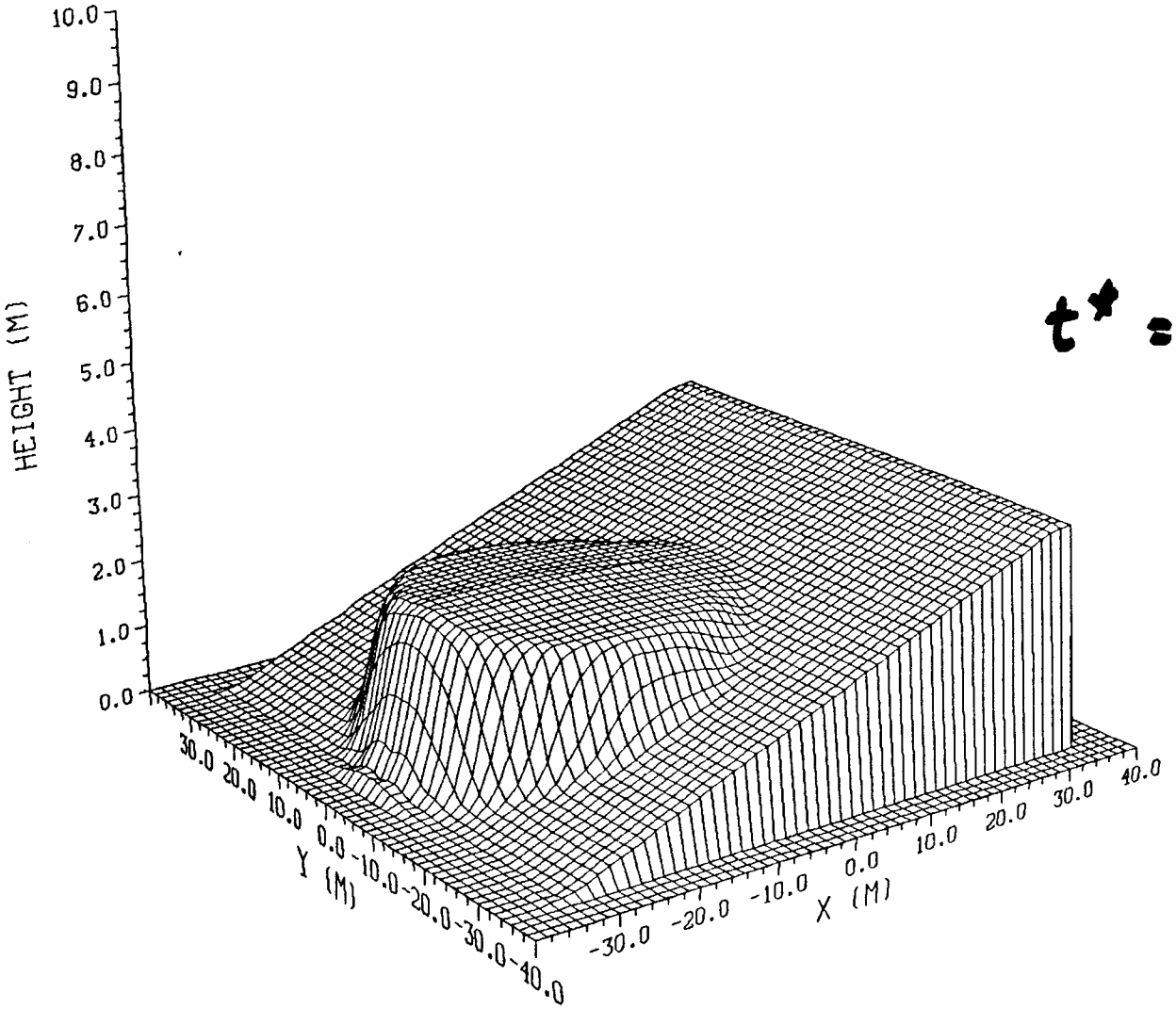
$t^* = 1.0$

slope1 1:20



$t^* = 17.02$

slope1 1:20



$t^* = 51.48$

PLOT 3 01.22.38 THUR 6 AUG, 1987 JOB-WFRM , COLORADO STATE UNIVERSITY DISSPLA 10.0

Boston 8 - Hypoth

Slope 1:20

SLOPE1 1:20

PLOT 2 23.12.13 WED 5 AUG, 1987 JOB-WFKW , COLORADO STATE UNIVERSITY DISSPLA 10.0

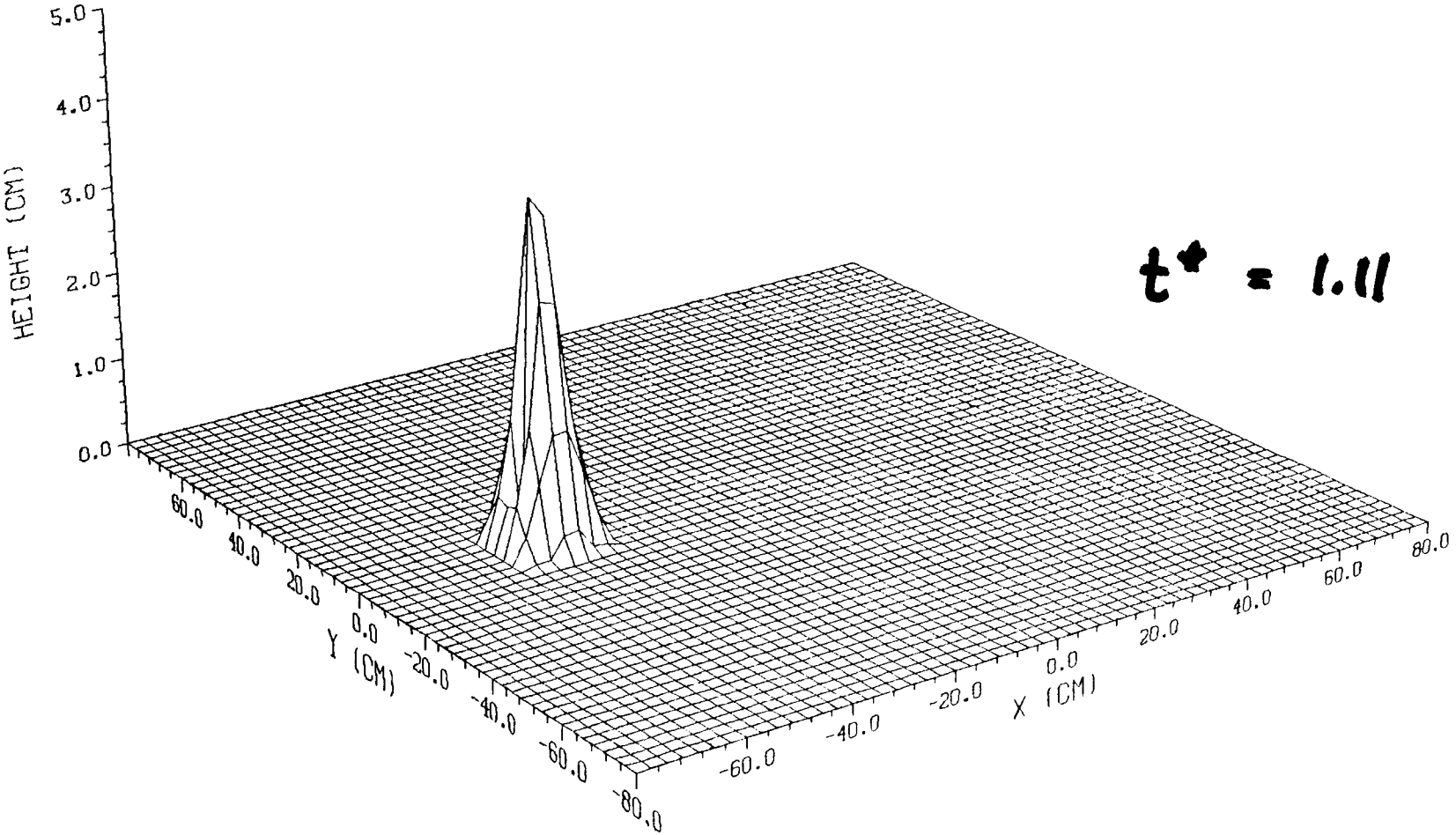
ml no. 7

MERONEY-LOHMEYER No.7
WIND TUNNEL

VOLUME = 165 cm^3

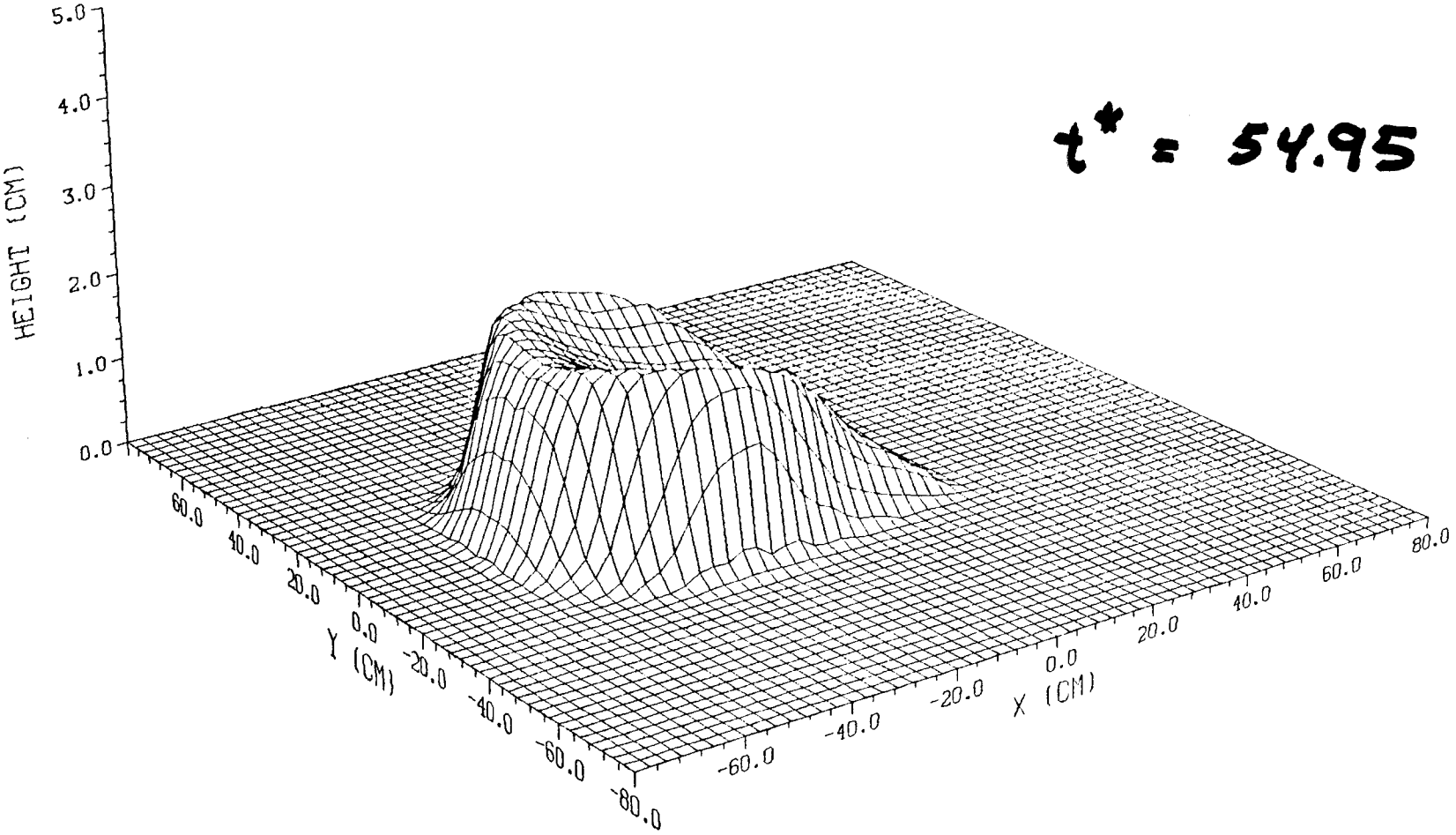
U_R = 0.2 m/s

SG = 4.17



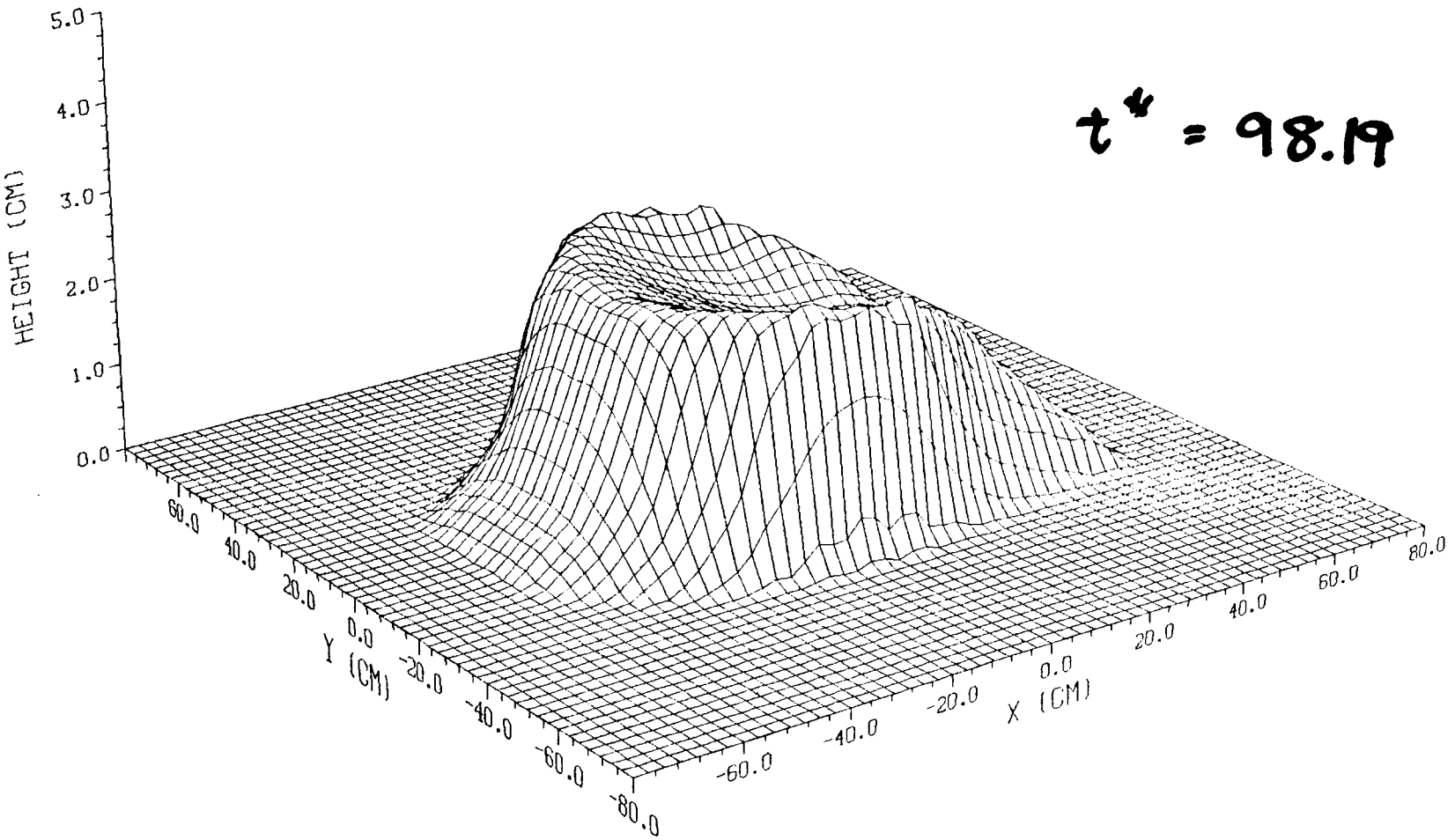
$t^* = 1.11$

ml no. 7


HEIGHT (CM)
5.0
4.0
3.0
2.0
1.0
0.0
Y (CM)
60.0
40.0
20.0
0.0
-20.0
-40.0
-60.0
-80.0
X (CM)
-60.0
-40.0
-20.0
0.0
20.0
40.0
60.0
80.0

$t^* = 54.95$

ml no. 7

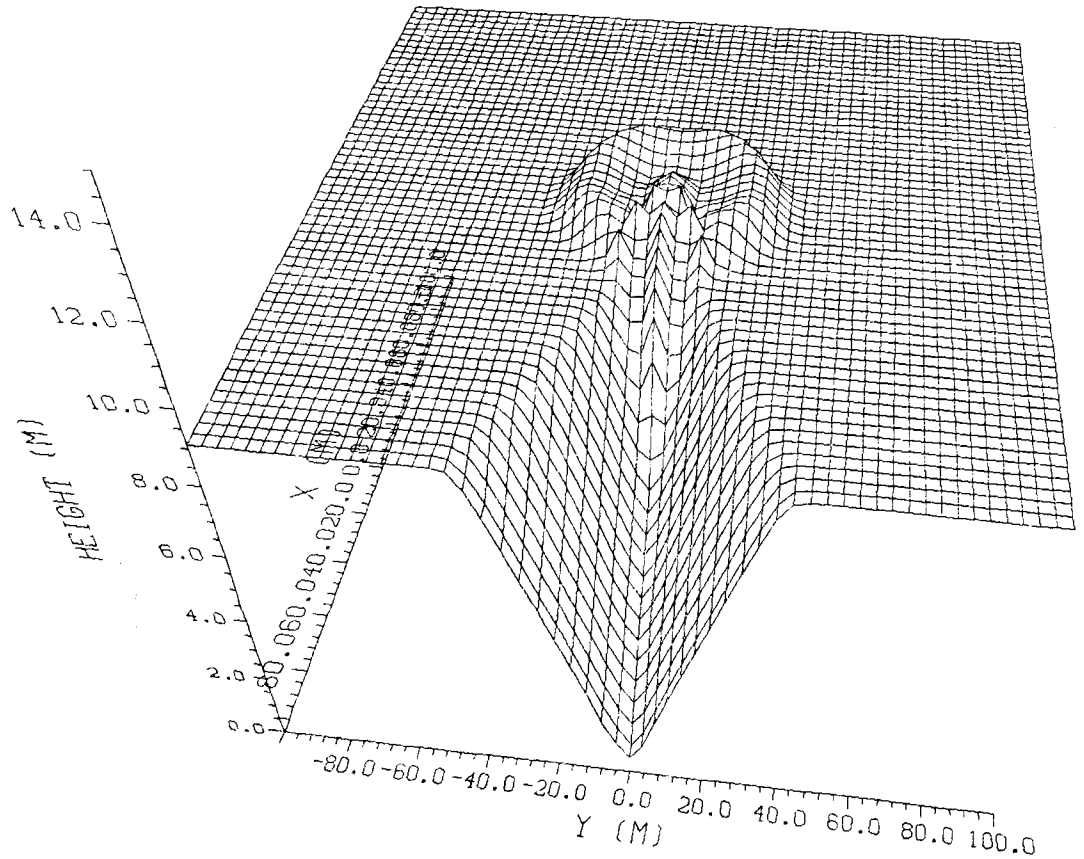

HEIGHT (CM)
5.0
4.0
3.0
2.0
1.0
0.0
60.0
40.0
20.0
0.0
-20.0
-40.0
-60.0
-80.0
Y (CM)
-60.0
-40.0
-20.0
0.0
20.0
40.0
60.0
80.0
X (CM)

$t^* = 98.19$

channel 1 1:10 1:4.14 PORTON 8

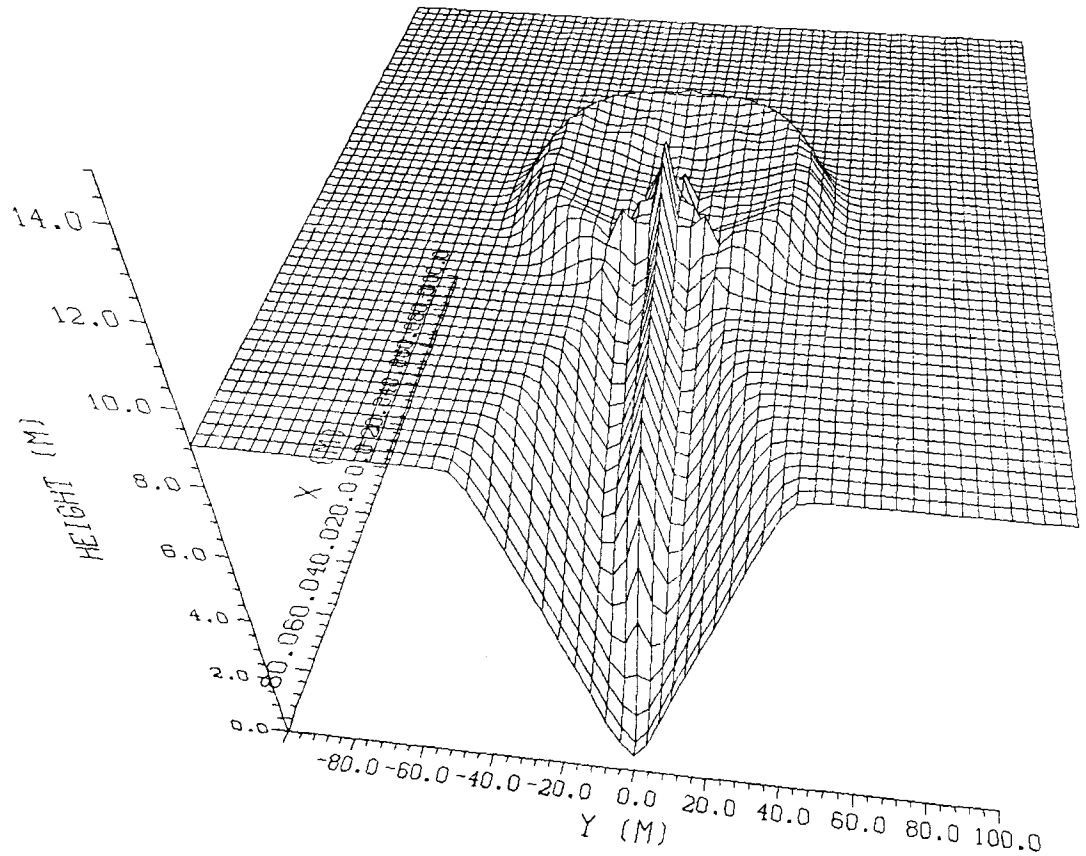
GORGE : x direction 1:10
y " 1:4.1

Volume = 40 m³
u ~ 0
SG = 2.0



$t^* \sim 20$

channel1 1:10 1:4.14



$t^* = 100$