308 --- Q199701100003
Scientific Notebook #065,
Stochastic Project

S149
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SHAW'S
PIONEERS SINCE 1831

Stochastic Project
Scientific Notebook.
Used by
Michael A. Muller
Michael A. Muller M.M.

Ross Bagtzoglou

0 78910 13932 5

account book S149

Available in 150 and 300 pages

CNWRA CONTROLLED COPY 065

All work hypotheses are described in the Project Plan.

No Units
Record Ruled, 27 Lines

Reorder number stamped on backbone of this book

WilsonJones®
Chicago, Illinois 60648

Made in Korea

In all subsequent references to BIGFLOW, version 2.0 is used.

1993

Mar 15 1993 Worked on calcfract3d-16 (in ...fractures/wrk/18). Specifically subs calcfract.f and checking for core dump (probably due to memory overwrite) in planeintersection.f, orderpoints.f. Fixed calcfract.f with new test for box-wireframe intersections. m.m

Mar 16 1993

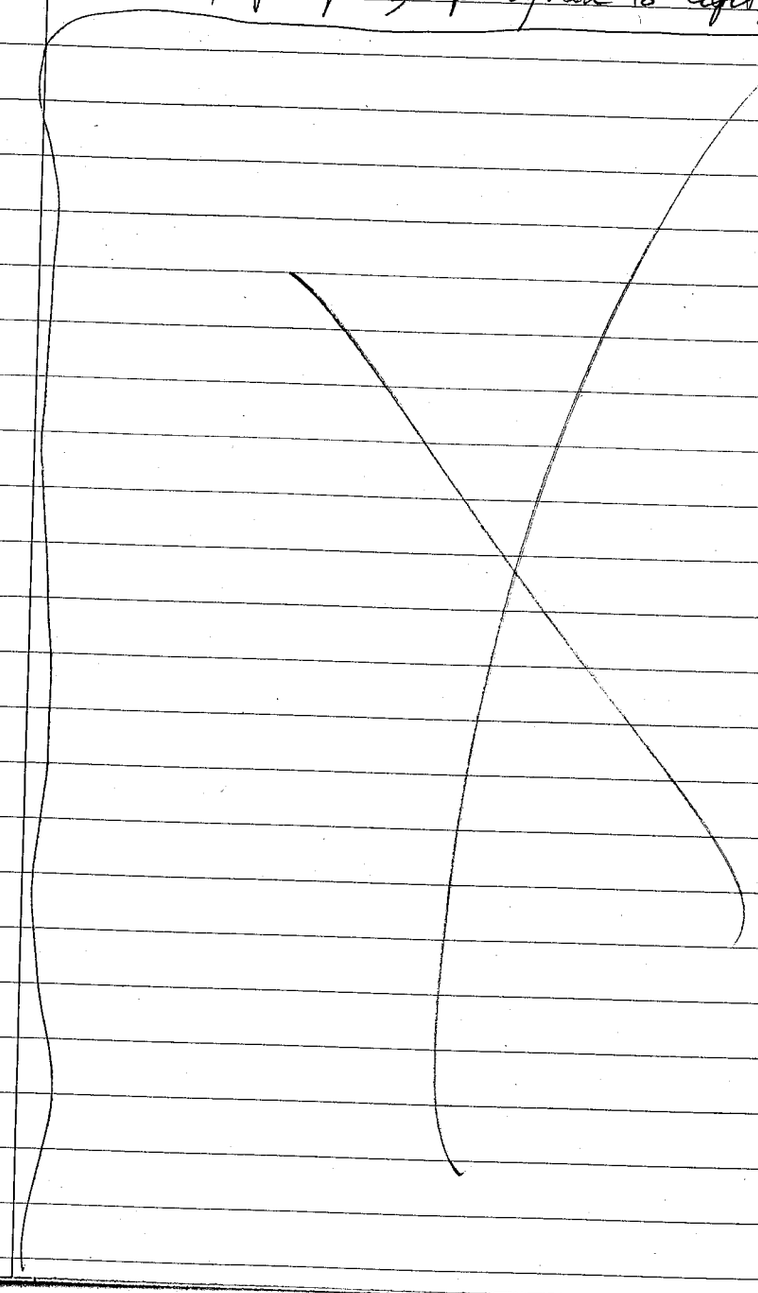
Worked more on tracking down error - I think its somewhere in linedistance.f because for 45 lines w/ .15 distance there are 900+ intersections - unbelievable. Also, when program is run w/ 0.0 distance, it doesn't crash. I started to write a comparable VAX program that would compare the line intersections. It ran w/ 600+ intersections. There has been a lot of network problems lately especially when doing long lists and telnetted from VAX → psun → gsiris. There is no problem from VAX → gsiris or VAX → psun → espsun. It must be something w/ the gateway(s). Alfred m.m. is investigating.

Mar 17 1993

Worked on linedistance on gsiris found out that was caculating intersections of lines outside of box - hence the large #'s of intersections. This is what caused the core dump because MAXFRACTS was used to define array to hold the intersections anticipating that there would be ~~f~~ just a few. Last checking line intersection output against the VAX (output in file ltest.out) results inconclusive because had to leave m.m.

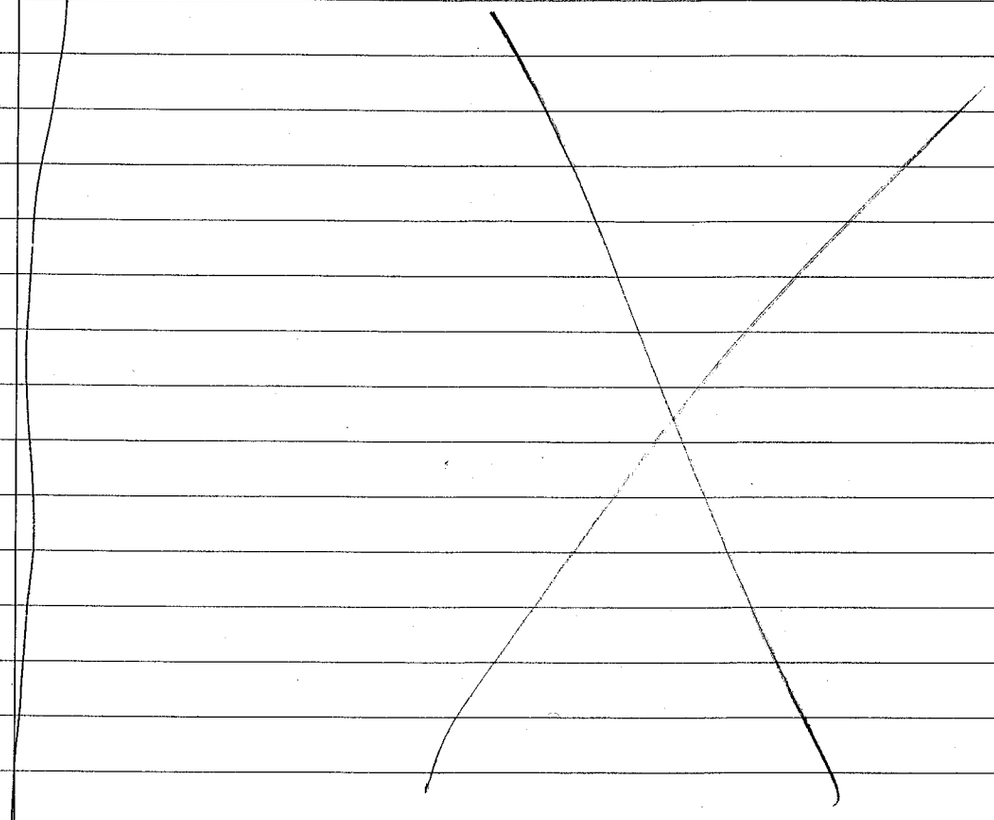
Mar 19
1993

files output agreed w/ Vax. Put in correction s/ additions to program to not call lines outside of box. Started preping program to output pictures. n.m.



Mar 23

Worked on integration of modified routines into program. n.m.



Mar 24 1993 Worked on integration of modified routines into program. M.M

Mar 25 1993 Tried some pictures on IRIS and found a few more bugs in program. Worked on fixing them. Changed program name to GLFRACT3D-18. M.M

Mar 26 1993 Tweaked program a little

mm

Mar 30 1993 Did a lot of fixing to program. But could not find a critical error which halted further modifications.

m.m.

Mar 31 1993

Found error in old part of GLFRACT3D main program. Now the integration of some previously discarded new changes can be made. mm

Apr. 1 1993

Working on integration of "new changes". mm

Apr. 2 1993 Finished with mode. ~~to~~ Making pictures for presentations. mm.

Apr 5 1993 Still working on pictures. Need to circumvent bad data lines between IRIS and psun - can't ftp. Transfer IRIS → VAX → psun ⇒ print m.m.

Apr. 6
1993

Working on printing.

m.m

Apr. 7
1993

Working on printing.

m.m.

Apr 9 1993 Still doing some printing. Need more disk space on psun; Cleaning it up. m.m

Apr. 14 1993 Still cleaning up psun. Almost finished. Space is still limited. m.m.

May 24 1993

Started to run bigflo and slim on Cray (also doing sysadmin so didn't get to do much on cray). m.m.

(was gone for awhile)

May 25 1993

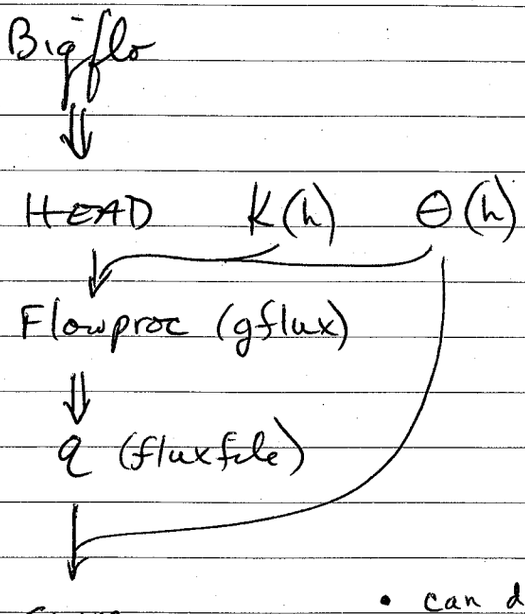
Bigflow compiled w/ one warning about CG subroutine was used in program and not from /lib/libsci.a

Slim compiled OK. Next thing is to run them: can run interactively or in batch

Only know how to run interactively and set run level / $ w/ service command m.m.

May 26 1993

Actually set service, priority pØ. and ran bigflo ~~it~~ Also used time command. ran slim Also used time command. Next is flowproc (or rather Gflux part of flow proc) - see how best to go from interactive to batch (or something)



- can do q/θ after flowproc or inside slim
- will want output files HEAD, K(h), θ(h) so can plot them. (user controlls if output or not)

M.M.

May 31 1993

Compiled and ran flow proc. Next, look at GFlux part

M.M.

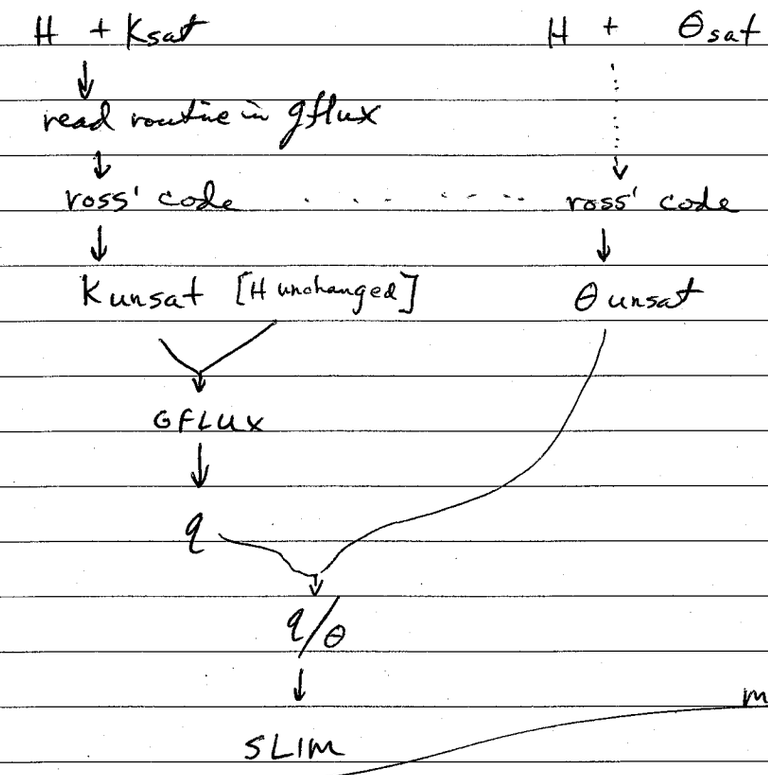
Tue June 2 1993

Ran flowproc with bigflow files HEAD-TI and KSAT, blew up. Looked at GFLUX sub part of flowproc. Updated Ross a little mm.

Thur June 3 1993

Met w/ Ross, talked about what to do. Ran flowproc, found error. HEAD and KSAT file did not have the same header FXXL 1,2,3 was different. Program should still runs with these different but it doesn't so I edited HEAD file to match KSAT file - ran OK

Here is process



mm

June 4, 1993

met w/ Ross. Discussed programs & procedures. got 2 pgms on gsiris unsat.f = calc Kunsat, from H, Ksat
flux.f = convert 3-D to 2-D (5 nodes from Bigflo to 1 node (center))

will do all conversions and testing on gsiris - ftp'ed programs and files to gsiris, ready to go

m.m.

June 6 1993 tue

worked on merging gflux and unsat.f m.m.

June 9 wed
1993

worked on merging gflow w/ unsat
talked with ross about input files and
overall pgm structure. 3 input files
for 3 sections of pgm: bigflow, gflow+unsat, slim.
Have master program run each one - probably
a nmij shell pgm. (or FTN w/ fork) mm

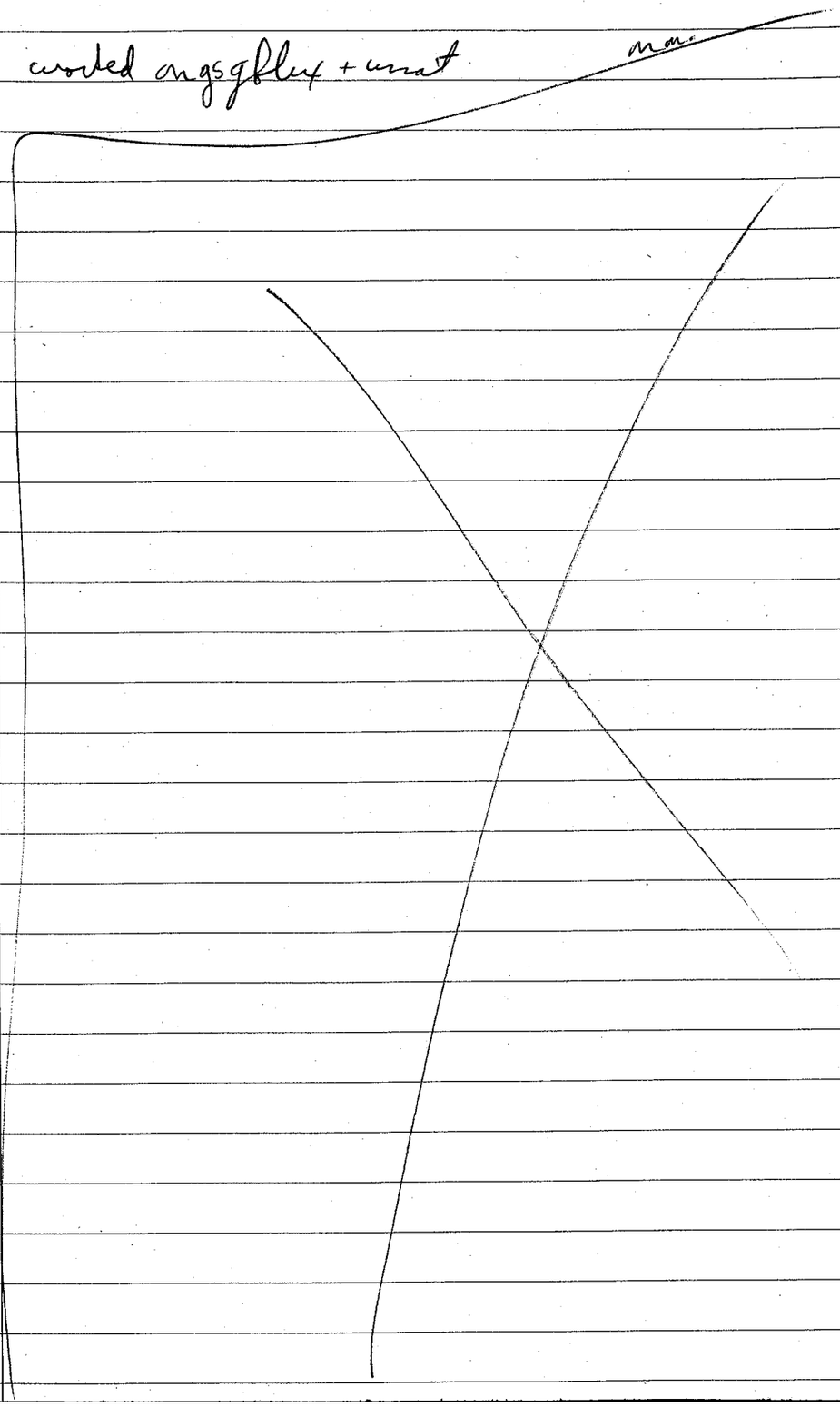
June 10
1993

worked on gflow + unsat mm

June 11 fri
1993

worked on gsgflux + unsat

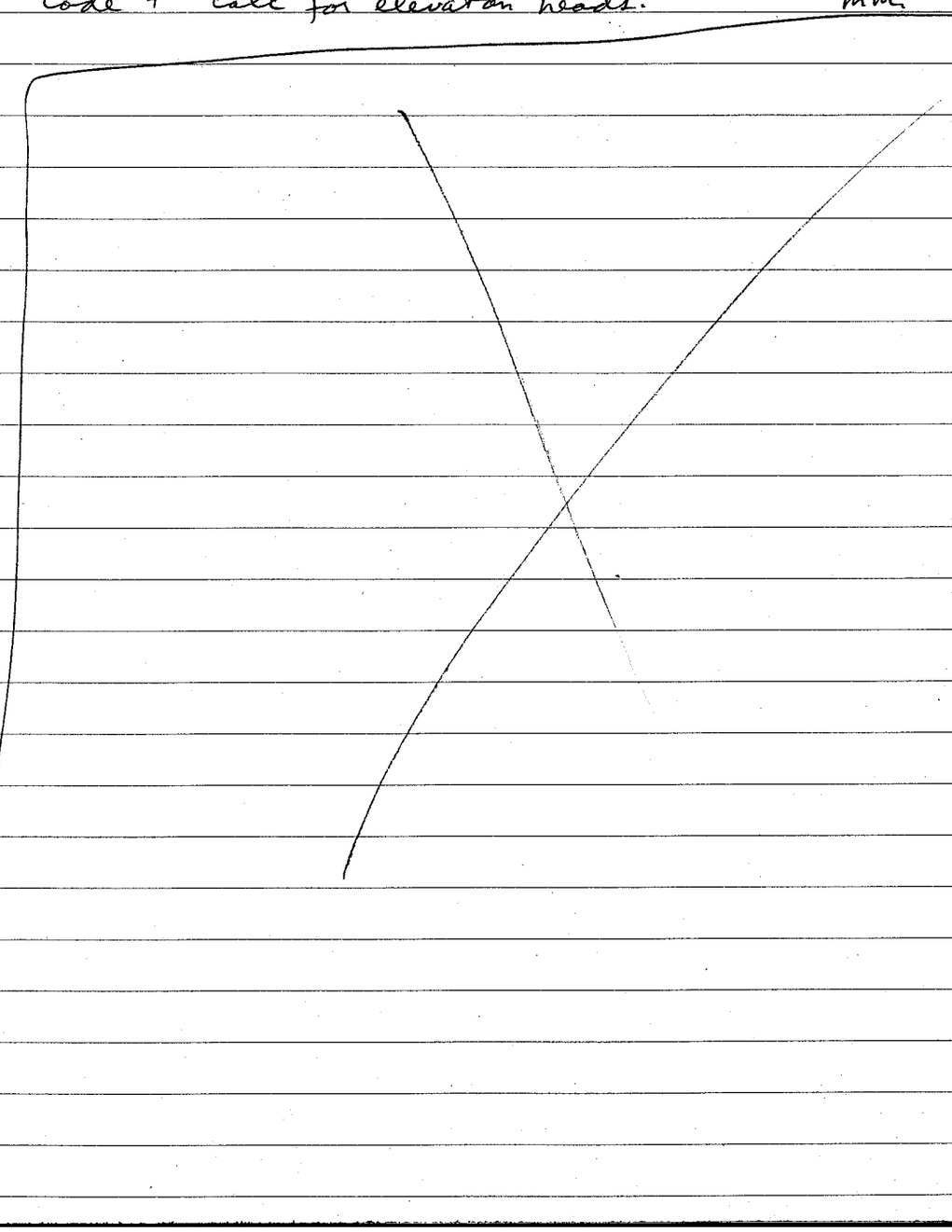
mm.



June 16
tue
1993

worked on gs, gflux + unsat on gsiris
integrated in-gflux w/ unsat.f pgm
almost complete. only needs const.-or-file
code + calc for elevation heads.

mm.



June 17

stocastic hrs: Oct 1 – Mar 500 hours 6 mo = 26 wks

worked on flux m.m.

June 18
Fri
1993

Meeet w/ Ross, worked on flux. m.m

June 21
1993

Worked on flux. Small meeting w/ Ross. Still need to put in gflux part (left it out by mistake) and then need to test. Also, need to meet w/ Rachid.

m.m.

June 22
Tue 1993

Q: in complete code, after BIGFLO is run, is memory freed? It should be - find out.

Also, make master program check that input files are compatible (that is, that the values are the same)

Finished 1st draft of flux. Includes gflux. Did not meet w/ Rachid - he is having severe back problems.

Set meeting date for Thur. 930 AM. m.m.

June 24

Met w/ Rose & Rachid all morning. Discussed flux and TBM and total pckg. will meet w/ Rachid Fri to do MKPROP (TBM) and finalize codes for run. If keep all files, will need about 1.5 Gb of disk! Avail as of today, cray in /usr/tmp has ~1.2 Gb. m.m.

June 25 Fri 1993

finish flux.f. worked part on main.f and some on mkprop. memory on cray is ok - each proc. started by system is separate and controls its own memory. m.m

ne 28, 1993
on

Worked w/ Ross & Rachid on mkprop and discussed turn3d (TBM) code and what is needed. Almost finished putting things together m.m.

June 29
1993
Tue

Talked w/ Ross + Rachid. Mostly wait for Rachid to get random seed working consistently between realizations. After he finished, I finished up mkprop which calls turn3d to do the files. I finished it late in the day and ~~are~~ doing final testing m.m.

June 30
Wed 1993

worked on finishing mkprop and tbm. GSCRIS had some problem w/ mkprop which caused time to be lost. It centered around K2 and the file not being closed. CRAY doesn't use CALL SYSTEM(char) to spawn/fork. It uses ishell(char) and the man pg. say to run the master program (now called suflot) with pshell

like this: % pshell suflot.x

M.M.

July 1
1993 Thu

Talked w/ Rachid & Ross about turn3d (TBM) code and we agreed again to use a different seed for every file output by turn3d. Turn3d must be called once for each new file that it creates. Settled on interface between mkprop & turn3d. moving everything to Cray to compile and run. missing NEWCOM so big to not compile. Wait till tomorrow.

M.M.

July 2, 1993
Fri

Finalized code. van test case but turn1.dat and INPUT1.dat had different size parameters so sim did not ~~run~~ run. Will run on Tue

MM

July 6
Tue 1993

Ran bigflow and flux/mkprop w/ same param. Bigflo very sensative to deviation in tsat. DEV > .001 crashed bigflo. so, time was spent on finding limits of other vars: alfa, tsat, beta, vgn, Hdry. Also, dump/crash of program produces trace w/ line #'s. ~~The~~ Tried to get cf77 to output listing to correspond but could not — even after calling Inel who suggested -Wf"-es" → this only produced a symbol table.

M.M.

July 7
wed 1993

Finished checking out limits on inputs to Bigflo. It seems that tsat is OK and was probably bombing Bflo because some values were < tHdry which ~~should~~ is wrong. Also, new distribution output from TBM (turn3d) codes was discussed and implemented so that output/input files could have either lognormal or normal distributions. Flags put in in1_mkprop. While easier to put in INPUT1, it was decided that these #'s would be confusing there & since Bflo doesn't even know they exist and doesn't use them. M.M.

July 8
thu 1993

worked on TBM lognormal and changes to suflat to incorporate recent changes. M.M.

July 9
Fri 1993

worked on slim and getting VEZ into same fmt as output of flut. Worked on TECPLOT and making output files: HEAD, VEZ, plstat compatible w/ TECPLOT. 3-D is out because not purchased. worked late

M.M.

Jul 12
Mon 1993

Same as Fri. worked late. tested .postscript output: OK.

M.M.

July 13
Tue 1993

Clean up code some. Start work on "smarter" program - more error checking. m.m.

July 14
Wed 1993

Worked on misc. parts of code. m.m.

July 15
Thur 1993

"smarte" code, cut for plstat. (slim) m.m.

in2-head
in-ksat
out-kunsat
out-tunsat
out-thead (total head)

} contour
[middle of 3xNxN]

VEL } BlackWhite vecplot
} also VMAGnitude contour

in tecplot:

V_1	i
V_2	j
V_3	Vel_x
V_4	Vel_y
V_5	VMAG } → contour

to get VMAG; $V_5 = SQRT(V_3^2 + V_4^2)$
GO ALTER
VMAG

plstat file: $\bar{x}$, σ
→ make 2 files

file 1	file 2
i	i
j	j
$\bar{x}$	σ
contour	contour

or 1 file
i
j
$\bar{x}$ }
σ }
and 2 contours

8 color contours
1 bbw vec plot : can overlay VMAG contour + Vel Vec plots.

July 16
1993 Fri

worked on "smart" code. discussed possibilities w/ Ross and Rachel. Met w/ Ross and Rachel to discuss layering of property files. mkprop calls TBM once for ea. layer of file and appends them to get a layered property file.

m.m.

July 19
MON 1993

Worked on suflat "smart"

m.m.

July 20 1993
Tue.

work on finishing "smart" pgm. , update Ron + Rashid then work on old pictures + Div 15 stuff. Emerge Tue of next week. m.m

July 21
1993 Wed

Put finishing touches on suflat, mkprop, slim
M.M

July 22

worked on testing checks/smart in suflat - small bug. Also worked on layer stuff for mkprop

m.m.

July 23
1993 Fri

finished test of suflat. worked on layering bug in tbm. nz in input sub and nzlayer. fixed.

m.m.

Aug 2
1993 mon

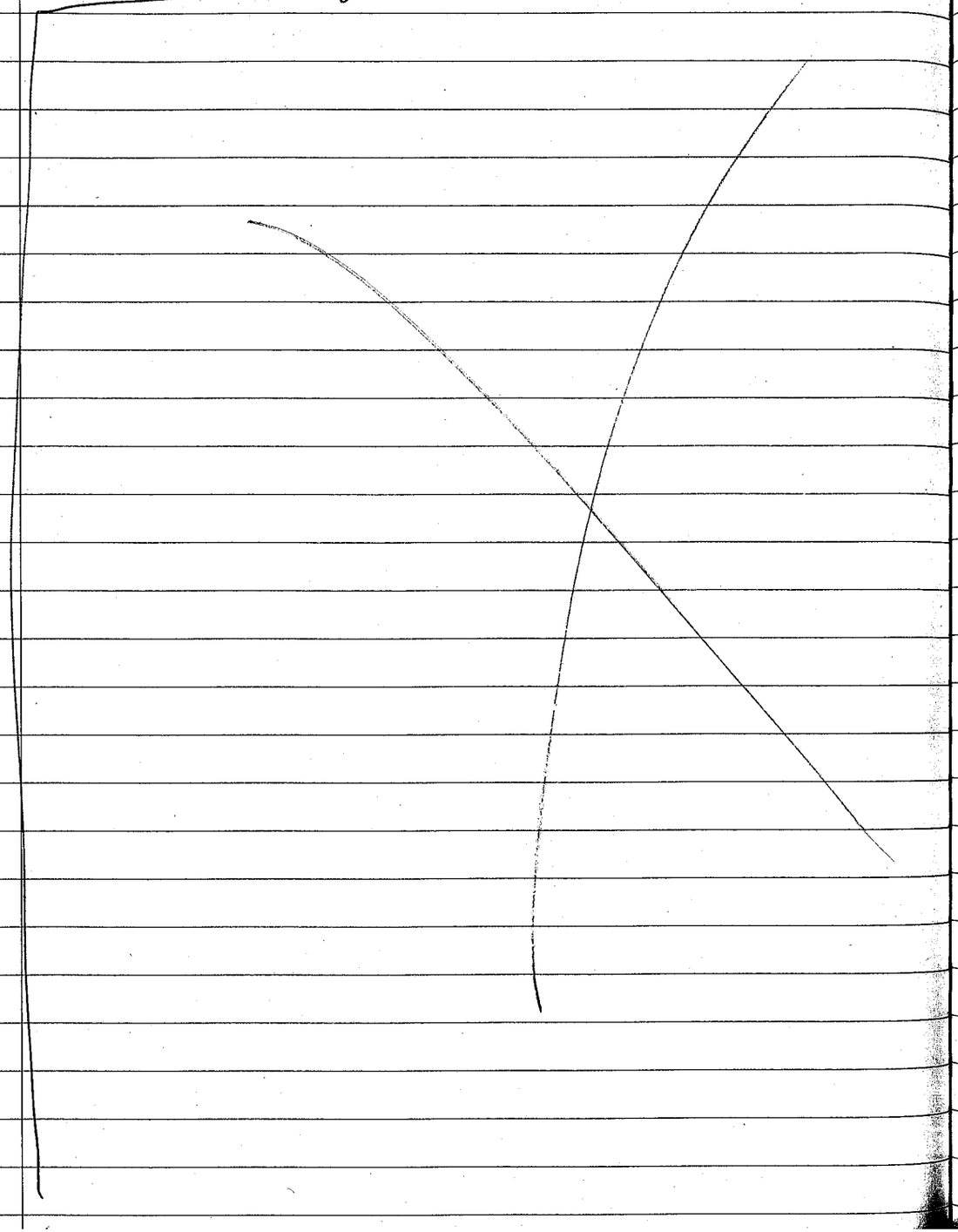
"Short" meeting to discuss changes to int-mkprop. INI-mkprop ~~to~~ now has correlation coeff. added so that tbm can make layers correlated
Ian working on WAIS for SDDAS (div. 15) this week m.m.

Aug 16
1993 mon
I'm Back

Meet w/ Rashid + Ross. They are working on setting up layers. Helped some w/ code. (mkprop). m.m.

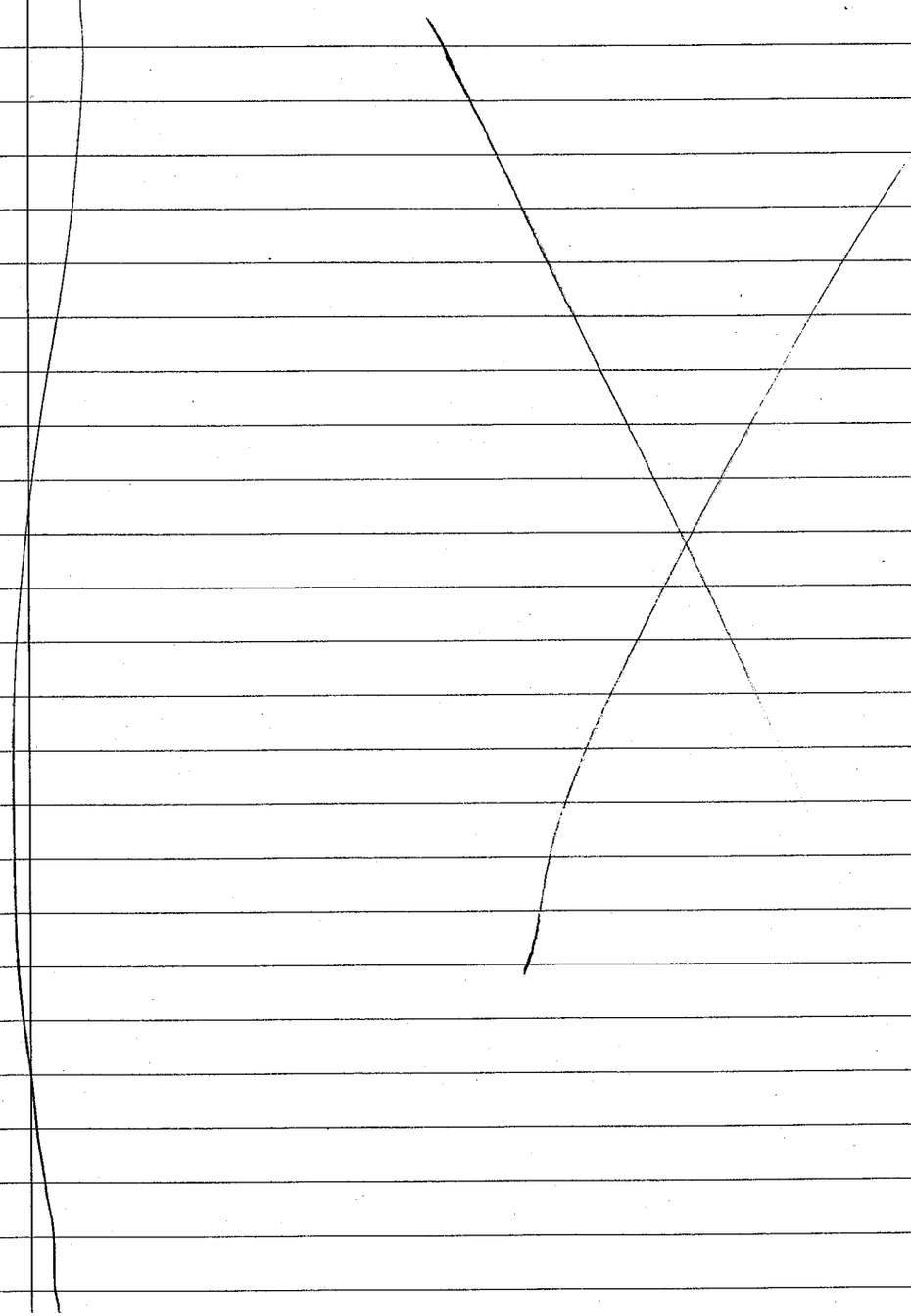
Aug 17
Tue 1993

Same as yesterday + some teeplot M.M.



Aug 18
Wed 1993

Same as yesterday. A lot of checking on mkprop with more help/instruction from Rashid. M.M.



Aug 19 Thur. 1993

Same as yesterday + finally finished properties and started BIGFLO run. m.m.

Aug 20 Fri 1993

BIGFLO run did not work out quite as expected, there were some negative heads. Ross checking on this. Tidied up programs and directories ~~some~~ m.m.

Sep 1
Wed 1993

New project #, new part of proj.
meeting w/ Ross about new direction
(KSAT + Head files generated by
neural network - Steven Seida in DIVOS)
going to run BIGFLO etc and check
to see if new neural net result
compares to "conventional" results. M.M.

Sep 2
Thu 1993

Meet w/ Steven Seida and obtain
neural net KSAT & HEAD files.
Discuss procedures w/ Ross.
Write programs to convert files from
column format to Bigflo fmt. Actually,
just modify programs that come w/
WIPP site data. M.M.

p 3
ri 1993

~~continue~~ finish modifying WIPP programs.
Convert BIGFLO to work on Goliath.
needs FT7-N125 to use up to 25
continuation lines.
Make a few test runs. Get bad
outcomes. ~~Appears that~~ m.m.

Sep 6 = Holiday

Sep 7
Tue

Worked on Bigflo and got everything
OK with tests. Then tried
BIGFLO with regularly spaced (converted)
boundary condition file calculated from
fields.dat & grids.dat. Output
had trouble converging. When it
did converge, output had negative
heads and some very large heads.
Data seen as being difficult to
handle by program m.m.

Sep 8
Wed 1993

Explored data and BIGFLO output further. Did not achieve a satisfactory solution. Made plans for future.

M.M.

Sep 9
Thur 1993

Continued plans, came up with list. Also on list to do old fracture plane plots.

list: do bigflow on neural net result.
if ok, try boundary condition on it
try mean of neural net file
try 940-910 head?
use NBC with given fixed head on left side
(now have ~~flow~~ variable flux)
if works, then check flux calcs.

Started on this

M.M.

ep 10
1993

mean-neural-net
↓
neur2dat.x (cvt neural fmt to fields.dat fmt
↓
mean.fields.dat
↓
interp.x (cvt from irregular small grid to
same data on regular spaced grid
need: grid.dat = spacing of data on old grid
grid.dat.new = " " interpolated data on new"
↓
mean.fields.dat.new (really mymean.dat.new)
↓
dat2big (cvt transmissivity to conductivity
↓ to make KSAT file) (also heads)
ksat.new head.new
↓ ← + (INBC,1
bigflo.x

m.n

Sep 20
mon 1993

- worked on making the mean neural net file suitable (was missing top line)
- also worked on neur2dat.f
- also met w/ Ross to review future

m.n

221
1993

met w/ Ross, went over what to do.

1) bigflo w/ mean-neural + INBC from 940 → 910 in INPUT 1, all other = ∅

2) if ~~a~~ work or not work, scale mean.neural from min/max (~E-3 to ~E-11) to not so big a difference (ex. ~E-5 to ~E-9) and keep at it until bigflo works

3) then try increasing 6.

1) HEAD looks good E-3, E-4. M.M.

Sep 22
Wed 1993

Orig KSAT (fields.dat) goes from
1.E-11 to 9.E-3
mean T file (neural net) goes from
5E-9 5.E-5

org means dat from fields.dat

mean+ 940→910 "INBC" 403 timesteps to converge
HEAD.T0 looks good min max head 395, 1230.

Ksat (org) fields.dat 940→910 INBC 398 timesteps to converge
head -8.E3, 7.E3

mean + INBC.org file 366 timesteps to "
head 900, 8E+9

mean w/ b=770. (dz=365.) +940→910 "inbc"
~400 timesteps, head=-2E3, 4E3 min max

Sep 23
Thur 1993

meet w/ Ross, worked on some more
bigflow file stuff. m.m.

Sep 24
Fri 1993

KSAT w/ DX DY 250 x 250

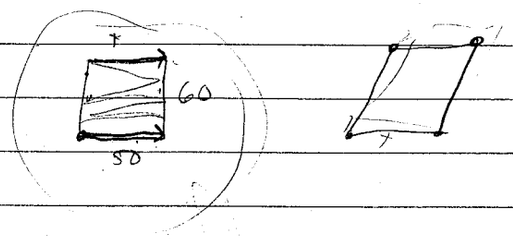
b = 770.

BIGFLO
Program blew up, div by zero

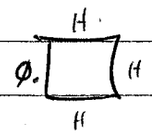
set b = 7.7, then ran, div. by zero. m.m.

Mon Sep 27
1993

moved file to cray
DX = 250 size = 100 x 120 const input → div. by zero
const input KSAT.mean 50x60 bigflo works, HEAD.TO
INBC.org + KSAT.mean", bigflo same as on goliath 900,8E+9
between 910 and 940

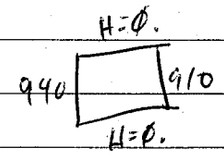


on cray, re-done INBC



+ HEAD.mean or HEAD.good

if INPUT1 X_0 INBC = 1 = 940 ~~to 910~~
X_L INBC = 1 = 910 then



(11) 11 ✓ MINMAXh.x = .139, 930.8326

2 top = flux = Ø,
bot = flux = Ø.

if INPUT1 X_0 = 11 = Ø. from file
X_L = 11 = from file
✓ minmaxh.x = .139 930.8326 — why?
how can this be? m.m.

22
↓
0

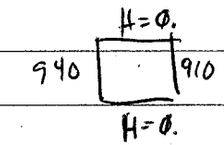
11

Sep 28
Tue 1993

1) 1 1 940 910 INPUT
11 11 → INBC 0 0
2 2 0 0

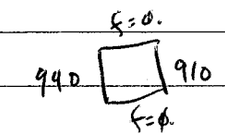
min max head .139 930.8326

2) 1 1 940 910
1 1 0 0
2 2 0 0



min max .9252 940.

3) 1 1 940 910
2 2 0 0
2 2 0 0



min max 910 940

4) 1 22 940 910
11 11 0 0
2 2 0 0

min max -4.E13 922.97

5) 1 1 940 910
1 1 0 0
2 2 0 0

min max 0.925, 940.

6) 11 11 → INBC = Ø.
1 1 940 910
2 2 0 0
0 0

min max .139, 930.8326
INBC = 0

7) 11 11
11 11
2 2 0.139 930.8326

m.m

8)

22 1		0. 0.
1 1		0. 0.
2 2		0. 0.

min max 899.7524 7.96E9

9)

22 11		0 0
11 11		0 0
2 2		0 0

min max hed 899.7524 7.96E9

LTYPE = ±12 ⇒ LBCTYP=1

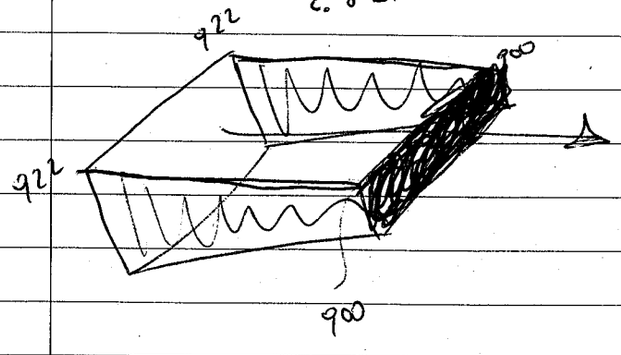
→ " =0, =11, =22, =±12 LBCFIX=1

10) 22 22 INBC

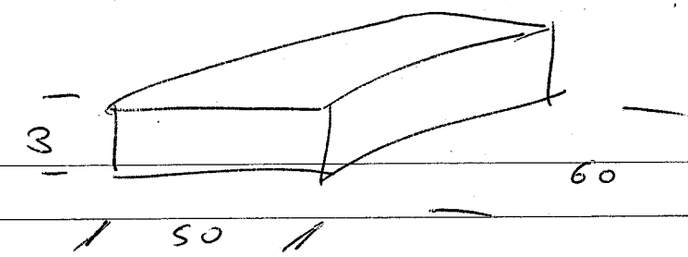
22 22

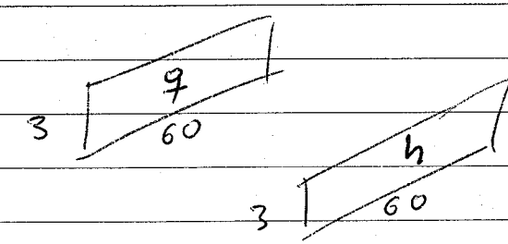
22 22

2.8E+21 2.81E+21

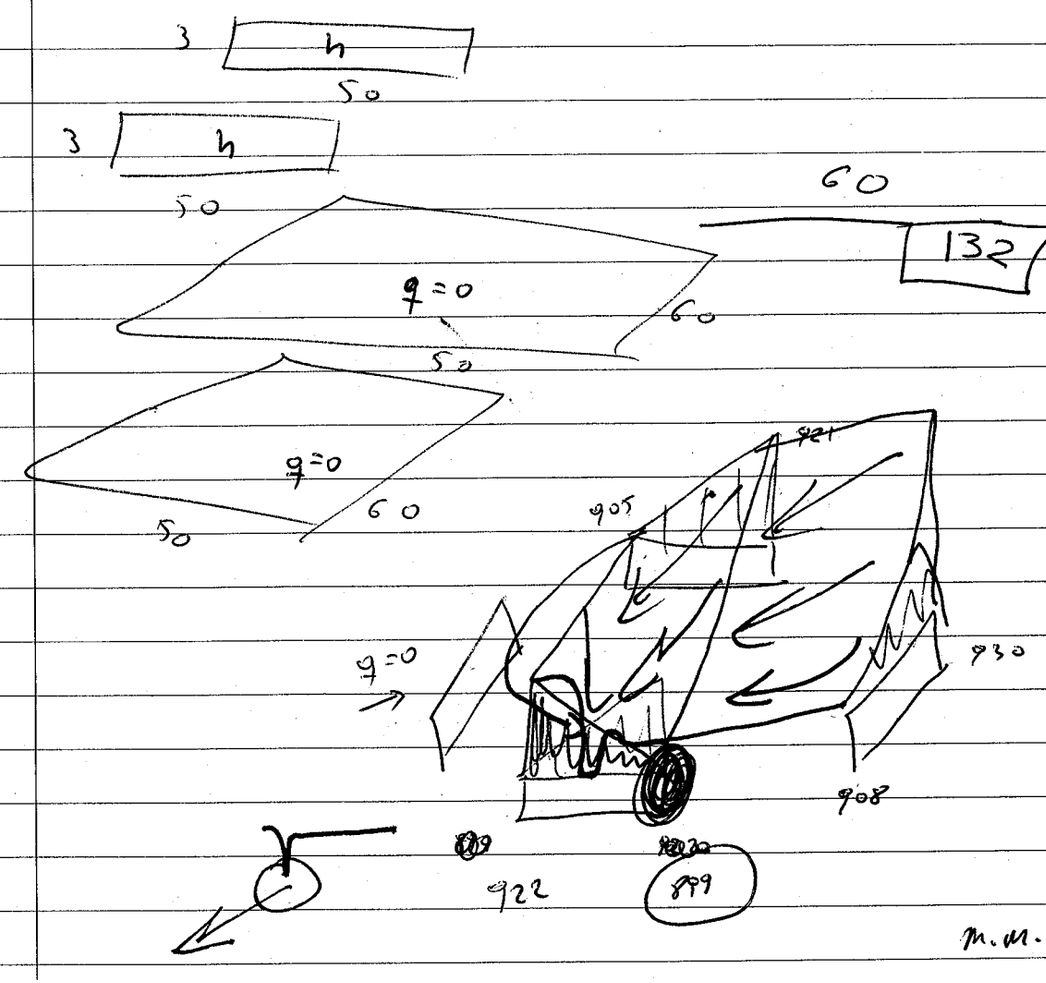


M.M



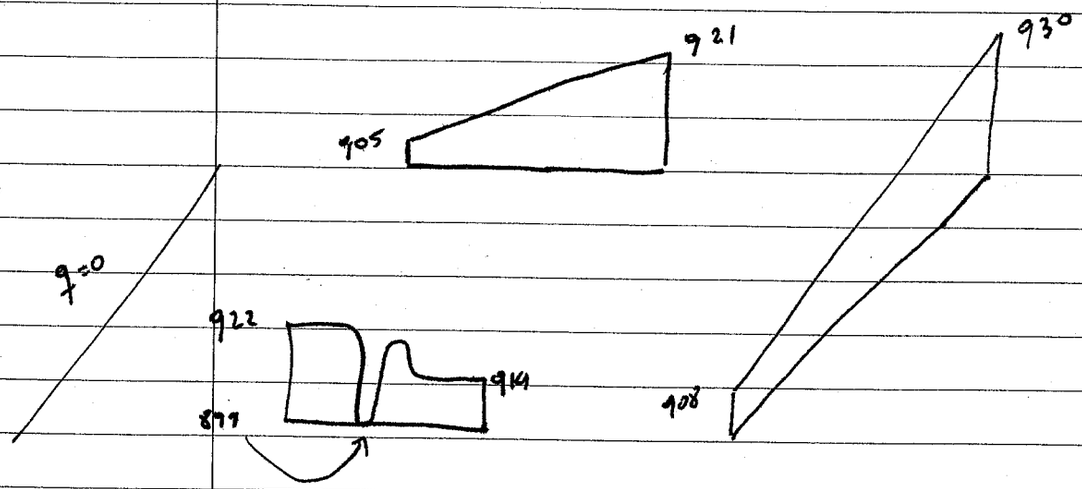


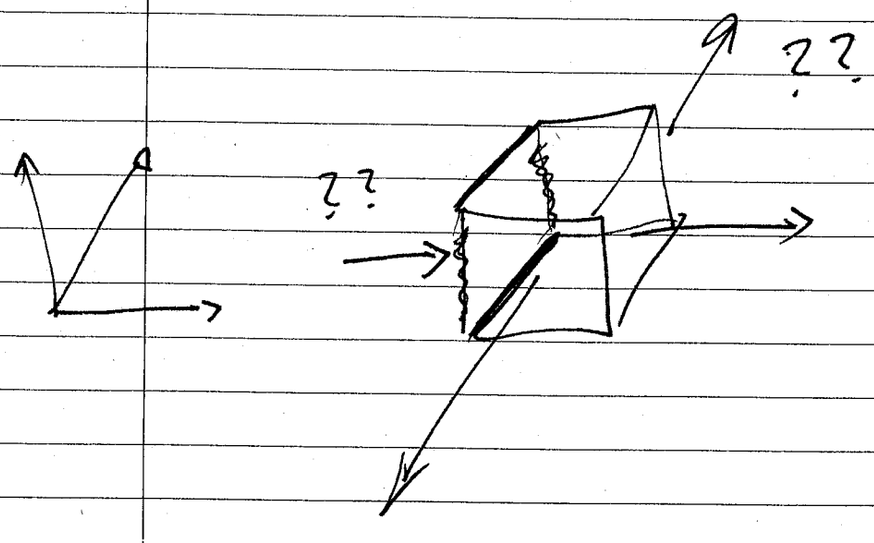
72



132

M.M.





2 11 w/ constant ksat = 500
11 11 it works
2 2

M.M.

=0
2 11
11 11
2 2 same bombing

$(E-30)\begin{pmatrix}1\\2\end{pmatrix}\begin{pmatrix}x_1\\x_2\end{pmatrix}=\begin{pmatrix}0\\0\end{pmatrix}$ $\begin{pmatrix}1\times E-30\\2\times E-30\end{pmatrix}\begin{pmatrix}x_1\\x_2\end{pmatrix}=\begin{pmatrix}0\\0\end{pmatrix}$

$\cancel{\frac{S}{\Delta t}} + A\cdot x \ldots = 0$

$A\cdot x = 0 \Rightarrow x = x(x, y, z)$

SS $\rightarrow \frac{1}{\Delta t} \approx 0 \Rightarrow \Delta t \rightarrow \infty$

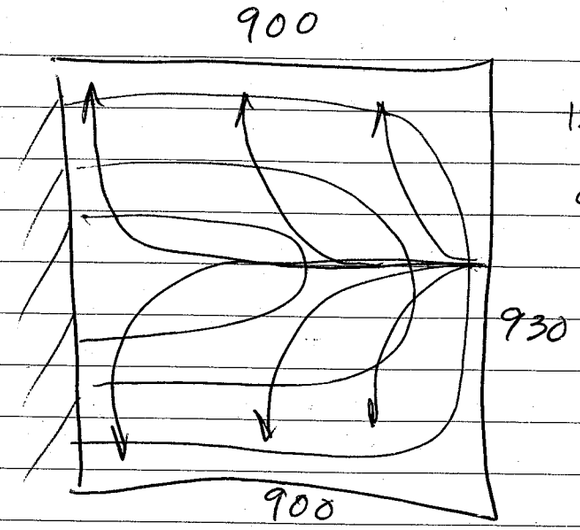
$\frac{S}{\Delta t} + A\cdot x = 0 \rightarrow x = x(x, y, z, t)$

m/s $\rightarrow$ m/day

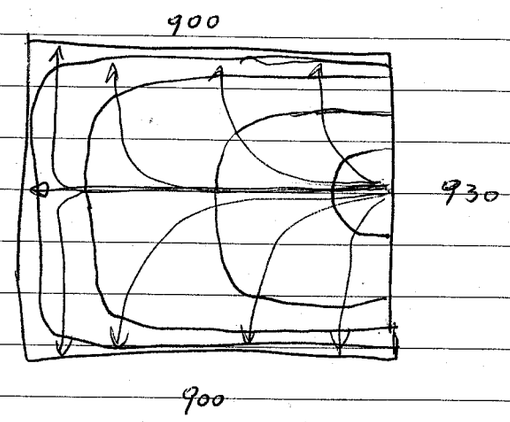
$8.64\times10^4 \times 365 = 3.1536\times10^7$

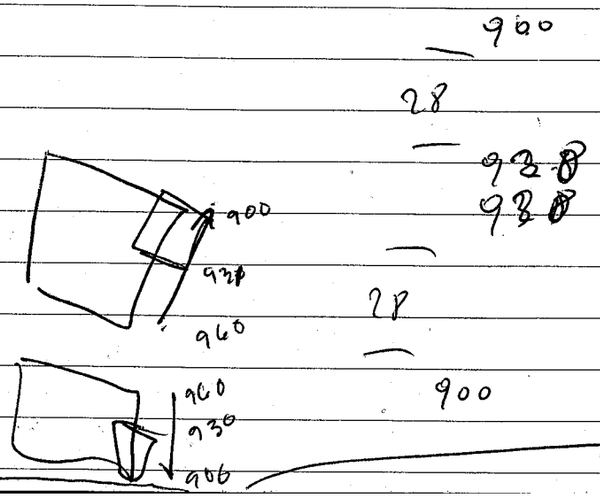
M.M.

Sep 29 Wed
1993



Is bigflo on cray ok ?
NO

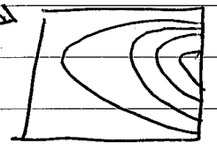




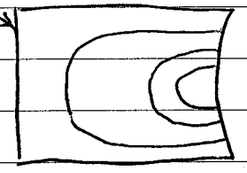
QFA1
98259E-1

Sep 30
Thur
1993

Worked on bigflo problem some more found that thickness of 3 ~~cells~~ is ok but that with DX Y Z = 500, 500, 3.85 the 3.85 makes the problem too hard to solve for the computer and gives bad answers. 38.5 works fine. Also, bigflo2 on the cray has a problem which skews the output if symmetrical like this



instead of this:



(this was tested using old bigflo code on qsiris. goliath exhibits same problem as cray with bigflo2.

Oct 1, 1993

Change State.
Presentation due Tue. New
Simulation 21 x 21 x 41
DX Y Z = 12.5 12.5 12.5
worked on tecplot, plots of
KSAT, etc

m.m.

Oct 4
Mon 1993

Worked on weekend on plots, made
some nice ones (porosity etc.). Today
printed out rest of color plots - fixed
bug in flux.f (forgot parenthesis
around equation $\left(\frac{1}{1+}\right)^{am}$ so results
were imperfect and flux was
wrong. Made transparencies

m.m.

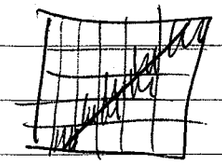
Oct 8
Fri 1993

Tried to find plots, pgms, etc. for glfract3d for talk, also plots. found prelim things, talk was canceled.

m.m.

Oct 11
Mon 1993

found rgb (IRIS) "slider" in ~usr/muller/rgb, will move to muller/fractures/rgb or fractures/work/apache/rgb or something. also, last pgm I used was in muller/fractures/work/18/scale/tmp/tmp. and a special version of g15.x under that. Talked about all odd info I had on this. new addition maybe



← find which caller fracture goes through and make a property file for bigflo/flex.

m.m.

Oct 12
Tue

printed plots. Have to watch disk space. Ea ps plot uses 7Mbytes
2 programs on qsiris tops = system pgm which does portrait and is OK but does not size image well.
sgi2ps which does landscape and does a very good job of it
tops -rgb for color, default is b/w

M.M.

Oct 13
Wed

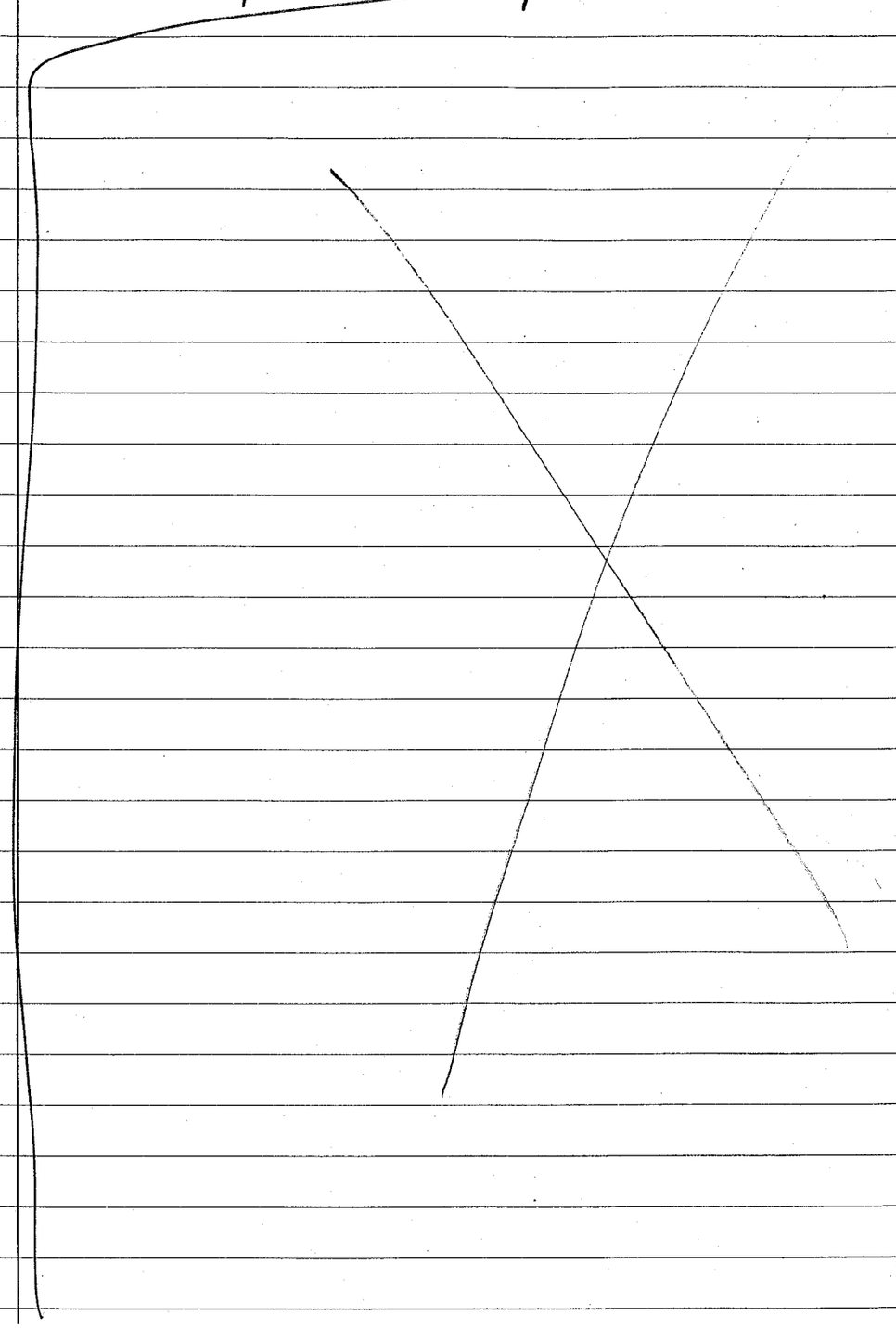
Printed Plots, met w/ Ross to define future agenda

M.M.

Oct 14
Thu

Printed plots (fractures) - labled plots.

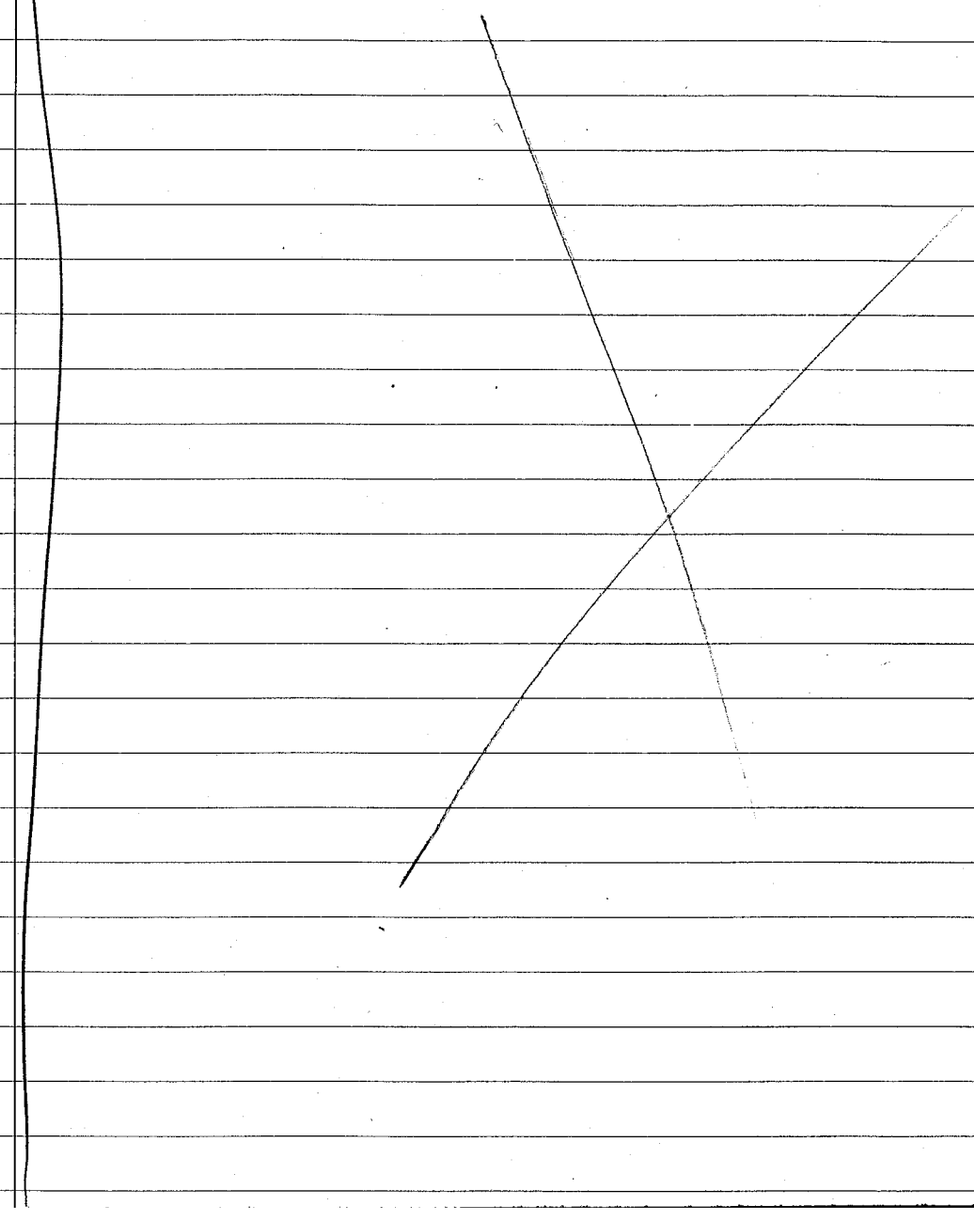
m.m



Oct 15
Fri

Started to plot HEAD 66 3f from cray.
65 " "
look pretty much the same

m.m



Oct 18
Mon 1993

Worked on 21x21x41 case H-66 (faulted case), ported flux to goliath and ran for case. error - compiled w/ -r8 and get exactly same #'s as cray + no error. output file in miller/ross/tec/out21.f. Plotted some of the output file. Trouble with vector plots (giant vectors). mm.

Oct 19
Tue 1993

Finished up color tecplots of out21f worked on runs of 21x21x41 w/ flux and comparing output. much work w/ Ross on meaning of output. m.m.

ported slim to goliath, compiled fine. ran test case, seems to run ok. cleaned up cray account. saved all files in tar to goliath. m.m.

Oct 21
Thur 1993

ported mkprop to goliath. not needed yet but eventually will. Tryed to finalize vector plots from OUT21 and out.21.f. Discovered error in flux run. flux reads in filename that it gets from INPUT1. file was in2-ic which existed. It should be in2-head (or HEAD-OUT output from end of bigflow. that means that all output from flux was incorrect. Re-ran flux for OUT21 and out21f (no fault + fault) and re-do plots for no fault. Plots were very similar to bad data plots. Started to make final color copies of both cases. m.m.

Oct 22
Fri 1993

Finalized plots for 21x21x41 faulted case. (TECPLOT) Paper + Transparency. File in mulle/ross/tec/OUT21.f. Also final part of re-do for non faulted case. ~~Ta~~ Meeting w/ Ross + Vivek about SLIM runs.

1) need to pick good param + starting particle position for ~~S~~ slim runs.
2) try slim, bigfo on IBM to see if faster than goliath

mm

Oct 25
mon 1993

posted slim + big flow to IBM, compiled -O3 fine. Ran Slim on both

IBM ~ 8 times faster than goliath

goliath : 198.7u .5s 91% 3:37 wall
IBM : 23.u .8s 100% :35 wall

meet w/ Vivek to start SLIM runs mm.

Oct 26
Tue 1993

Run slim. Start looking ~~out~~ at output. Save Cray files to Goliath m.m

Oct 27
Wed 1993

Get plot correct for slim output. Try bigflo on IBM. Talk w/ Ross about slim output. m.m.

Oct 28
Thur 1993

Discuss some of slim output w/ Ross.
Still working on bigflo on IBM - get
Nadd's - error.

M.M.

Oct 29
Fri 1993

Goliath is down, Div. 20 moved to
new building. Start "Cray run" of
bigflo on IBM but use double
precision to correct Nadd errors.
~~Stop~~ Seems to work somewhat.
~~Not sure about results.~~

M.M.

Nov 3
Wed 1993

Talked w/ Ross
a) finish Slim picture for discussion
(1 mill yrs, 500 yr snapshots)
b) put bigflo the same on both
IBM & goliath. - Run.
c) mkprop ~~to~~ more/cvt to goliath
worked on Bigflo on Slim & IBM. m.m.

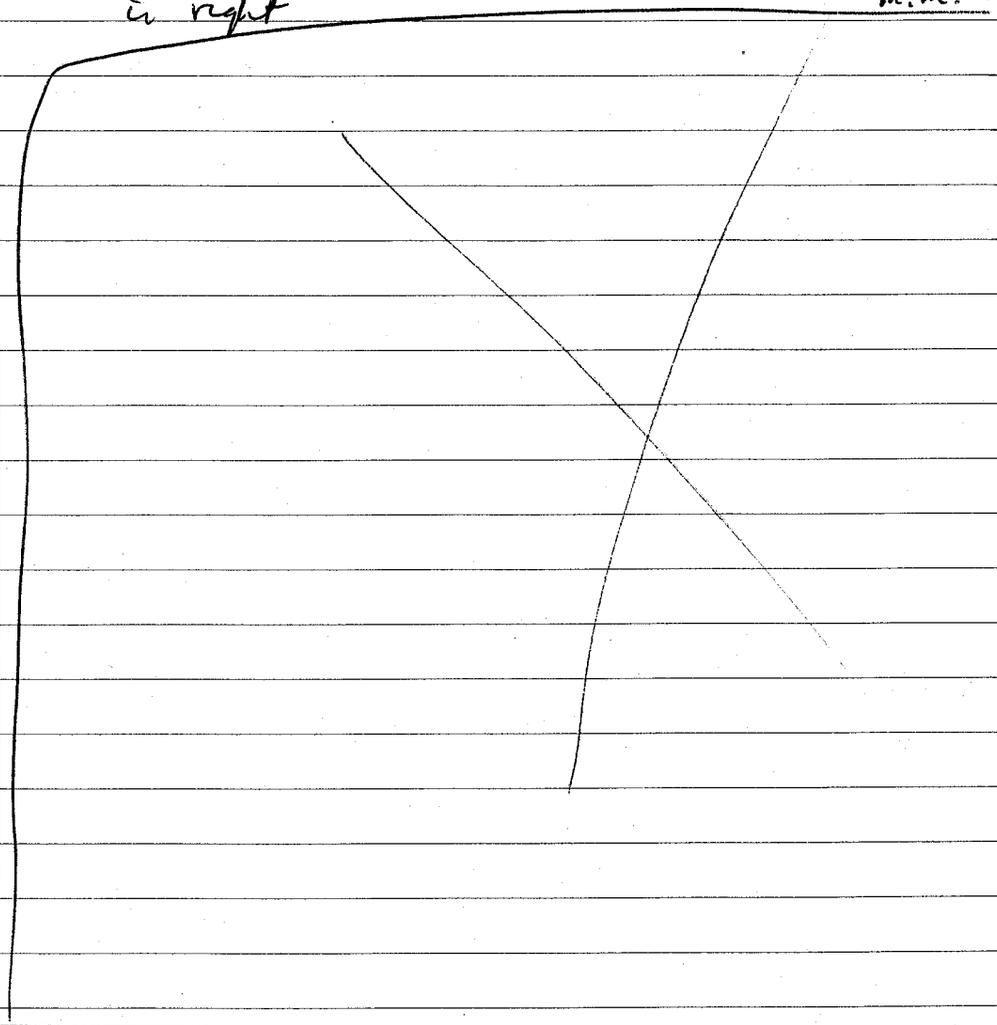
Nov 4
Thur 1993

Talk w/ Ross
Slim ~~[illegible]~~ works on both IBM and Goliath but
use IBM because its faster
look of over files.
decide to run finer resolution
from 200 - 500K yrs w/ output every 10K yrs.
- this shows not much. However, when
using tecplot, the lower limit is IMPORTANT
because what were previously blobs are
now shown as a spread out mist when
the lower color bar limit ~~[illegible]~~ is
lowered. m.m.

Nov 5
Fri 1993

discussed bigflow output - time to run with different ~~so~~ property files (change seed in mkprop so that a slightly different property emerges) try convergence for 10K yrs (inz_ic is from no fault 1.E6 years)
→ ran out of file space, but from looks of simulation, about 1Kyrs is right

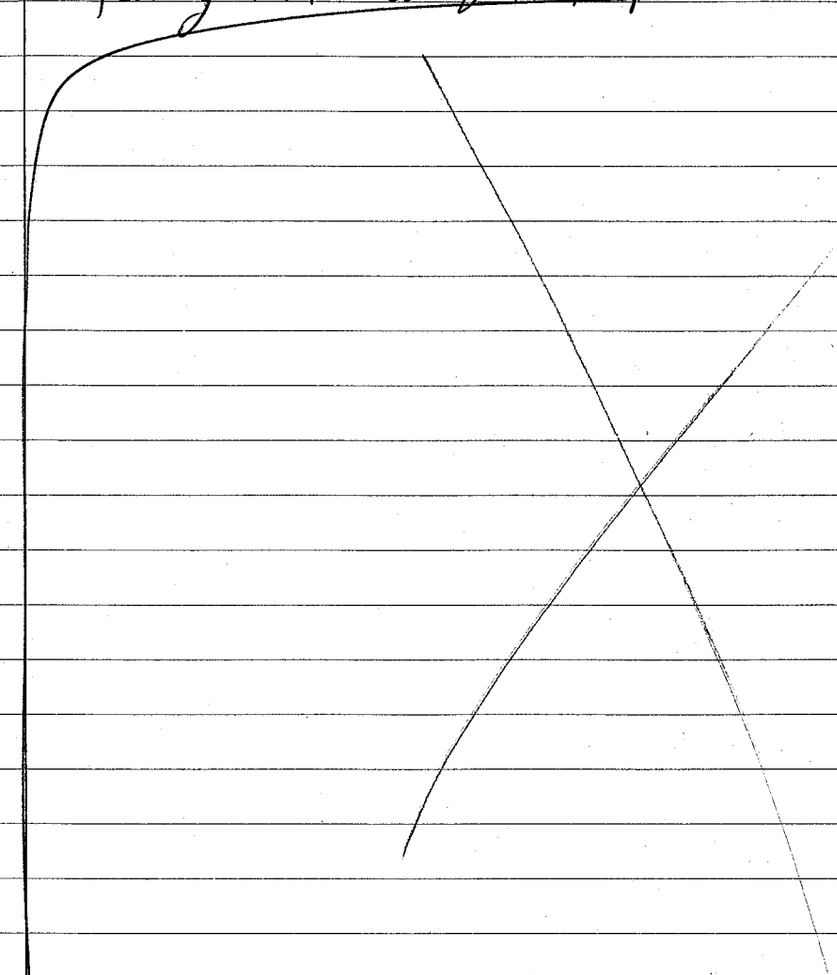
m.m.



Nov 8
Mon 1993

worked w/ Ross on bigflow outputs w/ different properties using the first perturbation as test case. Did not get convergence for 1K yrs. Run for another .5 K yrs. Looks funny. Not converged. Keep on...

m.m.



Nov 9
Tue 1993

Try 6K, 2K. Look at outputs.
pretty similar

m.m.

Nov 11
Thur. 1993

Try 5K. Convergence (steady state) in pretty much reached (~~ster~~ at about 1.2 K yrs and goes into a VERY SLOW oscillation afterwards so that it may be more ~~of~~ or less converged by 5 or 6 K years. Decided to use 5K yrs as standard for multiple bigflow runs. Will run 10 (need 10 mkprop runs) done on cray because it is ready and there (~~8hr~~ takes about 5 min). Run bigflow separately for ea. realization.

m.m.

Nov 12
Fri 1993

Start slim run on IBM's for
VEL w/ 10 realizations (takes up
10 meg. formatted.

M.M.

Mon 15
Nov 1993

Takes ~10 hours for slim to run.
Also ran test to see if 1 realization
gives ∅ stddev in ~~plotstat.dat~~ plstat.dat (no, stddev =
mean for 1 realiz). Worked OK for 2
realiz. This was a small test to make sure
that larger test gives valid answers
for slim: plstat.dat. Results were
a bit confusing for me

M.M.

Nov 19
Fri 1993

found out that plstat.dat did not finish properly. looked at plot m w/ ross. Also, disk space a problem. It appears that particles are NOT leaving through the bottom of the simulation cube. Is the 2nd layer practically impervious? Need to find out.

1) Start new simulation to get plstat.dat
2) run multiple simulations starting particles just below top of 2nd (lower) layer and move down for each succeeding simulation. Watch to see if particles move and how far.

M.M.

Nov 22
1993

Network problem. Power outtage over the weekend. Other cable problem with empty office and in closet.

1) get plstat plotted. v few particle escaped
2) multiple simulations show very few particles escaping. Particle do move but very slowly. Here are results in terms of particle height at beginning and end of simulation

1)	z = 168.7 meters	x = 118.7	y = 131.2	top (release pt.)
	146.7	137.5	134.6	bottom
2)	156.2	118.6	131.2	
	151.7	121.3	137.3	
3)	143.7	118.7	131.4	
	142.1	124.0	149.9	
4)	131.2	118.6	131.5	
	98.2	129.3	160.1	
5)	106.2	118.6	131.3	
	103.3	115.9	139.5	
6)	81.2	118.6	131.3	
	81.2	118.6	131.3	
7)	56.2	118.6	131.3	
	47.0	117.6	143.4	

M.M.

Nov 23
Tue 1993

long simulation still running = slim
w/ 10 realizations + al, at = 1., 1.
Noticed strange behavior in plstat.dat
for 2 realizations, mean = stdev.
for 1 realization, stdev ≠ Ø.
hmm. started investigation w/
loss of slim. Output equation
correct, must not be using VEL
correctly. For 10 realizations,
stdev = 3.000 for about 75%
of means. - wrong. - probably n.m.

Nov 24
Wed 1993

checked output w/ VEL = 1 realization &
VEL = 2 realiz. more closely. Put
in dummy data and plstat came
out correct. recompiled slim w/ double.
Didn't make much difference. iplotc = Ø or 1
didn't make difference. made breakthrough
curve files from plotb. so can plot
them in mathlab or tecplot. n.m.

Nov 29
Mon 1993

Plotted breakthrough curves. Also ran slim w/ VEL = 3 realiz. Ross had meeting so could not discuss outcome m.m.

Nov 30
Tue

Checked (w/Ross) output of ~~VEL~~ SLIM using VEL w/ 3 realizations on Goliath in ~/ross/tec/out.21/slim/3realiz. goal was to compare plstat.dat vars (mean & stdev) w/ mean from plotc.dat and make sure stdev is OK. This builds on previous concerns. Finally found out what was going on: SLIM uses $\sigma^2 = \frac{1}{n}\left[\Sigma x^2 - n(\bar{x}^2)\right]$ which is true for large n

$n \geq 30 \approx 98\%$ of formula

$$\sigma^2 = \frac{1}{n-1}\left[\Sigma x^2 - n\bar{x}^2\right]$$

$n \geq 4 \approx 99\%$ of formula

for $n = 10$, as in our case, $\sigma \approx 95\%$ of σ so that answers are not totally correct but can be made correct by mult by 1/[sqrt(n-1)/sqrt(n)] or 1/[sqrt9/sqrt10] = 1.0541

we are going to discuss ~~break through plots~~ m.m.

Dec 1
Wed 1993

Met w/ Ross, went over breakthrough
curves w/ mathlab. files ~~are~~ on goliath are:
~/ross/tec/out.21/slim/10realiz ← advective
10realiz.disp ← dispersive
(these are output from slim w/ 10 realizations
in VEZ. plotb.dat is broken into
5 files xl_a.dat, xr_a.dat, yf_all.dat
yb_.dat, zb_dat
xr = xright (# particles break through x right boundary)
xl = xleft
yf = yfront
yb = yback
zb = zback
each file is in fmt ntimestep realiz1 realiz2 ... r10
⋮ ⋮ ⋮ ⋮
10,000 timestep

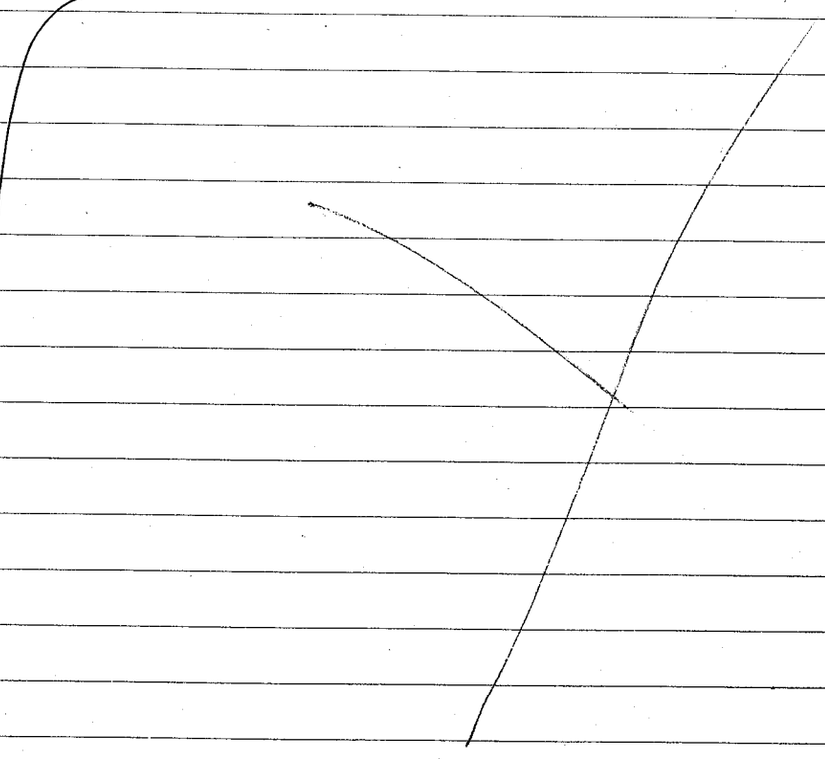
each timestep = 100 yrs, total time = 1M years
particles really start leaving sim after
200K yrs for advect or disp. for advect, ~275K
yrs, for disp ~225K yrs. particles 1st leave
at xl & xr bounds, then at yf, yb. Parts
also leave for more realizations in disper. case.
In advect case, only a few realiz. cause parts
to leave en mass. Need to figure out final time for
new simulations M.M.

Dec 2
Thu 1993

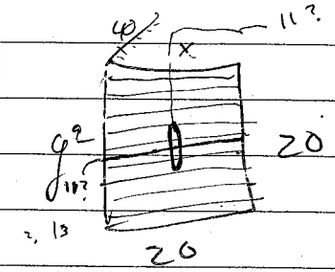
New simulation times for
Advect: 50K, 75K, 100K, 150K, 200K, 250K yrs
Dispers: 50K, 75K, 100K yrs
(already have 300K yrs for adv., 150K yrs for dispers.)
There simulations were run on the IBM's
in ~/ross/slim/rall/ advect / 50kyrs, 75kyrs...
dispers / 50kyrs, ...
Worked on tecplots of 300K yrs and 150K yrs. M.M.

Dec 3
Fri 1993

Did paper and transparency plots for MATLAB (~~plotst~~ plotb) breakthrough curves (semilogy). Did paper and transparency plots for plstat for slim runs for advective 50Kyrs, 150Kyrs, 300Kyrs
dispersive 50Kyrs, 150Kyrs, ~~[illegible]~~
did 3 plots MEAN, STD DEV, coeff of Variation for 20x20x40 domain and for ~~[illegible]~~ 20 x ~~[illegible]~~ 10 x 40 domain (cutaway of 3-D picture) which made 6 pictures for each #Kyrs. MM.



Dec 6
Mon 1993



11, 9 - 13
10, 8 - 12

7x20 + 10 = 150
8x20 + 11 = 171

x = 13
y = 13] fastest velocities
(13=12-1) in VEL3D

(+ 39 x 400) 16000
- 400
15600

(29-1)
28 x 400 = 11200

(13-1)
12 x 20 = 240

x = 13

11200
240
13
11453 → 11453

fastest vel's 11413
11433
center $\boxed{11453}$
11473
11493

current 15410
400 x 38 = 15200 + $\boxed{210}$ 20 x 10 = 200 + 10 z = 39 y = 10 x = 10

fault release
400 x 38 = 15200 + 240 + 13 ⇒ 15453 z = 39 y = 13 x = 13 M.M.

Jan 4
1994

Back from vacation. Started on old plots ~~in~~ ~~Ross~~ on Goliath. In ~/ross/tec/out.21/slim/10realiz-disp/
/0realiz-advec/

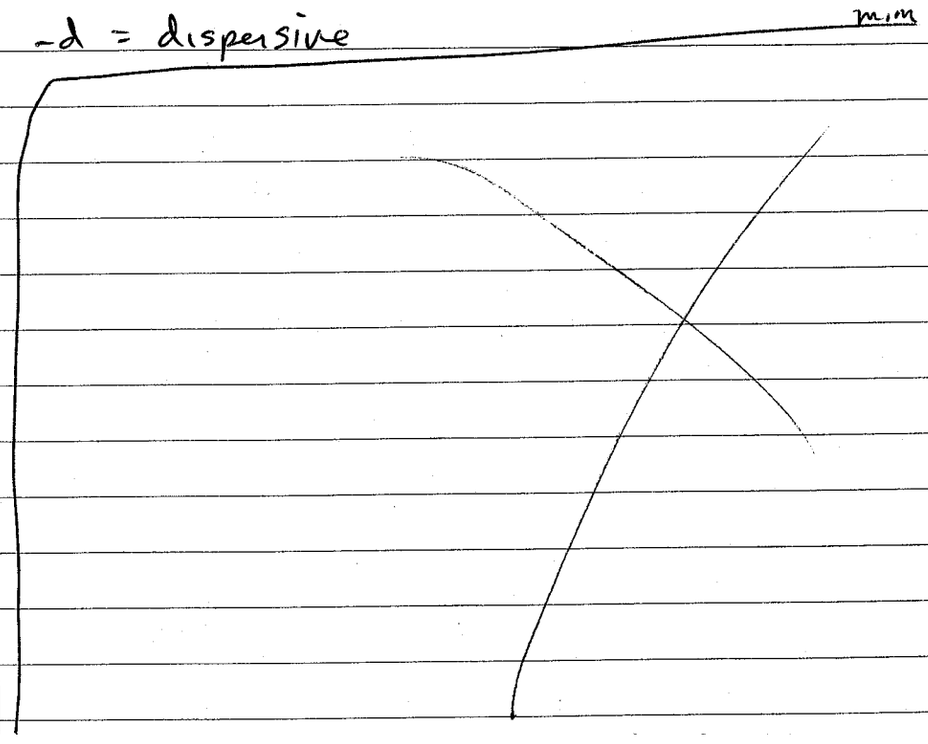
for 75Kyrs, 100Kyrs dispersive
75K, 100K, 200K, 250K advective
(already plotted mean, std deviation, coefficient of variation for 50, 150, 300 cases on Dec3)
~~These plots~~ the data for these plots is ~~on~~ originally from Whipple (the IBM) in ~/ross/slim/rall/dispers and advect m.m.

Jan 5
1994
wed

Finished plots from Jan 4.
started runs of Goliath: ashok/s/slim for 100 Million years.
started run for ~~Goliath~~ Whipple: ~/ross/slim/rall/dispers.1/1myrs this is slim with al, at = .1, .1 dispersion
Also started run for 150K yrs because it would have to be done eventually.
This is to get the breakthrough curves ~~[illegible]~~ which show which side of the simulation and at what time, particles leave the simulation. ~~The idea~~ this is ~~[illegible]~~ in file plotb. The idea is then to run the simulation only up to the point where particles leave so that plotm (the moments) has meaningful values - to use later m.m.

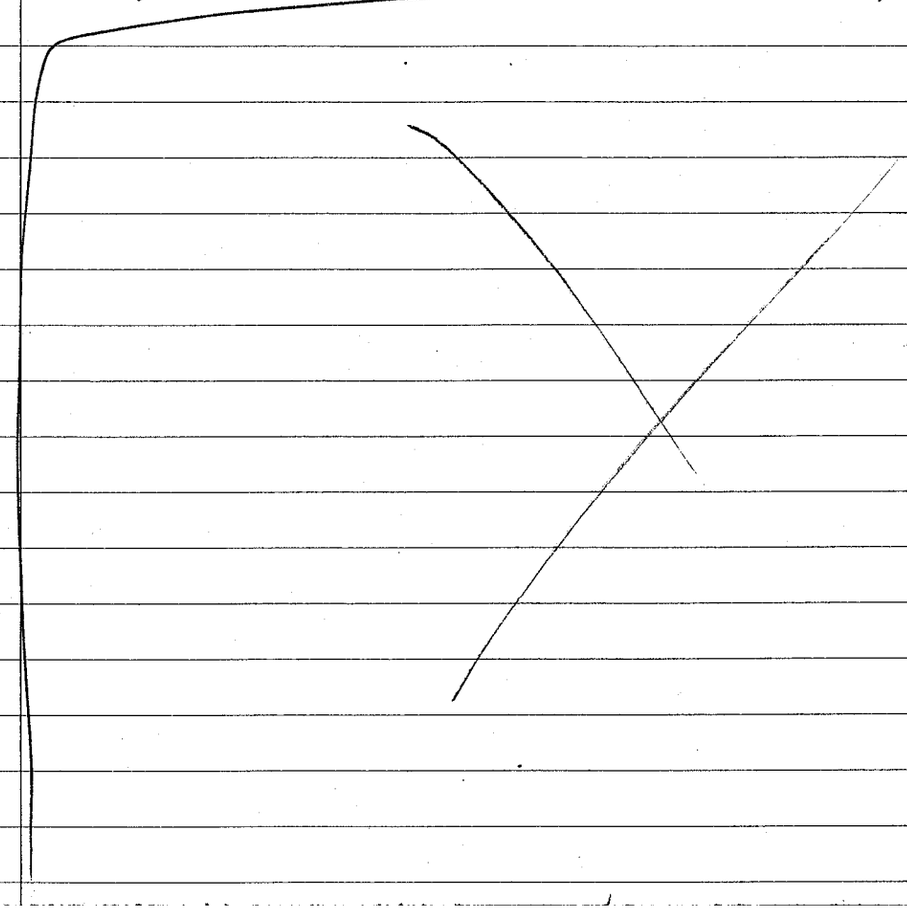
Jan 6
1994
Thur

slim running for 100 m yrs on Goliath (ashok/5)
is broken. Have fixed it on Whipple.
tcut = 1E6 and that is longest that
can run slim, is a kludgy part of code
and needs to be edited (= 100E6) and
slim re-compiled. Did it.
plotb.dat from Whipple ftpd to Goliath,
prepared for plotting w/ matlab using
program ~/~~xxr~~ 10realiz-advec/1myrs/mvplotb.x
output is xl_a.dat, xr_a.dat, yb_a.dat, yf_a.d,
zb_a.dat all -a changed to -d
xl = xleft, xr = xright (of simulation "cube")
yf = yfront, yb = yback
zb = zbottom
-d = dispersive



Jan 7
Fri
1994

Plotted 50K, 75K, 100K, 150K for
dispersive al, at = .1, .1 using tecplot
(in ~/ross/tec/out.21/slim/10realiz_disp.1/
/50Kyrs; /75Kyrs /100Kyrs, ... 150, 200, 250
200 and 250 still running on Whipple
Determined from breakthrough curves that
only 1 particle [from all sides (x,y,z), all 10
realizations] leaves simulation before 200K yrs.
~ 50 particles leave from all... before
250K yrs. This is about .5% (50/10000).
So, sims are run for 200K and 250K yrs. m.m.



Jan 10
Mon 1994

Worked on programs to do tables:

① → plstat.out — plstat using $x_c y_c z_c$ → plotm.dat

t	min CV	x y z loc.	CV centroid	$x_c y_c z_c$
50K				
75K				

② ← plstat.out →

t	# cells covar ≤ 1.	# cells conc ≥ cd	# cells covar ≤ 1. / # cells conc ≥ cd
		= active cells = cells with at least 1 particle	

where $cd = \frac{1 \text{ particle} * \text{mass of particle}}{\Delta x * \Delta y * \Delta z} = \frac{1 * 1}{12.5^3 * 27}$

③ ← plotm.dat

t	sigxx sigyy sigzz

④ ← plstat

t	max conc	x y z loc

each table is done for dispersion = alpha = 0., .1, 1.

finished color plots for disp.1 200kyrs, 250kyrs
mean, std, covar : ~/ross/tec/out.21/slim/10realiz-di
200kyrs/plstat.mean.cps ..., /250kyrs/...cps

Jan 11
1994 Tue

Finished tables started on prev. day.
cells ~~≤1~~ where covar ≤ 1. looked low
(some examples are: 20, 8, 4, 0) so
I checked it and it seems correct.
Here is Areadme file ~~in~~ on Goliath in:
~/ross/tec/out.21/slim/10realiz-disp.1/250kyrs

Jan 11, 1994. M. Muller
plstat_stats2.f and a.out are special cases of ../../plstat_stats2.x which print out each covar <=1. found as a check since the numbers seem low. In each case that was checked (disp.1 disp advec) for random ones, everything seemed correct. stats2.dat agrees with ../../plstat_stat.x agrees with ../../plstat_stats2.x agrees with a.out agreed with a "by-hand" check of part of one plstat.dat file.

M.M.

Jan 12 1994 Wed

plotmstat (pmstat) for t=50K, 75K, etc showing moments. For each realization looking down at points 100K and 200K

		x	y	z			
100K	1)	~~100K~~	140.7	119.8	388.0		
		~~200K~~	~~140.5~~	~~113~~	~~328~~	I	J	K
	2)	128	113	430				34
	3)	140	99	389			7	
	4)	120	126	359		9		
	5	133	124	385				
	6	126	134	419			10	
	7	129	108	409				
	8	125	131	354				28
	9	156	133	358		12		
	10	127	121	428				

~~140 119 388~~ repeats from vi wraparound

~~128 113 430~~

~~140 99 389~~

~~120 126 359~~

~~133 124 385~~

Avg. centroid for 100K = 10 9 31

132 121 392

looks like 128, 130, 400 covar = .21889E+1

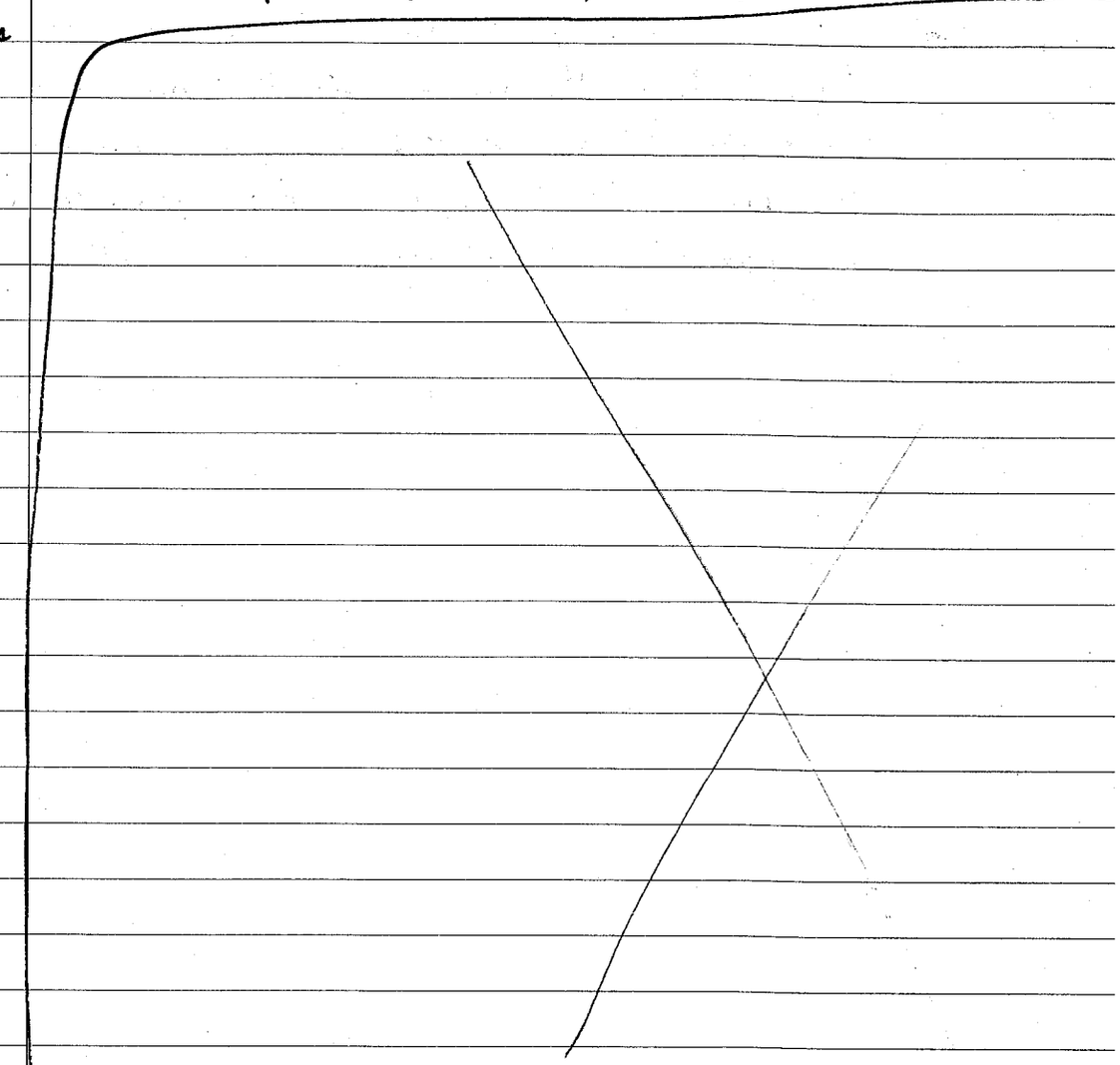
10 10 32

plotst.dat covar = .17836E+1

min covar ≈ .89 is not even close.

Jan 13 1994 Thu

Made plots for dispers = .1, .1 a.m.



Jan 14 1994 Fri

Redid a few plots. Made some black and white plots for paper. It seems that line-thickness CANNOT be changed for the blanking-box lines; it appears to be pre-set and reserved (via explanation in manual and attempts to change it). m.m.

Jan 17 1994 Mon

rfault, disp, 10, 20, 30, 40 Kyrs → replot

change (on IBM/whipple ~/ross/slim/rfault/dispers/40kyrs/

(on Goliath ~/ross/tec/out21.f/slim/disp/40Kyrs/

and plot c1, 2, 3, 4 (one for each 10K yrs)

1) correct time in lower right corner for ea. plot ex: 10K

2) color bar is 1E-1 to 1E-5, change min: 1E-3,

max = tecplot suggested max rounded.

3) plot only "cut" versions (blank half of plot)

(Goliath 200.ps needs white boxes and black letters for contour labels; ~/ross/tec/shortfrac/fig7.plt) m.m

Jan 18
Tue 1994

plotted 10, 20, 30, 40K, 150K yrs for
faulted advective case
in: whipple=IBM/~/ross/slim/rfault/advec/150kyrs
goliath/~/ross/tec/out.21f/slim/advect/150kyrs
~~plot~~ plots are done with y=11 and y=12
cutoffs ("Blanking" in tecplot) because
the center of the particle cloud is
not the same as for the dispersive
case; ie, it have move forward one
cell in the y-direction. m.m.

Jan 19
1994 Wed

Discussed w/ Vivek the possibility of
run Very large BIGFLO simulations
- the same field as in out.21 simulations
except w/ ~~more gridpoints~~ m.m.

Jan ~~28~~ 27
1994 Thur

Vivek: run Bigflo w/ one layer same as prev. sim's w/ 2 layers. on Goliath, set um mkprop.x in /user2/goliath/muller/ross/mkprop/test
Changed in-mkprop and in1-turn1 and INPUT1 to use the new size 42x42x82 (~~double~~ double the previous: 21x21x41)
Ran into error when program started to do property alfa. Investigating.
Also, re-did a few plots for Ross M.M.

Jan 28
1994 Fri

Went to IPA phase 3 meeting from 8-12
overview of phase 2
RFP for phase 3 . worked on mkprop - still error. M.M.

Jan 31
1994 Mon.

Still have error in mkprop. Solved.
mkprop.f does NOT read in gmean, std, etc from in1-mkprop when there is only 1 layer. I reads them in from INPUT1. This seems like an inconsistancy which may involve changing the source (in1-mkprop CANNOT (now) have these values in its file because it breaks mkprop.x).
in1-mkprop fixed and now generating new property files.
mkprop.f idim is apparently too small, increasing to 150,000. re-run.

Feb 1
1994 Tue

Found error in mkprop. When only 1 property, it reads in from INPUT1, NOT from in1-mkprop. in1-mkprop cannot contain the med, dev, l1, l2, l3 values or mkprop crashes. Obtained new properties. Started bigflow runs:
whipple:/home/muller/ross/bigflow/vk1layer

p.m.

Feb 2
1994 Wed

Bigflow output look strange. Consulted with Ross and Vivek. Using bad in2_ic (initial head) condition. Re-made ~~with~~ new one with equations from Vivek. Now goes from Ø. to 44. (head) Started new sim, still strange. Found out that all property files were in error (mkprop made bad output files). Tried different fixes to made new (good) property files. Left 2 trials running. m.m.

Feb 3
1994 Thur

New mkprop a success. The only thing changed was statement which read ONLY from input 1 if only 1 layer. Now in1_mkprop needs #'s in it just like for 2 layer case. Generated new property files. Started sim on whipple. looks good. m.m.

Feb 4
1994 Fri

Sim looks good. Started 2 more.
total sim time is 500 + 1000 + 10K years.
made 3 tec plots of diffs

ABS(head(2500 – 1600)) / head(2500)

ABS(ABS (head_2500 – head_1600) / head_2500)

ABS(ABS(head_6500 - head_2500) / head_6500)

most changes are < 10% but there
are still a few areas of high change
mailed message to Ross and Vivek — M.M.

Feb 7
1994 Mon

Have now done 500+1000+10K+10K+2K
years. Still not equal (QFA3 QFB3 in Out13)
Put (on Goliath, some plots.ps plots in
~/rossps for ross to plot. M.M.

Feb 8 1994 Tue

Have now done 500+1000+10K+10K+2K +500 = 24K
Did difference plots of last 23600, 700, 800, 900, 24K yrs
found a significant # of positive head values.
in last head HEAD_T5 in
Colidth: ~/muller/ross/tee/out.42/bigflo/6 and
Whipple: .../muller/ross/bigflo/vk1layer/6th
~3K of ~~value~~ head values between 6 & 190.
Plan for new sim run:
change all pos. values to Ø.
change CAPGM (storativity) to 1.E-4
run for 500 years
init time step = 1 sec., max t step = 1 day min

Feb 9 1994 Wed.

New sim still running ~11 hours; at time 1.5 days
with step of ~5 hours. Should have QBOUND ≅ Ø.
(QFA3 = QFB3) at about 41. years.
sim at 1.7 yrs on Feb 9 at 10AM, predict about 100 more hours.
~4 days.
Started new sim on cray. Only difference is
sim for 100 yrs with output every 10 years.
It is in zircon:/u1/mum/ross/run/7 m.m.

Feb 10 1994
Thur

sim on ~~gobat~~ whipple is at 9.4 years and has been running ~ 1 day, 23 hours (47 hours)
sim on cray (zircon) is at 11.7 years and has been running ~ 20 hours.
checked out pos values of HEAD_T1. 2400 values in domain (not including top layer) with values between 0 and 6.4 m.
values up to 193 m. in top layer. m.u.

Feb 11 1994
Fri

Have HEAD_T1, 2, 3, 4, 5, 6. Paused sim on Cray so no more CPU time would be used. ~~Stopped program on IBM at 19.7 years.~~ used 12 hours
Made diff file ABS (HEAD_T2 - HEAD_T1 / HEAD_T2) and plotted. Found some points of very high diff (> 10m.). ~~Try~~ Tried various plots and views. m.m.

Feb 14 1994
Mon.

Have diff 6-5. Picking out points for comparison w/ property files.

200 25 275 11.806

162.5 262.5 443.75 15.004 [162.62 262.5 445.65 10.44]

112.5 162.5 12.5 13.062

131.25 150 31.25 89.441

x y z diff (HEAD_TC - TS / TG)

HEAD_TG

top layer ⇒ disregard

100	118.75	512.5	60.23
250	237.5	512.5	145.04
218.75	281.25	512.5	115.27
206.25	143.75	512.5	68.15
206.25	175	512.5	62.0
200	150	512.5	48.24
143.75	125	512.5	57.74
131.25	131.25	512.5	97.4
131.25	125	"	62.7
125	131.25	"	68.8
112.5	118.75	"	57.9
100	118.75	"	60.2
143	200	"	191.6
137.5	218.75	"	139.0
156.25	218.75	"	193.21

HEAD_TG no top layer

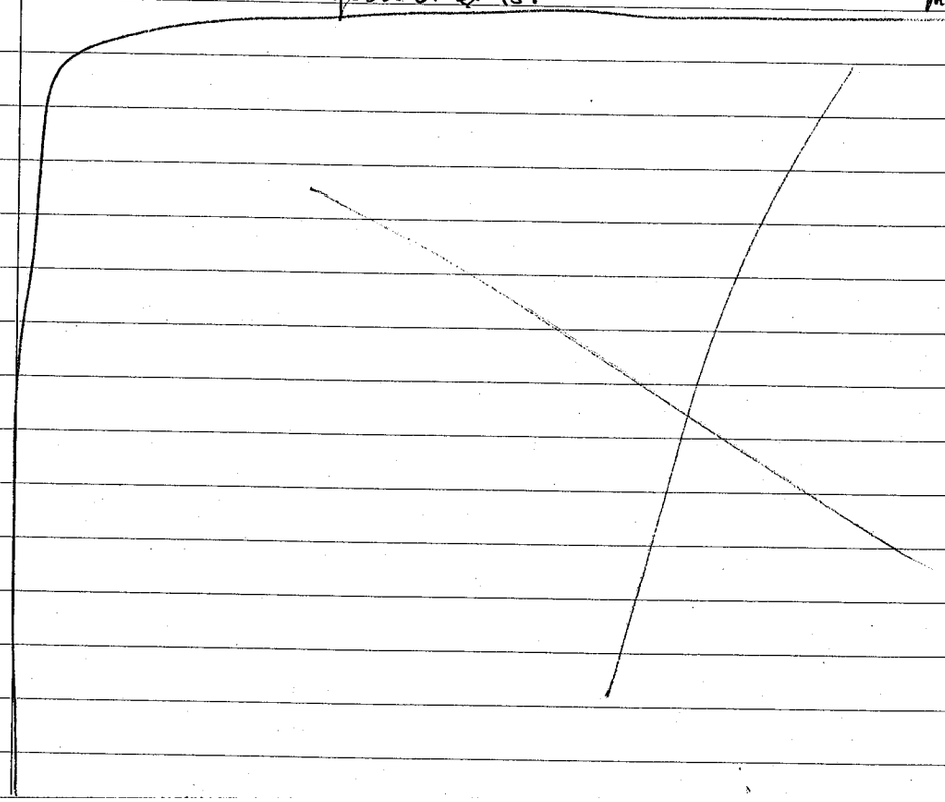
250	75	250	9.4				
181.25	56.25	250	9.1				
93.75	68.75	350	9.3				
156.25	243.75	150	10.5	✓	12.5	19.5	12
225	12.5	268.75	11.17				
231	6.25	268.75	11.25				
237	18.75	268.75	11.08				
231.25	12.5	262.5	13.49	✓	18.5	1	21

m, m.

Feb 15
1994

made bw plots from color postscript2.
I) sent to Frank Tapia in Pubs and printed on canon color copier. No good, even w/ color levels set to Ø. He tried photoshop and Adobe Illustrator, no good. 7 meg .ps file was too big for Illustrator. Could not use photoshop to read in .ps file. Sent .ps to linotype - waiting for results.
Also just a edited file (produced on gsiris from "tops" program) which had a gray shade part already in it. I just removed the 2 "if" stmnts around it. waiting for feedback on how good it is.

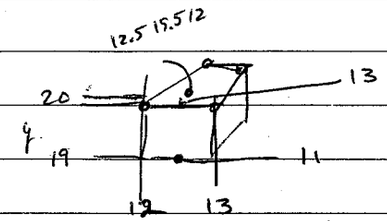
m.m.



Feb 16
1994 Wed.

HEAD-T6 two points w/ high heads 12.5 19.5 12 and 18.5 1 21

12	19	12	-29
13	19	12	-23
12	20	12	-32
13	20	12	-29
12	19	11	-28
13	19	11	-24
12	20	11	-27
13	20	11	-27
12	19	13	-27
13	19	13	-27
12	20	13	-28
13	20	13	-27



12 19 11
13 19 11
12 20 11
13 20 11

12 19 12
13 19 12
12 20 12
13 20 12

12 19 13
13 19 13
12 20 13
13 20 13

Can't seem to find max head values as indicated by tecplot. So, modified outminmax.f (

data found on next pg.

Feb 16 cont.

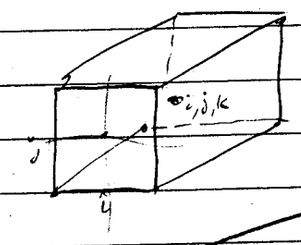
Head_T6				[24/25 37/38 39/40 24] HEAD_T1	in5_KSAT	in6_alfa
10.45	24 25	39	24	5.97 6.45	1.31E-11	2.94E-2
13.49	37	1	42		3.90E-12	8.22E-3
13.49	37	2	42		4.44E-12	1.10E-2
11.17	36	1	43	5.39	1.26E-11	1.52E-2
11.25	37	1	43	5.24	4.57E-12	1.76E-2
10.98	38	1	43		7.45E-12	1.76E-2
11.17	36	2	43	5.39	9.04E-12	1.30E-2
11.25	37	2	43	5.24	4.96E-11	1.01E-2
10.98	38	2	43		1.05E-11	1.47E-2
10.92	36	3	43	4.94	7.54E-12	1.76E-2
11.05	37	3	43	4.77	4.37E-11	1.07E-2
11.08	38	3	43	4.49	1.84E-11	1.1[illegible]E-2
10.05	37	4	43		1.58E-11	1.66E-2

m.m.

b 17
994 Thur.

m.m.

in7_tsat	in8_beta	in10_vgn	in11_ttdry
1.06E-1	7.16E-3		6.27E-3
6.44E-2	7.20E-3	1.54	5.18E-3
7.24E-2	7.24E-3	1.8[illegible]	6.25E-3
9.03E-2	7.19E-3	1.75	6.49E-3
8.34E-2	7.21E-3	1.70	5.88E-3
8.64E-2	7.19E-3	1.72	5.43E-3
8.34E-2	7.19E-3	1.69	5.74E-3
9.48E-2	7.24E-3	1.78	5.74E-3
8.76E-2	7.23E-3	1.73	5.25E-3
8.84E-2	7.18E-3	1.74	4.33E-3
9.48E-2	7.20E-3	1.78	5.24E-3
8.69E-2	7.22E-3	1.72	5.09E-3
9.46E-2	7.20E-3	1.78	4.71E-3



i-1, j-1, k-1
i-1, j-1, k+1
i+1, j-1, k-1
i+1, j-1, k+1
i-1, j+1, k-1
i-1 j+1 k+1
j+1 j+1 k-1
i+1 j+1 k+1

Fri Feb 18 1994

~~Started on differences from~~ Found out INPUT1 had "conditioning" property values for calico hills and so changed them and re-ran simulation on IBM (had trouble with IBM since "qmenu" was not working properly). For 100 years, it took 54 hours (recall that it took 12 cray cpu hours over ~~24~~ 48 hours of real time for 60 year ~~of~~ simulation time). Checked some files, no real change from previous (cray) sim. Started on difference between outputs (Head_T1 - HEAD_T2, ect, ... HEAD_T10 - HEAD_T11)

Feb 24 Thur 1994

Differences looked for:
~~not~~, ~~not~~, use top diff (top layers of sim), avg. excluding top.
Size: 42x42x81

Fri Feb 25 1994

76 = diff HEAD7 a6 / HEAD7) (no top layer!)

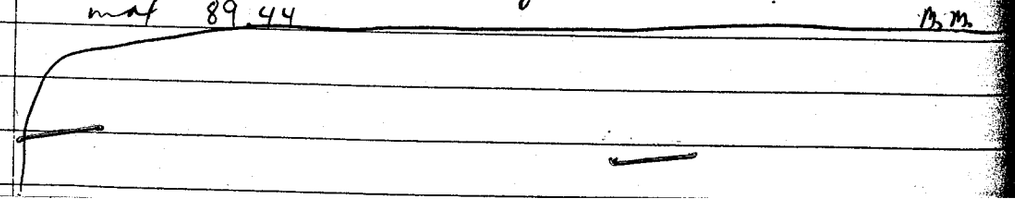
ss((ABS(HEAD7 - HEAD6))/HEAD7)

marked on fracture ps plots, sent to lino

also diff 76.out etc. (goliath: 1.../8)

54 - special test to see if IBM lhe chg (INPUT was slightly different w/ mean & std of each property = mean, mnt prop.

76	btw 5,200. 17	avg. 6.713E-3	
	max 176.21		
89	btw 5,200. 14	avg 6.096E-3	
	max 164.7		
98	btw 5,200. 6	avg 3.571E-3	
	max 26.35		
10 9	btw 5,200. 11	avg 3.557E-3	
	max 46.4		
2 1	btw 5,200 23	avg 1.51E-2	
	max 89.56		
3 2	btw 28	avg 1.213E-2	
	max 165.7		
4 3	btw 13	avg 7.52E-3	
	max 81.58		
5 4	btw 19	avg 1.26E-2	
	max 574.56		
6 5	btw 14	avg 5.40E-3	
	max 89.44		

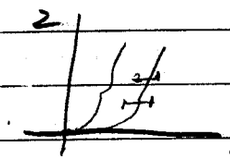


Feb 28 mon 1994

Avg. for final head, 1 avg for each of 82 layer

mean at each z-layer, sub mean from ea

$\sqrt{\Sigma (n_i - \text{mean})^2 / (42^2)} = \sigma$ of each z

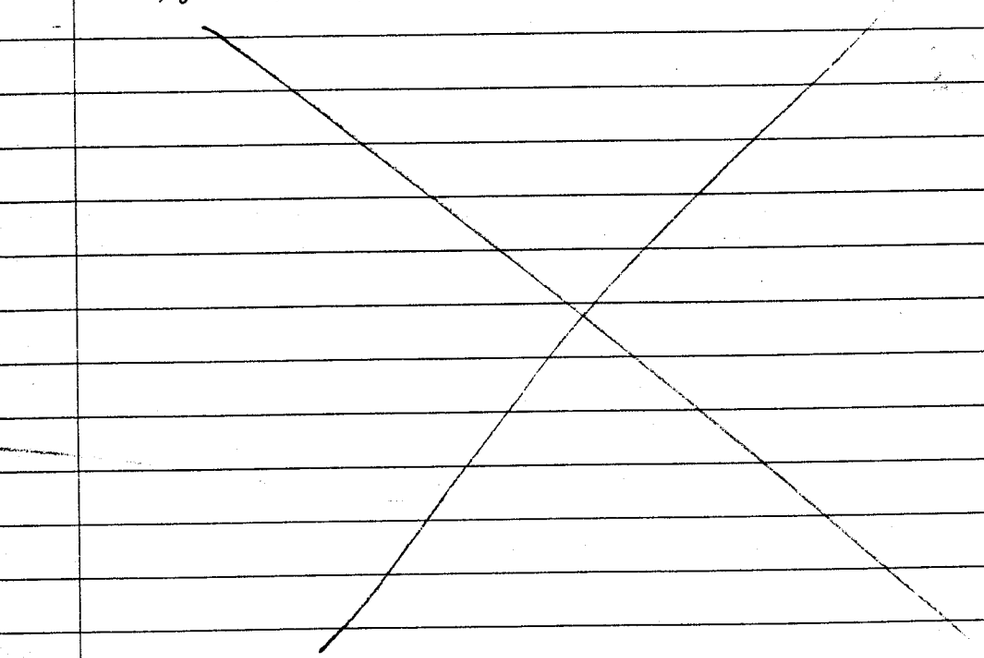


Head org, $\bar{H}$, σ

→ $+-\sigma$ error bars

HEAD at z

× i=21, j=21, z=1,82



Apr. 6 1994

Wed

Working on tough velocity output in prep for SLIM run (Rongreen ran tough to creat vel output)

1^{00} 2^{00} 3^{00} ← y positions of data. Need to put on grid. Irregular y-pos. so need to interpolate

could put this here & here??

	$pt_0 = 0$	
value at 1. assigned to these cells	$pt_1 = pt_0 + 1$	$.5^{00}$
	$pt_{2+} = pt_1 + ncells - 1$; $ncells = INT\left[\left(\frac{(2-1)}{2.}\right)/5\right]$	1^{00}
	$pt_3 = pt_2 + 1$	1
	$pt_{4+} = pt_3 + ncells - 1$	1.5
value at 2. assigned to these cells	$pt_5 = pt_4 + 1$	1.5
	$pt_{6+} = pt_5 + ncells - 1$	2.
	$pt_7 = pt_6 + 1$	2
	$pt_{8+} = pt_7 + ncells - 1$; $ncells = INT\left[\left(\frac{3-2}{2.}\right)/5\right]$	2.5
value at 3 assigned to these cells	$pt_9 = pt_8 + 1$	2.5
	$pt_{10+} = pt_9 + ncells - 1$	3.
	$+1$	

∴ $ncells = \left(\frac{4-3}{2}\right)$ M

Apr 8 1994

Fri

Coding program shown on prev. page. m.m.

April 11 1994

Coding and testing program on 2nd prev. page

M.M

April 12 1994 ALSO.

April 13 1994

Testing slim to see if works with multiple VEL files. There seems to be a few code problems. ie. tnext = 1.E6 is hardcoded and when changed to a smaller #, the code stops timestepping and just prints ~~output~~ the same output until ~~tmax~~ (the timestep count is incremented but the simulation time (curtime) isn't. - Look into this.

M.M.

April 14
Thur 1994

It appears that the VEL update was only partially implemented which is why the curtime was not updated. The major code change is shown:

```
sub driver
      :
c.....adjust next time step if needed
c
        if(curtime+dt.gt.tmax) goto 2000
        if(curtime.lt.tnext) goto 1500

c         Changed egn. to do vel input3 right.MM1994.
c       if(curtime+dt.lt.tnext) goto 1500
c         Don't know why this is here ?!! - M.M.1994.
c       dt=tnext-curtime
c         Made new variable tnextinit to handle tnext update.
c         Update tnext to keep ahead of curtime so
c         that it will trigger vel read next time
c         curtime=curtime+tnext_init

        tnext=tnext+tnextinit
c
c.....update velocities and moisture contents
c
cc    commented if no updating occurs
        call input3(vel,th)
c
c.....update boundary concentrations
c
 1500 call update(grid,lboun,nbcell,atrib,latrib,vel,flux)
      :
```

tnextinit = time interval between VEL updates. Working on output to get correct intervals. M.M.

April 15
Fri 1994

Slim tested OK. Prints output at correct intervals and reads in new VEL field (from a VEL file with multiple fields) at correct tnextinit interval. Conversion program from tough VEL output to slim INPUT tests OK. HEADER of tough vel output must be edited to only be nx,ny (the size of the 2-D VEL data field) for the conversion program to work properly. Also met w/ Ron Green and Ross to show progress and discuss next steps. Next steps include running slim on tough VEL field and plotting results. M.M.

April 29 1994

Slim is NOT quite working. All particles leave domain ~100K yrs but plot m shows center has not moved very much. Investigation shows that this is due to the second VEL fold. The mean and median values are not that different. Still investigating

M.M

Pages 1 through 158 of this Scientific Notebook were reviewed for compliance with QAP-001 in response to Corrective Action Request 94-02. Corrections and clarifications were made as appropriate. In some cases, the date of a change will reflect the date of this review rather than the date of the original Scientific Notebook entry.

Randy Fatch
SwRI-QA
12/09/94

Project closed in December, 1994 because of project completion.

12/18/96

ADDITIONAL INFORMATION FOR SCIENTIFIC NOTEBOOK No.: 065, 067, 068, and 069

Document Date:	02/26/1993
Availability:	Southwest Research Institute Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, Texas 78228
Contact:	U.S. Nuclear Regulatory Commission Public Document Room 01F13 One White Flint North 11555 Rockville Pike Rockville, Maryland 10852 1-800-397-4209
Data Sensitivity:	■"Non-Sensitive" ☐ Sensitive ☐"Non-Sensitive - Copyright" ☐ Sensitive - Copyright
Date Generated:	1993
Operating System: (including version number)	UNIX
Application Used: (including version number)	NA
Media Type: (CDs, 3 1/2, 5 1/4 disks, etc.)	1 8-mm tape
File Types: (.exe, .bat, .zip, etc.)	Various
Remarks: (computer runs, etc.)	Media contains: data and output files relative to the stochastic project.