SOFTWARE RELEASE NOTICE

1. SRN Number: **GLGP-SRN-227**	
2. Project Title: **3DStress**	Project No. **20-1402-472**
3. SRN Title: **3DStress version 1.3.3 irix**	
4. Originator/Requestor: **David A. Ferrill**	Date: **09/20/2000**

5. Summary of Actions

- ☐ Release of new software
- ☒ Release of modified software:
  - ☒ Enhancements made
  - ☐ Corrections made
- ☐ Change of access software
- ☐ Software Retirement

6. Persons Authorized Access

Name	Read Only/Read-Write	Addition/Change/Delete
David Ferrill	**RW**	
John Stamatakos	**RW**	
Larry McKague	**RW**	
Alan Morris	**RW**	
Darrell Sims	**RW**	
Joshua Buckner	**RW**	
Philip Justus (NRC)	**RO**	
Chuck Connor	**RO**	
Britt Hill	**RO**	

7. Element Manager Approval: **Larry McKague** L. McKague Date: 9/20/00

8. Remarks:

CNWRA Form TOP-6 (05/98)

SOFTWARE SUMMARY FORM

01. Summary Date: **9/20/2000**	02. Summary prepared by (Name and phone) **Joshua Buckner (210)522-5246**	03. Summary Action: **New**
04. Software Date: **09/20/2000**	05. Short Title: **3DStress version 1.3.3 irix**	
06. Software Title: **3DStress version 1.3.3 irix**		07. Internal Software ID: **None**

08. Software Type:	09. Processing Mode:	10. Application Area
☐ Automated Data System ☒ Computer Program ☐ Subroutine/Module	☒ Interactive ☐ Batch ☐ Combination	a. General: ☒ Scientific/Engineering ☐ Auxiliary Analyses ☐ Total System PA ☐ Subsystem PA ☐ Other b. Specific:

11. Submitting Organization and Address:	12. Technical Contact(s) and Phone:
CNWRA/SwRI **6220 Culebra Road** **San Antonio, TX 78228**	**David A. Ferrill (210)522-6082**

13. Software Application: **3DStress is a stress analysis and visualization program for analysis of geological structures such as the fault and fracture in three dimensional stress fields. 3DStress performs calculations of slip tendency, dilation tendency, and leakage factor of faults and fractures based on resolved stresses.**

14. Computer Platform **SGI Indigo2**	15. Computer Operating System: **IRIX 6.2**	16. Programming Language(s): **C++**	17. Number of Source Program Statements: **69,302**
18. Computer Memory Requirements: **128 Mb**	19. Tape Drives: **N/A**	20. Disk Units: **Hard Drive**	21. Graphics: **Motif 1.2 & OpenGL**

22. Other Operational Requirements: **None**

23. Software Availability:	24. Documentation Availability:
☒ Available ☐ Limited ☐ In-House ONLY	☒ Available ☐ Preliminary ☐ In-House ONLY

25.

Software Developer: _____ Date: 9/20/2000

CNWRA Form TOP-4-1 (05/98)

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE

DEVELOPED SOFTWARE[1]

Software Title/Name: 3D STRESS Version 1.3.3 irix

Version: 1.3.3 irix

Demonstration workstation: Silicon Graphics Indigo 2 ("Yosemite")

Operating System: IRIX 6.2

Developer: D. Ferrill & J. Buckner
GIS Room A251 - Bldg 189 SwRI

Total line count 69,320

1. Software Requirements Description: TOP-018, Section 5.3

Software Requirements Description (SRD) and any changes thereto reviewed in accordance with QAP-002 requirements?

Yes: ☒ No: ☐ N/A: ☐

SRD Version: Revised SDP for 3D STRESS 12/30/99 —

SRD Approval Date: (12/30/99)

Notes: SRD is dated 8/18/97 and went through QAP-002 Review. Documentation in 3DSTRESS Software Folder

2. Software Development Plan (SDP): TOP-018, Section 5.4

a) The Element Manager has approved the SDP and any changes?

Yes: ☒ No: ☐ N/A: ☐

b) The SDP addresses applicable section of TOP-018, Appendix B, Software Development Plan Template?

Yes: ☒ No: ☐ N/A: ☐

SDP Version: Revised 12/30/99

SDP Approval Date: 12/30/99

Notes: N/A

[1] See TOP-018, Table 1 for criteria.

3. Design and Development: TOP-018, Section 5.5.1, 5.5.2

a) Is development and module/subroutine-level testing documented either in scientific notebooks and/or in Software Change Reports (SCR)?

Yes: ☒ No: ☐ N/A: ☐

Scientific Notebook(s): N/A

SCR Number(s): Six Software Change Reports completed.

Notes: SCRs in This Folder - numbers GLGP-SCR-315, 316, 317, 318, 319, ~~321~~ 340 9/20/2000

b) Is development and module/subroutine-level testing sufficiently documented so that an informed reviewer can follow the testing procedures and logic?

Yes: ☒ No: ☐ N/A: ☐

Notes: N/A

c) Is development in accordance with the conventions described in the SDP/SCR, i.e. coding convention?

Yes: ☒ No: ☐ N/A: ☐

Notes: C language coding practices used.

4. Internal Documentation: TOP-018, Section 5.5.3

Software internally documented to allow a user to understand the function(s) being performed and to follow the flow of execution of individual routines?

Yes: ☒ No: ☐ N/A: ☐

Module(s) Reviewed: RECALC Sigmas - More options CB.C++
Class: Plot Class -
Class: Graph Class -

Notes: N/A

5. Output: TOP-018, Section 5.5.4

Software designed so that individual runs are uniquely identified by Date, Time, Name of software and version?

Yes: ☒ No: ☐ N/A: ☐

Date and time of run: Wednesday Sept 20, 2000 11:19:09

Name and version: 3D STRESS LINE FILE

Notes: N/A

6. Code Reviews: TOP-018, Section 5.5.5

Are code reviews (if implemented) documented in a scientific notebook or in another format that allows others to understand the code review process and results?

Yes: ☒ No: ☐ N/A: ☐

Scientific Notebook: NOT used. A. Morris performed a code review in the SCRs, along with D. Sims.

Notes: Acquired code that is not to be modified is accepted as is. No code reviews required.

7. Medium and Header Documentation: TOP-018, Section 5.5.6

a) Program title block of main program contains required information?

Yes: ☒ No: ☐ N/A: ☐

Program Title: 3DSTRESS Version 1.3.3 irix

Customer Name: U.S. Nuclear Regulatory Commission

Customer Office/Division: NMSS

Customer Contact(s): Philip Justus

Customer Phone Number: 301-415-6745

Associated Documentation: Copyright 1999 SwRI

Disclaimer Notice: yes, both disclaimers are present in code.

Notes: N/A

b) Source code module header contains required information provides Program Name, Client Name, Contract Reference, Revision Number, and Revision History?

Yes: ☒ No: ☐ N/A: ☐

Module Reviewed: GFX.class

Module Reviewed: Viewer.class

Module Reviewed: Surf.class

Notes: N/A

7. Medium and Header Documentation, continued: TOP-018, Section 5.5.6

c) The physical labeling of software medium (tapes, disks, etc.) contain required information?

Yes: ☒ No: ☐ N/A: ☐

Program Name: 3DStress V. 1.3.3 irix

Module/Name/Title: 3D Stress

Module Revision: V. 1.3.3 irix

File Type (ASCII, OBJ, EXE): ASCII, EXE

Recording Date: 9/20/2000

Operating System of Supporting Hardware: IRIX 6.2

Notes: N/A

8. User's Manual: TOP-018, Section 5.5.5

a) Is there a Users' Manual for the software?

Yes: ☒ No: ☐ N/A: ☐

User's Manual Version and Date: 3DStress Version 1.3 June 1998

Notes: N/A

b) Are there basic instructions for the use of the software?

Yes: ☒ No: ☐ N/A: ☐

Location of Instruction: User's Guide for 3DStress, page 50-57

Notes: N/A

9. Acceptance Testing: TOP-018, Section 5.6

a) Does the acceptance testing demonstrate whether or not requirements in the SRD and/or SCR have been fulfilled?

Yes: ☒ No: ☐ N/A: ☐

Location of Test Results: SCRapports GLGP-SCR 315, 316, 317, 318, 319, 321 340

Notes: N/A

9/20/2000

9. Acceptance Testing, continued: TOP-018, Section 5.6

b) Has acceptance testing been conducted for each intended computer platform and operating system?

Yes: ☒ No: ☐ N/A: ☐

Platform(s): 9/20/2000 ~~Sun ULTRA Sun~~ ~~Silicon~~ Silicon Graphics

Operating System(s): 8 IRIX 6.2 Yosemite Indigo 2

Location of Test Results: With SCRs

Notes: N/A

c) Has installation testing been conducted for each intended computer platform and operating system?

Yes: ☒ No: ☐ N/A: ☐

Platform(s): Silicon Graphics

Operating System(s): IRIX 6.2

Location of Test Results: With this folder

Notes: N/A

10. Configuration Control: TOP-018, Section 5.7

a) Is the Software Summary Form completed and signed?

Yes: ☒ No: ☐ N/A: ☐

Software Summary Form Approval Date: 9/20/2000

Notes:

b) Is a software technical description prepared, documenting the essential mathematical and numerical basis?

Yes: ☒ No: ☐ N/A: ☐

Location Technical Description: In the SRD for 3DSTRESS V. 1.3, 2nd page, 3rd section.

Notes:

c) Is the source code available (or, is the executable code available in the case of (acquired/commercial codes)?

Yes: ☒ No: ☐ N/A: ☐

Location of Source Code: QA Records Room - Bldg 189

Notes: N/A

11. Configuration Control, continued: TOP-018, Section 5.7

d) Have all the script/make files and executable files been submitted to the Software Custodian?

Yes: ☒ No: ☐ N/A: ☐

Location of Script/Make Files: On CD in QA Records Room

Notes: N/A

12. Software Release: TOP-018, Section 5.9

Upon acceptance of the software as verified above, has a Software release Notice, Form TOP-6 been issued?

Yes: ☒ No: ☐ N/A: ☐

Version number on software (1.0 for 1st issue): 1.3.3 irix

Version number on SRN: 1.3.3 irix

Notes: N/A → GLGP-SRN-227

13. Software Validation: TOP-018, Section 5.10

a) Has a Software Validation Test Plan (SVTP) been prepared for the range of application of the software?

Yes: ☒ No: ☐ N/A: ☐

Version/Date of SVTP: August 1998

Date reviewed and approved via QAP-002: 8/10/98

Notes: N/A

b) Has a Software Validation Test Report (SVTR) been prepared that documents the results of the validation cases, interpretation of the results, and determination if the software has been validated?

Yes: ☒ No: ☐ N/A: ☐

Version/Date of SVTR: August 1998 – original

Date reviewed and approved via QAP-002: 8/10/98

Notes: N/A

Additional Remarks:

9/20/2000 9/20/2000

CNWRA Software Developer/Date **CNWRA Software Custodian/Date**

```
//
//-----------------------------------------------------------------------
//    Program Name: 3DStress
//    Program Version: 1.3.3_irix
//    Release Date: September 2000
//    SCR Number: 315 - 319
//-----------------------------------------------------------------------
//
//
//    Developed by the Center for Nuclear Waste Regulatory
//    Analyses (CNWRA), Southwest Research Institute (SwRI),
//    San Antonio, Texas, USA.
//    CNWRA Contact: David Ferrill (210) 522-6082
//
//    Customer Info:
//      Name:  U.S. Nuclear Regulatory Commission
//      Office/Division:  Office of Nuclear Material Safety and
//                        Safeguards
//      Contact:  Philip Justus
//      Phone #:  (301)415-6745
//
//    Copyright 1999 Southwest Research Institute
//                All rights reserved.
//
//    This software is a trade secret owned by Southwest Research
//    Institute, with access limited except as required for use by
//    authorized users.
//
//    This program was developed under sponsorship of the U.S.
//    Nuclear Regulatory Commission, contract number NRC-02-97-009.
//    NRC Office of Nuclear Material Safety and Safeguards
//    NRC Division of Waste Management, Engineering and Geoscience Branch
//
//    This computer code/material was prepared as an account of work
//    performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA)
//    for the Division of Waste Management of the Nuclear Regulatory
//    Commission (NRC), an independent agency of the United States
//    Goverment.  The developer(s) of the code nor any of their sponsors
//    make any warranty, expressed or implied, or assume any legal
//    liability or responsibility for the accuracy, completeness, or
//    usefulness of any information, apparatus, product or process
//    disclosed, or represent that its use would not infringe on
//    privately-owned rights.
//
//    IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW WILL THE SPONSORS
//    OR THOSE WHO HAVE WRITTEN OR MODIFIED THIS CODE, BE LIABLE FOR
//    DAMAGES, INCLUDING ANY LOST PROFITS, LOST MONIES, OR OTHER SPECIAL,
//    INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR
//    INABILITY TO USE (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA
//    BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY THIRD PARTIES OR A
//    FAILURE OF THE PROGRAM TO OPERATE WITH OTHER PROGRAMS) THE PROGRAM,
//    EVEN IF YOU HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES,
//    OR FOR ANY CLAIM BY ANY OTHER PARTY.
//
```

```
------- Module Example I ----------

//+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
//  Function:  recalcSigmas (not a member function)
//
//  File:  mohrOptionCB.c++
//
//  Arguments:  double newMax -- The previous maximum sigma value takes
//    this as its new value.
//
//  State Changes:  mohrObj.attributes->sigmas[?], updates the sigmas
//        with respect to newMax and the dependent stress
//        ratios.
//
//  Purpose:  This program updates the sigmas according to newMax and
//       the dependent stress ratios.
//
// Last Modified:  14 July 1997, Joshua Buckner (jbuckner@cs.trinity.edu)
//+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
void recalcSigmas(int min, int mid, int max, double newMax)

------- Module Example II ----------

//////////////////////////////////
// Class: PlotClass
//
// Description:
//
//  This class is responsible for
//  drawing the actual Tendency Plot
//  (stereonet).
//////////////////////////////////

class PlotClass {

------- Module Example III ----------

//////////////////////////////////
// Class: GraphClass
//
// Description:
//
//  This class draws and controls
//  the graph (on a logarithmic scale)
//  of the perportion of s1 to s2 versus
//  the perportion of s2 to s3.
//////////////////////////////////

class GraphClass {
```

```
//  Revision History
//  $Log: mohrClass.hh,v $
//  Revision 1.16  2000/09/19  20:54:29  jbuckner
//  added qa header
//
//  Revision 1.15  1999/08/19  20:24:39  jbuckner
//  Added mohrFacet stuff
//
//  Revision 1.14  1999/08/02  19:15:34  jbuckner
//  Added anti-aliasing
//
//  Revision 1.13  1999/07/08  18:34:18  jbuckner
//  Added facility for a fluid Press max slider
//
//  Revision 1.12  1998/08/05  15:19:28  jbuckner
//  Added Documentation for Class Purpose
//
//  Revision 1.11  1997/07/01  15:39:02  jbuckner
//  changed stress ratio variables in the attributes structure
//
//  Revision 1.10  1997/06/27  21:32:33  jbuckner
//  Changed stressDepRatio to double in attrib struct
//
//  Revision 1.9  1997/06/27  17:41:52  jbuckner
//  Added an array to hold effective stress
//
//  Revision 1.8  1997/06/20  19:41:36  jbuckner
//  Made the sigmas member variable a double
//
//  Revision 1.7  1997/06/19  18:45:07  jbuckner
//  Added variables for a variable Poisson's in dependent stresses in the st
ructure
//  Revision 1.6  1997/06/18  21:16:18  jbuckner
//  Added a boolean for the stress dependency radio box to the member variab
les
//
//  Revision 1.5  1997/02/19  17:45:26  rboenau
//  Added fluid pressure
//
//  Revision 1.4  1997/02/18  19:04:30  rboenau
//  Incremented tauValues array and now computes if failure has occured
//
//  Revision 1.3  1997/02/14  14:45:57  rboenau
//  Added all the variables for calculating the failure envelope
//
//  Revision 1.2  1997/01/03  14:51:04  rboenau
//  Additional parameters added for options and functions added to fit with
the standards of other functions
//
//  Revision 1.1  1996/12/20  14:38:36  rboenau
//  Initial revision
//
//
////////////////////////////////////////
```

Example Run JWB


```
#3DStress_Lin_Type_V1.3.3_IRIX
#Generated_By   jbuckner
#Time_Stamp     Wed Sep 20 11:19:19 2000
100
549472.919192 4073999.000000 46.619690
549472.919192 4074059.416107 40.906990
549533.242424 4073999.000000 142.565216
549533.242424 4074059.416107 139.699020
549593.565657 4073999.000000 237.225616
549593.565657 4074059.416107 237.393967
```

```
/usr/people/3dstress/3d/src$ head gfxClass.hh
// ------------------------------------------------------------------
// extra header info added on 19 Sept. 2000
// ------------------------------------------------------------------
// Program Name:        3DStress version 1.3.3_irix
// Client Name:         U.S. Nuclear Regulatory Commission
// Client Division:     Office of Nuclear Material Safety and Safeguards
// Contract Reference: NRC-02-97-009
// CNWRA Project #:     20-1402-472
// ------------------------------------------------------------------

/usr/people/3dstress/3d/src$ head viewerClass.hh
// ------------------------------------------------------------------
// extra header info added on 19 Sept. 2000
// ------------------------------------------------------------------
// Program Name:        3DStress version 1.3.3_irix
// Client Name:         U.S. Nuclear Regulatory Commission
// Client Division:     Office of Nuclear Material Safety and Safeguards
// Contract Reference: NRC-02-97-009
// CNWRA Project #:     20-1402-472
// ------------------------------------------------------------------

/usr/people/3dstress/3d/src$ head surfClass.hh
// ------------------------------------------------------------------
// extra header info added on 19 Sept. 2000
// ------------------------------------------------------------------
// Program Name:        3DStress version 1.3.3_irix
// Client Name:         U.S. Nuclear Regulatory Commission
// Client Division:     Office of Nuclear Material Safety and Safeguards
// Contract Reference: NRC-02-97-009
// CNWRA Project #:     20-1402-472
// ------------------------------------------------------------------

/usr/people/3dstress/3d/src$
```

```
Installation Test on pluto.cnwra.swri.edu
  an SGI Onyx2 running IRIX 6.5

pluto:/pscr0> rm -rf 3ds_irix
pluto:/pscr0> ls /CDROM
stress.tar
pluto:/pscr0> tar -xvf /CDROM/stress.tar
<snipped file listing>
3ds_irix/help/images/enable.gif
3ds_irix/help/images/appendix5.gif
3ds_irix/help/images/surfacetool_xv.gif
3ds_irix/help/images/ratgraph3.gif
3ds_irix/help/images/magtool3.gif
3ds_irix/help/images/tendplot2_sc_xv.gif
3ds_irix/help/images/mapbar.gif
3ds_irix/help/images/ratgraph_sc.gif
3ds_irix/help/images/appendix2.gif
<snipped file listing>
pluto:/pscr0> ls 3ds_irix
README  bin     data    help    libs    src
pluto:/pscr0> cd 3ds_irix/bin
pluto:/pscr0/3ds_irix/bin> 3dstress.exp
pluto:/pscr0/3ds_irix/bin>
<succesful run>
```

SOFTWARE RELEASE NOTICE

1. SRN Number: **GLGP-SRN-228**	
2. Project Title: **3DStress**	Project No. **20-1402-472**
3. SRN Title: **3DStress version 1.3.3 solaris**	
4. Originator/Requestor: **David A. Ferrill**	Date: **09/20/2000**

5. Summary of Actions

- ☐ Release of new software
- ☒ Release of modified software:
  - ☒ Enhancements made
  - ☐ Corrections made
- ☐ Change of access software
- ☐ Software Retirement

6. Persons Authorized Access

Name	Read Only/Read-Write	Addition/Change/Delete
David Ferrill	**RW**	
John Stamatakos	**RW**	
Larry McKague	**RW**	
Alan Morris	**RW**	
Darrell Sims	**RW**	
Joshua Buckner	**RW**	
Philip Justus (NRC)	**RO**	
Chuck Connor	**RO**	
Britt Hill	**RO**	

7. Element Manager Approval: **Larry McKague** H. L. McKague Date: 9/20/00

8. Remarks:

CNWRA Form TOP-6 (05/98)

SOFTWARE SUMMARY FORM

01. Summary Date: **9/20/2000**	02. Summary prepared by (Name and phone) **Joshua Buckner (210)522-5246**	03. Summary Action: **New**
04. Software Date: **09/20/2000**	05. Short Title: **3DStress version 1.3.3 solaris**	
06. Software Title: **3DStress version 1.3.3 solaris**		07. Internal Software ID: **None**

08. Software Type: ☐ Automated Data System ☒ Computer Program ☐ Subroutine/Module	09. Processing Mode: ☒ Interactive ☐ Batch ☐ Combination	10. Application Area a. General: ☒ Scientific/Engineering ☐ Auxiliary Analyses ☐ Total System PA ☐ Subsystem PA ☐ Other b. Specific:
11. Submitting Organization and Address: **CNWRA/SwRI** **6220 Culebra Road** **San Antonio, TX 78228**		12. Technical Contact(s) and Phone: **David A. Ferrill (210)522-6082**

13. Software Application: **3DStress is a stress analysis and visualization program for analysis of geological structures such as the fault and fracture in three dimensional stress fields. 3DStress performs calculations of slip tendency, dilation tendency, and leakage factor of faults and fractures based on resolved stresses.**

14. Computer Platform **Sun Ultra 10**	15. Computer Operating System: **Solaris 2.7**	16. Programming Language(s): **C++**	17. Number of Source Program Statements: **68,686**
18. Computer Memory Requirements: **128 Mb**	19. Tape Drives: **N/A**	20. Disk Units: **Hard Drive**	21. Graphics: **Motif 1.2 & OpenGL**

22. Other Operational Requirements: **None**

23. Software Availability: ☒ Available ☐ Limited ☐ In-House ONLY	24. Documentation Availability: ☒ Available ☐ Preliminary ☐ In-House ONLY

25.

Software Developer: D. A. Ferrill Date: 9/20/2000.

CNWRA Form TOP-4-1 (05/98)

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES
DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE

DEVELOPED SOFTWARE[1]

Software Title/Name: 3DSTRESS Version 1.3.3 Solaris

Version: 1.3.3 Solaris

Demonstration workstation: "SENTUM" Sun ULTRA

Operating System: Solaris 2.7

Developer: D. Farrill & J. Buckner
GIS Room A251 - Bldg 189 SwRI

---

1. Software Requirements Description: TOP-018, Section 5.3

Software Requirements Description (SRD) and any changes thereto reviewed in accordance with QAP-002 requirements?

Yes: ☒ No: ☐ N/A: ☐

SRD Version: Dated 8/18/97 by Em - Dated 8/5/97

SRD Approval Date: 8/18/97

Notes: N/A

2. Software Development Plan (SDP): TOP-018, Section 5.4

a) The Element Manager has approved the SDP and any changes?

Yes: ☒ No: ☐ N/A: ☐

b) The SDP addresses applicable section of TOP-018, Appendix B, Software Development Plan Template?

Yes: ☒ No: ☐ N/A: ☐

SDP Version: Revised 12/30/99

SDP Approval Date: 12/30/99

Notes: N/A

[1] See TOP-018, Table 1 for criteria.

3. Design and Development: TOP-018, Section 5.5.1, 5.5.2

a) Is development and module/subroutine-level testing documented either in scientific notebooks and/or in Software Change Reports (SCR)?

Yes: ☒ No: ☐ N/A: ☐

Scientific Notebook(s): N/A

SCR Number(s): Six Software Change Reports

Notes: SCRs GLGP-SCR 315, 316, 317, 318, 319, ~~321~~ 340 BSW 9/20/2000

b) Is development and module/subroutine-level testing sufficiently documented so that an informed reviewer can follow the testing procedures and logic?

Yes: ☒ No: ☐ N/A: ☐

Notes: N/A

c) Is development in accordance with the conventions described in the SDP/SCR, i.e. coding convention?

Yes: ☒ No: ☐ N/A: ☐

Notes: C language code practices used

4. Internal Documentation: TOP-018, Section 5.5.3

Software internally documented to allow a user to understand the function(s) being performed and to follow the flow of execution of individual routines?

Yes: ☐ No: ☐ N/A: ☒

Module(s) Reviewed: CMD.class
mohrs3Tos/RATIOscaleChange
ROT.class

Notes: N/A

5. Output: TOP-018, Section 5.5.4

Software designed so that individual runs are uniquely identified by Date, Time, Name of software and version?

Yes: ☒ No: ☐ N/A: ☐

Date and time of run: Wednesday Sept 20, 12:27:31 2000

Name and version: 3DStress File Type 1.3.3 Solaris

Notes: N/A

6. Code Reviews: TOP-018, Section 5.5.5

Are code reviews (if implemented) documented in a scientific notebook or in another format that allows others to understand the code review process and results?

Yes: ☒ No: ☐ N/A: ☐

Scientific Notebook: NOT used. A. Morris & D. Sims performed code Reviews during their checking of the SCR actions. [illegible]

Notes: Acquired code that is not to be modified is accepted as is. No code reviews required.

7. Medium and Header Documentation: TOP-018, Section 5.5.6

a) Program title block of main program contains required information?

Yes: ☐ No: ☐ N/A: ☐

Program Title: 3D Stress Unison 1.3.3 Solaris

Customer Name: U.S. Nuclear Commission

Customer Office/Division: NMSS

Customer Contact(s): Philip Justus

Customer Phone Number: 301-415-6745

Associated Documentation: Copyright 1999 SwRI

Disclaimer Notice: yes

Notes: N/A

b) Source code module header contains required information provides Program Name, Client Name, Contract Reference, Revision Number, and Revision History?

Yes: ☒ No: ☐ N/A: ☐

Module Reviewed: Graph.class

Module Reviewed: RoseClass

Module Reviewed: optionClass

Notes: N/A

7. Medium and Header Documentation, continued: TOP-018, Section 5.5.6

c) The physical labeling of software medium (tapes, disks, etc.) contain required information?

Yes: ☒ No: ☐ N/A: ☐

Program Name: 3D Stress V. 1.3.3 Solaris

Module/Name/Title: 3 D Stress

Module Revision: V 1.3.3 solaris

File Type (ASCII, OBJ, EXE): ASCII, Executable

Recording Date: 9/20/2000

Operating System of Supporting Hardware: Solaris 2.7

Notes: N/A

8. User's Manual: TOP-018, Section 5.5.5

a) Is there a Users' Manual for the software?

Yes: ☒ No: ☐ N/A: ☐

User's Manual Version and Date: 3D Stress V. 1.3 June 1998

Notes: N/A

b) Are there basic instructions for the use of the software?

Yes: ☒ No: ☐ N/A: ☐

Location of Instruction: User's Guide for 3D Stress, pages 50-57.

Notes: N/A

9. Acceptance Testing: TOP-018, Section 5.6

a) Does the acceptance testing demonstrate whether or not requirements in the SRD and/or SCR have been fulfilled?

Yes: ☒ No: ☐ N/A: ☐

Location of Test Results: SC Reports GLGP-SCR 315, 316, 317, 318, 319, ~~321~~ 340

Notes: N/A

9/20/2000

9. Acceptance Testing, continued: TOP-018, Section 5.6

b) Has acceptance testing been conducted for each intended computer platform and operating system?

Yes: ☒ No: ☐ N/A: ☐

Platform(s): Sun ULTRA

Operating System(s): Solaris 2.7

Location of Test Results: with SCRs

Notes: N/A

c) Has installation testing been conducted for each intended computer platform and operating system?

Yes: ☒ No: ☐ N/A: ☐

Platform(s): Sun ULTRA

Operating System(s): Solaris 2.7

Location of Test Results: with This folder

Notes: N/A

10. Configuration Control: TOP-018, Section 5.7

a) Is the Software Summary Form completed and signed?

Yes: ☒ No: ☐ N/A: ☐

Software Summary Form Approval Date: 9/20/2000

Notes: N/A

b) Is a software technical description prepared, documenting the essential mathematical and numerical basis?

Yes: ☒ No: ☐ N/A: ☐

Location Technical Description: in The SRD for 3D STRESS V 1.3, 2nd page, 3rd section

Notes:

c) Is the source code available (or, is the executable code available in the case of (acquired/commercial codes)?

Yes: ☒ No: ☐ N/A: ☐

Location of Source Code: QA Records Room - Bldg 189

Notes: N/A

11. Configuration Control, continued: TOP-018, Section 5.7

d) Have all the script/make files and executable files been submitted to the Software Custodian?

Yes: ☒ No: ☐ N/A: ☐

Location of Script/Make Files: On CD in QA Records Room

Notes: N/A

12. Software Release: TOP-018, Section 5.9

Upon acceptance of the software as verified above, has a Software release Notice, Form TOP-6 been issued?

Yes: ☒ No: ☐ N/A: ☐

Version number on software (1.0 for 1st issue): 1.3.3 solaris

Version number on SRN: 1.3.3 solaris

Notes: N/A → SRN# GLGA-SRN-228

13. Software Validation: TOP-018, Section 5.10

a) Has a Software Validation Test Plan (SVTP) been prepared for the range of application of the software?

Yes: ☒ No: ☐ N/A: ☐

Version/Date of SVTP: August 1998

Date reviewed and approved via QAP-002: 8/10/98

Notes: N/A

b) Has a Software Validation Test Report (SVTR) been prepared that documents the results of the validation cases, interpretation of the results, and determination if the software has been validated?

Yes: ☒ No: ☐ N/A: ☐

Version/Date of SVTR: August 1998

Date reviewed and approved via QAP-002: 8/10/98

Notes: N/A

Additional Remarks:

[illegible] 9/20/2000 — CNWRA Software Developer/Date

[illegible] 9/20/2000 — CNWRA Software Custodian/Date

```
//  $Header: /usr/people/3dstress/3d/src/RCS/roseClass.hh,v 1.8 1998/08/05 1
5:22
:11 jbuckner Exp $
//
//  Revision History
//  $Log: roseClass.hh,v $
//  Revision 1.8  1998/08/05  15:22:11  jbuckner
//  Added Documentation for Class Purpose
//
//  Revision 1.7  1998/07/27  20:37:32  jbuckner
//  Added builder data toggle
//
//  Revision 1.6  1996/09/06  13:15:39  rboenau
//  Add lower funcion
//
//  Revision 1.5  1996/08/26  14:43:21  rboenau
//  Added write option
//
//  Revision 1.4  1996/08/22  22:21:17  rboenau
//  Background now changes color
//
//  Revision 1.3  1996/08/21  20:26:19  rboenau
//  Mouse cursor now changes
//
//  Revision 1.2  1996/08/01  20:39:12  rboenau
//  Added variables for toggle modes
//
//  Revision 1.1  1996/07/26  19:17:08  rboenau
//  Initial revision
```

```
$ head graphClass.hh

// ------------------------------------------------------------------
// extra header info added on 19 Sept. 2000
// ------------------------------------------------------------------
// Program Name:        3DStress version 1.3.3_solaris
// Client Name:         U.S. Nuclear Regulatory Commission
// Client Division:     Office of Nuclear Material Safety and Safeguards
// Contract Reference: NRC-02-97-009
// CNWRA Project #:     20-1402-472
// ------------------------------------------------------------------
$ head roseClass.hh

// ------------------------------------------------------------------
// extra header info added on 19 Sept. 2000
// ------------------------------------------------------------------
// Program Name:        3DStress version 1.3.3_solaris
// Client Name:         U.S. Nuclear Regulatory Commission
// Client Division:     Office of Nuclear Material Safety and Safeguards
// Contract Reference: NRC-02-97-009
// CNWRA Project #:     20-1402-472
// ------------------------------------------------------------------
$ head optionClass.hh

// ------------------------------------------------------------------
// extra header info added on 19 Sept. 2000
// ------------------------------------------------------------------
// Program Name:        3DStress version 1.3.3_solaris
// Client Name:         U.S. Nuclear Regulatory Commission
// Client Division:     Office of Nuclear Material Safety and Safeguards
// Contract Reference: NRC-02-97-009
// CNWRA Project #:     20-1402-472
// ------------------------------------------------------------------
$
```

```
//
//-----------------------------------------------------------------------
//     Program Name: 3DStress
//     Program Version: 1.3.3_solaris (Port to Sun Solaris 2.7)
//     Release Date: Sept. 2000
//     SCR Number: 315 - 319
//-----------------------------------------------------------------------
//
//
//     Developed by the Center for Nuclear Waste Regulatory
//     Analyses (CNWRA), Southwest Research Institute (SwRI),
//     San Antonio, Texas, USA.
//     CNWRA Contact: David Ferrill (210) 522-6082
//
//     Customer Info:
//       Name:  U.S. Nuclear Regulatory Commission
//       Office/Division:  Office of Nuclear Material Safety and
//                         Safeguards
//       Contact:  Philip Justus
//       Phone #:  (301)415-6745
//
//     Copyright 1999 Southwest Research Institute
//                 All rights reserved.
//
//     This software is a trade secret owned by Southwest Research
//     Institute, with access limited except as required for use by
//     authorized users.
//
//     This program was developed under sponsorship of the U.S.
//     Nuclear Regulatory Commission, contract number NRC-02-97-009.
//     NRC Office of Nuclear Material Safety and Safeguards
//     NRC Division of Waste Management, Engineering and Geoscience Branch
//
//     This computer code/material was prepared as an account of work
//     performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA)
//     for the Division of Waste Management of the Nuclear Regulatory
//     Commission (NRC), an independent agency of the United States
//     Goverment.  The developer(s) of the code nor any of their sponsors
//     make any warranty, expressed or implied, or assume any legal
//     liability or responsibility for the accuracy, completeness, or
//     usefulness of any information, apparatus, product or process
//     disclosed, or represent that its use would not infringe on
//     privately-owned rights.
//
//     IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW WILL THE SPONSORS
//     OR THOSE WHO HAVE WRITTEN OR MODIFIED THIS CODE, BE LIABLE FOR
//     DAMAGES, INCLUDING ANY LOST PROFITS, LOST MONIES, OR OTHER SPECIAL,
//     INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR
//     INABILITY TO USE (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA
//     BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY THIRD PARTIES OR A
//     FAILURE OF THE PROGRAM TO OPERATE WITH OTHER PROGRAMS) THE PROGRAM,
//     EVEN IF YOU HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES,
//     OR FOR ANY CLAIM BY ANY OTHER PARTY.
//
//   Purpose:
//   Stereo Net Viewing tool.
```

```
3DStress_File_Type_V1.3.3_solaris
Time_Stamp      Wed Sep 20 12:27:31 2000
Format          3
Translate       0.0 0.0 0.0
Rotation        0.0 0.0 0.0
Minimum         0.000000 0.000000 -0.019709
Maximum         0.098247 0.033268 0.000359
Center          0.049123 0.016634 -0.009675
Segment_Count   684
Segment         3
```

```
------------ Example Module I -------------

//////////////////////////////////
// Class: CmdClass
//
// Description:
//
//  This class processes and stores
//  the data from the Sliders
//  (Stress Magnitude) window.  This
//  includes stress magnitudes, stress
//  directions, stress plunges, fluid
//  pressure, and tensile strength
//////////////////////////////////

class CmdClass {

------------ Example Module II -------------

//+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
//  Function:  mohrs3Tos1RatioScaleChange (not a member function)
//
//  File:  mohrOptionCB.c++
//
//  Arguments:  Widget, XtPointer, XtPointer callData
//
//  State Changes:  mohrObj.attributes->s3Tos1Ratio, updates the degree
//                  to which the stress are dependent when in dependent
//                  stress mode
//
//  Purpose:  This program updates the allows the user to change Poisson's
//            ratio in the calculation of dependency for dependent stresses
//
// Last Modified:  14 July 1997, Joshua Buckner (jbuckner@cs.trinity.edu)
//+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

------------ Example Module III -------------

//////////////////////////////////////////////////
//  Filename:    rotClass.hh
//  Author:      Brent Henderson
//  Date:        11-29-95
//
//  Purpose:
//  Computes rotation matrix (OpenGL style) based on mouse
//  movements.
//
```

```
Installation Test on sentum.cnwra.swri.edu
  a Sun Ultra 10 running Solaris 2.7

$ cd /tmp
$ ls /cdrom/000920_1413
stress.tar
$ tar -xvf /cdrom/000920_1413/stress.tar
<snipped file listing>
3ds_solaris/help/images/enable.gif
3ds_solaris/help/images/appendix5.gif
3ds_solaris/help/images/surfacetool_xv.gif
3ds_solaris/help/images/ratgraph3.gif
3ds_solaris/help/images/magtool3.gif
3ds_solaris/help/images/tendplot2_sc_xv.gif
3ds_solaris/help/images/mapbar.gif
3ds_solaris/help/images/ratgraph_sc.gif
3ds_solaris/help/images/appendix2.gif
<snipped file listing>
$ ls 3ds_solaris
README  bin     data    help    libs    src
$ cd 3ds_solaris/bin
$ LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/tmp/3ds_solaris/libs
$ export LD_LIBRARY_PATH
$ 3dstress.exp
$
<succesful run>
```

SOFTWARE VALIDATION REPORT FOR 3DSTRESS™, VERSION 1.3.3

Prepared for

U.S. Nuclear Regulatory Commission
Contract NRC–02–97–009

Prepared by

Nathan M. Franklin
David A. Ferrill

Center for Nuclear Waste Regulatory Analyses
San Antonio, Texas

November 2001

Approved by:

H. Lawrence McKague, Element Manager
Geology and Geophysics

11/16/01
Date

1 SCOPE

This report documents validation of the functionality of 3DStress™, version 1.3.3. This software application was developed by the Center for the Nuclear Waste Regulatory Analyses (CNWRA) at Southwest Research Institute. This validation uses test results from the documented changes to 3DStress™, versions 1.3.1 and 1.3.2, and previous testing and validation of 3DStress™, version 1.3. A Software Validation Test Plan for version 1.3.3 was not created because no additional testing for this version was required beyond that which has already been performed with the software change reports (SCR) and the installation testing.

2 VALIDATION OF 3DSTRESS™ 1.3.3

The 3DStress™, version 1.3 application was tested and validated on July 15–16, 1998 at the CNWRA. Software changes that occurred after version 1.3 are documented in the Software Change Reports for 3DStress™, versions 1.3.1, 1.3.2, and 1.3.3. With each software change, the problem, resolution, and testing are documented in a software change report (SCR). These changes are summarized in Appendix A. The changes in 3DStress™, versions 1.3.1 and 1.3.2 primarily pertain to the user interface. Version 1.3.3 of 3DStress™ created both a Solaris and Irix version of 3DStress™ and changed the format of the help files from Showcase to HTML.

3 REFERENCED DOCUMENTS

The following documents are referenced or were used as the basis for this validation:

3DStress™ Software Validation Test Plan for version 1.3	15 July 1998
3DStress™ Software Test Report for version 1.3	16 July 1998
Software Change Reports for 3DStress™, version 1.3.1	13–14 July 1999
Software Change Reports for 3DStress™, version 1.3.2	7 Sept 1999
Software Change Reports for 3DStress™, version 1.3.3	11–15 Sep 1999

4 SUMMARY

The last major release of 3DStress™ was version 1.3. Version 1.3 was validated on July 16, 1998. Subsequent modifications have been relatively minor, limited to the user interface and the ability of compiling the program on the Solaris operating system. These modifications have all been documented, implemented, and tested in software change reports. Incremental upgrades of 3DStress™ have been named 3DStress™, versions 1.3.1, 1.3.2, and 1.3.3. As stated in TOP–018:

> "Software validation shall consist of (i) tests that provide evidence of correct and successful implementation of the underlying theory and algorithms, as appropriate, and outlined in the SRD, and (ii) benchmarking or comparative testing against results from other software."

The modifications to the validated 3DStress™, version 1.3 do not alter the implementation of the underlying theory and algorithms of 3DStress™. Through the validation of 3DStress™, version 1.3 and the thorough documentation and testing of all subsequent changes to 3DStress™, 3DStress™ v.1.3.3 for the Irix and Solaris operating systems is considered validated.

APPENDIX
Software Change Reports

SCR #	**3DStress™, version 1.3.1.**
262	Improved the splash screen.
263	Increased the max fluid pressure from 100 to 1000 in the options window of the Mohr graph.
264	Displayed the formula for effective stress in the Mohr Graph and its options window.
265	Fixed the module that converted EarthVision™ grd files to asci flt files.
266	Added primes and asterisks to the Mohr graph.
267	Removed the unnecessary bounds on effective stresses in the Mohr graph.
268	Renamed "apply" button to "update" button in the options window of the Mohr graph.
269	Corrected Motif scale errors when minimum and maximum are close to each other in the options window of the Mohr graph.

	3DStress™, version 1.3.2.
279	Changed graph so that it updates in real time as the sliders are moved.

	3DStress™, version 1.3.3.
315	Changed location of the variable initialization and removed extraneous final commas in some motif function calls to allow compilation on Solaris 2.7's djgcc compiler.
317	Converted the format of the help files from Showcase to HTML.
318	Changed the location of some open GL header files because they are located in different directories on Solaris and Irix.
319	Changed the version number.
320	Implemented the tool for manipulating the coverage depth in the 3D Fault Viewer.

Software Change Reports

SOFTWARE CHANGE REPORT (SCR)

1. SCR No. (*Software Developer Assigns*):	2. Software Title and Version:	3. Project No:
GLGR-SCR- 315	3DStress 1.3.3 (IRIX & Solaris)	20-01402-472

4. Affected Software Module(s), Description of Problem(s):

Latest djgcc compiler g++ for Solaris 2.7 would not compile the 3DStress source code because the code contained nonstandard items.

Specifically:
a) variable initialization inside one block and variable use in an outer block
b) extraneous final commas appeared in the argument list of some Motif function calls

5. Change Requested by:	6. Change Authorized by (*Software Developer*):
David A. Ferrill **Date:** 10 December 1999	David A. Ferrill **Date:** 10 December 1999

7. Description of Change(s) or Problem Resolution (*If changes not implemented, please justify*):

a) variables are now initialized in the highest level block in which they are used
b) the extraneous final commas in the argument lists were removed

8. Implemented by:	Date:
Joshua Buckner	31 December 1999

9. Description of Acceptance Tests:

See attached.

10. Tested by:	Date:
ALAN MORRIS	15 SEP 2000

CNWRA Form TOP-5 (05/2000)

9. Description of Acceptance Test:

   a. Start 3Dstress 1.3.3_Solaris on a Sun machine running the Solaris 2.7 Operating System.

1 b. Open the Mohr Graph Window by clicking on the Mohr button on the Control Bar.

2 c. Ensure that dragging the Mohr Graph with the left mouse button changes the position of the graph.

3 d. Ensure that dragging the Mohr Graph with the middle mouse button zooms in.

4 (grids off) e. Ensure that the Mohr Graph's hot keys work as described in the Quick Help dialog box. This dialog box is accessed by selecting Quick Help from the help pull-down menu at the upper right of the Mohr Graph Window.

5 (inner grids off)

6 (solid shading)

   f. Open the Mohr Options Window by clicking on the options button at the top of the Mohr Graph Window.

   g. Set the σ Max Value slider to 150 in the Mohr Options Window.

   h. Change the magnitudes of the σ U, V, and W sliders to 133, 108, and 68 respectively via their magnitude sliders in the Mohr Options Window.

   i. Change the Fluid Pressure Slider to 43 in the Mohr Options Window.

   j. Click the Update Button near the bottom left of the Mohr Options Window.

   k. Open the Magnitude Tool by clicking on the Sliders Button on the Control Bar.

Print file l. Use the Save Button near the top of the Magnitude Tool to save the Stress Magnitude and Direction information to disk.

   m. Change the V Direction Slider on the Magnitude Tool to 28.

   n. Open the Options Window by clicking on the Options Button on the Control Bar.

   o. In the Options Window, change the Step Size to 1 by clicking on the radio button labeled 1 under the Step Size Heading.

   p. Open the 3D Fault Viewer by clicking on the 3Dview Button on the Control Bar.

q. Load the file flt010_bowRidge020.flt into the 3D Fault Viewer by clicking on the Load Button near the upper left corner of the 3D Fault Viewer and using the standard file selector.

r. Open the Fault Builder by clicking on the Builder Button near the top of the 3D Fault Viewer.

s. Click on the Start Triangle Button near the upper left corner of the Fault Builder.

t. Hold down the Control Key and using the left mouse button, drag the corner of the new triangle that appeared in the corner of the Bounding Box labeled N.

u. Click the End Triangle Button near the top of the Fault Builder.

v. Click the Options Button near the top of the 3D Fault Viewer.

print file w. Click the Save File(s) Button near the lower left corner of the 3D Fault Viewer's Options Window and save the 3D data to disk using the file selector that appears.

x. Open the Map Viewer by clicking the Map Button on the Control Bar.

y. Load the file frizzell.lin into the Map Viewer from the data directory of the root installation of 3Dstress by clicking on the Load Button near the top of the Map Viewer and using the standard file selector.

z. Load the coverage worldutmz11.lin into the Map Viewer from the data directory of the root installation of 3Dstress by clicking on the Load Button near the bottom of the Map Viewer's Coverage Tool and using the standard file selector. Then, press the Coverage Tool's Close Button.

aa. Open the Line Builder by clicking on the Builder Button near the top of the Map Viewer.

bb. Click the Start Line Button near the upper left corner of the Line Builder.

cc. Hold down the Control Key and using the left mouse button, drag the top end of the new line that appeared on the left side of the Map Viewer's Bounding Box to the upper right corner of the Bounding Box.

dd. Click the End Line Button of the Line Builder.

screenshot 7 → ee. Open the Rose Diagram by clicking on the Rose Button near the top of the Map Viewer.

ff. Open the Stress Ratio Graph by clicking on the Graph Button on the Control Bar.

gg. Click the right mouse button in the Stress Ratio Graph and confirm that the graph changes from a natural log scale to a log base 10 scale.

hh. Click the left mouse button over the center of the Stress Ratio Graph and confirm that the Stereograph Slip Tendency Plot changes.

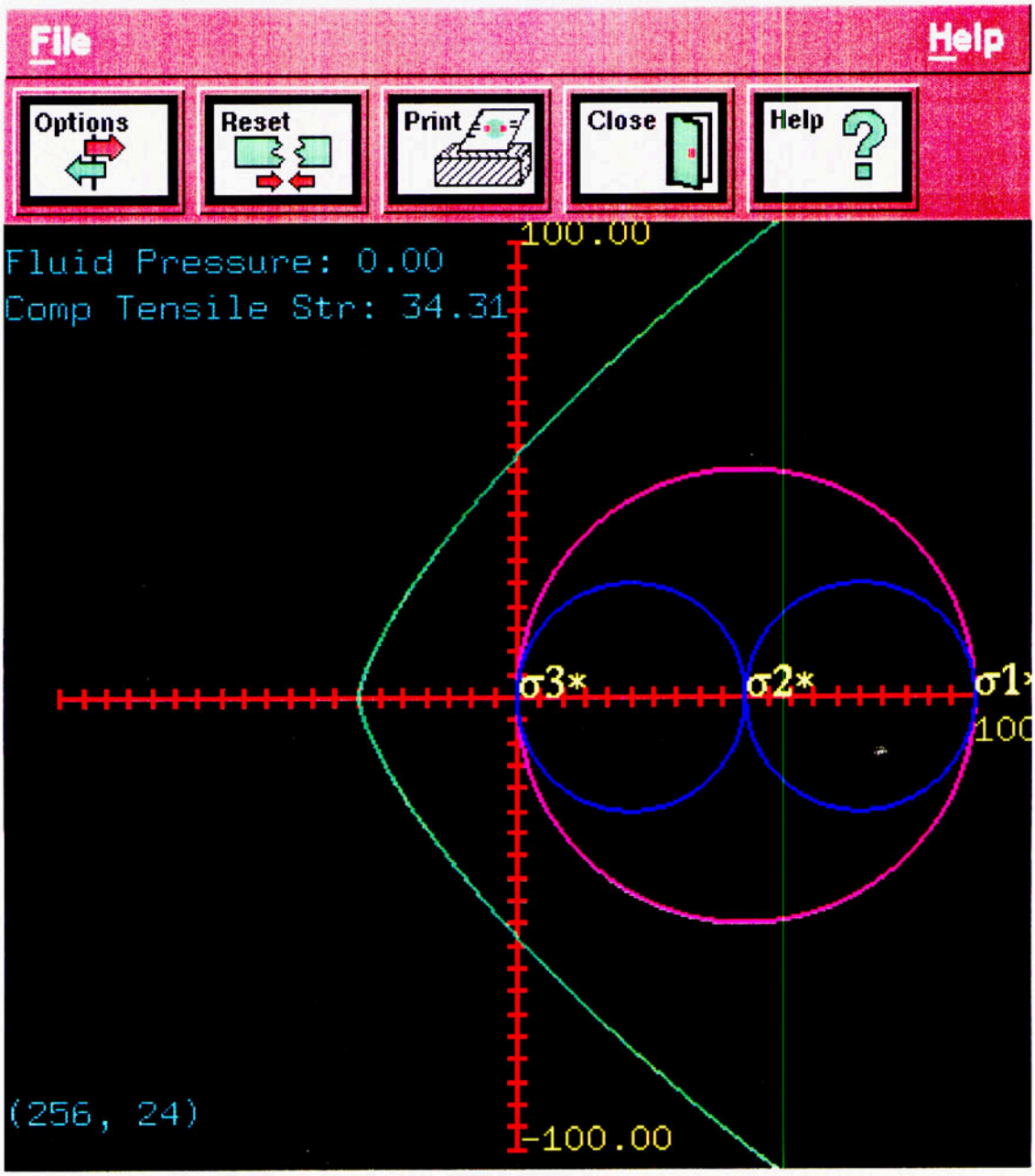
ii. Open the Surface Viewer by clicking on the 3Dsurf Button on the Control Bar.

jj. Open the Surface Viewer's Options Window by clicking on the Options Button on the Surface Viewer.

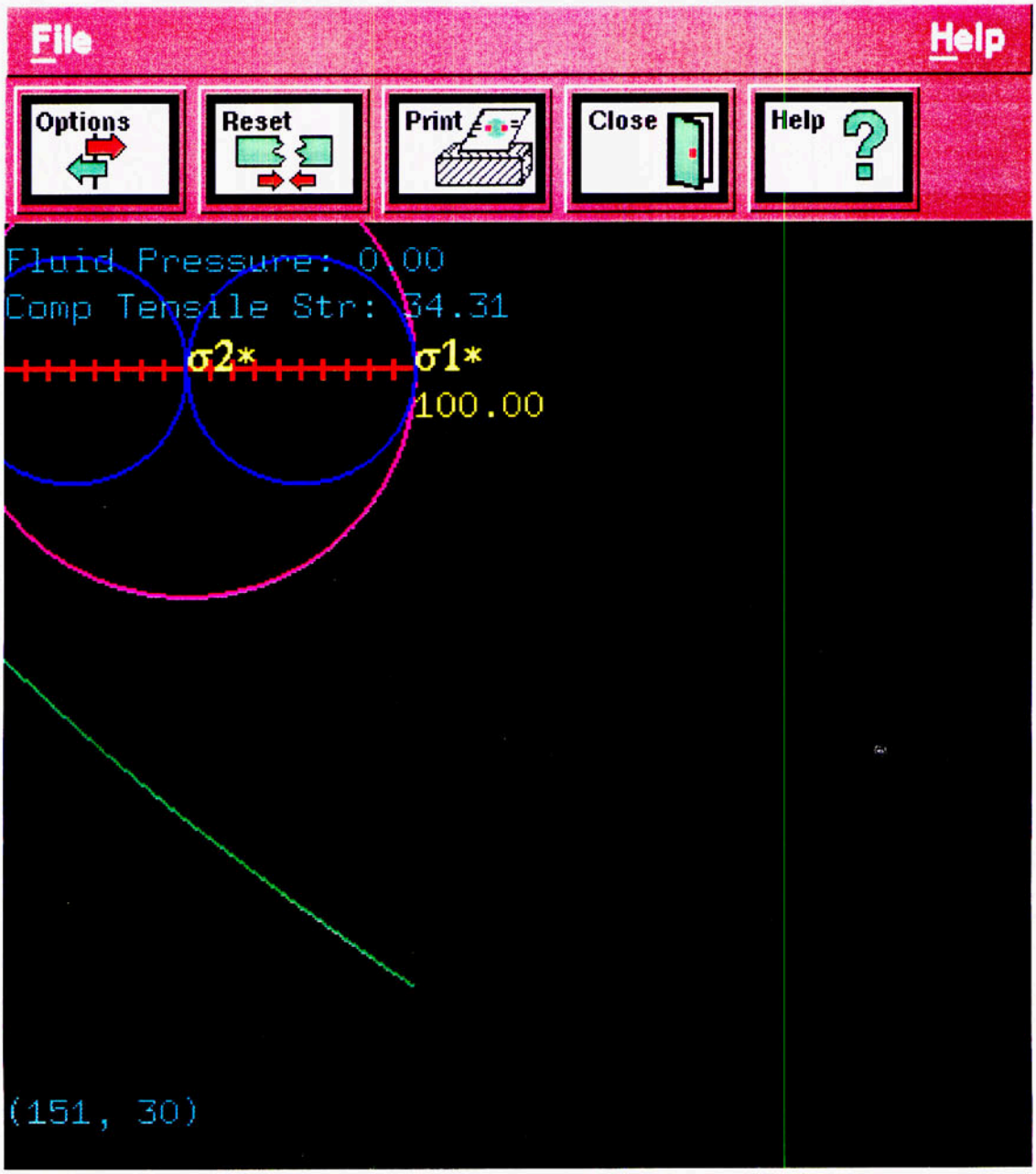
kk. Click the right arrow next to the label Vertical Exaggeration several times and confirm that the object in the Surface Viewer becomes longer.

Print all the outputs from the above steps and attach to this form. If 3Dstress does not crash during the completion of these test then it has passed this acceptance test.

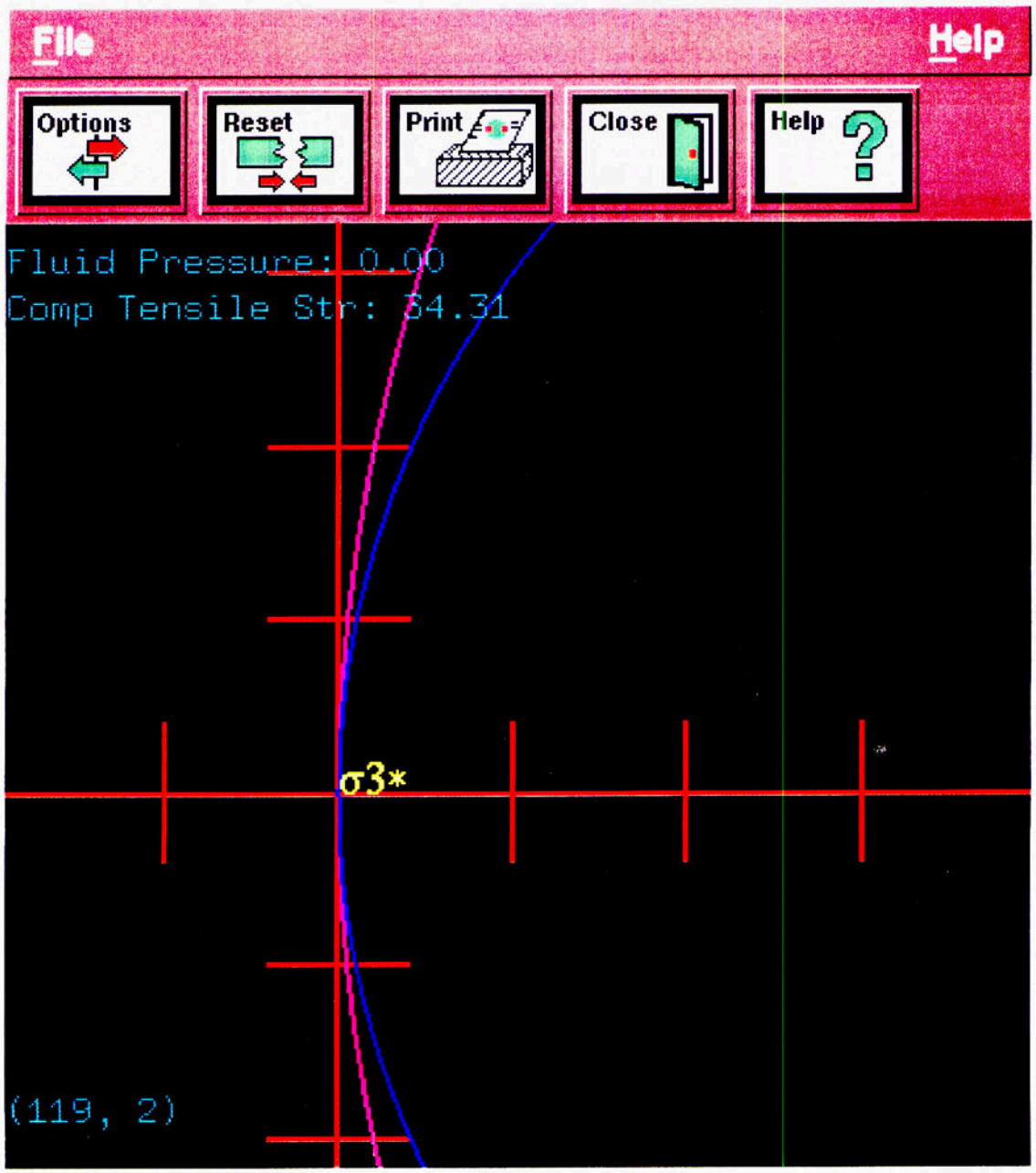
User: jbuckner
Host: pluto
Class: pluto
Job: help_315_01scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
100.00
σ3*
σ2*
σ1*
100
-100.00
(256, 24)

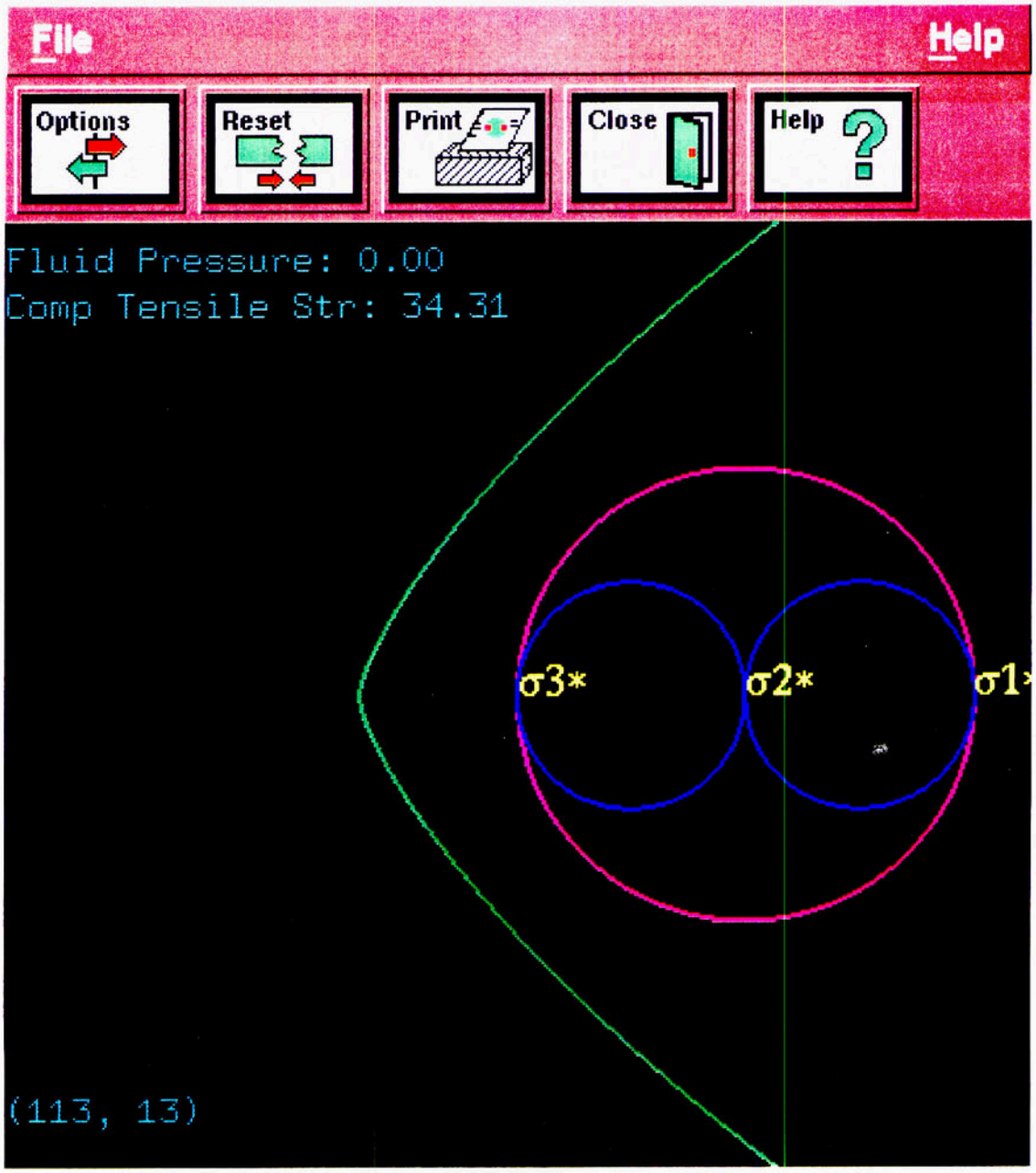
User: jbuckner
Host: pluto
Class: pluto
Job: help_315_02scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
σ2*
σ1*
100.00
(151, 30)

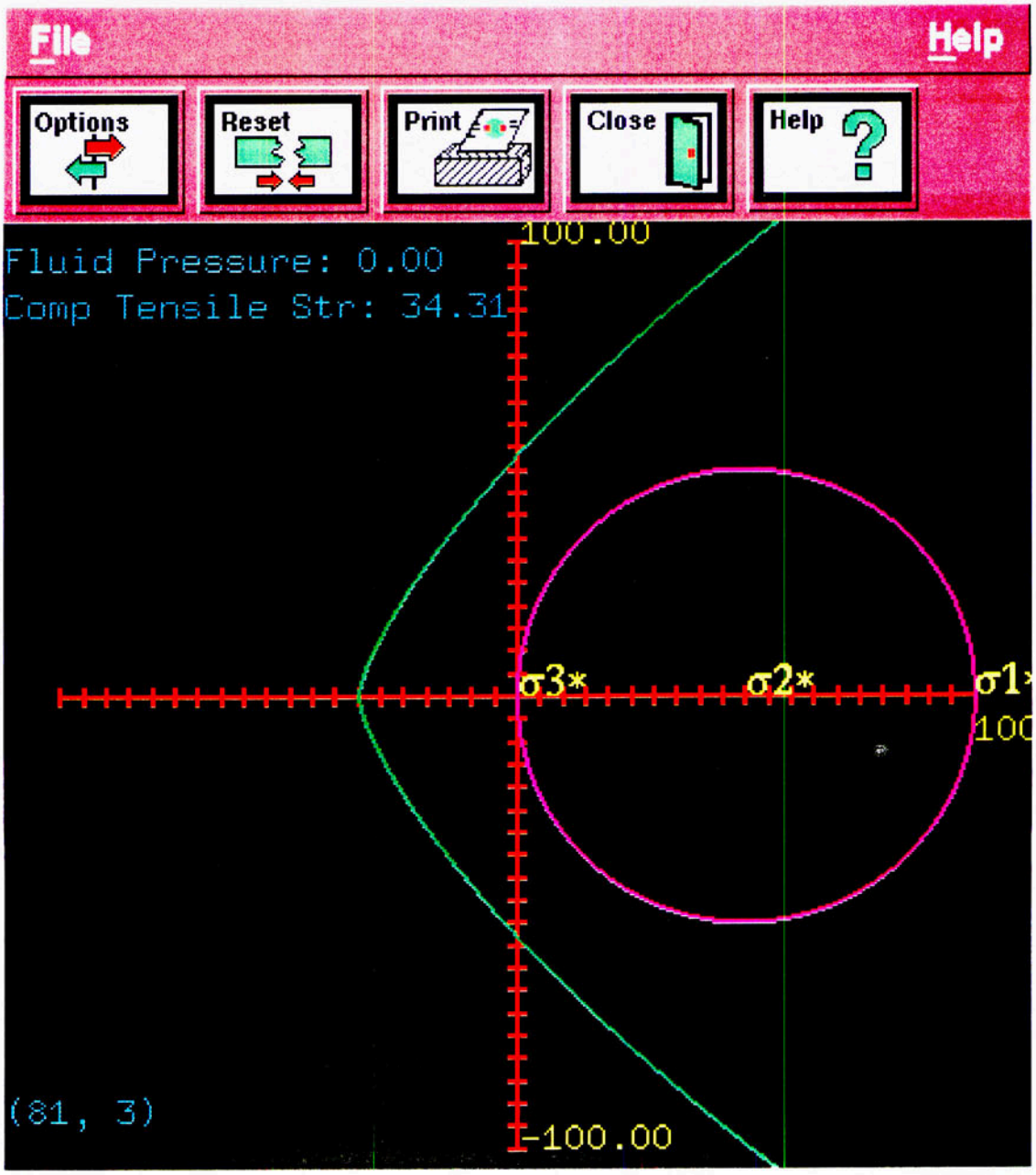
User: jbuckner
Host: pluto
Class: pluto
Job: help_315_03scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
σ3*
(119, 2)

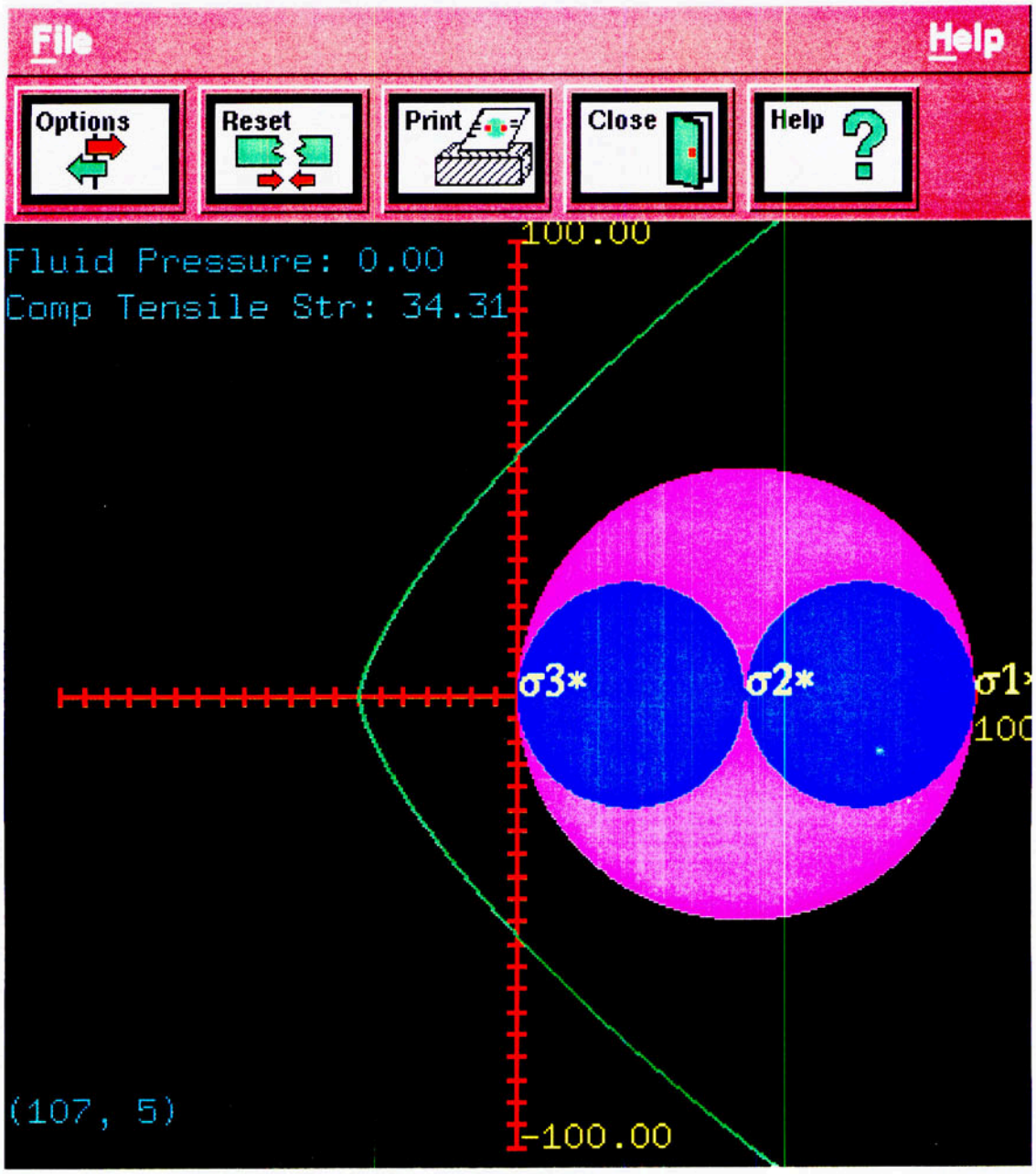
User: jbuckner
Host: pluto
Class: pluto
Job: help_315_04scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
σ3*
σ2*
σ1*
(113, 13)

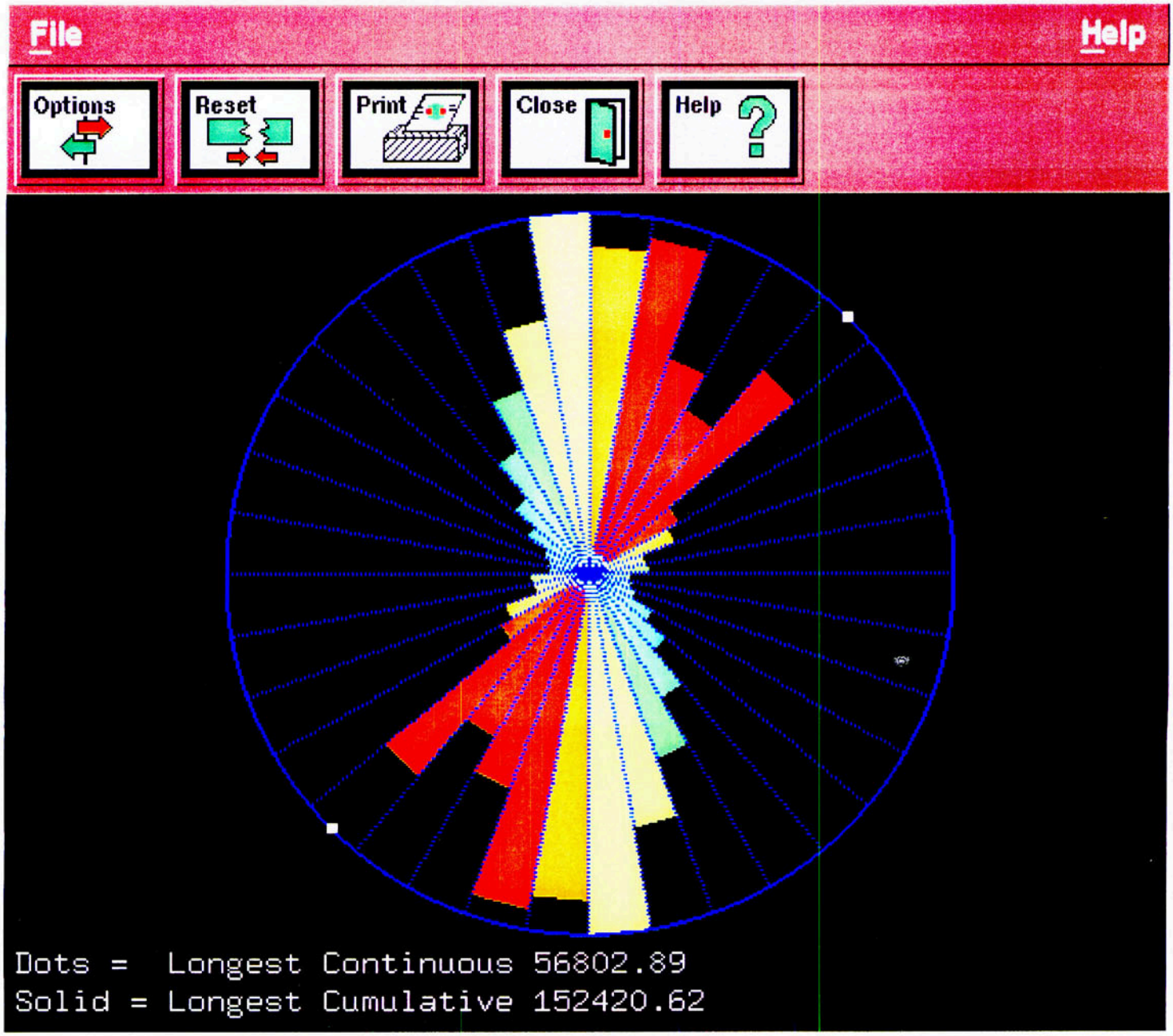
User: jbuckner
Host: pluto
Class: pluto
Job: help_315_05scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
100.00
σ3*
σ2*
σ1*
100
(81, 3)
-100.00

User: jbuckner
Host: pluto
Class: pluto
Job: help_315_06scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
100.00
σ3*
σ2*
σ1*
100
(107, 5)
-100.00

User: jbuckner
Host: pluto
Class: pluto
Job: help_315_07scr_sun.ps


File
Help
Options
Reset
Print
Close
Help
Dots = Longest Continuous 56802.89
Solid = Longest Cumulative 152420.62

User: jbuckner
Host: pluto
Class: pluto
Job: help_315_02scr_sun.ps

User: jbuckner
Host: pluto
Class: pluto
Job: help_315_03scr_sun.ps

```
90 65 25
0 90
0 0
90 0
43.000000 -34.313461
0
```

User: jbuckner
Host: pluto
Class: pluto
Job: help_315_02flt_sun.ps

```
#3DStress_Lin_Type_V1.3.3_IRIX
#Generated_By   josh
#Time_Stamp     Fri Sep 15 10:19:08 2000
100
549472.919192 4073999.000000 46.619690
549472.919192 4074059.416107 40.906990
549533.242424 4073999.000000 142.565216
549533.242424 4074059.416107 139.699020
549593.565657 4073999.000000 237.225616
549593.565657 4074059.416107 237.393967
549653.888889 4073999.000000 330.442963
549653.888889 4074059.416107 333.696564
549714.212121 4073999.000000 421.979370
549714.212121 4074059.416107 428.235962
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END
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SOFTWARE CHANGE REPORT (SCR)

1. SCR No. (*Software Developer Assigns*):	2. Software Title and Version:	3. Project No:
GLGP-SCR ~ 316	3DStress 1.3.3 (IRIX & Solaris)	20-01402-472

4. Affected Software Module(s), Description of Problem(s):

The current application used to view help files, Showcase, is only available on the SGI platforms. The 3DStress software needs to be modified so that the help button launches a common HTML browser that will be generally available for the Sun Solaris and SGI IRIX platforms.

5. Change Requested by:	6. Change Authorized by (*Software Developer*):
David A. Ferrill **Date:** 10 December 1999	David A. Ferrill **Date:** 10 December 1999

7. Description of Change(s) or Problem Resolution (*If changes not implemented, please justify*):

The help viewer is now Netscape which is available for most popular computing platforms. This change takes the form of changing the arguments in the call to execlp from showcase with its switches to netscape in helpClass.c++.

8. Implemented by:	Date:
Joshua Buckner	31 December 1999

9. Description of Acceptance Tests:

See attached.

10. Tested by:	Date:
Darrell Sims	11 SEP 00

CNWRA Form TOP-5 (05/2000)

9. Acceptance Test:

a) start 3DStress 1.3.3_Solaris on a Sun machine running the Solaris 2.7 Operating System (henceforth known as the Sun session)

b) start 3DStress 1.3.3_IRIX on an SGI machine running the IRIX 5.x or later operating system (henceforth known as the SGI session)

The rest of the steps should be taken on both sessions:

c) open the Magnitude Tool window by clicking the Sliders button on the Control Bar

d) click the Help button near the top of the Magnitude Tool

e) click inside the right from of the help file that has been automatically loaded in the Netscape browser

f) select Print Frame from the file menu of the Netscape browser that should appear and print the first page of the help file that has been automatically loaded

g) close the Netscape browser by selecting exit from its file menu

h) click the Help button on the Control Bar

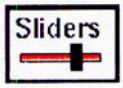
i) repeat steps e, f, and g

j) from the IRIX command prompt, start Netscape and load the following files from the directory tree rooted at the 3DStress installation in the 'help/htmldocs' directory: Magnitude_Tool.html and openingpageCOLS.html

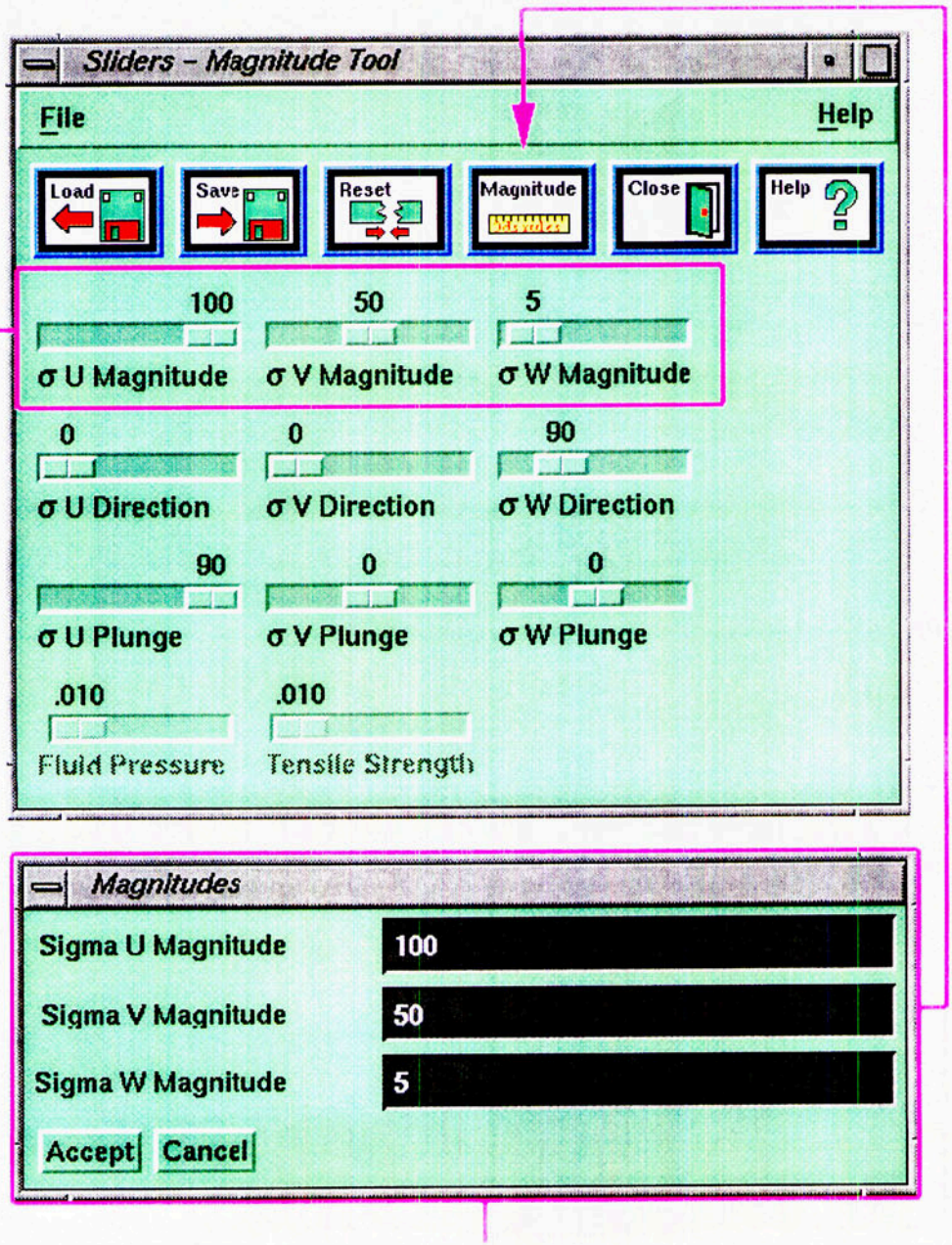
k) print the first page of each file

If the printings from within 3DStress are identical to the front pages printed from the files loaded via Netscape manually, the new version of 3DStress has passed the test.

Magnitude Tool

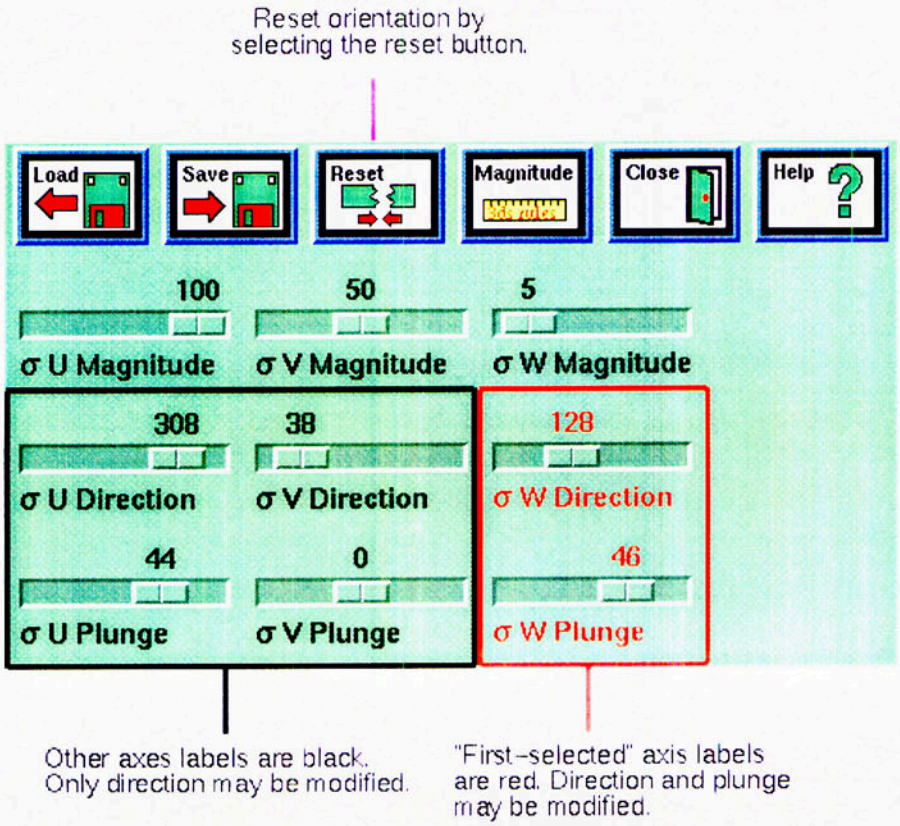


Stress magnitudes can be modified by using either the left or middle mouse button to select the desired normalized magnitude on the stress magnitude sliders. Input magnitudes range from 1 to 100 on each slider.



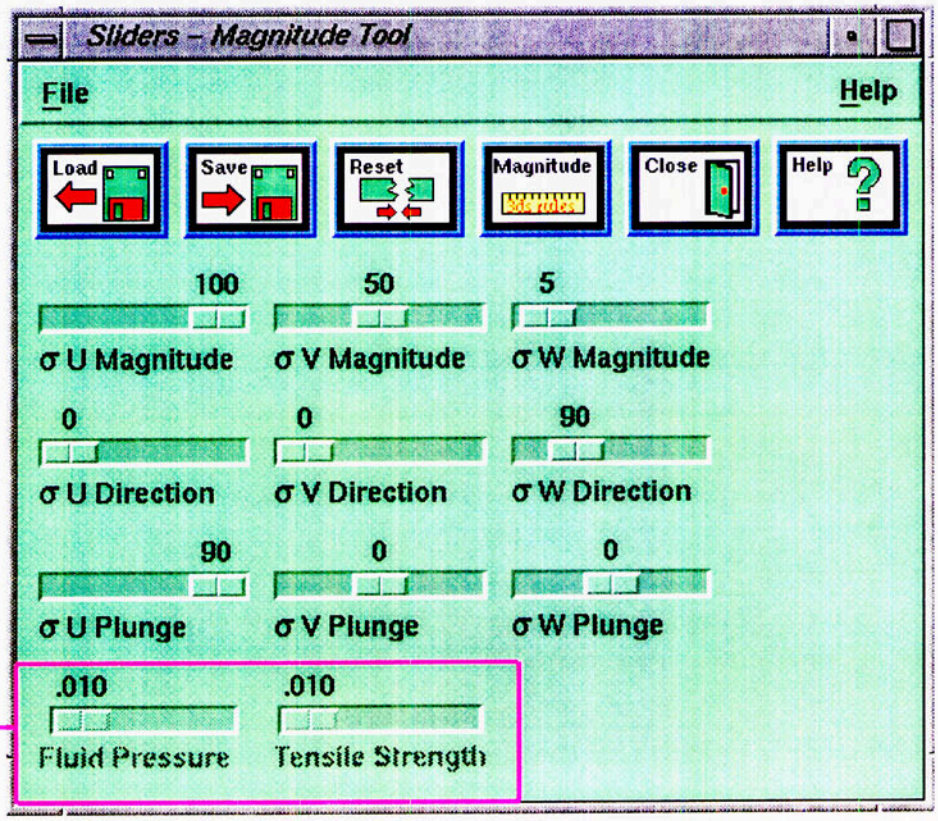
Use the magnitudes entry window to enter true magnitudes from the keyboard. The program will automatically normalize the input values to range from 1 to 100 while maintaining the correct magnitude ratios.

Stress orientations are shown in degrees and are selected by using the left and middle **mouse buttons** with the orientation control **sliders**. The labels of the first axis selected will turn red. The **direction** and **plunge** of the **first-selected axis** may be entered. Only **direction** changes are allowed for the **other two axes**. Pressing the reset button will **reset** the orientations and allow selection of a new first-selected axis. Directions range from 0 to 360 and plunges range from 0 to 90 in order to enable any measured or simulated 3D stress orientation.

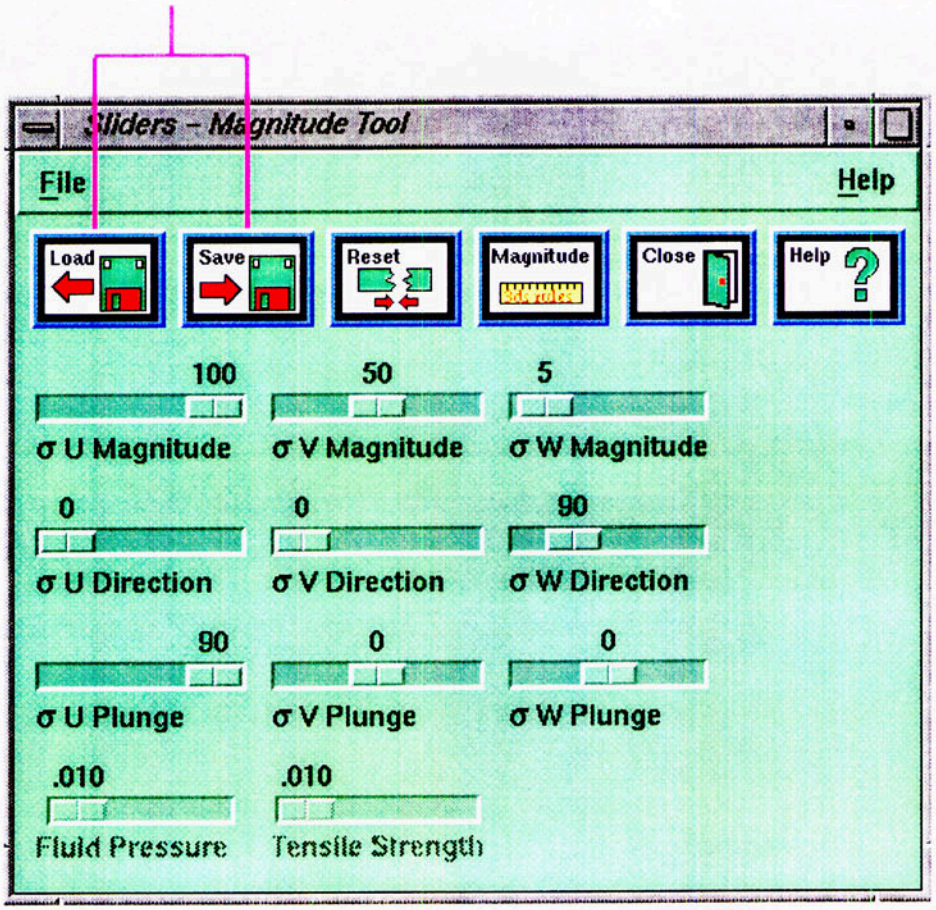


Fluid pressure and tensile strength may be used when computing leakage factor (see options).

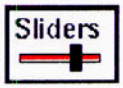
Values are changed by using the left and right mouse buttons.



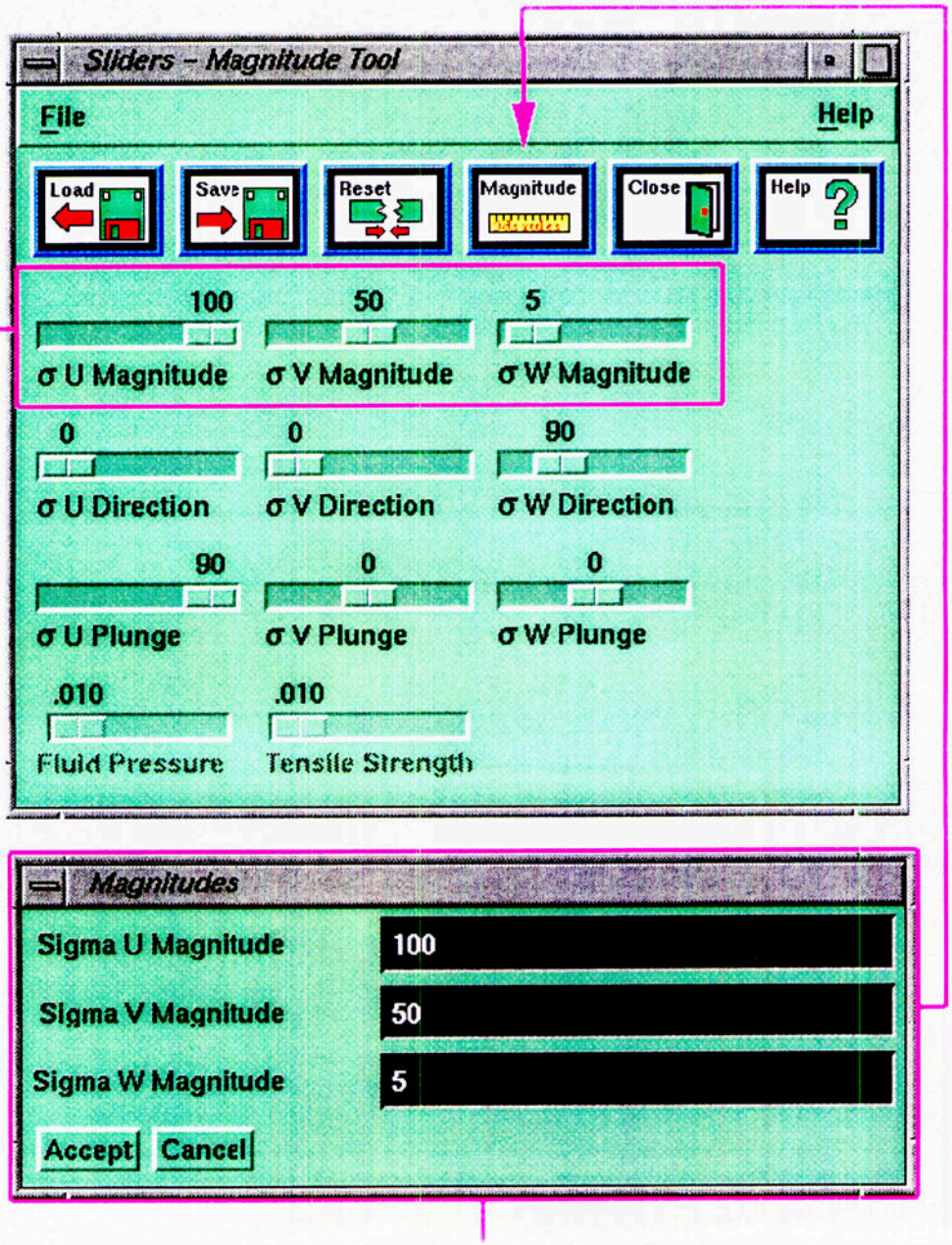
Stress magnitudes and orientations may be saved by pressing the save button and specifying a file name. These values may then later be reapplied by using the load button and choosing a file.



Magnitude Tool



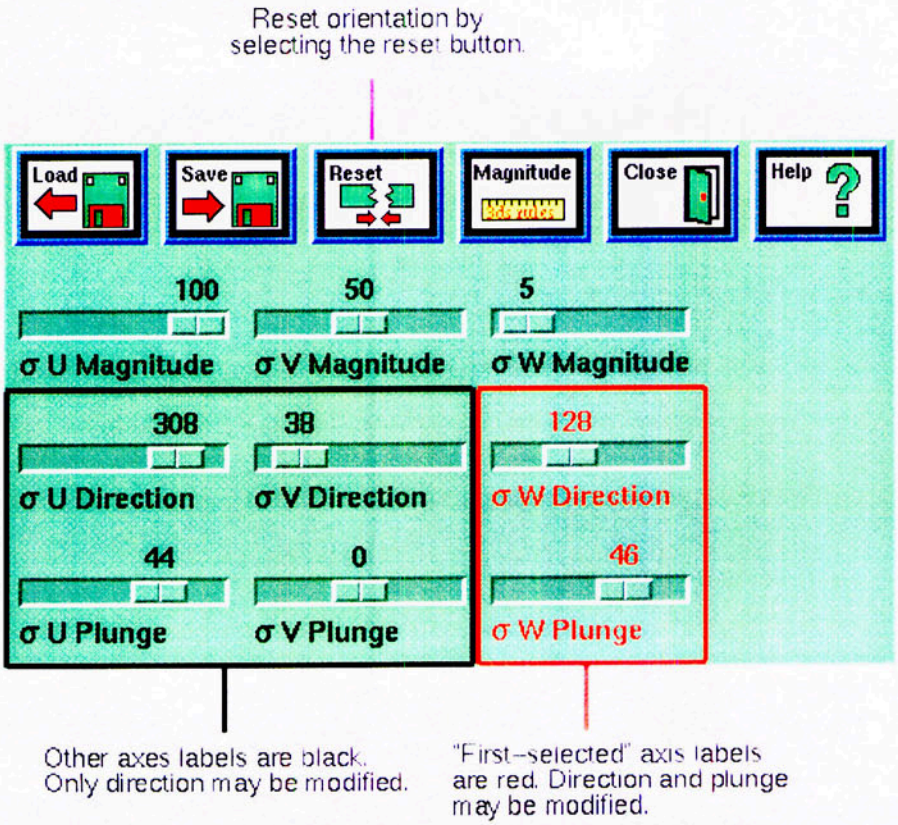
Stress magnitudes can be modified by using either the left or middle mouse button to select the desired normalized magnitude on the stress magnitude sliders. Input magnitudes range from 1 to 100 on each slider.



Use the magnitudes entry window to enter true magnitudes from the keyboard. The program will automatically normalize the input values to range from 1 to 100 while maintaining the correct magnitude ratios.

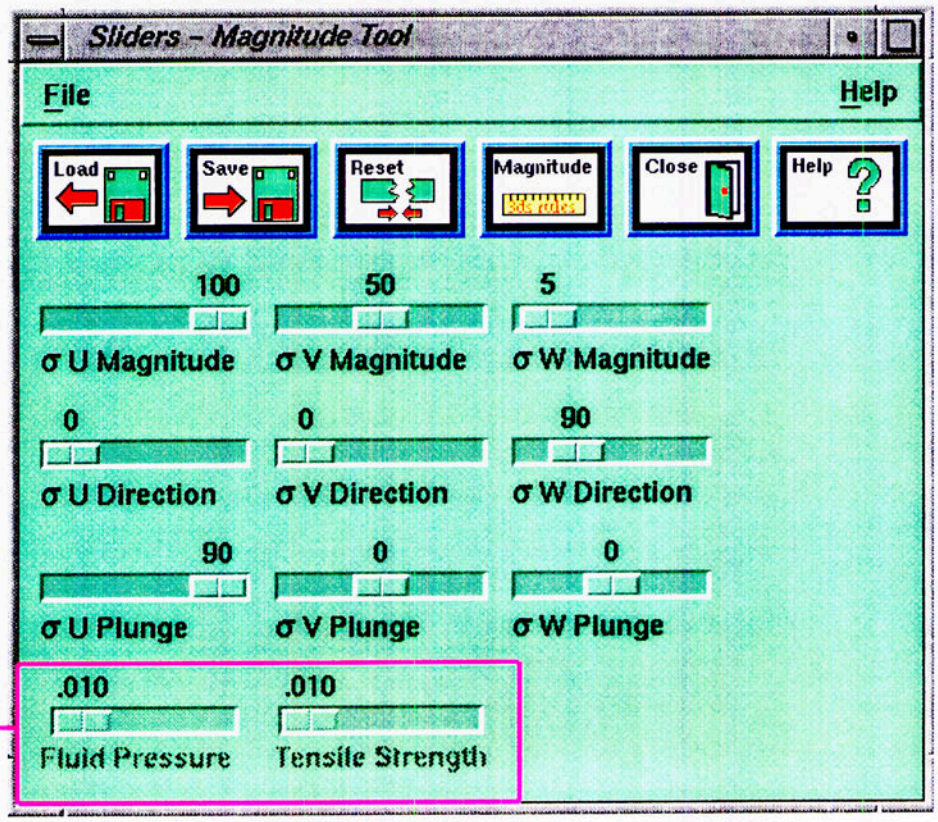
561

Stress orientations are shown in degrees and are selected by using the left and middle **mouse buttons** with the orientation control **sliders**. The labels of the first axis selected will turn red. The **direction** and **plunge** of the **first-selected axis** may be entered. Only **direction** changes are allowed for the **other two axes**. Pressing the reset button will **reset** the orientations and allow selection of a new first-selected axis. Directions range from 0 to 360 and plunges range from 0 to 90 in order to enable any measured or simulated 3D stress orientation.

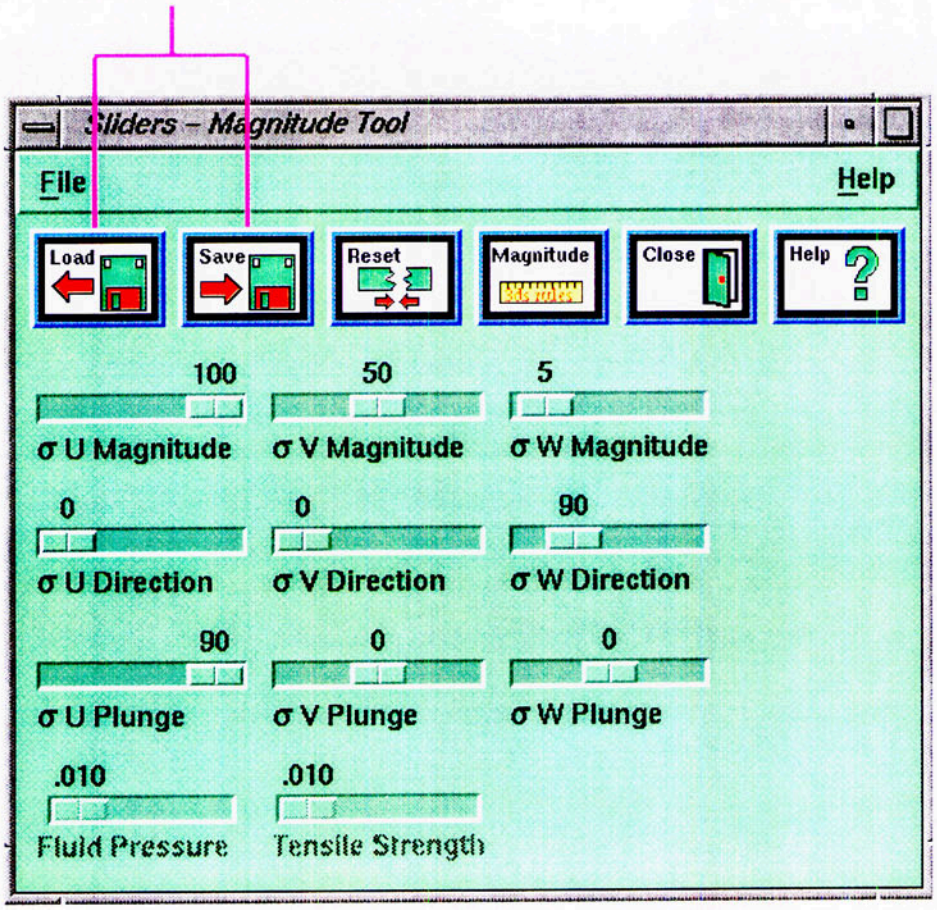


Fluid pressure and tensile strength may be used when computing leakage factor (see options).

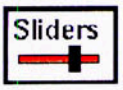
Values are changed by using the left and right mouse buttons.



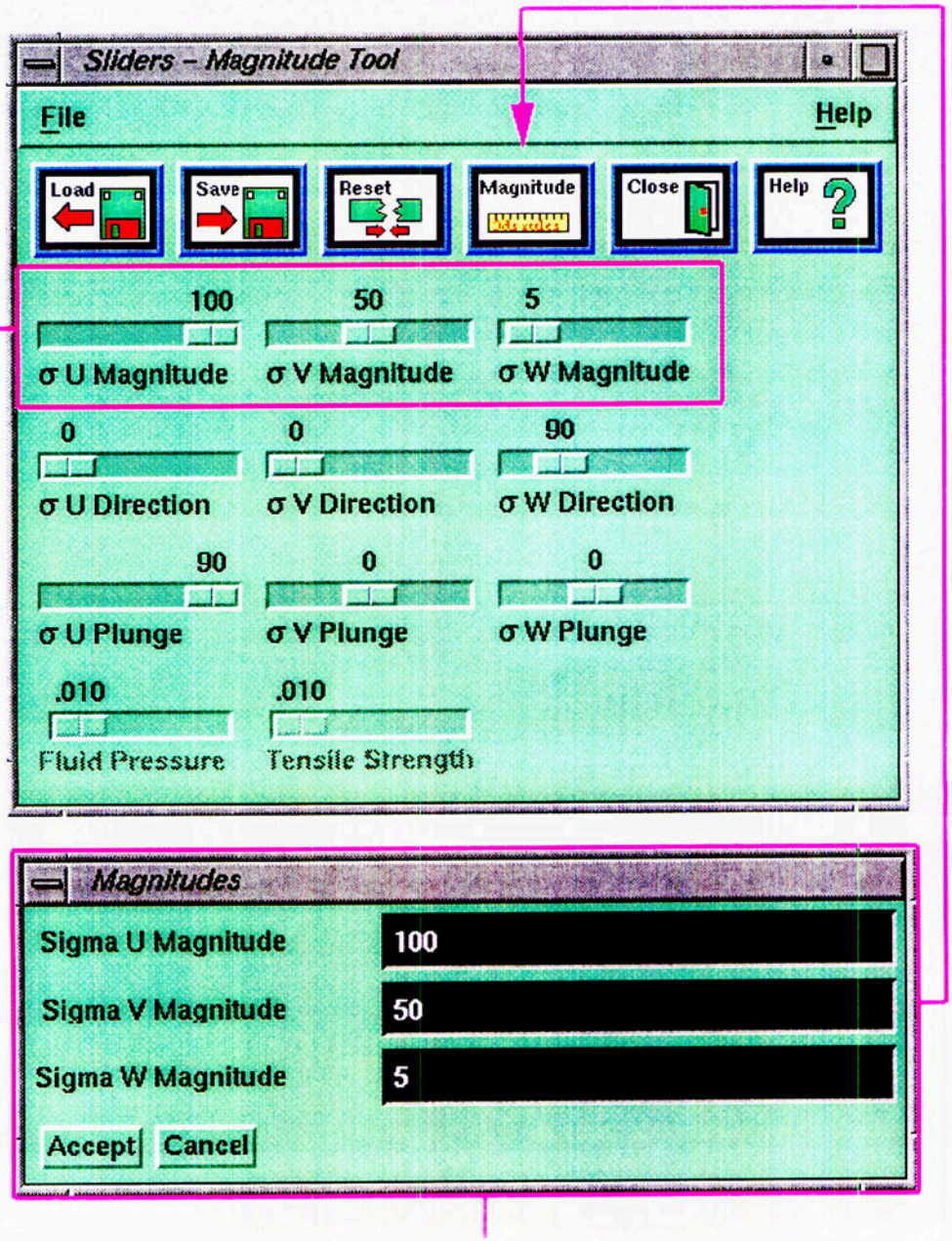
Stress magnitudes and orientations may be saved by pressing the save button and specifying a file name. These values may then later be reapplied by using the load button and choosing a file.



Magnitude Tool



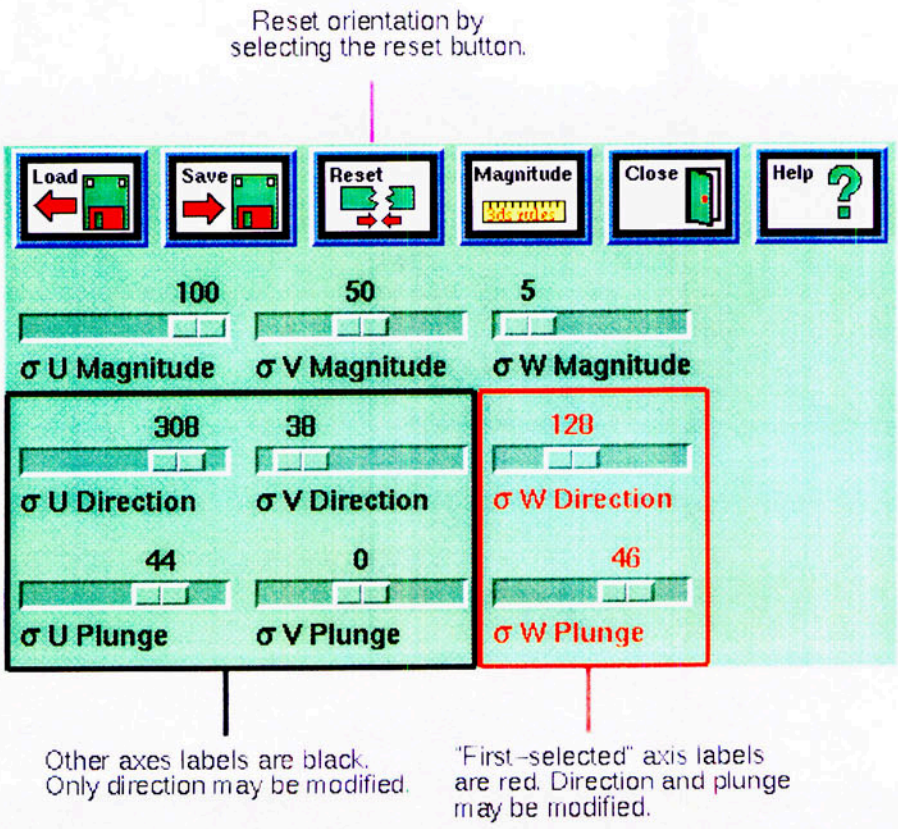
Stress magnitudes can be modified by using either the left or middle mouse button to select the desired normalized magnitude on the stress magnitude sliders. Input magnitudes range from 1 to 100 on each slider.



Use the magnitudes entry window to enter true magnitudes from the keyboard. The program will automatically normalize the input values to range from 1 to 100 while maintaining the correct magnitude ratios.

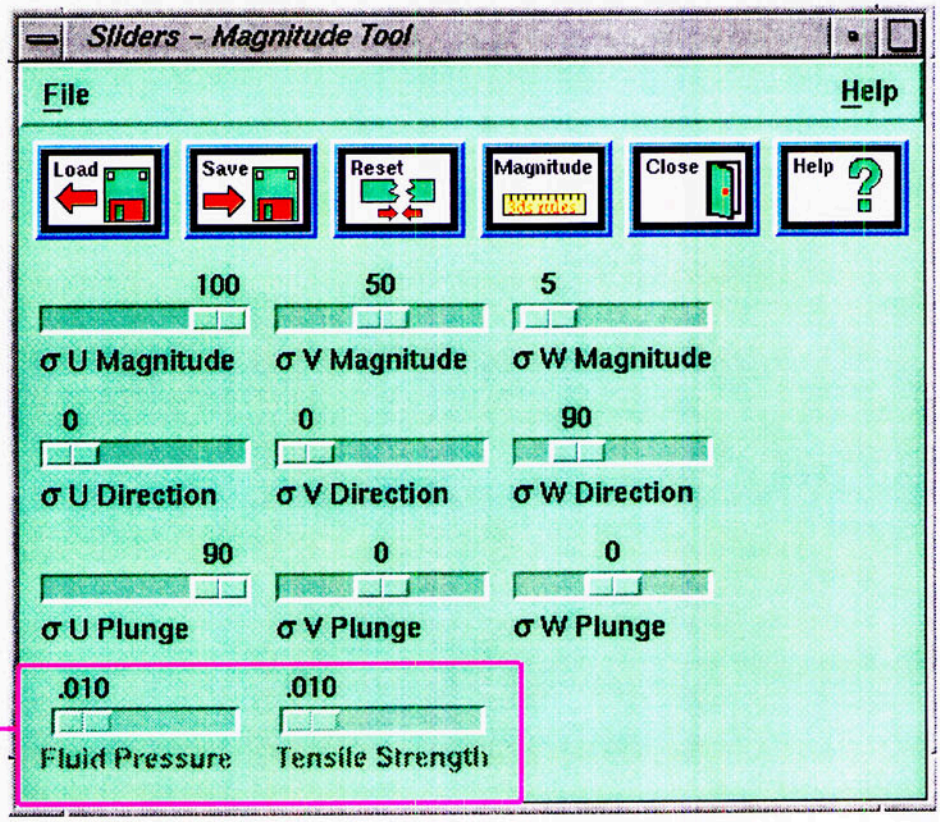
original Html file
SGI 4/1

Stress orientations are shown in degrees and are selected by using the left and middle **mouse buttons** with the orientation control **sliders**. The labels of the first axis selected will turn red. The **direction** and **plunge** of the **first-selected axis** may be entered. Only **direction** changes are allowed for the **other two axes**. Pressing the reset button will **reset** the orientations and allow selection of a new first-selected axis. Directions range from 0 to 360 and plunges range from 0 to 90 in order to enable any measured or simulated 3D stress orientation.

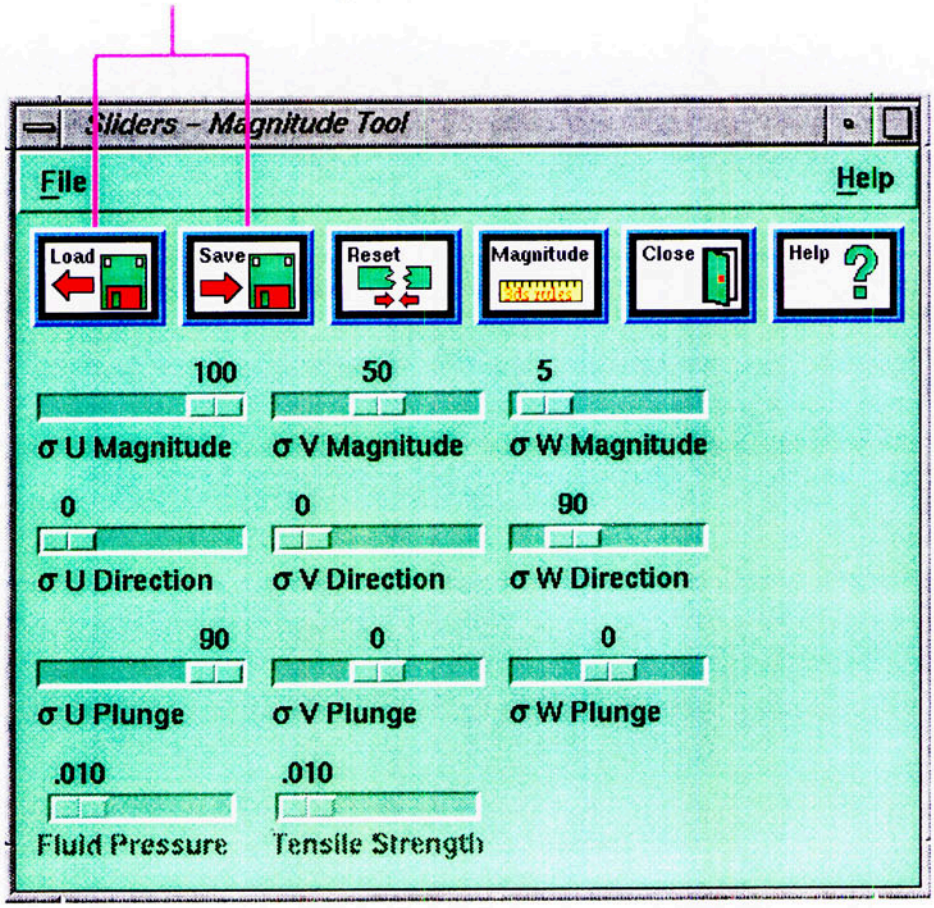


Fluid pressure and tensile strength may be used when computing leakage factor (see options).

Values are changed by using the left and right mouse buttons.



Stress magnitudes and orientations may be saved by pressing the save button and specifying a file name. These values may then later be reapplied by using the load button and choosing a file.



User's Guide for Version 1.3.3

3DStress was prepared as an account of work performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA) for the Division of Waste Management of the Nuclear Regulatory Commission (NRC), an independent agency of the United States Government. Neither the developer(s) of 3dstress nor any of their sponsors make any warranty, expressed or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represent that its use would not fringe on privately-owned rights.

Technical Support

For technical support for 3DStress contact:

Dr. David A. Ferrill, CNWRA, Southwest Research Institute, 6220 Culebra Road, San Antonio Texas 78238 USA, 210-522-6082 (voice), 210-522-5155 (fax), E-mail: dferrill@swri.edu

Hardware Requirements

Sun Ultra workstation running the Solaris 2.7 Operating System

User's Guide for Version 1.3.3

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Hardware Requirements

Silicon Graphics Workstation Running IRIX 5.x or later Operating System

Original Html

User's Guide for Version 1.3.3

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Hardware Requirements

Silicon Graphics Workstation Running IRIX 5.x or later Operating System

SOFTWARE CHANGE REPORT (SCR)

1. SCR No. (*Software Developer Assigns*):	2. Software Title and Version:	3. Project No:
GLGP-SCR- 317	3DStress 1.3.3 (Solaris & IRIX)	20-01402-472

4. Affected Software Module(s), Description of Problem(s):

The current help files are proprietary Showcase files and may only be viewed using Showcase which is only available on the SGI platforms (ie not on Sun platforms). The help files must be in a format that can be used with either 3DStress 1.3.3_Solaris or 3DStress 1.3.3_IRIX.

5. Change Requested by:	6. Change Authorized by (*Software Developer*):
David A. Ferrill **Date:** 10 December 1999	David A. Ferrill **Date:** 10 December 1999

7. Description of Change(s) or Problem Resolution (*If changes not implemented, please justify*):

The help files were rewritten in html format and will be used for both 3DStress 1.3.3_Solaris and 3DStress 1.3.3_IRIX.

8. Implemented by:	Date:
Karl Heinen, Brandi Winfrey, and Joshua Buckner	17 July 2000

9. Description of Acceptance Tests:

See attached.

10. Tested by:	Date:
	13 SEP 2000

9. Description of Acceptance Test:

a) start 3DStress 1.3.3_Solaris on a Sun machine running the Solaris 2.7 Operating System (henceforth known as the Sun session)

b) start 3DStress 1.3.3_IRIX on an SGI machine running the IRIX 5.x or later operating system (henceforth known as the SGI session)

The rest of the steps should be taken on both sessions:

c) click the Help button near the top of the Stereograph Slip Tendency Pot

d) click inside the right from of the help file that has been automatically loaded in the Netscape browser

e) select Print Frame from the file menu of the Netscape browser that should
1 appear and print the first page of the help file that has been automatically loaded

f) close the Netscape browser by selecting exit from its file menu

g) open the Magnitude Tool window by clicking the Sliders button on the Control Bar

c) click the Help button near the top of the Magnitude Tool

d) click inside the right from of the help file that has been automatically loaded in the Netscape browser

e) select Print Frame from the file menu of the Netscape browser that should
2 appear and print the first page of the help file that has been automatically loaded

f) close the Netscape browser by selecting exit from its file menu

g) open the Stress Ratio Graph window by clicking the Graph button on the Control Bar

h) click the Help button near the top of the Stress Ratio Graph

3 i) repeat steps d, e, and f

j) open the Mohr Graph window by clicking the Graph button at on Control Bar

k) click the Help button near the top of the Mohr Graph

4 l) repeat steps d, e, and f

m) open the 3D Fault Viewer window by clicking the 3Dviewer button on the Control Bar

k) click the Help button near the top of the 3D Fault Viewer Graph

5 l) repeat steps d, e, and f

m) open the Map Viewer window by clicking the Map button on the Control Bar

k) click the Help button near the top of the Map viewer

6 l) repeat steps d, e, and f

m) open the Surface Viewer window by clicking the 3Dsurf button on the Control Bar

k) click the Help button near the top of the Surface viewer

7 l) repeat steps d, e, and f

m) open the Options window by clicking the Options button on the Control Bar

k) click the Help button near the top of the Options window

8 l) repeat steps d, e, and f

m) click the Help button on the Control Bar

9 n) repeat steps d, e, and f

Read the outputs generated by these tests and confirm that the text and images appear as expected (ie are formatted correctly).

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_01_irix.ps

Tendency Plot

3DStress computes slip tendency based on a user-selected stress tate. The stress state is defined by the magnitudes and orientations of the orthogonal stress axes called σ_u, σ_v, and σ_w. The magnitude values in 3DStress are **normalized** to range from 1 to 100. These represent principal compressive stresses.

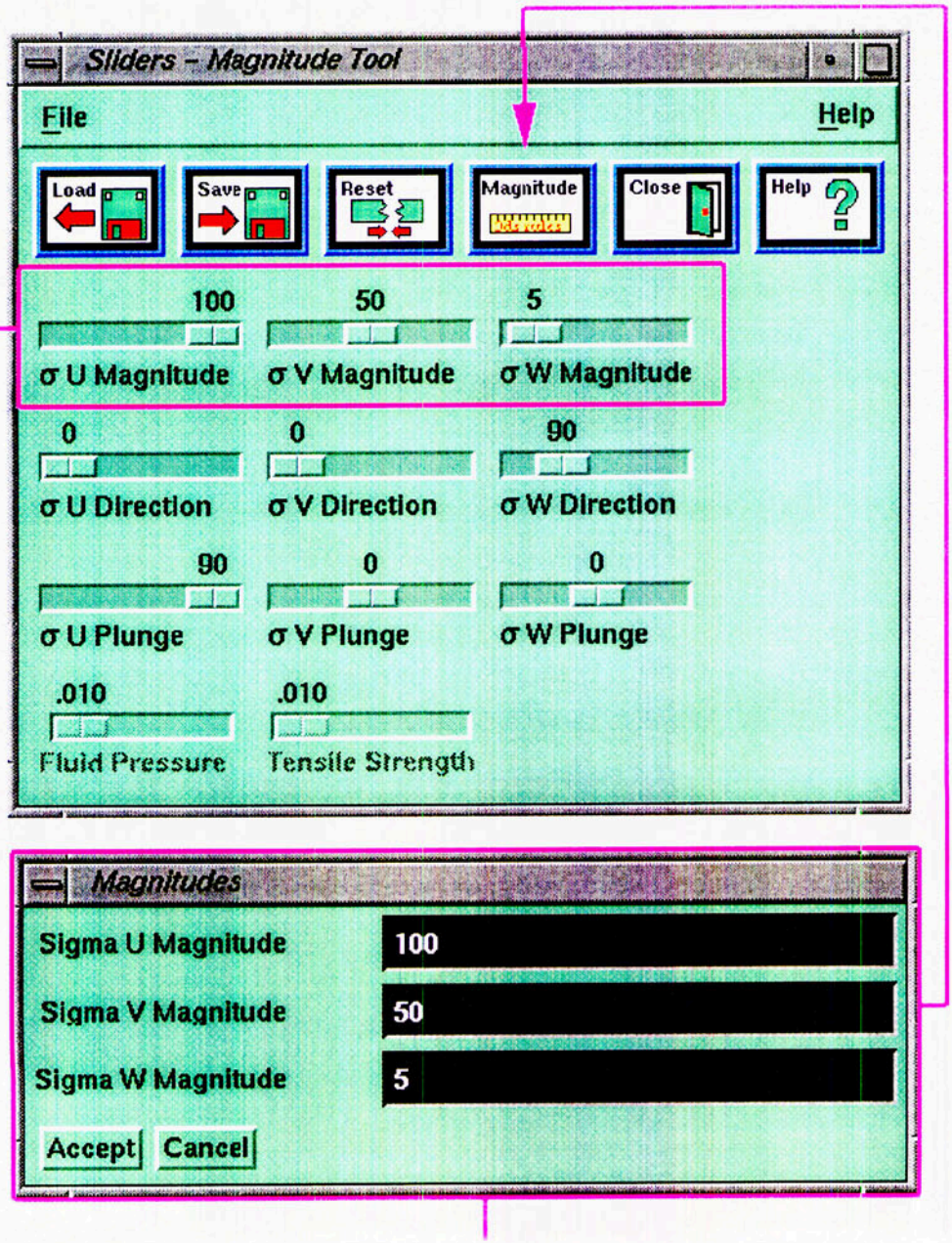
The stress axis with the **greatest** magnitude is called σ_1. The stress axis with the **smallest** magnitude is called σ_3. The **intermediate** stress axis is called σ_2. Any of the stress axes $(\sigma_u, \sigma_v, \text{ or } \sigma_w)$ can be σ_1, σ_2, or σ_3 depending on the user selection

A **stress state** is defined in terms of principal stress components σ_1, σ_2, and σ_3 $(\sigma_3 \leq \sigma_2 \leq \sigma_1)$, which are oriented along orthogonal directions u, v, and w. The user may set the relative magnitudes of the principal stress components and may choose any two of the three orthogonal axes for σ_1 and σ_3. Initially, u points vertically down, but the user may rotate the stress axes to other orientations (see the **Magnitude Tool** section). Only mutually orthogonal stress-axis orientations are allowed by 3DStress.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_02_irix.ps

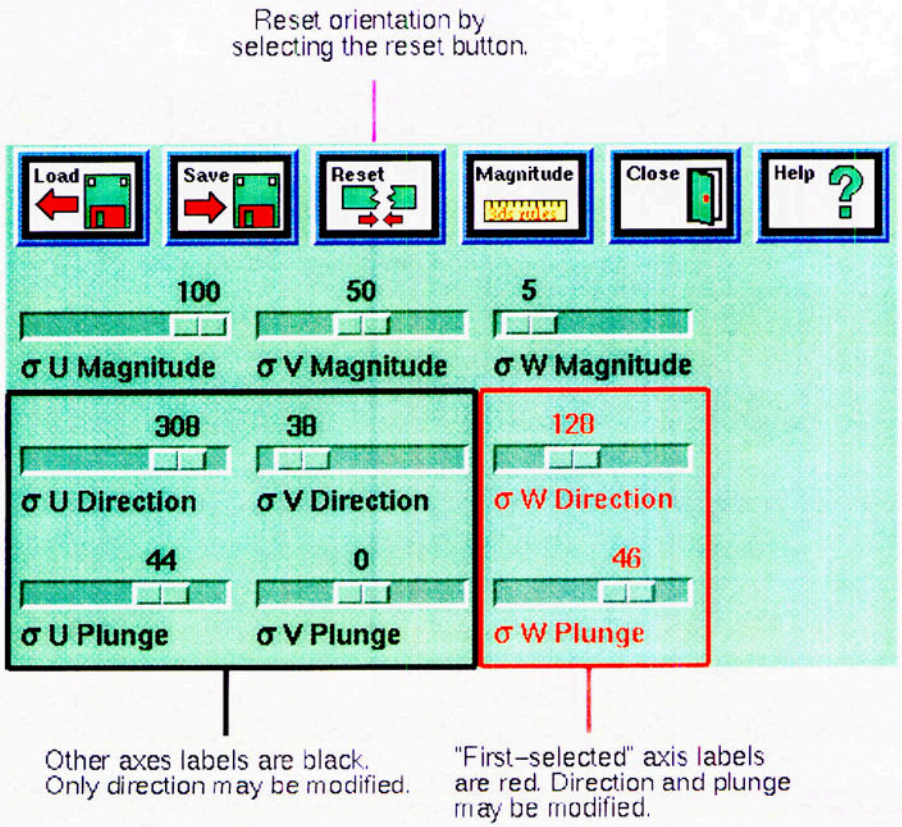
Magnitude Tool

Stress magnitudes can be modified by using either the left or middle mouse button to select the desired normalized magnitude on the stress magnitude sliders. Input magnitudes range from 1 to 100 on each slider.



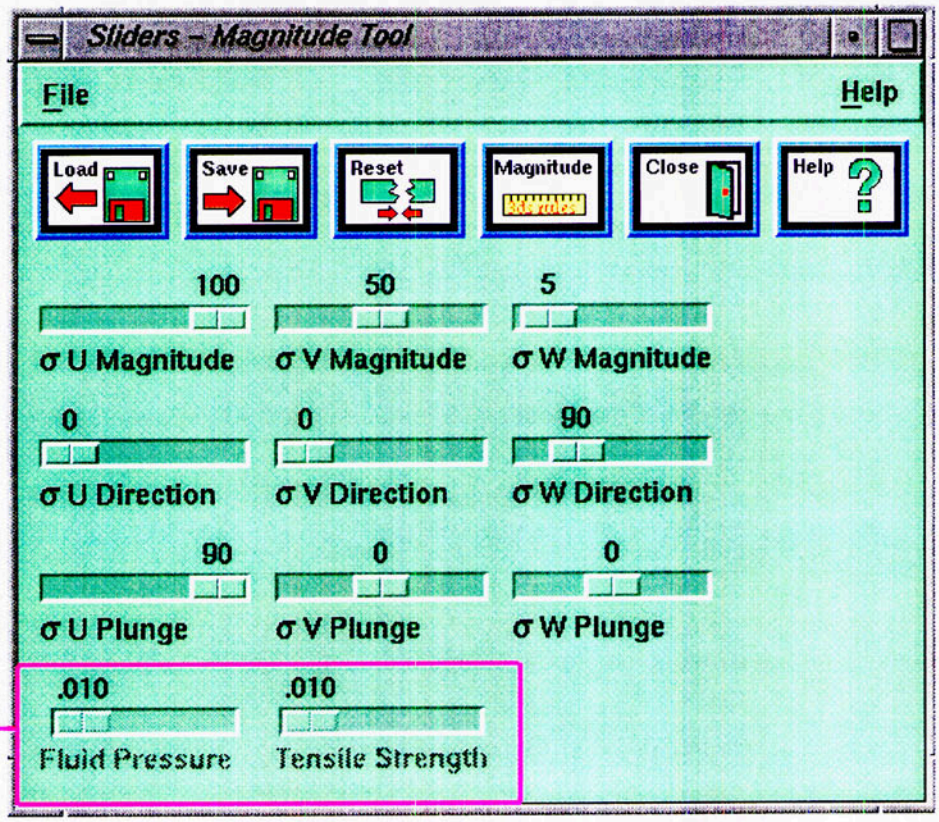
Use the magnitudes entry window to enter true magnitudes from the keyboard. The program will automatically normalize the input values to range from 1 to 100 while maintaining the correct magnitude ratios.

Stress orientations are shown in degrees and are selected by using the left and middle **mouse buttons** with the orientation control **sliders**. The labels of the first axis selected will turn red. The **direction** and **plunge** of the **first-selected axis** may be entered. Only **direction** changes are allowed for the **other two axes**. Pressing the reset button will **reset** the orientations and allow selection of a new first-selected axis. Directions range from 0 to 360 and plunges range from 0 to 90 in order to enable any measured or simulated 3D stress orientation.

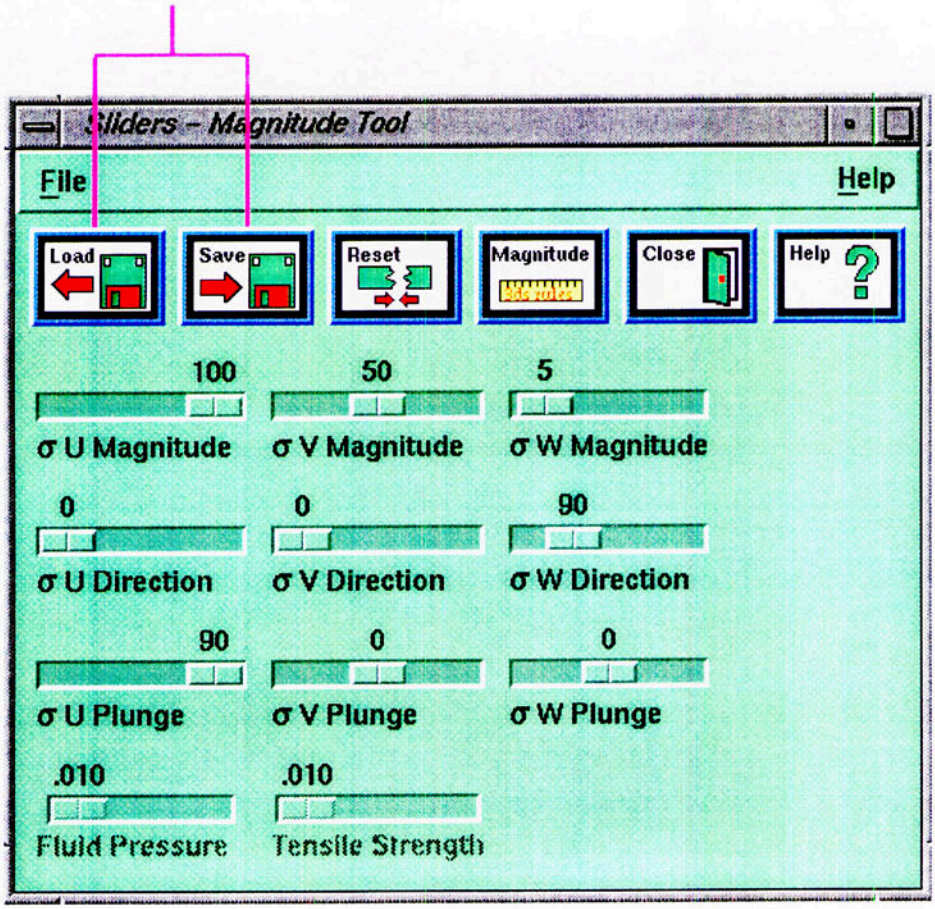


Fluid pressure and tensile strength may be used when computing leakage factor (see options).

Values are changed by using the left and right mouse buttons.

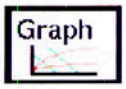


Stress magnitudes and orientations may be saved by pressing the save button and specifying a file name. These values may then later be reapplied by using the load button and choosing a file.

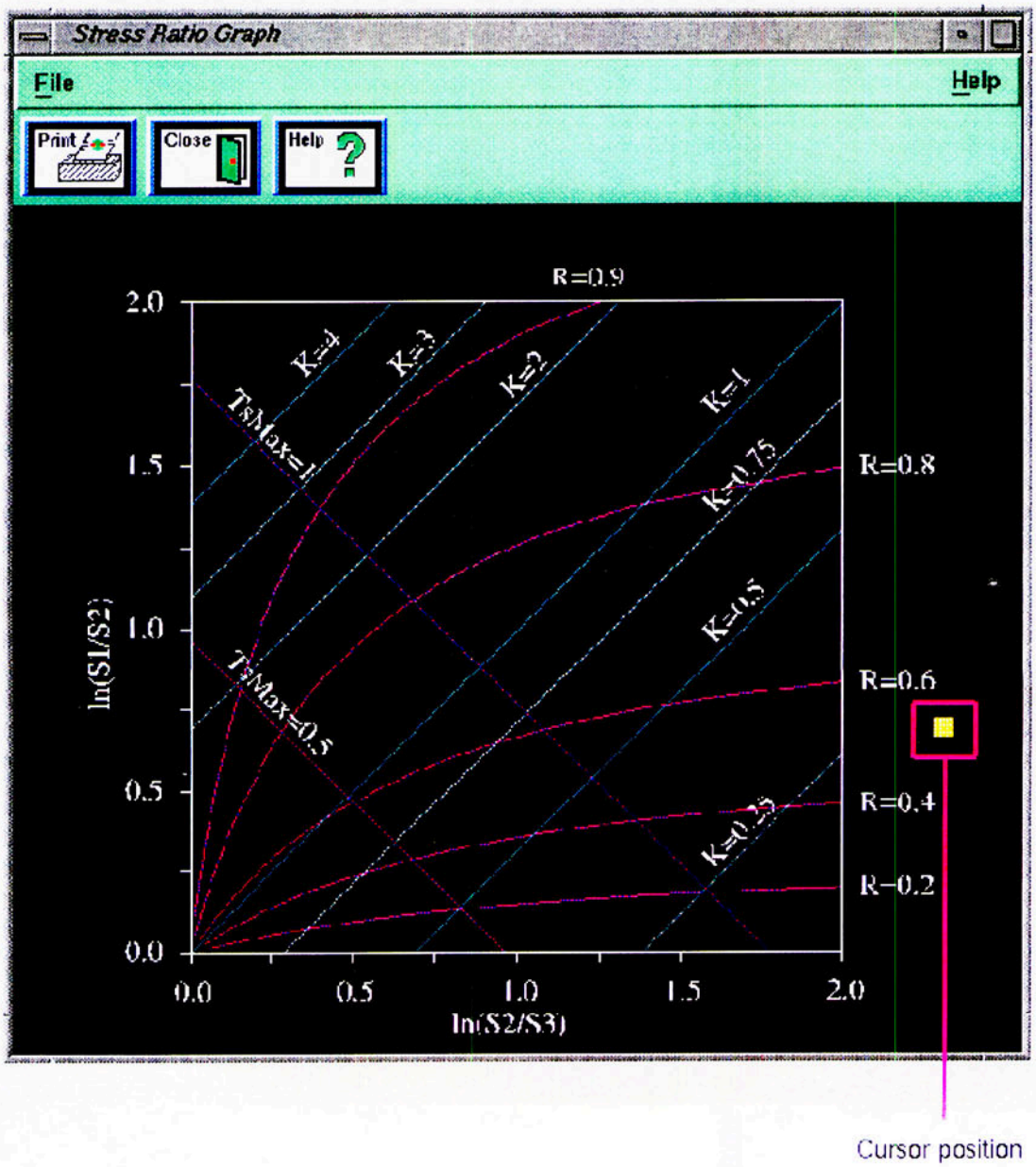


User: jbuckner
Host: pluto
Class: pluto
Job: help_317_03_irix.ps

Stress Ratio Graph



Use the stress ratio graph window to select the desired stress magnitude ratios by holding down the **left mouse button** and moving the cursor to the desired stress state and releasing the mouse button. The **right mouse button** toggles between a logarithm base 10 (log-log) and natural logarithm (ln-ln) scale.

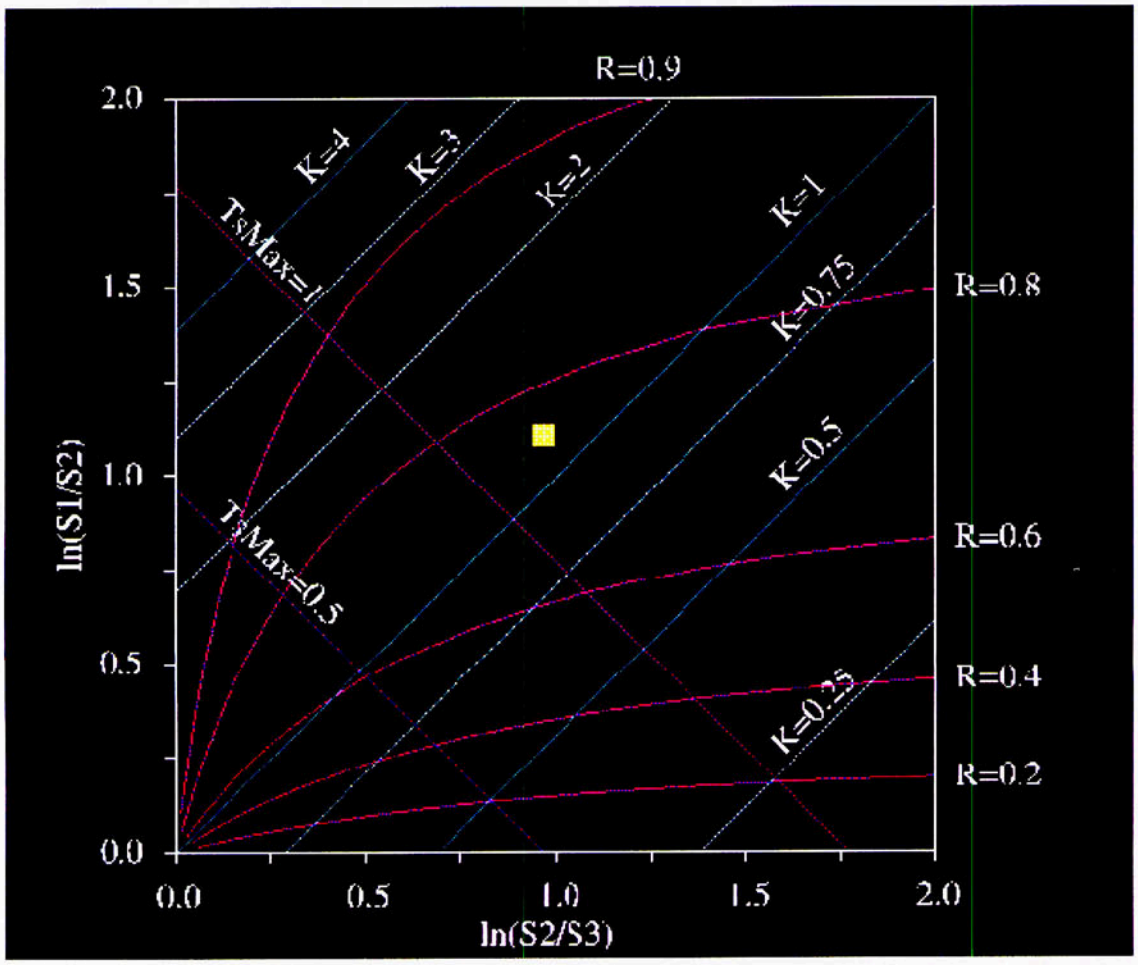


The stress ratio graph displays a **yellow square** whose location is based on the stress ratios of σ_1 to σ_2 along the y-axis and σ_2 to σ_3 along the x-axis of the plot. σ_1 is the magnitude of the maximum principal stress, σ_2 is the intermediate principal stress, and σ_3 is the minimum principal stress. In addition to showing the location of the current stress state on a logarithmic scale, the graph also shows where the current stress state lies relative to plots of the following parameters:

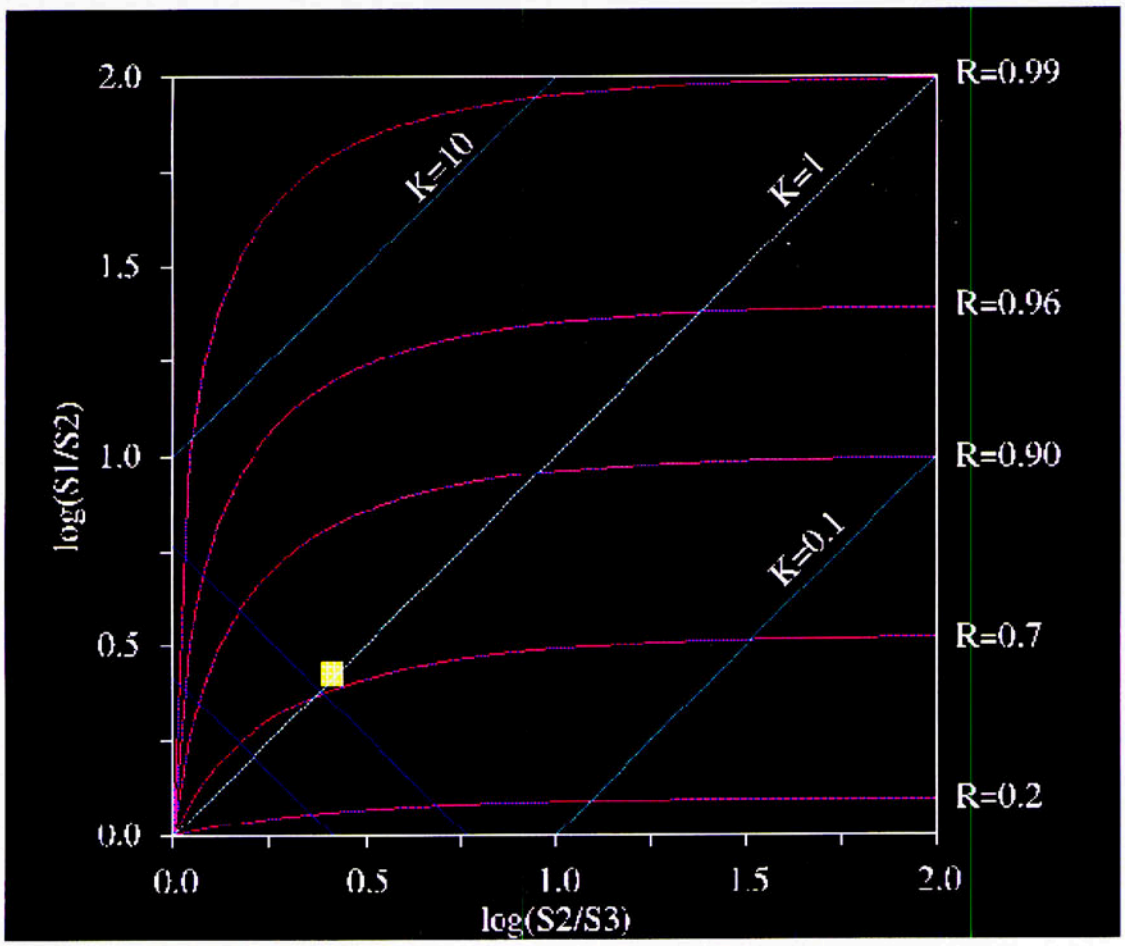
$$K = (\sigma 1 / \sigma 2) / (\sigma 2 / \sigma 3)$$

$$R = (\sigma 1 - \sigma 2) / (\sigma 1 - \sigma 3)$$

TsMax = maximum slip tendency of all fault orientations for a given stress state.



Natural logarithm scale


2.0
1.5
1.0
0.5
0.0
log(S1/S2)
0.0
0.5
1.0
1.5
2.0
log(S2/S3)
K=10
K=1
K=0.1
R=0.99
R=0.96
R=0.90
R=0.7
R=0.2

User: jbuckner
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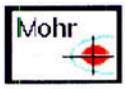
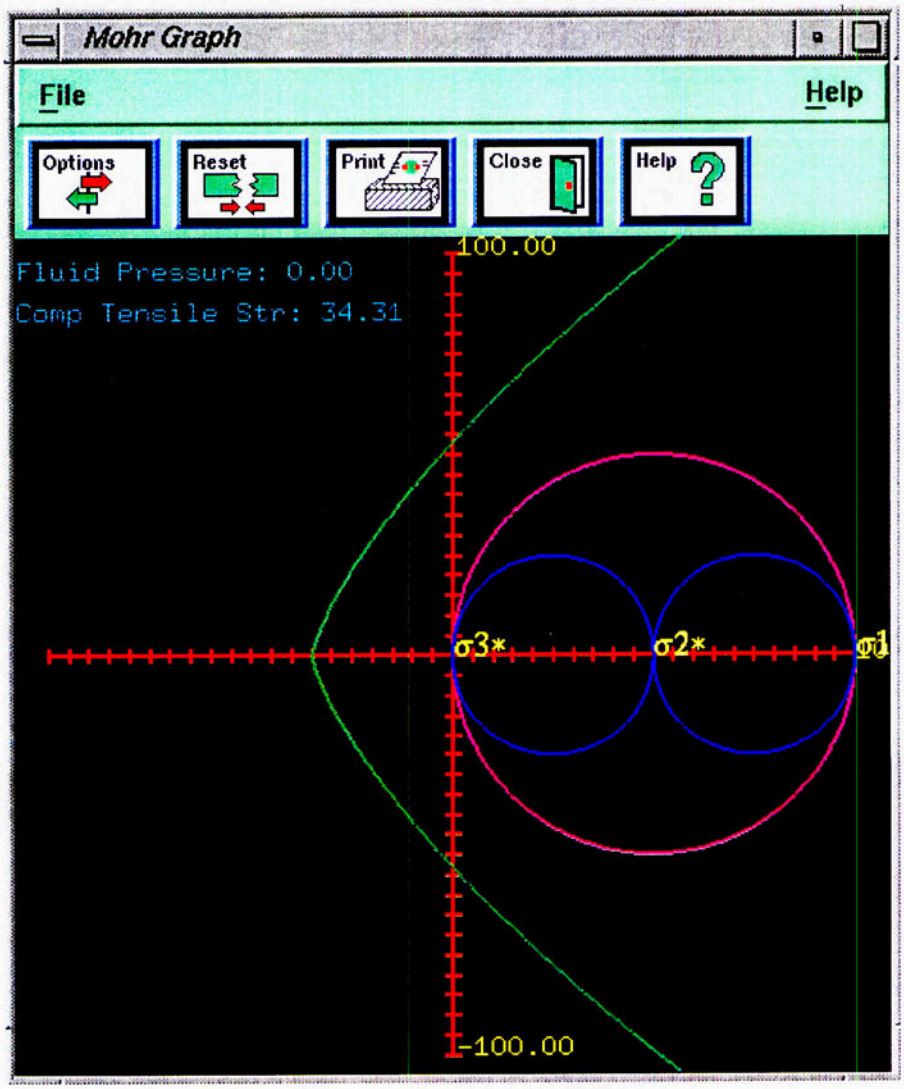
Class: pluto
Job: help_317_04_irix.ps

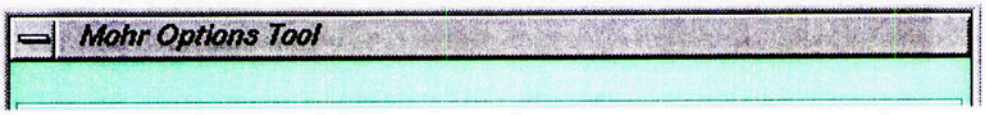
Mohr Graph

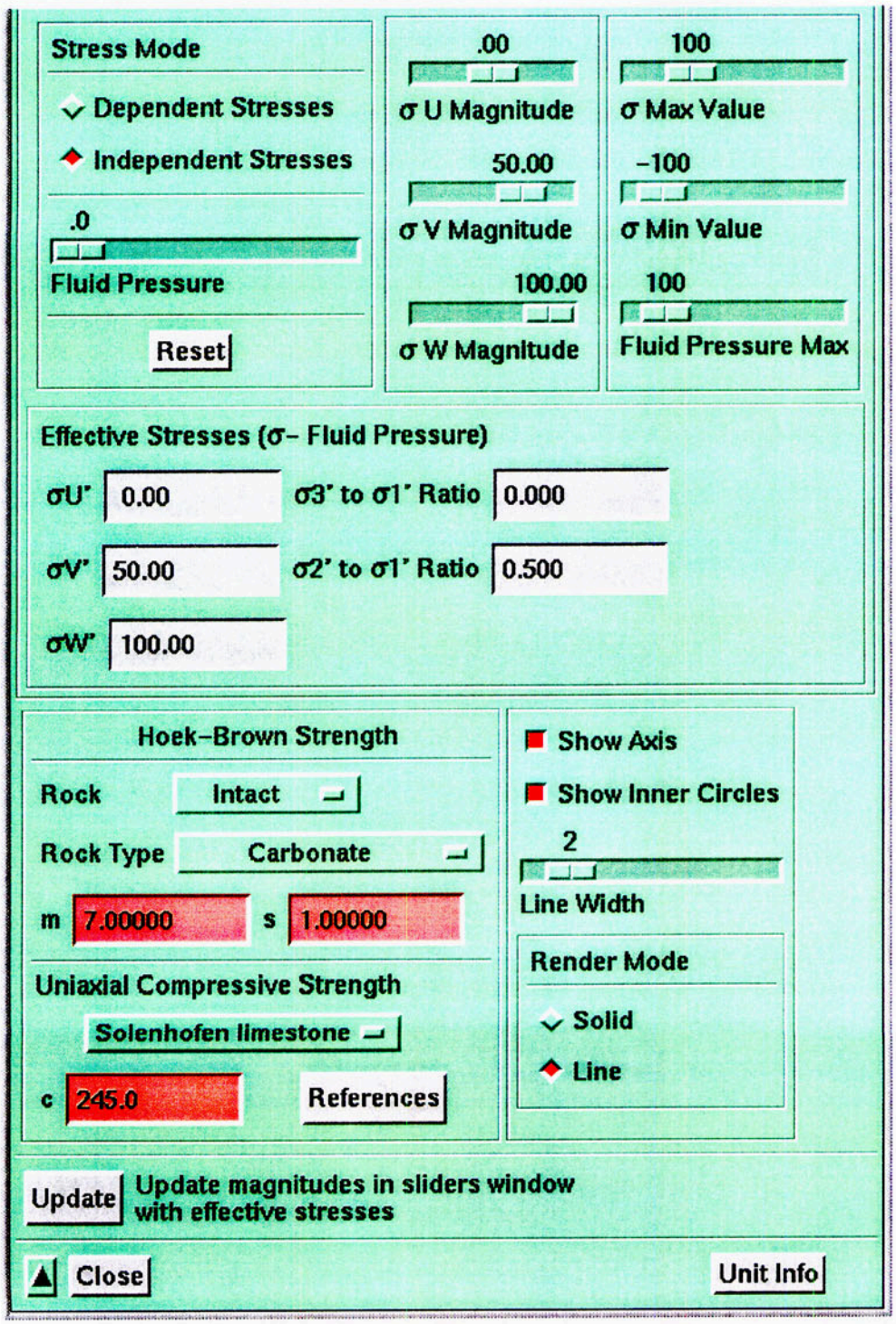


The Mohr Graph allows the user to apply stress and fluid pressure to a specified type of rock and visualize the result. The result of the stresses and fluid pressure on the rock is displayed in a traditional Mohr Graph. Effective stresses are indicated in the visual display by an asterisk.



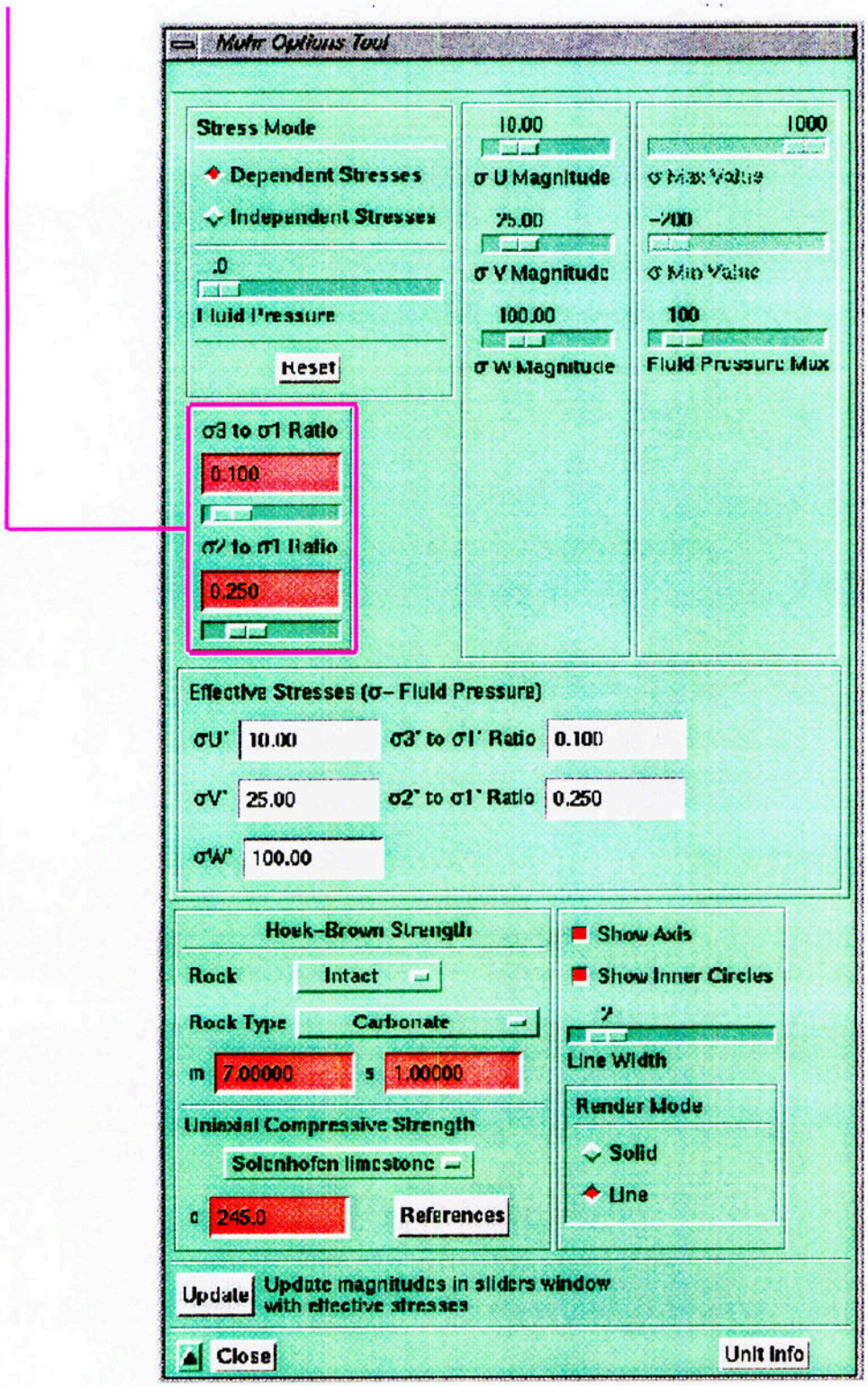
The rock attributes may be altered in the Hoek-Brown Strength portion of the Options window.





In particular, the user may enter the quality, material type, and specific rock test results to work with pull down menus. The variables m, s, and c may be entered via text fields.

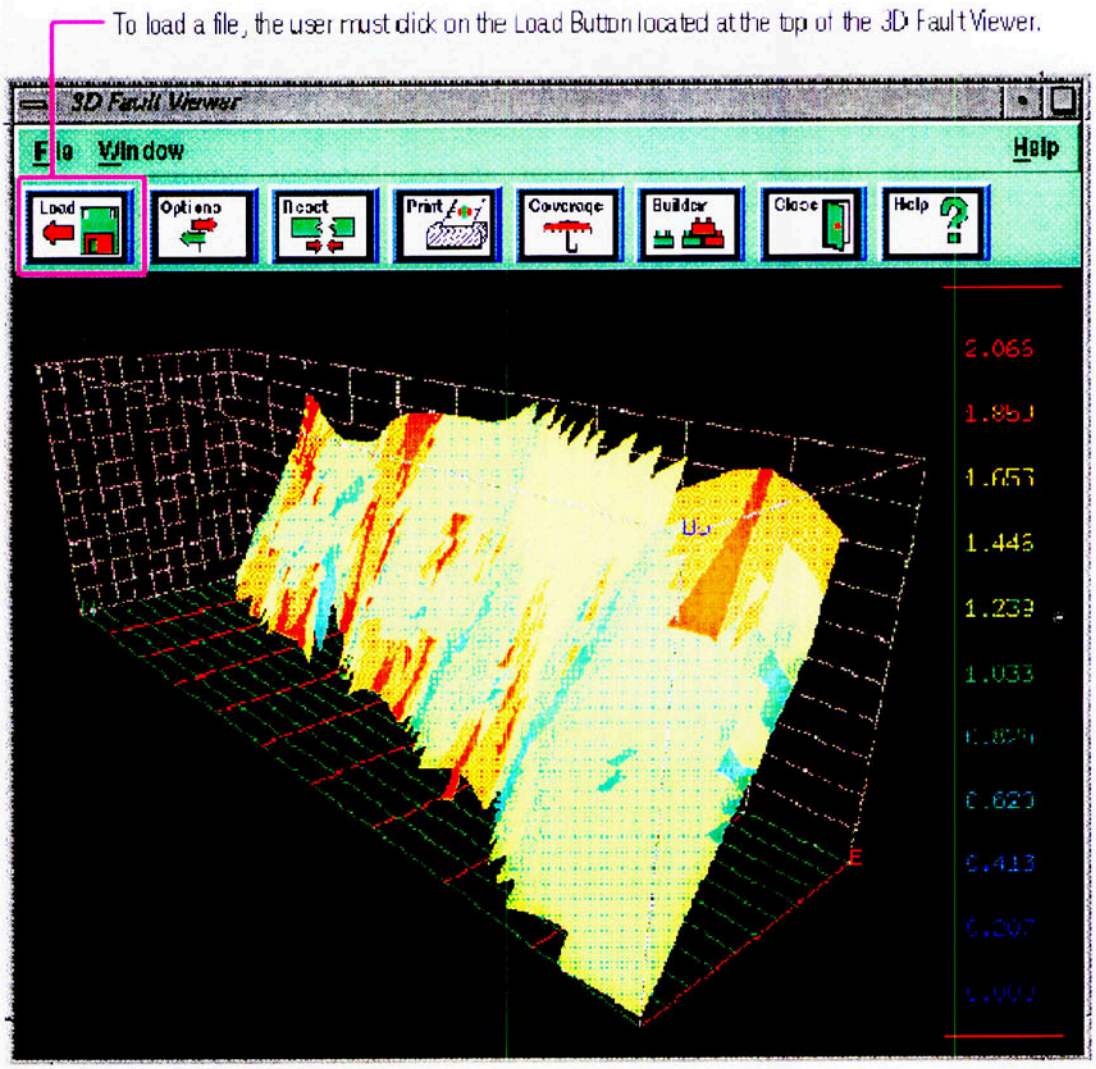
Another interesting feature of the 3D Stress Mohr Graph is the ability to switch between dependent and independent stress modes. When Dependent Stress Mode is selected, sliders and text boxes for the specification of the stress ratios appear.


Mohr Options Tool
Stress Mode
Dependent Stresses
Independent Stresses
.0
Fluid Pressure
Reset
10.00
σ U Magnitude
25.00
σ V Magnitude
100.00
σ W Magnitude
1000
σ Max Value
-200
σ Min Value
100
Fluid Pressure Max
σ3 to σ1 Ratio
0.100
σ2 to σ1 Ratio
0.250
Effective Stresses (σ– Fluid Pressure)
σU' 10.00
σ3' to σ1' Ratio 0.100
σV' 25.00
σ2' to σ1' Ratio 0.250
σW' 100.00
Hoek–Brown Strength
Rock Intact
Rock Type Carbonate
m 7.00000
s 1.00000
Uniaxial Compressive Strength
Solenhofen limestone
σ 245.0
References
Show Axis
Show Inner Circles
Line Width
Render Mode
Solid
Line
Update
Update magnitudes in sliders window with effective stresses
Close
Unit Info

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_05_irix.ps

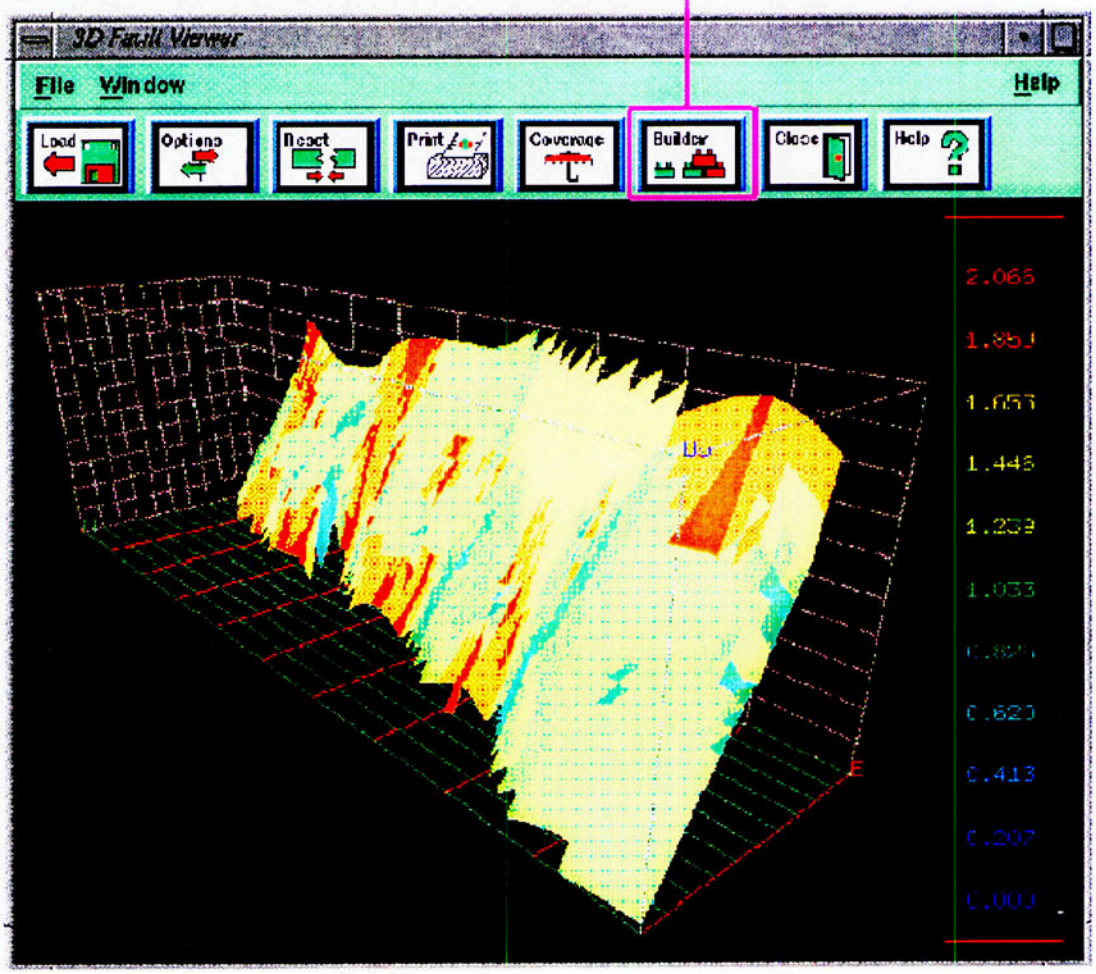
3D Fault Viewer

The 3D Fault Viewer enables the user to view and interact with faults defined in 3-space as polygons. The following formats for input files are currently supported: flt, vbl, and 3ds. The 3ds file format is the 3DStress application's own specific format not to be confused with the popular three-dimension modeling mesh format.



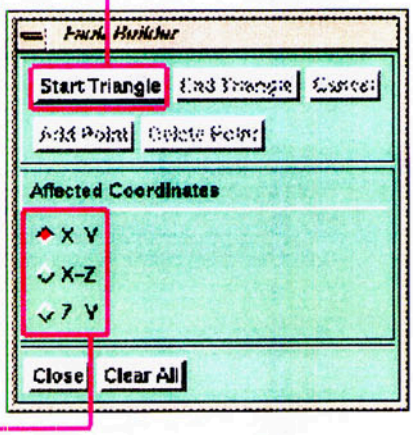
Upon clicking load, the user will be prompted with a file browser dialog window with which the file may be selected.

The user may also build faults using the 3D Fault Viewer's Fault Builder tool. The user may access the Fault Builder by clicking on the Builder Button at the top of the 3D Fault Viewer Window.



Upon pressing the Builder Button, the user will be presented with the Fault Builder Window. If a fault file is already loaded in the 3D Fault Viewer, the user may add to it. If no fault file is loaded, the user is presented with a default bounding box and may create a fault from scratch. The user should use the bounding box as a reference to the geographical coordinate system.

To add a triangle to the fault, click the Start Triangle button. A new triangle will appear with vertices on the corners designated N, E, and Up by the bounding box. To adjust any one of the vertices, hold down the control key and select the vertex with the left mouse button while dragging the vertex with the mouse.

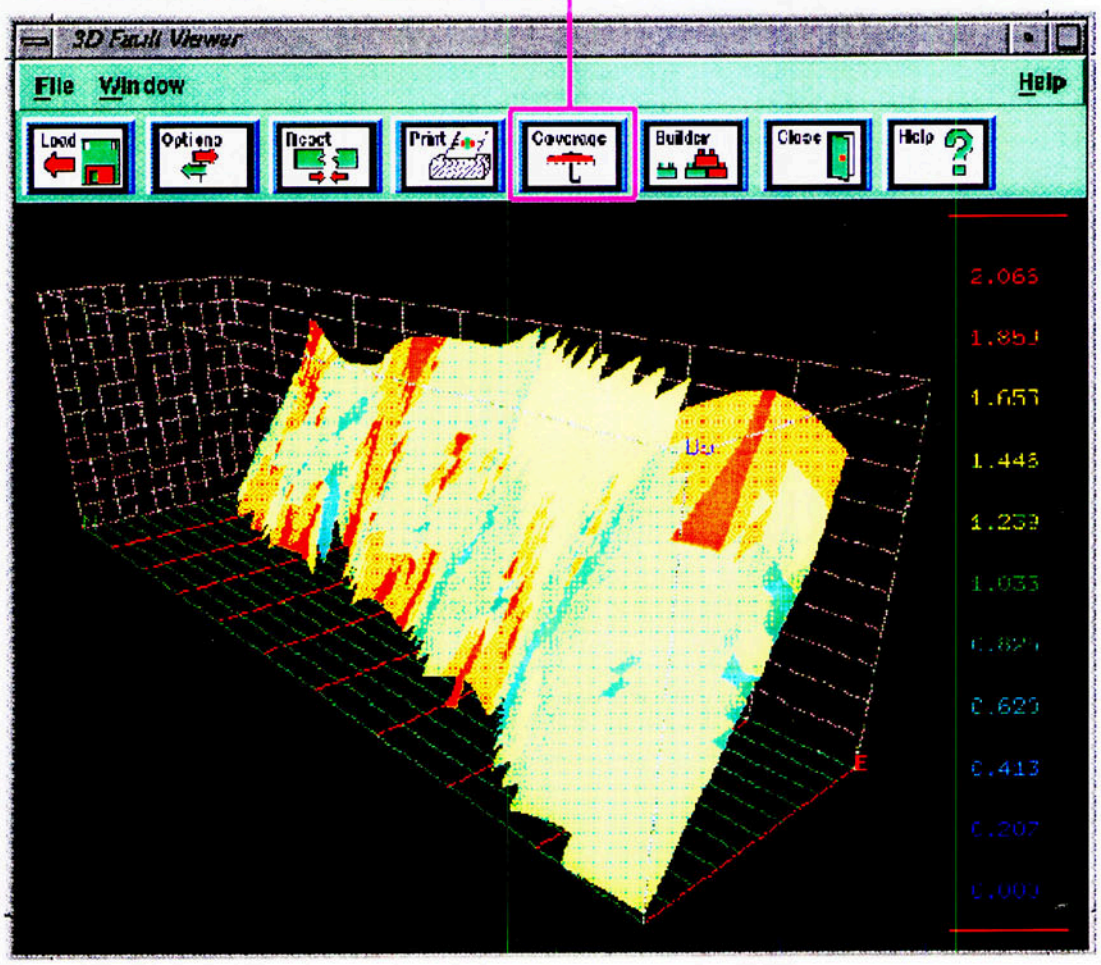


The three buttons designated Affected Coordinates control the plane in which the vertices are allowed to move. For example, to move a vertex along the X-Y plane, select the X-Y button. X, Y, and Z correspond to a right-handed coordinate system with +Z coming out of the screen. Thus, +X runs horizontal from right to left across the screen, and +Y runs vertically from top to bottom. This coordinate system is distinct and independent of the geographical coordinate system defined by the loaded fault and coverage files.

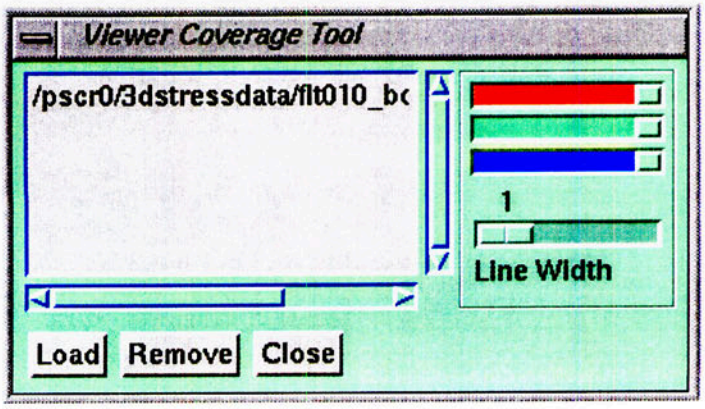
Points may be deleted and added to the triangle using the Delete Point and Add Point buttons, located directly below the triangle buttons. The current fault in progress may be aborted by clicking the Cancel button, located directly to the right of the End Triangle button. When finished, click the End Triangle button, located directly to the right of the Start triangle button. To remove all Fault-Builder produced polygons, click the Clear All button.

Closing the window accepts modifications, but these are not saved untill the user saves the file to disk via the 3D Fault Viewer's file pulldown menu.

The user should also note that coverages may be placed over 3D objects. To access the coverage tool, the user should click on the Coverage Button located at the top of the 3D Fault Viewer Window.



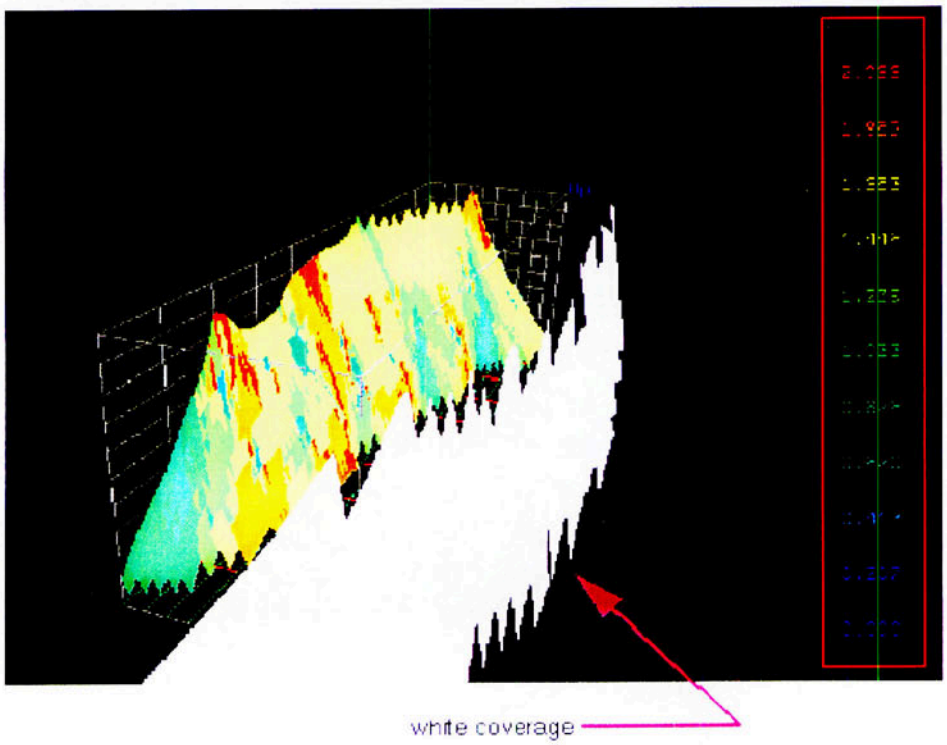
Upon clicking the Coverage Button, the user is presented with the Coverage Tool.



To load a coverage file, click the **Load** button and a file selector will appear. After

selecting a coverage file, the name of the file is displayed in the Viewer Coverage Tool. Each loaded coverage may be manipulated by clicking on the coverage name, then adjusting the color sliders or adjusting the Line Width slider. To remove a coverage select the name and click the Remove button.

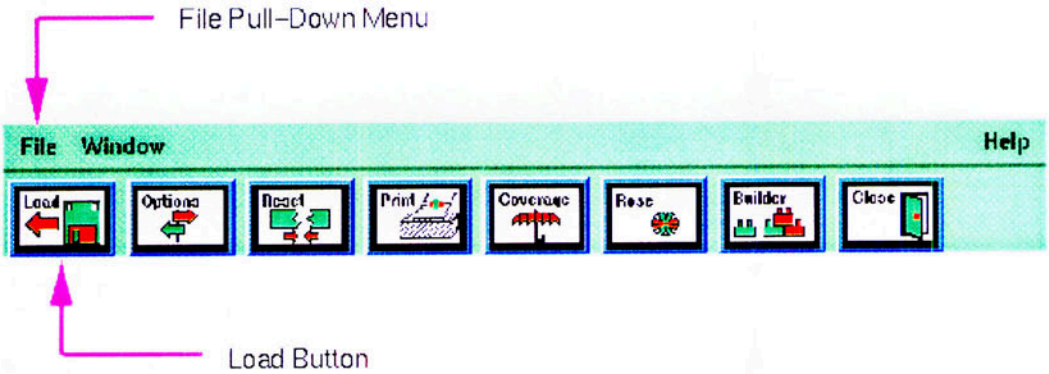
An example of a coverage and a normal fault file loaded at the same time appears below. Note that the coverage is white and the normal fault file is shaded according to stress.



User: jbuckner
Host: pluto
Class: pluto
Job: help_317_06_irix.ps

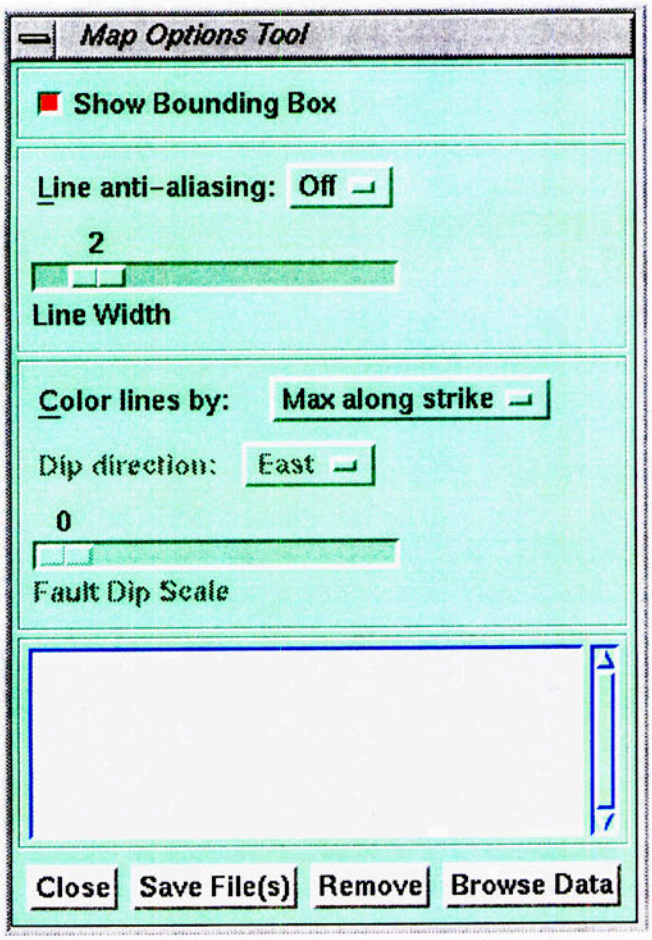
Map Viewer

The Map Viewer is used to display files of faults displayed as lines and overlay those images with coverages. To load a file, either choose Load from the File pull-down menu at the top of the Map Viewer window, or click on the Load button just below the File pull-down menu.



A File Selection box will then appear prompting for the selection of a map. Use this dialog box to navigate the file-system and select the appropriate file as described in the Appendix.

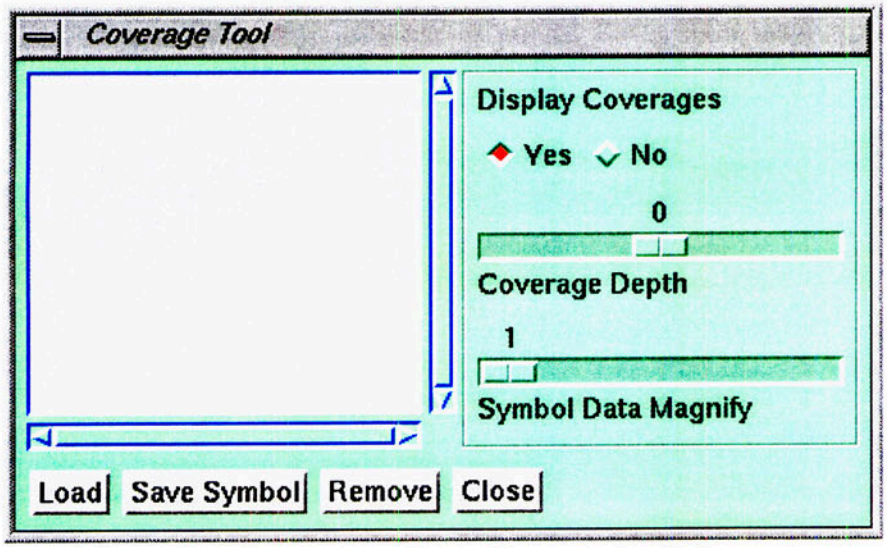
The Options tool may be used to toggle display of the bounding box, toggle anti-aliasing, set line width, set the color scheme, set the dip direction, set the fault dip scale, and browse the data file. The Options tool may be accessed in a similar manner to the Load File dialog box. Either select Options from the File pull-down menu or click the Options button just below the Window pull-down menu. Upon loading a file, the filename will appear in the text box in the Options window. Multiple files may be loaded, and to remove one simply highlight the file and press the remove button below the text box. The files may also be saved as one .lin file by pressing the Save File(s) button.



The Reset feature is used to reset the point-of-view in the Map Viewer window to the default, start-up location. Either select Reset from the File pull-down menu or click the Reset button just below the Window pull-down menu to reset the point-of-view.

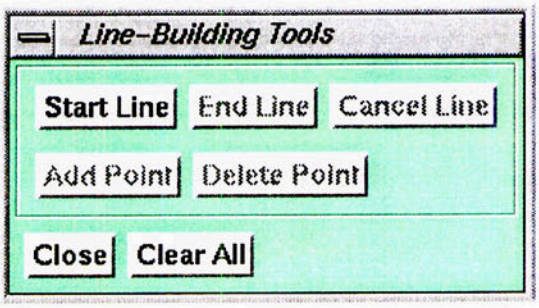
The Print feature is used to print the Map Viewer window to an SGI RGB file. Either select Print from the File pull-down menu or click the Print button just below the Window pull-down menu to access the Save File dialog box. Use this dialog box to navigate the file-system and select the apropriate filename to call the saved image.

The Coverage tool is used to overlay a coverage image on top of the fault image. To access the coverage tool, either choose Coverage from the Window pull-down menu at the top of the Map Viewer window, or click on the Coverage button just below the pull-down menu bar. With the coverage, the user may load several files at once and toggle the displaying of each loaded file individually. Also, coverage depth may be set, the degree of magnification of the symbol data may be set. Symbols may be saved, and coverage files may be removed from the list. To load a coverage file, click on the Load button at the bottom of the Coverage Tool window. A dialog box will then appear prompting for the selection of a file. Use this dialog box to navigate the file-system and select the appropriate file.



A rose diagram is displayed by pressing the Rose button below the pull-down menu bar or selecting Rose from the Window pull-down menu. See the Rose Diagram chapter for more information on the Rose Viewer.

The Line-Building Tools dialog box may be used to place lines on existing maps. To begin a line, click the Start Line button. A new line will appear along the left edge of the bounding box with its end points at the corners. To select a point and move it, hold down the control key while clicking and dragging the point with the left mouse button. Points may also be added and deleted using the Add Point and Delete Point buttons. Added points always appear in the lower left corner of the bounding box. The point currently selected is the one deleted. A point may be selected by holding the control key and clicking the left mouse button over it. The selected point is displayed as yellow.

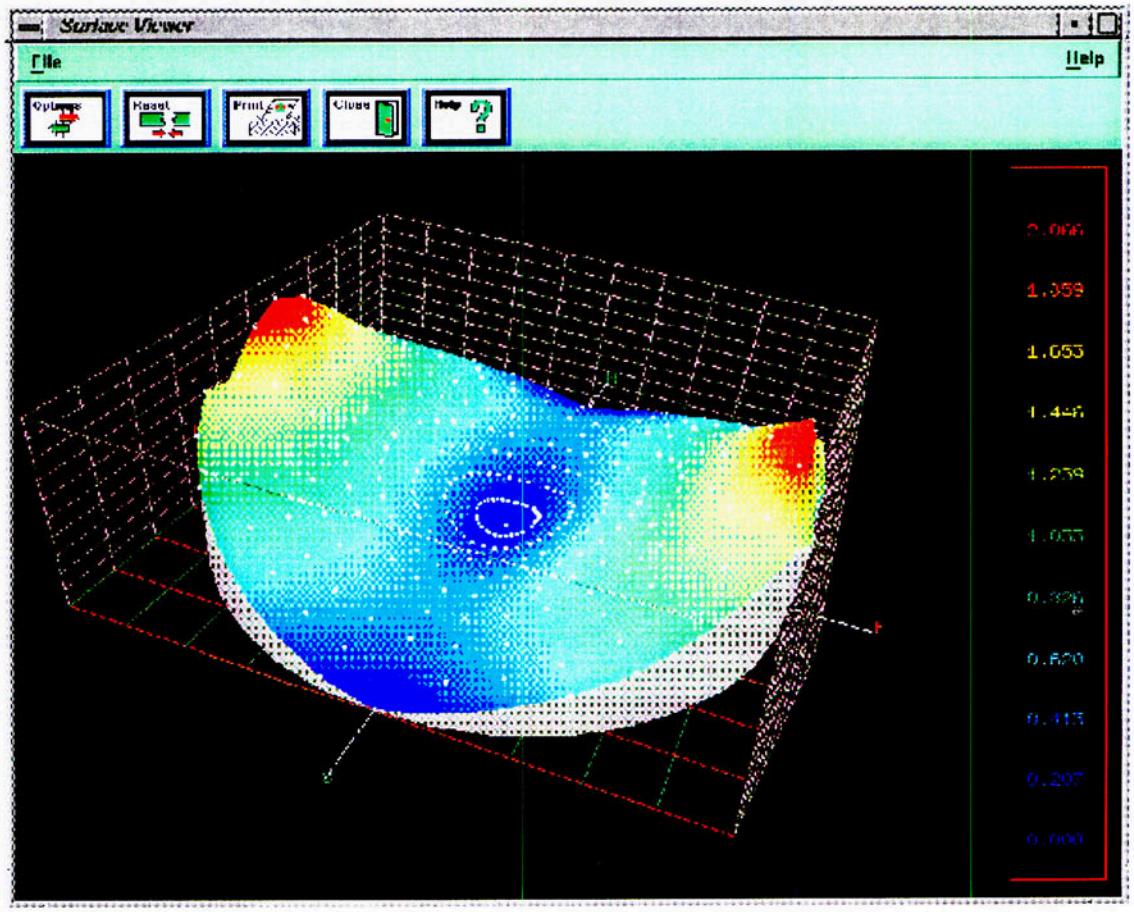


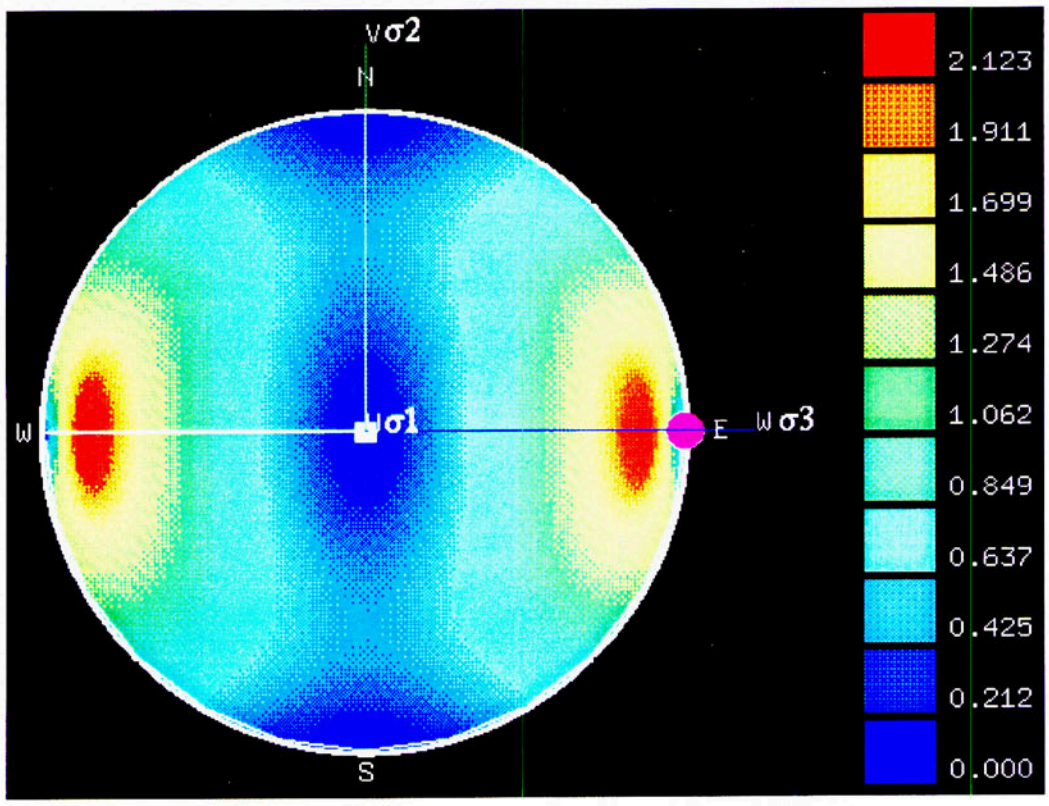
The user may remove all lines produced via the Line Builder by pressing the Clear All button. To exit the Map Viewer, select Close from the File pull-down menu or click the Close button below the pull-down menu bar. To access the online help for 3DStress, use the Help pull-down menu or click the Help button below the pull-down menu bar.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_07_irix.ps

Surface Viewer

The surface viewer displays slip tendency, dilation tendency, or leakage factor values computed in the Tendency Plot window as a 3D surface. The height and color of the surface represent the computed slip tendency, dilation tendency, leakage factor values. The vertical exaggeration of the surface is controlled by buttons on the Options window.



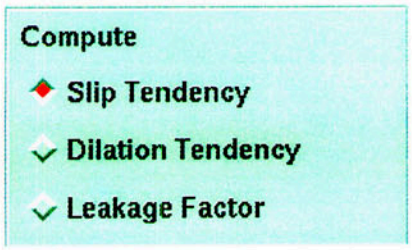

V σ2
N
W
σ1
E
W σ3
S
2.123
1.911
1.699
1.486
1.274
1.062
0.849
0.637
0.425
0.212
0.000

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_08_irix.ps

Options

The Options Window may be accessed by clicking on the Options Button on the Command Bar. The tools in this window allow the user to change the variable plotted in the **Tendency Plot**, change the color scheme of the graphics window, change the color detail, change the lighting scheme, change the color threshold, and toggle the verbosity mode.

The user may change the variable plotted in the Tendency plot by clicking on the radio button next to the desired plot-type. See the following figure.



The user may also change the color scheme of the graphics window. The user may toggle between color and black-and-white plots for the graphics displays.

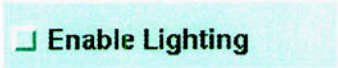
Also, the user may select a white or a black background for the graphics displays.

The user may alter the detail used in the coloring of images by changing the step size setting and the color scale setting.

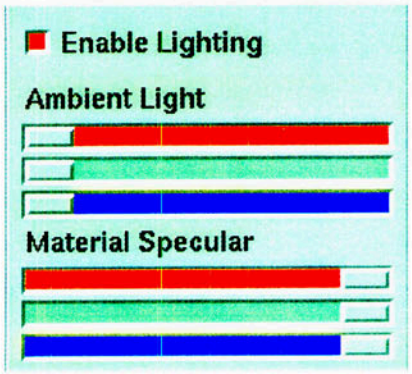
Step size controls the number of point of data drawn. The smaller the step size is, the more detailed the plot becomes. The color scale setting controls the gradient of the color scale. As the magnitude of the color scale setting increases the range of data

colored by the color used for the largest data values increases.

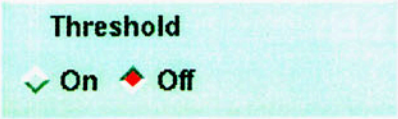
The user may alter certain lighting conditions by enabling the Enable Lighting toggle button.



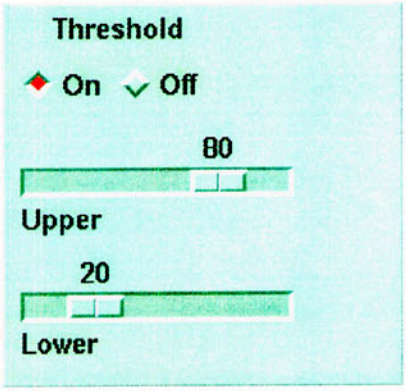
Enabling this toggle causes the lighting controls to appear just below it. The user may then alter the RGB value for the ambient light (light emitted by the objects themselves rather than by an external source) by moving the three sliders representing the amount of red, green, and blue that appear just under the heading "Ambient Light". There are additional sliders for the RGB value of the Specular Color (the color illuminating the whole scene from an external source) of the graphic displays.



The Threshold option is the next option vertically after the Enable Lighting option. Like the Enable Lighting option, the Threshold option is a toggle button, i.e., it can either be set on or off.



The Threshold option is used to control the range of colors used on the legends of the graphics displays. When the toggle is set to "On", the sliders controlling the range of the legend colors appears.



The Verbose toggle button is the final button appearing vertically in the options window. When enabled, this button provides detailed information on the actual inner workings of 3dstress. It is useful in determining the reason for sometimes esoteric system errors.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_09_irix.ps

User's Guide for Version 1.3.3

3DStress was prepared as an account of work performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA) for the Division of Waste Management of the Nuclear Regulatory Commission (NRC), an independent agency of the United States Government. Neither the developer(s) of 3DStress nor any of their sponsors make any warranty, expressed or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represent that its use would not fringe on privately-owned rights.

Technical Support

For technical support for 3DStress contact:

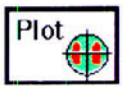
Dr. David A. Ferrill, CNWRA, Southwest Research Institute, 6220 Culebra Road, San Antonio Texas 78238 USA, 210-522-6082 (voice), 210-522-5155 (fax), E-mail: dferrill@swri.edu

Hardware Requirements

Silicon Graphics Workstation Running IRIX 5.x or later Operating System

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_01_sun.ps

Tendency Plot



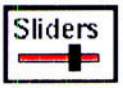
3DStress computes slip tendency based on a user-selected stress tate. The stress state is defined by the magnitudes and orientations of the orthogonal stress axes called σ_u, σ_v, and σ_w. The magnitude values in 3DStress are **normalized** to range from 1 to 100. These represent principal compressive stresses.

The stress axis with the **greatest** magnitude is called σ_1. The stress axis with the **smallest** magnitude is called σ_3. The **intermediate** stress axis is called σ_2. Any of the stress axes $(\sigma_u, \sigma_v, \text{ or } \sigma_w)$ can be σ_1, σ_2, or σ_3 depending on the user selection

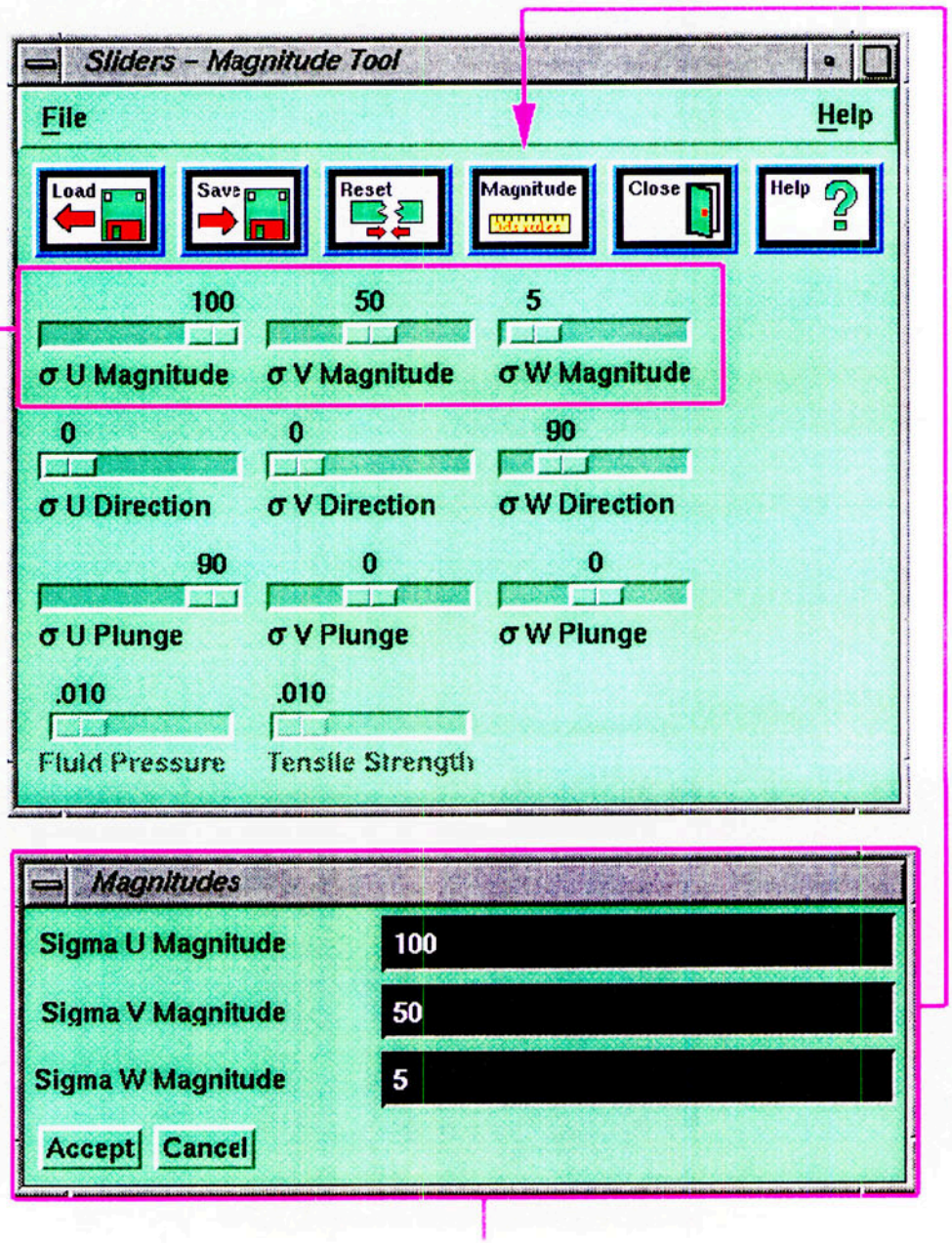
A **stress state** is defined in terms of principal stress components σ_1, σ_2, and σ_3 $(\sigma_3 \leq \sigma_2 \leq \sigma_1)$, which are oriented along orthogonal directions u, v, and w. The user may set the relative magnitudes of the principal stress components and may choose any two of the three orthogonal axes for σ_1 and σ_3. Initially, u points vertically down, but the user may rotate the stress axes to other orientations (see the **Magnitude Tool** section). Only mutually orthogonal stress-axis orientations are allowed by 3DStress.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_02_sun.ps

Magnitude Tool

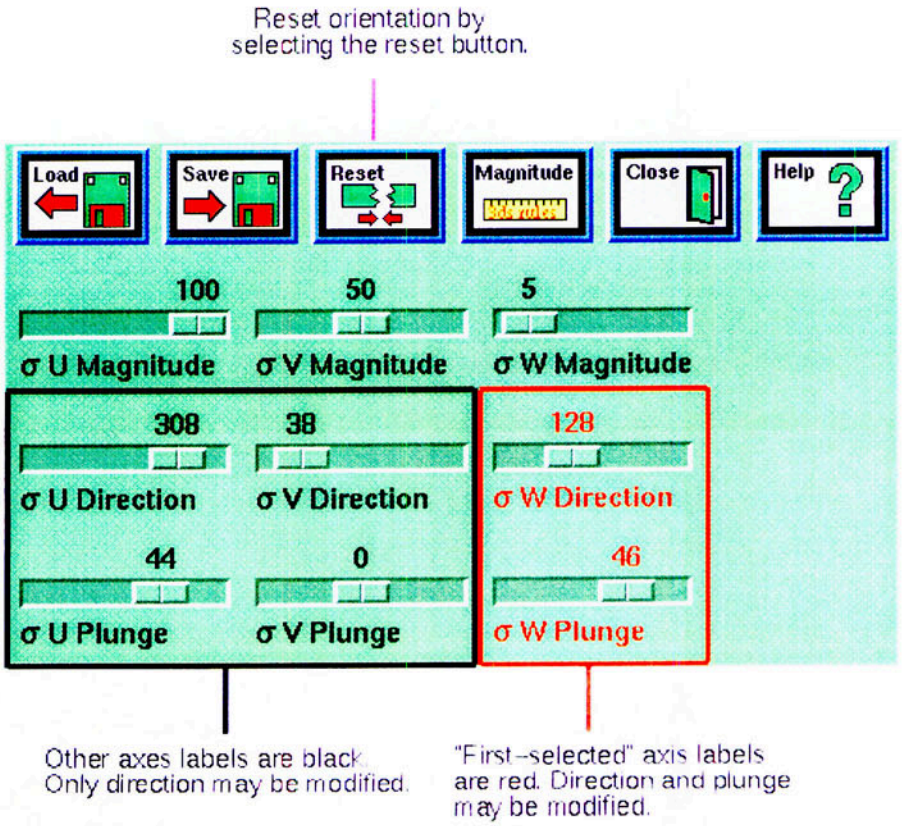


Stress magnitudes can be modified by using either the left or middle mouse button to select the desired normalized magnitude on the stress magnitude sliders. Input magnitudes range from 1 to 100 on each slider.



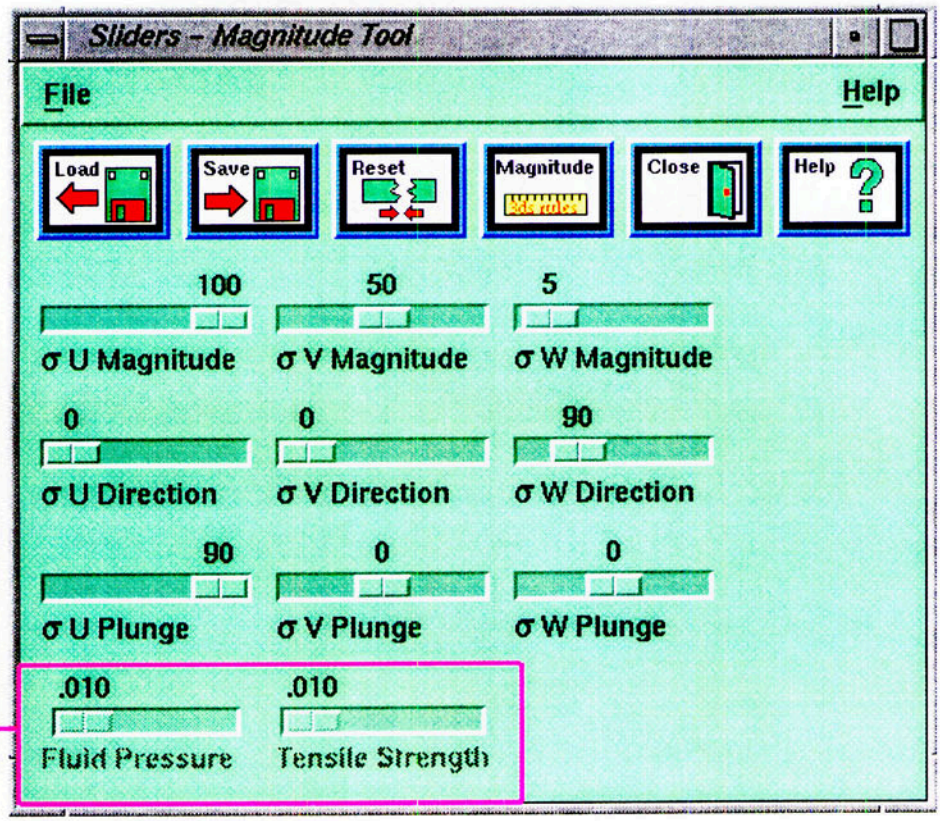
Use the magnitudes entry window to enter true magnitudes from the keyboard. The program will automatically normalize the input values to range from 1 to 100 while maintaining the correct magnitude ratios.

Stress orientations are shown in degrees and are selected by using the left and middle **mouse buttons** with the orientation control **sliders**. The labels of the first axis selected will turn red. The **direction** and **plunge** of the **first-selected axis** may be entered. Only **direction** changes are allowed for the **other two axes**. Pressing the reset button will **reset** the orientations and allow selection of a new first-selected axis. Directions range from 0 to 360 and plunges range from 0 to 90 in order to enable any measured or simulated 3D stress orientation.

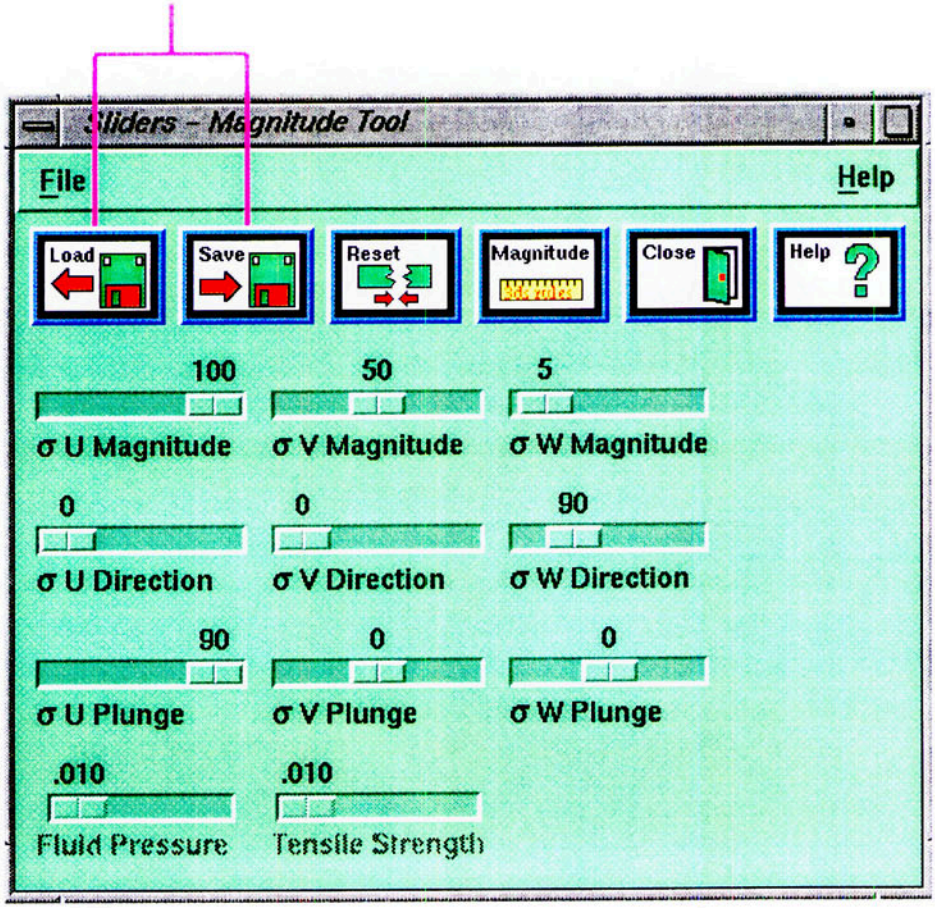


Fluid pressure and tensile strength may be used when computing leakage factor (see options).

Values are changed by using the left and right mouse buttons.



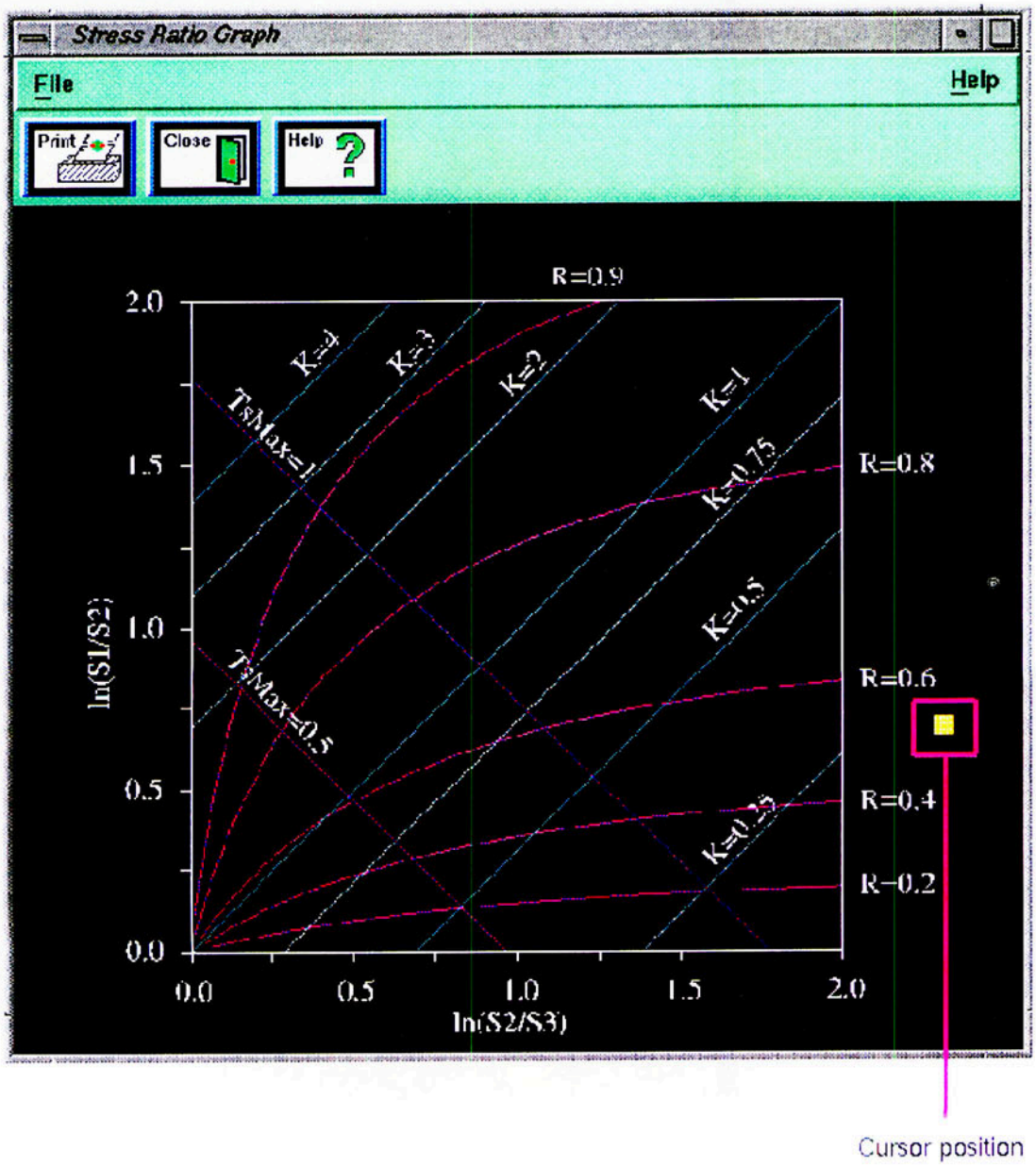
Stress magnitudes and orientations may be saved by pressing the save button and specifying a file name. These values may then later be reapplied by using the load button and choosing a file.



User: jbuckner
Host: pluto
Class: pluto
Job: help_317_03_sun.ps

Stress Ratio Graph

Use the stress ratio graph window to select the desired stress magnitude ratios by holding down the **left mouse button** and moving the cursor to the desired stress state and releasing the mouse button. The **right mouse button** toggles between a logarithm base 10 (log-log) and natural logarithm (ln-ln) scale.



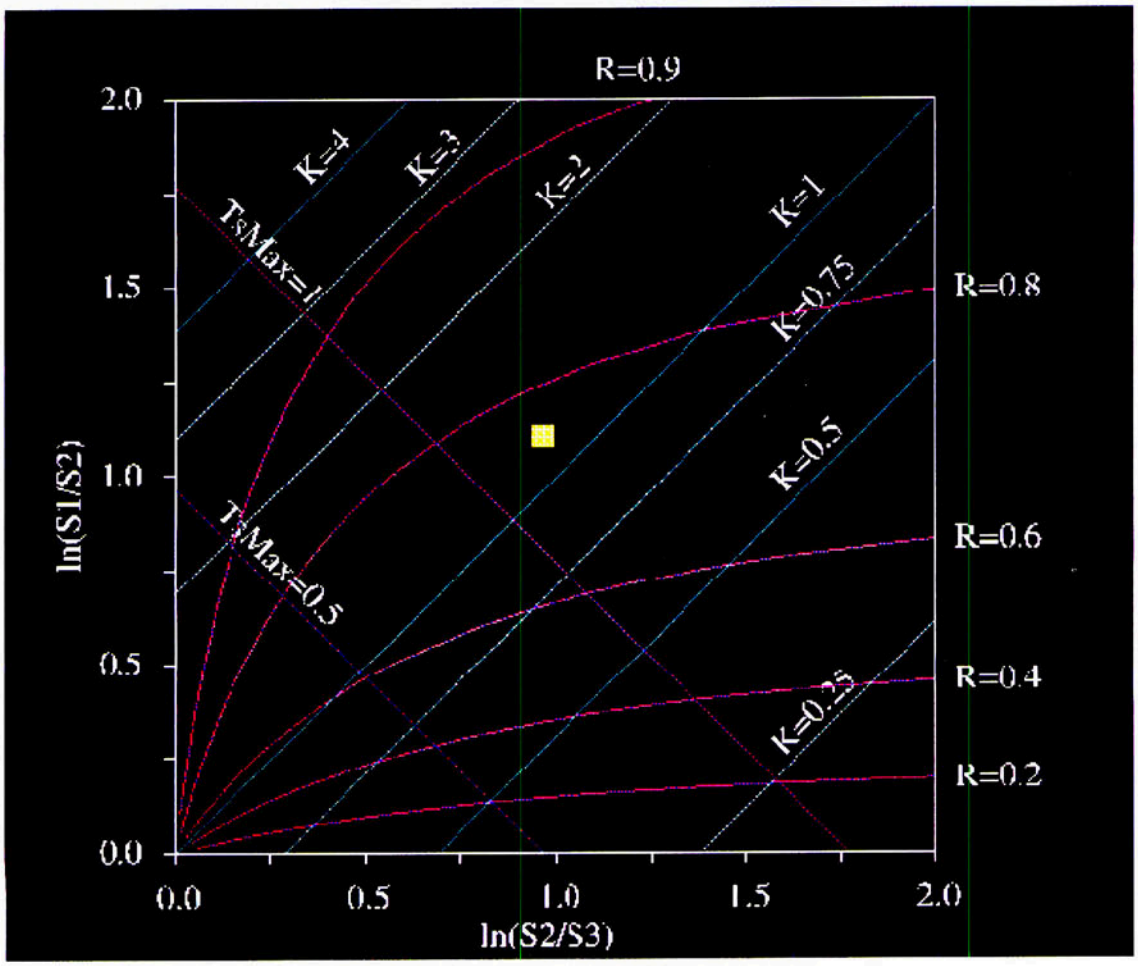
Cursor position

The stress ratio graph displays a **yellow square** whose location is based on the stress ratios of σ_1 to σ_2 along the y-axis and σ_2 to σ_3 along the x-axis of the plot. σ_1 is the magnitude of the maximum principal stress, σ_2 is the intermediate principal stress, and σ_3 is the minimum principal stress. In addition to showing the location of the current stress state on a logarithmic scale, the graph also shows where the current stress state lies relative to plots of the following parameters:

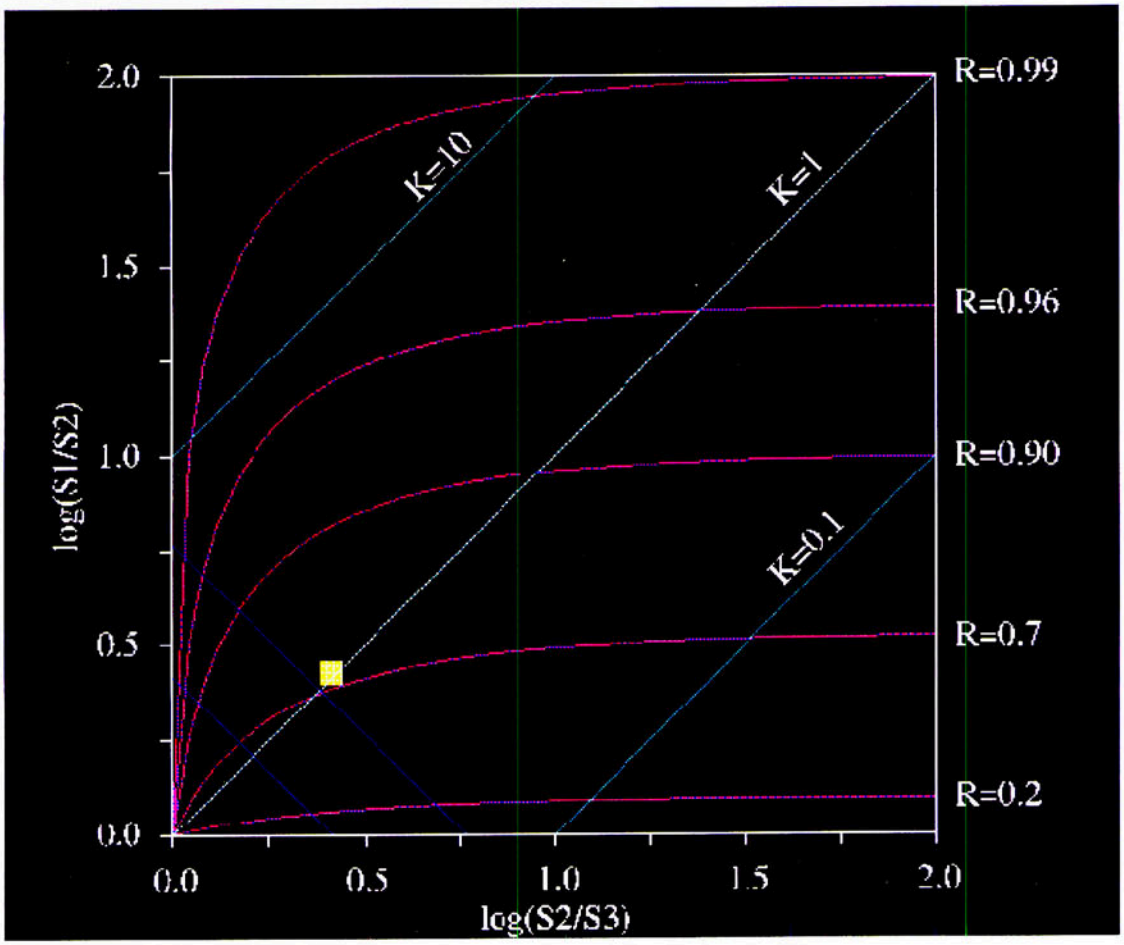
$$K = (\sigma 1 / \sigma 2) / (\sigma 2 / \sigma 3)$$

$$R = (\sigma 1 - \sigma 2) / (\sigma 1 - \sigma 3)$$

TsMax = maximum slip tendency of all fault orientations for a given stress state.

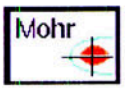


Natural logarithm scale

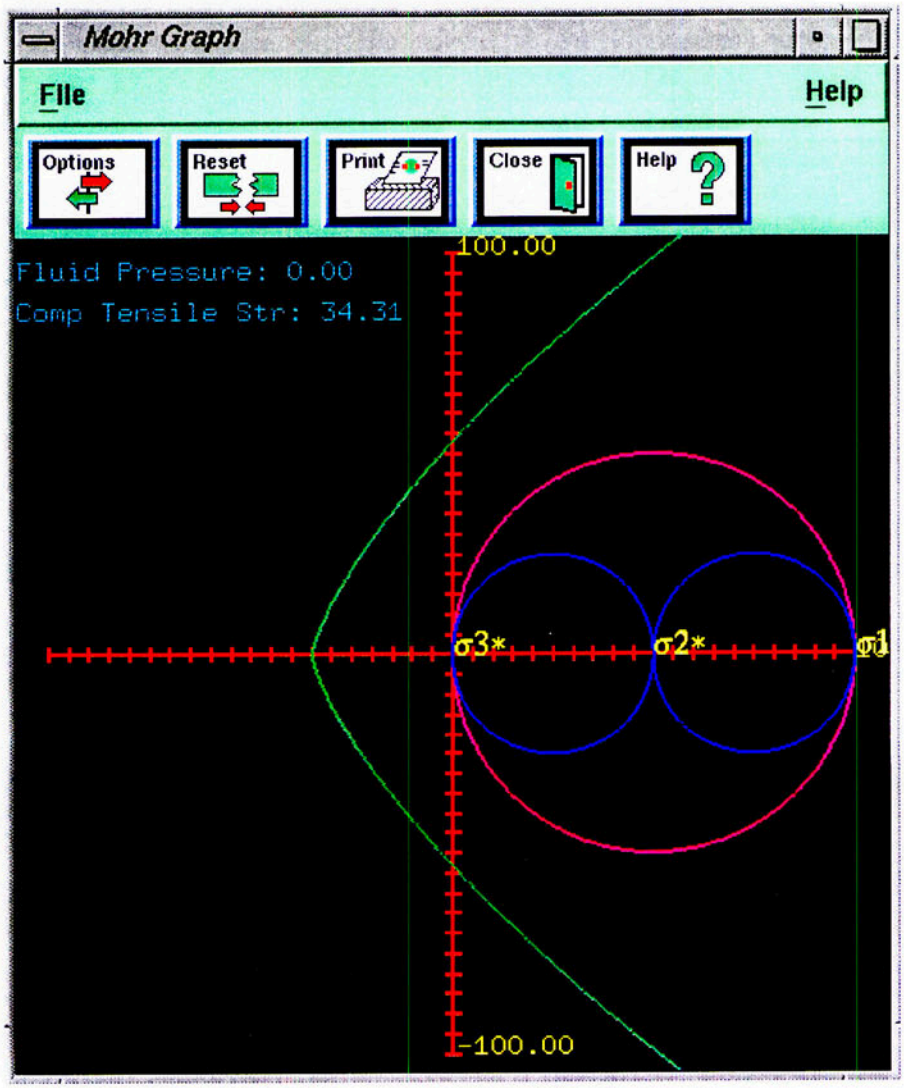

2.0
1.5
1.0
0.5
0.0
log(S1/S2)
0.0
0.5
1.0
1.5
2.0
log(S2/S3)
K=10
K=1
K=0.1
R=0.99
R=0.96
R=0.90
R=0.7
R=0.2

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_04_sun.ps

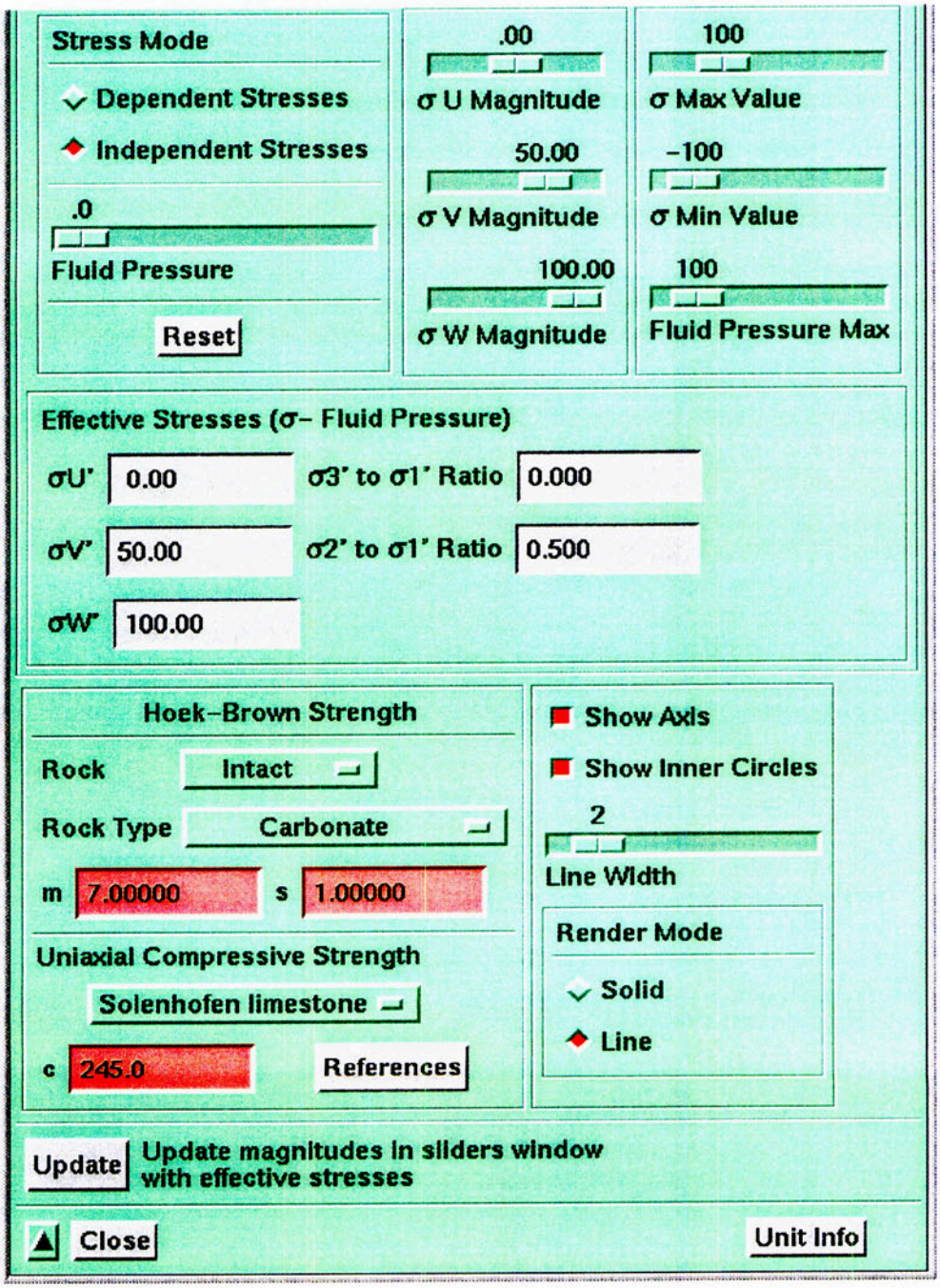
Mohr Graph



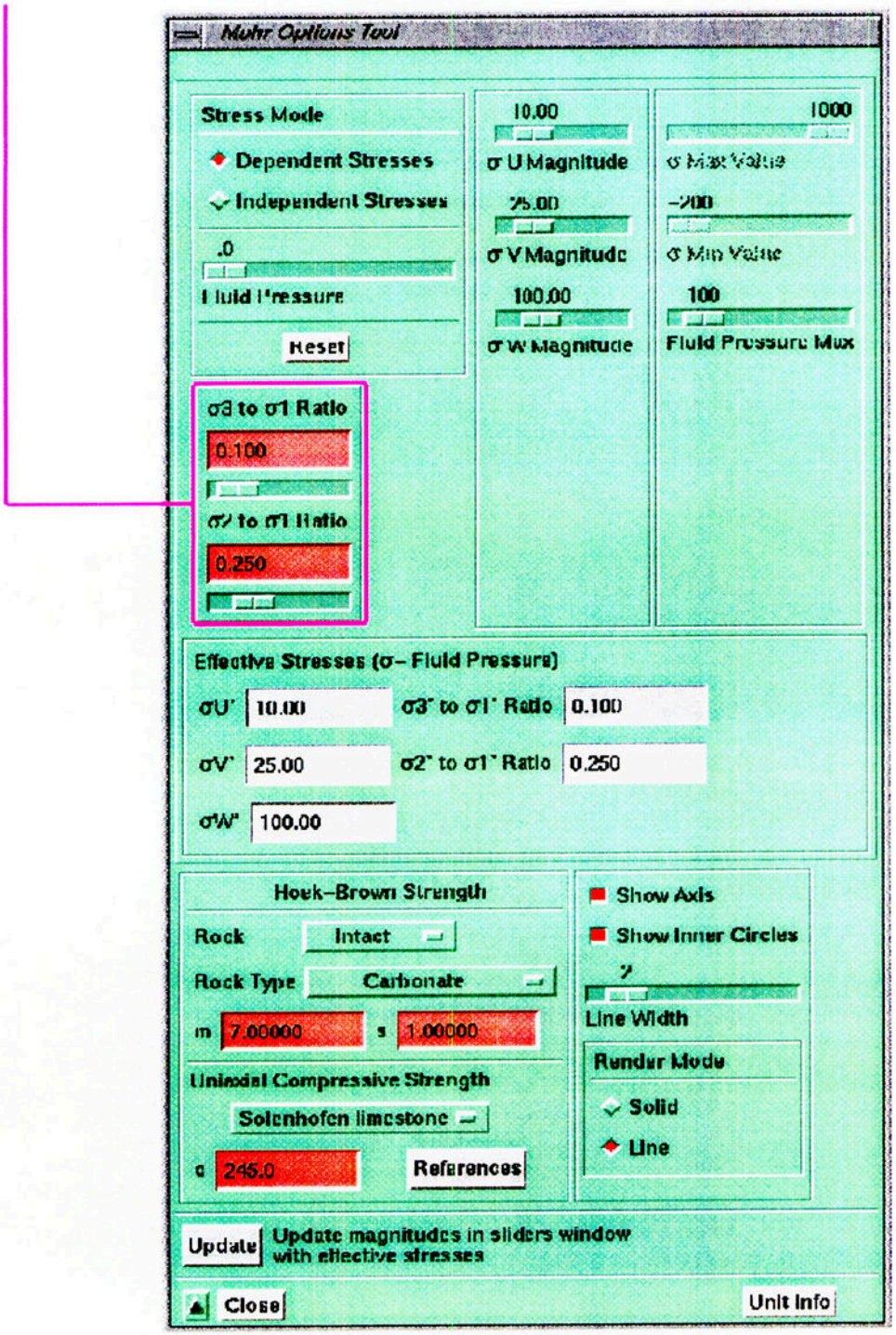
The Mohr Graph allows the user to apply stress and fluid pressure to a specified type of rock and visualize the result. The result of the stresses and fluid pressure on the rock is displayed in a traditional Mohr Graph. Effective stresses are indicated in the visual display by an asterisk.



The rock attributes may be altered in the Hoek-Brown Strength portion of the Options window.



In particular, the user may enter the quality, material type, and specific rock test results to work with pull down menus. The variables m, s, and c may be entered via text fields.

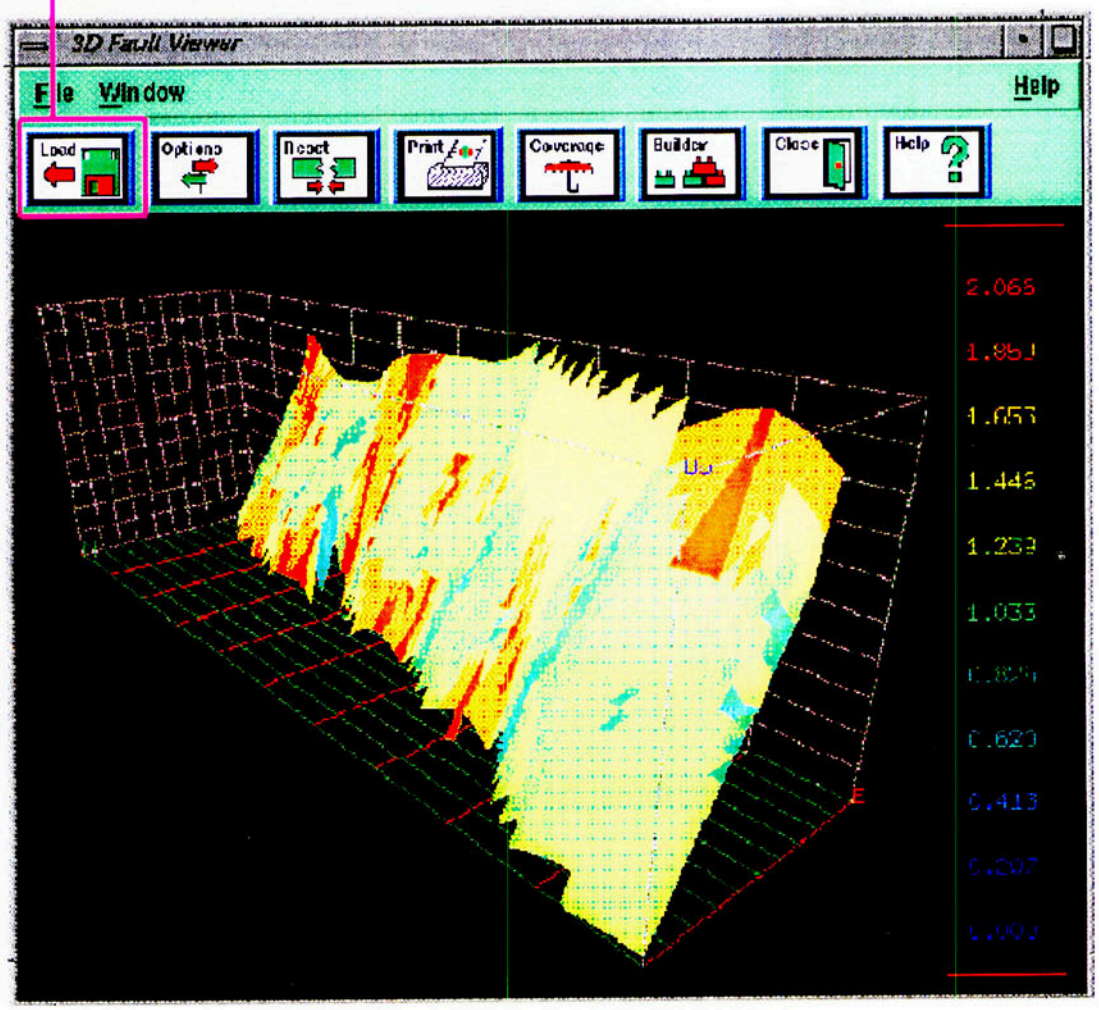

Mohr Options Tool
Stress Mode
Dependent Stresses
Independent Stresses
.0
Fluid Pressure
Reset
10.00
σ U Magnitude
25.00
σ V Magnitude
100.00
σ W Magnitude
1000
σ Max Value
-200
σ Min Value
100
Fluid Pressure Max
σ3 to σ1 Ratio
0.100
σ2 to σ1 Ratio
0.250
Effective Stresses (σ – Fluid Pressure)
σU' 10.00
σ3' to σ1' Ratio 0.100
σV' 25.00
σ2' to σ1' Ratio 0.250
σW' 100.00
Hoek–Brown Strength
Rock Intact
Rock Type Carbonate
m 7.00000
s 1.00000
Uniaxial Compressive Strength
Solenhofen limestone
σ 245.0
References
Show Axis
Show Inner Circles
2
Line Width
Render Mode
Solid
Line
Update
Update magnitudes in sliders window with effective stresses
Close
Unit Info

User: jbuckner
Host: pluto
Class: pluto
Job: standard_input

3D Fault Viewer

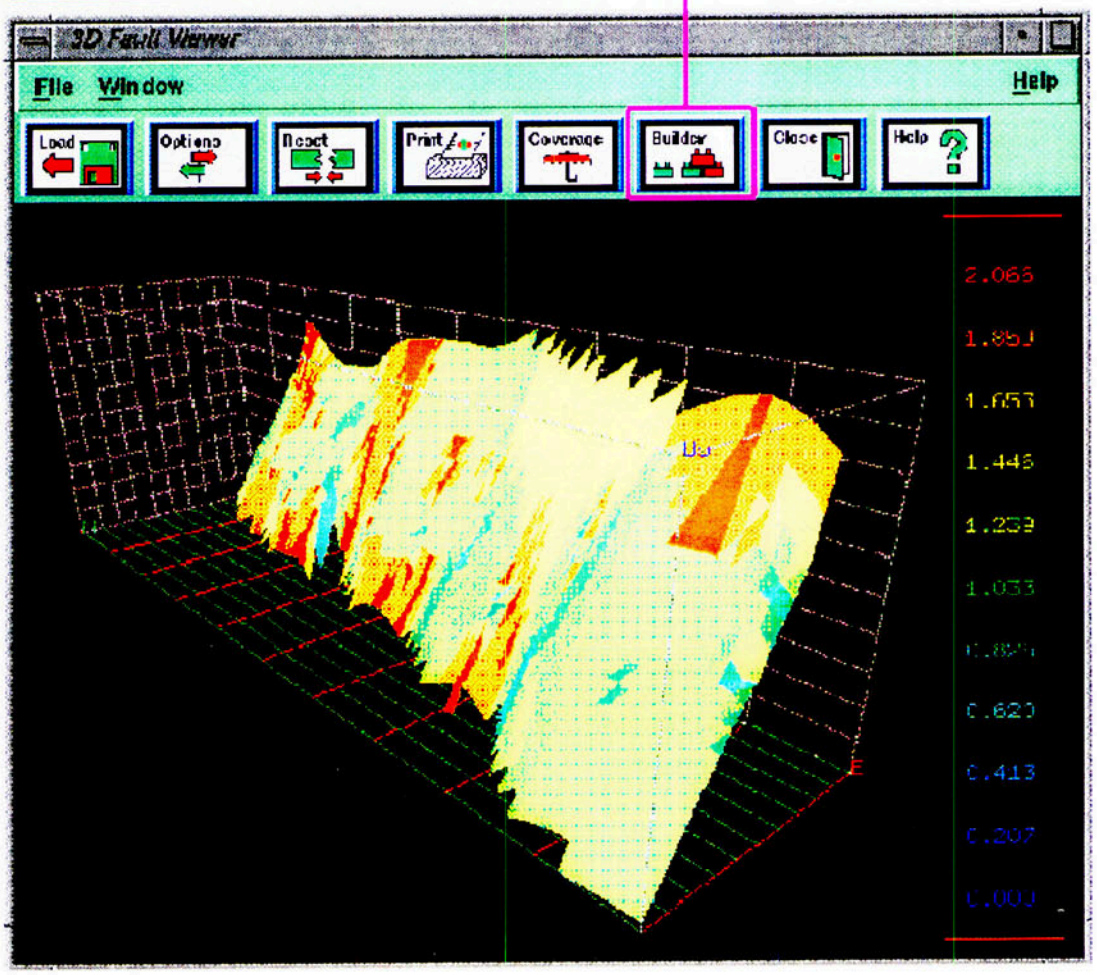
The 3D Fault Viewer enables the user to view and interact with faults defined in 3-space as polygons. The following formats for input files are currently supported: flt, vbl, and 3ds. The 3ds file format is the 3DStress application's own specific format not to be confused with the popular three-dimension modeling mesh format.

To load a file, the user must click on the Load Button located at the top of the 3D Fault Viewer.



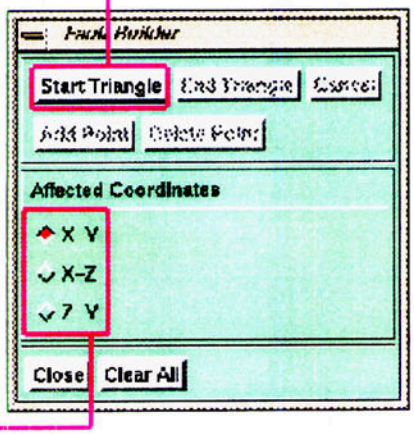
Upon clicking load, the user will be prompted with a file browser dialog window with which the file may be selected.

The user may also build faults using the 3D Fault Viewer's Fault Builder tool. The user may access the Fault Builder by clicking on the Builder Button at the top of the 3D Fault Viewer Window.



Upon pressing the Builder Button, the user will be presented with the Fault Builder Window. If a fault file is already loaded in the 3D Fault Viewer, the user may add to it. If no fault file is loaded, the user is presented with a default bounding box and may create a fault from scratch. The user should use the bounding box as a reference to the geographical coordinate system.

To add a triangle to the fault, click the Start Triangle button. A new triangle will appear with vertices on the corners designated N, E, and Up by the bounding box. To adjust any one of the vertices, hold down the control key and select the vertex with the left mouse button while dragging the vertex with the mouse.

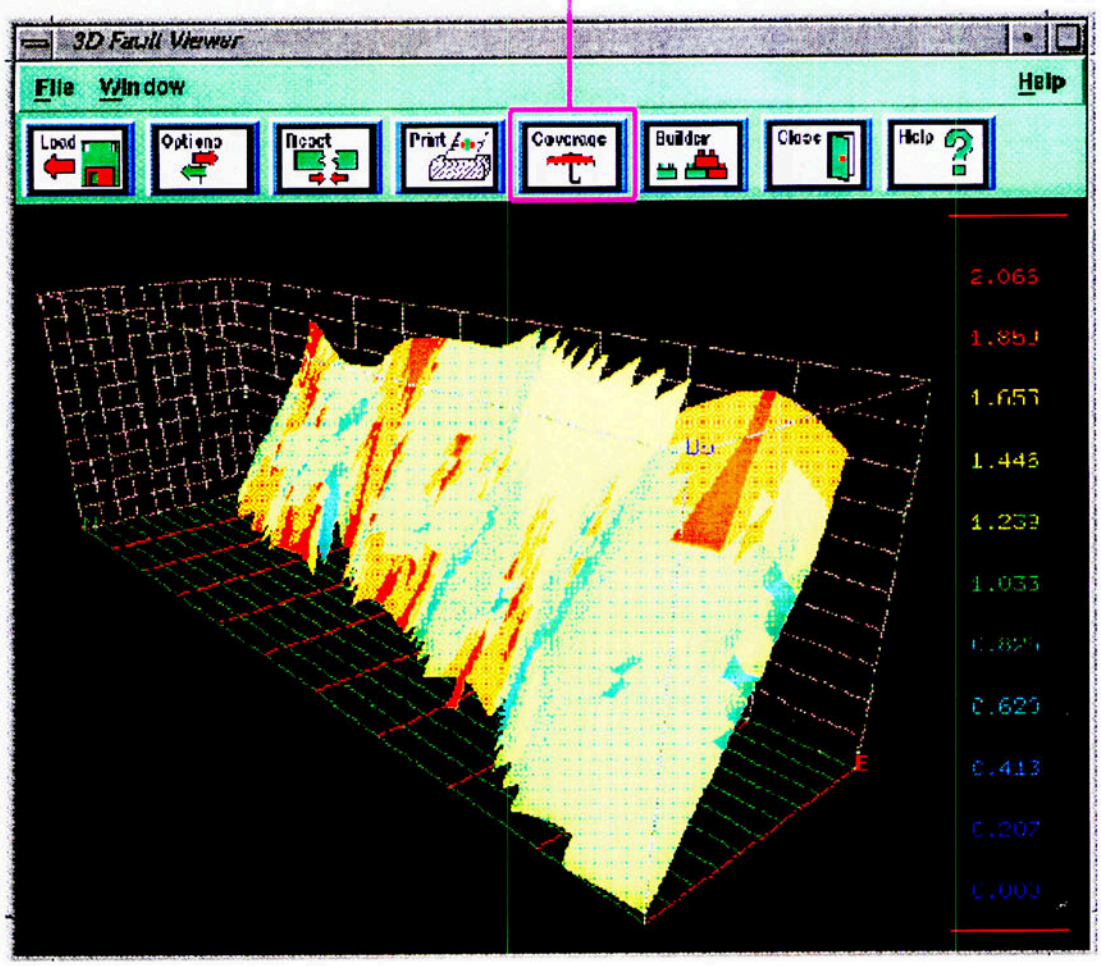


The three buttons designated Affected Coordinates control the plane in which the vertices are allowed to move. For example, to move a vertex along the X-Y plane, select the X-Y button. X, Y, and Z correspond to a right-handed coordinate system with +Z coming out of the screen. Thus, +X runs horizontal from right to left across the screen, and +Y runs vertically from top to bottom. This coordinate system is distinct and independent of the geographical coordinate system defined by the loaded fault and coverage files.

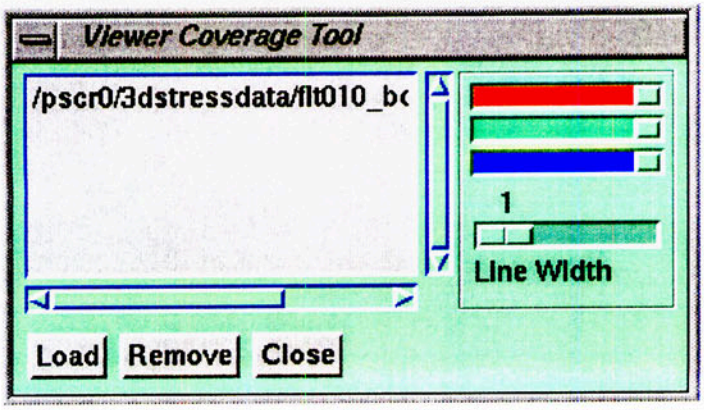
Points may be deleted and added to the triangle using the Delete Point and Add Point buttons, located directly below the triangle buttons. The current fault in progress may be aborted by clicking the Cancel button, located directly to the right of the End Triangle button. When finished, click the End Triangle button, located directly to the right of the Start triangle button. To remove all Fault-Builder produced polygons, click the Clear All button.

Closing the window accepts modifications, but these are not saved untill the user saves the file to disk via the 3D Fault Viewer's file pulldown menu.

The user should also note that coverages may be placed over 3D objects. To access the coverage tool, the user should click on the Coverage Button located at the top of the 3D Fault Viewer Window.



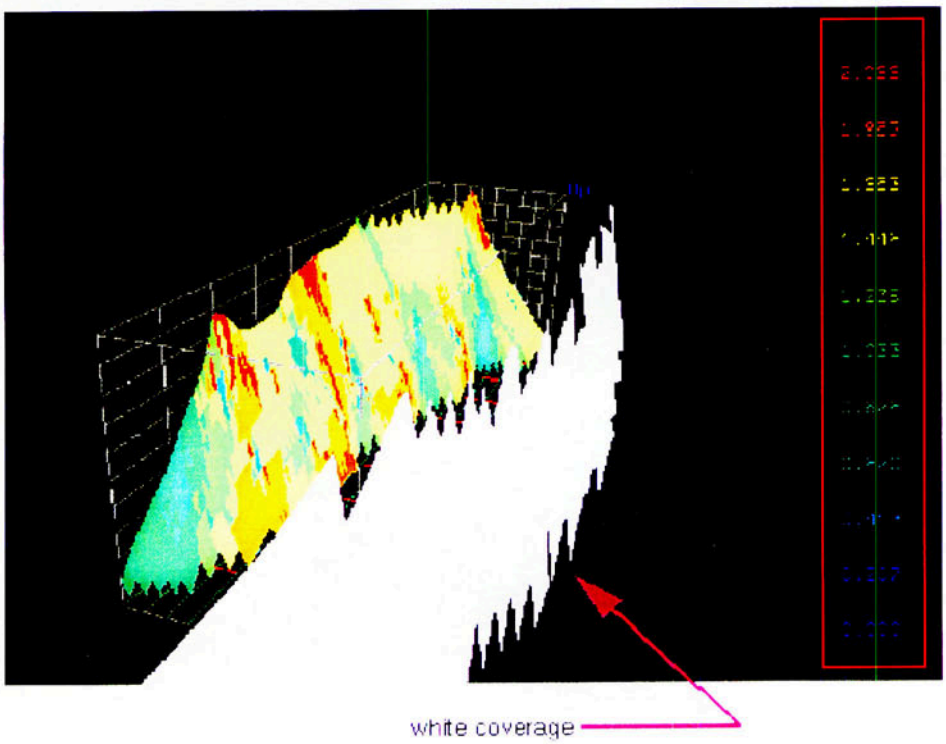
Upon clicking the Coverage Button, the user is presented with the Coverage Tool.



To load a coverage file, click the **Load** button and a file selector will appear. After

selecting a coverage file, the name of the file is displayed in the Viewer Coverage Tool. Each loaded coverage may be manipulated by clicking on the coverage name, then adjusting the color sliders or adjusting the Line Width slider. To remove a coverage select the name and click the Remove button.

An example of a coverage and a normal fault file loaded at the same time appears below. Note that the coverage is white and the normal fault file is shaded according to stress.

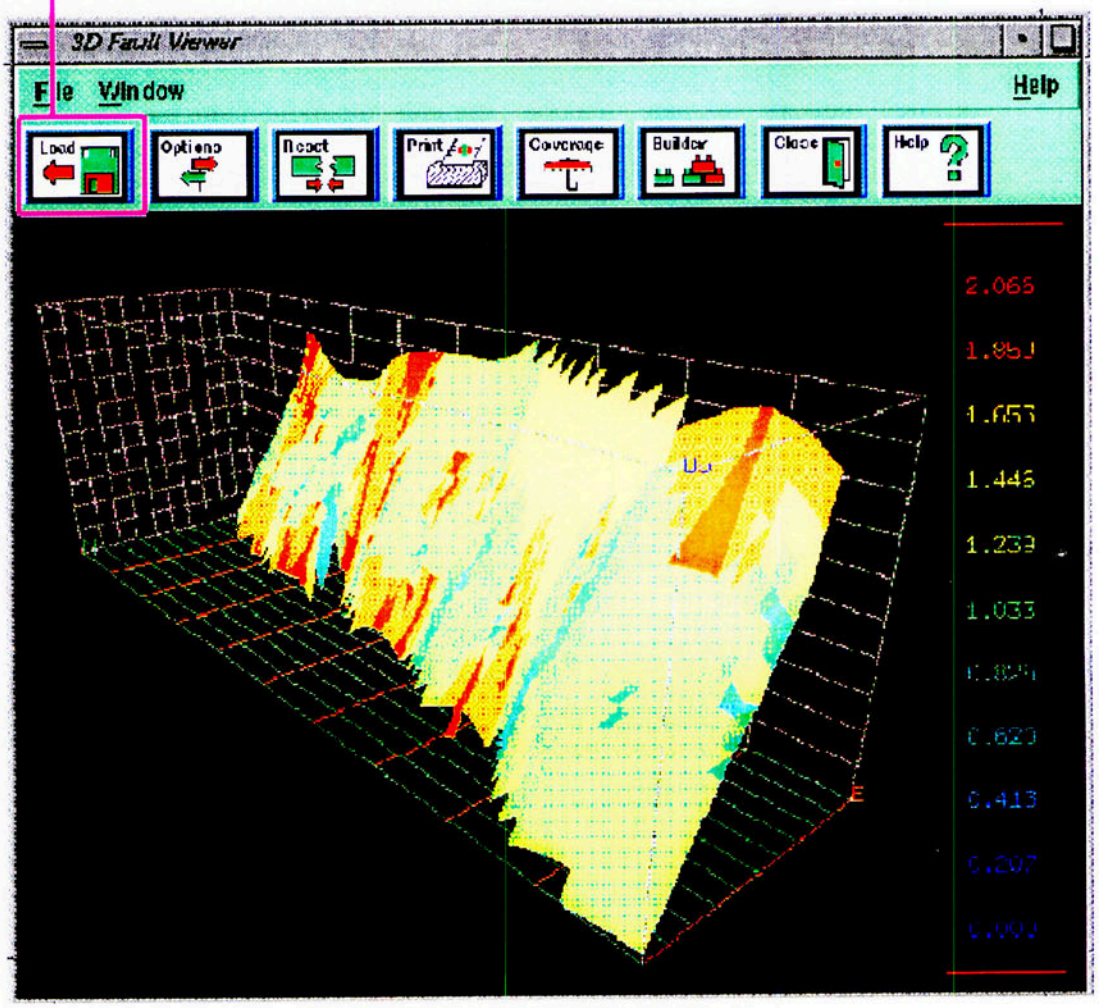


User: jbuckner
Host: pluto
Class: pluto
Job: help_317_05_sun.ps

3D Fault Viewer

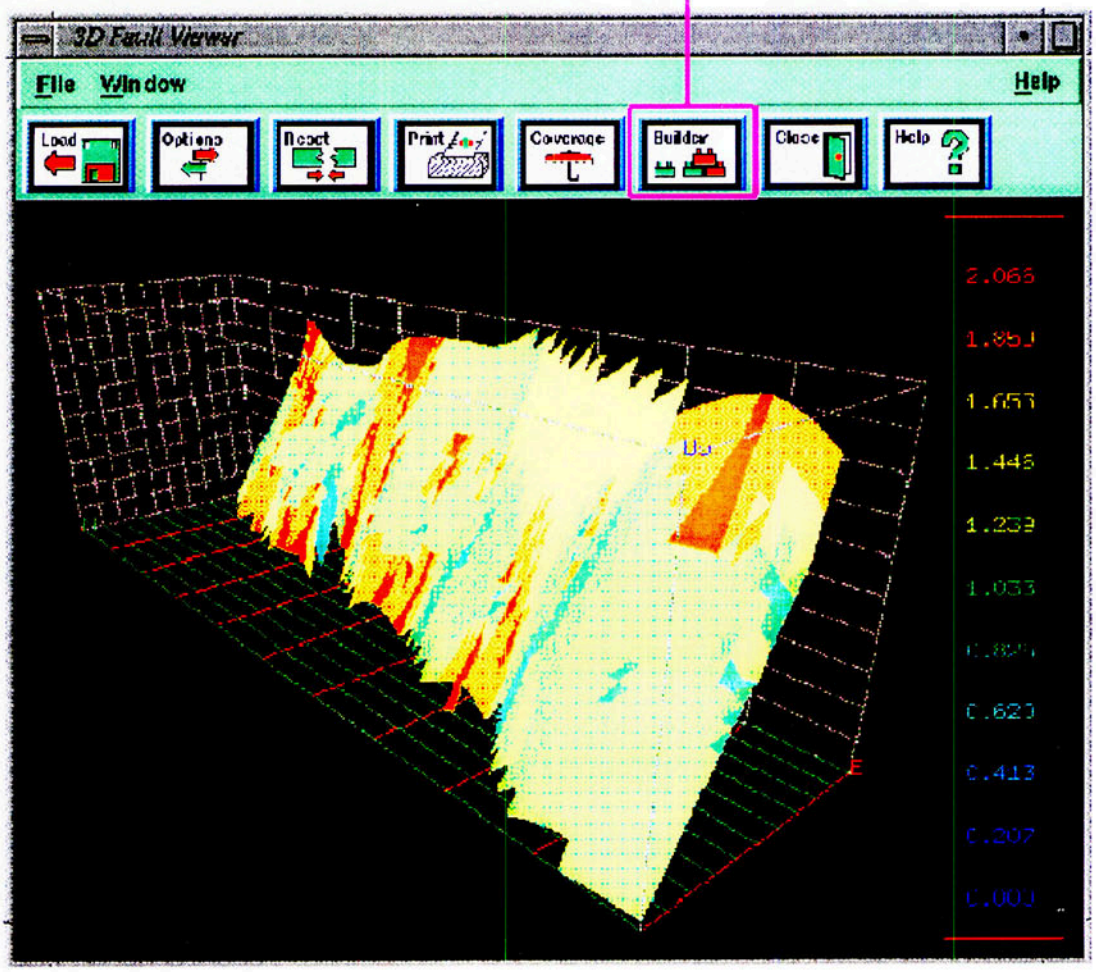
The 3D Fault Viewer enables the user to view and interact with faults defined in 3-space as polygons. The following formats for input files are currently supported: flt, vbl, and 3ds. The 3ds file format is the 3DStress application's own specific format not to be confused with the popular three-dimension modeling mesh format.

To load a file, the user must click on the Load Button located at the top of the 3D Fault Viewer.



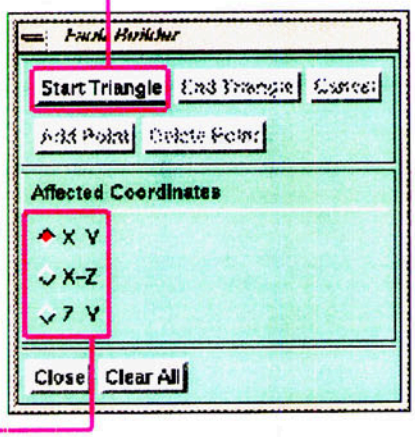
Upon clicking load, the user will be prompted with a file browser dialog window with which the file may be selected.

The user may also build faults using the 3D Fault Viewer's Fault Builder tool. The user may access the Fault Builder by clicking on the Builder Button at the top of the 3D Fault Viewer Window.



Upon pressing the Builder Button, the user will be presented with the Fault Builder Window. If a fault file is already loaded in the 3D Fault Viewer, the user may add to it. If no fault file is loaded, the user is presented with a default bounding box and may create a fault from scratch. The user should use the bounding box as a reference to the geographical coordinate system.

To add a triangle to the fault, click the Start Triangle button. A new triangle will appear with vertices on the corners designated N, E, and Up by the bounding box. To adjust any one of the vertices, hold down the control key and select the vertex with the left mouse button while dragging the vertex with the mouse.



The three buttons designated Affected Coordinates control the plane in which the vertices are allowed to move. For example, to move a vertex along the X-Y plane, select the X-Y button. X, Y, and Z correspond to a right-handed coordinate system with +Z coming out of the screen. Thus, +X runs horizontal from right to left across the screen, and +Y runs vertically from top to bottom. This coordinate system is distinct and independent of the geographical coordinate system defined by the loaded fault and coverage files.

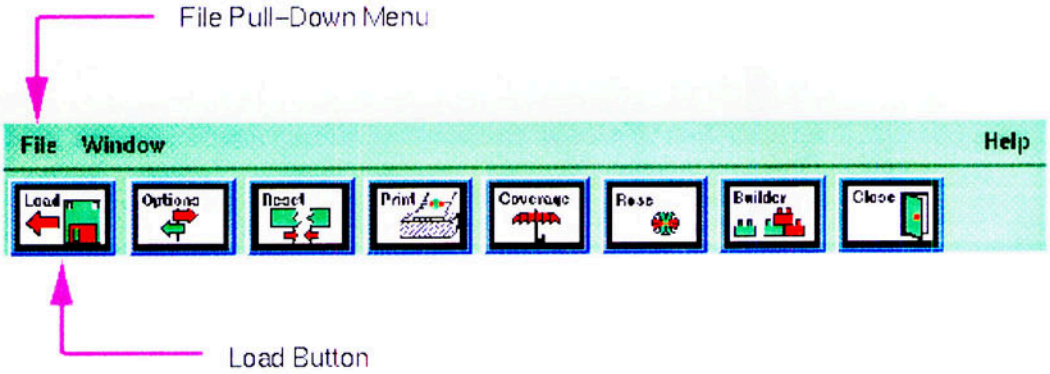
Points may be deleted and added to the triangle using the Delete Point and Add Point buttons, located directly below the triangle buttons. The current fault in progress may be aborted by clicking the Cancel button, located directly to the right of the End Triangle button. When finished, click the End Triangle button, located directly to the right of the Start triangle button. To remove all Fault-Builder produced polygons, click the Clear All button.

Closing the window accepts modifications, but these are not saved untill the user saves the file to disk via the 3D Fault Viewer's file pulldown menu.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_06_sun.ps

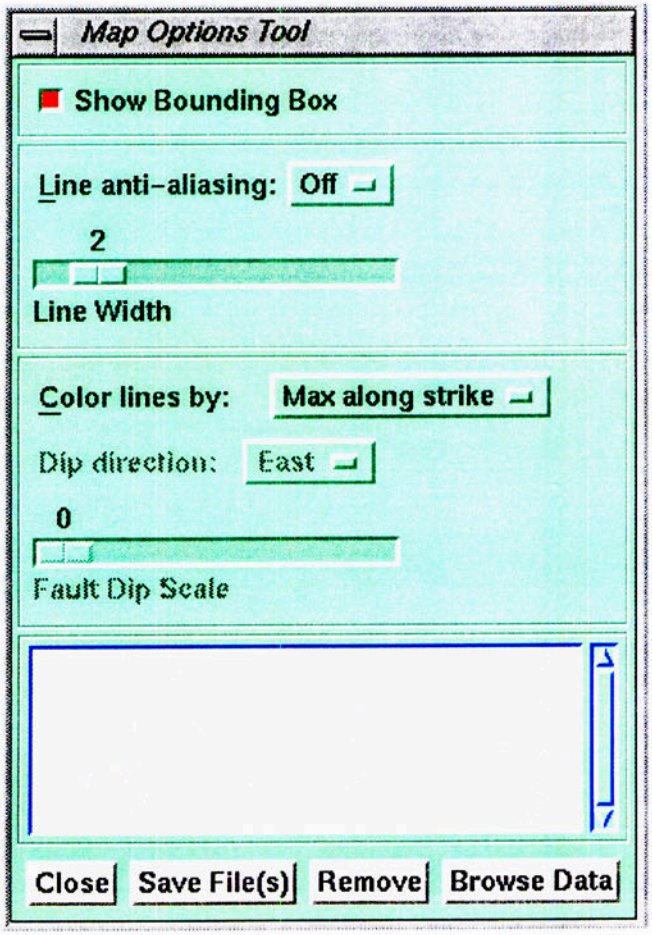
Map Viewer

The Map Viewer is used to display files of faults displayed as lines and overlay those images with coverages. To load a file, either choose Load from the File pull-down menu at the top of the Map Viewer window, or click on the Load button just below the File pull-down menu.



A File Selection box will then appear prompting for the selection of a map. Use this dialog box to navigate the file-system and select the appropriate file as described in the Appendix.

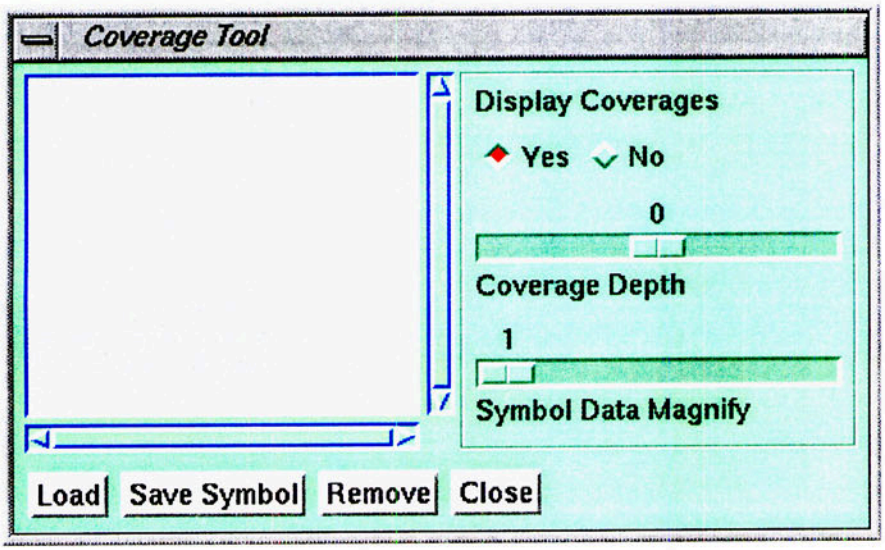
The Options tool may be used to toggle display of the bounding box, toggle anti-aliasing, set line width, set the color scheme, set the dip direction, set the fault dip scale, and browse the data file. The Options tool may be accessed in a similar manner to the Load File dialog box. Either select Options from the File pull-down menu or click the Options button just below the Window pull-down menu. Upon loading a file, the filename will appear in the text box in the Options window. Multiple files may be loaded, and to remove one simply highlight the file and press the remove button below the text box. The files may also be saved as one .lin file by pressing the Save File(s) button.



The Reset feature is used to reset the point-of-view in the Map Viewer window to the default, start-up location. Either select Reset from the File pull-down menu or click the Reset button just below the Window pull-down menu to reset the point-of-view.

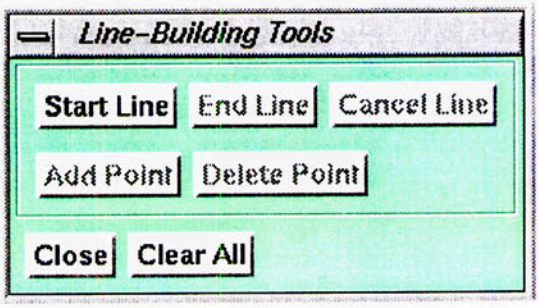
The Print feature is used to print the Map Viewer window to an SGI RGB file. Either select Print from the File pull-down menu or click the Print button just below the Window pull-down menu to access the Save File dialog box. Use this dialog box to navigate the file-system and select the apropriate filename to call the saved image.

The Coverage tool is used to overlay a coverage image on top of the fault image. To access the coverage tool, either choose Coverage from the Window pull-down menu at the top of the Map Viewer window, or click on the Coverage button just below the pull-down menu bar. With the coverage, the user may load several files at once and toggle the displaying of each loaded file individually. Also, coverage depth may be set, the degree of magnification of the symbol data may be set. Symbols may be saved, and coverage files may be removed from the list. To load a coverage file, click on the Load button at the bottom of the Coverage Tool window. A dialog box will then appear prompting for the selection of a file. Use this dialog box to navigate the file-system and select the appropriate file.



A rose diagram is displayed by pressing the Rose button below the pull-down menu bar or selecting Rose from the Window pull-down menu. See the Rose Diagram chapter for more information on the Rose Viewer.

The Line-Building Tools dialog box may be used to place lines on existing maps. To begin a line, click the Start Line button. A new line will appear along the left edge of the bounding box with its end points at the corners. To select a point and move it, hold down the control key while clicking and dragging the point with the left mouse button. Points may also be added and deleted using the Add Point and Delete Point buttons. Added points always appear in the lower left corner of the bounding box. The point currently selected is the one deleted. A point may be selected by holding the control key and clicking the left mouse button over it. The selected point is displayed as yellow.

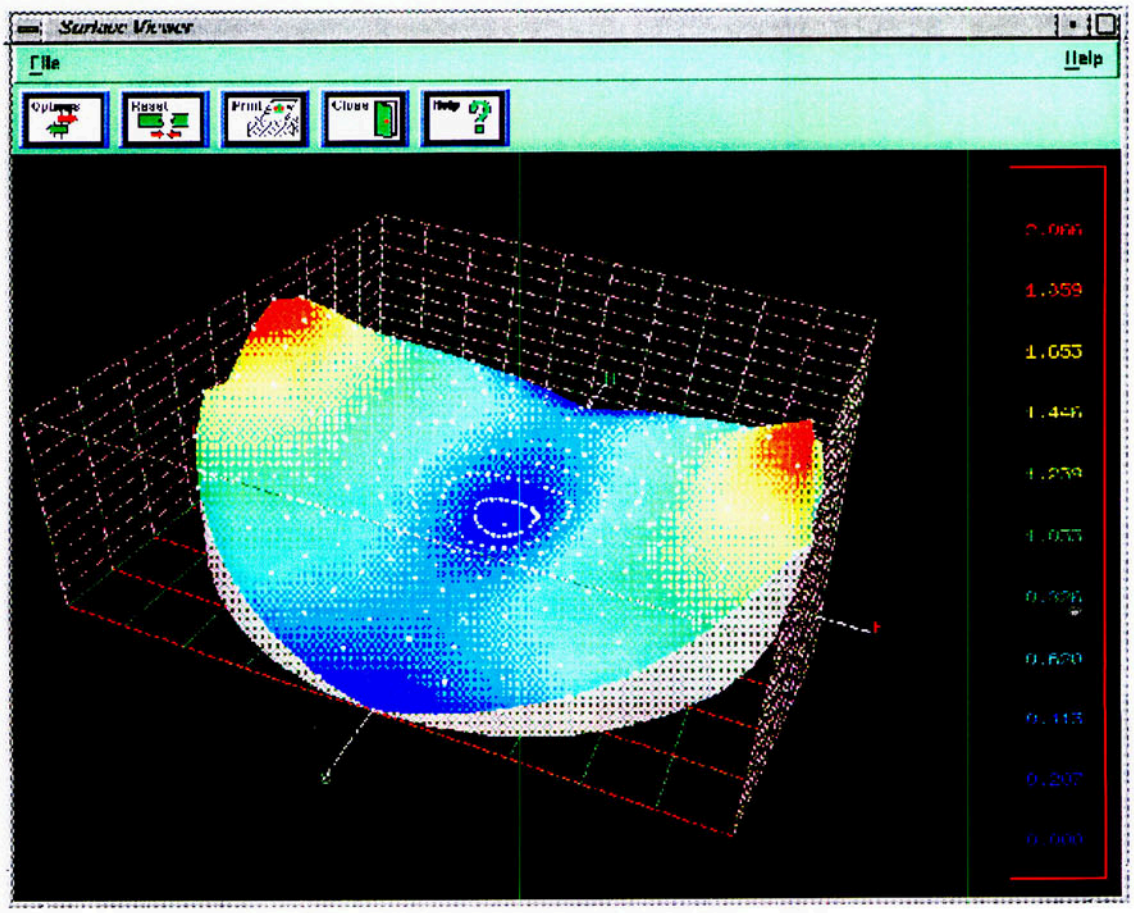


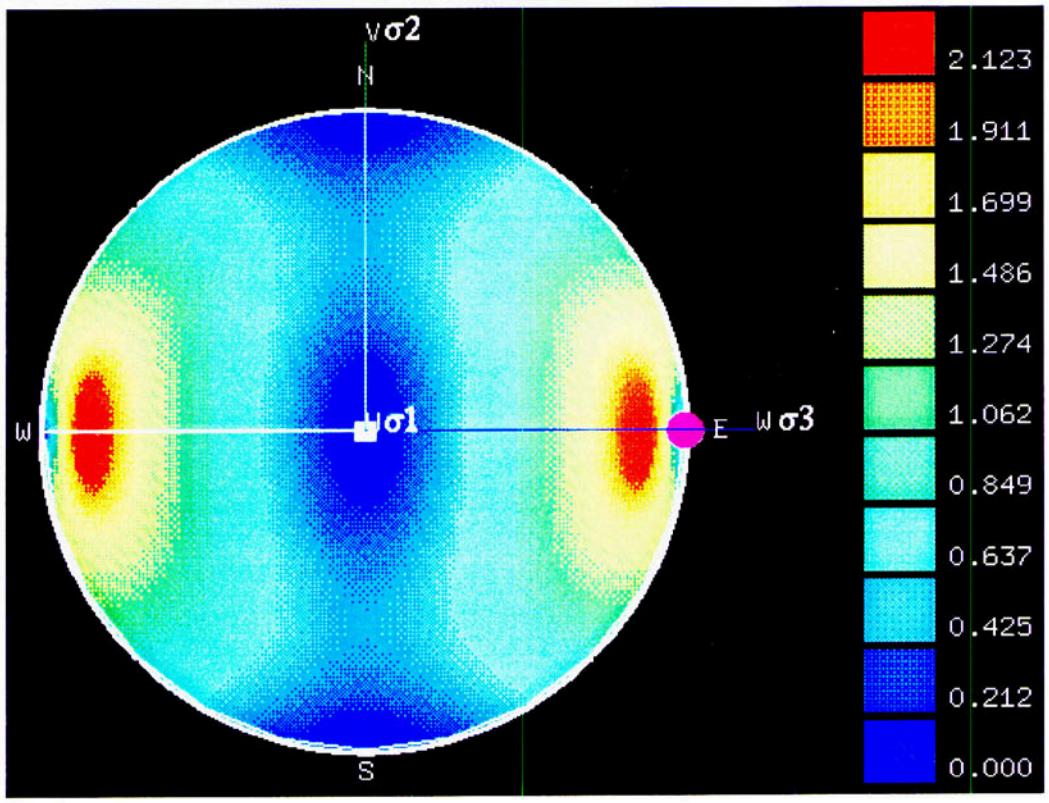
The user may remove all lines produced via the Line Builder by pressing the Clear All button. To exit the Map Viewer, select Close from the File pull-down menu or click the Close button below the pull-down menu bar. To access the online help for 3DStress, use the Help pull-down menu or click the Help button below the pull-down menu bar.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_07_sun.ps

Surface Viewer

The surface viewer displays slip tendency, dilation tendency, or leakage factor values computed in the Tendency Plot window as a 3D surface. The height and color of the surface represent the computed slip tendency, dilation tendency, leakage factor values. The vertical exaggeration of the surface is controlled by buttons on the Options window.



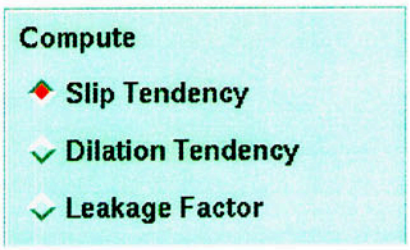

V σ2
N
W
σ1
E
W σ3
S
2.123
1.911
1.699
1.486
1.274
1.062
0.849
0.637
0.425
0.212
0.000

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_08_sun.ps

Options

The Options Window may be accessed by clicking on the Options Button on the Command Bar. The tools in this window allow the user to change the variable plotted in the **Tendency Plot**, change the color scheme of the graphics window, change the color detail, change the lighting scheme, change the color threshold, and toggle the verbosity mode.

The user may change the variable plotted in the Tendency plot by clicking on the radio button next to the desired plot-type. See the following figure.



The user may also change the color scheme of the graphics window. The user may toggle between color and black-and-white plots for the graphics displays.

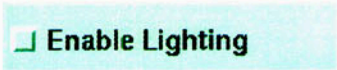
Also, the user may select a white or a black background for the graphics displays.

The user may alter the detail used in the coloring of images by changing the step size setting and the color scale setting.

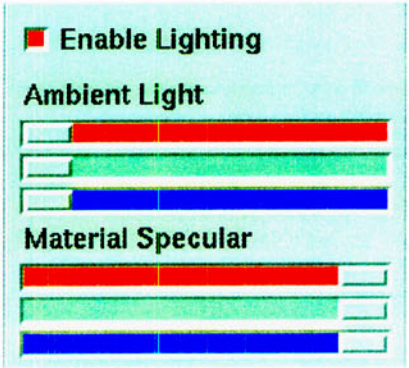
Step size controls the number of point of data drawn. The smaller the step size is, the more detailed the plot becomes. The color scale setting controls the gradient of the color scale. As the magnitude of the color scale setting increases the range of data

colored by the color used for the largest data values increases.

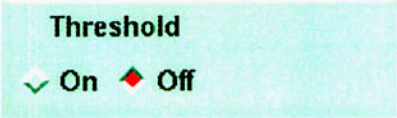
The user may alter certain lighting conditions by enabling the Enable Lighting toggle button.



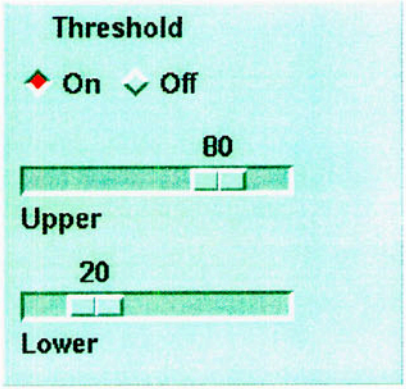
Enabling this toggle causes the lighting controls to appear just below it. The user may then alter the RGB value for the ambient light (light emitted by the objects themselves rather than by an external source) by moving the three sliders representing the amount of red, green, and blue that appear just under the heading "Ambient Light". There are additional sliders for the RGB value of the Specular Color (the color illuminating the whole scene from an external source) of the graphic displays.



The Threshold option is the next option vertically after the Enable Lighting option. Like the Enable Lighting option, the Threshold option is a toggle button, i.e., it can either be set on or off.



The Threshold option is used to control the range of colors used on the legends of the graphics displays. When the toggle is set to "On", the sliders controlling the range of the legend colors appears.



The Verbose toggle button is the final button appearing vertically in the options window. When enabled, this button provides detailed information on the actual inner workings of 3dstress. It is useful in determining the reason for sometimes esoteric system errors.

User: jbuckner
Host: pluto
Class: pluto
Job: help_317_09_sun.ps

User's Guide for Version 1.3.3

3DStress was prepared as an account of work performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA) for the Division of Waste Management of the Nuclear Regulatory Commission (NRC), an independent agency of the United States Government. Neither the developer(s) of 3dstress nor any of their sponsors make any warranty, expressed or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed, or represent that its use would not fringe on privately-owned rights.

Technical Support

For technical support for 3DStress contact:

Dr. David A. Ferrill, CNWRA, Southwest Research Institute, 6220 Culebra Road, San Antonio Texas 78238 USA, 210-522-6082 (voice), 210-522-5155 (fax), E-mail: dferrill@swri.edu

Hardware Requirements

Sun Ultra workstation running the Solaris 2.7 Operating System

SOFTWARE CHANGE REPORT (SCR)

1. SCR No. (*Software Developer Assigns*):	2. Software Title and Version:	3. Project No:
GLGP-SCR-318	3DStress 1.3.3 (IRIX & Solaris)	20-01402-472

4. Affected Software Module(s), Description of Problem(s):

3DStress source code will not compile using the latest djgcc c++ compiler on the Sun Solaris platform because the GL implementation for Solaris 2.7

a) places some header files in the <GLw/. . .> directory while the IRIX implementation places them in the <GL/. . .> directory

b) has more stringent requirements on the declaration of memory space for color information (ie the red needed a full 8 bits explicitly set aside for each GL window)

5. Change Requested by: David A. Ferrill Date: 10 December 1999	6. Change Authorized by (*Software Developer*): David A. Ferrill Date: 10 December 1999

7. Description of Change(s) or Problem Resolution (*If changes not implemented, please justify*):

a) appropriate #include <GL/glHeader.h> changed to #include <GLw/glHeader.h>

b) global variable for initialization of all GL windows declared in viewNet.c++ as int dblBuf[]

8. Implemented by: Joshua Buckner	Date: 17 July 2000

9. Description of Acceptance Tests:

See attached.

10. Tested by:	Date: 13 SEP 2000

CNWRA Form TOP-5 (05/2000)

9. Description of Acceptance Tests:

a) start 3DStress 1.3.3_Solaris on a Sun machine running the Solaris 2.7 Operating System (henceforth known as the Sun session)

b) start 3DStress 1.3.2 on an SGI machine running the IRIX 5.x or later operating system (henceforth known as the SGI session)

1

c) open the Mohr Graph window by clicking on the Mohr button on the Control Bar on both sessions

d) on both sessions, print a screen shot of the Mohr graph using the Print button at the top of the Mohr Graph window

2

e) on both sessions, make sure that the Stereograph Slip Tendancy Plot window is open by clicking on the Plot button at the top of the Control Bar

f) on both sessions, print a screen shot of the Plot using the Print button at the top of the Stereograph Slip Tendancy Plot window

3

g) on both sessions, open the 3D Fault Viewer by clicking on the 3Dview button on the Control Bar

h) on both sessions, load the file flt010_bowRidge020.flt into the 3D Fault Viewer from the data directory of the root installation of 3DStress by clicking on the Load button near the top of the 3D Fault Viewer and using the standard file selector

i) on both sessions, print a screen shot of the 3D Fault Viewer using the Print button near the top of the 3D Fault Viewer

4

j) on both sessions, open the Map Viewer by clicking on the Map button on the Control Bar

k) on both sessions, load the file frizzell.lin into the Map Viewer from the data directory of the root installation of 3DStress by clicking on the Load button near the top of the Map Viewer and using the standard file selector

l) on both sessions, load the coverage worldutmz11.lin into the Map Viewer from the data directory of the root installation of 3DStress by clicking on the Coverage button near the top of the Map Viewer, clicking on the Load button near the lower left corner of the Coverage tool, and using the standard file selector. Then, close the Coverage tool using the Close button.

m) on both sessions, print a screen shot of the Map Viewer using the Print button near the top of the Map Viewer

5

n) on both sessions, open the Rose diagram by clicking the Rose button near the top of the Map Viewer

o) on both sessions, print a screen shot of the rose diagram by clicking on the Print button near the top of the Rose diagram window

6

p) on both sessions, open the Stress Ratio Graph by clicking on the Graph button on the Control Bar

q) on both sessions, print a before screen shot of the Graph using the Print button near the top of the Stress Ratio Graph window

7

r) on both sessions, click the right mouse button in the Stress Ratio Graph

s) on both sessions, print an after screen shot of the Graph using the Print button near the top of the Stress Ratio Graph window

8

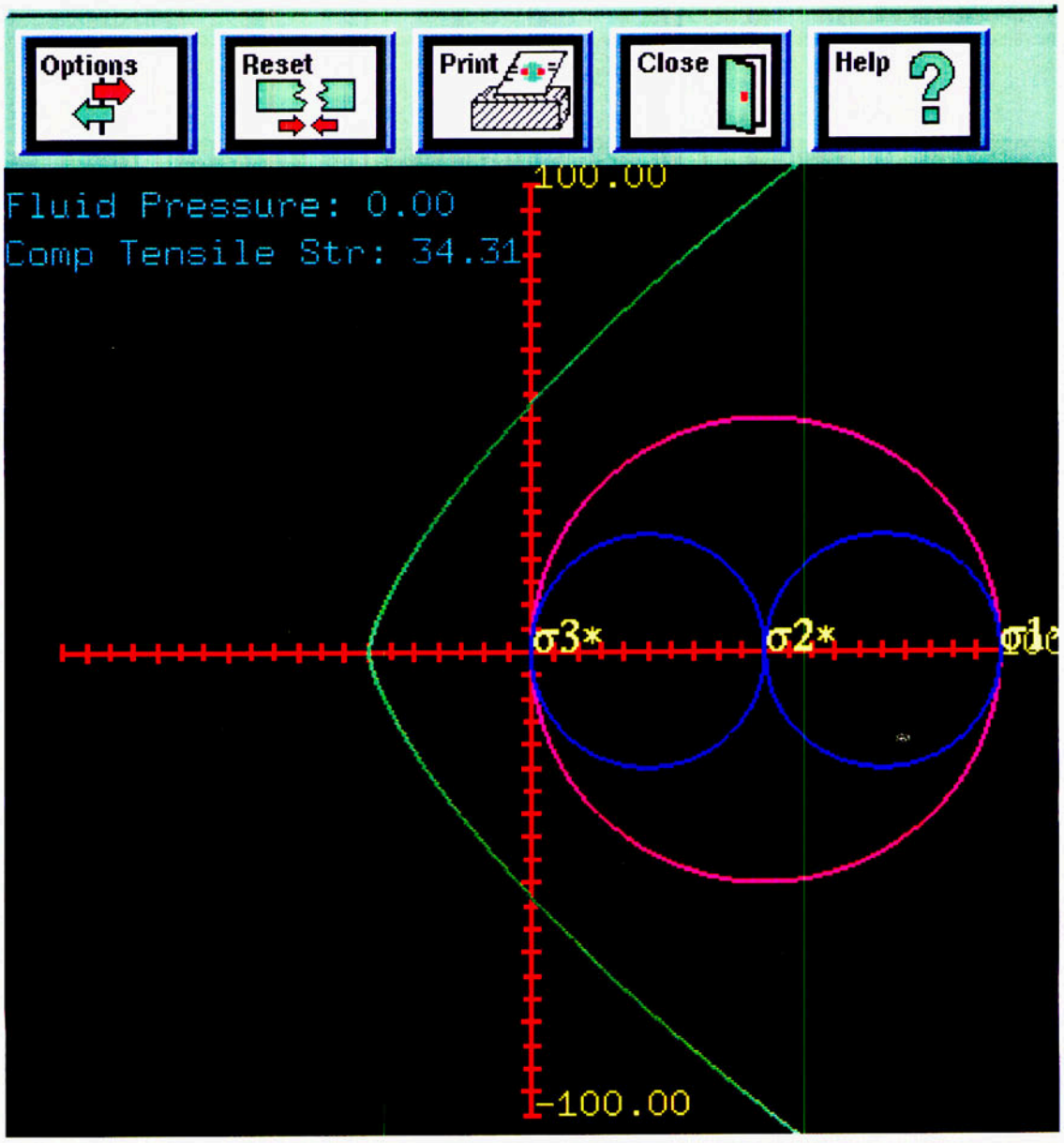
t) on both sessions, open the Surface Viewer by clicking on the 3Dsurf button on the Control Bar

u) on both sessions, print a screen shot of the Surface Viewer using the Print

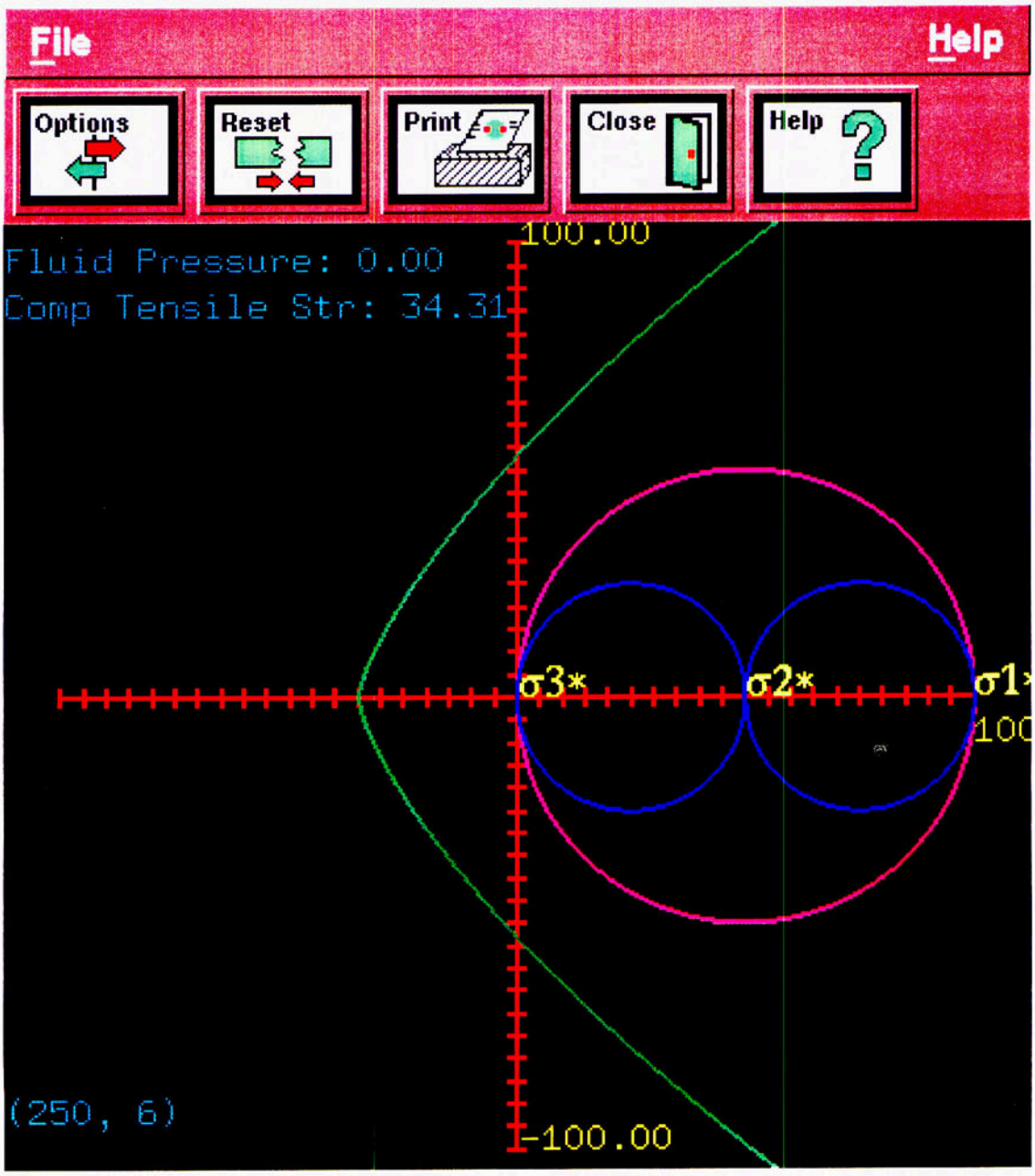
button at the top of the Surface Viewer

Print all screen shots and attach to this SCR. If all of the shots appear essentially identical, the new version of 3DStress has passed the test.

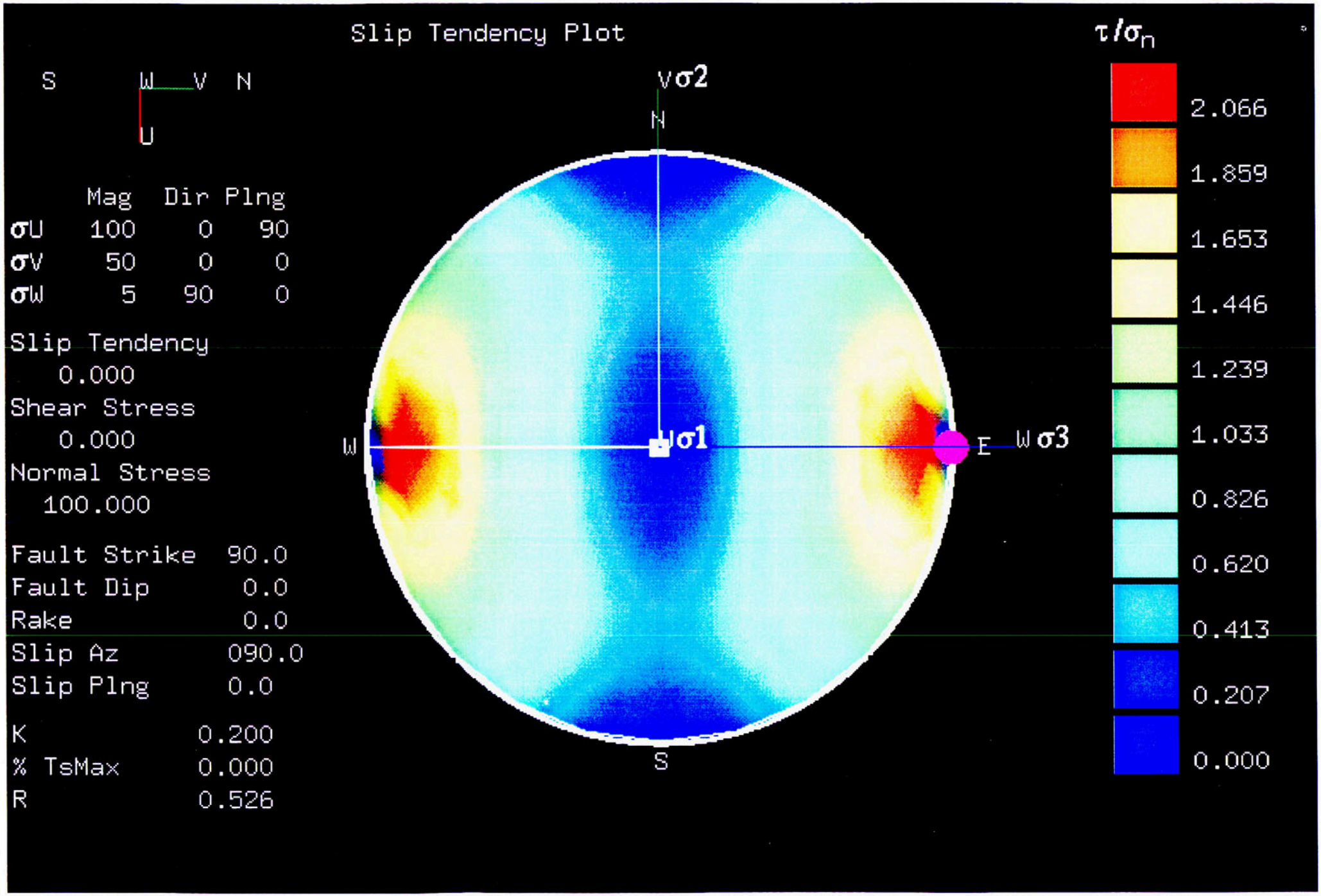
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_01_irix.ps


Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
100.00
-100.00
σ3*
σ2*

User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_01_sun.ps


File
Help
Options
Reset
Print
Close
Help
Fluid Pressure: 0.00
Comp Tensile Str: 34.31
100.00
σ3*
σ2*
σ1*
100
(250, 6)
-100.00

User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_02_irix.ps


Slip Tendency Plot
S
W
V
N
U
Mag Dir Plng
σU 100 0 90
σV 50 0 0
σW 5 90 0
Slip Tendency
0.000
Shear Stress
0.000
Normal Stress
100.000
Fault Strike 90.0
Fault Dip 0.0
Rake 0.0
Slip Az 090.0
Slip Plng 0.0
K 0.200
% TsMax 0.000
R 0.526
Vσ2
N
W
Wσ1
E
W σ3
S
τ/σn
2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000

User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_02_sun.ps

SOFTWARE CHANGE REPORT (SCR)

1. SCR No. (*Software Developer Assigns*):	2. Software Title and Version:	3. Project No:
GLGP-SCR- 319	3DStress 1.3.3 (IRIX & Solaris)	20-01402-472

4. Affected Software Module(s), Description of Problem(s):

The version number must be changed on both the and Solaris version from 1.3.2 to 1.3.3_IRIX and 1.3.3_Solaris. The only modules affected will be the help files, the save file routine, and the splash screen.

5. Change Requested by:	6. Change Authorized by (*Software Developer*):
David A. Ferrill **Date:** 13 July 2000	David A. Ferrill **Date:** 13 July 2000

7. Description of Change(s) or Problem Resolution (*If changes not implemented, please justify*):

Search each file for the text string 1.3.2 and replace it with 1.3.3_IRIX or 1.3.3_Solaris. This could be done by hand, using any standard text editor with a find and replace feature, or (from a UNIX command prompt) issuing the command

```
'sed s/1\.3\.2/1\.3\.3_IRIX/g <filename> > <filename>.changed'
```

for the IRIX version and

```
'sed s/1\.3\.2/1\.3\.3_Solaris/g <filename> > <filename>.changed'
```

and for the Solaris version after which the command

```
'mv <filename>.change <filename>'
```

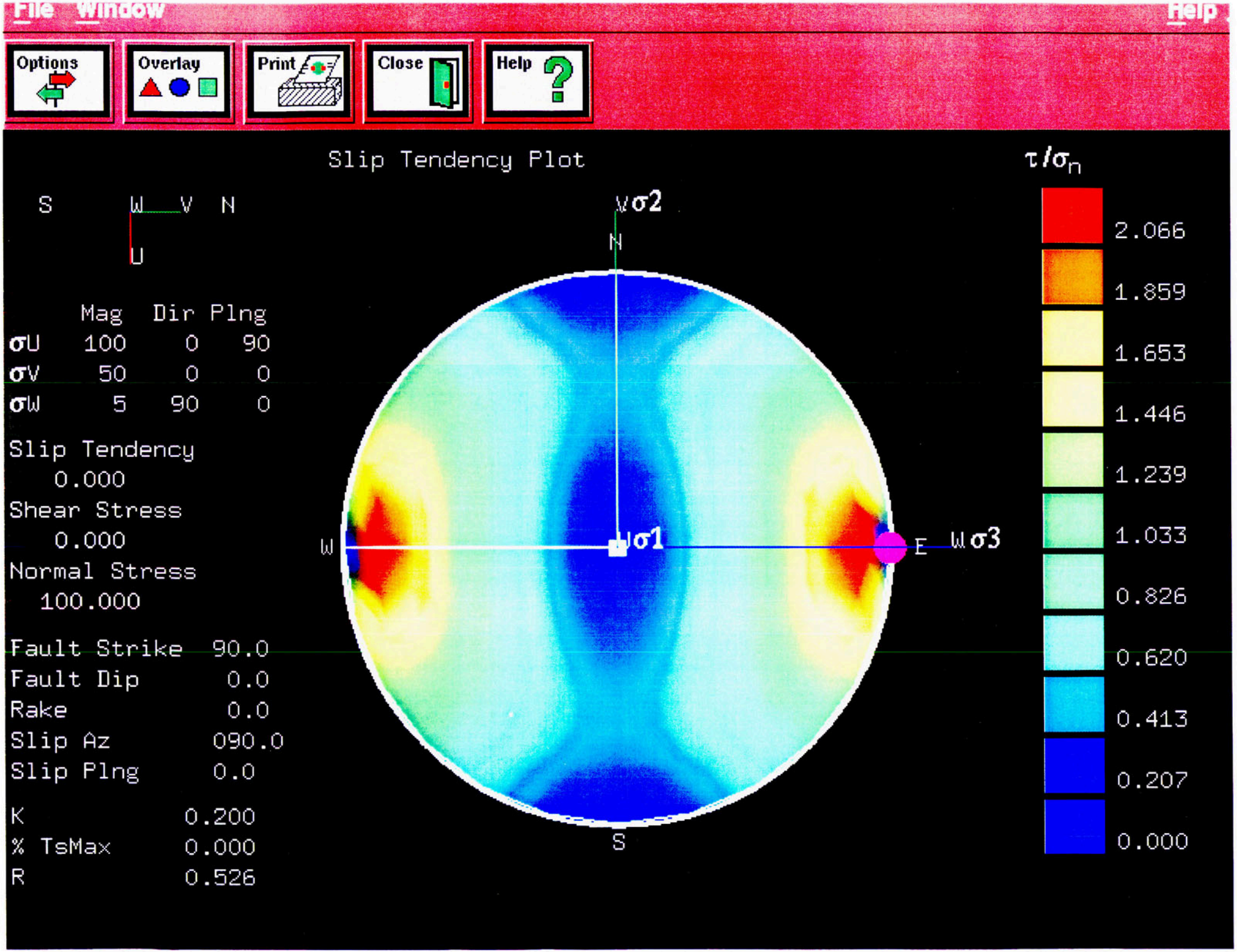
must be issued. The last option should occur from the main 3dstress archive (currently yosemite.cnwra.swri.edu:~3dstress/3d or QA records) under the directory to the src directory

8. Implemented by:	Date:
Joshua Buckner	17 July 2000

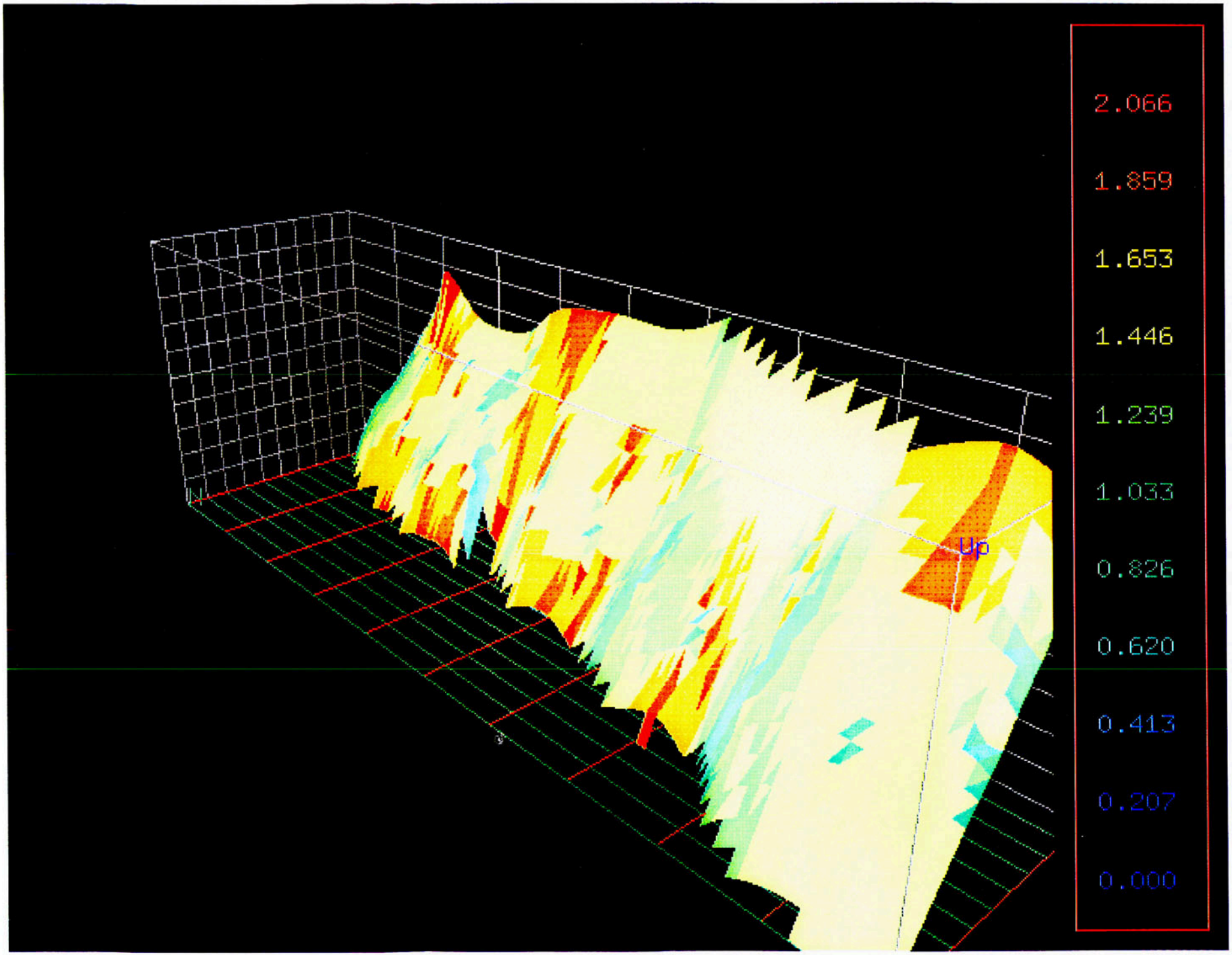
9. Description of Acceptance Tests:

Search every *.c++ and *.hh file for the string 1.3.2. This could be done by hand, using a standard text editor with a find feature, or by isssuing the command (from the UNIX prompt and the main 3dstress archive, currently yosemite.cnwra.swri.edu:~3dstress/3d or the QA archive, under the directory src) "grep -n '1\.3\.2' *.c++ *.hh". If the search finds no occurences, 3DStress passes the test.

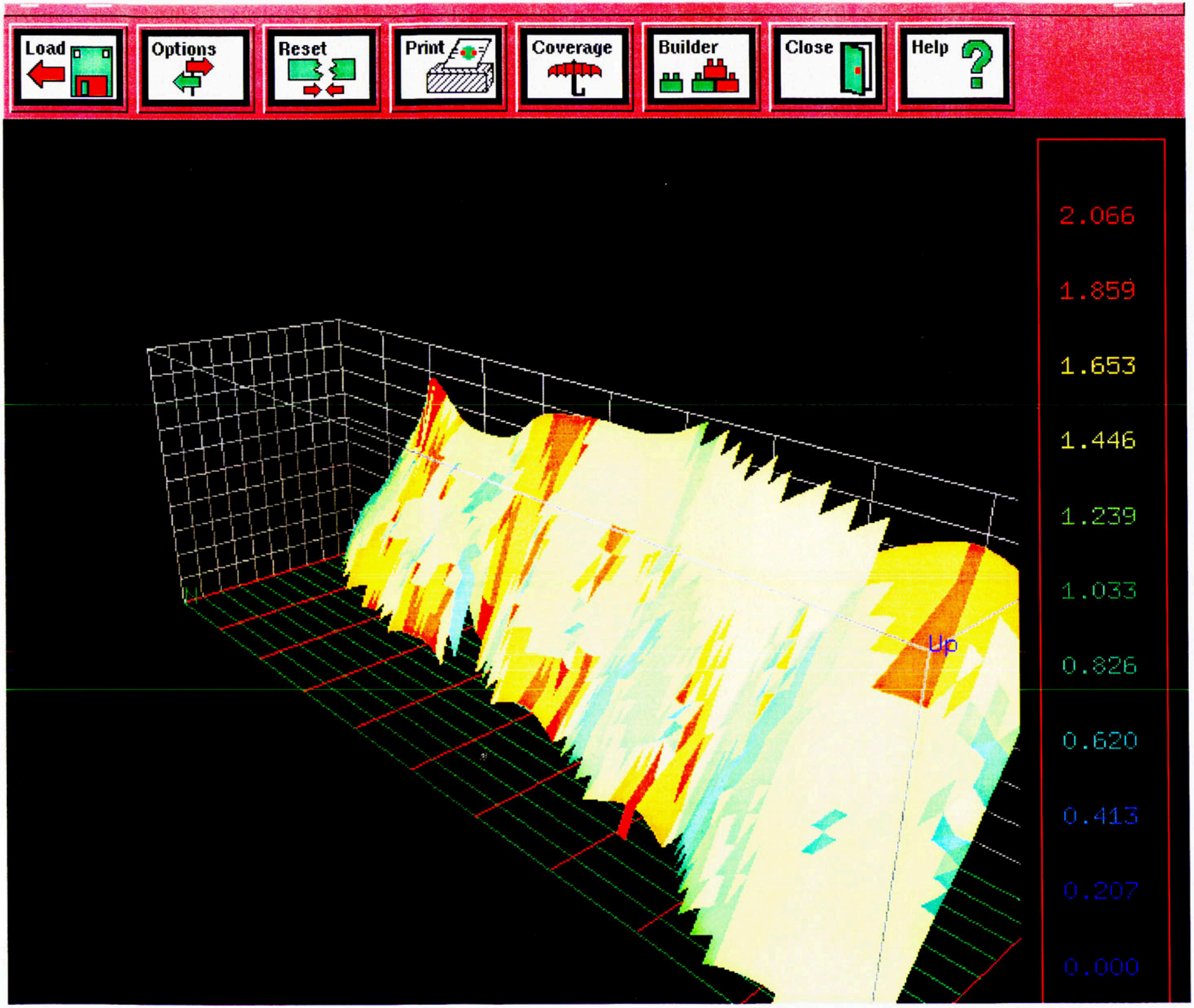
10. Tested by:	Date:
	11 Sep. 2000


File Window
Help
Options
Overlay
Print
Close
Help
Slip Tendency Plot
S
W V N
U
Mag Dir Plng
σU 100 0 90
σV 50 0 0
σW 5 90 0
Slip Tendency
0.000
Shear Stress
0.000
Normal Stress
100.000
Fault Strike 90.0
Fault Dip 0.0
Rake 0.0
Slip Az 090.0
Slip Plng 0.0
K 0.200
% TsMax 0.000
R 0.526
σ2
N
W
σ1
E
σ3
S
τ/σn
2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000

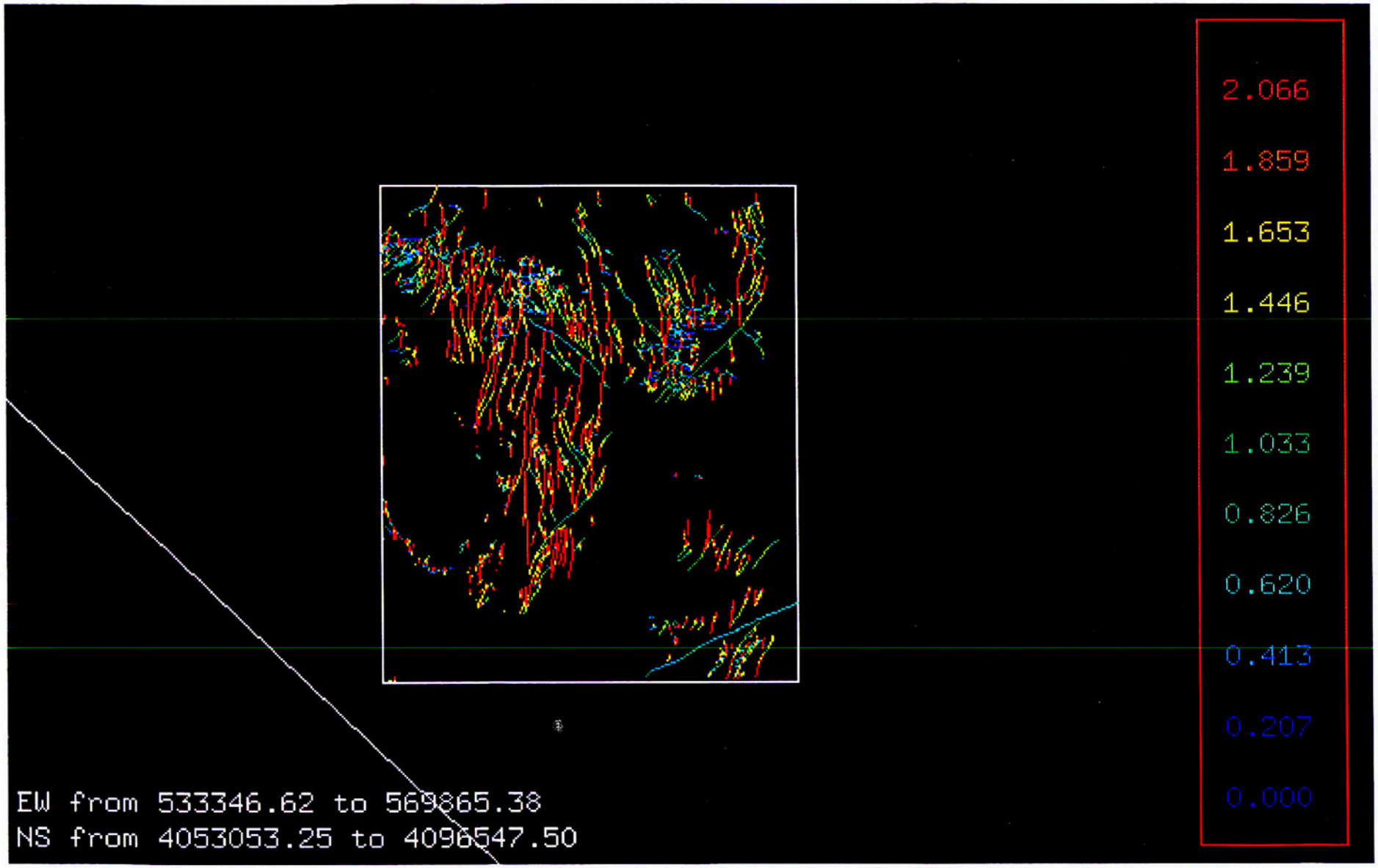
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_03_irix.ps


2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
Up

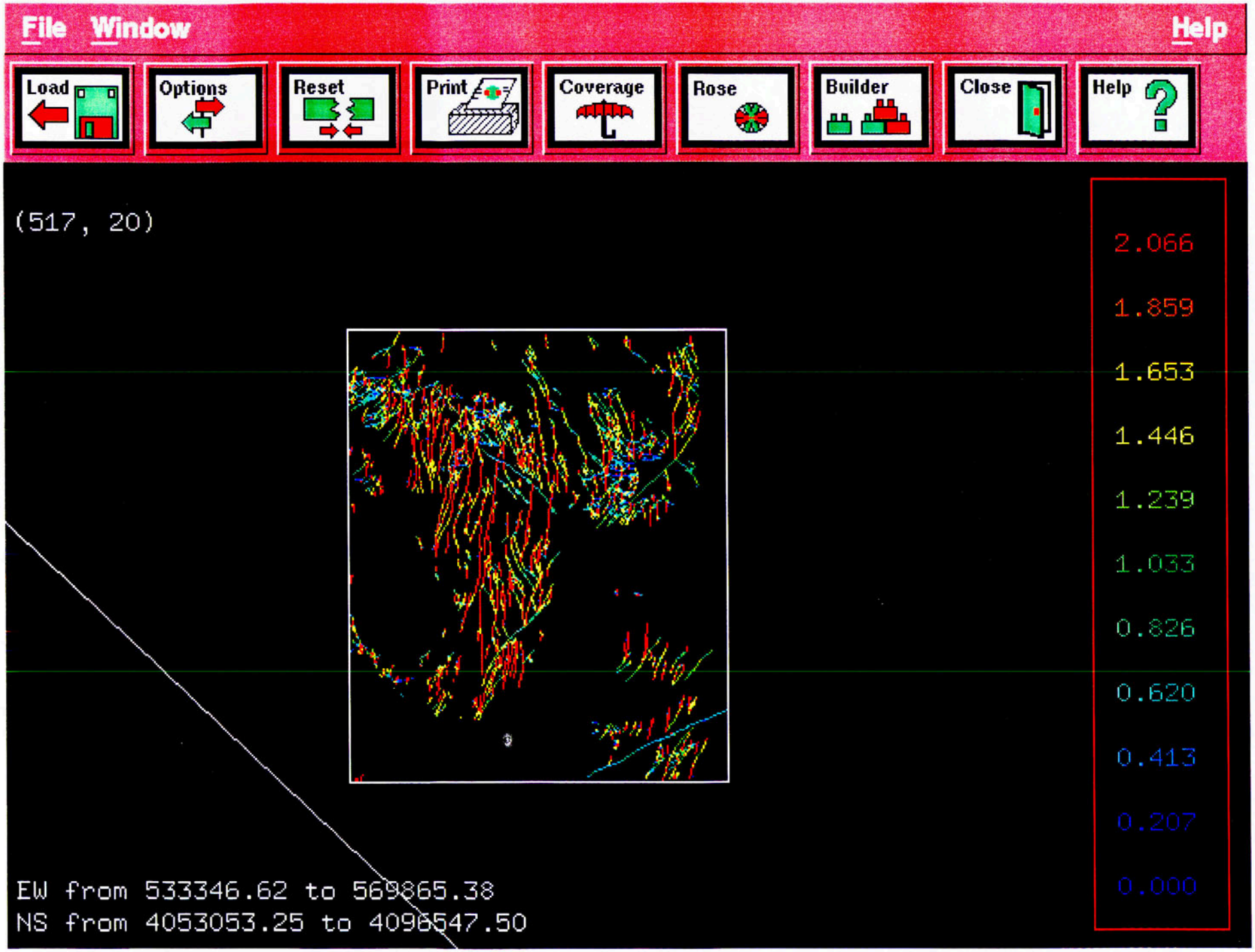
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_03_sun.ps


Load
Options
Reset
Print
Coverage
Builder
Close
Help
Up
2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000

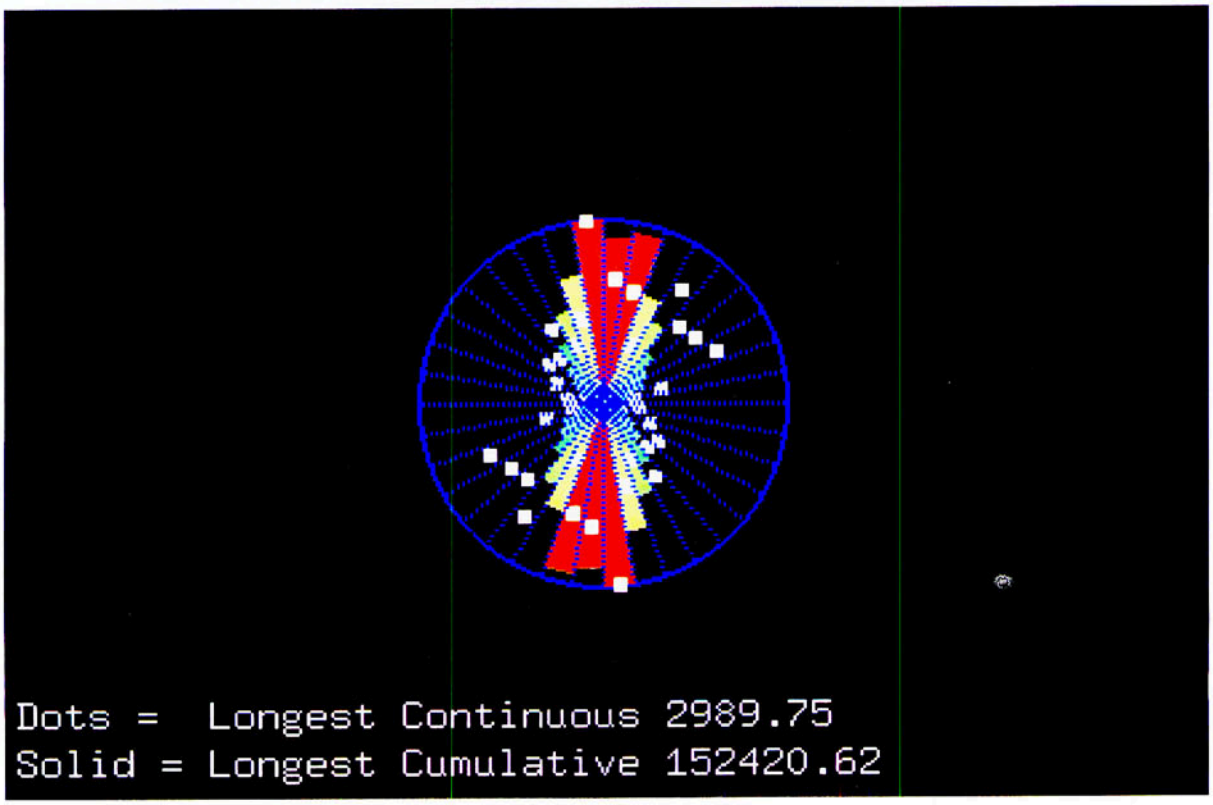
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_04_irix.ps


2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
EW from 533346.62 to 569865.38
NS from 4053053.25 to 4096547.50

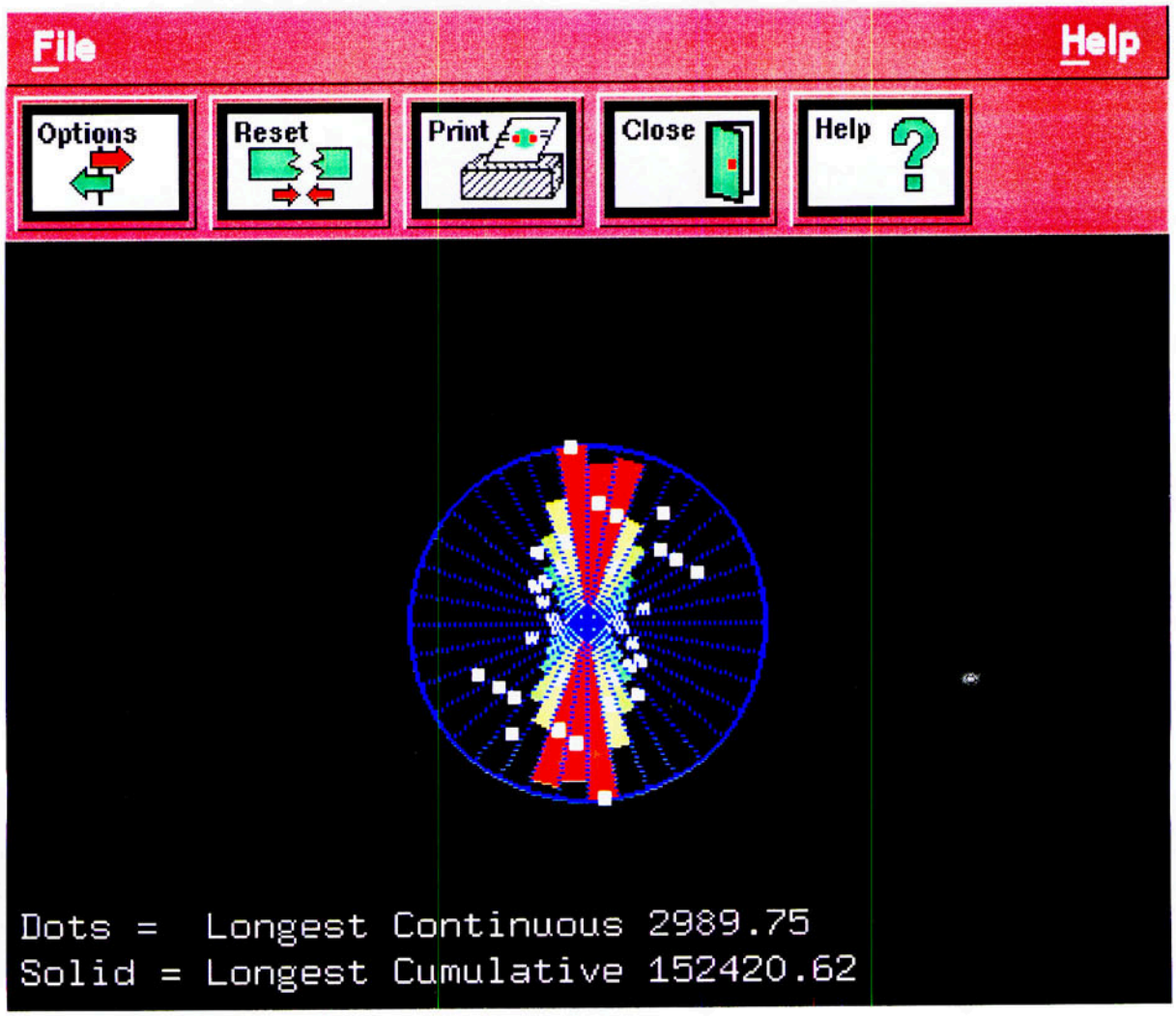
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_04_sun.ps


File
Window
Help
Load
Options
Reset
Print
Coverage
Rose
Builder
Close
Help
(517, 20)
2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
EW from 533346.62 to 569865.38
NS from 4053053.25 to 4096547.50

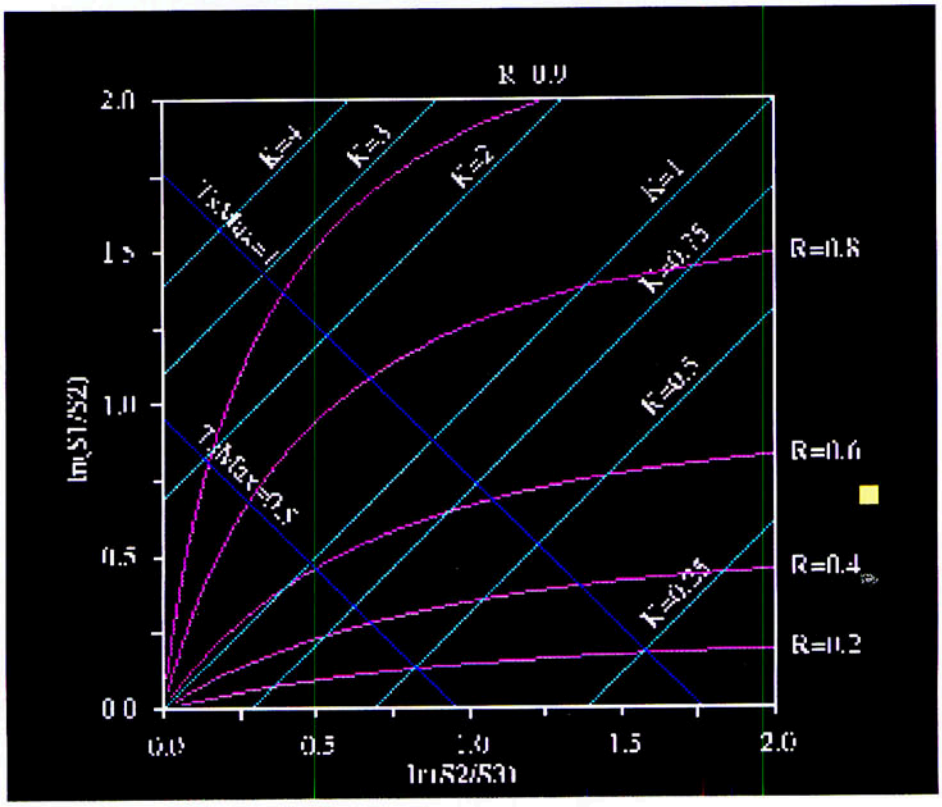
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_05_irix.ps


Dots = Longest Continuous 2989.75
Solid = Longest Cumulative 152420.62

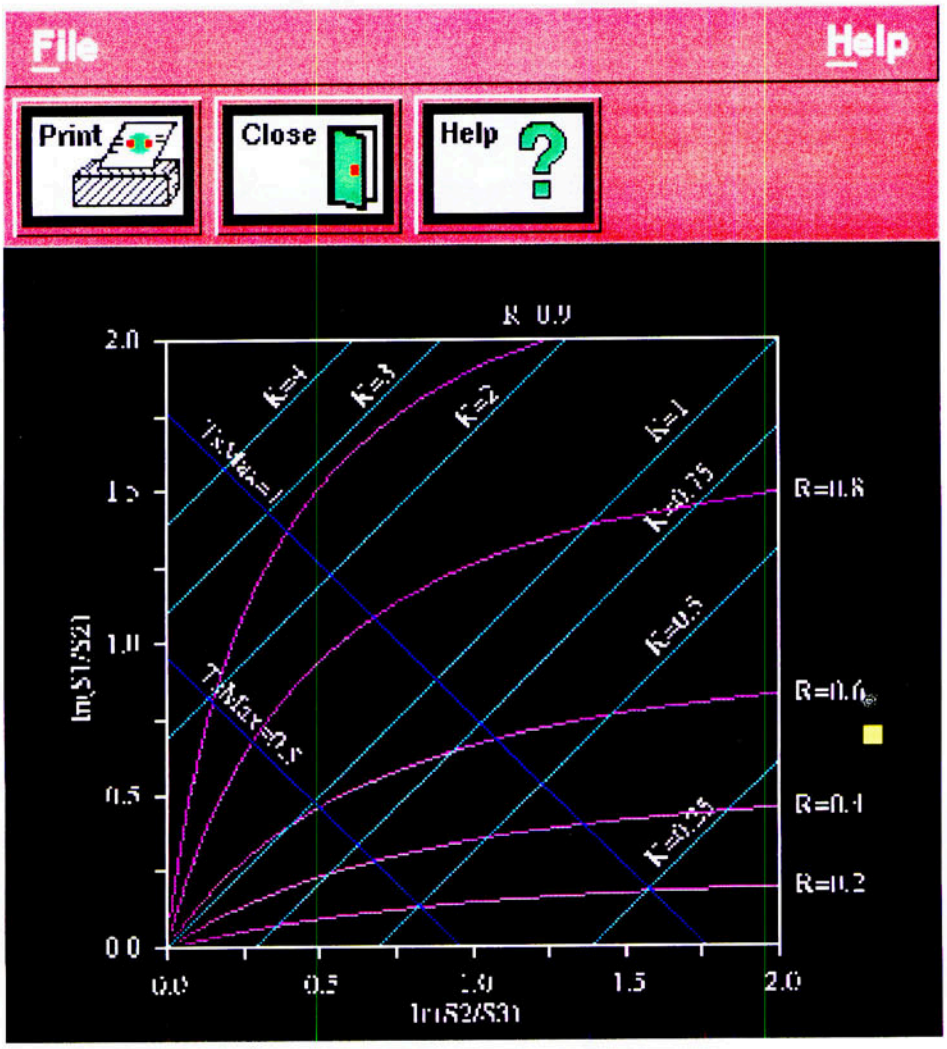
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_05_sun.ps


File
Help
Options
Reset
Print
Close
Help
Dots = Longest Continuous 2989.75
Solid = Longest Cumulative 152420.62

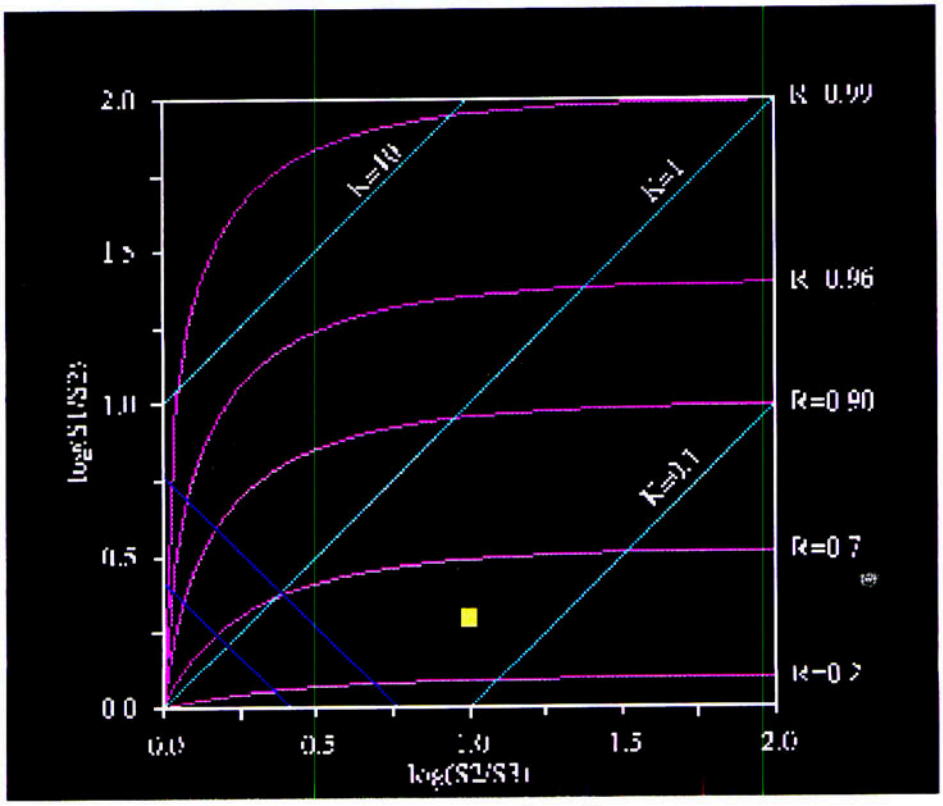
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_06_irix.ps


R 0.9
2.0
1.5
1.0
0.5
0.0
0.0
0.5
1.0
1.5
2.0
ln(S1/S2)
ln(S2/S0)
K=4
K=3
K=2
K=1
K=0.75
K=0.5
K=0.25
R=0.8
R=0.6
R=0.4
R=0.2

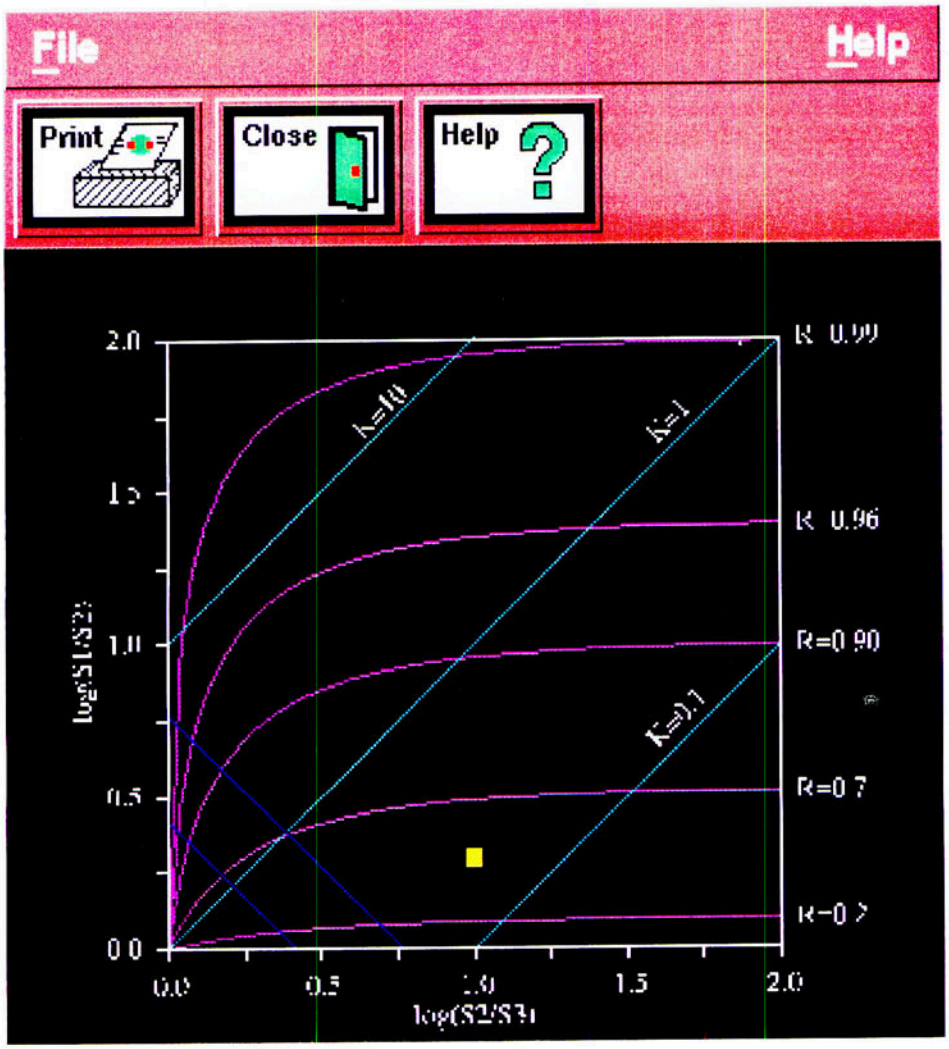
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_06_sun.ps


File
Help
Print
Close
Help
R 0.9
K=4
K=3
K=2
K=1
K=0.75
K=0.5
K=0.35
R=0.8
R=0.6
R=0.4
R=0.2
2.0
1.5
1.0
0.5
0.0
0.0
0.5
1.0
1.5
2.0
ln(S1/S2)
ln(S2/S3)

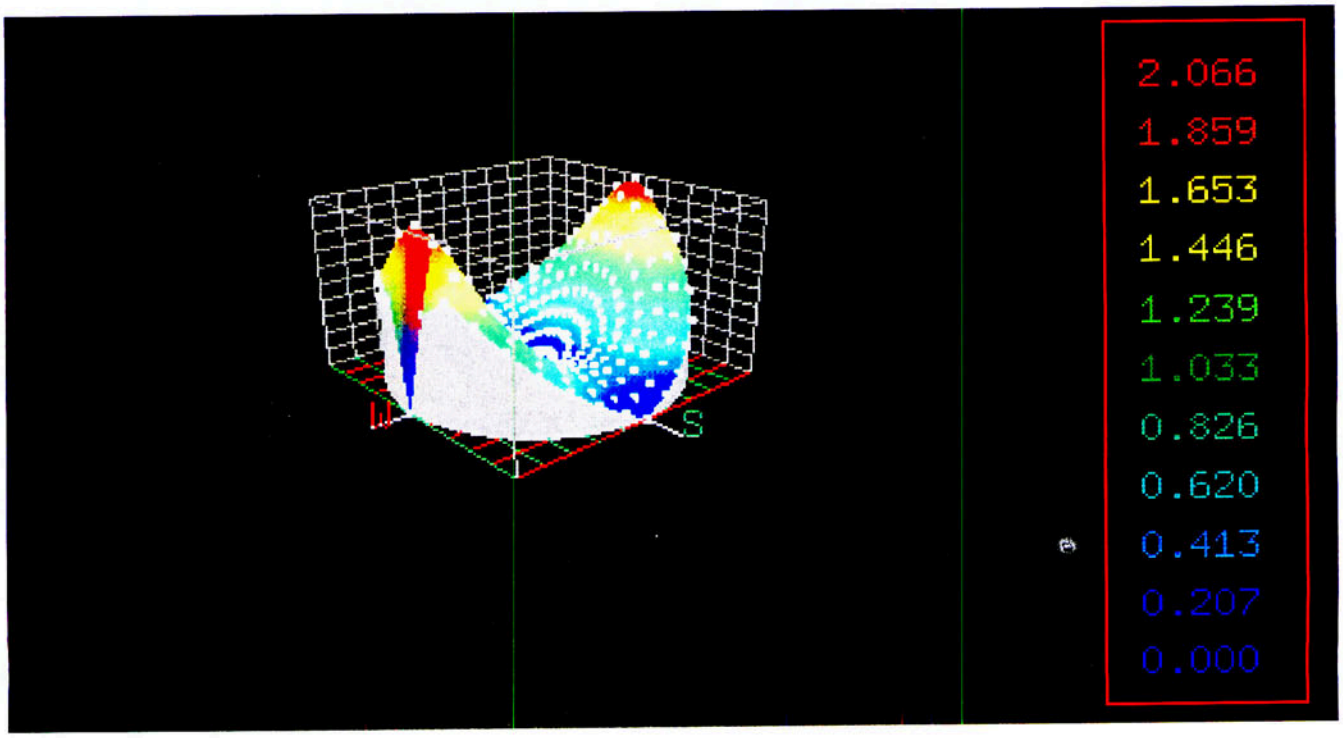
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_07_irix.ps


2.0
1.5
1.0
0.5
0.0
0.0
0.5
1.0
1.5
2.0
log(S2/S3)
log(S1/S2)
K=10
K=1
K=0.1
R 0.99
R 0.96
R=0.90
R=0.7
R=0.2

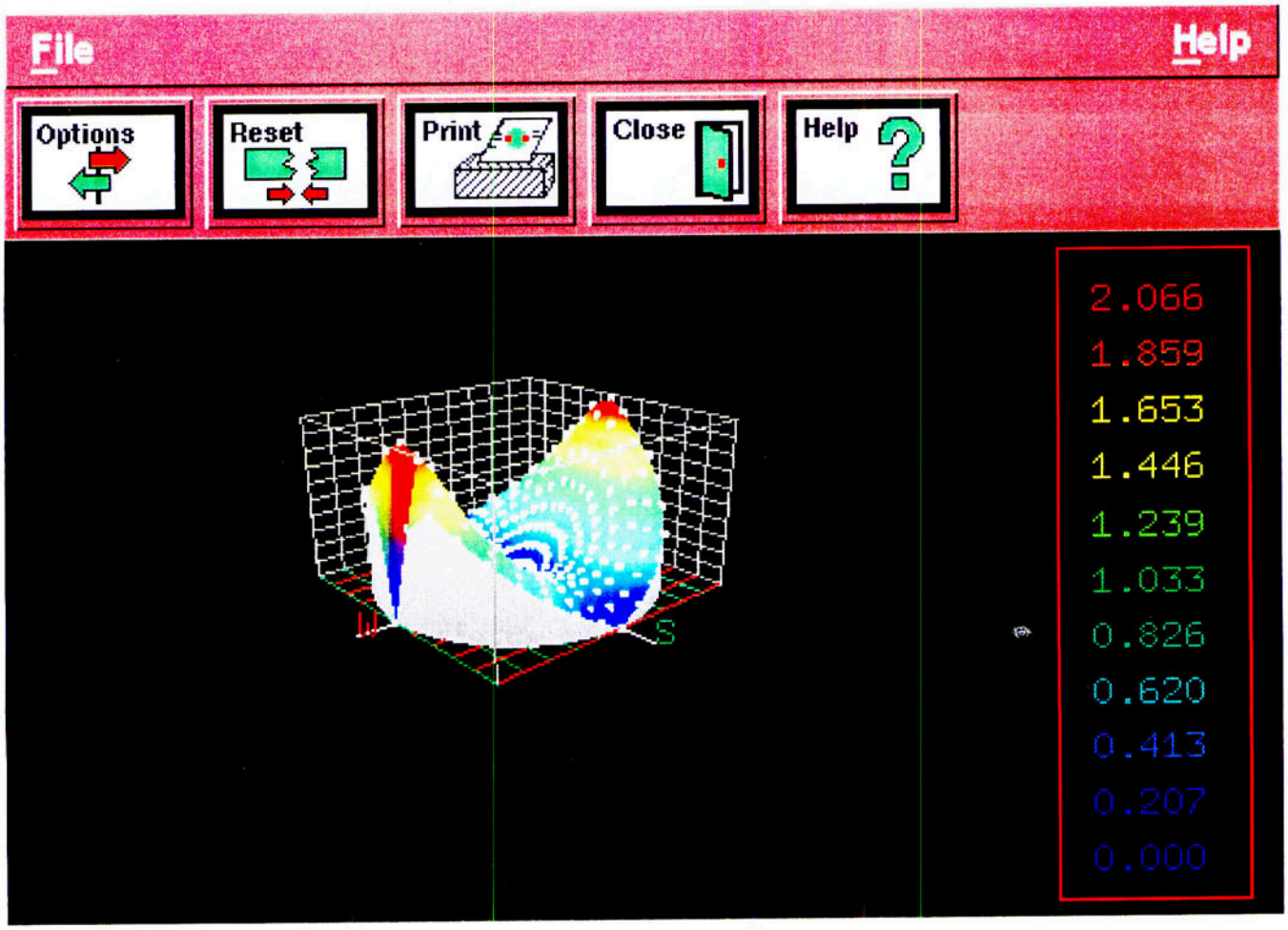
User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_07_sun.ps


File
Help
Print
Close
Help
2.0
1.5
1.0
0.5
0.0
0.0
0.5
1.0
1.5
2.0
log(S2/S3)
k=10
k=1
k=0.1
R 0.99
R 0.96
R=0.90
R=0.7

User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_08_irix.ps


2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
S

User: jbuckner
Host: yosemite
Class: yosemite
Job: help_318_08_sun.ps


File
Help
Options
Reset
Print
Close
Help
S
2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000

SOFTWARE CHANGE REPORT (SCR)

1. SCR No. (*Software Developer Assigns*):	2. Software Title and Version:	3. Project No:
GLGP- SCR-~~321~~340 9/20/2000	3DStress 1.3.3 (IRIX & Solaris)	20-01402-472

4. Affected Software Module(s), Description of Problem(s):

In the Map Viewer, coverages are assigned a particular depth which may be adjusted by the user. This coverage depth should have been implemented in the 3D Fault Viewer. But, the 3D Fault Viewer lacks the coverage depth feature.

5. Change Requested by:	6. Change Authorized by (*Software Developer*):
David A. Ferrill **Date:** 20 July 2000	David A. Ferrill **Date:** 7 August 2000

7. Description of Change(s) or Problem Resolution (*If changes not implemented, please justify*):

Move the coverage depth feature from the Map Viewer to the 3D Fault Viewer.

8. Implemented by:	Date:
Joshua Buckner	31 December 1999

9. Description of Acceptance Tests:

See attached.

10. Tested by:	Date:
Darrell Sims	11SEP00

CNWRA Form TOP-5 (05/2000)

9. Description of Acceptance Test:

a) start 3DStress 1.3.3 (either platform)

b) open the 3D Fault Viewer by clicking on the 3Dview button on the Control Bar

c) load the file flt010_bowRidge020.flt into the 3D Fault Viewer from the data directory of the root installation of 3DStress by clicking on the Load button near the top of the 3D Fault Viewer and using the standard file selector

d) load the coverage frizzell.lin into the 3D Fault Viewer from the data directory of the root installation of 3DStress by clicking on the Coverage button near the top of the 3D Fault Viewer, clicking on the Load button near the lower left corner of the Coverage tool, and using the standard file selector

e) print a screen shot of the loaded coverage at the default depth

f) confirm visually that there is a depth slider on the Coverage Tool

g) print a screen shot of the Coverage Tool showing the depth slider

h) change the depth to ~~1~~ 2000 LWB 9-11-00 via the slider on the Coverage Tool

i) print a screen shot of the coverage at the new depth

j) open the Map Viewer by clicking on the Map button on the Control Bar

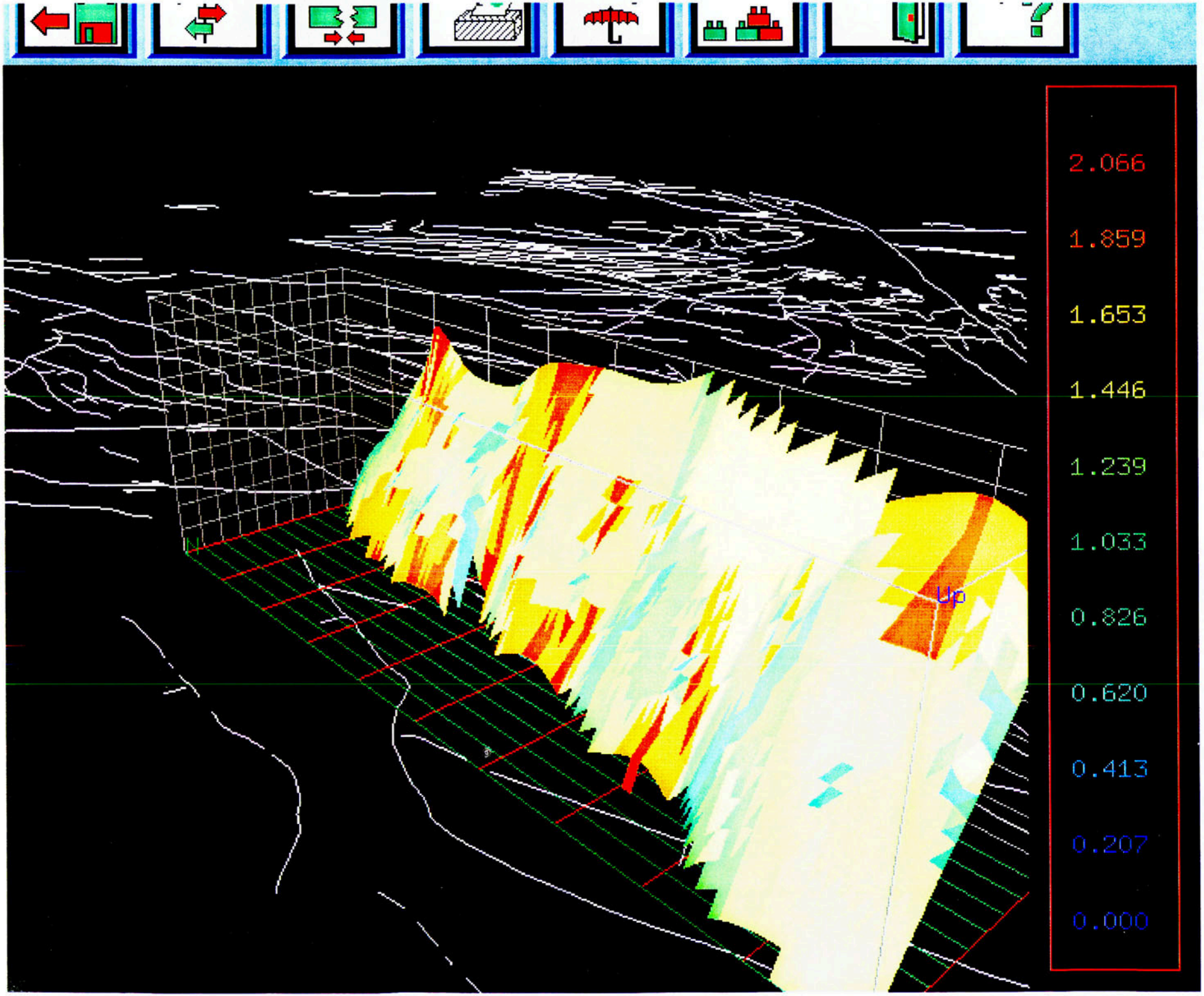
k) ~~on both sessions,~~ LWB 9-11-00 load the file frizzell.lin into the Map Viewer from the data directory of the root installation of 3DStress by clicking on the Load button near the top of the Map Viewer and using the standard file selector

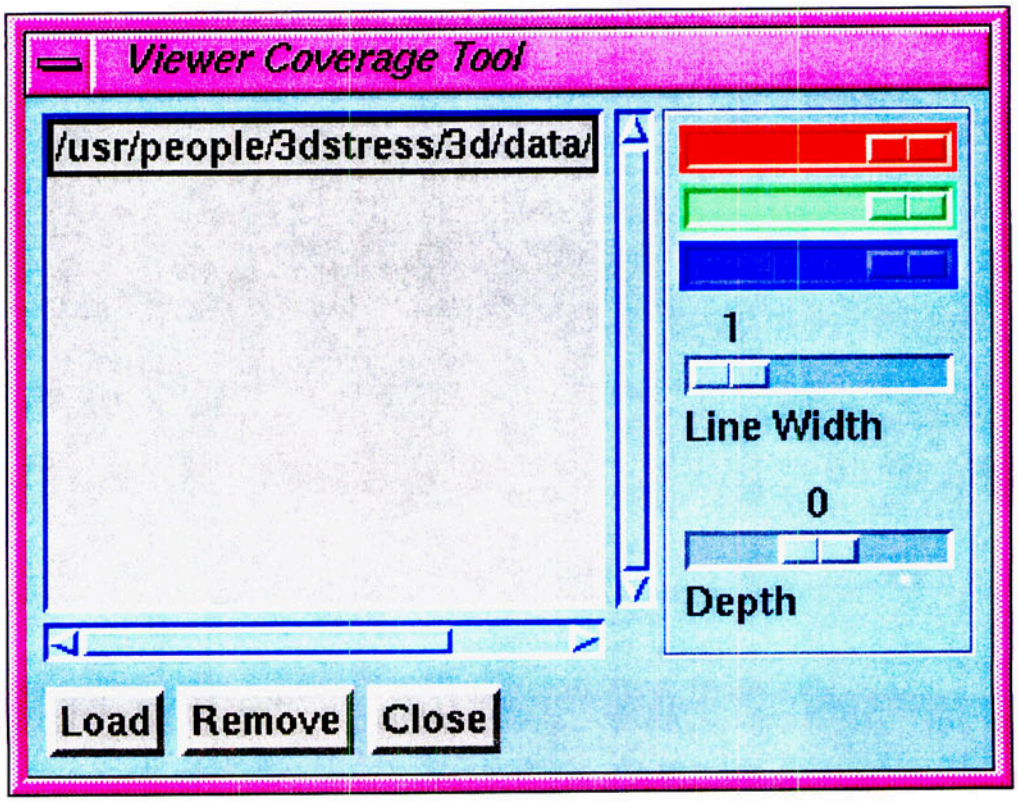
l) load the coverage worldutmz11.lin into the Map Viewer from the data directory of the root installation of 3DStress by clicking on the Coverage button near the top of the Map Viewer, clicking on the Load button near the lower left corner of the Coverage tool, and using the standard file selector

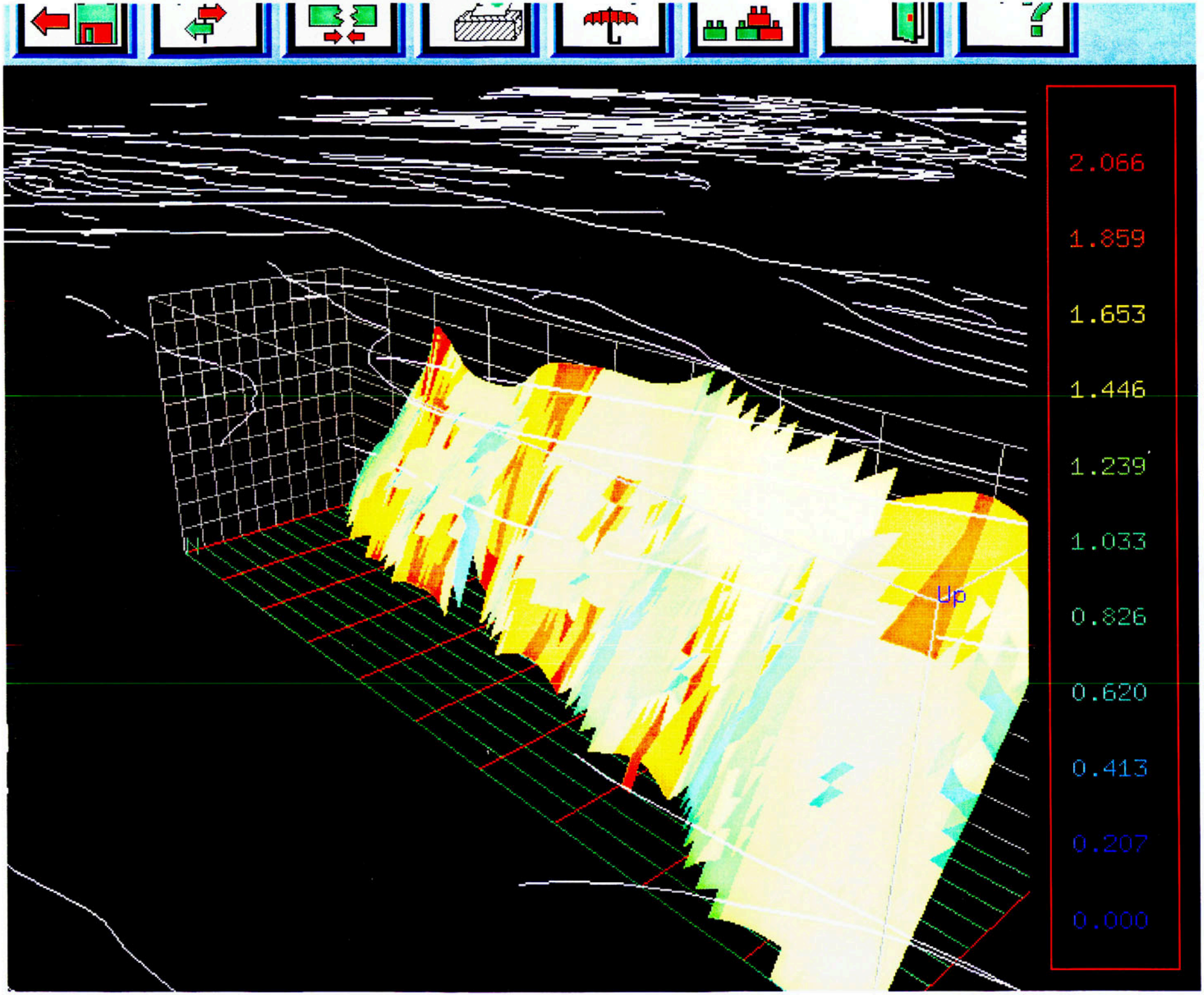
m) confirm visually that there is no depth slider on the Coverage Tool. Then, close the Coverage tool using the Close button

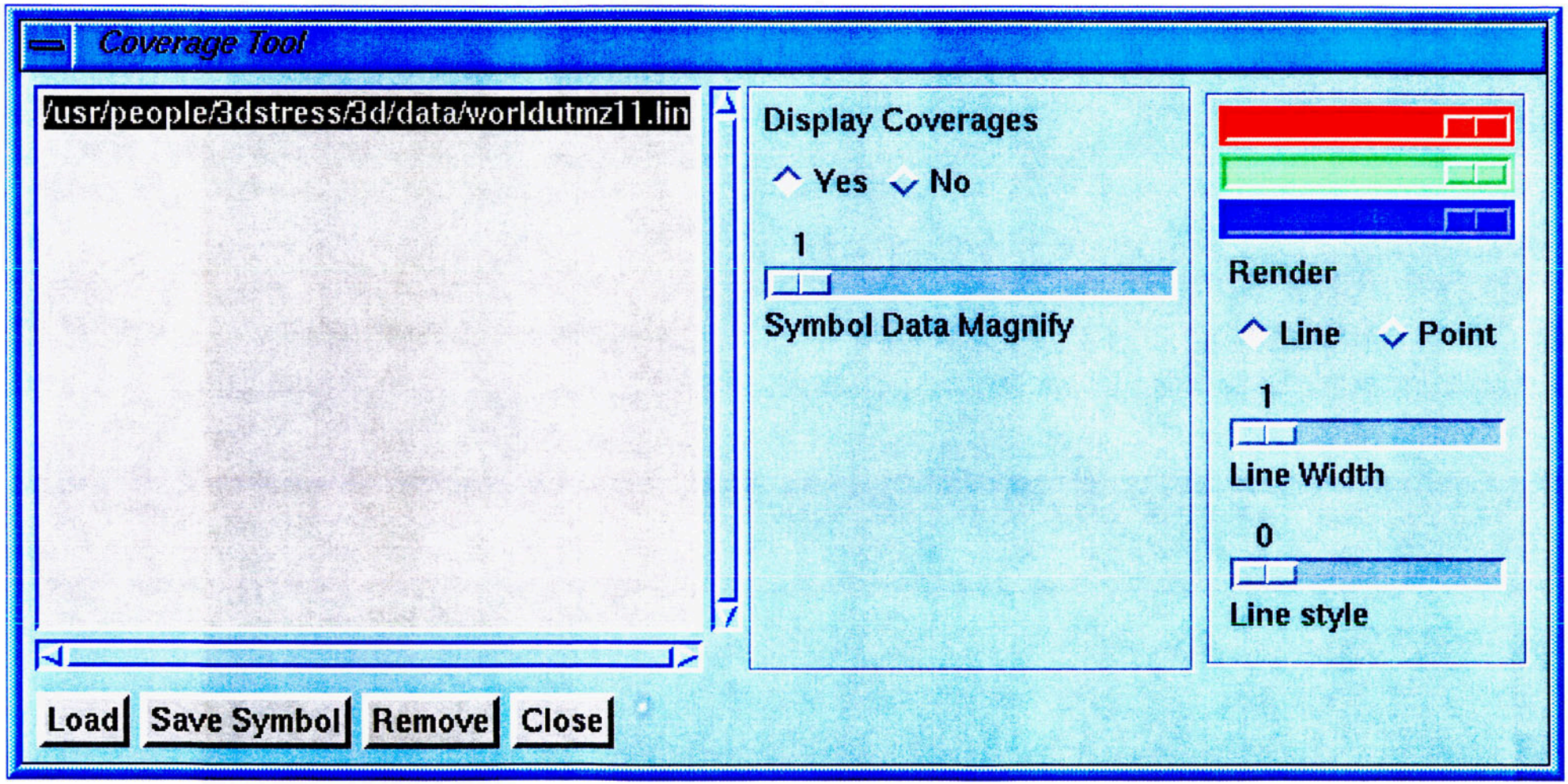
n) print a screen shot showing both the Coverage Tool and the loaded coverage

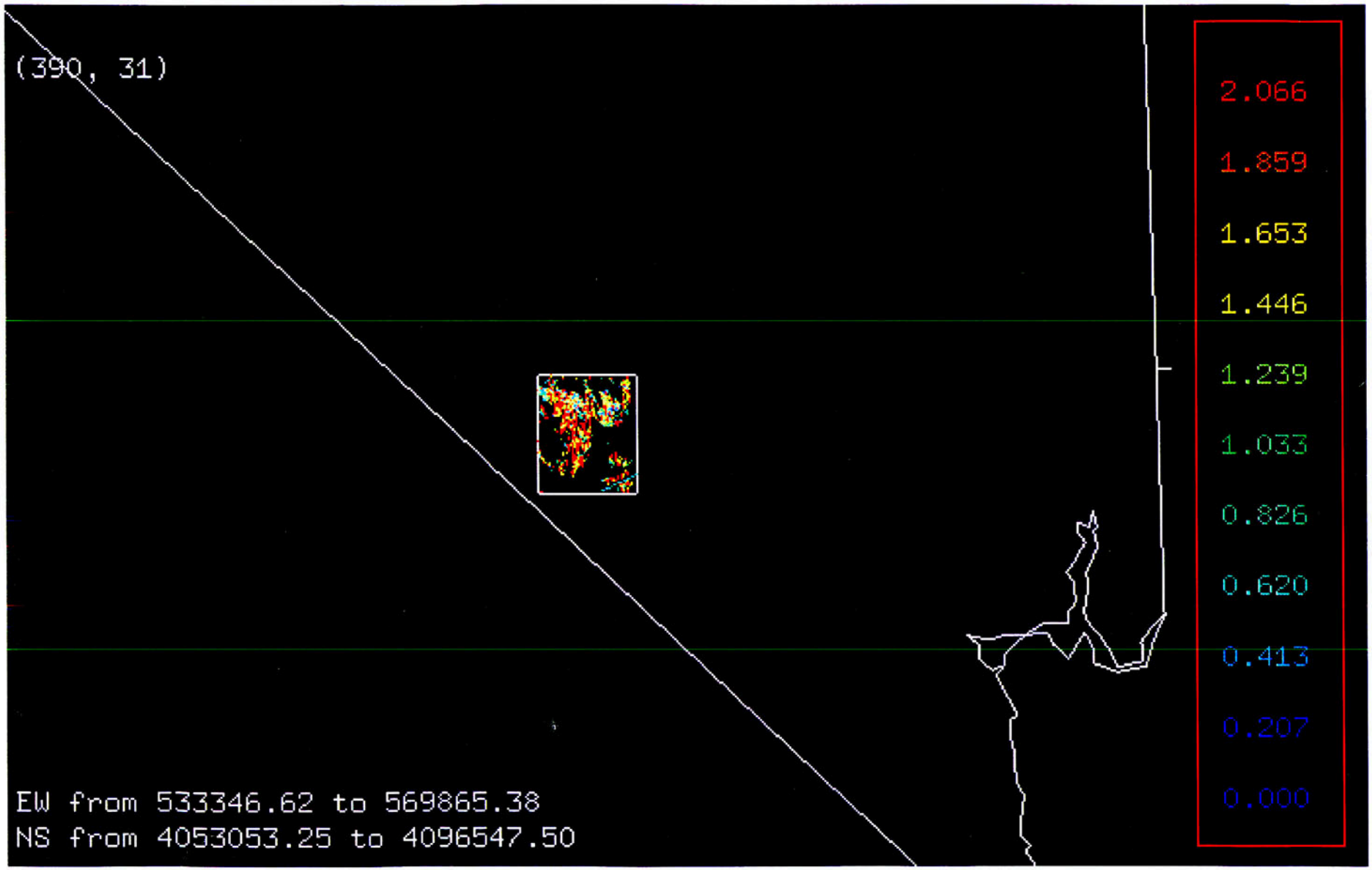
o) print all outputs and attach to this SCR


2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
Up


Viewer Coverage Tool
/usr/people/3dstress/3d/data/
1
Line Width
0
Depth
Load
Remove
Close


2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
Up


Coverage Tool
/usr/people/3dstress/3d/data/worldutmz11.lin
Display Coverages
Yes
No
1
Symbol Data Magnify
Render
Line
Point
1
Line Width
0
Line style
Load
Save Symbol
Remove
Close


(390, 31)
2.066
1.859
1.653
1.446
1.239
1.033
0.826
0.620
0.413
0.207
0.000
EW from 533346.62 to 569865.38
NS from 4053053.25 to 4096547.50