

ChangeView

USER MANUAL

Credits:

This software is developed within the framework of the EU FP6 project Land/Sea Integrated Monitoring for European Security as a part of the deliverables of WP3400 Treaties Monitoring. The Geomonitoring working group at Freiberg University of Mining and Technology holds all rights concerning the software. The software is free to distribute and works only with the freely available IDL Virtual Machine.

The software is written and compiled in the IDL version 6.1 environment. IDL is a commercial integrated software development environment and is a product of ITT visual information solutions.

Author: Prashanth Reddy Marpu

Please report problems, bugs and suggestions to prashanthmarpu@ieee.org

Software dependencies:

The following open source programs were used in the current software:

1) Imdisp.pro

Author: Dr. Liam Gumley

<http://www.ssec.wisc.edu/~gumley/imdisp.html>

2) Covpm__define.pro, prov_means.dll

Author: Dr. Morton Canty

<http://mcanty.homepage.t-online.de/software.html>

3) Progressbar_define.pro

Author: Dr. David Fanning

http://www.dfanning.com/documents/programs.html#PROGRESSBAR__DEFINE

The above programs are linked in the compiled .sav files.

Other:

- The applications can run only using the IDL virtual machine. The IDL VM can be downloaded from http://www.creaso.com/english/12_swvis/11_idl/idlvm.htm
- The DLL file *prov_means.dll* should be added to the **C:\WINDOWS** folder.

Automatic Change Identification: TUBAF_MAD

MAD transformation: The Multivariate Alteration Detection (MAD) technique is a very effective automatic change detection method which not only allows identifying changes but also gives a chance to visualize different types of changes.

Reference:

The regularized iteratively reweighted MAD method for change detection in multi- and hyperspectral data. Allan Aasbjerg Nielsen, IEEE Transactions on Image Processing, Vol. 16, No. 2, February, 2007

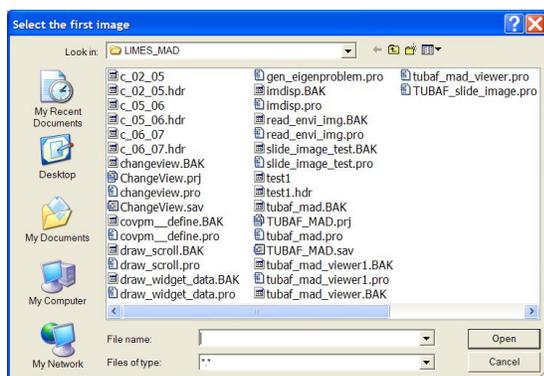
The TUBAF_MAD program calculates the MAD transformation. The output of this program can be used for change visualization using ChangeView software. The program asks for the two satellite images of two different dates and prompts for an output file name. This is guided by user friendly Windows File Selector Graphical User Interfaces.

The following things have to be noted for the proper execution of the program:

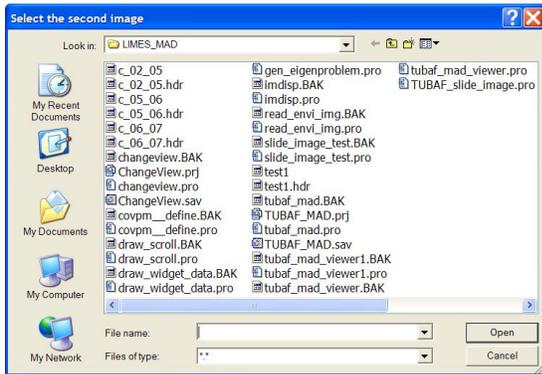
- 1) Currently, the software handles only BIP format envi binary files. However, in the future versions, all the formats will be handled.
- 2) The input image names can have a .img extension (ERDAS IMAGINE file format).
- 3) The output filename can have a .img extension.

The process sequence is in the following order:

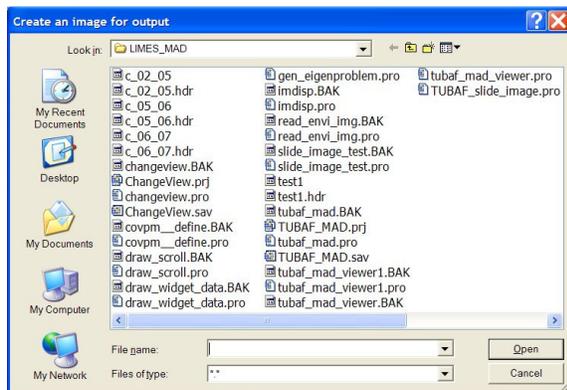
- 1) Select the first image.



2) Select the second image.



3) Create an output image



The output file holds the same Map info as the input files. The file consists of MAD components and Chi squared value of the MAD components as image bands.

Change Visualization: ChangeView

ChangeView is an interactive display tool to visualize changes identified by MAD transformation.

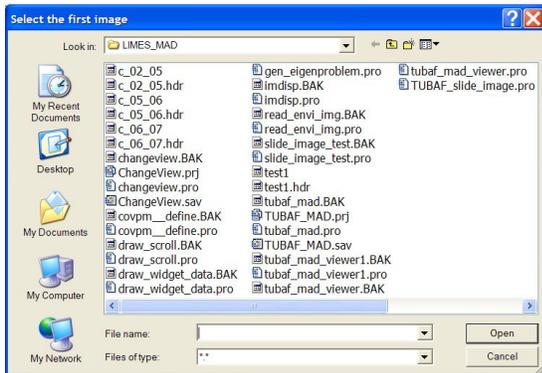
Input:

- 1) Satellite images of two dates from the same region
- 2) Image after MAD Transformation. This image is created using the TUBAF_MAD program.

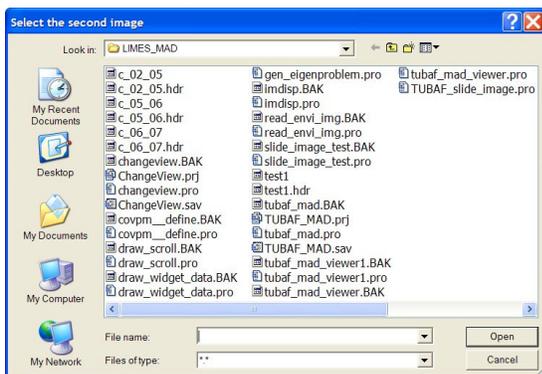
Currently, only BIP files are permitted. However, it will be possible to use all the formats in the future versions.

The process sequence is in the following order:

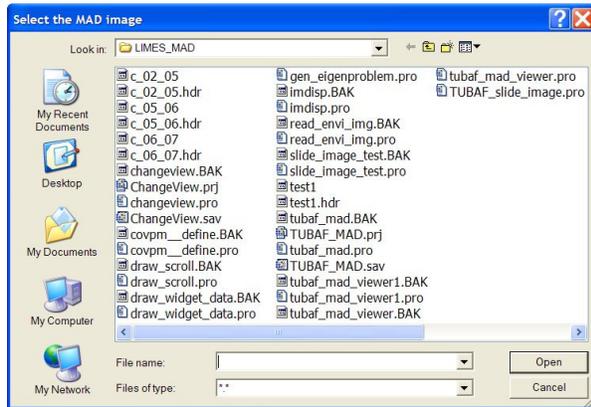
- 1) Select the first image.



- 2) Select the second image.

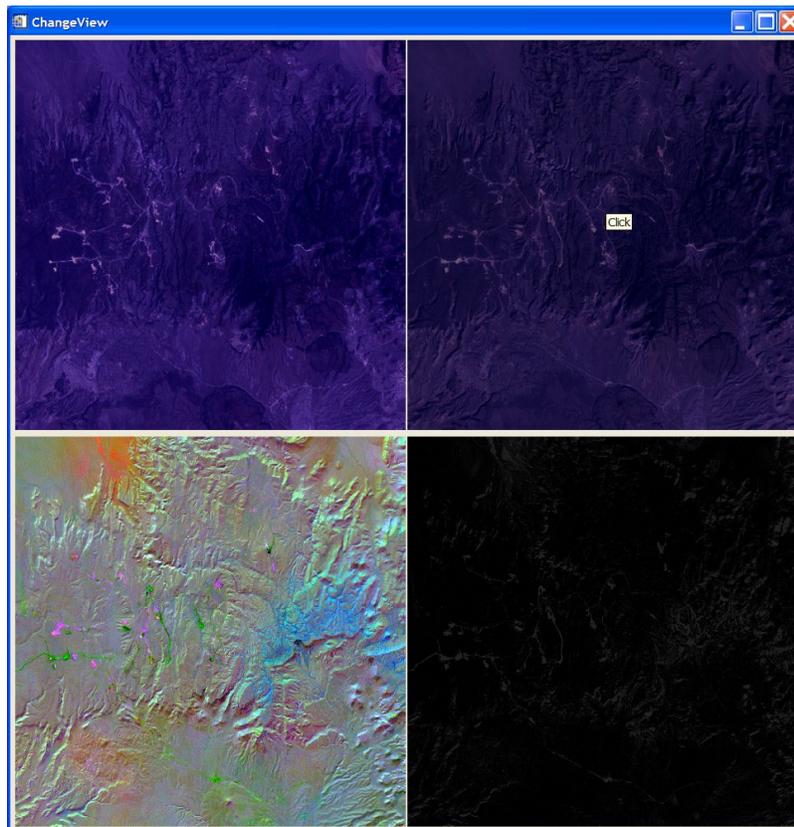


3) Select the MAD image. This is the image created using TUBAF_MAD application. The file consists of MAD components and Chi squared value of the MAD components as image bands.

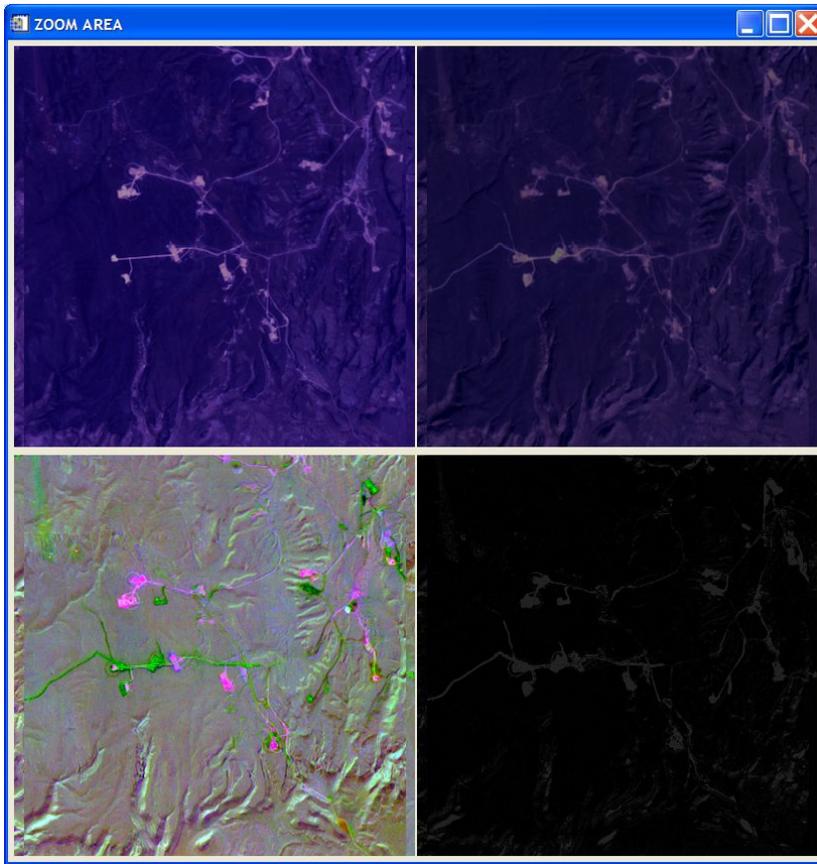


4) The following windows are displayed:

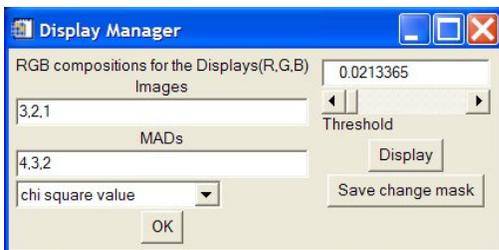
a) ChangeView viewer, which displays the images of two dates, MAD components and a change description image. The user can click on any region in the four displays to have a closer look in the Zoom Area window.



c) Zoom Area, which displays a small region of 400X 400 pixels around the clicked point in the main display window.

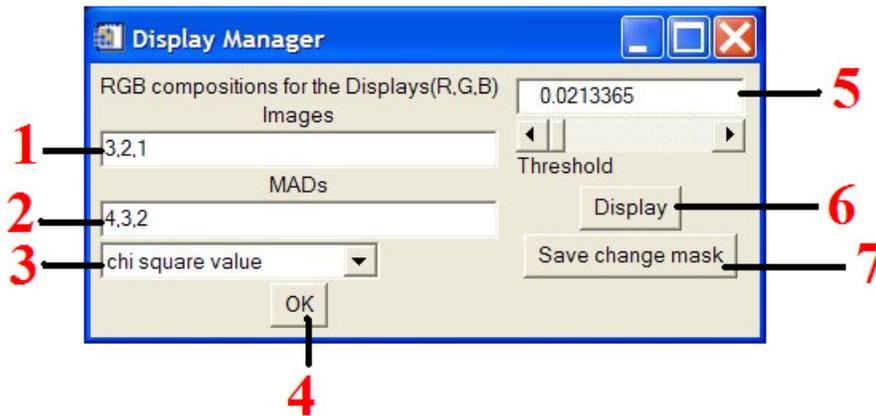


c) Display Manager, which controls the display settings.



Display options:

The following display options are possible:



- 1) Change the color composition of the input images
- 2) Change the color composition of MAD bands
- 3) Select among i) chi- squared image, ii) probability of change and iii) maximum change in canonical variates. All these images are normalized and mapped to values between 0 – 255.
- 4) Click on OK button to effect the changes in color compositions in the display.
- 5) Select the threshold either in the text box or using the slider. The threshold is a value between 0 and 255 which thresholds the image represented in [3].
- 6) Click on Display button to see the thresholded image.
- 7) The thresholded image is the change mask. Click on the Save Change mask button to be prompted for a filename using a GUI. The change mask is saved as a bmp file. There is **no need** to specify the .bmp extension in the file name.

