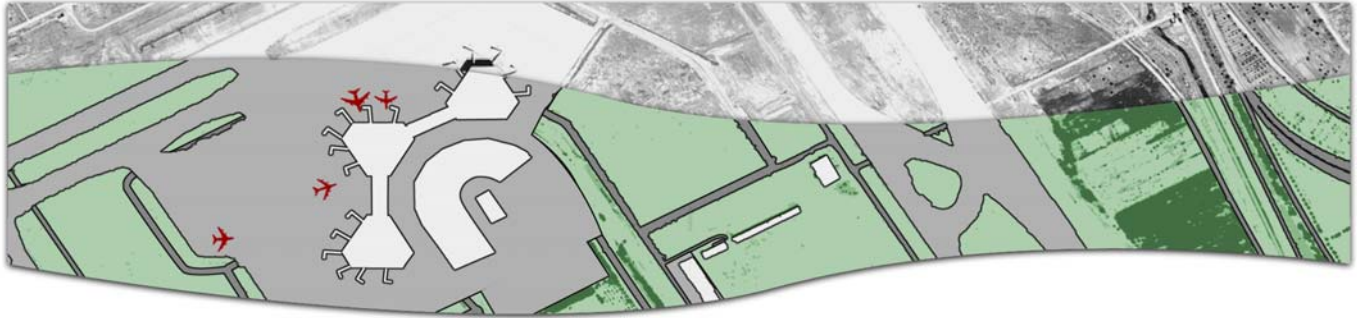


Feature Analyst® QuickStart GUIDE



4.2 for ArcGIS

CHANGE DETECTION

Note: Verify that your images are correctly registered or use the ArcMap Georeferencing Tools, as necessary. In order for change detection to function properly, the before and after images must align exactly. If features do not align, results can be skewed.

Feature Analyst has the ability to perform change detection on image data sets that show change over time. You decide whether you want to extract all changed areas between before and after images, or employ object-specific change detection. Object-specific change detection allows you to extract specific changes. Object-specific change detection allows you to extract changes in specific class types. For example, find all buildings that no longer exist in the after image or find the roads that have been added since the before image.



Banda Ache aligned images: before (A) and after (B) the Tsunami of 2004

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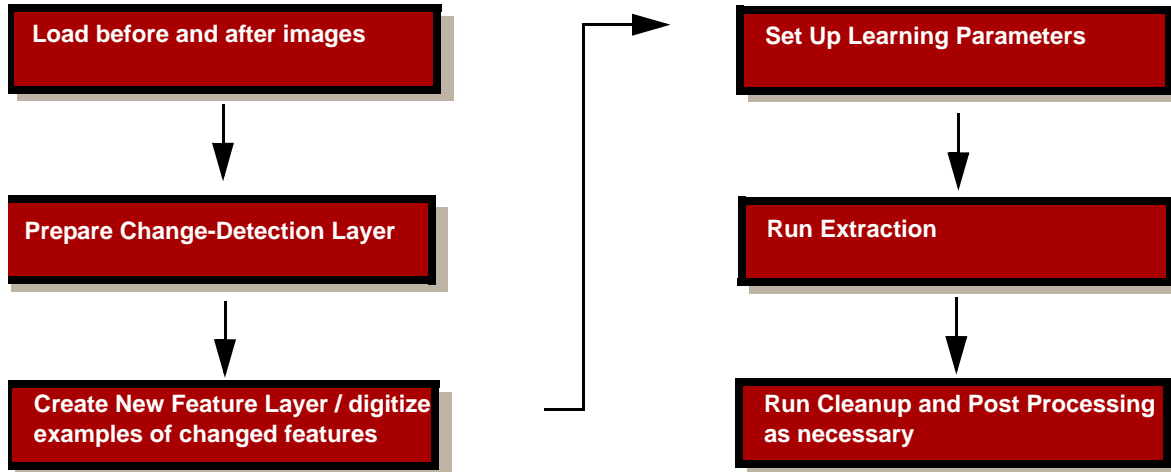


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Change-Detection Workflow

The first step in a change-detection extraction is creating a composite raster comprising all bands from the before and after images. Once you have your composite change-detection layer, you can draw a training set targeting either features added over time or features lost over time.

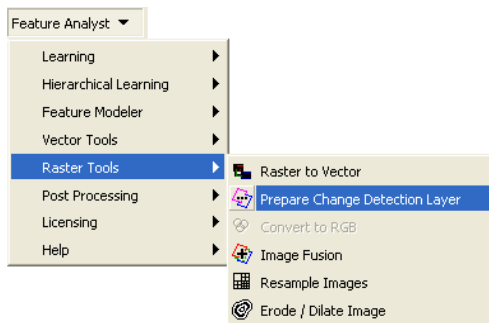
Follow the general workflow below to run an extraction for changed features.



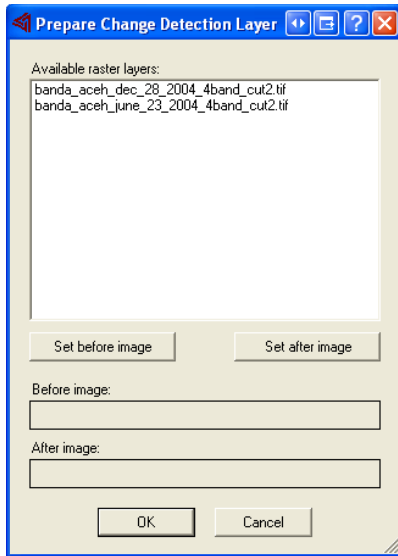
Prepare a Change-Detection Layer

The change-detection composite layer improves visualization by changing the symbology of the features to define and enhance the differences between the two images.

- 1 Load your images into the table of contents.
- 2 Review alignment and compare common image features, which must overlap exactly.
- 3 Choose **Feature Analyst** on the toolbar, choose **Raster Tools** on the drop-down menu, and then choose **Prepare Change Detection Layer**.



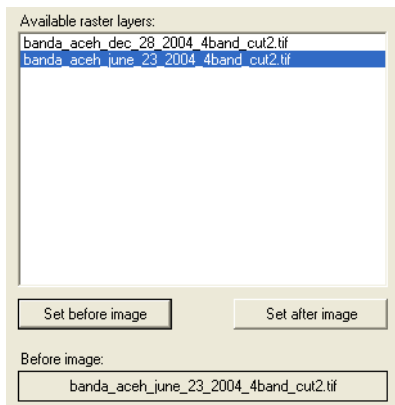
The Prepare Change Detection Layer dialog box opens.



The activated images loaded in the table of contents display in the Available raster layers list box.

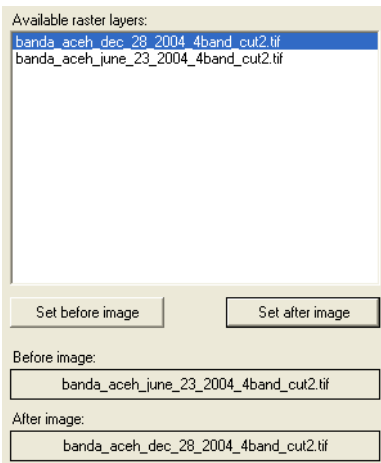
- 4 In accordance with chronology, select **the first image** in the Available raster layers list box and choose **Set before image**.

The first image displays in the Before image field.



- 5 Select **the last image** in the Available raster layers list box and choose **Set after image**.

The last image displays in the After image field.



6 Choose OK.

The Save Raster As dialog box opens.

By default, Feature Analyst names the file in the Name field using the last file name, the process (in this case CDL for Change Detection Layer), and incremental numbering.

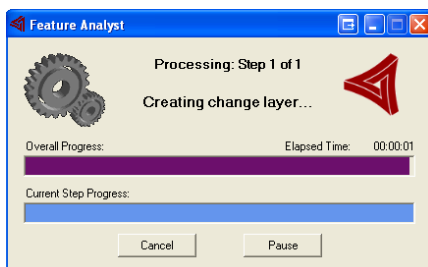
7 Accept the default file name and file location.

-or-

Provide a new name and location for the file and choose **Save**.

When the input rasters are both panchromatic images, Feature Analyst automatically adds an extra band to enable an RGB composite display for improved visualization.

The Feature Analyst Process box opens, displaying the progress of the composite layer.



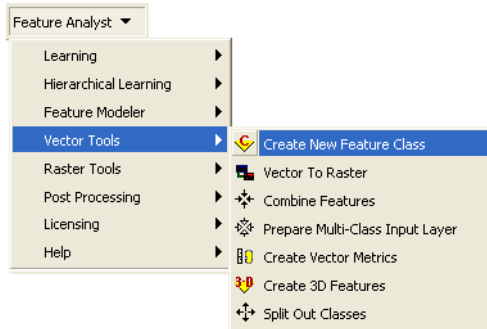
The change-detection composite layer appears in the table of contents and displays in the workspace.

In the result image, reddish areas indicate features removed; blue-green areas indicate features added.

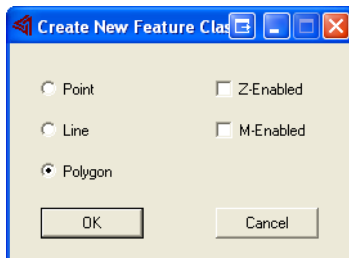
8 Examine the change-detection raster.

Create a Training Set for Added or Subtracted Features

- 1 Choose **Feature Analyst** on the toolbar, choose **Vector Tools** on the drop-down menu, and then choose **Create New Feature Class**.



The Create New Feature Class dialog box opens.



- 2 Select a **training type** and choose **OK**.

The Save Feature As dialog box opens.



By default, Feature Analyst names the file in the Name field.

- 3 Accept **the default file name** and **file location**.

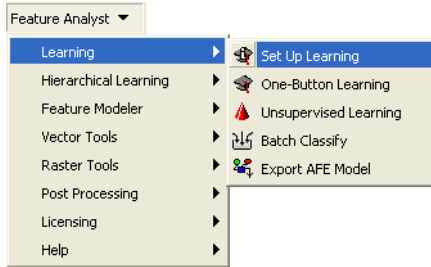
-or-

Provide a **new name** and **location** for the file and choose **Save**.

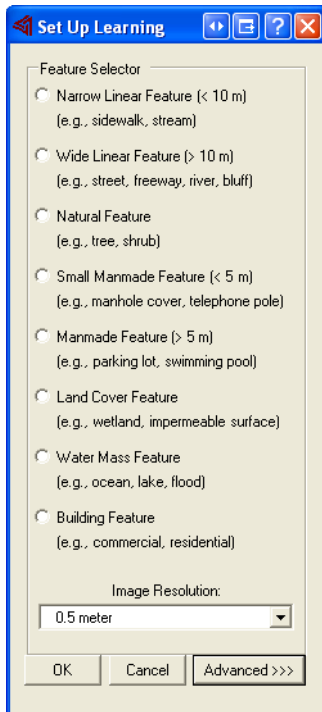
The new feature class appears in the table of contents, selected and ready for editing.

- 4 Zoom in on the features that reflect the type of change you are trying to extract (features added over time or removed over time) and, using either the **ArcMap Sketch**  tool or the **Feature Analyst Digitize**  tool, draw your training set.
- 5 Save your edits and then stop editing.

- 6 Choose **Feature Analyst** on the toolbar, choose **Learning** on the drop-down menu, and then choose **Set Up Learning**.

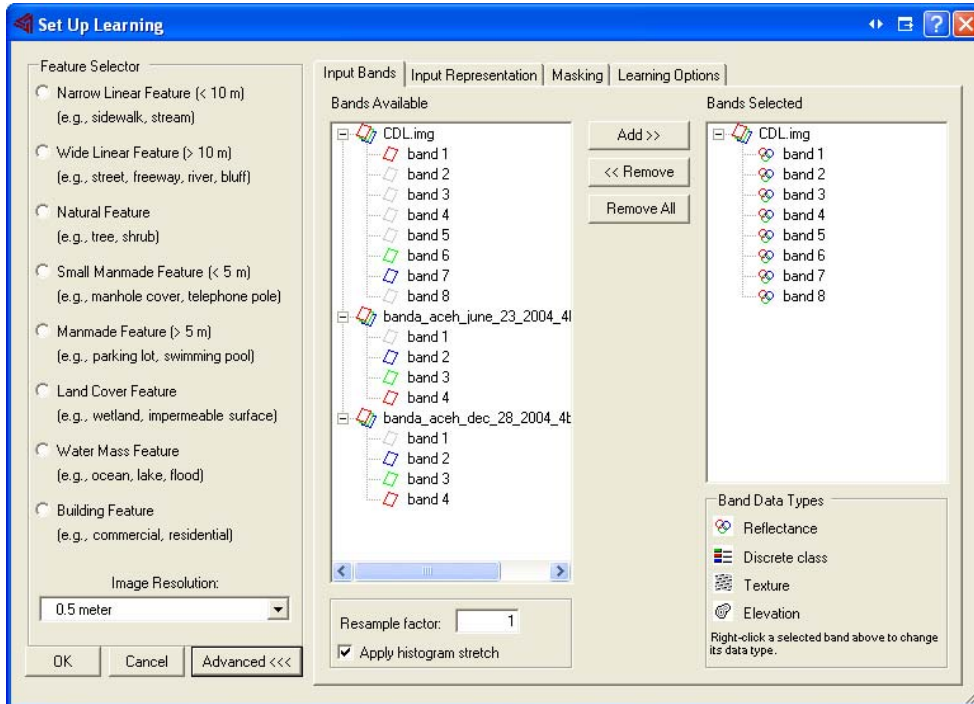


The Set Up Learning dialog box opens.



- 7 Choose **Advanced**.

The dialog box expands and displays the **Input Bands** tab.



- 8 In the **Bands Selected** list box, verify that the change detection raster appears in the **Bands Selected** list, and that all of the appropriate bands are selected with the correct reflectance data type.
- 9 If you added a third band to a panchromatic image, highlight that band in the **Bands Selected** box and choose **Remove**.

Note: When Feature Analyst fuses panchromatic images for change detection, it prompts you to add a third, blank band to make visualization easier. This blank band contains no data and should not be used for learning.

- 10 Select a **feature type** under **Feature Selector** that best describes *all* your target features.

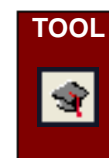
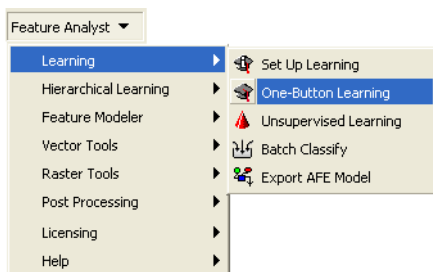
-or-

Customize the learning parameters, as necessary.

- 11 Choose **OK** when you are done.

The *Set Up Learning* dialog box closes.

- 12 Choose **Feature Analyst** on the toolbar, choose **Learning** on the drop-down menu, and then choose **One-Button Learning**.



The Save Feature As dialog box opens.

By default, Feature Analyst names the file in the Name field.

13 Accept the default file name and file location.

-or-

Provide a **new name** and **location** for the file and choose **Save**.

The Feature Analyst Process box opens, displaying the progress of the extraction.

The resulting feature class extraction appears in the table of contents and displays in the workspace.

14 Examine your change detection extraction results layer.

Clean Up Results

- Run Hierarchical Learning or Post Processing, as necessary, to refine results.