

## Using Bathymetry Grids for Cocos (Keeling) Islands

iView3D is an interactive 3D data visualization system. It allows the user to view detailed imagery of the Cocos Islands landmass, surrounding mudflats and seafloor. iView3D can be used to find the coordinates and depths of various points of the islands and surrounding ocean.

### Opening Files

To view Cocos Islands bathymetry grids go to the C:\CocosGIS\shortcuts.

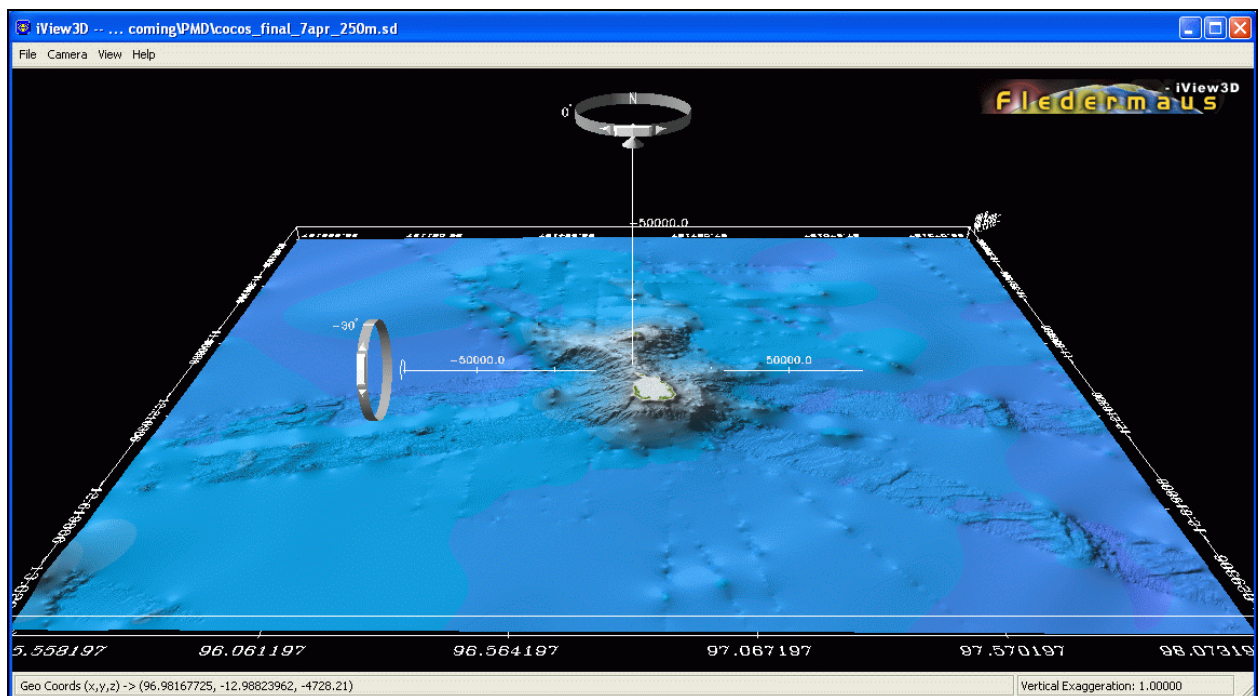
There are two different .sd files: a 250m resolution of the islands and surrounding seafloor and a 10m resolution image of the islands and mudflats.

Double click the file you require.

Name	Size	Type
1987 aerial photography	2 KB	Shortcut
1987 Nth Keeling air photo	2 KB	Shortcut
2003 satellite image (Nov03)	2 KB	Shortcut
2004 North Keeling satellite im...	2 KB	Shortcut
Cocos GIS	2 KB	Shortcut
cocos_10m	1 KB	Shortcut
cocos_250m	1 KB	Shortcut

This will open iView3D.

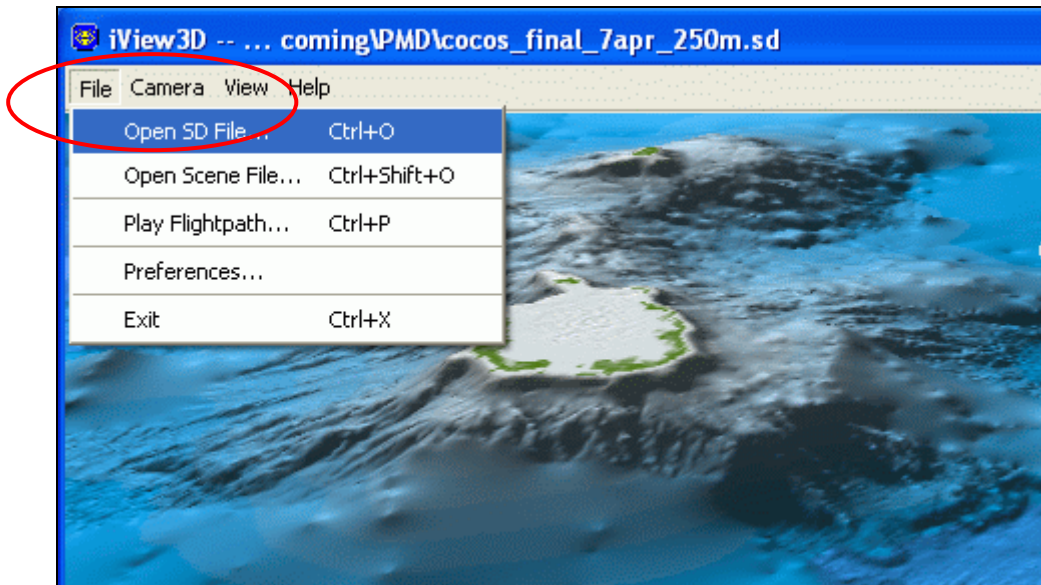
A 3D image of the Cocos (Keeling) Islands and surrounding seafloor will automatically load.



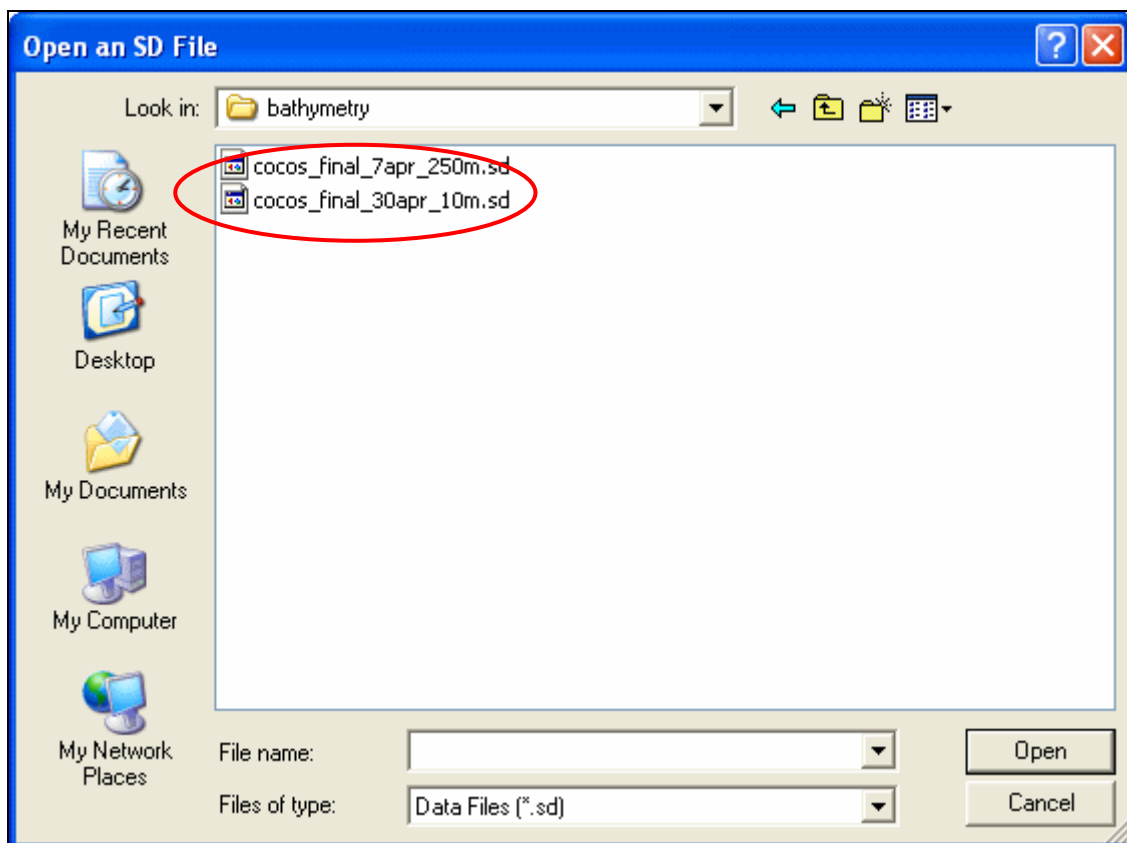
cocos\_final\_7apr\_250m.sd

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Once the program is open, you can easily change file by clicking **File** then Open SD File.

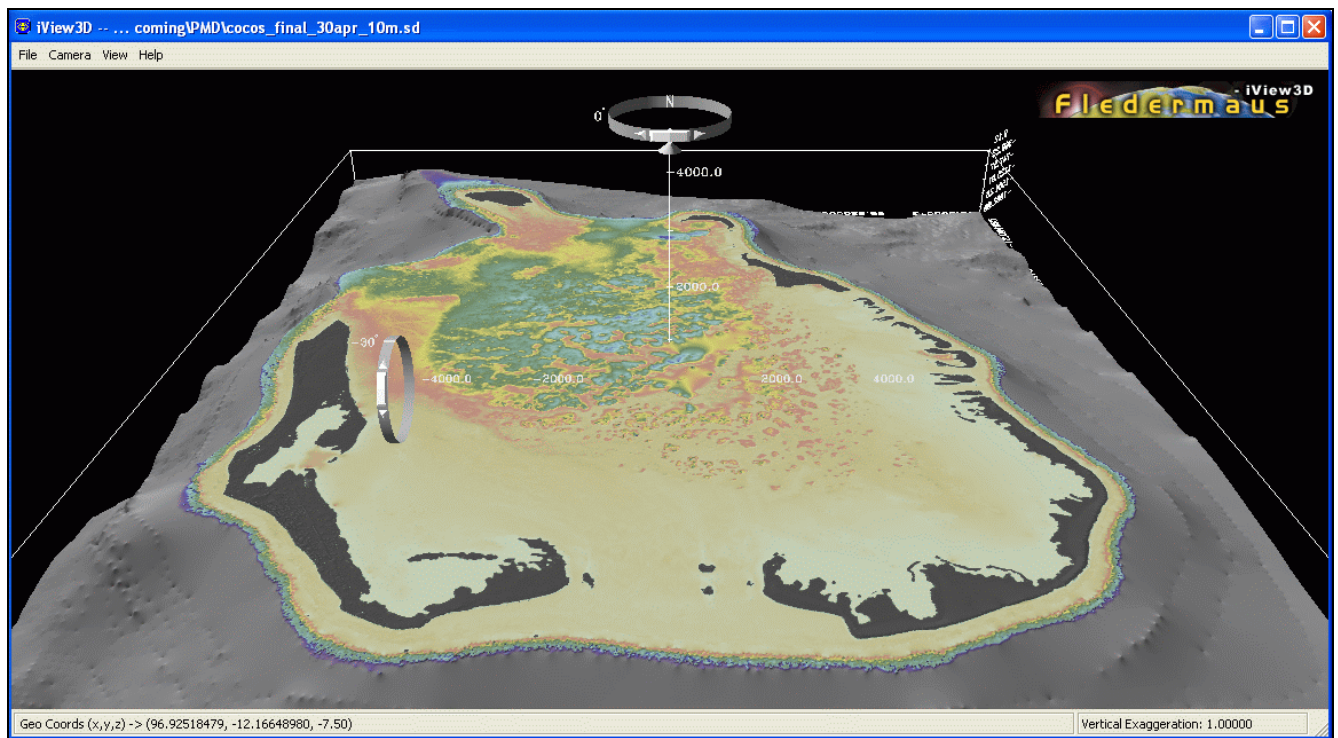


A window should appear with two files, if not navigate to this directory path C:\CocosGIS\bathymetry Double click the Cocos Islands file you require.



The 10m resolution image of the Cocos Islands looks like this:

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cocos\_final\_30apr\_10m.sd

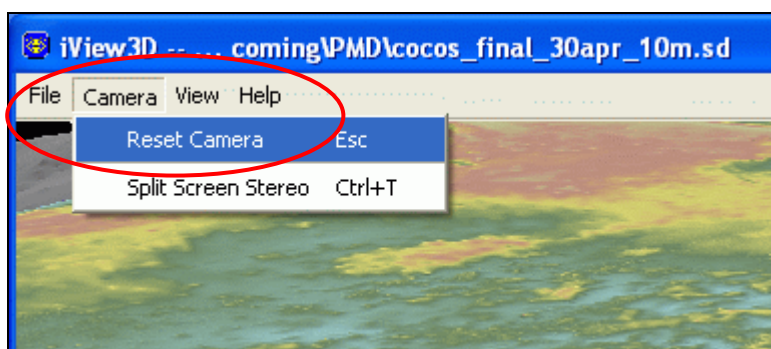
## Using the Program

In iView3D users are able to navigate and manipulate the image using four basic controls: zoom, rotation, vertical exaggeration and georeferencing coordinates.

### Zoom

To zoom, right click on the map at the point you wish to examine. Without releasing the right mouse button, drag up to zoom in or drag down to zoom out. If your mouse has a wheel you can use this to zoom.

To reset the view to its initial starting position click Camera> Reset Camera or press Esc.



### Rotation

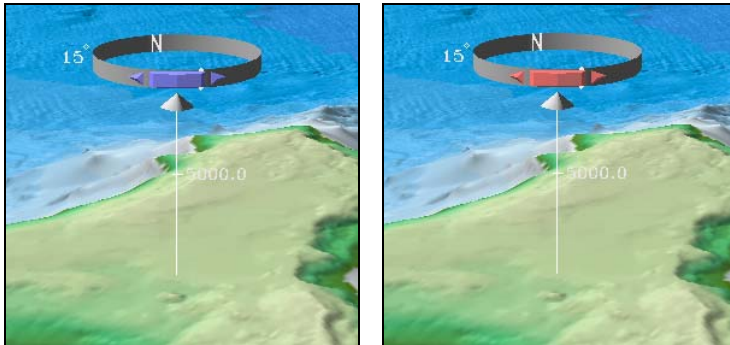
To rotate the scene on the vertical axis hold down the left mouse button and drag left or right. To rotate about the horizontal axis hold down the left mouse button and drag up or down. To swap between planes the mouse button must be released and clicked again. When rotating, the active scroll bar widget will move and appear blue. To change the pivot point right click at the point you desire.



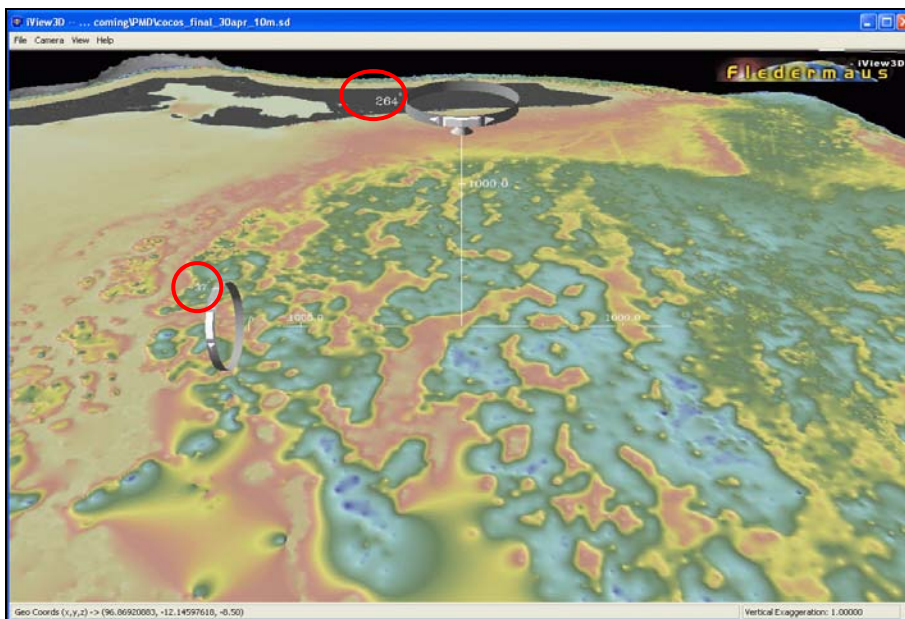
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Angles appear beside the rotation widgets, showing the compass bearing or angle of declination. The N on the top widget indicates north.

To lock a rotation axis, hold the left mouse button and drag to the desired angle, while the left button is still down click the right mouse button. The widgets will turn red to indicate the rotation is locked. To unlock the angle left click on the widget. Note: If you are still rotating the image when you click lock, you will lock the widget to continue to move on that axis at that speed. Unlock by clicking on the widget with the left mouse button.



We have navigated to a view of the Cocos Islands' mudflats and sinkholes with West Island visible at the top of the image. The scene has been rotated  $264^\circ$  on the horizontal axis and  $-37^\circ$  on the vertical axis.

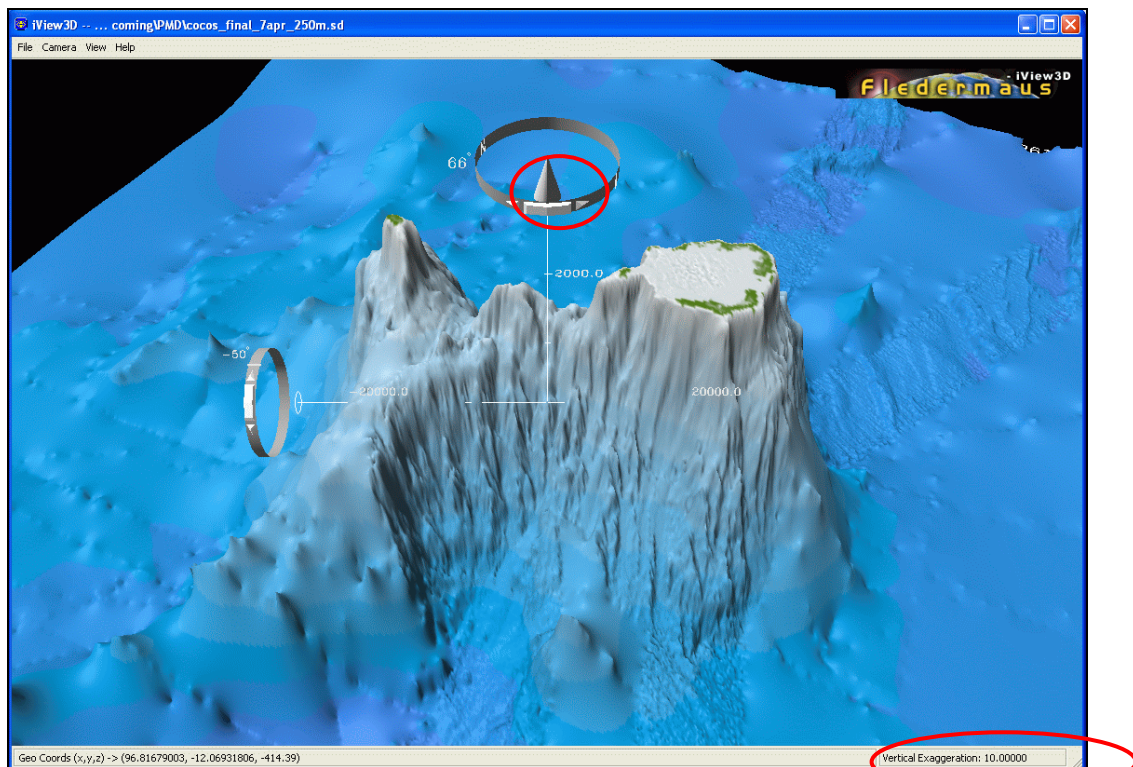


**cocos\_final\_30apr\_10m.sd**

### Vertical Exaggeration

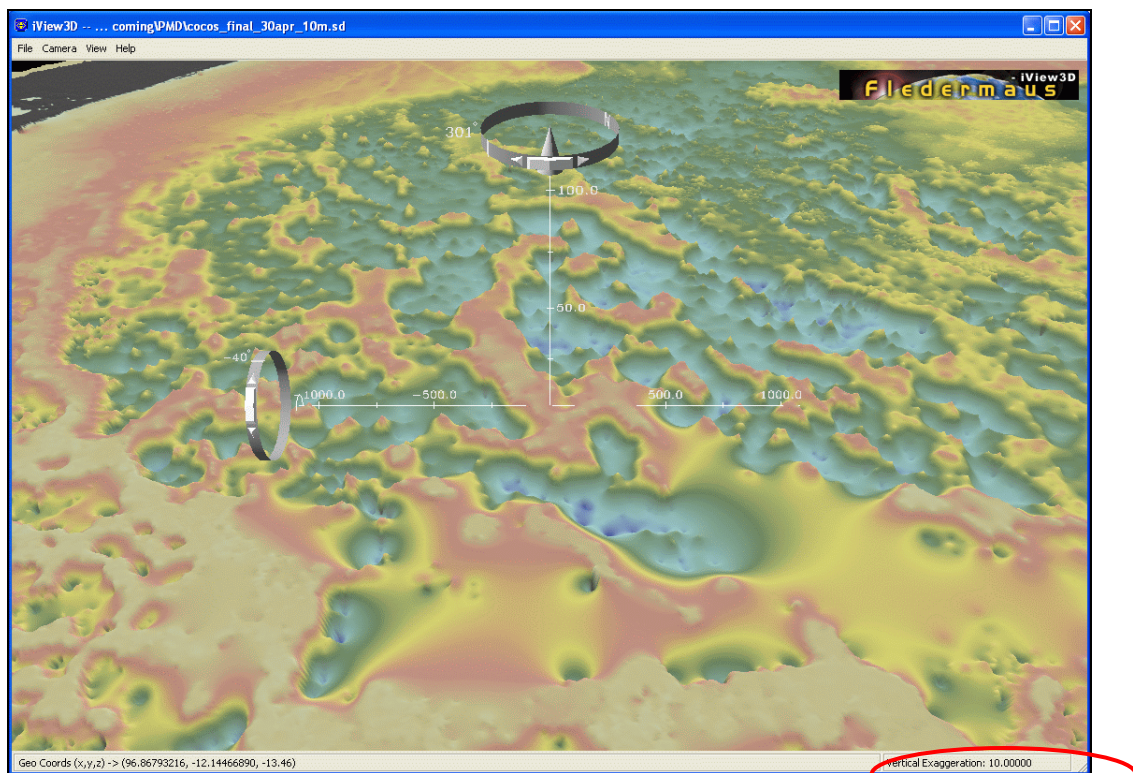
To change the vertical exaggeration of the scene, left click the cone in the middle of the top widget and drag up or down. In the image below, the vertical exaggeration is set to x10. The extent of vertical exaggeration is shown in the right hand corner of the status bar.

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**cocos\_final\_7apr\_250m.sd**

This function is helpful when examining sinkholes. In this image, vertical exaggeration is set at x10.



**cocos\_final\_30apr\_10m.sd**

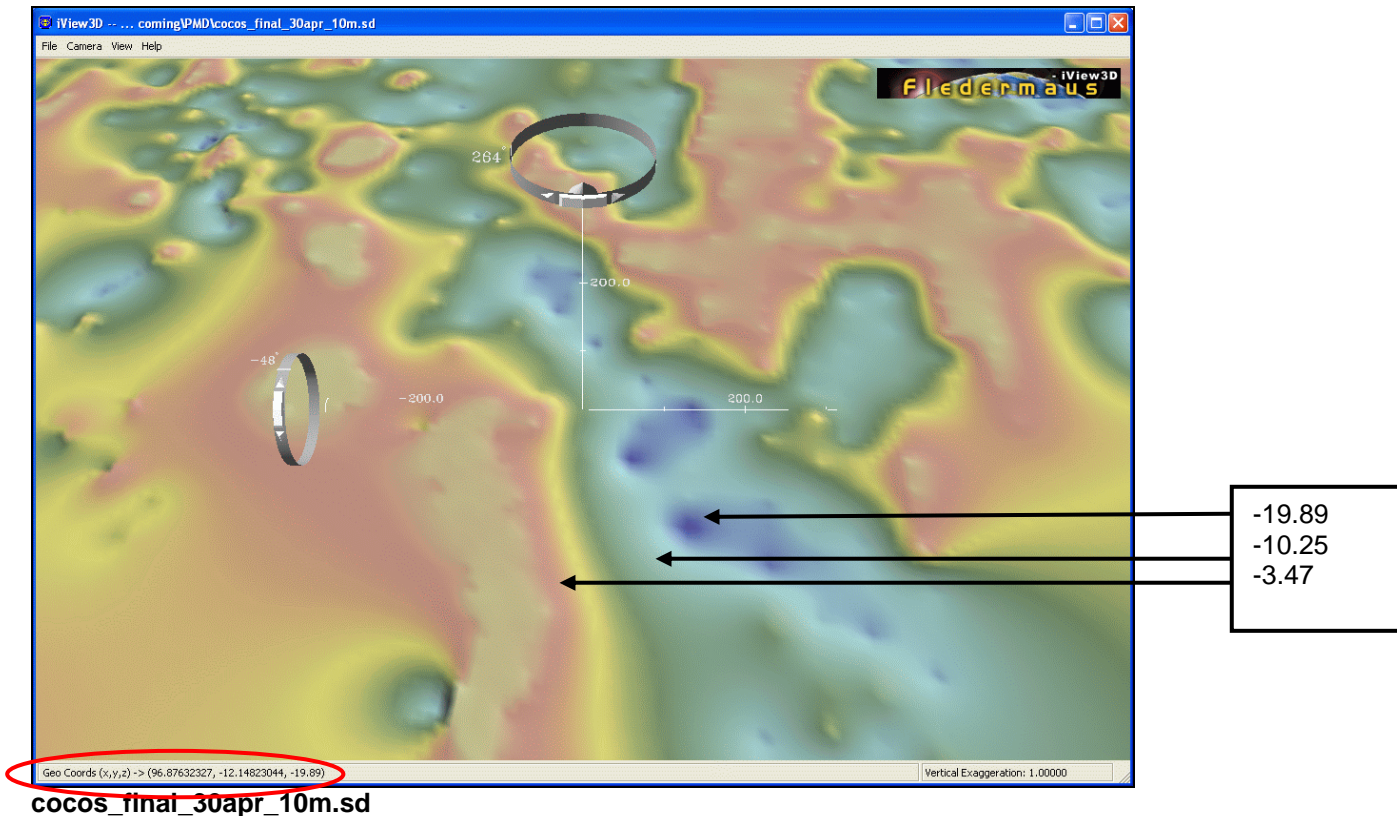
### Coordinates

The georeferencing coordinates are shown in the left corner of the status bar. Move the mouse over the surface of the map to a point of interest. The first two numbers are the x and y axis coordinates. The third number (z) is the depth or elevation relative to sea level.



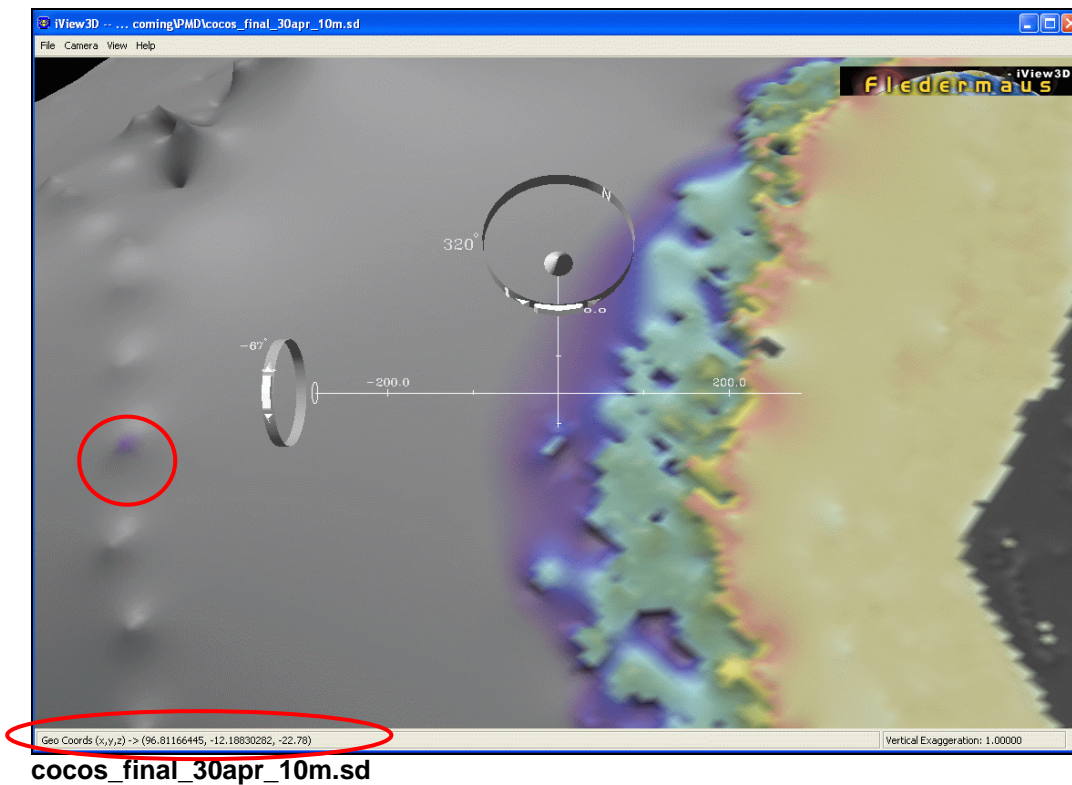
## Using Bathymetry Grids - Cocos (Keeling) Islands

Using this function it is easy to locate and estimate the depth of sinkholes surrounding the Cocos Islands. In this image the sinkhole is estimated at 19.89 meters below sea level. The surrounding mudflat is 3.47 below sea level.



A similar technique can be used to locate **possible reefs** or points of interest surrounding the island.

The following image shows a small raised point on the sea floor. The point is 22.78m below sea level, compared to a surrounding average depth of 35m below sea level.



## Using Bathymetry Grids - Cocos (Keeling) Islands

By examining the horizontal axis we can determine that this point is approximately 900 meters from the shore of West Island.

