

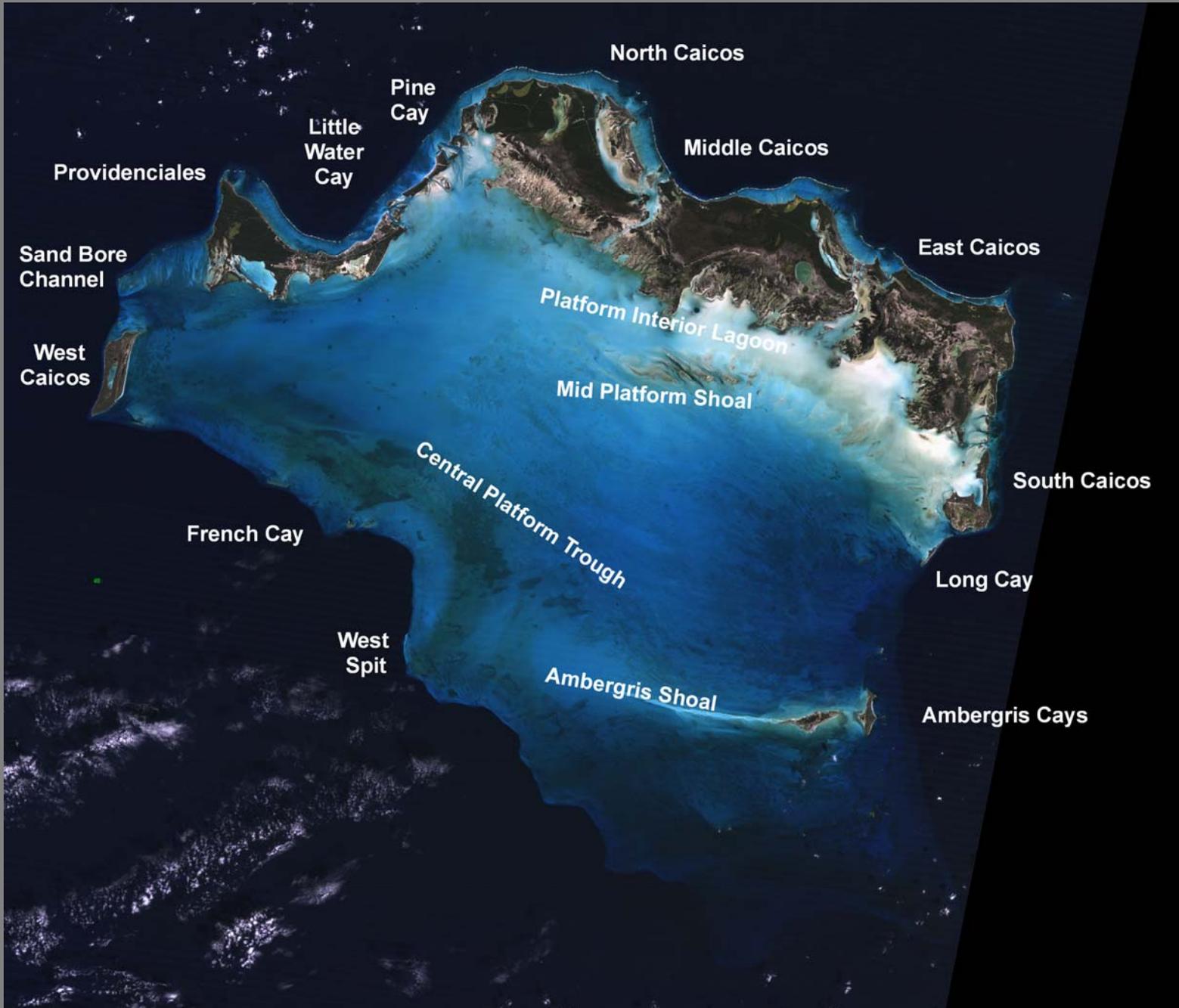
Satellite Imagery and Visualization of the Caicos Platform



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Rationale

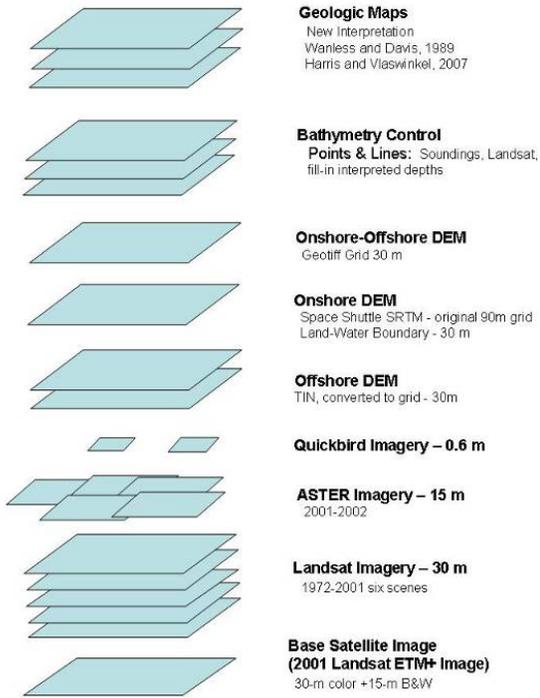
- The Caicos Platform is an area of continuing interest to researchers in modern carbonates, an important training venue, and a valuable modern analog for understanding facies patterns of subsurface isolated platforms.
- We hope to promote this interest by making readily available a set of processed satellite images, a digital elevation model (DEM), and examples of how this data can be visualized and used.



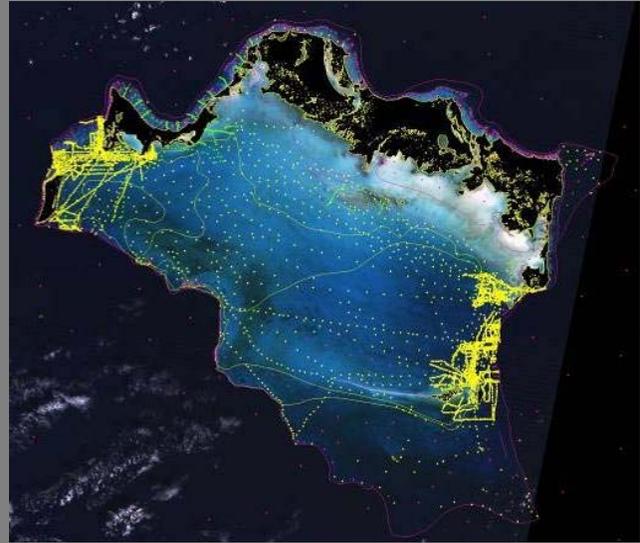
1990 Landsat TM natural color image in GIS with locations

Caicos GIS

GIS Stack of Images & Maps for Caicos Platform

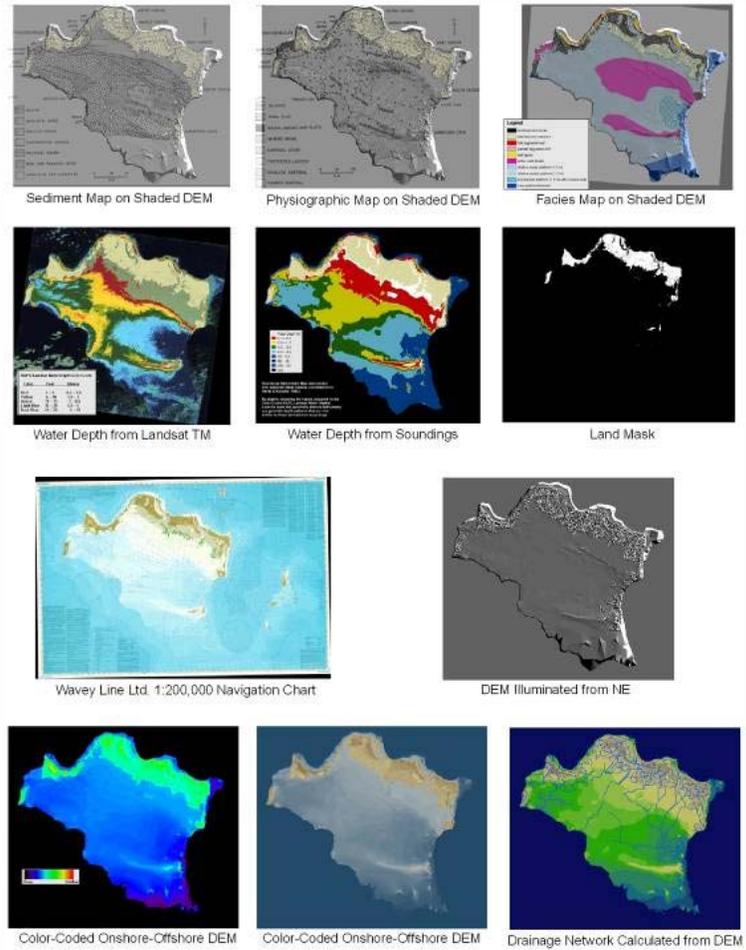


Stack of co-registered images, maps, and control data for Caicos GIS

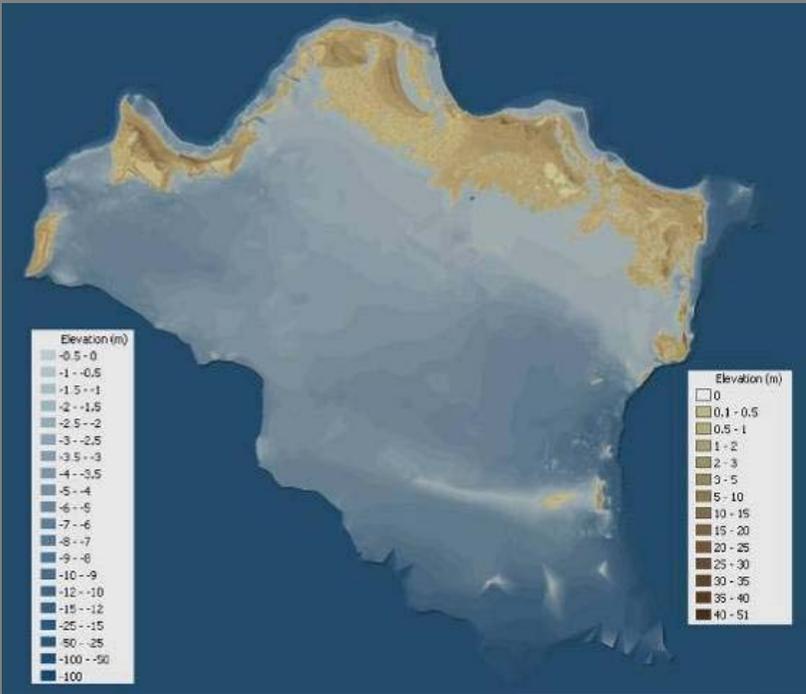


Bathymetric control data: Yellow dots and lines are measured data (soundings, Space Shuttle land/water boundary, interpolated contours); purple dots and lines are water depths interpreted from the Landsat imagery.

Overview of satellite images, maps and enhanced DEM in the Caicos GIS



DEM and Examples



Offshore and onshore DEMs merged in GIS and color-coded with elevation or water depth in meters.

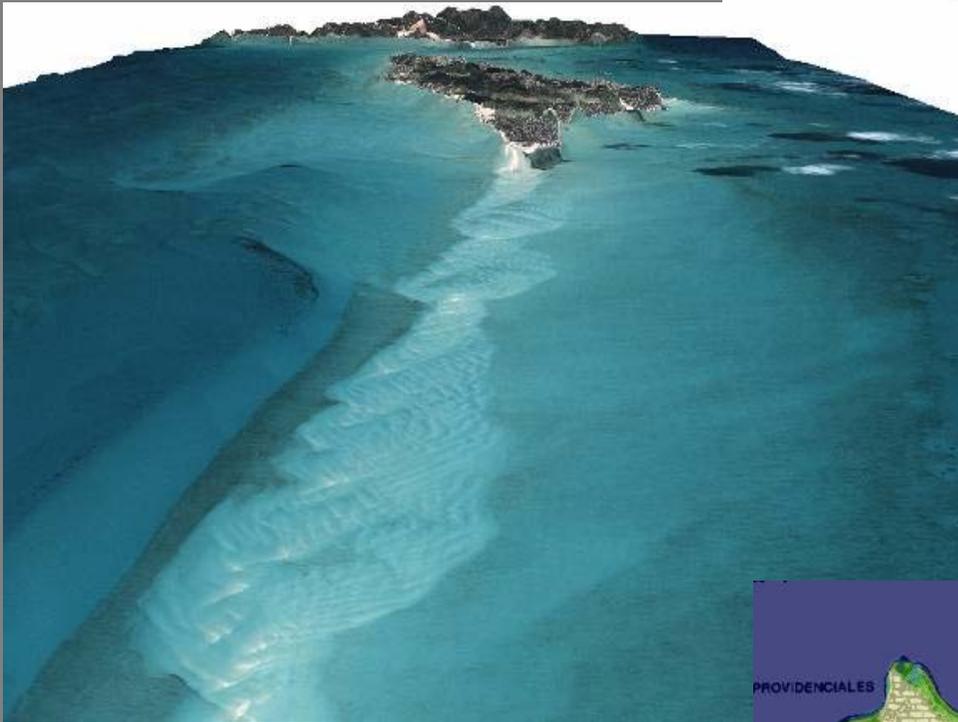
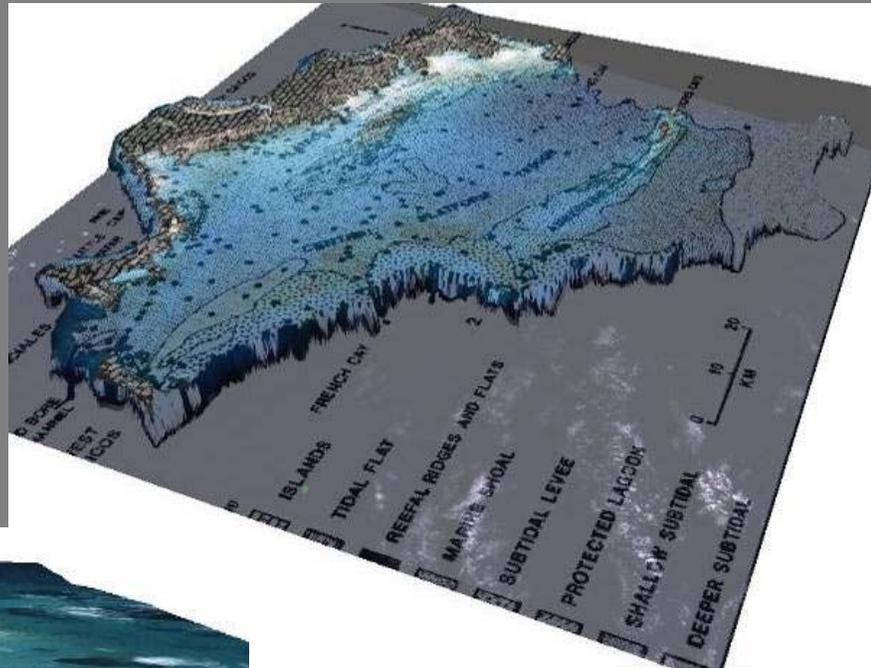
Perspective view looking ENE of 1990 Landsat TM image draped onto DEM (50X vertical exaggeration).



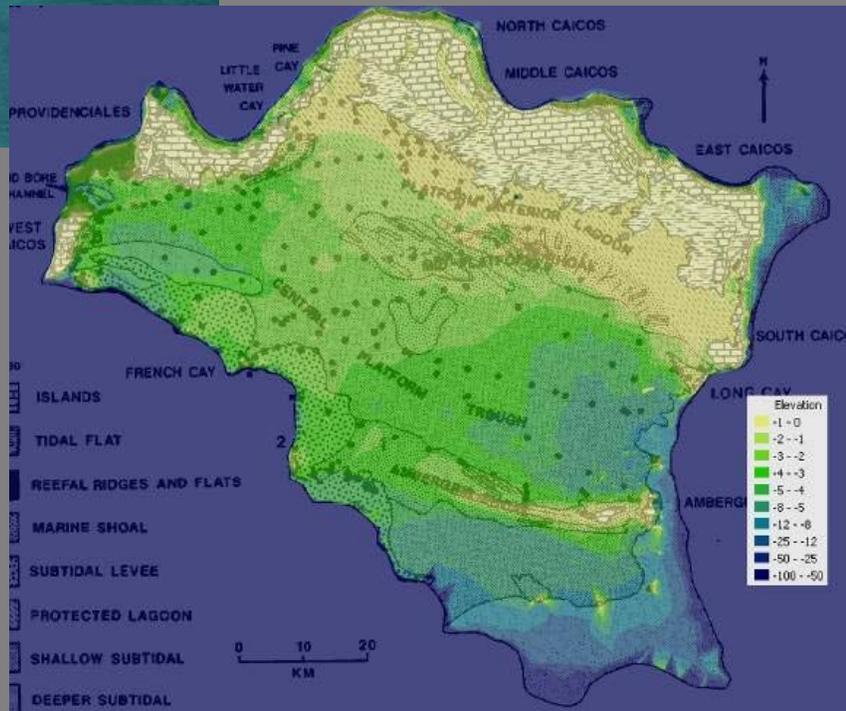
Drainage map showing pruned (low density) network derived from onshore-offshore DEM.

DEM and Examples

Perspective view looking ENE of physiographic map (Wanless and Davis, 1989) merged with 1990 Landsat TM image and draped onto DEM.

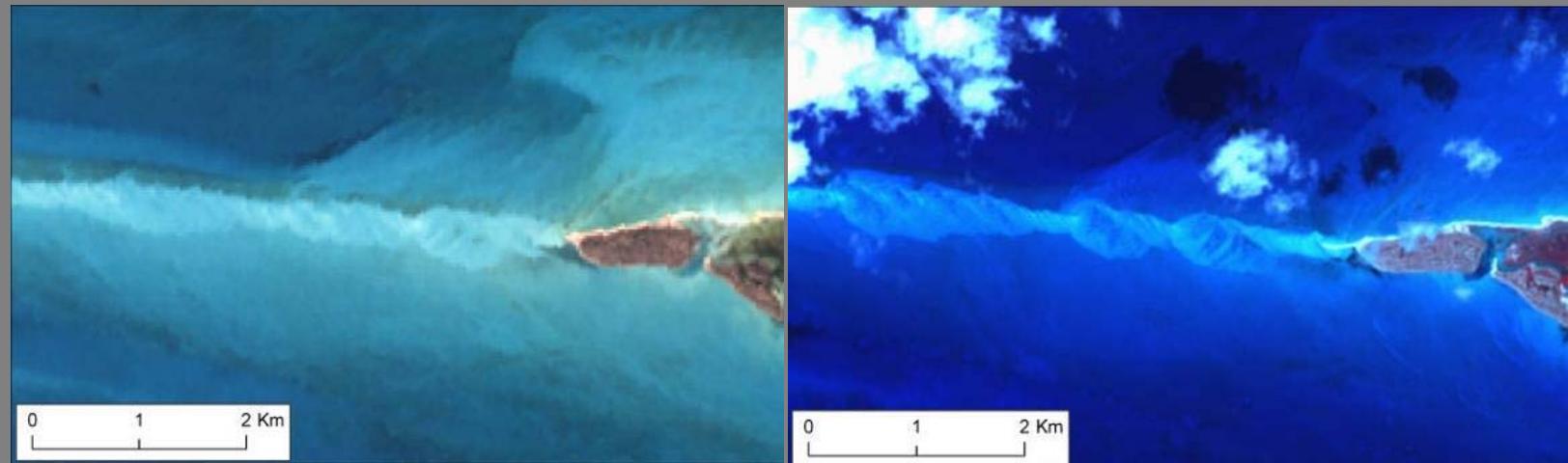


Close-up perspective view of Ambergris Shoal looking West with 2004 Quickbird satellite image draped onto DEM (50x vertical exaggeration).



Physiographic map (Wanless and Davis, 1989) draped onto color-coded DEM. Bathymetry patterns and water depths can be compared directly with the geologic map.

Using the Data

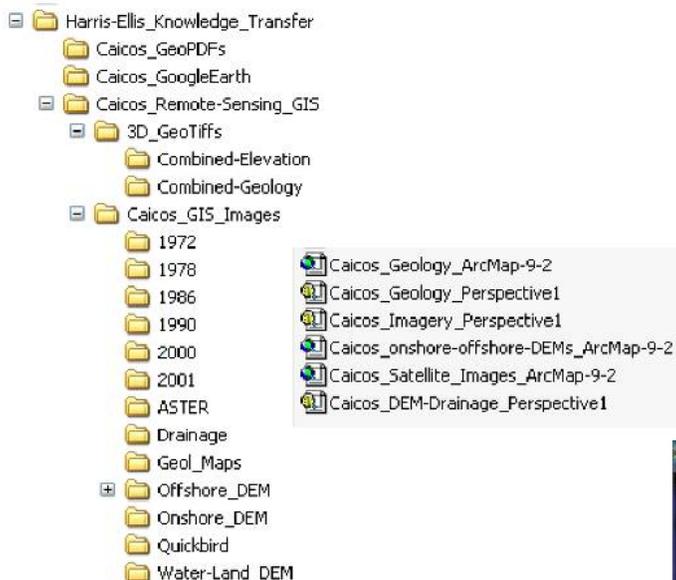


Change detection of sand waves along the Ambergris Shoal with 1986 Landsat (left) compared with 2002 ASTER (right). Wave fronts have moved and the geomorphology of the sand waves has changed.

Perspective view of Little Water Cay (looking ESE) with sediment map (Wanless and Dravis, 1989) in background and high-resolution Quickbird satellite image draped over DEM (10X vertical exaggeration) in foreground. Satellite imagery supports both regional and detailed mapping.



Knowledge Transfer



Full-resolution satellite imagery and maps in GIS format (with ESRI ArcGIS 9.2 mxd and sdx project files), GeoPDFs, and GoogleEarth images are provided on a DVD (Harris-Ellis Knowledge Transfer) included with our paper. The organization of the digital files is shown to the left.

A GIS layer (the onshore-offshore color-coded DEM) transferred out of the GIS and displayed in GoogleEarth.



The GIS stack of geologic maps transferred out of the GIS and into Adobe Reader using GeoPDF, enabling image and map comparison, location, measurement, and interpretation to be done outside of GIS.

