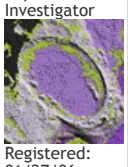
More Nebraska bays ★★★★★ [Re: Cintos]

#1322931 - 04/12/10 10:29 AM

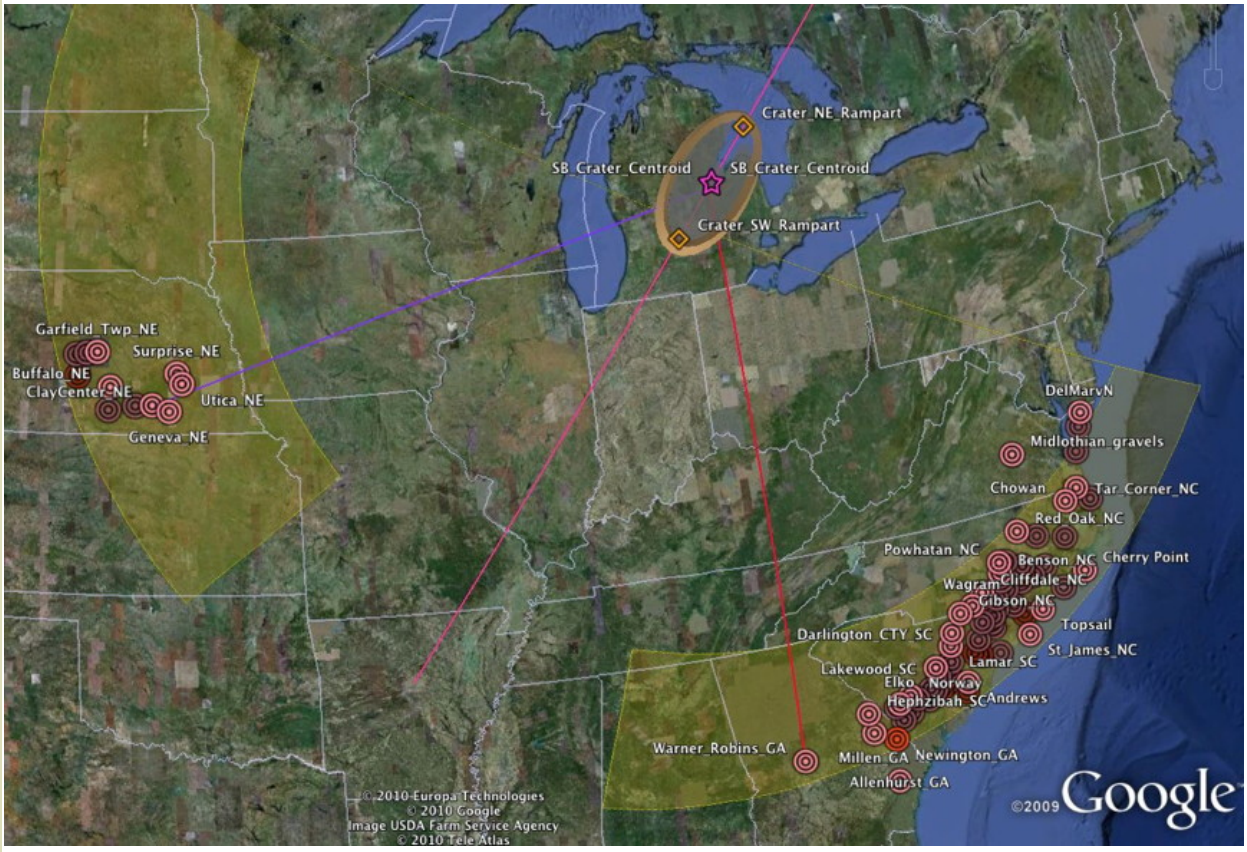
Cintos
Impactor Investigator

Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

Greetings:

Our count of "fields" of Carolina bay type landforms in Nebraska has increased to 12. While there is a great deal of research covering the "Carolina bays" on the eastern seaboard of the US, little attention has been paid to the significant quantity of oval-shaped landforms in the eastern areas of Nebraska. These, too, are aligned with each other. Significantly, the inferred alignment is considerably different than that of the orientation of the extensive sand dunes in the area.

While not nearly as extensive as those in the east, the identification of these bays to be critical to the impact site triangulation process, as contrasted with their eastern-US brethren.

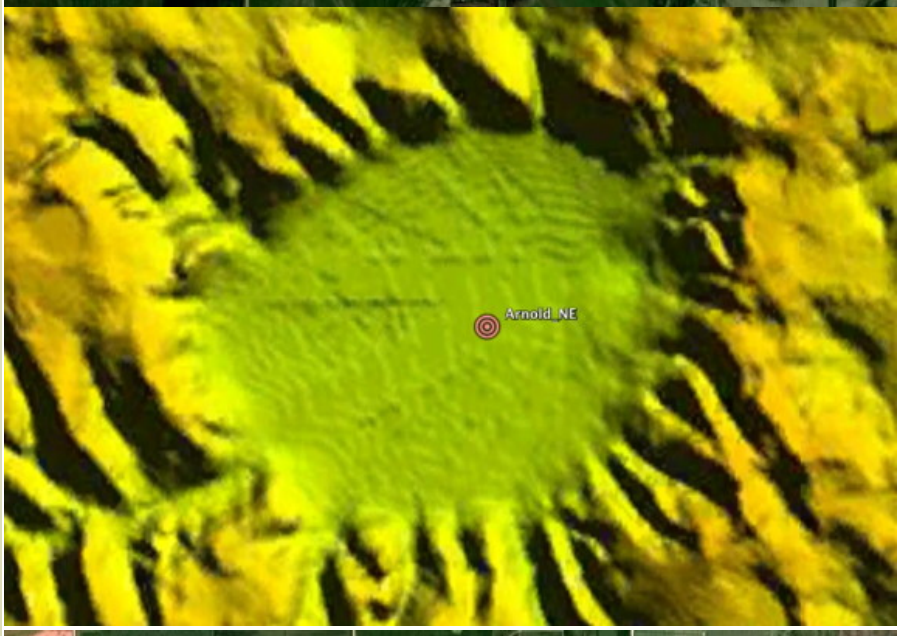
The graphic here shows the extent of identified Nebraska bays, and how the Nebraskan bays we have identified lie along a ring around the Saginaw impact site. They are correlated to a high degree using the Bearing Calculator tool. The attached kmz file contains placemarks and kml elements to reproduce this graphic in Google Earth.

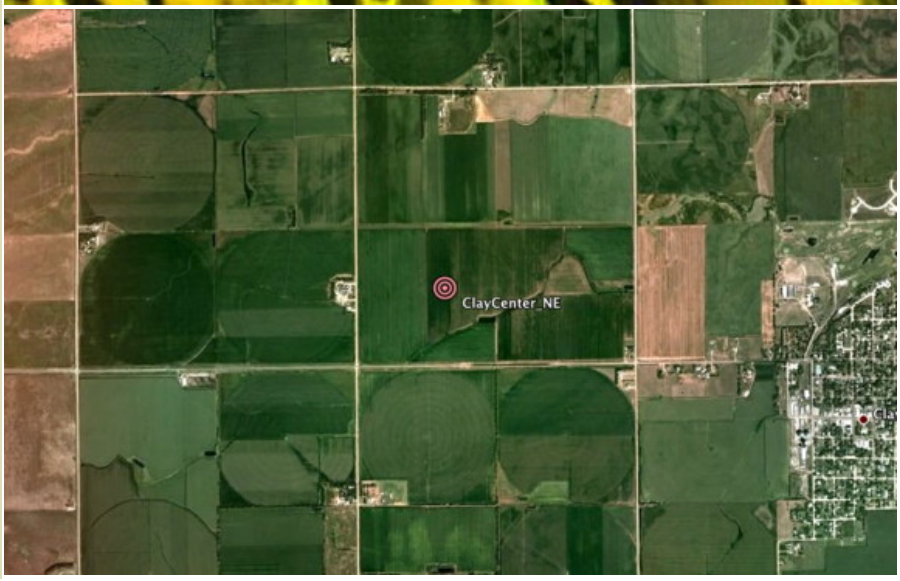


The use of USGS-provided digital elevation maps (DEM) of the area has allowed for this identification, as the characteristic shape and orientations are rarely seen or identified on the ground or in satellite imagery through Google Earth. Each field placemark in the attached kmz file includes links to DEM images as Google Earth overlays, which you are encouraged to load and view.

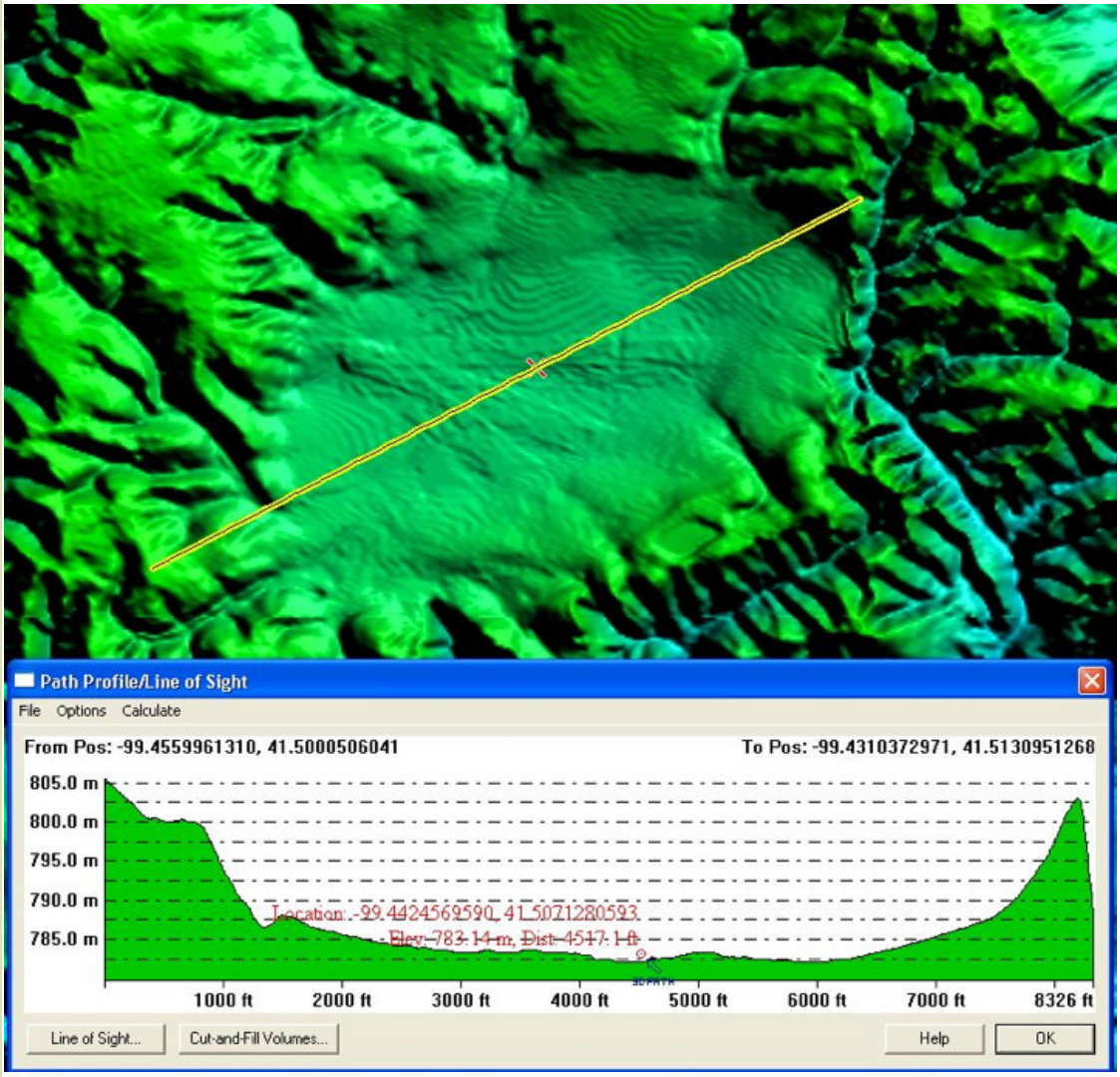
For quick comparison, here are close-ups of two individual bays, showing the normal Goggle Earth Imagery, and then the DEM overlay. A web page is available which shows the same pairings for all 12 areas:The Nebraska bays


Arnold_NE


Arnold_NE


ClayCenter_NE

The bays are not really very deep, of course. The color ramp DEM images are run with the elevation exaggerated. The last graphic here shows an elevation profile across one of the Garfield, NE bays.



We interpret the placement of the bays as being indicative of them being "pedestals" landforms, which owe their existence to the bowl-shaped interior's capability of retaining moisture. Over the millennia since their emplacement, the majority of the ejecta

blanket has been subjected to wind and water erosion, whereas these have been stabilized. The analogy is that of tire tracks in snow, outlasting the surrounding snow, rising above the road surface. A similar process is implicated in the pedestal craters on Mars. Numerous landforms in nearby areas suggest they were at one time 'bays", but have been compromised by encroaching erosion. Such a fate is likely in the future for the Garfield Township bay shown above, which is beginning to be invaded by a stream.

Best wishes,
Michael

Attachments
New_NEbraska_bays.kmz (100 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: support kml for new NE bays post

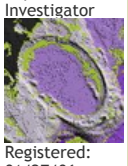
Edited by Cintos (05/09/10 07:57 PM)
Edit Reason: update links

_____
Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

Top

Exceptional Maryland bays [Re: Cintos] #1325310 - 04/20/10 12:30 PM

Cintos
Impactor Investigator



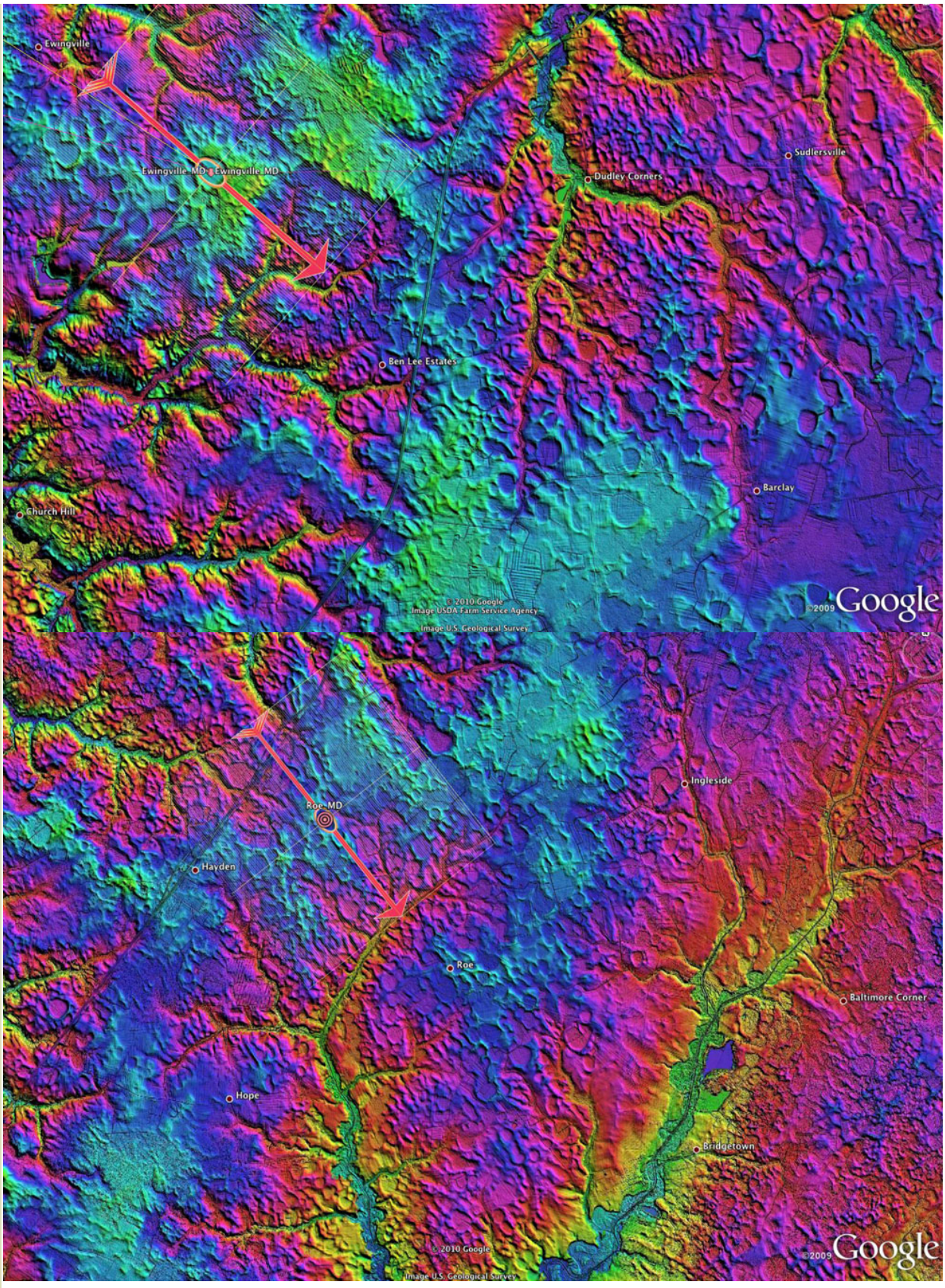
Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

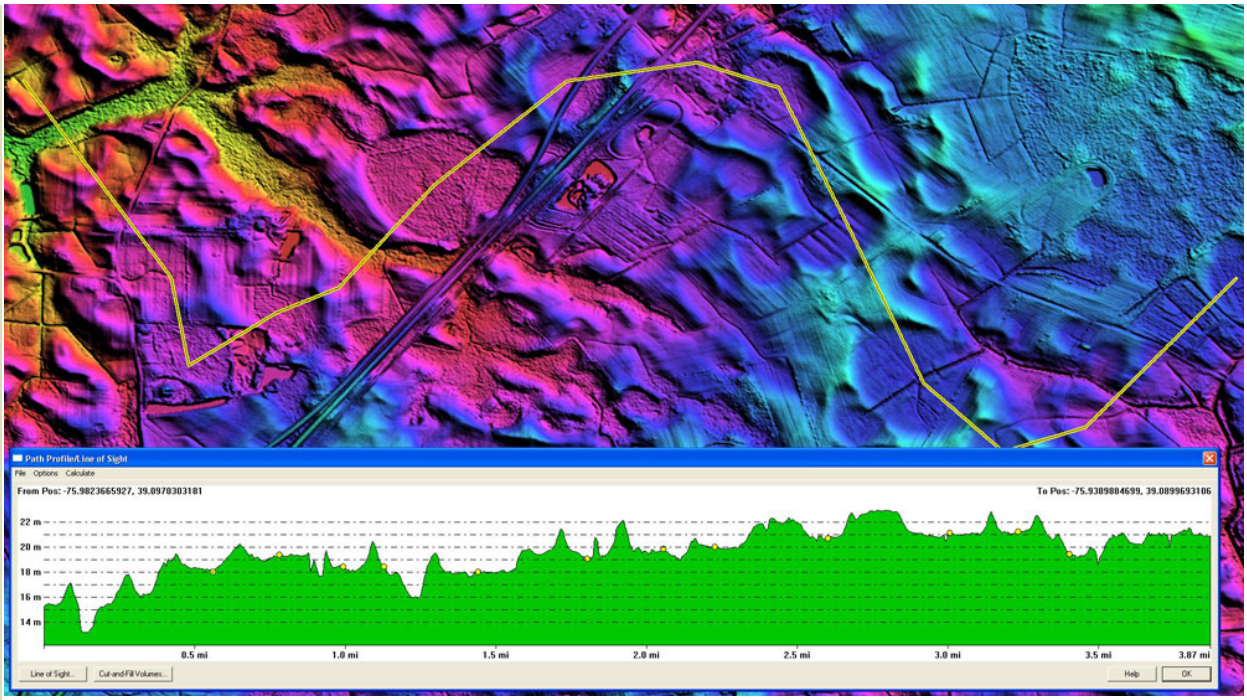
Greetings:

The Inferred Alignment Prediction calculator has been updated to V 2.7, which fixes a small trigonometric error encountered when handling western fields. The correlation of predicted bearings vs the inferred orientations of all identified bays continues to be close to 1.

There is a significant **exception** to our success: bays in the northwestern corner of the DelMarva Peninsula. There, just east of Washington, DC, lies an extensive field of Carolina bays - probably numbering in the tens of thousands. These bays are almost invisible in visual imager (like Google Earth), but are simply stunning when visualized in high-resolution LiDAR color-ramp imagery.

Bays exist in staggering numbers all across the Delmarva Peninsula, and the *Distal Ejecta Field*s kml file now includes placemarks and kml support for 15 Fields there. As the fields are traversed south to north, the planform of the bays becomes more and more rounded, yet they can be correlated well with the calculator's numerically predicted arrival bearings. Needless to say, a "round" bay can not suggest an inferred arrival orientation, and thus two fields at the very top of the peninsula suggest an orientation that is off from our predictions by about 15° in the clockwise direction. Here are three graphics, created from 1/9 arc second USGS NED data using Global Mapper. The last of theses shows the elevation profile across a 4 mile path through these bays. Given the small vertical relief, it is no wonder they are virtually invisible to the eye.


Ewingville
Ewingville MD
Ewingville MD
Sudlersville
Dudley Corners
Ben Lee Estates
Barclay
Church Hill
© 2010 Google
Image USDA Farm Service Agency
Image U.S. Geological Survey
©2009 Google
Ingleside
Roe MD
Hayden
Roe
Baltimore Corner
Hope
Bridgetown
© 2010 Google
Image U.S. Geological Survey
©2009 Google



If I ever get "into the field" for some ground work, the road cuts in this area (near Price, MD) would be a great place to start! I am placing a network linked overlay file for this last graphic as an attachment to this post.

- Michael

Attachments
MD_Exceptions_post.kmz (85 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: DEM imagery overlay kml for MD exceptions post

Edited by Cintos (05/09/10 07:55 PM)
Edit Reason: update links

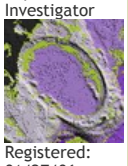
_____
Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

Top

Cardinal Points for New Jersey [Re: Cintos]

#1326258 - 04/23/10 02:07 PM

Cintos
Impactor Investigator

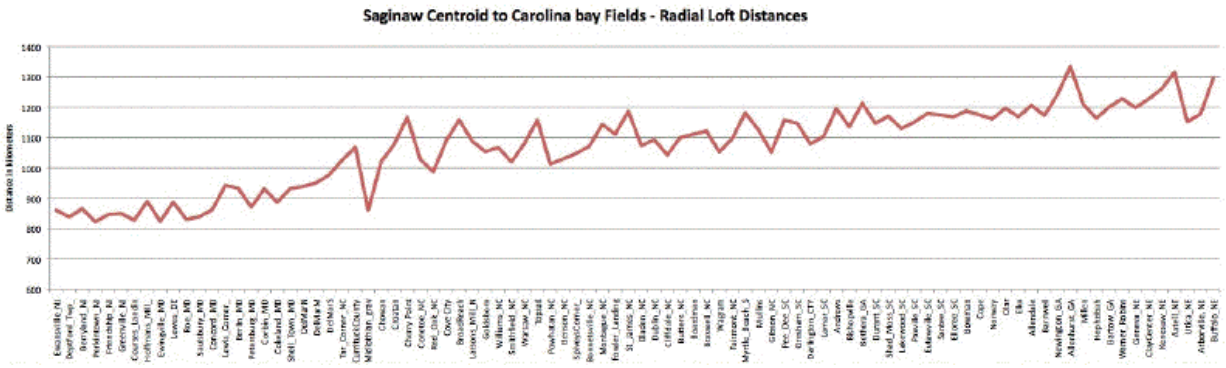


Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

Greetings:

If you recall, the numerical model embedded in the Inferred Alignment Calculator uses trigonometry to de-construct and then re-construct the trajectories based on the loft transit time of the ejecta, and its terminal velocity as it re-enters the lower atmosphere. These trig formulas are actually different in each of the four quadrants of the compass cardinal points. To make matters worse, the trig functions are not well behaved when crossing the 0°, 90°, 180° and 270°. Up to now the relationship of the bays and the Saginaw site are not close to any of these, but the New Jersey sites are getting close to 90° east of the crater.

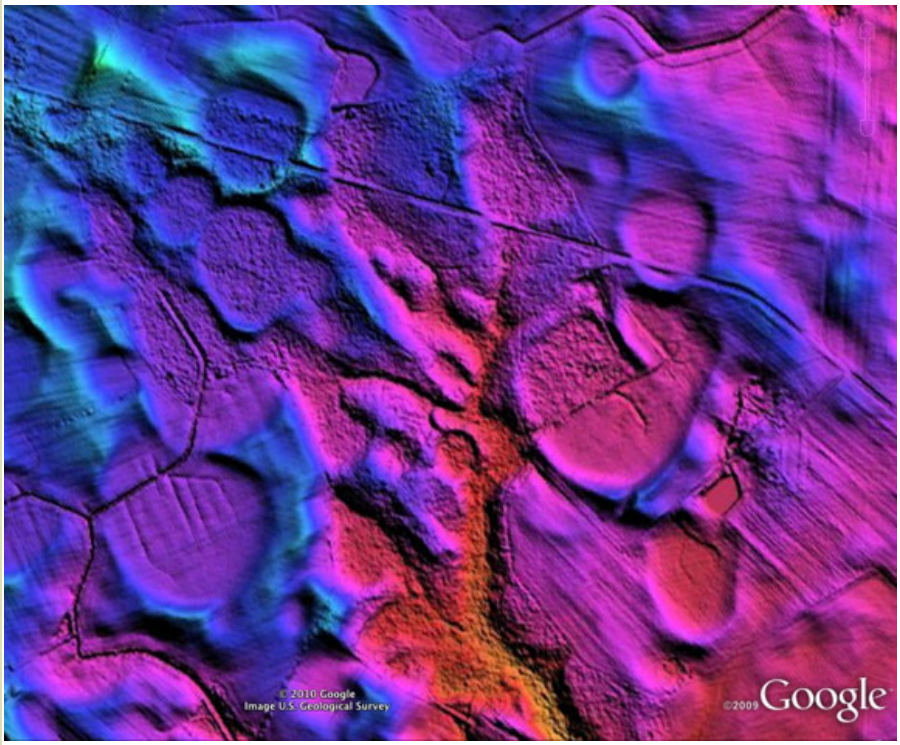
Our earlier solution sets, using bays in North Carolina and southward, were all approximately the same radial distance from the Saginaw focus. That allowed us to use a "loft time" parameter in the calculations. The Maryland, Delaware and New Jersey fields are breaking that model, as they are increasingly closer to the proposed impact site. Here is the graph of distances, walking clockwise around the Saginaw focus.

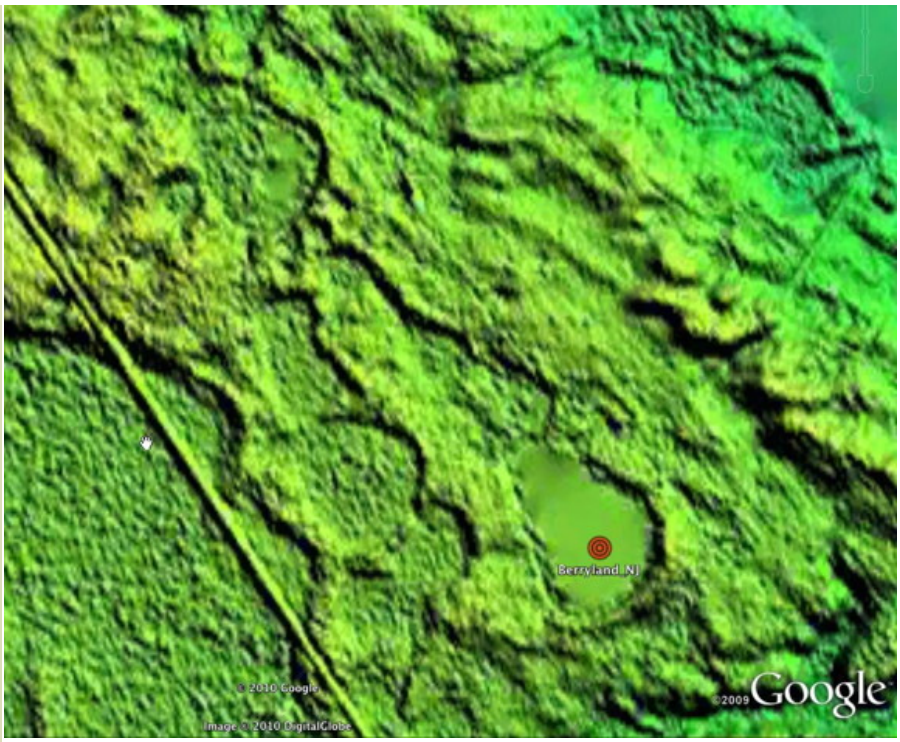


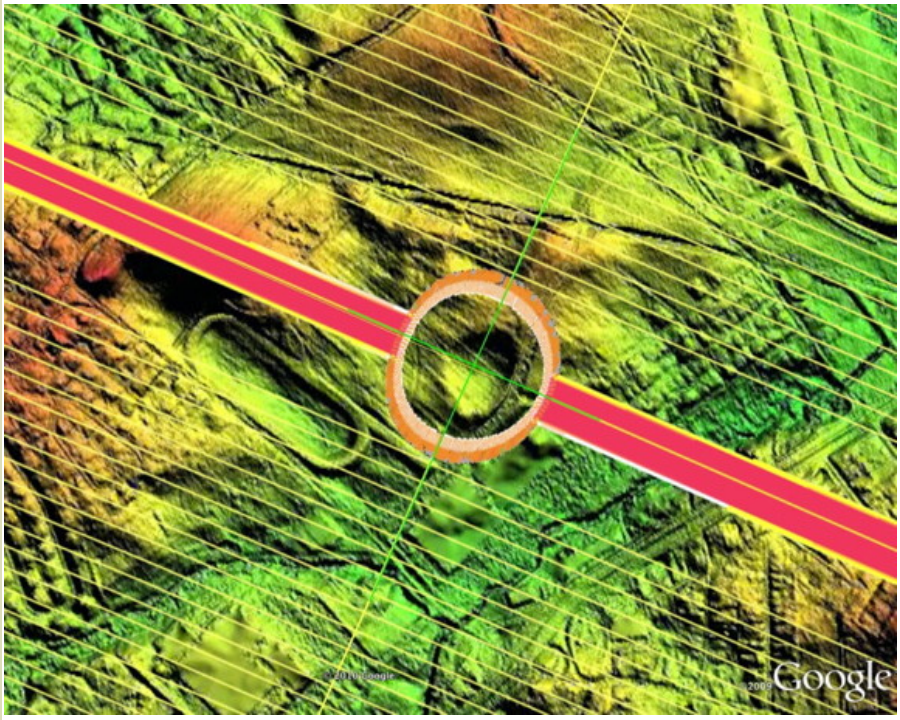
To address this, the calculator (Version 2.9) now uses a user-adjustable parameter "average velocity" for the transit from crater to the eventual ejecta depositions site. From that value, we are now calculating the loft time for each location. Thus the loft time used for NJ (850 km) will now be less than for those in Nebraska (1200 km), which seems to be a reasonable model enhancement. The result is an even higher degree of correlation between all the bay's inferred alignment (as empirically measured) and the calculator's predictions.

As mentioned in the prior post, many of the bays of Maryland, and now for New Jersey, have lost the elongation which aided in deducing an inferred orientation. In fact, it has long been reported by others that bays in the far south and those in the north trend towards a round shape. What is left, significantly, is a predisposition for having a segment of the enclosing ring be fatter & higher than the opposing side. If we continue to deduce the alignment to be from the shallow side to the fat "lip", then we may be able to continue with the process.

Here are three examples of what look to be fields of "Squashed" bays, where the momentum during emplacement was more downward than laterally (higher loft angle?).

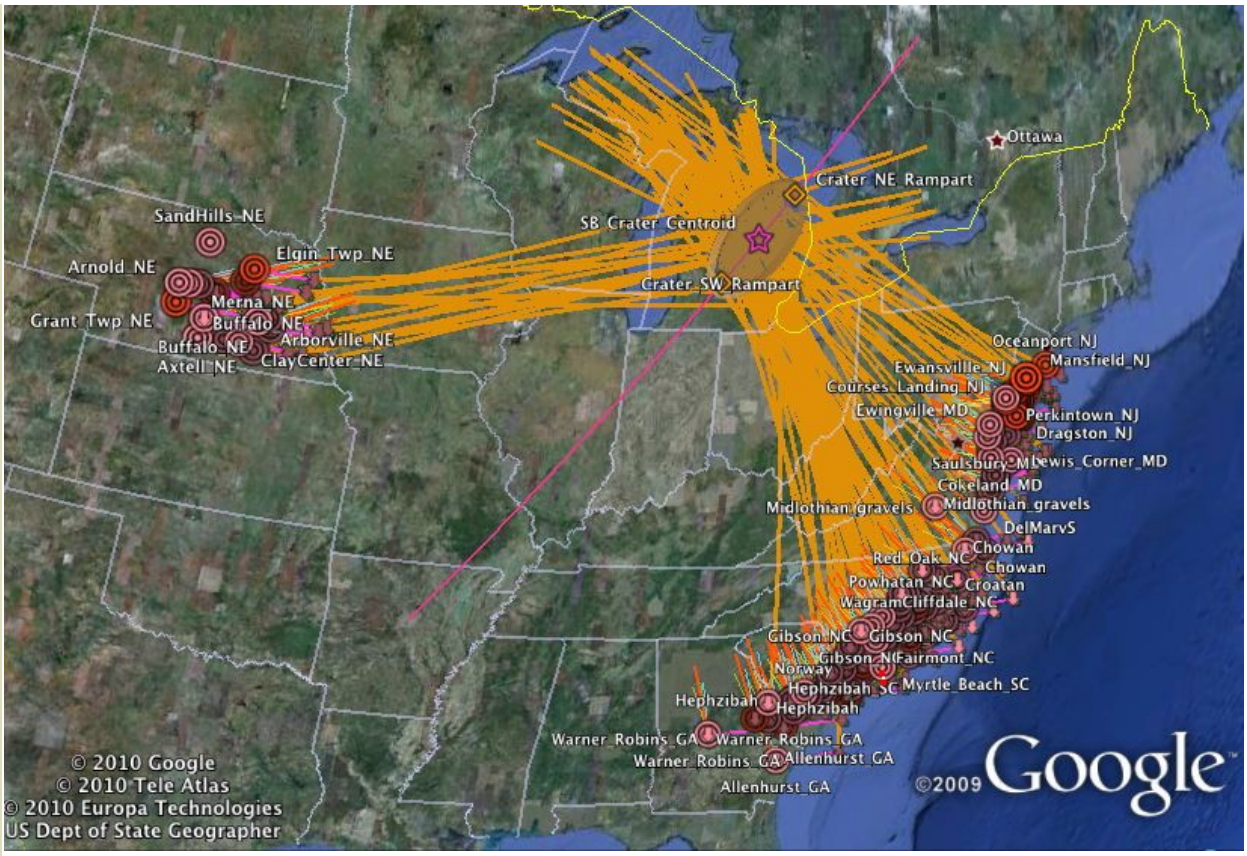






The count of bay fields is now at 100. Here is the mashup from our database-generated de-skewed alignments & predicted orientations. The associated kml elements are in the attached file.

- Michael



Attachments
CardinalPost.kmz (74 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: KML for Inferred Alignment discussion

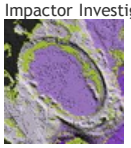
Edited by Cintos (05/09/10 07:48 PM)
Edit Reason: update links to cintos.org presentation

_____
Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

Top

Upland Bay Search [Re: Cintos] #1328185 - 04/30/10 11:02 AM

Cintos
Impactor Investigator

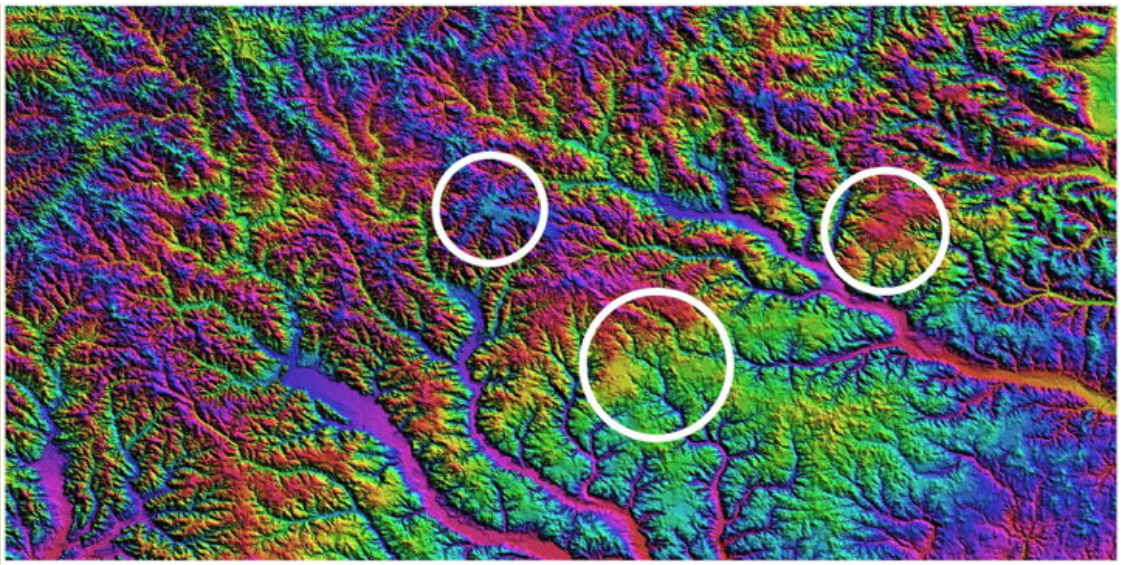


Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

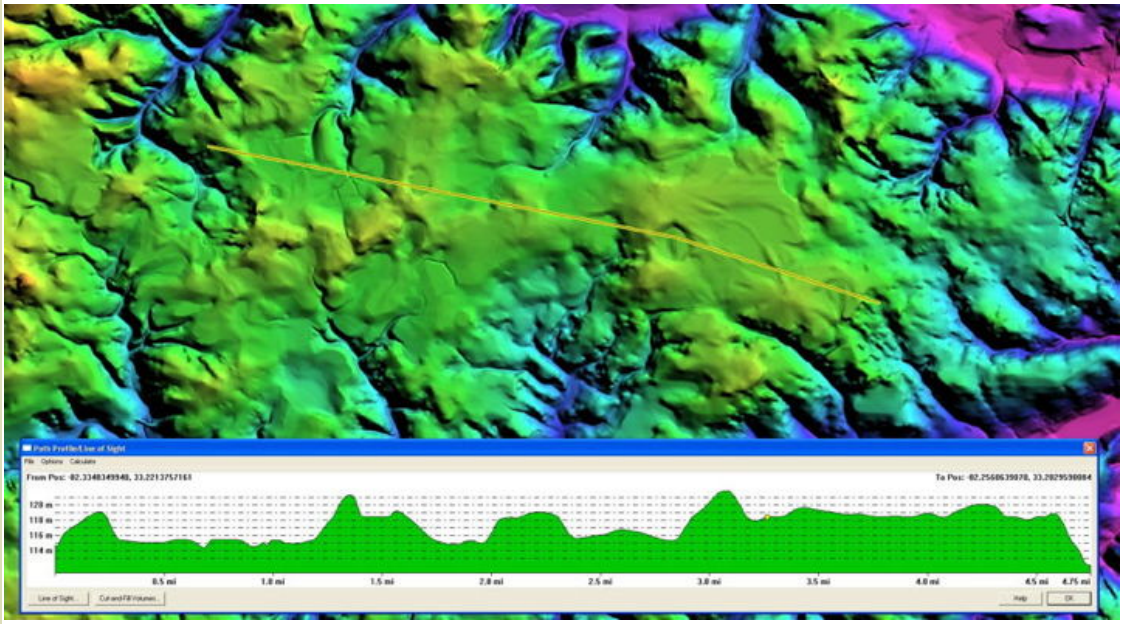
Finding Carolina bays in the Carolinas is easy, given their plentiful quantities and solid identification, but as the ejecta butterfly arc is walked northerly and southerly, the search becomes more challenging. Some of this is due to the more rounded shapes seen above Maryland and down in Georgia. An additional challenge is the increasingly rough terrain seen when moving inland from the costal plains. Our ejecta blanket sheet model suggests that the bays are present as defects (popped bubbles) in a thin layer of sandy ejecta. These can persist over the thousands of years of erosion only under special circumstances. If the landing area is relatively flat and moist, they will be easily stabilized as bays. If the area is level but very dry, the blanket will be reworked by the wind into a generic dune field, obliterating any bay formation.

When the landing field is in rough terrain, we propose it is quickly sloughed off in erosion. Any bay formations that are draped over elevations that exceed the bay's rim hight can not hold moisture for stabilization. Thus in hilly areas further inland on the east coast, we have pursued the search for bays by identifying areas which exhibit level terrain. These can usually seen as plateaus in the digital elevation maps (DEMs) we are using. The plateaus could be indications of a plateau extent present when the ejecta landed, or be merely the surviving remnants of a larger plateau that has been invaded by erosional valleys. In the latter case, we see that bays which once were stabilized were later compromised by encroaching erosional valleys.

Here is an example of the search methodology, as applied to interior Georgia. The USGS geographic information VIEWER facility is first used to retrieve elevation data for an area.The retrieved data files are loaded into the Global Mapper GIS tool for display in a Color-Ramp image. The full "Thompson" 100K block, with three circles highlighting areas that look to be flat enough to suport bay formation and survival is shown below.

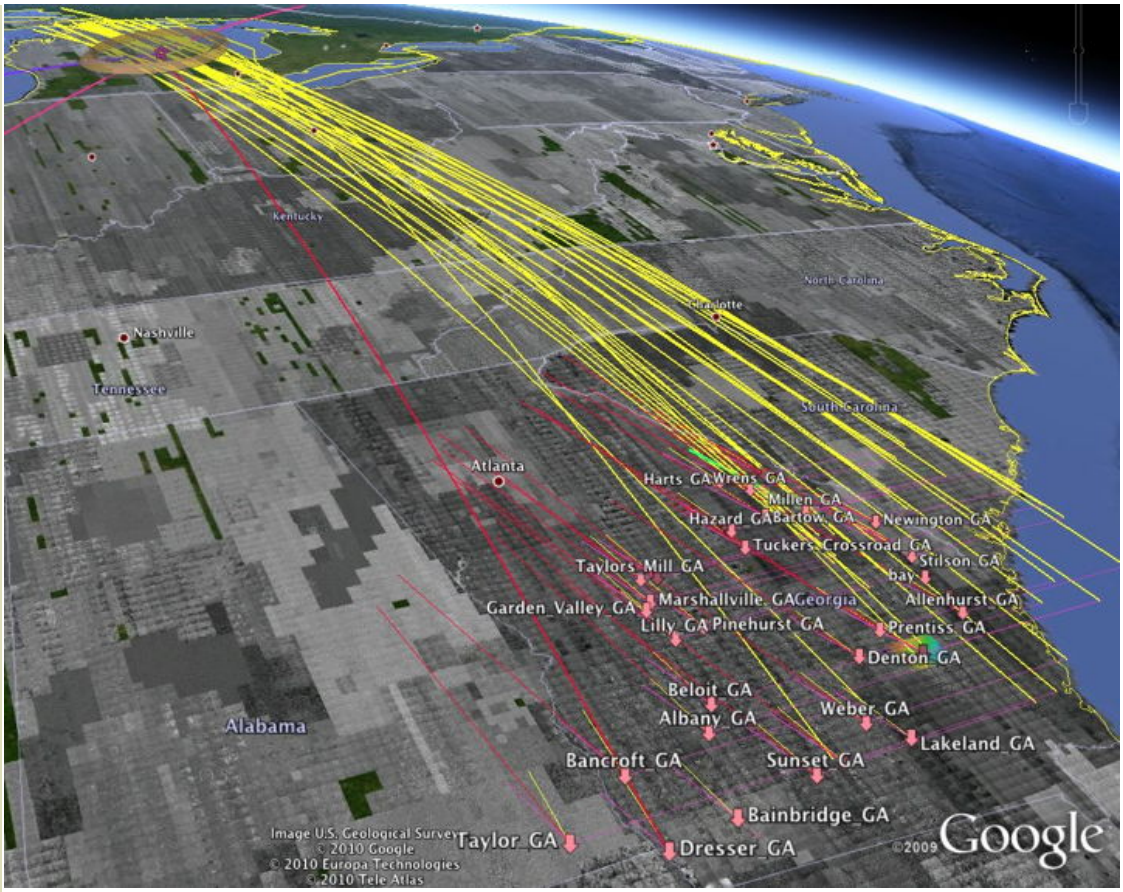


Zooming in to higher resolution view reveals the presence of oval landform shapes in the smooth surface areas. Another level of zoom, below, brings out more of these details. The Global Mapper elevation profiling tool is used to identify the terrain and validate the bowl-shaped nature of a Carolina bay possibility.



Global Mapper can export the color-ramp DEM image as a set of coordinate indexed Google Earth kmz layers. These are imported into Google Earth, where they are used to enhance the normal visual imagery. Once in place, each depression can be evaluated against the visual imagery of the location, to verify if a bay planform is present. If a correlation is found, the site can be tested with the Inferred Orientation Calculator, which will create a set of reference kml for Google Earth display and further correlation. You may note from the image above that several full-rimed ovals are present, and all exhibit roughly the same NNW to SSE orientation. Also apparent are indications of man-made drainage ditches cut into the center of several to drain them. Using Goolge Eart's imagery, and in this case, historic black and white imagery (1999), the array of aligned bay landforms is readily apparent.

The area is identified in Google Earth as being near the town of Wrens, GA. A folder of kml data is assembled for distribution as the "Wrens_GA" field. Similarly, bay suspects were located in each of the other "circled" areas in the Thompson 100K block, and a set of kml developed for each of the other two sites as well: Harts_GA and Hephzibah_GA. These three folders of kml are included in the attached kml file covering 30 fields of bays currently in our Distal Ejecta Fields index kmz file for Georgia. A similar process is used in identification of the state of Nebraska



This post is a subset of the presentation made on our web site on the Searching For Bays page.

- Michael

Attachments
UplandSearchPost.kmz (68 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: Support kml files for Upland bay Search post

Edited by Cintos (05/05/10 08:35 AM)
Edit Reason: modified links

_____
Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

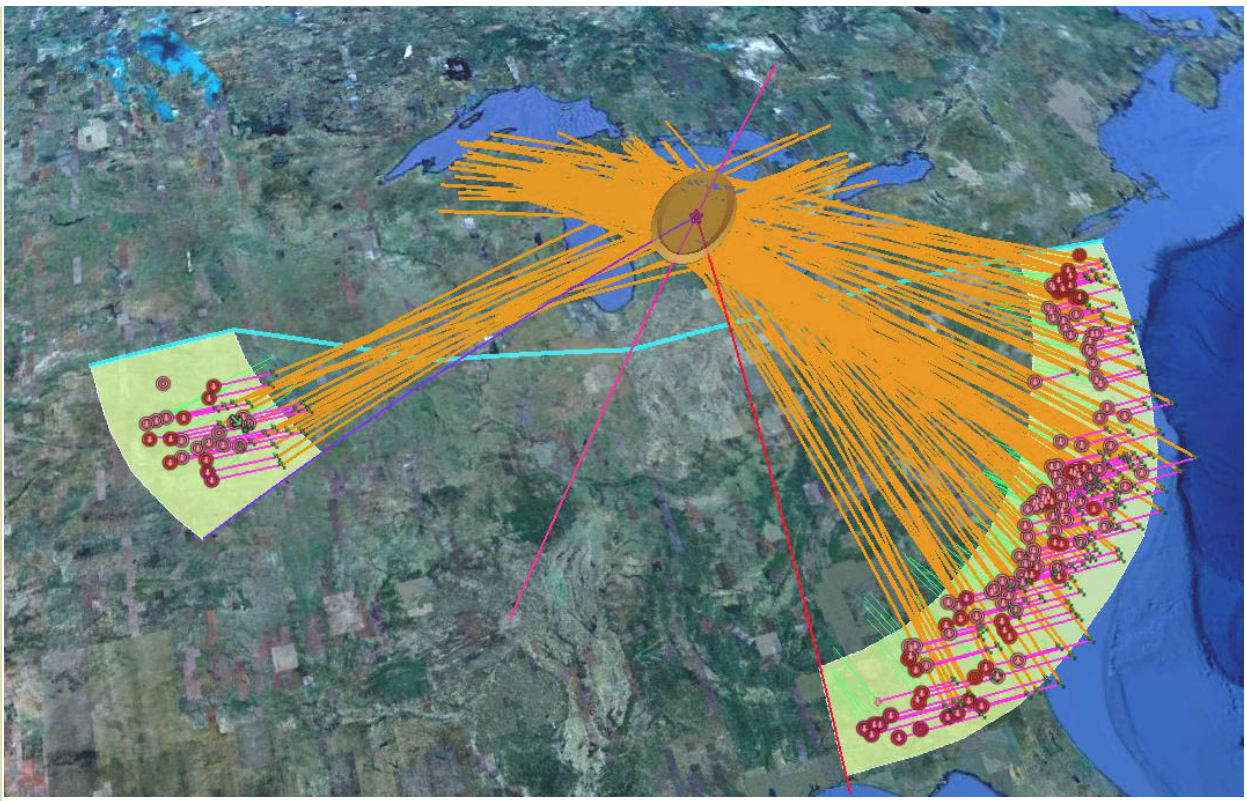
Top

Java Code Snippets [Re: Cintos] #1336264 - 05/28/10 07:32 PM

Cintos
Impactor Investigator

For starters, here is the latest Saginaw Manifold "de-skewed bearing" Portrait. The file now lists over 140 fields of bays. The attached kml file will recreate this mash-up in your own Goggle Earth instance, including our model's bearing predictions at each bay field and the "walk back" corresponding to the bay's measured inferred alignment.

Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA



Hopefully some readers have used the Bearing Calculator with some measure of success. Our motivation for providing the calculator as a web-based tool is to encourage testing of the relevance of the model by those interested in our conjecture. In addition to any Carolina bay location information you may already have access to, we refer the reader to two sources:

* Our extensive catalogue of Carolian Bay "Fields" - Distal Ejecta Fields
* An independent list of individual Carolina bays - Comprehensive SouthEastern US Crater catalog by Thomas Flores

The calculator's numerical model was truly arrived at heuristically during the production of this thread, driven by a forensic analysis of the evidence (a given bay's momentum-generated orientation) and a sense of the potential dynamic and geophysical forces at work. The variables were adjusted until all the evaluated bays' measured alignments were within the calculator's prediction values. The goal was to craft an algorithm that would predict a bay's momentum-driven alignment at any given point along the ejecta ring, which is a significantly different than addressing the simple ballistic trajectory.

I intend on documenting the java code in my model to help explain the algorithm. Allow me to use this opportunity to try some presentation methodologies for the code as it relates to the kml production. Perhaps it can be of use to others in their own kml generation programs.

This is the subroutine to calculate the great circle distance between lat1, lon1 and lat2, lon2: (convdr and convrd convert between radians and degrees)

Code:

```
private double GreatCircleDistance(double lat1, double lon1
    , double lat2, double lon2) {

 double dLat = (lat2 - lat1);
 double dLon = (lon2 - lon1);
 double a = Math.sin(dLat / 2) * Math.sin(dLat / 2) + Math.cos(lat1)
   * Math.cos(lat2) * Math.sin(dLon / 2) * Math.sin(dLon / 2);
 return (earthRadius * 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1 - a)));  }
```

Here is the code to calculate the initial bearing from lat1, lon1 towards a point lat2, lon2:

Code:

```
private double GreatCircleBearing(double lat1, double lon1
    , double lat2, double lon2) {

 double dLon = (lon2 - lon1);
```

```
  double y = Math.sin(dLon) * Math.cos(lat2);
  double x = Math.cos(lat1) * Math.sin(lat2) - Math.sin(lat1)
    * Math.cos(lat2) * Math.cos(dLon);
  double Bearing = 180 + (Math.atan2(y, x) * convrd);

  return (Bearing * convdr);
}
```

Here is a set of code to create a Google Earth path "linestring" kml element from the *forepoint* out a *distance* km, following the initial *bearing* degrees.

Code:

```
private String GEpathFromBearing(double foreLat, double foreLon,
                    double bearing, double distance) {

  final String startKML = "<LineString> <tessellate>1</tessellate> <coordinates>";
  final String endKML = "</coordinates> </LineString>";

  double farLat = Math.asin(Math.sin(foreLat) * Math.cos(distance
    / earthRadius) + Math.cos(foreLat), Math.sin(distance
    / earthRadius) * Math.cos(bearing));
  double farLon = foreLon + Math.atan2(Math.sin(bearing)
     * Math.sin(distance / earthRadius) * Math.cos(foreLat)
    , Math.cos(distance / earthRadius) - Math.sin(foreLat)
    * Math.sin(farLat));

  String foreCoord = foreLon*convrd +  "," + foreLat*convrd +  ",0 ";
  String farCoord = farLon*convrd + "," + farLat*convrd + ",0 ";

  return (startKML + foreCoord + farCoord + endKML);
      }
```

Rather pedestrian stuff. The next one is more Google Earth kml "exotic" . Returns a sting of kml to place a copy of our *Bearing Arrow* overlay at a bay site given *lat*, *lon* and *rotation*, with inputs in radians. In the caclulator, this places the bearing arrow properly rotated to reflect the predicted arrival bearing at the bay location. The math identifies the the required points for the overlay location as a 4 kilometer diagonal square using the provided placemark as the center point, by going 2 km out 45° (NE) and 225° (SW).

Code:

```
public String bearingArrowKML(double lat , Double lon , Double rotationValue ){

  double distance = 2 ; /* km for building latlon box */
  double NELat = Math.asin(Math.sin(lat)
    * Math.cos(distance / earthRadius) + Math.cos(lat)
    * Math.sin(distance / earthRadius) * Math.cos(45 * convdr));
  double NELon = lon + Math.atan2(Math.sin(45 * convdr)
    * Math.sin(distance / earthRadius) * Math.cos(lat),
      Math.cos(distance / earthRadius) - Math.sin(lat)
    * Math.sin(NELat));
  double SWLat = Math.asin(Math.sin(lat)
    * Math.cos(distance / earthRadius) + Math.cos(lat)
    * Math.sin(distance / earthRadius) * Math.cos(225 * convdr));
  double SWLon = lon + Math.atan2(Math.sin(225 * convdr)
    * Math.sin(distance / earthRadius) * Math.cos(lat),
     Math.cos(distance / earthRadius) - Math.sin(lat)
    * Math.sin(SWLat));
  Double rotationValueBox = (180 -rotationValue*convrd) % 360;
  final String kmlA = "<GroundOverlay><name>";
    /* elementName */
  final String kmlB = "</name><description><![CDATA[Bearing Arrow Overlay <br>" +
    "<a href= \"http://cintos.org/SaginawManifold/BearingCalc/index.html\"> " +
    "Bearing Calculator V 2.9 </a> <br> © Cintos 2010 ]]></description>" +
    "<drawOrder>6</drawOrder><Icon>" +
    "<href>http://cintos.org/ge/overlays/Bearing_Arrow.png</href>" +
```

```
    " <viewBoundScale>0.75</viewBoundScale></Icon><LatLonBox><north>";
  /* north lat */
  final String kmlC = "</north><south>";
  /* south lat */
  final String kmlD = "</south><east>";
  /* east lon */
  final String kmlE = "</east><west>";
  /* west lon */
  final String kmlF = "</west><rotation>";
  /* rotation value */
  final String kmlG = "</rotation></LatLonBox></GroundOverlay>";

  return (kmlA + elementName +  kmlB + NELat*convrd + kmlC
    + SWLat * convrd +  kmlD + NELon * convrd + kmlE + SWLon
    * convrd + kmlF + rotationValueBox + kmlG);
}
```

- Michael

Attachments
Ejecta_Butterfly.kml (53 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: Saginaw Impact Manifold ejecta butterfly Portrait, with field bearings and walkbacks

Edited by Cintos (05/29/10 04:20 AM)
Edit Reason: typo

_____
Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

Top

Re: Java Code Snippets [Re: Cintos] #1337567 - 06/01/10 06:34 PM

JavaGAR
Master Explorer

Registered: 10/07/06
Posts: 1104
Loc: Long Island Pine Barrens, USA

Michael:

Thanks for the Java code. It looks really useful, not only for your project, but for other projects involving geographic calculations as well.

A few questions on how to use the code follow:

Should the parameters be passed to the *GreatCircleDistance* method in radians? That seems to be the case because Java's Math methods are written to operate directly on angles given in radians.

It appears that *convrd*, *convdr*, and *earthRadius* are variables that are declared and assigned their values outside the methods that use them. Is the following what needs to be included in code in order to give them their necessary values?

Code:

```
double convrd = 180.0 / Math.PI;
double convdr = Math.PI / 180.0;
double earthRadius = 6371.0; // in kilometers, or 3959.0 miles
```

It appears that those variables could be declared, either as constants inside the methods that use them in order to make those methods self-contained - or alternatively the methods can all be placed together in a class, along with those variables, in which case the methods could each access the variables globally.

It also appears that the parameters to the *GEpathFromBearing* and *bearingArrowKML* methods should be passed in radians. Is this correct?

This is a really interesting project, and it is great that you are sharing some of the useful code with us.

_____
Best Regards,

JavaGAR

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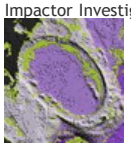
Re: Java Code Snippets [Re: JavaGAR] #1337834 - 06/02/10 03:52 PM

Cintos
Impactor Investigator

Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

Greetings JavaGAR:

Thanks for the kind words. As that was my first foray into presenting code on the BBS, I was motivated to try some presentation approaches. The only thing I could find that seemed to work was the "CODE" UBBCode tag. Any comments or suggestions you may have there would be appreciated. Also ! full disclosure ! this was my first trip into Java, being an old FORTRAN guy from the 60's. Take my approach with a grain of salt.

As you surmise, the MATH variables require radians as inputs. Your code for the conversions and earth radius are correct. The subroutines are instantiated within my main, and those are in scope throughout.

I'd like to take the opportunity to add a few more snippets. The Bearing Calculator can ingest two elements, either a Placemark (point), or the arrow overlay. While there is java code out there that handles all manner of tags, I kept it simple and just coded what I needed.

A separate "latLon" class was created to carry the metadata for a location, and did set some default values. I have only created a few children, but eventually I may expand the code to create an array of them as the program is used. When the values Lat & Lon are set using degrees , the routine creates the radian versions lat & lon. (note my hinting: upper case = degrees, lower = radians)

Code:

```
/**
 * Identifies a Google Earth Placemark object on the earth's
 * surface at the supplied latitude / longitude; altitude= 0
 */
public class latLon {

 static final double PI = 3.141592653589793;
 static final double convdr = PI / 180., convrd = 180 / PI;

 double Lat = 45.0;
 double Lon = -80.0;
 Double lat = Lat * convdr;
 Double lon = Lon * convdr;
 String LonLatGE = Lon + ", " + Lat + ", 0 ";

 void latLonSet (Double latNew, Double lonNew){
     Lat = latNew;
     Lon = lonNew;
     lat = Lat * convdr;
     lon = Lon * convdr;
     LonLatGE = Lon + ", " + Lat + ", 0 ";
      }
}
```

A "bay" location is instantiated, along with the Coriolis target location and a pair used in the arrow overlay box kml in the previous post.

Code:

```
latLon bayLoc = new latLon ();
 latLon tgtLoc = new latLon ();
 latLon arrowBoxNE = new latLon ();
 latLon arrowBoxSW = new latLon ();
```

To parse the placemark or an arrow overlay, I first walk through the input kml text for the for the existence of a either point or arrow,

Code:

```
static  String point = "<Point>";
static  String lineSting = "<LineString>";
static  String comaDelim = ",";
static  String coOrdinates = "<coordinates>";
```

```
static  String placeName = "<Placemark>";
static  String latLonBox = "<LatLonBox>";
static  String nameDelim = "</";
static  String nameFlag = "<name>";
static  String northFlag = "<north>";
static  String southFlag = "<south>";
static  String eastFlag = "<east>";
static  String westFlag = "<west>";
static  String rotationFlag = "<rotation>";

userPoint = false;
userArrow = false;
linePos = inKML.indexOf(point)  ;
if (linePos != -1) {   /// do user point option
     userPoint = true;
     int placemarkPt = inKML.indexOf(placeName );
     int namePtr = inKML.indexOf(nameFlag, placemarkPt );
     namePtr = namePtr + 6;
     int nameEnd = inKML.indexOf(nameDelim, namePtr);
     elementName = inKML.substring(namePtr, nameEnd);
     pointCaseCoordinates (linePos);

}  else {
linePos = inKML.indexOf(latLonBox)  ;
if (linePos != -1) {   /// do user point option
     userArrow = true;
     int namePtr = inKML.indexOf(nameFlag );
     namePtr = namePtr + 6;
     int nameEnd = inKML.indexOf(nameDelim, namePtr);
     elementName = inKML.substring(namePtr, nameEnd);
     arrowCaseCoordinates (linePos);
} else  {
          elementName = " No Name";
        }
}
```

I check for which type was pasted in by the user (point or arrow). In the point case I then pass the start position to a routine to pull the lat & lon out, placing those values into the bayLoc latLon container using latLonSet.

Code:

```
private void pointCaseCoordinates (int linePos) {
Double lat1, lon1;
int cordPosition = inKML.indexOf( coOrdinates , linePos)  ;

int lon1Start = cordPosition + 13;
int comaPosition = inKML.indexOf(comaDelim, lon1Start) ;
lon1 = Double.valueOf(inKML.substring(lon1Start, comaPosition) );

int lat1Start = comaPosition + 1;
comaPosition = inKML.indexOf(comaDelim, lat1Start) ;
lat1 = Double.valueOf(inKML.substring(lat1Start, comaPosition) );

bayLoc.latLonSet(lat1.doubleValue(), lon1.doubleValue() );
}
```

After setting, I can simply read values as radians or degrees as fits the need.

Here is the code to extract meta data from the arrow overlay kml in the arrow case. Most important is the "rotation" data Google carries along for the overlay. I created the png file for the overlay with the arrow pointing straight up, and Google Earth tracks the angle as the overlay is rotated. Neat... :

Code:

```
private void arrowCaseCoordinates (int linePos) {
```

```
Double LatNE, LonNE, LatSW, LonSW, rotation;
int coordPosition, coordEnd;

//north
coordPosition = inKML.indexOf( northFlag , linePos) ;
coordEnd = inKML.indexOf(nameDelim, coordPosition);
LatNE = Double.valueOf(inKML.substring(coordPosition + 7, coordEnd) );

//south
coordPosition = inKML.indexOf( southFlag , coordEnd) ;
coordEnd = inKML.indexOf(nameDelim, coordPosition);
LatSW = Double.valueOf(inKML.substring(coordPosition + 7, coordEnd ) );

//east
coordPosition = inKML.indexOf( eastFlag , linePos) ;
coordEnd = inKML.indexOf(nameDelim, coordPosition);
LonNE = Double.valueOf(inKML.substring(coordPosition + 6, coordEnd ) );

//west
coordPosition = inKML.indexOf( westFlag , coordEnd) ;
coordEnd = inKML.indexOf(nameDelim, coordPosition);
LonSW = Double.valueOf(inKML.substring(coordPosition + 6, coordEnd ) );

arrowBoxNE.latLonSet( LatNE.doubleValue(), LonNE.doubleValue() );
arrowBoxSW.latLonSet( LatSW.doubleValue(), LonSW.doubleValue() );

bayLoc.latLonSet((arrowBoxNE.Lat + arrowBoxSW.Lat)/2, (arrowBoxNE.Lon + arr

//rotation : note that provided bearing is counterclockwise ...
coordPosition = inKML.indexOf( rotationFlag , coordEnd) ;
coordEnd = inKML.indexOf(nameDelim, coordPosition);

rotation = Double.valueOf(inKML.substring(coordPosition + 10, coordEnd ) );
BayBearingFromArrow = (360.0 - rotation.doubleValue()) % 360 ;
}
```

Looking at my full code base, you'd probably note that a lot of time is spent going from degrees to radians and back, as required for the kml exchange back and forth with Google Earth. You would also note that trig functions expect radial values from -180 to +180, while bearings are done from 0 to 360. ugh.

Another great hardship is that while I can decompose a bearing angle of 135° easily enough with sin and cos, if I try to recompose with same results using acos, you won't get 135.... When I read a bearing, I immediately divide by 90 to yield a "quadrant" (0,1,2,3) to be used to recompose a bearing after adjusting it.

- Michael

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Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

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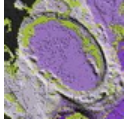
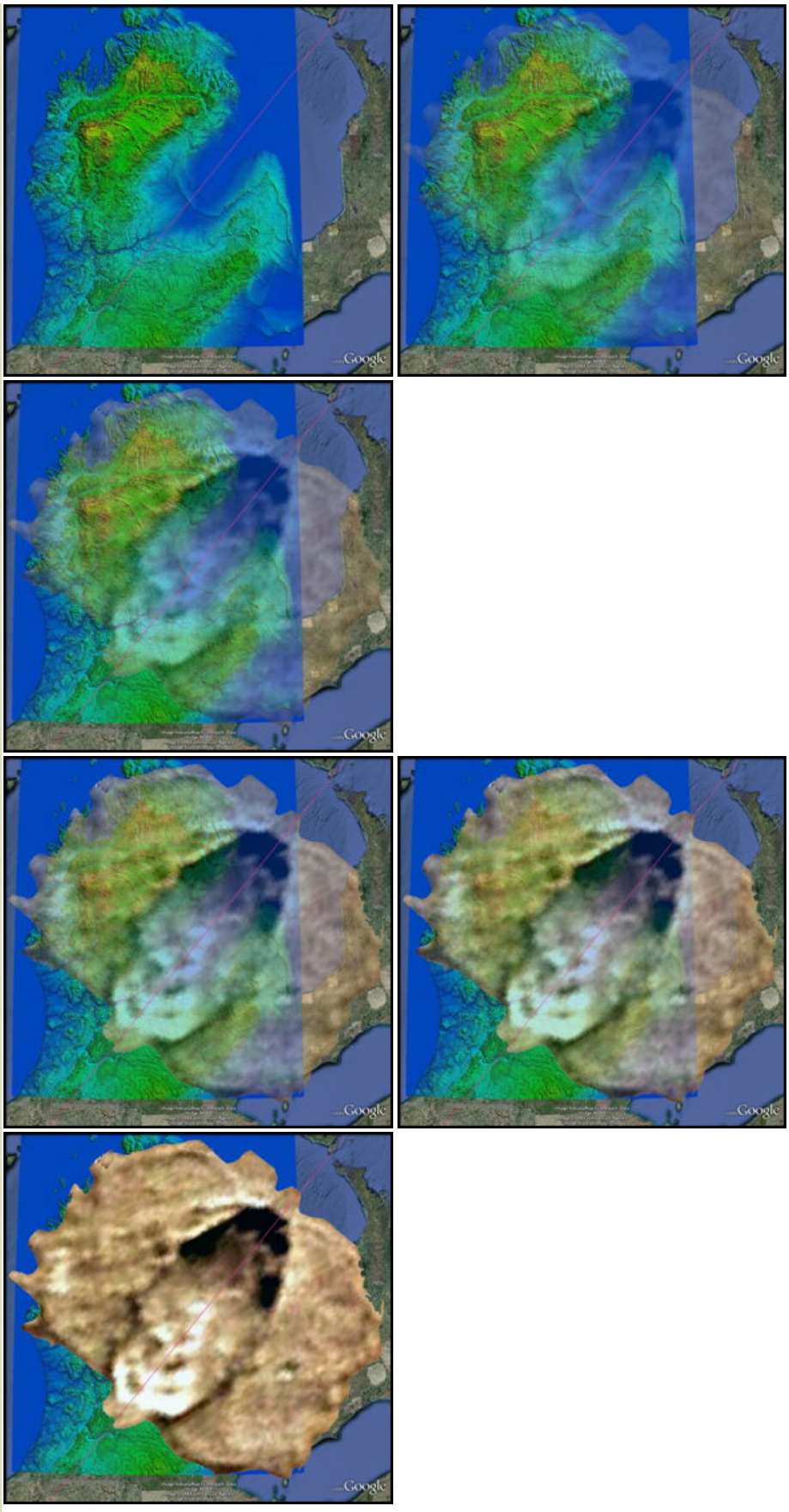
Comparing Mars Crater to Saginaw [Re: Cintos] #1338865 - 06/06/10 10:20 AM

Cintos
Impactor Investigator

Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

Greetings:

OK, I don't know the full scientific relevance of this discussion, all I know is that the comparisons here are kinda spooky. Early in my oblique impact research, I came across an example crater on Mars which presented the oval shape and butterfly distribution of local ejecta. The overlay has been available in our published kml for some time, shown in the Research_Overlays.kmz file, for example.

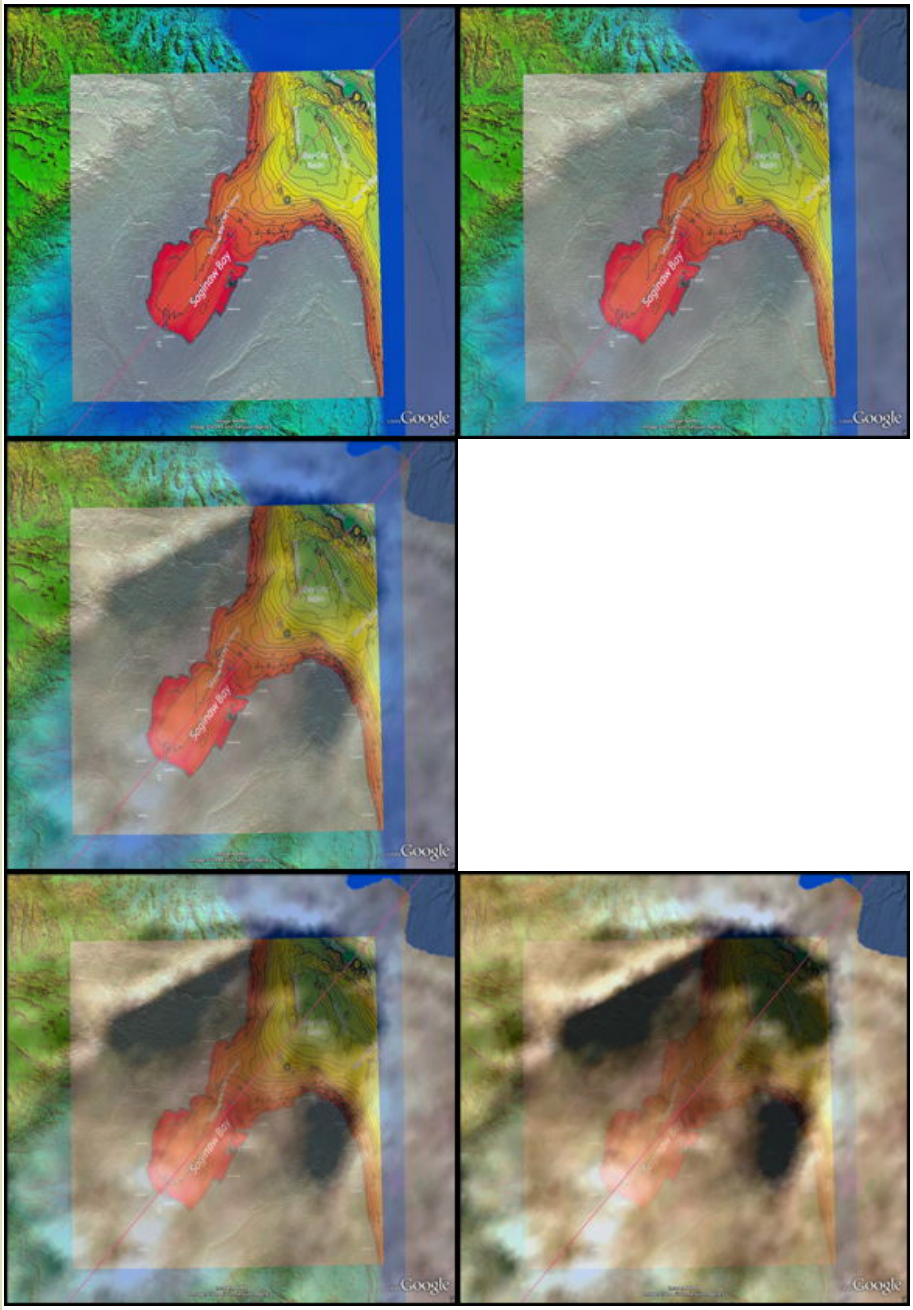
This Martian crater departs from a pure oval shape along some of its rim, and perhaps by pure coincidence, so does the topography of the Saginaw Bay area....in the same areas! Here are 6 images showing the Google Earth view of Saginaw, with an overlay showing a color ramp elevation DEM, along with the Mars crater overlay (adjusted for orientation and size to match), while changing the transparency of the latter.

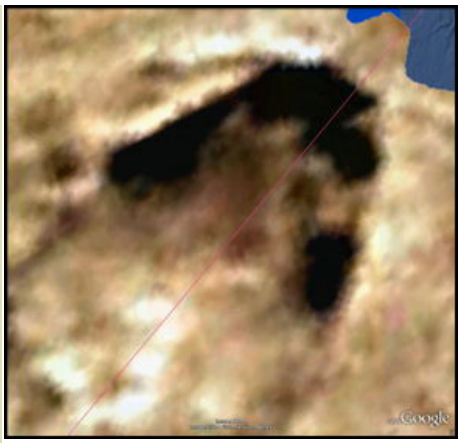


Along with the correlation along the rim, the general land mass of northern lower peninsula seems to bear the traces of

the ejecta spray. Lake Huron, of course is excised by the glacial flow known to have passed thought that area. Note how the Mars flow stops "at" the northern Lake Erie shoreline...
Certainly, just a coincidence.

Another comparison can be seen in the Lake Huron bathymetry overlay (courtesy NOAA), when compared with the Mars overlay. One characteristic of shallow, oblique impact craters is that the deepest excavation is right at the uprange opening of the crater. Here, that aligns with the Bay City Basin.





Once excavated into a 2km-thick sheet of ice, we expect the "crater" to have filled with water and eventually drained south-west catastrophically as the Kankakee Torrent and CKRV episodes. Glacial incursions across the crater floor from the Huron Lobe would explain the current glacial moraines along the Bay shoreline seen today.

The attached kmz file includes the three overlays and the azimuth line, so the viewer can open these in Google Earth, and using the Get_Info/Edit > Transparency slider, adjust the overlays to see the correlations shown above.

- Michael

Attachments
Saginaw_Crater_vs_Mars_Overlay.kml (29 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: kmz file containing overlays for discussion: mars oblique crater w/butterfly ejecta, Michigan LP DEM (USGS) color ramp, Huron/Saginaw bay Bathy (NOAA)

Edited by Cintos (06/06/10 01:12 PM)
Edit Reason: typos

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Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

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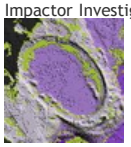
New High Resolution LiDAR from Nebraska [Re: Cintos] #1341250 - 06/15/10 11:29 AM

Cintos
Impactor Investigator

Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

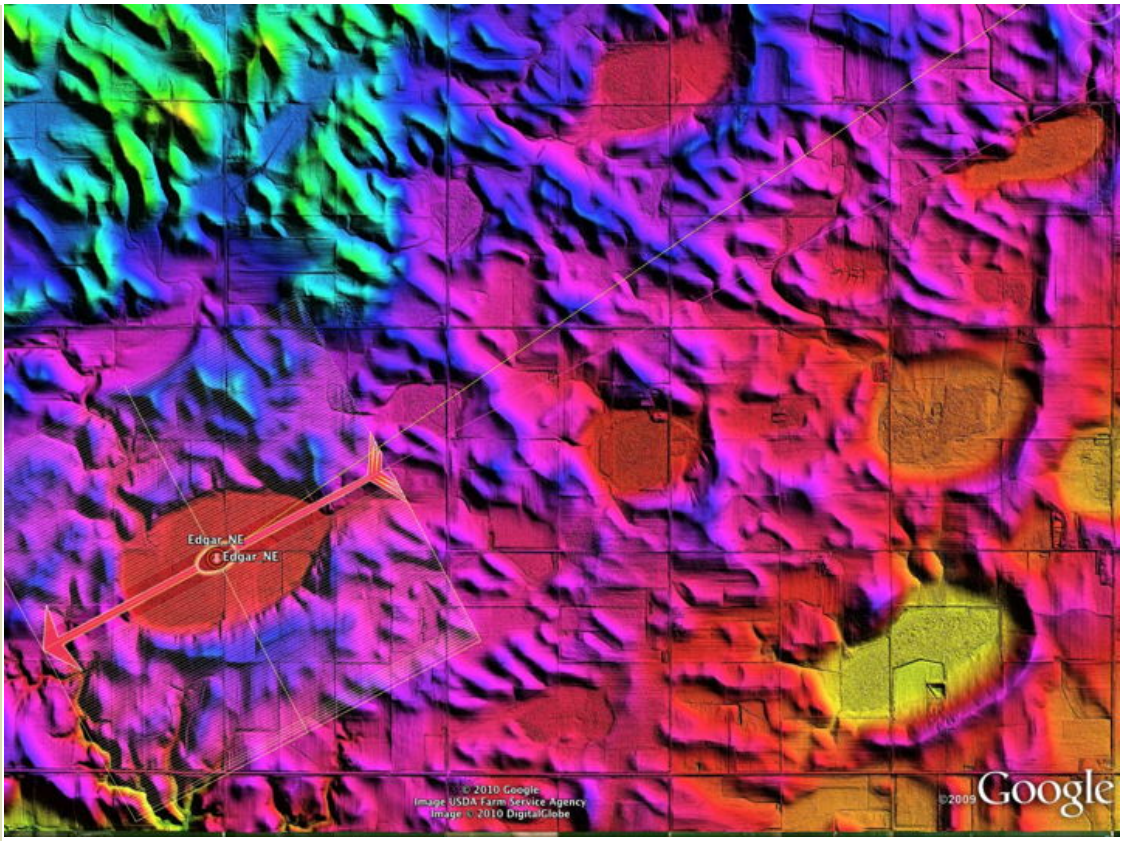
Greetings:

The fine folks at the Nebraska Department of Natural Resources (DNR) have just released a treasure trove of high resolution LiDAR data grids for public consumption . The coverage area is south of the North Platte, and covers about 50% of the bays we have examined using USGS 1/3 arc second National Elevation Database files.

The volume of data is enormous, given its 2x2 meter grid with elevation resolution of tens of cm. This gives us to opportunity to identify smaller basins and to see the larger bays in finer detail. I'd like to share a few early "discoveries".

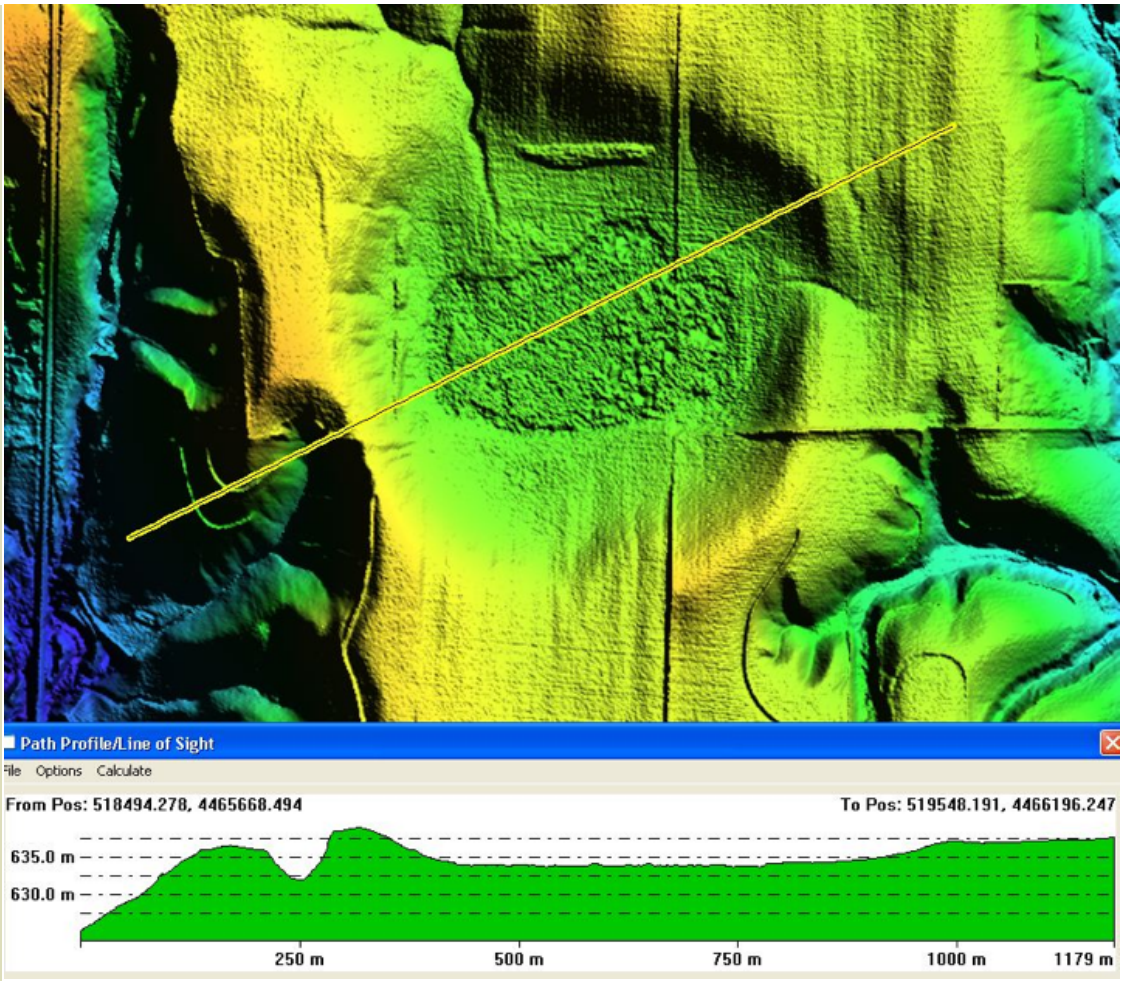
Sand dunes and ridges are commonly found across the Nebraska landscape, and we see these dunes and ridges as over-printing the structural basins. We speculate that the bay depressions were created upon ejecta deposition sometime prior to 25kya. Since that time a significant blanket of late Wisconsin glacial loess have been deposited, rounding off the sharp edges of the bay rims. In some ares local dunes have breached the landforms, but the underling structure continues to show through.

An area near Edgar, NE, shows the dune activity. The bays are oriented at right angles to the prevailing winds, and the dunes and ridges are slowly but surely migrating into the image from the upper left (north is @ top)

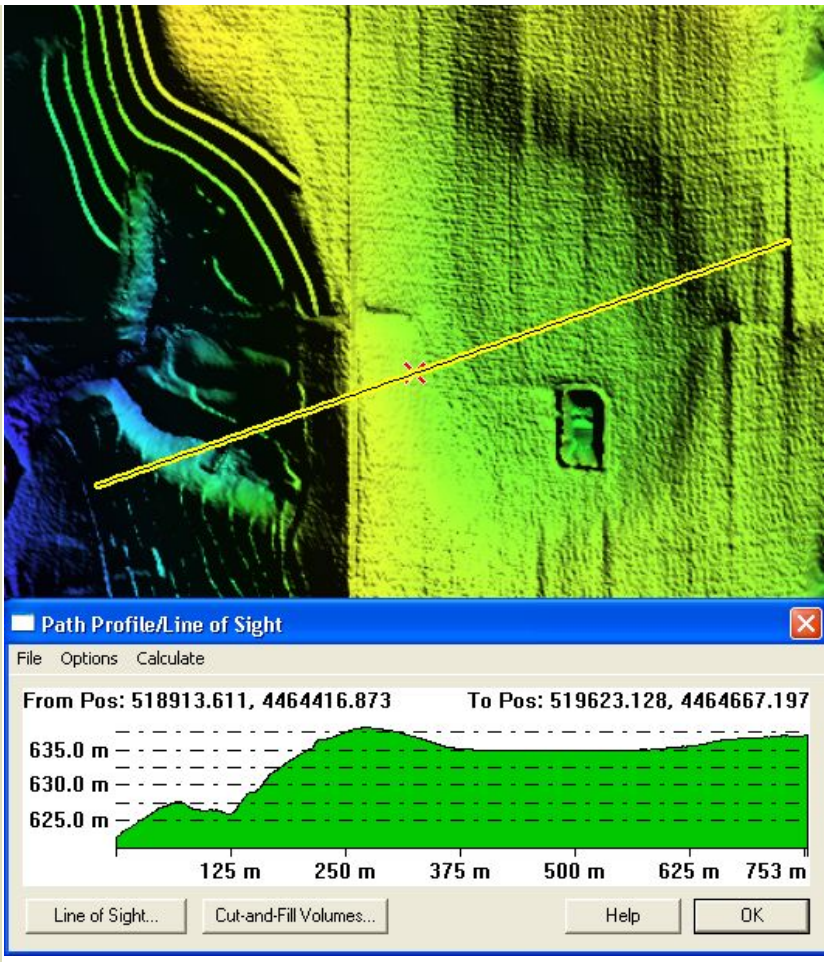


We speculate that much of the sand in the Nebraska Sand Hills was originally deposited as distal ejecta during the Saginaw Manifold, but has been compromised by this activity over the past 25 thousand years.

We view this next local with great interest. The Nebraskan bays have been overlain by many meters of late Wisconsin loess, rounding off the edge of their rims. In the Campbell area, there are two bays that have been eroded at one end by a stream, which removed the loess and exposes some of the original rim. This site would be an excellent candidate for additional ground research.



DIrectly south is another, and in both cases the lower left end of the underlying basin structure is visible.



KML to visualize these two areas from within Google Earth are in the attacked kmz file.

More on the Nebraska bays can be seen on our web site.

Attachments
Nebrsaka_Bays_vs_Dunes.kmz (27 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: KML elements to view Bays vs. Dunes discussion.

Edited by Cintos (06/15/10 12:39 PM)
Edit Reason: typo

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Men occasionally stumble over the truth ... but most of them pick themselves up and hurry off as if nothing had happened.
..... Winston Churchill

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