Inferred Orientation of Distal Ejecta

#1283658 - 12/03/09 11:32 AM

Cintos
Traveler

Registered: 01/27/06
Posts: 80
Loc: Connecticut, USA

Greetings:

Our post here is to explain the conceit we leverage in our evaluation of the Carolina bays. This is our first post in our presentation of our proposed Younger Dryas Boundary Manifold.The thread has been expanded as the trial-and-error approach we are taking proceeds. We encourage new readers to participate by reading each post in sequence.

Our "Perigee:Zero" conjecture holds that the Carolina bays structures are surface features in energetically deposited, highly hydrated, distal ejecta from a cosmic impact. A challenging aspect of the commonly proposed relationship between the bays and a cosmic impact involves the lack of an identifiable impact structure.

Most attempts at following the inferred orientation of the bays back up the trajectories' bearing have failed to produce a focus. We propose this to be caused by at least two variables not considered. First, that the impact may have been a "train-of-craters" event, which would infer a chaotic focus, and secondly, that the earth rotates during any realistic ejecta loft time, which we attempt to evaluate with the attached kml file. A third variable is the proper accounting for the west-to-east ground-velocity vectors that will be resolved when the ejecta strikes the earth. We will discuss that later; they are measured in m/sec vs km/sec, but were interacting with the relatively slow terminal velocity of the ejecta as it traversed the atmosphere and therefore will prove to be vitally important to the numerical model.

Shoot at where the target will be, not where it is right now

During the time period extending from the moment of the source impact to the eventual deposition of the distal ejecta, we see the de-coupling of the spatial coordinate reference systems in multiple dimensions. The decoupling is driven by the spherical nature of the "playing field" when trajectories cover significant distances. The common term applied to the effect is the Coriolis Force, which is a kinematic force applied to an object to "force" it along a great circle route as a object proceeds along its trajectory. For example, if an object is launched with sufficient velocity on an azimuth of 90 degrees from latitude 45 north (i.e. due East), it will follow a great circle route as it begins to "circle" the earths spherical surface. The cartesian coordinate "bearing" of our example object begins to "turn" south, and eventually the object will cross the equator on an azimuth 45 degrees increased, or 135 degrees. But the above analysis does not account for the fact that the earth is also *rotating* during any real-world loft trajectory period.

Here we will evaluate the effect on the cartesian cordinate system of azimuths and bearings when the Earth's rotation is considered. The Google Earth facility is employed with the attached set of kml.

During the 12 minute loft time we are modeling in this post (and attached kml), the Earth will rotate three (3) degrees of longitude from the west to the east (regardless of your location on the earth). Therefore, the landing location of the ejecta will actually be three degrees westward of the initial "target".

When the ejecta is deposited at the eventual location, it will still bear the original flight azimuth/bearing. If those geometries are followed back along the trajectory, the focus will be on a location three degrees west of the original launch location. Thus, we feel justified in applying the conceit that, from the perspective of the distal ejecta landing site, the inferred bearing would point back to a suragate impact crater. The suragate would offset on the global map by one degree of longitude westward for every four (4) minutes of loft time.

Please consider, also, that the loft time is a variable affected by both the launch velocity and its loft angle. A trajectory can be generated for a given landing location using shallow lofts (and short transit times) as well as higher loftings which would take longer to get to the same location.

- Michael

Attachments
20091203073731-4b17db3bce8f82.70378714.kmz (173 downloads)
Preview this file with the Google Earth Plugin (learn more)

Edited by Cintos (03/01/10 09:20 AM)
Edit Reason: numerical model update

"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

Top | Edit | Reply | Quote | Report | Email Post

Re: Inferred Orientation of Distal Ejecta [Re: Cintos] #1283786 - 12/03/09 04:46 PM

Hill
Master Guide

Registered: 11/01/04
Posts: 10668
Loc: Los Angeles, California

Cintos' post refers to the study of the reasons for the origin of the Carolina Bays. There is a thread about the bays and other evidence concerning their origin here.

Edited by Hill (12/03/09 04:47 PM)

A Pale Blue Dot: Earth from *Voyager 1* at a distance of about 4 billion miles.

Top | Reply | Quote | Report | Email Post

Surrogate Distal Ejecta Sources in Google Earth [Re: Cintos] #1284033 - 12/04/09 11:00 AM

Cintos
Traveler

Greetings:

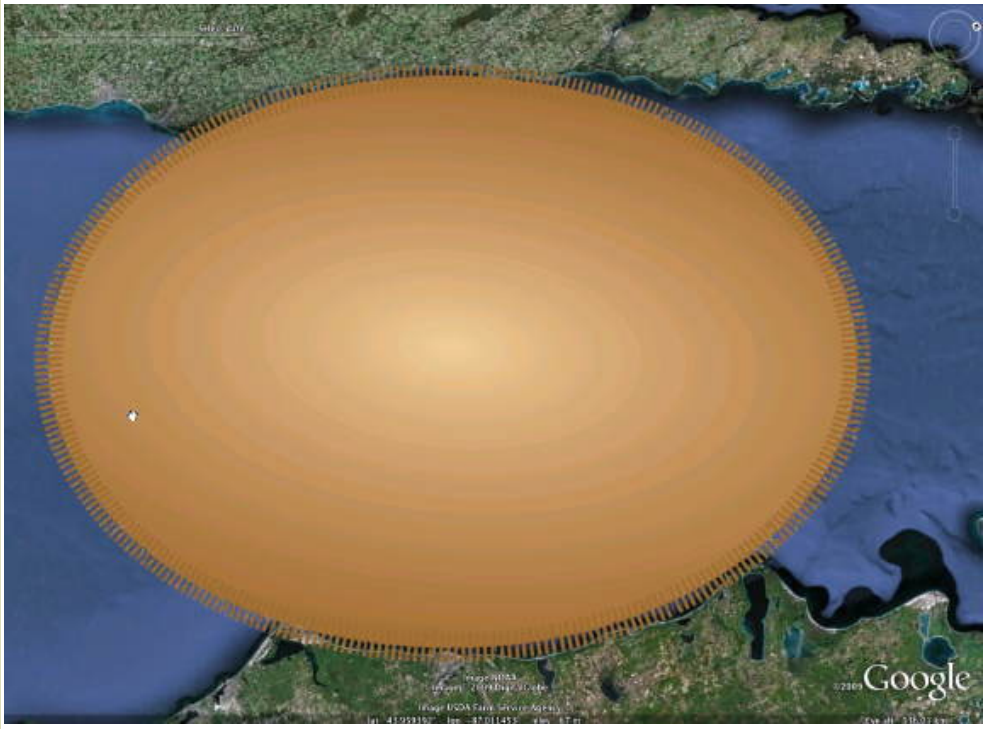
Registered: 01/27/06
Posts: 80
Loc: Connecticut, USA

Our initial post provides justification for the positioning of a "surrogate" crater on the globe to account for the earth's rotation during ejecta loft time. This post will discuss the identification of the "train of craters" forming our Lake Michigan impact crater, and the rational behind the selection of surrogate craters for test fitting in Google Earth.

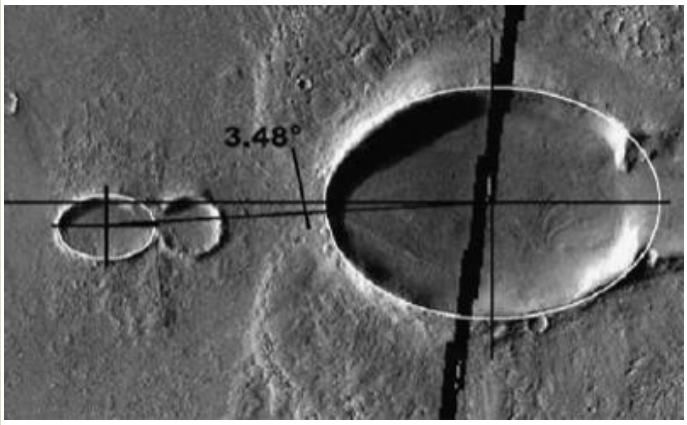
For many decades, maps have been drawn which attempt to identify the source of the Carolina bays by using the inferred long-axis orientation of the various bays as an arrival bearing. Drawn of "flat" maps, those attempts failed to account for the fact that the flight path of any meteor, shock wave or ejecta product would not show up on a projected map as a straight line, but rather be a curve following a great circle route. Hill previously posted the classic map from the Eyton & Parkhurst paper in the associated thread HERE.

Google Earth allows for the creation of true great circle lines using the "Add>Path", or by programmatic creation of the appropriate kml. A quick test of paths drawn back from numerous Carolina bays confirms the general trend to the north-west.

Heuristically, we chose to test fit against a set of ejecta sources in the Lake Michigan basin. The attached kmz file contains an overlay [OvalObliqueCrater] created to represent a low-angle-of-incidence, "oblique", oval crater structure. Please take the opportunity to use the model to perform your own "test fit" into the lake's many basins.



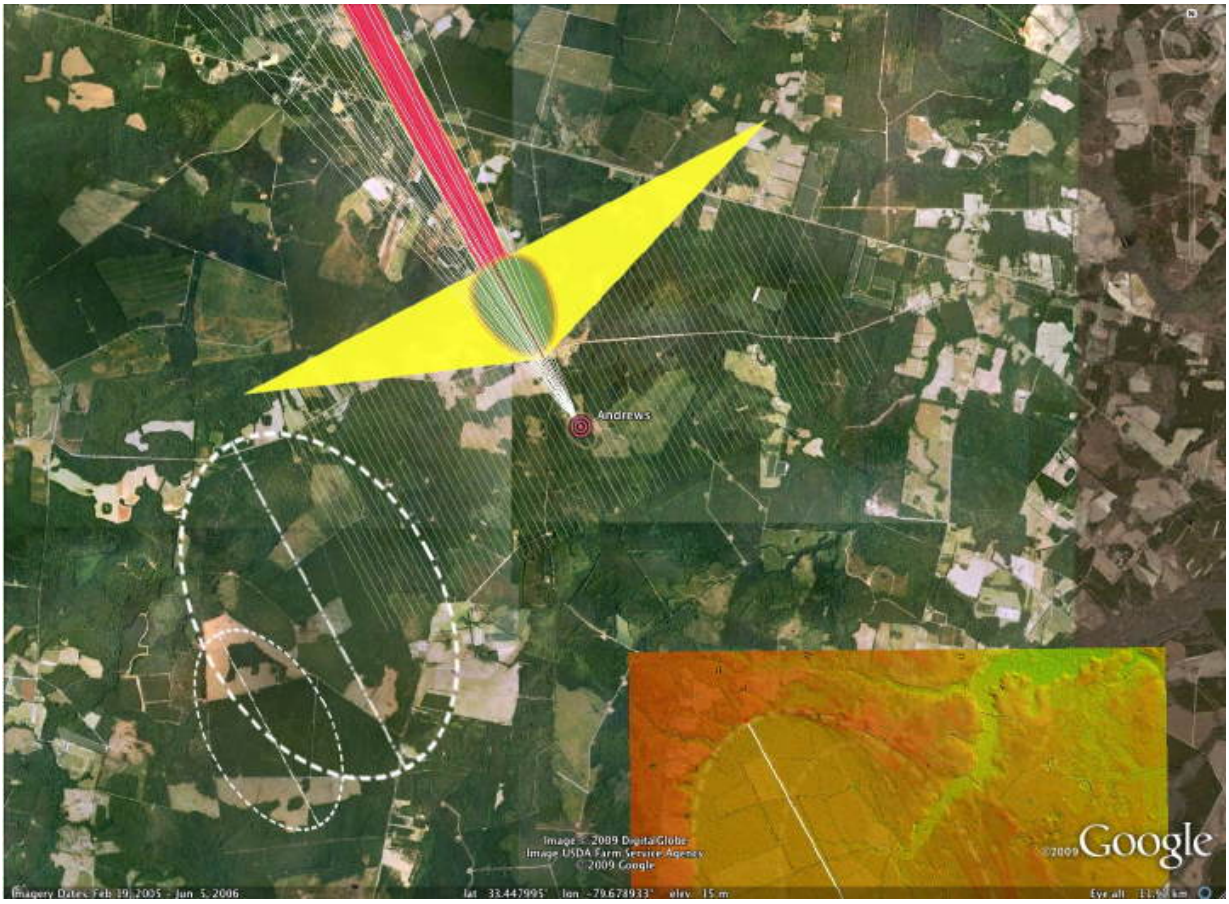
Why oval? Craters are circular, right??? Elliptical craters with "butterfly" ejecta patterns make up roughly 5% of the total crater population of terresterial planets and moons. They are caused by impactors which hit the surface at oblique, or very shallow angles, such as this one from Mars:



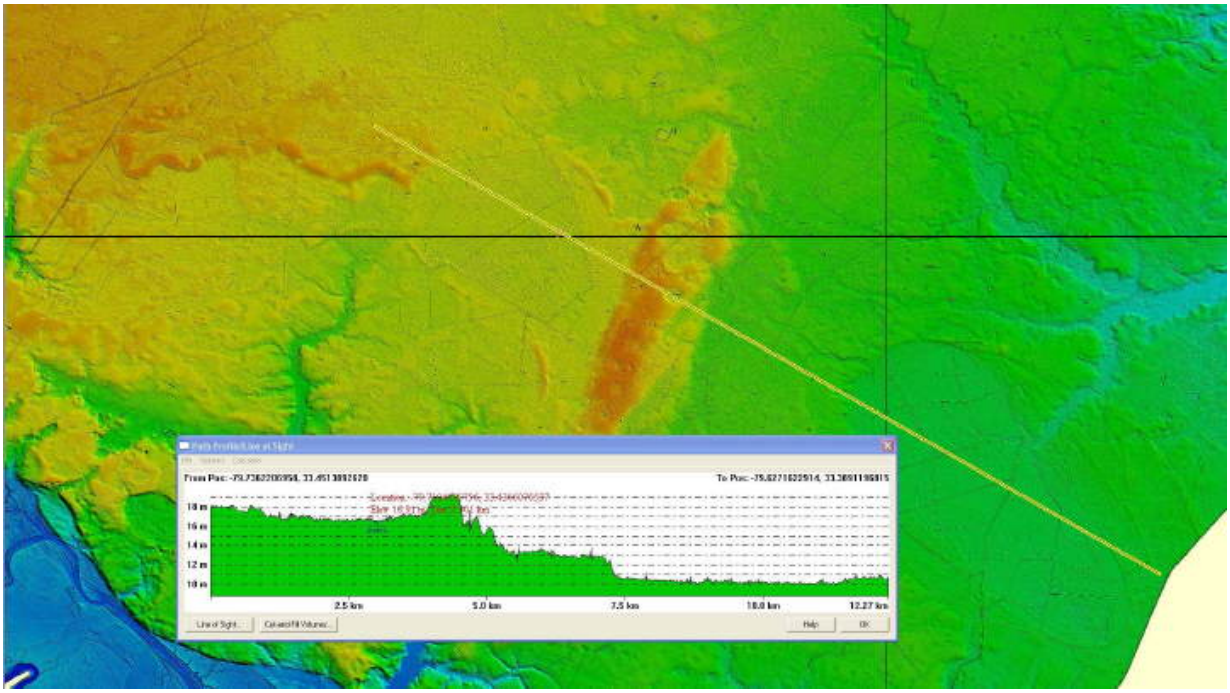
A vitally important detail of this lateral ejecta pattern is how well it fits into our proposed distribution of ejecta, both eastward and westward. This topic is discussed in more detail on our web page Oblique Impact.

Using the model, we identified seven (7) placemarks [LM_A through LM_G in the attached kml] to use as proposed impact "sources". Using our surrogate crater conceit, we generated an additional seven placemarks offset to the west by 2 degrees longitude corresponding to a loft time of eight (8) minutes. Another set was created to test for loft times of 16 minutes, for a total of 21 placemarks, available in the kml.

For a select set of about 30 "fields" of ejecta, we created kml to depict the Carolina bay features, and identify their inferred orientation with a "Bearing Grid" overlay. A set of Great Circle GE paths were created from the field location back to each of the 21 LM-xxx positions identified above. The attached kml includes the details of the "Andrews" field, as well as a folder of its 21 Coriolis paths. Using the bearing grid overlay, several Coriolis paths which best fit the visualized orientation were selected. From that subset, an optimized path [GC Andrews Optimum Coriolis Offset] was generated that uses an average of the possible surrogate impact locations' latitude and longitude.



The Andrews Field kml includes outline overlays of multiple Carolina bays, DEM color-hinted elevation mappings in overlay form, and output from Global Mapper that displays the elevation profile along a sample path through the ejecta field. Note that the adjacent bays were created at several elevations. Our conjecture that the bays are surface features in a thin 1- 10 meter thick blanket overlaying the original terrain is supported by this evidence.



In our next post, we will discuss our current visualization of the Lake Michigan "Crater" and it's possible implication in the Younger Dryas Boundary (YDB) Impact Event.

Attachments
EjectaSourcePost.kmz (106 downloads)

Preview this file with the Google Earth Plugin (learn more)Description: Support kml for discussion

Edited by Cintos (01/01/10 05:31 PM)
Edit Reason: update link

_____
"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

Top

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Visualization of the Proposed Lake Michigan Crater [Re: Cintos] #1285017 - 12/07/09 06:01 PM

Cintos
Traveler

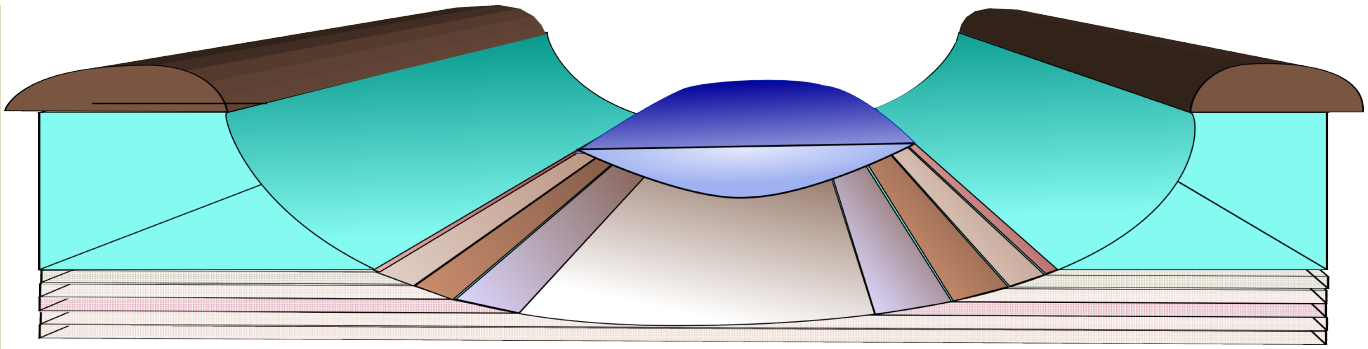
Registered: 01/27/06
Posts: 80
Loc: Connecticut, USA

Greetings:

Our two previous posts discussed how we arrived at using the Lake Michigan Basin as a proposed crater, from which ejecta was thrown across the continent. The concept is being developed for presentation at the Fall 2009 AGU meeting's *Younger Dryas Boundary: Extraterrestrial Impact or Not?* session. Subsequent to the AGU Meeting last month, our proposed YDB impact crater in the Lake Michigan area has been dismissed in favor of a more interesting candidate slightly to the east, in the Saginaw Bay area.

This particular post is being edited to reflect the change in our Heuristic Hunt, moving on to the Saginaw area, and we will discuss that investigation beginning with the Crater Hunt II post, below.

One of our premisses is that the area was covered 13,000 years ago by a 1-2km thick sheet of ice from the last glacial period. Thus, any crater would be cut more from the ice sheet than from the lake basin, as it is less than 500 meters deep - rather shallow as craters go, even oblique ones. Here is a graphic created to explain the strata which the crater was cut into. Vertical scale is greatly exaggerated!



It is quite appropriate to note that Lake Michigan has provenance as a glacially-carved companion to Lake Huron, as they both exist on the circumference of the Michigan Basin. That subsidence is centered below Michigan's land mass proper, not below the Lake; the strata under the body of the lake is understood to trend slightly down west to east across the entire width of the Lake. A significant body of knowledge holds that the Michigan basin is a simple (although "poorly understood" -USGS) geological depression in the earth's crust, which dragged down the overlying Cambrian, Ordovician and Silurian sedimentary strata (originally laid down horizontally), likely falsifying our conjecture.

Other obvious difficulties with attempting to cast Lake Michigan as an impact structure include, among other things: the current understanding of glacial ice sheet retreat has removed most of its bulk from above Lake Michigan prior to a YDB 12.9 kya timeline; older carbon dating of moraines in south of Lake Michigan suggest a geometric shape of the current Lake Michigan southern bowl; the depth of the crater is only 10% of what could reasonably be expected - even considering a 2k ice sheet cover.

In our next post, we will provide an "INDEX" kml that shows the 30-some Carolina bay sites with links for retrieving more detailed kml for each individual ejecta field, one at a time.

Best wishes,
Michael

Edited by Cintos (02/21/10 06:04 PM)
Edit Reason: Remove outdated kmz

_____
"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

Top

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Carolina bay Field Indexes [Re: Cintos]

#1285084 - 12/08/09 12:30 AM

Cintos
Traveler

Registered: 01/27/06

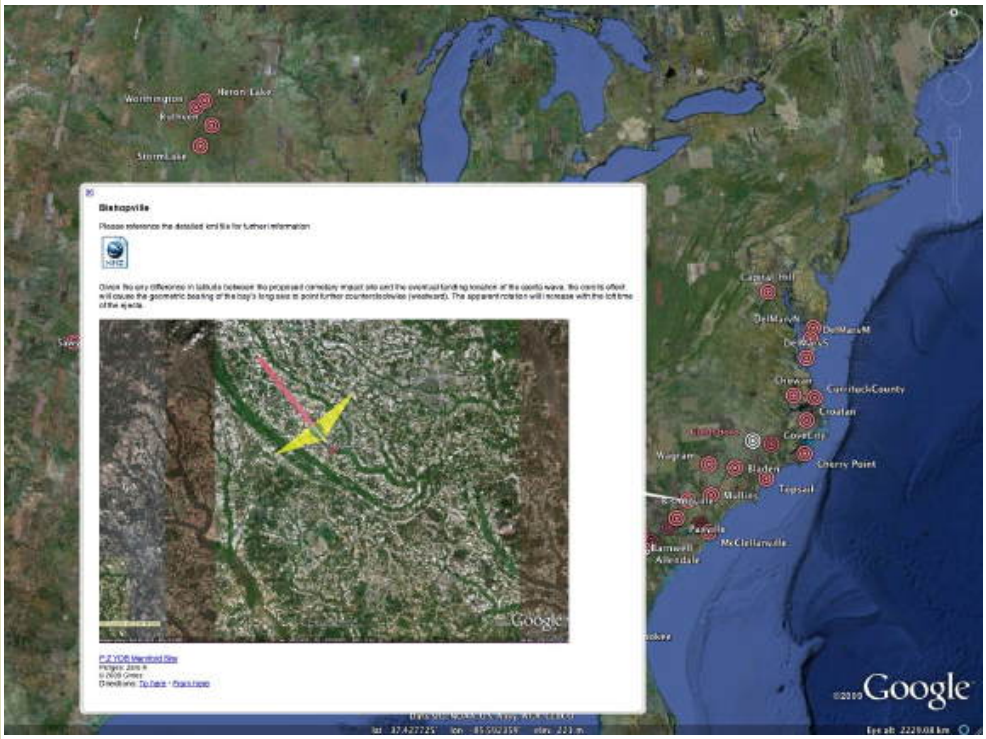
Greetings:

This research has been proceeding heuristically, and such a trial-and-error hunting expedition is hard to present in a logical sequence. We have shared the crater identification, now we will try to support the selection.

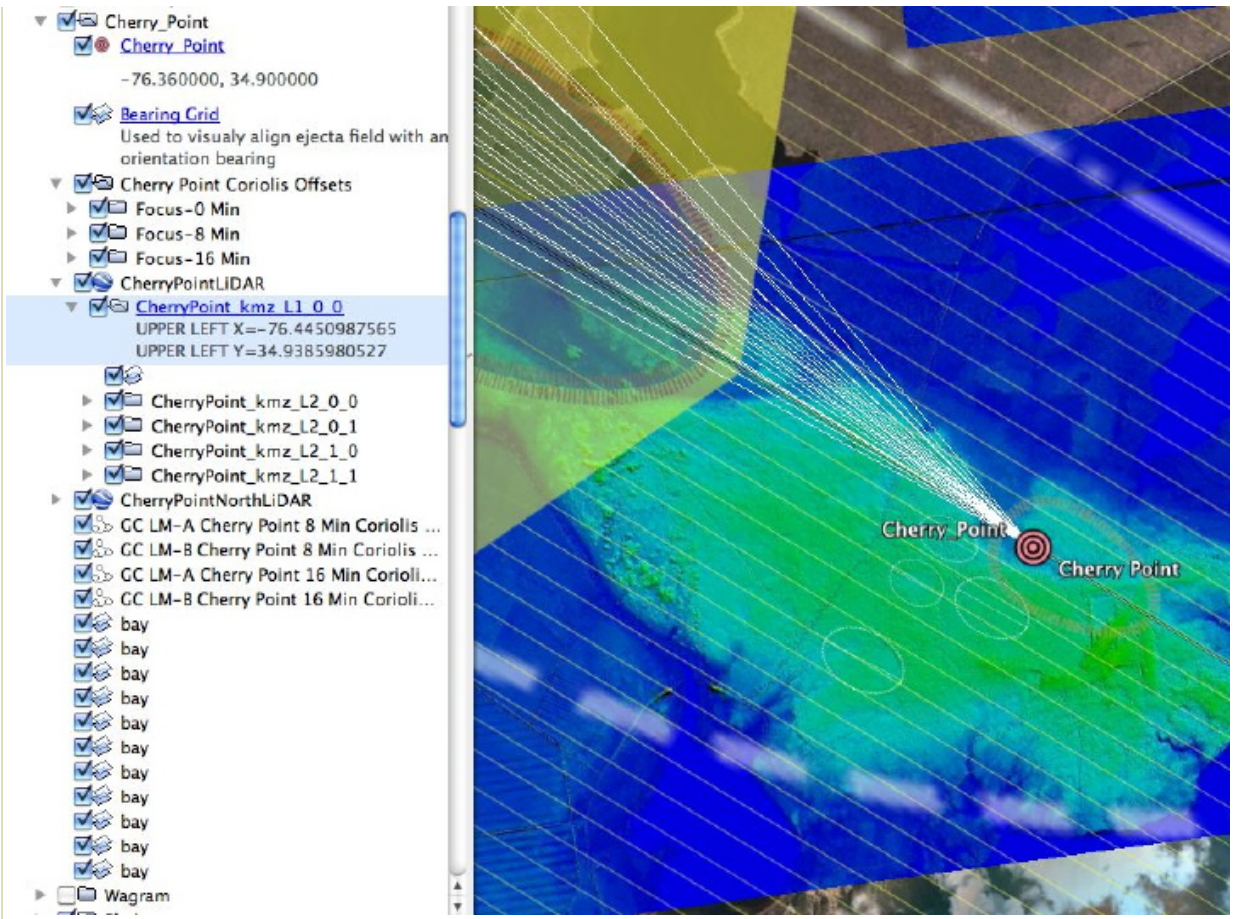
The attached kmz file (Heuristic_Hunt) has several sections. First is a folder titled "Distal Ejecta Fields", containing a list of 33 suspected Carolina bay fields. Google Earth will open with each of these shown as a placemark at their global position.

Posts: 80
Loc: Connecticut, USA

Clicking on any one of them will bring up a display that discusses the site, present a "portrait" of our imaging overlays, and provide a link to a more detailed set of kml.

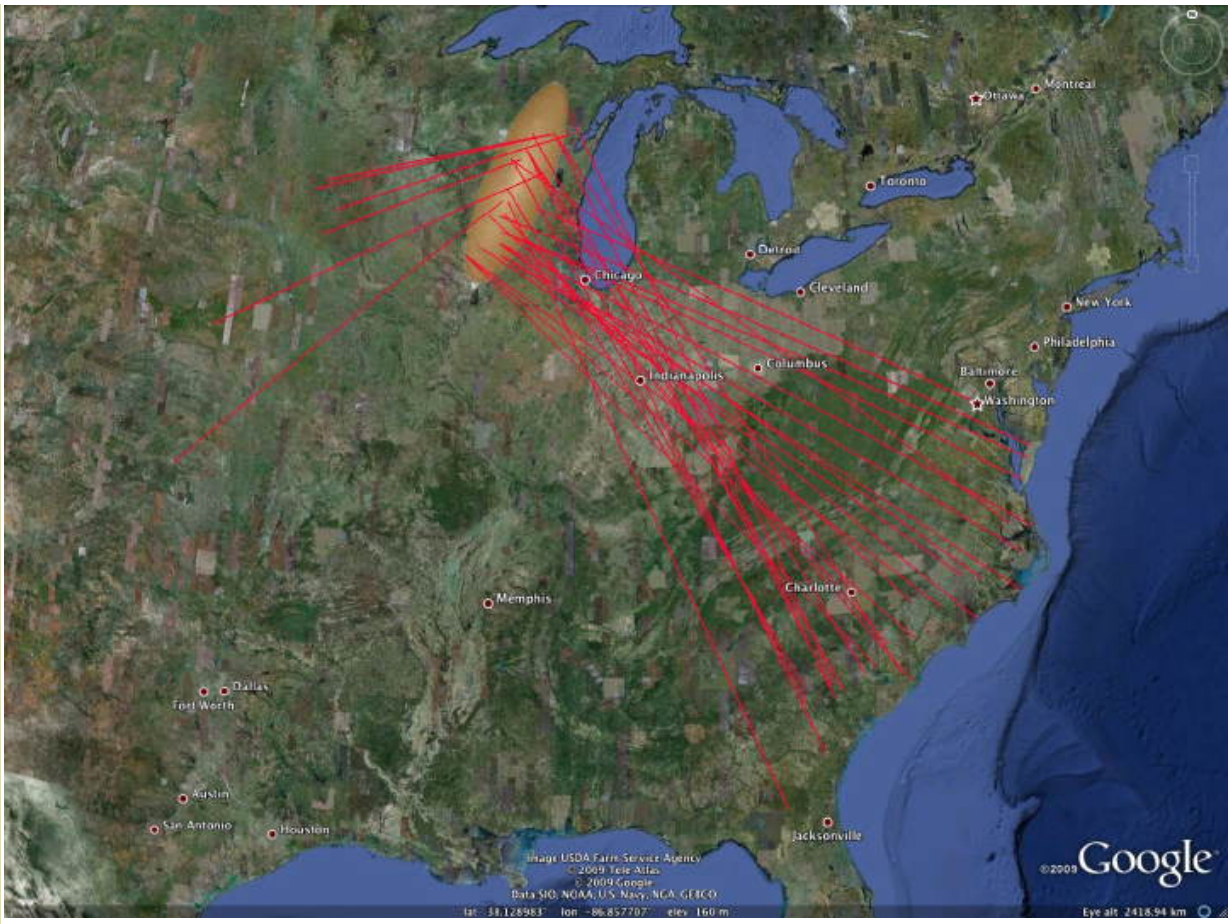


When the kml link is selected, you will get a folder that contains several standard items. I am substituting network links for the LiDAT kml data, so the kml is small, but the network load as you hit these could be high. There will be a placemark for control, a "Bearing Grid" which includes a reticle to help determine the bay alignments, a folder with 21 great circle Coriolis trajectories, a selection of individual trajectories which best fit (in our estimation, please feel free to select your own from the full list), color ramp elevation LiDAR or DEM overlays for bay identification, oval overlays on some individual bays, occasional "photo" links to present elevation profile data, and in two cases, a sample 3-D loft trajectory.



These individual kmz files are live documents, and they will be refreshed as time goes on.

Back to the kmz file attached here, there is a folder "LM_Coriolis Optimums", which are 33 proposed best-fit trajectories from the 33 fields back to the lake Michigan region. An overlay "Surrogate Crater Focus" shows our rough fit of an oval over all 33 destination points. Here is the visual of how the optimum trajectories focused in on an area ~3 degrees west of Lake Michigan , corresponding to a ~12 minute loft time.



That's about it for our informational posts. The research materials were developed in support of a submittal to be shown at the Fall 2009 AGU meeting in San Francisco December 16th. A session is being held to discuss the topic *Younger Dryas Boundary: Extraterrestrial Impact or Not?*

Thanks for participating. We welcome comments, and recognize that the catastrophic nature of our conjectures are way out of the box, so we don't expect much in the way of acceptance at this point.

- Michael

Attachments
Heuristic_Hunt.kmz (36 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: Updated kml file with current network-linked fields list

Edited by Cintos (01/12/10 11:27 PM)
Edit Reason: update kml file

"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

Top | Edit | Reply | Quote | Report | Email Post

Carolina bay Alignment - Resolves on Contact [Re: Cintos] #1286348 - 12/11/09 11:57 AM

Cintos
Traveler

Greetings:

In my first post in this thread I mentioned that a 2nd factor was superimposed in the inferred alignment of the Carolina bays, and that there would be "more on that later".

While the Coriolis Force component is *systematic by **loft** time*, this additional factor is *systematic by **latitude***. In the first case, the earth rotates at 0.25 degrees of longitude per second, regardless of where on the earth the consideration is

Registered: 01/27/06
Posts: 80
Loc: Connecticut, USA

applied. In our second case, we rationalize that the ground speed of any particular spot on the earth is a function of the cosine of its latitude. The end cases are the poles - where the ground velocity w>e due to rotation is negligible - and the equator - where the ground speed w>e is ~1,670 km per hour.

In our specific YDB Manifold, a relevant set of w>e velocities would be our Lake Michigan "C" point - rotating at 1,218 km/hr - and a generic ejecta filed such as Bishopville - rotating at 1382 km/hr. At time of contact the the 165 km/hr w>e velocity difference will resolved by a skewing of the "splat", effectively rotating the inferred bearing in the clockwise direction.

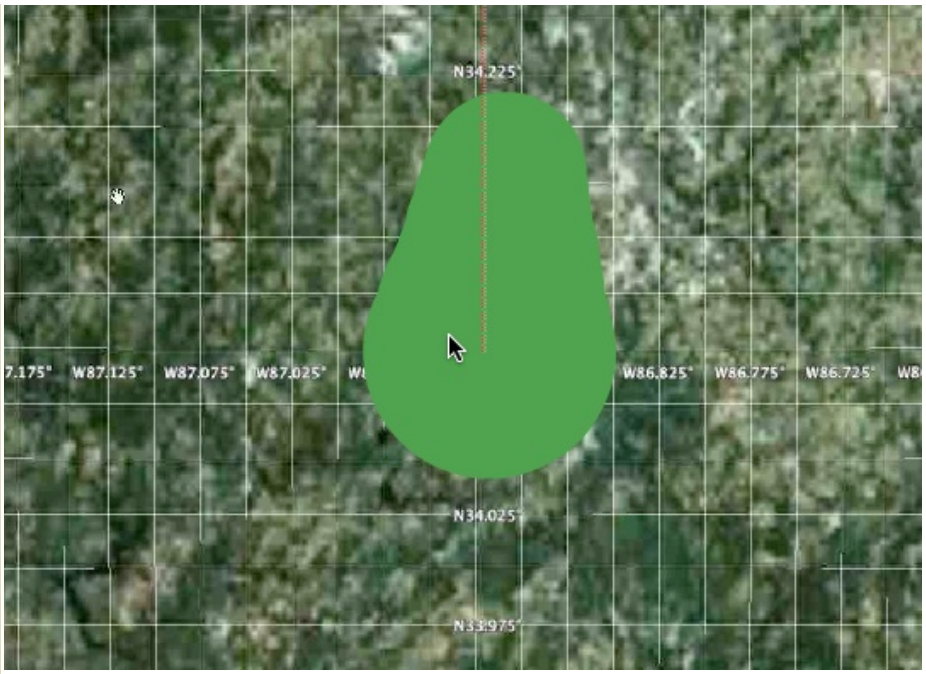
By way of explanation, a droplet of ejecta traveling from the north to the south in its great-circle frame of reference would not be affected by that ground speed difference until it lands on the surface of the earth. At that contact, the west-to-east ground velocities will be resolved. Given a point object such as a missile warhead, this resolution need not be considered. When an object as large as our posited ejecta droplets (say, 100m diameter) lands, this resolution will skew the inferred arrival bearing. In our cases the velocity difference will actually subtract from the expected w>e velocity vector. Since the n>s velocity vector is constant, the effective alignment rotates clockwise slightly.

A relevant analogy would be the "Crab Angle" velocity vector required to compensate for cross-runway winds during an aircraft landing approach. Given high enough cross-winds, the visual effect can be stunning. Take a look at these four sequential photos of a 747 landing. Clicking *HERE* will link to a web page with the movie.

Now, in our situation, it is the land that is moving rapidly west-to-east under the falling ejecta. That effect increases in magnitude as the landing sites move more southerly. If there were ejecta in the Everglades, for instance, the ground speed difference would be 274 km/hr.

How relevant is this? It may be considered to be a minor factor in the more northerly fields, where there is less w>e velocity differential to detract from a relatively high w>e loft vector. In the more southern fields, the adjustment becomes a much higher factor both in magnitude, and in respect to the smaller w>e loft velocity vector. When superimposed on the counter-clockwise effect of the Coriolis (systematic by loft time), the latter may tend to overpower the former. We suggest that when moving north to south through the fields this general shift of the alignment vector clockwise is seen as "systematic by latitude".

I have yet to create Google Earth kml that would properly represent this factor visually. I am editing to the thread here to include in a LINK to an animation that attempts to graphically explain the kinematics of the rotational alignment skew.



And the results of both? Chaos within a bound set of results. We assume that a compute model can be developed that will iteratively solve for a set of ejecta loft parameters from the Lake Michigan Impact area (ejection site along butterfly, loft azimuth, loft angle, loft velocity) that would satisfactorily correlate the inferred alignment of each of the Carolina bay structures with the empirically measured results.

Thanks for participating,
Michael

[The attached kml is an updated superset of all the previous attachments]

Attachments
GE_posts_YDB_KML.kmz (34 downloads)

Preview this file with the Google Earth Plugin (learn more)Description: Latest KML file using network links.

Edited by Cintos (01/12/10 11:40 PM)
Edit Reason: update kml file

_____
"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

Top

Visualizing Possible Skew [Re: Cintos]

#1289143 - 12/21/09 04:44 PM

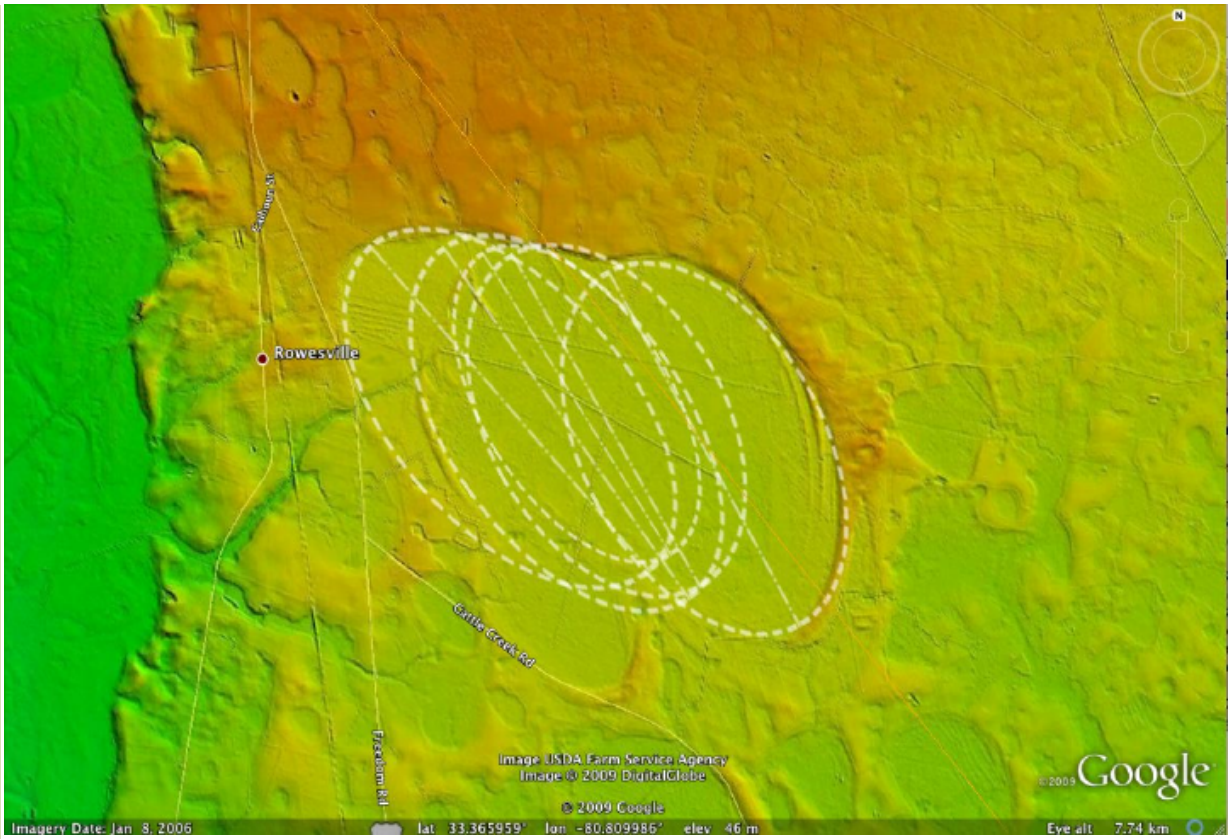
Cintos
Traveler

Registered: 01/27/06
Posts: 80
Loc: Connecticut, USA

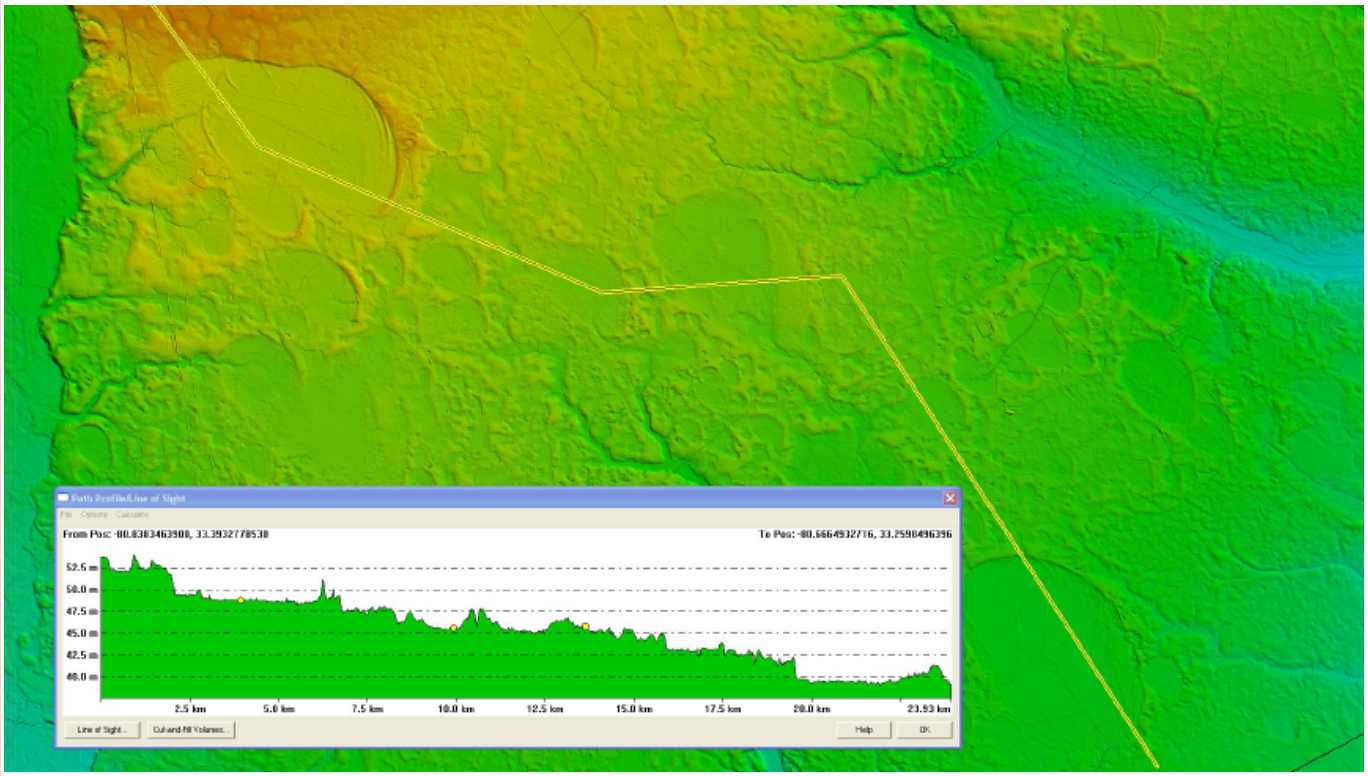
Greetings:

In my last post I discussed the "Systematic by latitude" alignment factor, driven by the difference between the west-to-east velocities of the impact site and the ejecta landing site. If you accepted for a moment that the Carolina bays were distal ejecta, we can presume it was coming from the north and west. We have run some calculations and determined that the area in the photo below was traveling about 40 meter/sec faster west to east than an impact site at 45N latitude, a velocity that must be resolved as the ejecta strikes the earth. We expect that the entire sheet moves in unison as it "resolves on contact", but we see what might be a different signature in some situations.

The photo below shows what we interpret as being a "skew" of a very watery droplet as it hits the ground. As the droplet spreads, it slides to the west, leaving a trail in its wake. We attempt to provide a visual explanation in the tour "Bowman_Skew" in the attached kml.



Alternatively, these may merely be oxbows. If so, someone has to explain the mechanism necessary to close them and get them all aligned. I have been removing some "fields" of ejecta that are likely oxbows, such as the ones I had for Allenhurst. Also, how it is possible that oxbows - the signature of lazy rivers - could be effective across the significant elevation differences seen in the local bays?



Note that the Global Mapper elevation places the floor of the small bay at top left at 52 meters, while the bay in the lower right is

below 40 meters. The distance between them is about 20km.

Some of the bays in this LiDAR image display the concept of "overprint", where a bay looks to be created on top of an older bay. If appropriate, in a later post we will explore this aspect of the enigmatic bays, along with examples of where these overprints are similarly aligned and there they present different alignment bearings.

Attachments
Bowman.kmz (75 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: kml file with tour of ejecta "skew" in Boseman Carolina bay field

Edited by Cintos (12/21/09 05:17 PM)

"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

Top | Edit | Reply | Quote | Report | Email Post

Crater Hunt II - Saginaw Bay [Re: Cintos]

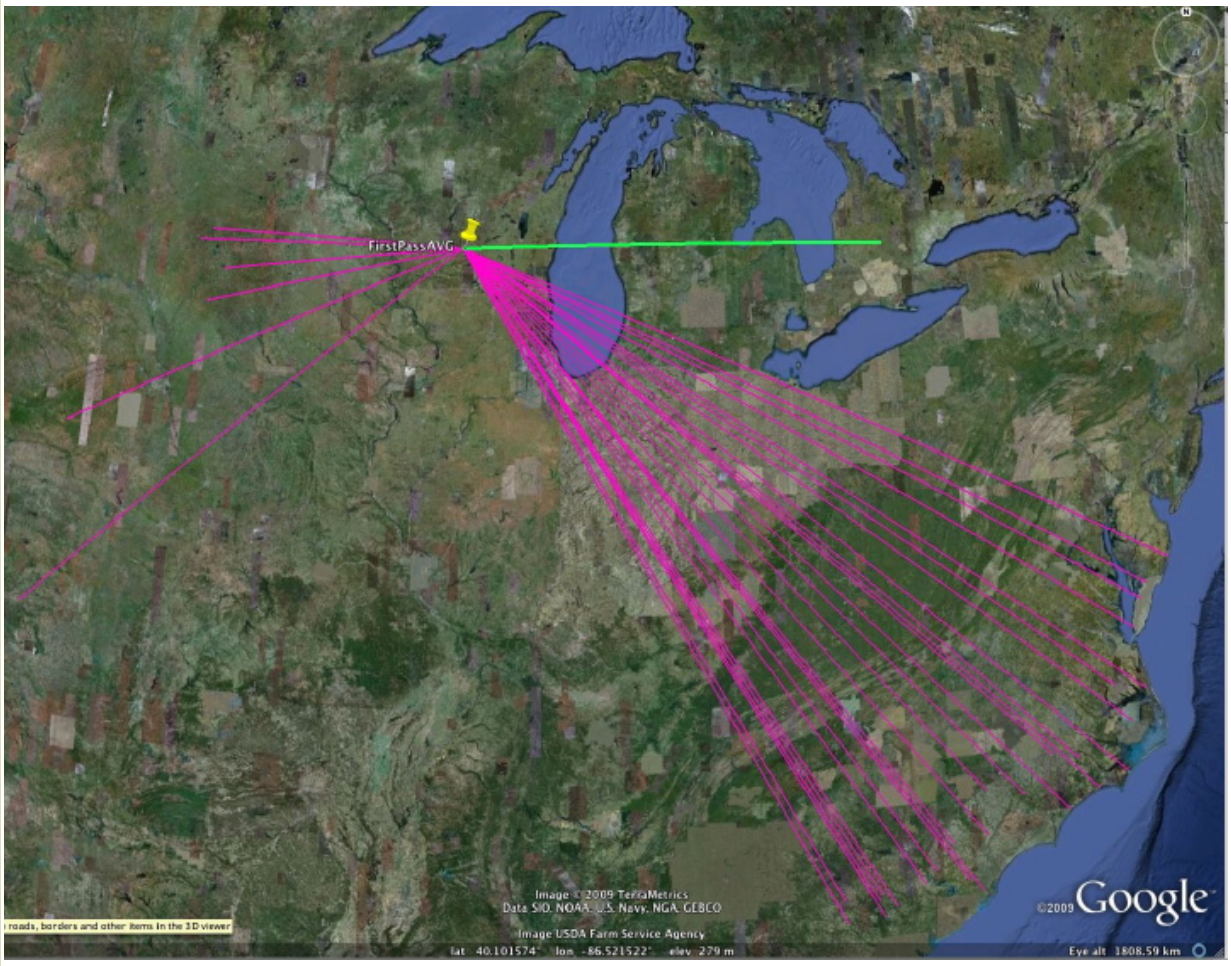
#1290782 - 12/27/09 11:50 PM

Cintos
Traveler

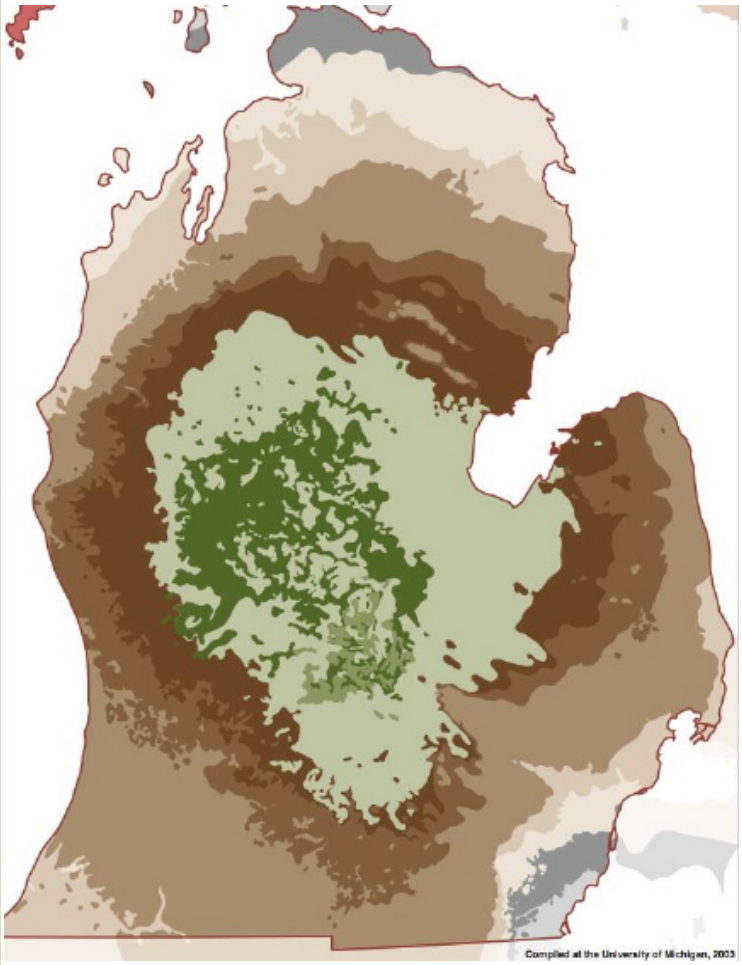
Registered: 01/27/06
Posts: 80
Loc: Connecticut, USA

Our initial test fit of Lake Michigan as the proposed cosmic impact site was quickly demoted in light of the solid evidence supporting its glacial heritage. Our second try at identifying another candidate is underway.

The evaluation of the various systematic adjustments to the inferred ejecta trajectory has suggested a rather chaotic set of variations can exist, but that the first order effect is the loft time shift. A mean average of all optimum trajectories was used to generate a proposed single point loci for an impact point. The location at 43.6259 North Latitude and 89.7043 West Longitude was computed. We extended the green line seen in the graphic below east along the indicated latitude to identify possible crater sources, using the surrogate crater conceit.



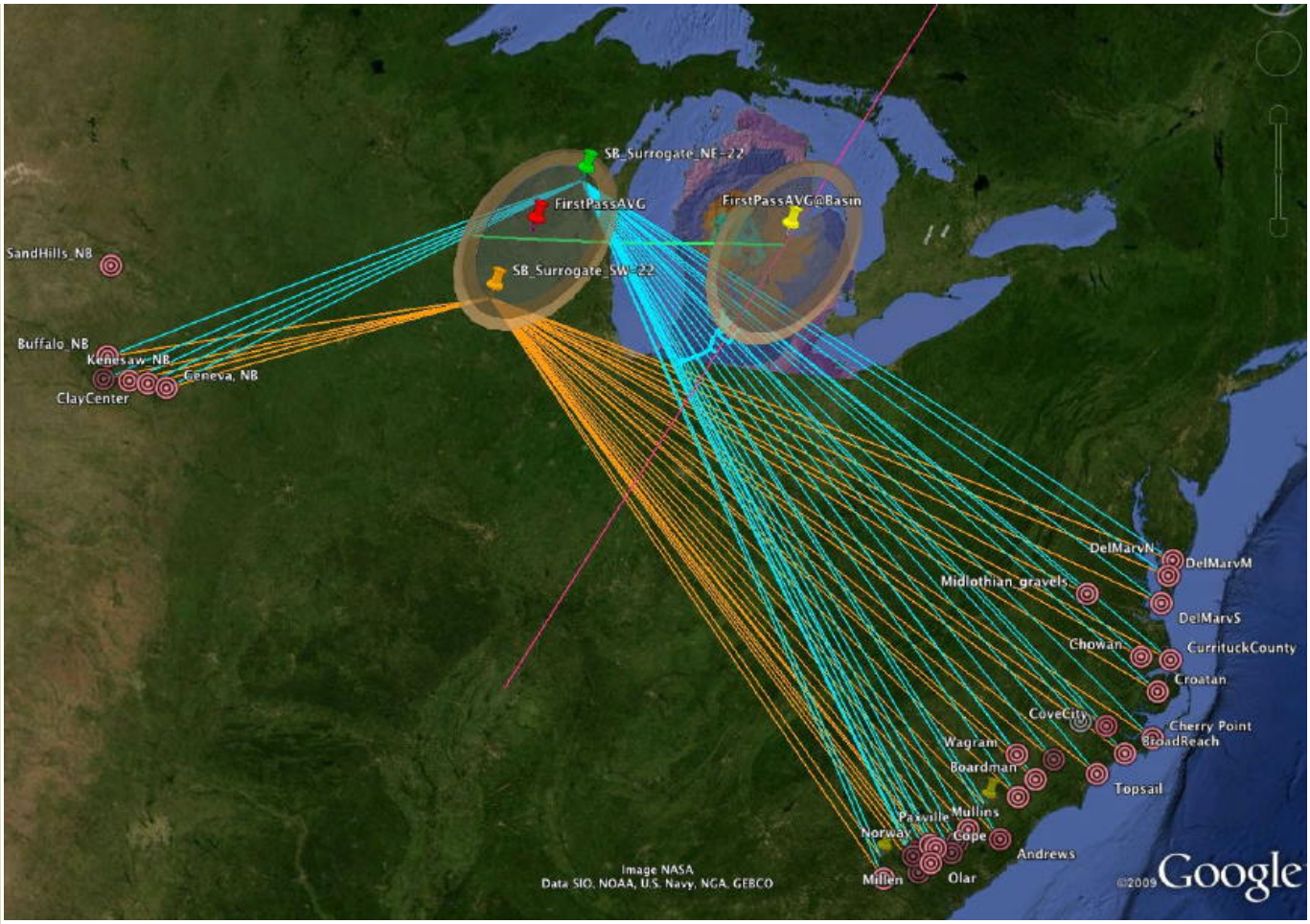
The following graphic Compiled at the University of Michigan describes the bedrock located within the Michigan Basin geological structure. The central zone is composed of younger, more solidified carbonate rocks, whereas the older underlying rocks are softer shales and sandstones built up prior to the origins of life and the calcium deposits derived from shells. The ice age glacial sheets which removed vast quantities of strata from above the basin were unsuccessful in breaching this carbonate layer to any degree with one major exception - Saginaw Bay.



This lead our search to the Saginaw Bay area. The shift eastward represents a slightly longer loft time of 22 minutes, a higher ejecta velocity and a higher loft ejection angle. Now, the Saginaw Lobe of the Wisconsin Ice sheet is highly likely to have been responsible for this slice into the basin. We are in the process of researching a number of anomalies related to the area in and around the bay. Among the items identified to investigate:

✓ Anomalous remnant ground water oxygen isotope markers water in the Saginaw lobe area; injection of water from Younger Dryas period indicated
✓ Anomalous hydraulic pressures in the surrounding strata layers
✓ Anomalous glacial deposits, juxtapositioned with large bolder fields resting on similarly dated, but smaller sized debris
✓ Identification of Precambrian deposits in glacial till, unique to the Saginaw lobe and not seen in any other Wisconsin-era lobe deposits
✓ Buried sub-glacial runoff channels suggestion the deposition of terrestrial debris on top of glacial sheets
✓ Anomalous buried soil layers suggesting moraine deposits on above warmer climate flora.
✓ Anomalous salt-bearing springs surrounding the Saginaw bay; used for commercial salt production in 1800s
✓ Unusually High Helium Atmospheric noble gas signatures in area aquifer fluxes
✓ Existence of structural anomaly beneath Saginaw bay floor suggested by several researchers; considered to be anticline by some
✓ Carbon dating of natural gas from wells across Michigan Basin show activation ~13kya
✓ Research susggests significant basin re-heating event in past; reactivation of Keweenawan Rift implicated by some

We have created an additional set of kml to visualize this possible crater, and to test fit a set of great-circle lines corresponding to ejecta trajectories from a surrogate crater 5.5 degrees of longitude westward from the Saginaw Bay area. Two points along the length of the crater were used as starting points for the line sets to each of the Carolina bay fields being evaluated. We continue to see general agreement between these trajectories and the actual alignment of the bays.



Attachments
CraterHunt_II.kmz (34 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: KML file providing GE elements to visualize the crater hunt

Edited by Cintos (02/08/10 09:09 AM)
Edit Reason: offset adjusted to 5.5 degrees

"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

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Distal Ejecta in Nebraska? [Re: Cintos] #1292856 - 01/03/10 04:55 PM

Cintos
Traveler

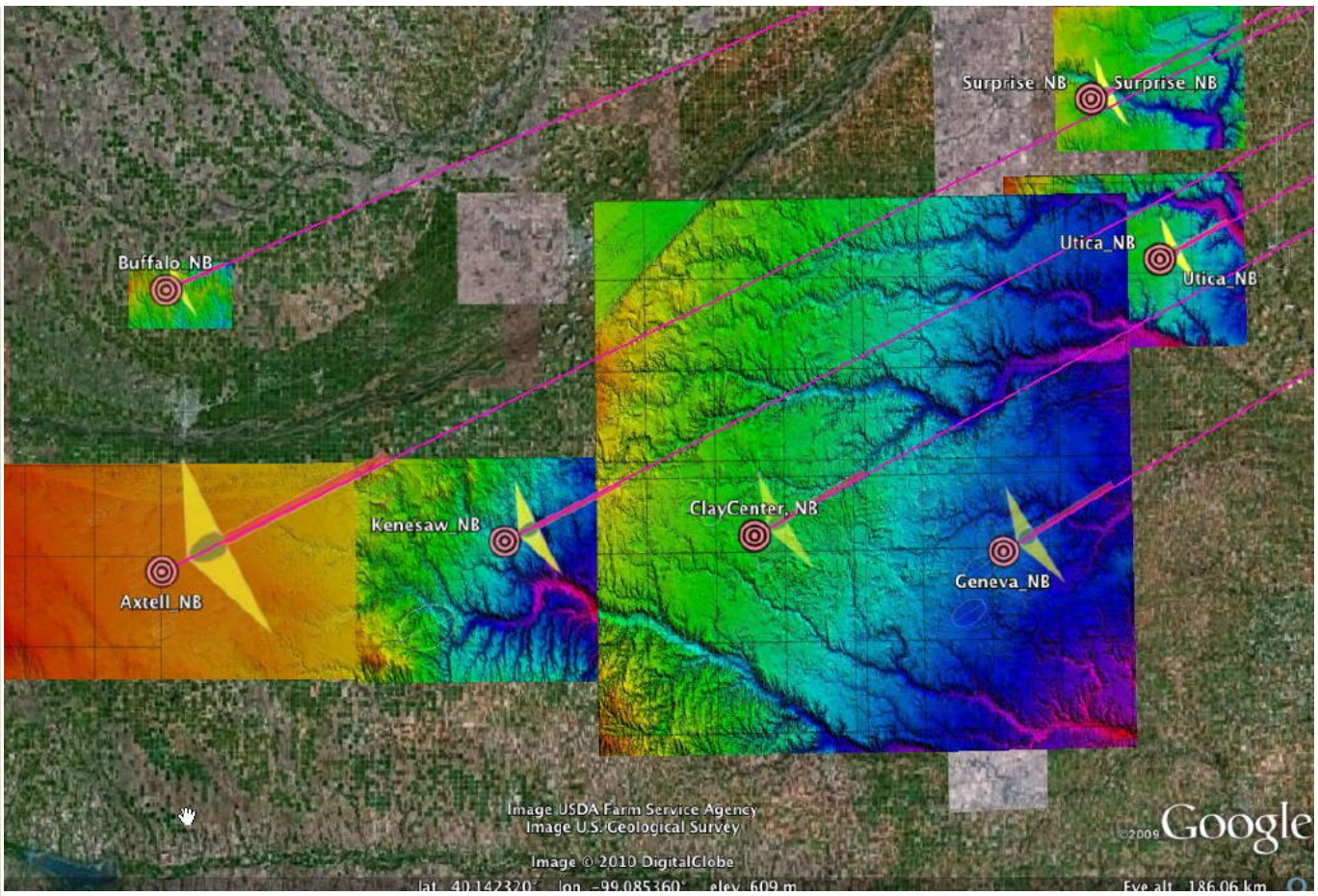
Registered: 01/27/06
Posts: 80

Greetings:

The attached kml has an updated list of proposed distal ejecta sites. A number of the sites "out west" have been removed, as they likely represent ancient oxbows or more common geological depressions. The overriding concept in declaring a "field" is that there be a substantial number of structures that present similar alignment and length-to-width ratios.

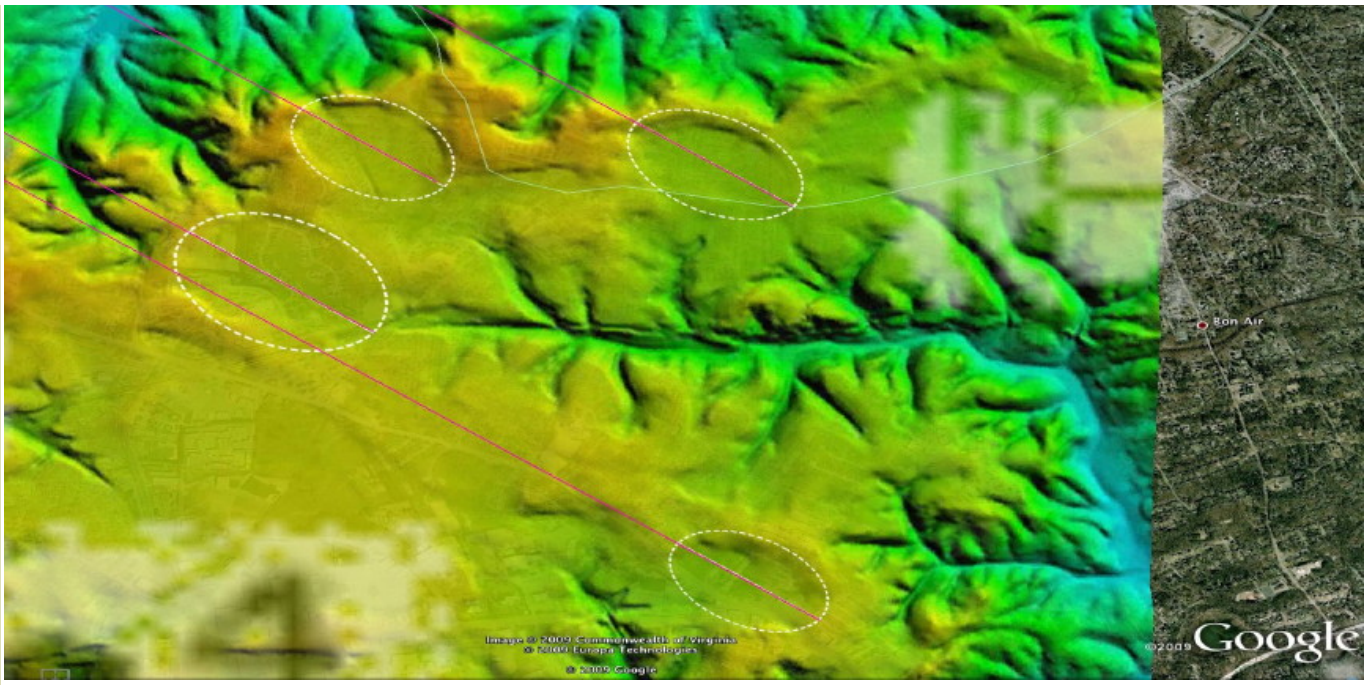
We have added more western fields from the state of Nebraska. Charmingly (or coincidentally?) the ovoid bays in each of these Nebraska sites are aligned towards our first-pass averaged focus at 43.63 North, 89.66 West.

Loc: Connecticut, USA



The field of landforms centered at Axtell, Nebraska are known as "Nebraska's Rainwater Basins", and have been likened by some researchers to Carolina bays.

Please note the addition of another "outlier" in the Fields list: The enigmatic Midlothian Gravels, just south-west of Richmond, VA. The bays in this area are formed within gravel rather than sand, somewhat negating a wind-blown dune ancestry. There is a useful review of these structures By Bruce K. Goodwin , available online. Like the Nebraska fields, above, these "bays" present an inferred alignment to the first-pass average surrogate impact site.



The teaser graphic below is extracted from that document, analogous to the Cross Section of the bays in the Goldsboro Ridge.

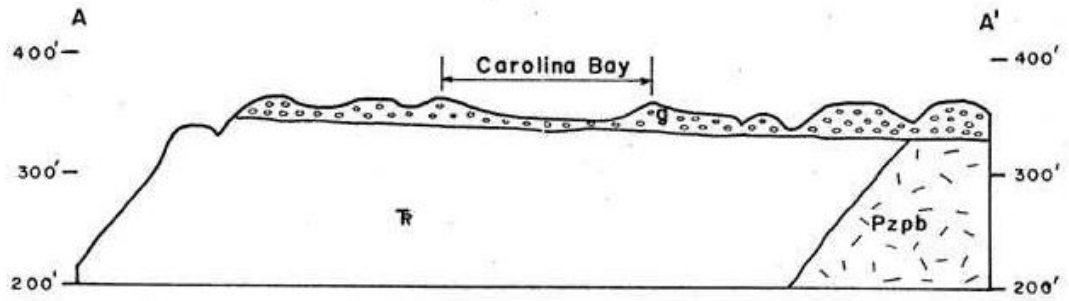


Figure 4. Generalized geologic section through a segment of the upland gravels. Section corresponds to A-A' of Figure 2.

Happy New Year!!!

Attachments
CraterHunt_II.kmz (43 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: Updated kml file with network links

Edited by Cintos (01/12/10 11:55 PM)
Edit Reason: update kml file

"Don't use quotations. ... Tell me what you know." -Ralph Waldo Emerson

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Re: Distal Ejecta in Nebraska? [Re: Cintos] #1293374 - 01/05/10 12:19 AM

Hill
Master Guide

Your updates have been interesting reading. Thanks for posting them.

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