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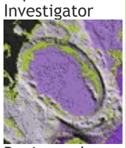
Stop the world, I want to Loft [Re: Cintos] #1294512 - 01/08/10 10:19 AM

Cintos
Impactor Investigator



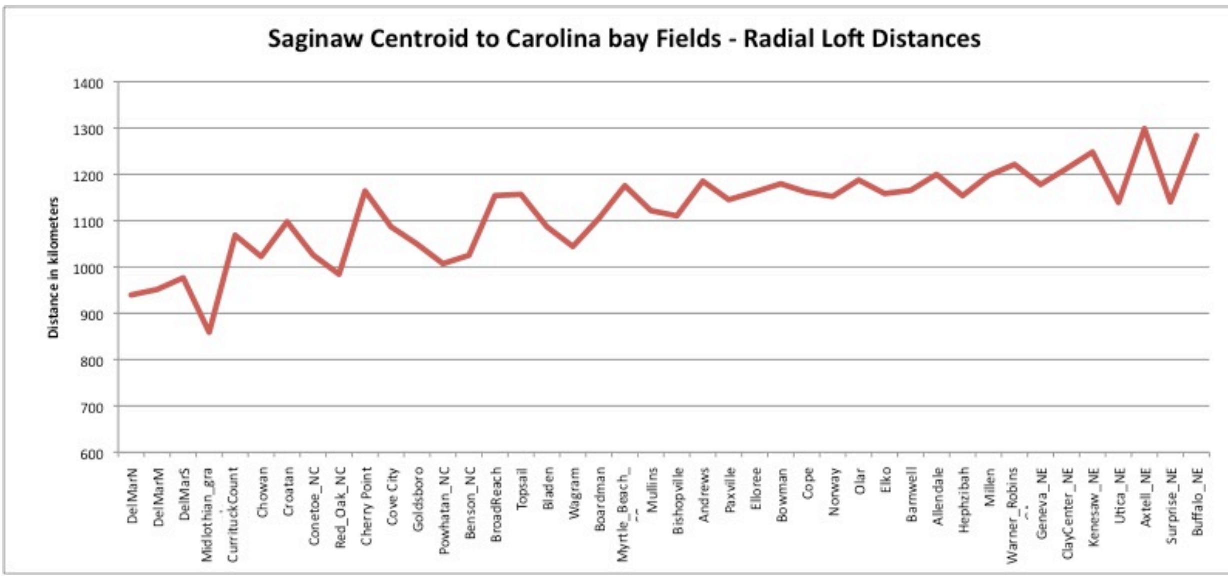
Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

Our "Perigee:Zero" conjecture holds that the Carolina bays structures are surface features within 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.

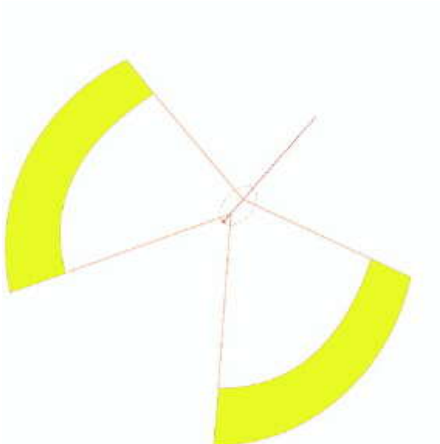
Most attempts at following the inferred orientation of the bays back up the trajectories' bearing have failed to produce a focus. We propose this to be caused by several variables not considered by others, and which we have discussed in earlier posts to this thread.

Our selection of the Saginaw Bay area of Michigan, along with the basin area westward across Michigan, as a proposed impact location, allows us to revisit the loft time and trajectories of the identified Carolina bay fields. While we have leveraged the surrogate crater conceit to rationalize the inferred ejecta trajectories bearings, when we evaluate the distance covered in during the event it is appropriate to evaluate the geographic distances involved assuming a stationary earth.

Using a proposed centroid for the Saginaw Bay impact at 43.63 N latitude and 83.94 W longitude, we computed the great circle distances for each of the fields. The chart below presents the fields in a clockwise direction. We feel that the highly correlated loft distances are indicative of a common flight time, loft angle and source for the ejecta at each of the location. The shortest flight distance is found at the Midlothian Gravels site, which may be due to the heavier gravels settling out of the ejecta cloud earlier. Note that the western fields correlate highly with the eastern fields. We propose that the "butterfly" provided slightly more energetic ejecta velocities towards the down-range direction, yielding more loft time and distance.

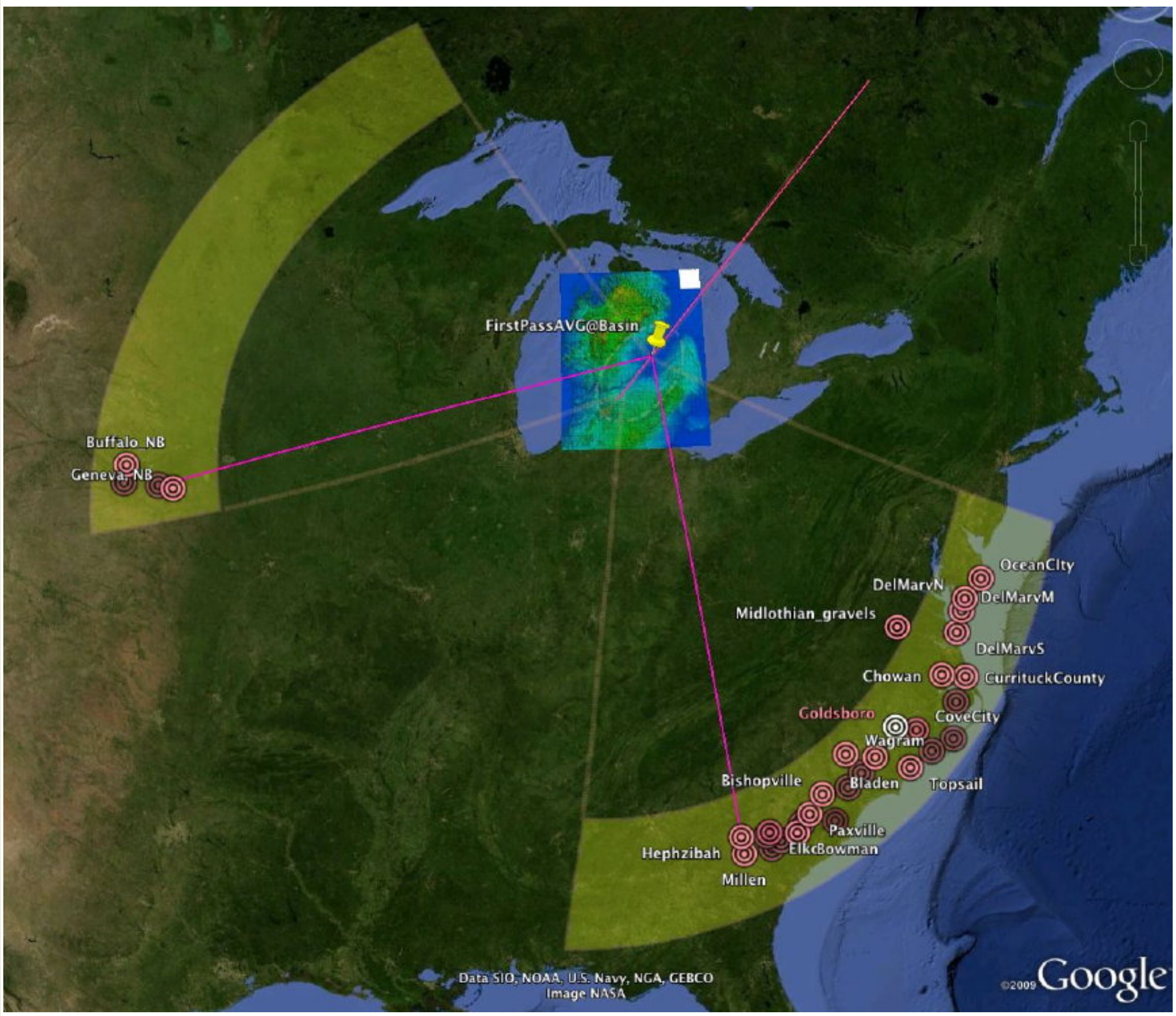


As discussed earlier in the thread, an oblique impact generating a butterfly ejecta distribution pattern is suggested. We have created a Google Earth overlay which, when visualized on the Google Earth facility, successfully encompasses the identified fields within two narrow bands, one to the east and one to the west.

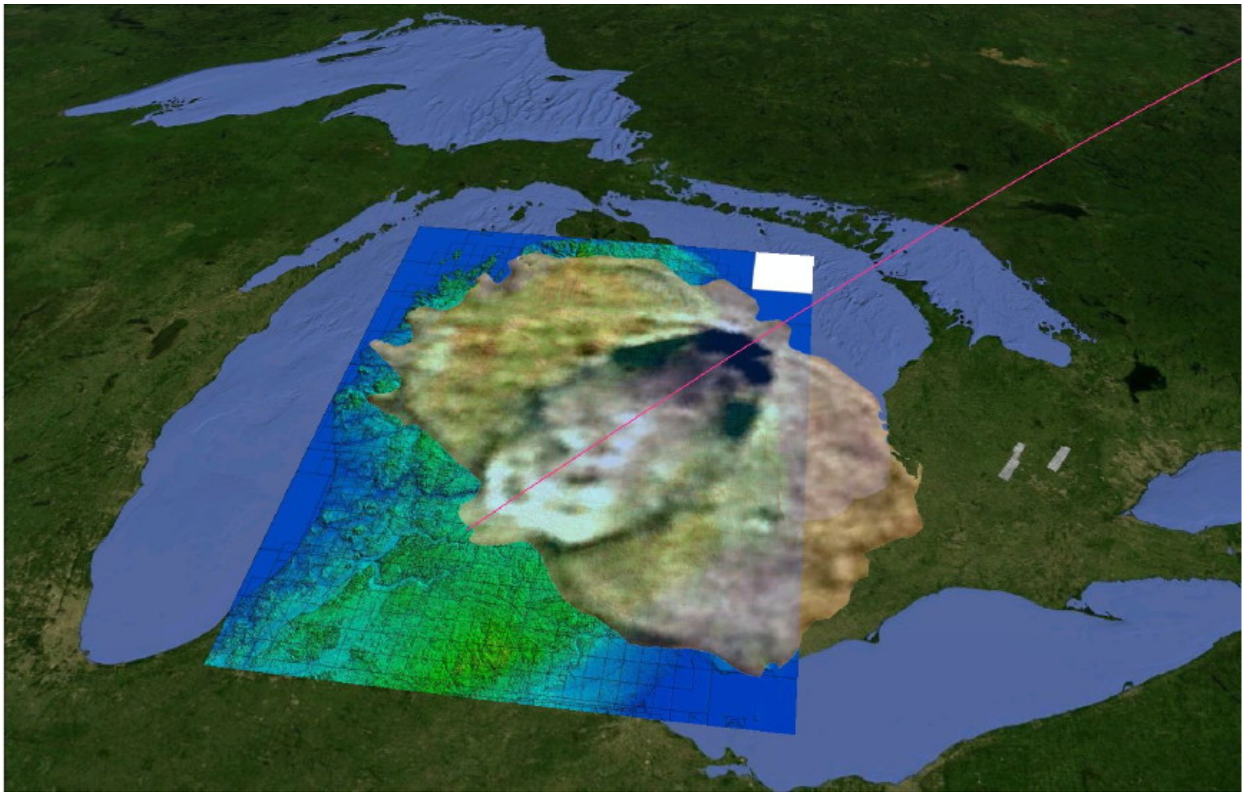


Let us emphasize here that we fully expect the ejecta blanket may present at distances closer and further than this "ring", but may not have been deposited on hospitable terrain (the Appalachian highlands and the Atlantic Ocean in the east and the Wisconsin Ice sheet in the west, for example).

The attached kml file (Distal_Ejecta_Butterfly) contains the overlay, positioned in a best-fit relationship to the fields, along with the proposed impact structure. When applied to the viewer, the following graphic is generated.



Finally, using the image of an appropriate oblique impact seen on Mars, we created an overlay graphic that presents the crater and its local ejecta sheet. The attacked kml includes that overlay, positioned over the lower Michigan peninsula as a suggested location. Also in the kml is a color ramp DEM graphic overlay displaying the "Saginaw Lobe" geography, which we associate with this crater structure.



The kml also contains a refresh of the Distal Impact Fields kml and the Coriolis bearing sets, among other tidbits.

- Michael

Attachments
Distal_Ejecta_Butterfly.kmz (177 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: Updated kml with new alignment for crater at 214 degrees. Several new fields added.

Edited by Cintos (01/12/10 07:03 AM)
Edit Reason: Update KML attachment

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

Top

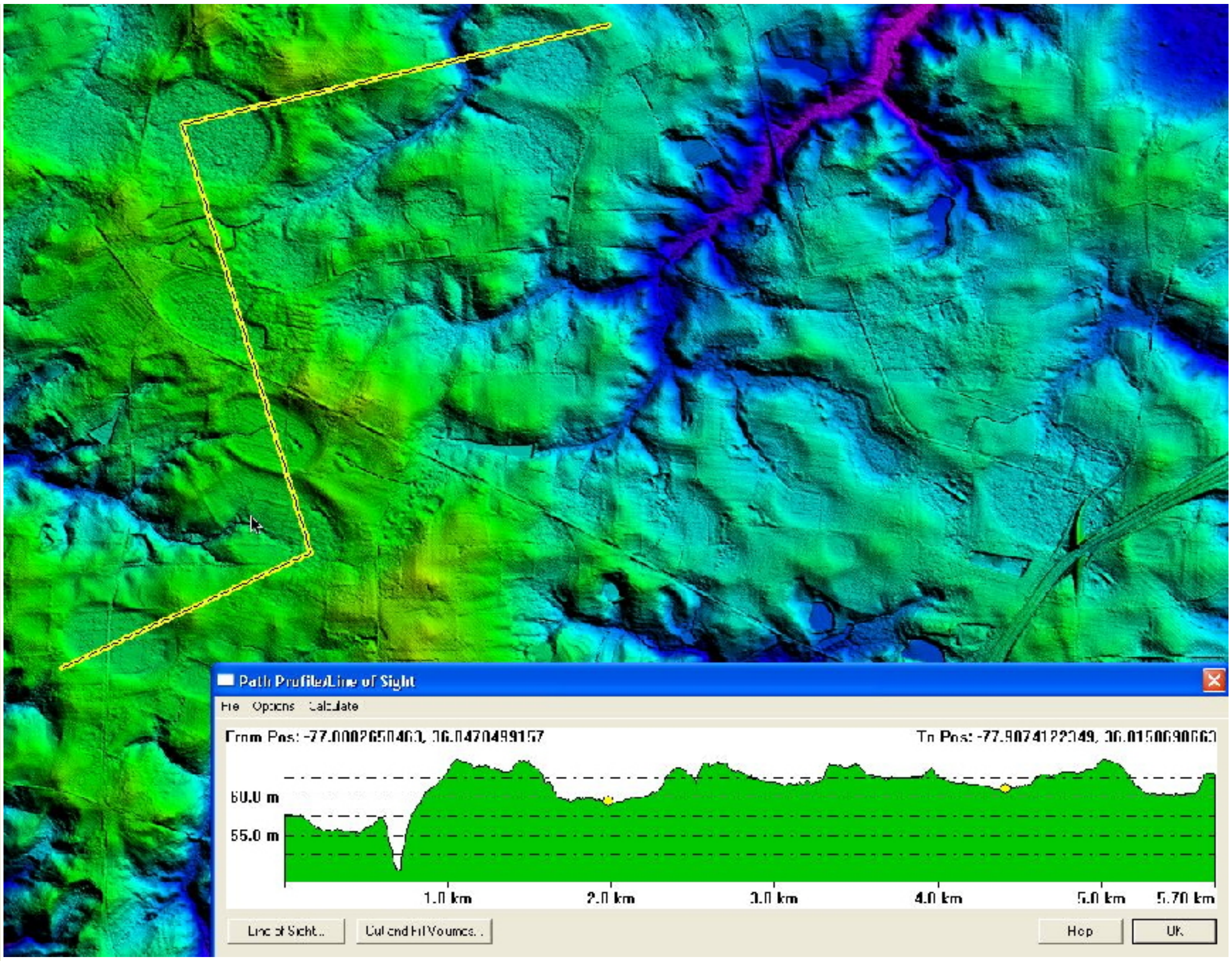
Correlating Inferred Carolina bay Orientations [Re: Cintos] #1303191 - 02/05/10 12:49 PM

Cintos
Impactor Investigator

Greetings:

Our search for geological formations presenting Carolina bay planforms has allowed us to expand our list of examined locations to a total of 38; 31 in the east and 7 in the west. The attached refresh of the Distal Ejecta Butterfly kml file includes these new sites. Of particular interest is the field at Red Oak, NC. This extensive (8 km x 16 km) set of bays is located quite far inland, in terrain a bit more diverse than others seen.

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



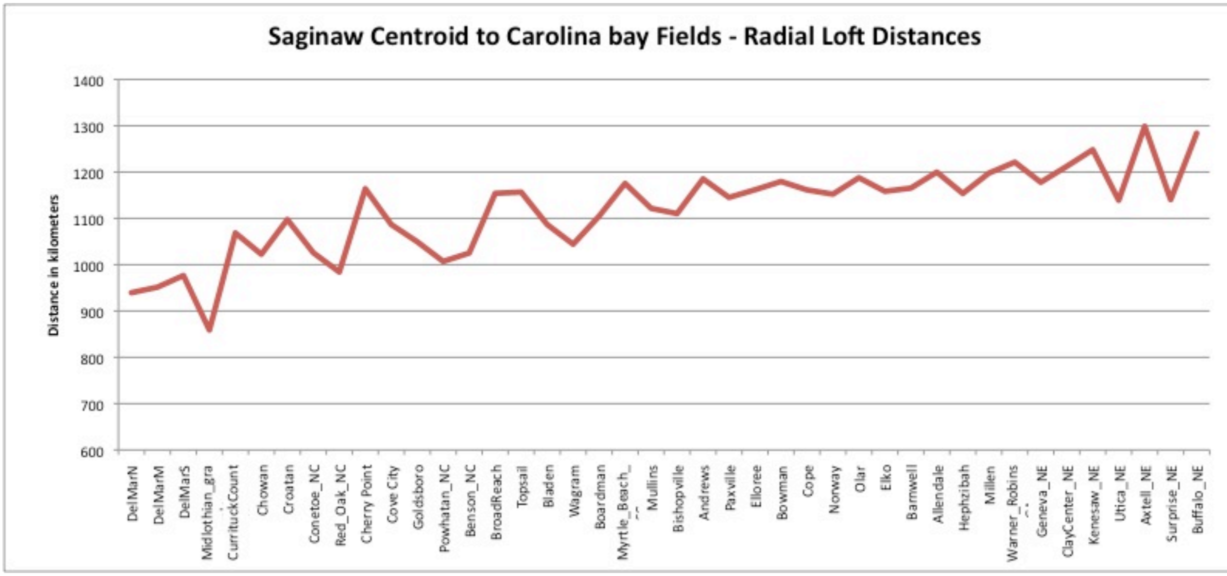
We encourage you to explore those sites and the associated color-ramp DEM overlays, as they allow these bays to jump off the screen by the hundreds. To review, the Distal Ejecta Fields kml element contains placemarks for each field. Clicking on any of those will open a dialogue box in Google Earth that discusses the site, provides a "portrait" of the DEM and orientation arrow, and provides a link to download the full kml element set for that particular field.

At the present time, we have made precious little progress in providing physical evidence to support our conjecture regarding the cosmic impact and resulting distal ejecta blanket. Evidence would need to be obtained from the bay's foundation rim sands, and correlated with data from numerous anomalies identified across the proposed impact site in the Saginaw Bay area of Central Michigan. However, we do feel the exercise here in Google Earth has provided supportive circumstantial evidence, if not an outright proof point.

To review and discuss:

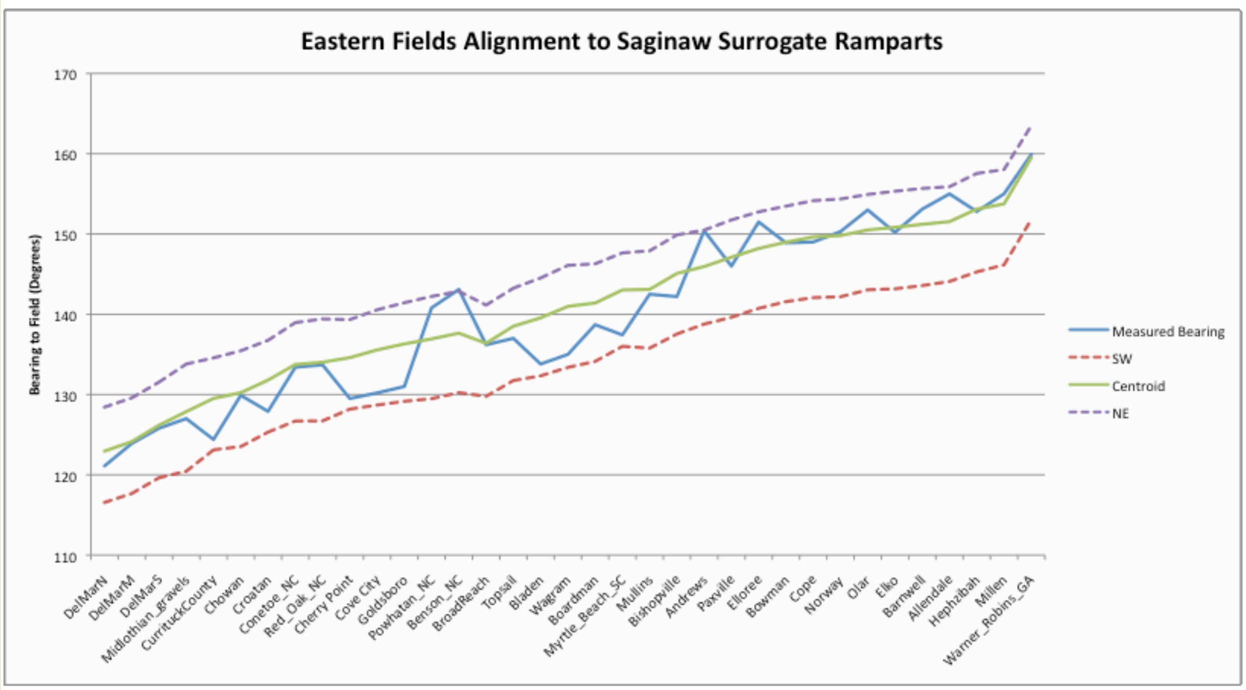
The flight lines, distances and bearings of the Carolina bay fields identified have been analyzed for correlation to the proposed surrogate impact crater site. From our initial bearing analysis, we identified an optimum loci as an average of all "first pass" Coriolis bearings. That value was further rounded for simplicity to a value of 43.5 North Latitudes and 89.5 West Longitude. Our current proposed impact site at Saginaw Bay represents approximately a 22 minutes loft time offset (equating to 5.5 degrees longitude w>e rotation), which suggests a working impact centroid at 43.5 North Latitude and 84 West Longitude.

Our first correlation considers the geographical great circle distance from each field back to the proposed impact centered at Saginaw Bay. As shown in the graph here, a very high degree of correlation is seen.

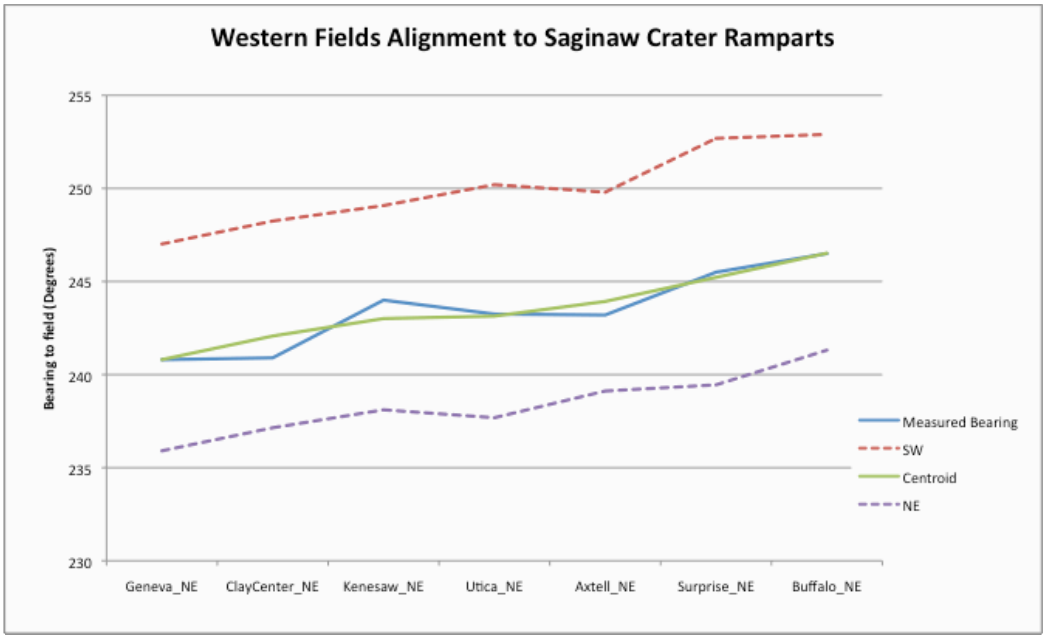


This suggests several things. First, an ejecta curtain was lofted with a fairly consistent loft angle and velocity. The distances do increases slightly as the landing fields progress radially along the butterfly pattern, suggesting that down-range ejecta was slightly more energetically lofted. lastly, the fields to the west are highly correlated distance-wise with their counterparts to the east. The shortest distance seen, at the Midlothian site, suggests that gravels may have precipitated early from the curtain. Also relevant is a general trend of increased distances as the sites trend towards the downrange-impact trajectory direction.

For each of the evaluated Carolina bay fields, we measured an inferred arrival bearing for the ejecta. These measurements can be validated by reviewing each field in Google Earth using the provided kml elements. Three sets of great circle bearings were generated from each Carolina bay fields back to **1**) the surrogate crater centroid (43.5 N, 89.5 W); **2**) a point to the NE representing the north-eastern limit of the crater ejection rampart (44.5 N, 88.6 W); and **3**) a point to the SW representing the south-western limit of the crater ejection rampart (42.5N, -90.5 W). These great circle lines can be imported into Google Earth using the SaginawCoriolisBearings.kmz file. The charts presented below plot the inferred bay alignment at 38 sets of sites (western and eastern, ordered in a clockwise walk around the butterfly) against the great circle line bearings back towards the three surrogate crater control points noted above.



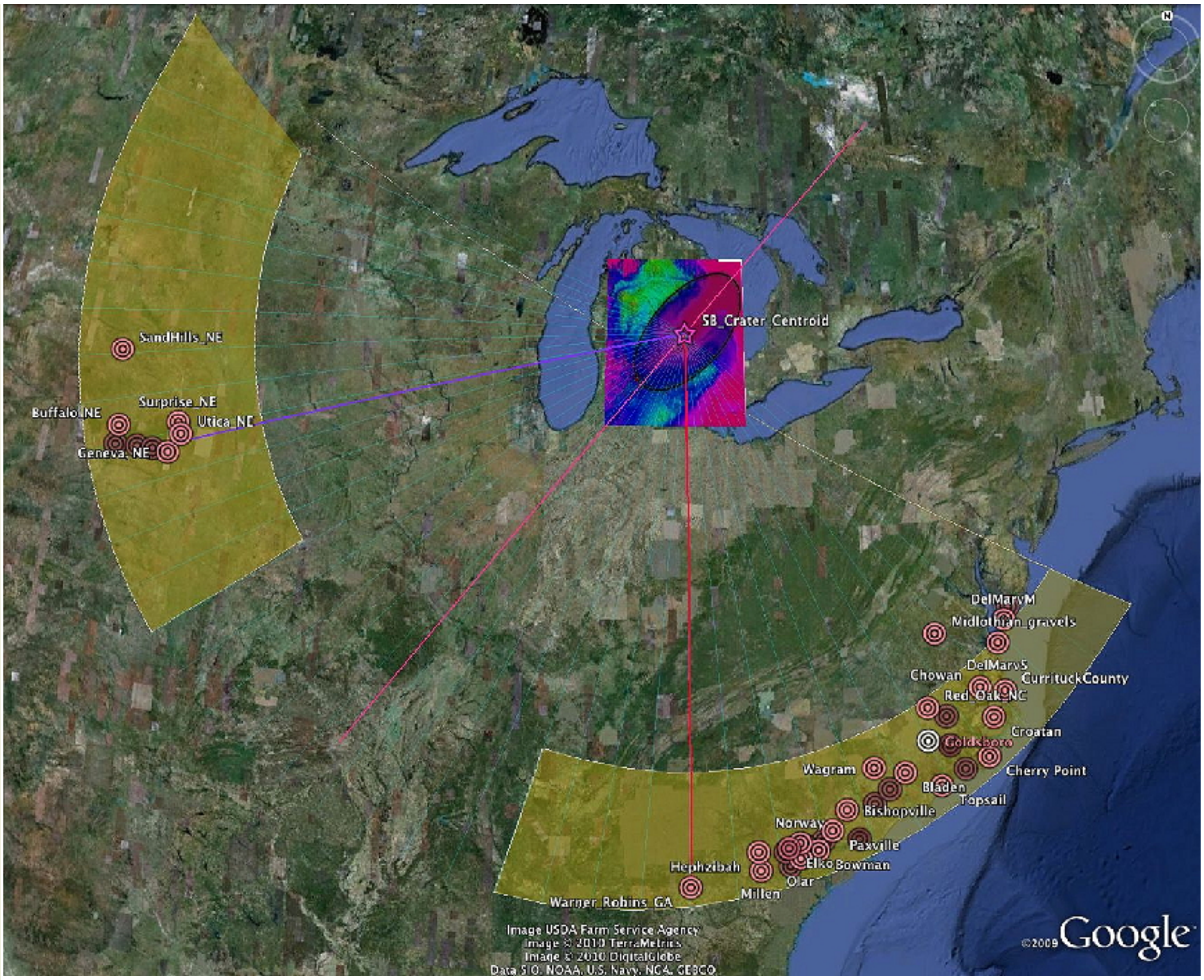
Eastern Fields Inferred Bearings vs. Surrogate Crater Control Points



Western Fields Inferred Bearings vs. Surrogate Crater Control Points

Without exception, the inferred bay alignment falls within the bounds of the surrogate crater control points. An obvious trend seen here (analogous to the function in the distance chart above), is that the radial location of the ejecta emplacement site is a function of the the location of ejection along the edge of the crater rampart. Inherent in the graphs is a non-intuitive suggestion that ejecta from the uprange side (NE) of the ellipsoid crater rampart traveled slightly further and on a more down-range bearing than later ejecta from the downrange (SW) rim. (bearings are Cartesian, not relative to the NE>SW centerline of the crater)

The correlation above suggest that the bays are geographic distributed along a narrow and highly symmetrical pair of "butterfly" arcs centered on the triangulated Saginaw impact location. such a distrubution is suggested in much of the current research on oblique impacts. Additionally, the identified down-range "no fly" zone is apparent in the distribution. The following graphic displays the arcs in Google Earth, and also demosnstrates the symmetrical nature of their locations around the implied impactor's azimuth.



We maintain that the high degree of correlation seen in these 38 disparate locations across the continental U.S. support our hypothesis of an ejecta blanket event. Or, perhaps, it is simply an amazing coincidence. If a field of Carolina bay aligned planforms could be identified which does NOT fit into this model it would be definitive negation point. Score 38 to 0.

Attachments
Distal_Ejecta_Butterfly.kmz (116 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: kml file to support discussion on Carolina Bay orientation

Edited by Cintos (02/18/10 08:08 AM)
Edit Reason: added new butterfly view

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

Top

Kankakee Torrent: Effects of Local Ejecta [Re: Cintos] #1305370 - 02/12/10 07:01 AM

Cintos
Impactor Investigator

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

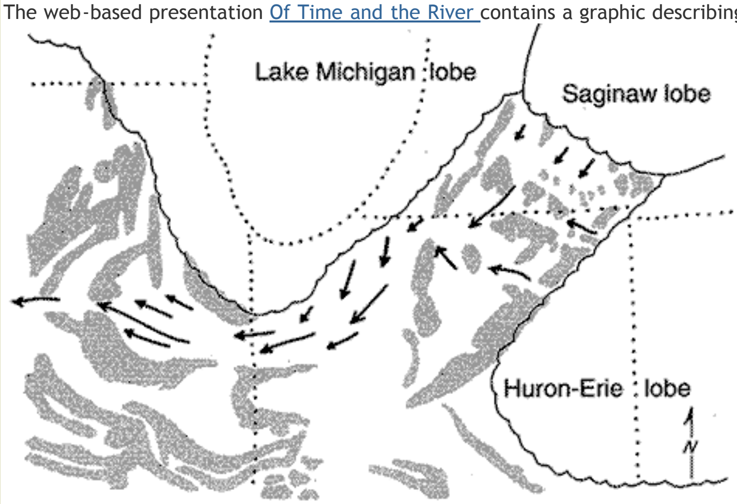
Greetings:

> Quote:
>
> 15,500 years ago found glaciers to the north and east of the Kankakee area melting _ melting very rapidly! Lobes of ice were in areas now occupied by Lake Michigan, the State of Michigan, and eastern Indiana. Moraines to the south pooled Meltwaters, and huge lakes formed. But not for long.“The moraines were breached, and the result was among the greatest floods of the Pleistocene Epoch. This flood had impact not only in the Kankakee area, but in areas far away as well, southern Illinois in fact! The flood is known as the Kankakee Torrent. There were subsequent episodes of flooding, but none so great at this.

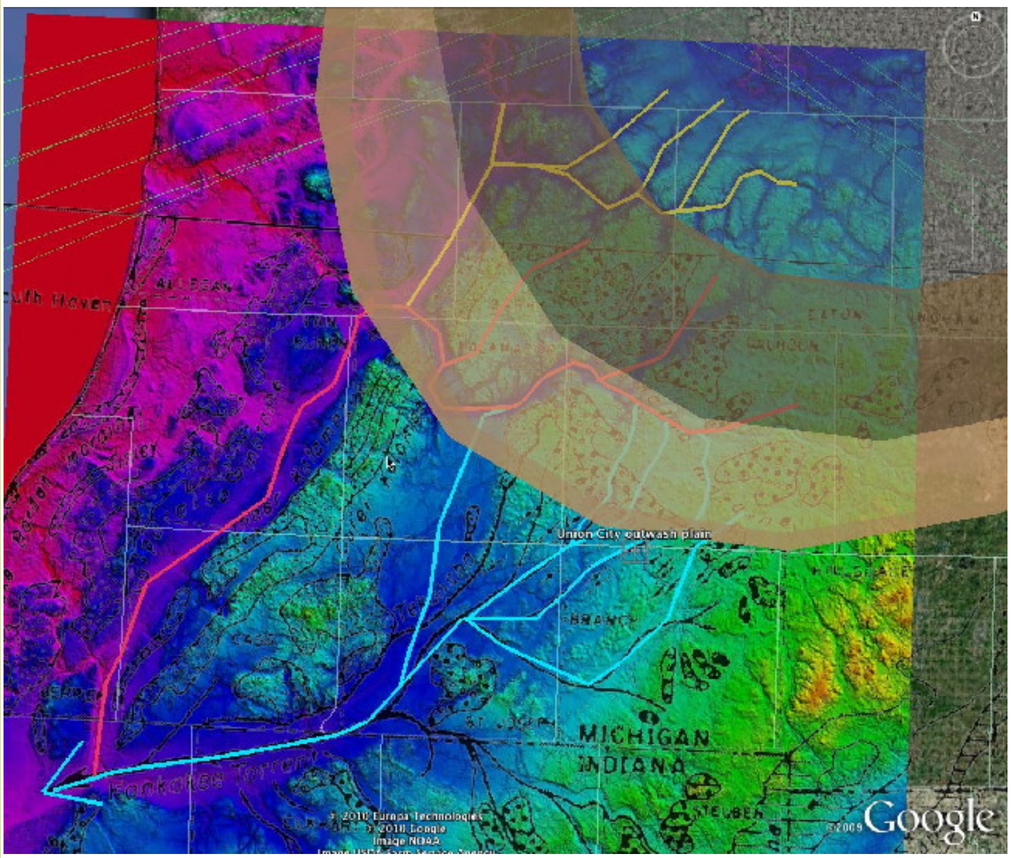
About.com Guest Column by GeoT, January 5, 2000 http://geography.about.com/library/misc/uckankakee.htm

When considering the excavation done by these torrents off the Saginaw lobe, it becomes obvious that the volume of water was far higher than that seen from across the moraines of the other Great Lakes during the deglaciation of the Wisconsin Ice Sheet. The common understanding is that a body of water formed against the retreating Saginaw lobe, and at some point it breached the terminal moraines entrapping it. A constraint on the volume of water ponded is the relative height of the Saginaw end moraines, as well as the fact that these moraines are at the highest elevation across the central lower Michigan peninsula understood to have hosted the Saginaw lobe.The lobe's retreat is likely to have occurred in tandem with the Huron/Erie and Michigan lobe retreats, yet those two ponds did not generate an outwash as massive as the Saginaw Torrents. That the Torrent was driven to access the Illinois River Valley by way of the Kankakee suggests that either the Michigan lobe was still in position, or the moraines dividing the two lobes were too high to be broached at that time. The currently available research of the torrent presents a wide range of dates, from 17.k5 kya to 12.9 kya. We are proposing ~15 kya, at the Bölling-Allerød warming period snowfall spike.

The web-based presentation Of Time and the River contains a graphic describing the early-pullback of the Saginaw lobes:



Here is a Google Earth mash up of several elements that allow us to consider an alternative to the moraine-breach concept. The attached kml file contains these elements for your review within Google Earth.



Saginaw Lobe Outwash plain and oversized valleys

We propose that a massive elliptical crater, excavated primarily from the ice sheet, would have quickly become a significant lake in its own right, as it would be surrounded by ~1km thick ice sheet. We suggest that over a short period of time the water level would have risen enough to cause the ice sheet to hydrostatically lift from the terrain along the peripheral edges to the west and south west. Once the undermining got underway, the extensive field of tunnel channels known to exist would have been quickly created. The subsequent catastrophic outflows from the crater basin would easily create both the Kankakee Torrent as well as carving the CKRV. This process may have repeated a few times over the course of the following centuries as the drained pond allowed the sheet to reattached, allowing the crater basin to re-fill again. The channels created are typically 50 meters (150 ft) deep, and often several km wide. They are now occupied by under-fit rivers.

A corollary to the hypothesis would suggest that terrestrial ejecta lofted from the crater floor would have landed on the ice sheet across Michigan, generating vast fields of buried ice. A significant volume of research exists which has attempted to provide a reasonable solution to the extensive anomalies seen in glacial deposits and outburst flood channels in this area.

Several sub topics in our Saginaw Bay discussion are relevant here: Unique Till, Sheetfloods, Buried Soils, Early Deglaciation and Unique Glaciation.

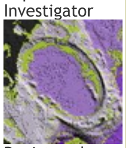
Attachments
SaginawTorrentFlows.kmz (113 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: KML to support discussion of the Kankakee Torrent

Edited by Cintos (02/13/10 06:53 AM)
Edit Reason: typos

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

Top

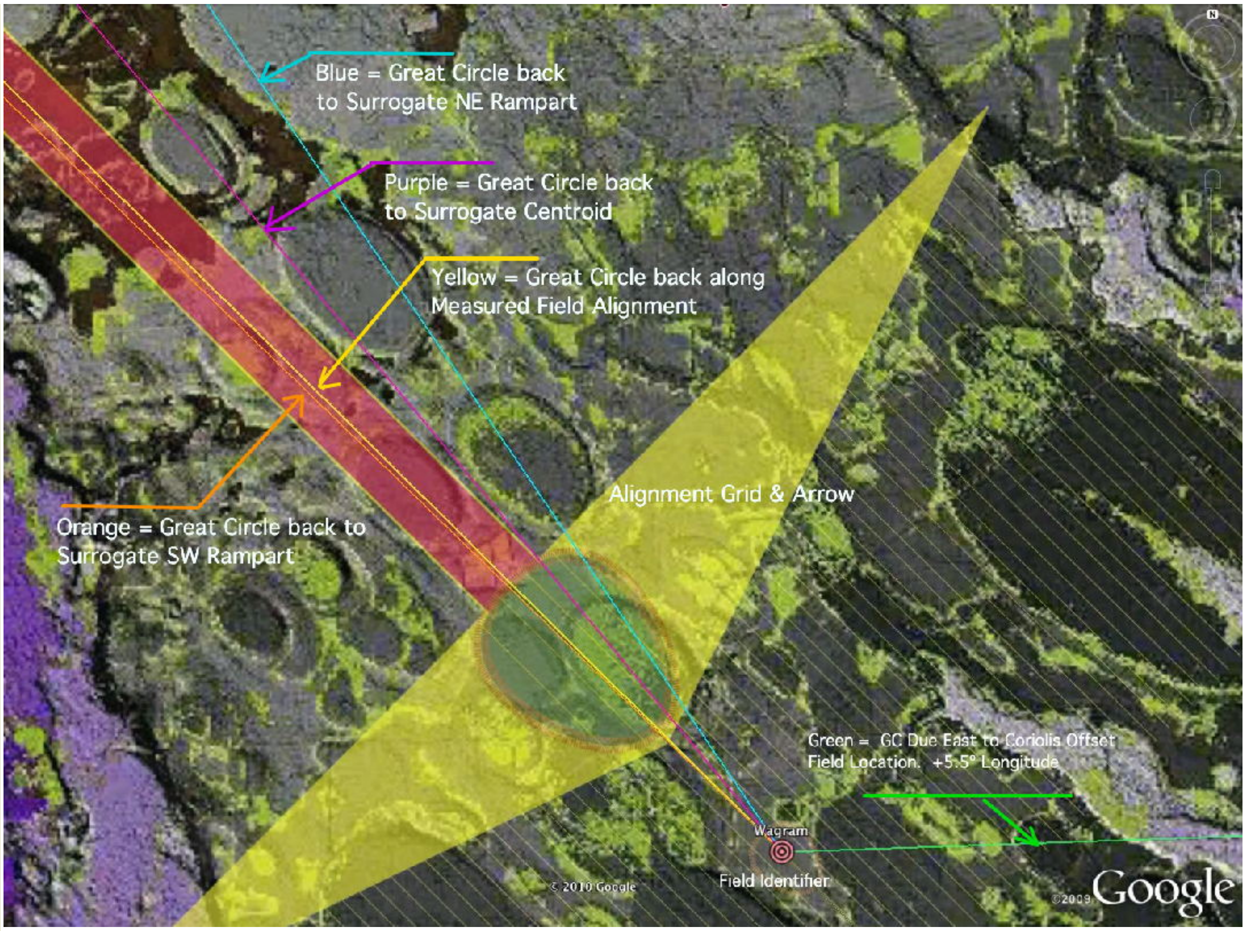
Better KML through Trigonometry [Re: Cintos] #1305557 - 02/12/10 08:35 PM

Cintos
Impactor Investigator

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

Greetings:

With the identification of Michigan's Saginaw area as a probable impact location, our research efforts have been reinvigorated. We can now offer additional approaches to visualizing the dynamics of the impact, and to enhancing the correlations between our conjecture and the landscape. As we discussed earlier, the inferred bearing is a function of the original loft azimuth, which would have deposited the fields of ejecta out in the Atlantic Ocean (for the eastern components) if the earth was stationary. An alternative to the Surrogate crater conceit is to offset the ***field*** due east by the Coriolis offset (currently 5.5 degrees), and then use trigonometric formulas to generate a great circle path back up the inferred arrival bearing.

The following graphic displays the Wagram Field , with the programmatically-generated Google Earth paths identified. Many of these elements have previously been discussed and presented in earlier kml files. Our kml generator can now create sets of great circle paths emanating from a point and traveling a suggested distance along a bearing angle. For instance, the yellow path in the graphic starts at the Wagram Carolina bay field and is projected northwest back along the empirically derived inferred arrival bearing (here it is ~135°). The green path at the bottom right runs to a point 5.5 degrees longitude due east of the Wagram site. The far end of the path defines a "target" location that this ejecta, if lofted from the Saginaw area, would have landed if the earth had not been rotating at 0.25° longitude per minute during a 22 minute loft period. Shoot at where the target will be, not where it is right now.



The next graphic displays the "Wagram.tgt" as a placemark, and another green path segment is generated back towards the proposed crater site, also using the field's inferred arrival bearing to drive the formula. These elements are available for all fields in the KML folder Bay Triangulation Computed , and is also in the attached kml file.

In the above graphic, the distal ejecta is hypothetically lofted from near the south western rim of the Saginaw crater, with an initial azimuth towards the "Wagram Tgt" location. However, as the earth rotates west-to-east during the 22 minute loft period, the eventual landing site in North Carolina "rolls" under the falling ejecta. The formula used to generate the great circle lines back from each the fields (both as-landed and the original Target site) is:

lat2 = asin(sin(lat1)*cos(d/R) + cos(lat1)*sin(d/R)*cos(θ))

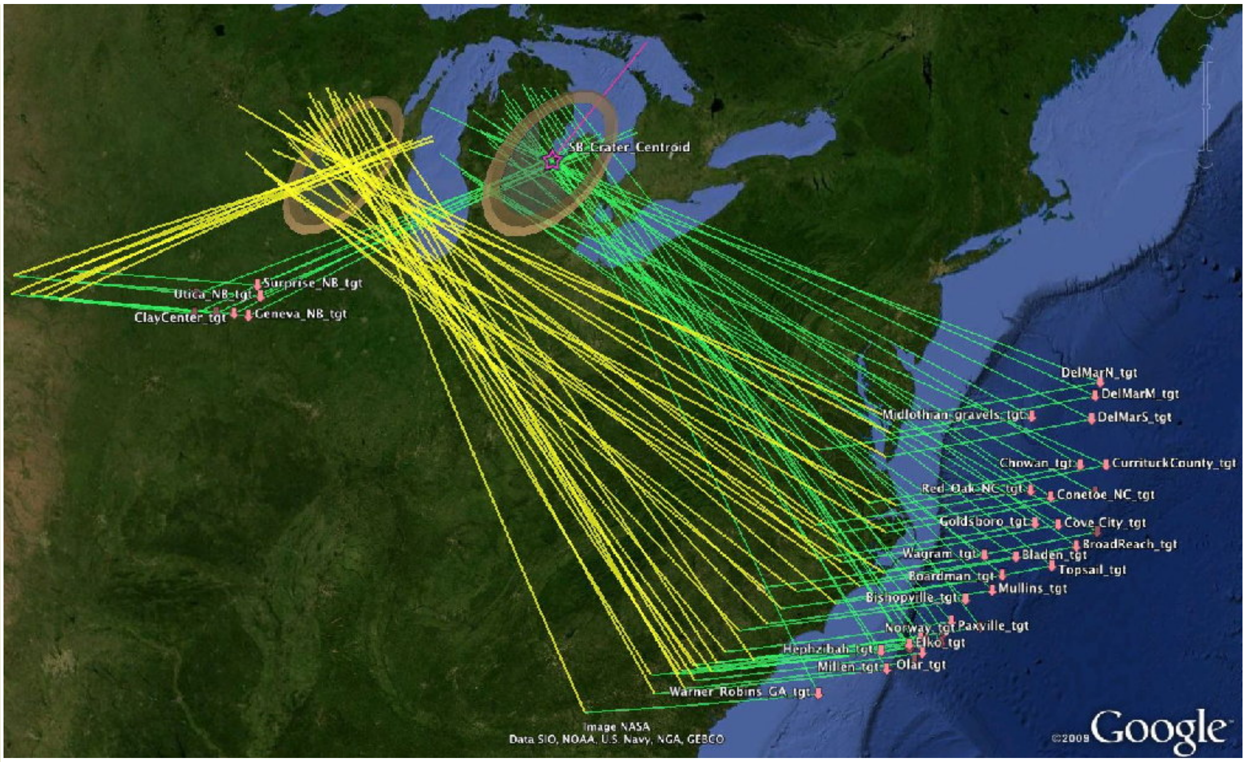
lon2 = lon1 + atan2(sin(θ)*sin(d/R)*cos(lat1), cos(d/R)−sin(lat1)*sin(lat2))

d/R is the angular distance (in radians), where d is the distance travelled and R is the earth's radius. θ is the inferred ejecta bearing, as empirically measured at the field.

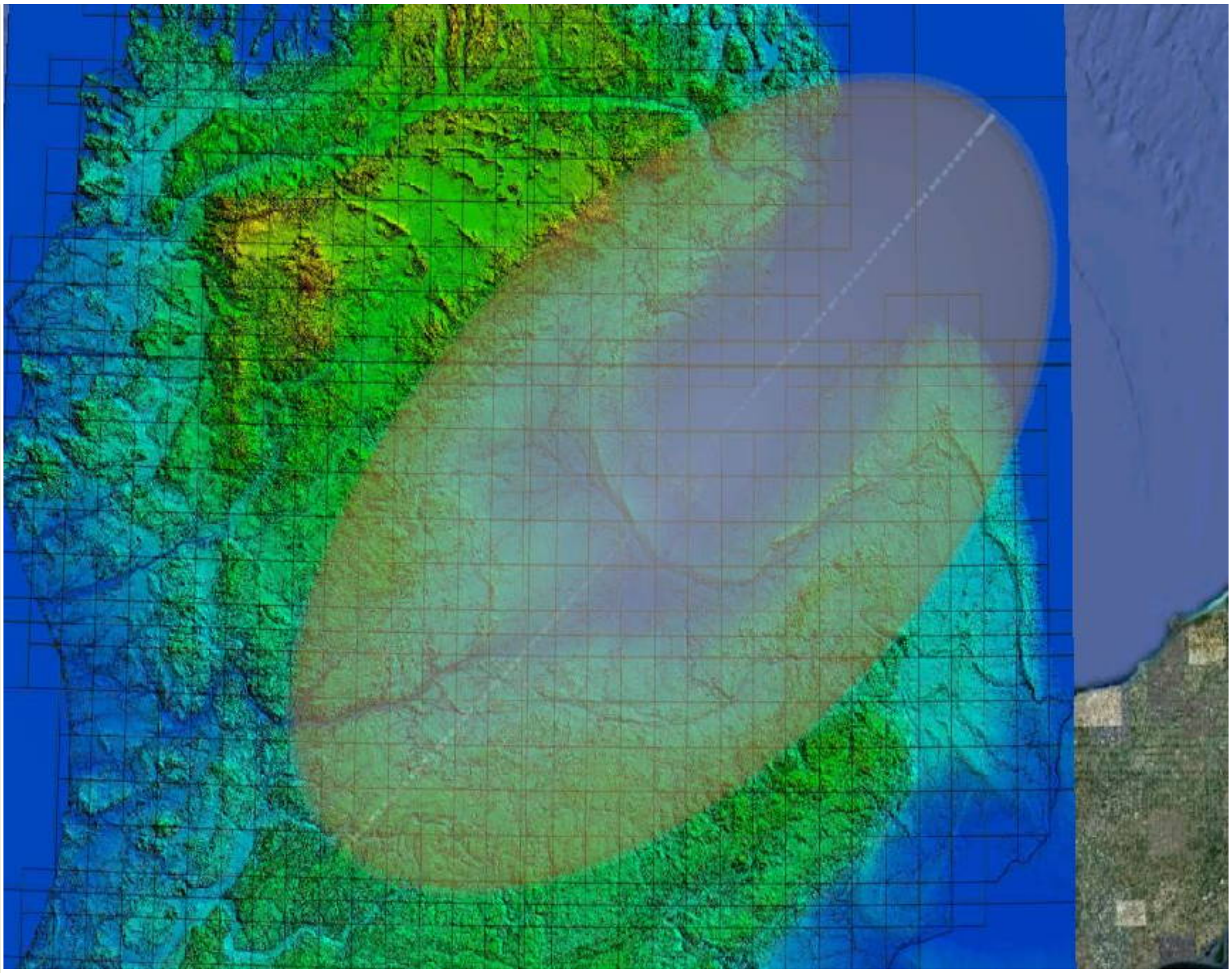
Where lat 2, lon2 are used to create a point back along the inferred alignment bearing angle. The path is then constructed with the distal field as lat1, lon1. The length of the path (used in the formula above as d) was empirically adjusted to truncate just beyond the identified crater sites.

With this model enabled in our KML generator spreadsheet, we can very easily generate a variety of "what if" scenarios. For instance, it is very easy to regenerate the entire class of great circle paths for our ~40 ejecta fields, using a different Coriolis offset (say 28 minutes). Of course, with the empirical data available, the triangulation (especially with the inclusion of the Nebraska fields) brings forward a fairly tightly constrained loci point for the crater.

Given our new tools, it is even easier to visualize the ejecta trajectories and to reassess and reconfirm our triangulation approach. The final mash-up suggest that the Saginaw Bay area is a probable impact site for distal ejecta lofted to the Carolina bay fields.



Confirmation of this area as an impact will likely take generations of research. Using visualization tools, however, we suggest there is a high correlation from a geometry perspective. Using kml elements in the attached file, the graphic here presents the area in Google Earth using two overlays: a color-ramp digital elevation mapping layer, and an appropriately sized and rotated oval shape file overlay.



We note the strong trend correlation across the northern and souther boundaries, as well as the overlap into the Kankakee Torrent flood plain in the southwestern end.

Experimental and planetary imaging has identified that oblique impact craters generate the deepest excavation at the uprange (arrival) end of the crater. Here, that point for our crater satisfactorily sits in one of the deepest parts of the Huron basin: the Bay City Basin (see the Huron_Bathy overlay in the kml). From that point, the land rises gently across the peninsula, reaching its greatest elevation at the southwest end of the oval overlay. Another common attribute of an oblique impact is the existence of a slight ridge - likely rebounded strata - tracing a line down the center of the structure. In our situation, the Charity Islands rise up from the bay directly along the oval's centerline.

Please note that we fully expect that the Huron lobe of the Wisconsinian Ice sheet would have eventually advanced into the excavated crater from the east, bulldozing the collapsed 1km high ice crater ramparts and leaving the existing set of terminal moraines behind as it deglaciated at the onset of the Holocene.

Thanks for sharing in my adventure...

Attachments
Saginaw_Impact_Correlation_Post.kmz (89 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: KML to support visualization of our inferred distal ejecta discussion. This is primarily a network link.

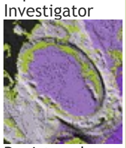
Edited by Cintos (05/06/10 11:46 AM)
Edit Reason: link updates

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

Top

De Skewing the Inferred Alignment [Re: Cintos] #1311272 - 03/02/10 12:29 PM

Cintos
Impactor Investigator



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

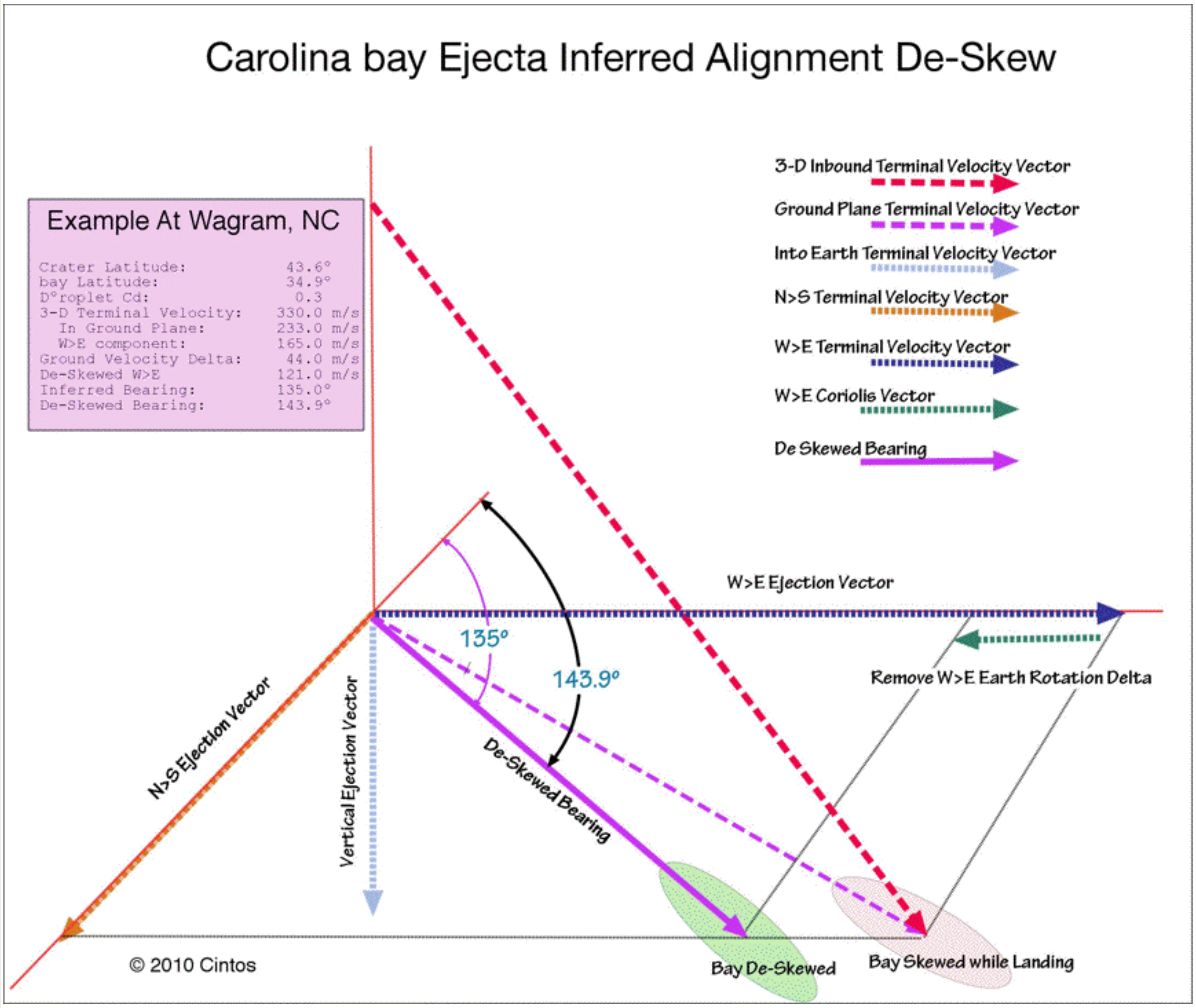
Greetings fellow earth browsers:

Correlation of the Carolina bay "Inferred Alignments" continues to suggest that, should they prove to be distal ejecta, they might be from an impact in the Lower Peninsula of Michigan. Perhaps the most problematic aspect of our analysis thus far has been the empirically-derived 22 minute required loft time. That value is not supportable by common trajectory models, which for a 22 minute transit mandate a steep loft to a very high apogee The resulting near-vertical reentry would not generate the "spread" upon landing required to generate an oval bay shape. At a more realistic 30 - 45 ° ejection, the loft time from two ballistic programs used are in the range of 400 to 600 seconds. We are now in a position to resolve that challenging aspect of the solution.

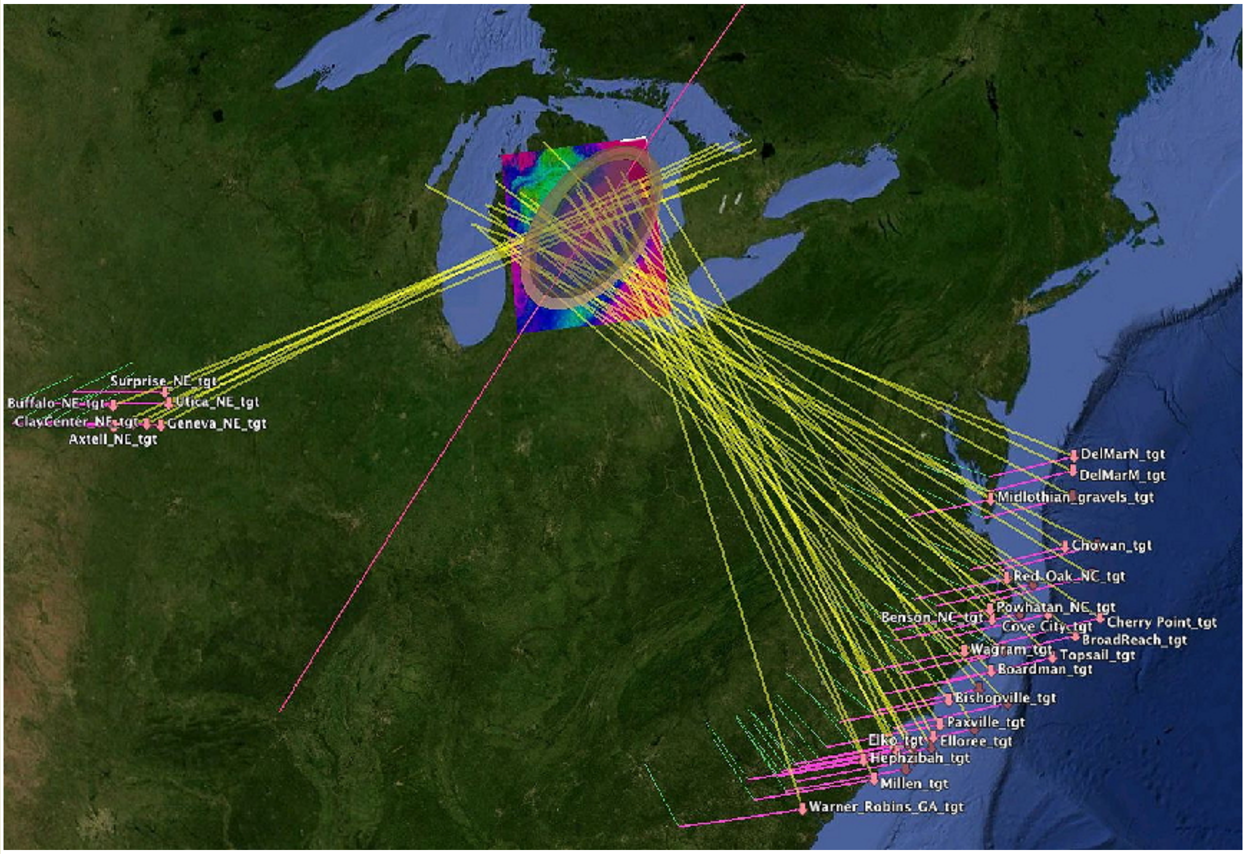
The "Systematic by Loft" model has been numerically extended by applying the "Systematic by Latitude" conjecture. While the Coriolis Force component is systematic by loft time, there is another factor superimposed on alignment that is a function of latitude. In the first case, the earth rotates at 0.25 degrees of longitude per second, regardless of where on the earth the consideration is 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 Saginaw Manifold example, a relevant set of w>e velocities would be our Sagianw Centroid point (43.58N, 83.94W) - rotating at 1,270 km/hr - and a generic ejecta field such as Bishopville - rotating at 1382 km/hr. At the time of contact, the 165 km/hr w>e velocity difference will resolved by a skewing of the "splat", effectively rotating the bearing in the counter-clockwise direction. To identify the true arrival bearing (which points back to the impact site), a de-skew model must be applied.

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 approaches the surface of the earth, where the atmospheric breaking effect on terminal velocity would be applied, effectively allowing for a higher W>E landing velocity than supported by the loft geometry. That effect increases in magnitude as the landing sites move more southerly. At our most southerly field, Warner Robins, GA, the ground speed difference is 197 km/hr. Amplifying the latitude effect, the 197 km/hr delta is applied to a W>E loft velocity vector that is smaller relative the those of the more northerly fields, resulting in a higher percentage adjustment. The following graphic attempts to exhibit the numerical adjustments we make to the inferred alignment to arrive at a de-skewed bearing for each bay. The graphic uses the metrics of Wagram, NC's field, and the numerical model generates a new bearing of 143.9° compared to the measured field bearing of 135°. This is the bearing we then apply at the easterly offset field location suggested using "Systematic by Loft Time".

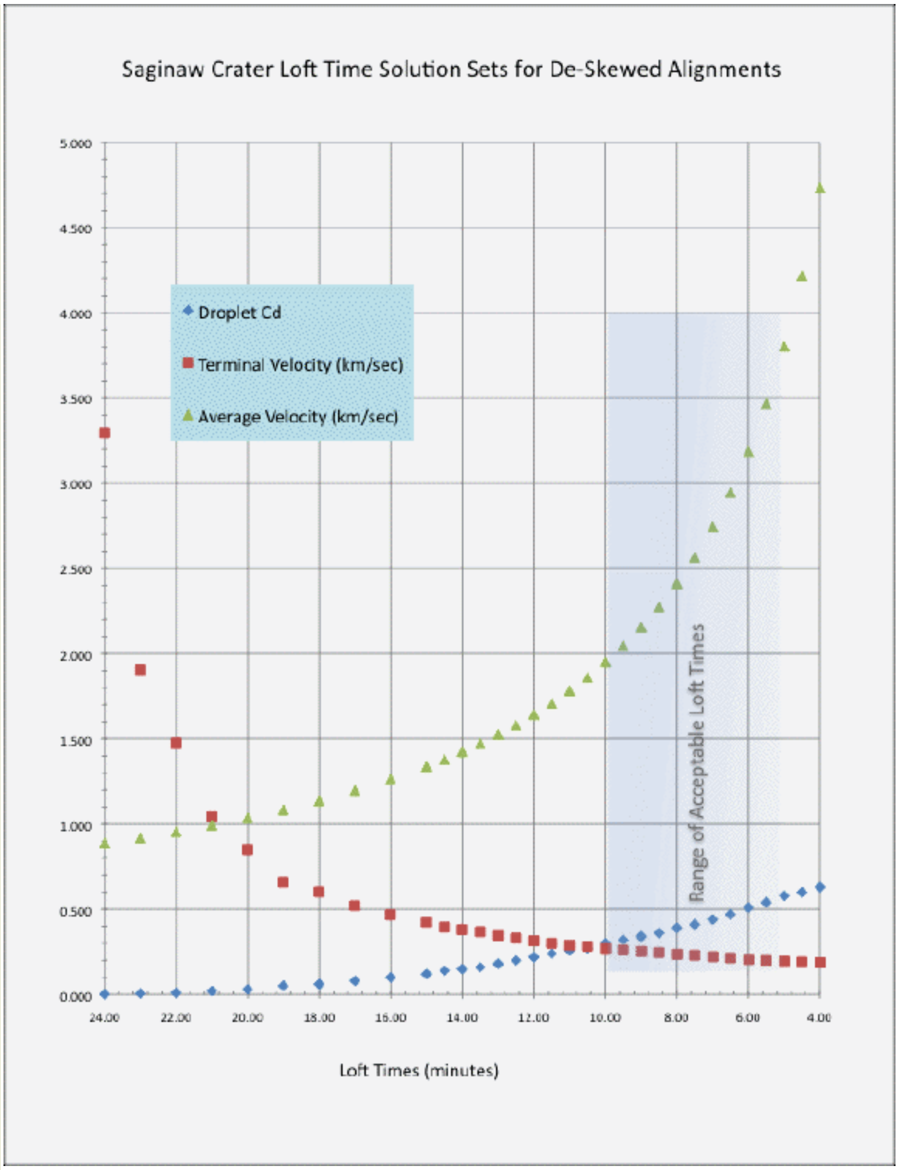


As the heuristic solution continued, we have assumed that a compute model could be developed that would iteratively resolve for a set of ejecta loft parameters from the Saginaw Impact area (ejection site along butterfly, loft azimuth, loft angle, loft velocity) that would satisfactorily correlate each of the Carolina bay structures with the empirically measured results. To further that goal, we have created a numerical model to generate the great-circle lines necessary to plot the west-to east offset caused by the Coriolis force (systematic by loft time) and the earth-surface rotational speed differences (systematic by latitude). By using the model, we solved for a Saginaw area loci and generated the following visualization in Google Earth.



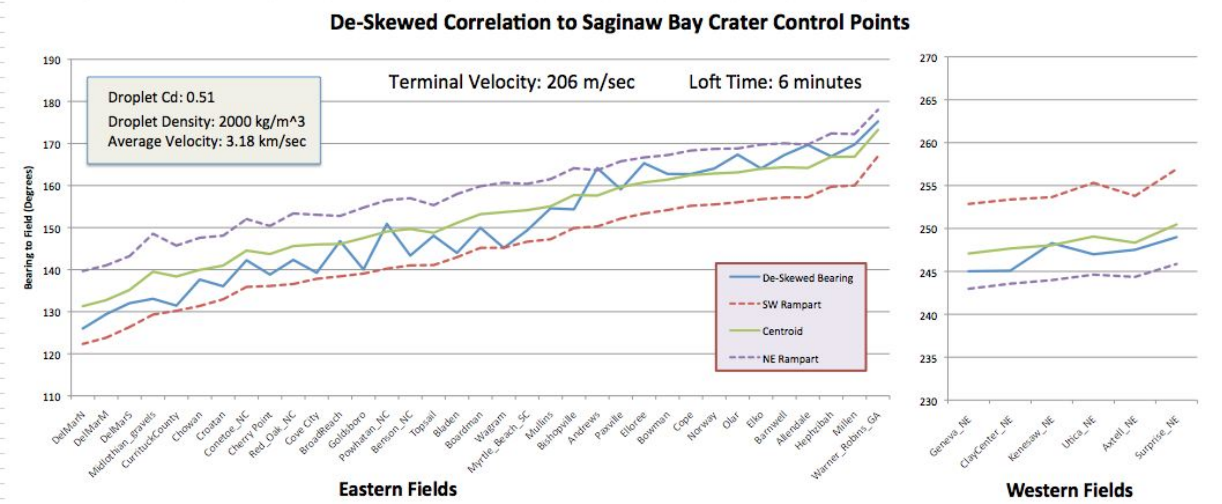
The elements generated include a short green line representing the measured inferred bearing at each field, a pink line to the east representing the loft time offset, a surrogate field placemark (tgt) representing the "stationary earth" trajectory target of the ejecta loft, and a yellow line representing a great circle line back from that target along the de-skewed arrival bearing. KML elements for these visuals are available in the "Saginaw_Rotate_deSkewed_8_min" folder in the attached file.

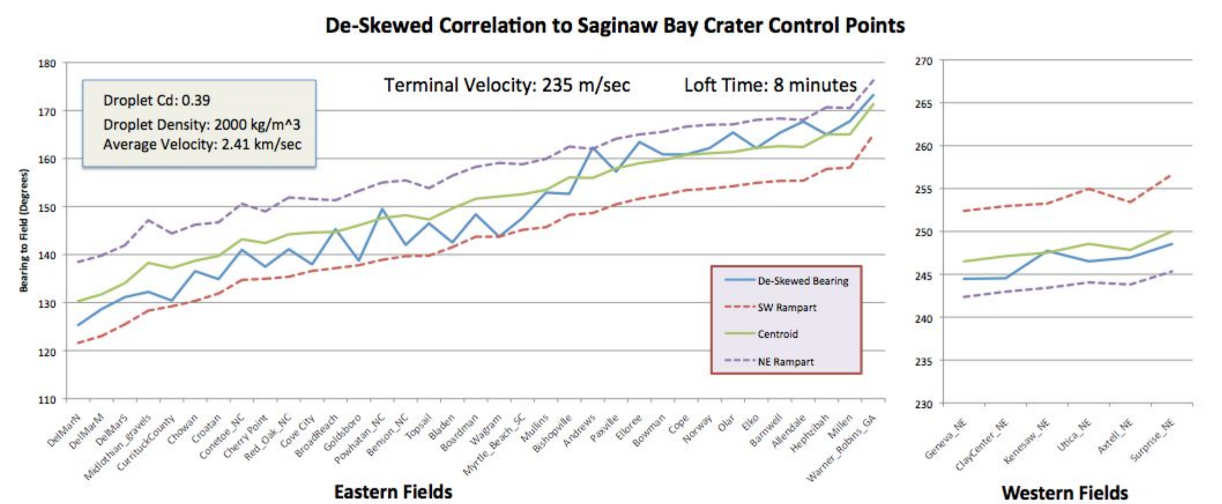
Here is a graphic which attempts to represent the relationship between the atmospheric drag on the ejecta droplets (Cd) and the resulting terminal velocity and average trajectory ground-velocity for a series of Saginaw loft time solutions. This chart was generated by varying the proposed loft time from 4 to 24 minutes, while varying the droplet Cd to reach a solution for all bays such that their bearing paths triangulate within the Saginaw crater ramparts.



The chart suggests a realistic range of probable velocities and resulting loft time solutions. As the average velocity exceeded ~2 km.sec, the terminal velocities required for a Saginaw loci solution approached a 200 m/sec asymptote. Empirically, this would suggest that the ground vector component of the terminal velocity of the ejecta was ~200 meters/sec. We believe that the 200-300 meters/sec range for terminal velocities that were identified are highly correlated to the ~360 meter/second value seen in a separate terminal-velocity calculation for a 100-meter diameter droplet of ejecta. Note that only the ground vector of the velocity is being considered in the de-skewing calculations, which would be lower than the total 3-D terminal velocity, The value of ground component would depend trigonometrically on the vertical angle of incidence that the ejecta approached at; these calculations assume a 45° angle.

Google Earth path sets for each of the plotted points in the chart above were generated to visualize the loci focus. The charts below are considered likely 'average" solutions to the set and use a loft time of 6 and 8 minutes (360 & 480 seconds). During the actual proposed impact, ejecta density and average velocities would likely vary by field, and thus vary the de-skew factor.





The entire range of correlation charts for the solution sets are displayed on a page at our web site (**Solution Charts** LINK). The attached KML file can be used to visualize the solution we have discussed here.

Our next effort is a web-based java script so that allows for others to input a bay lat/lon value and generate kml to "predict" the bay's inferred alignment for comparison to it's actual geometry on the ground. A beta version is available at deSkew Calculator. I'll be refining that over the coming days. What would really be neat is to add a new "Add" item in Google Earth so it could be generated within GE.

We maintain that the high degree of correlation demonstrated in our analysis and charts across these 42 disparate locations across the continental U.S. provide strong support our hypothesis of an ejecta blanket event.

- Michael

Attachments
SystematicByLatitude_Post.kmz (73 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: KML to visualize Systematic By Latitude Post

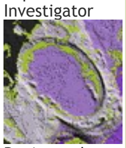
Edited by Cintos (03/02/10 03:46 PM)
Edit Reason: typo

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

Top

Predicting the Inferred Orientation of a bay [Re: Cintos] #1314779 - 03/15/10 02:44 PM

Cintos
Impactor Investigator



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

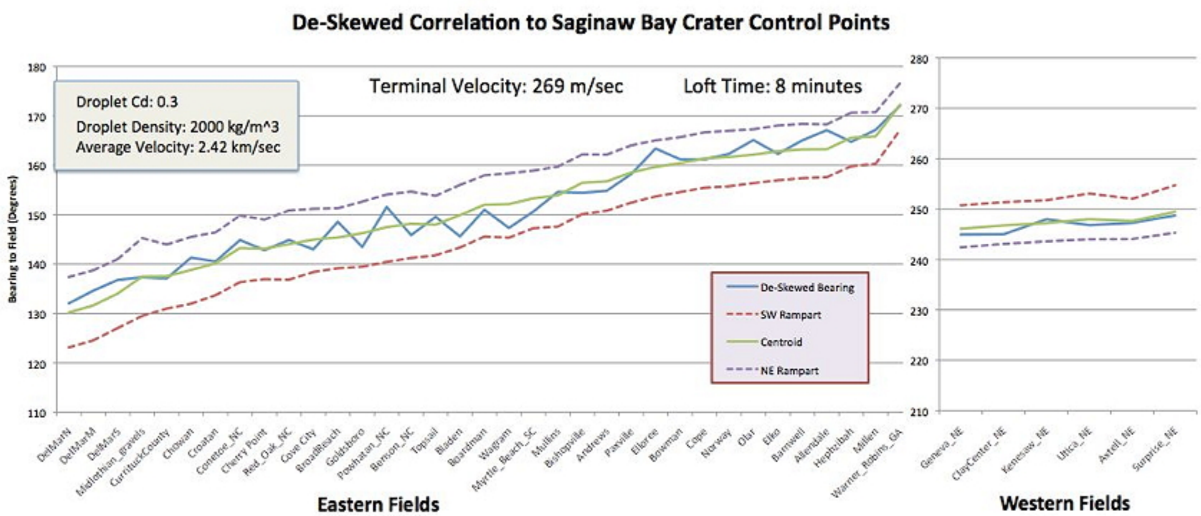
Greetings:

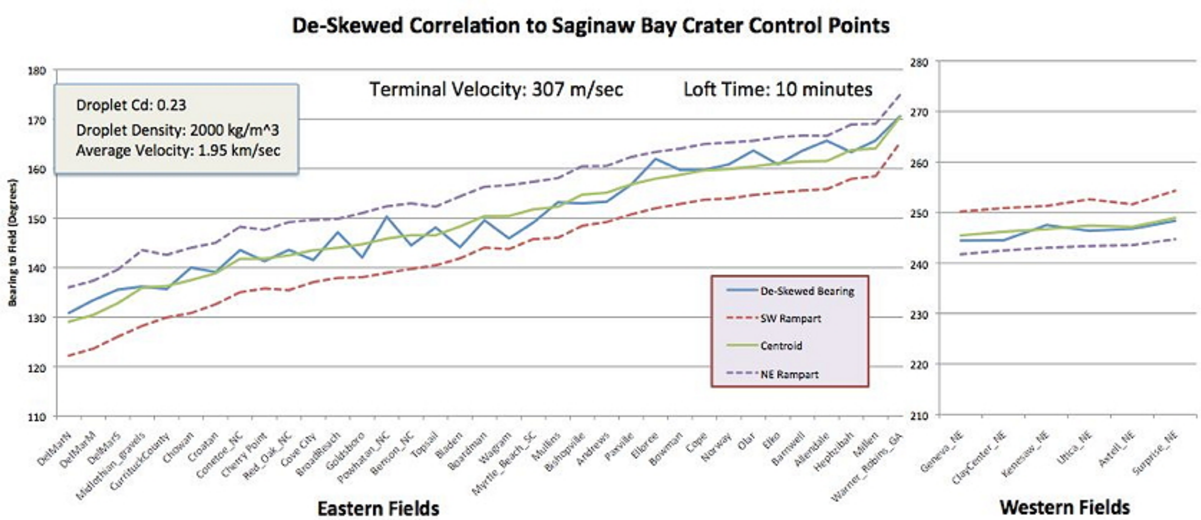
> **Quote:**
>
> The great physicist John von Neumann once disposed of a mathematical argument by saying, "With four adjustable parameters, I can fit an elephant; with five I can wiggle his trunk."

The mathematical model developed here is considered by us to be very simple and elegant. The only variables being perturbed are the average velocity of the ejecta during its flight (with loft time as the tuning proxy) and the terminal velocity of the falling droplet of ejecta (with the pellet's coefficient of drag Cd as the tuning proxy). At each field of bays, we extract the latitude and longitude as test-case input constants. The model was heuristically focused on the Saginaw Bay proposed structure and it's three control points (NE, Centroid and SW); those latitude and longitude values are similarly applied as constants across all calculations. The 42 bay location "fields" represent many thousands of individual bays, and the solution sets are resolved against all fields simultaneously, with all predicted bearings falling within the control points. While it would seem plausible that the ejecta at any given location may actually have a density or velocity different from other locations, the model did not have to leverage such fine tuning to arrive at simultaneous solutions for all 42 fields.

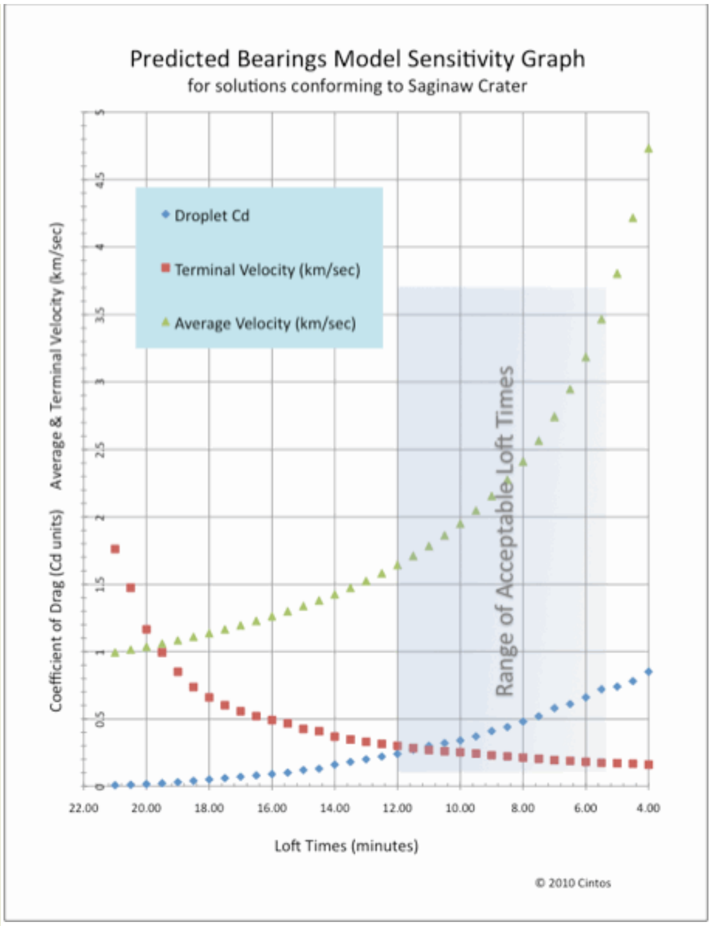
The model in use can generate correlations directly against an empirically measured bearing which is then de-skewed back to the proposed Saginaw crater location (as in the last post), or by starting with a single point (lat, lon) and generating predicted bearing sets which we compare visually against a bay at that location (which is discussed here) . The series of tests using both methods also generated sensitivity tests for the solutions.

Here are two plots, at 8 minutes and 10 minutes loft time, of the model's predictions of bearings compared to the actually measured bearing.





The only variables are the loft time and the terminal velocity (as a function of density and Cd). As shown in the figure below, the most acceptable solutions are found with a terminal velocity (in the ground plane) of 200 - 300 m/sec. We find this correlation to be highly supportive of the model's validity. Here is a sensitivity graph showing how the variables relate for the 42-field solution sets.

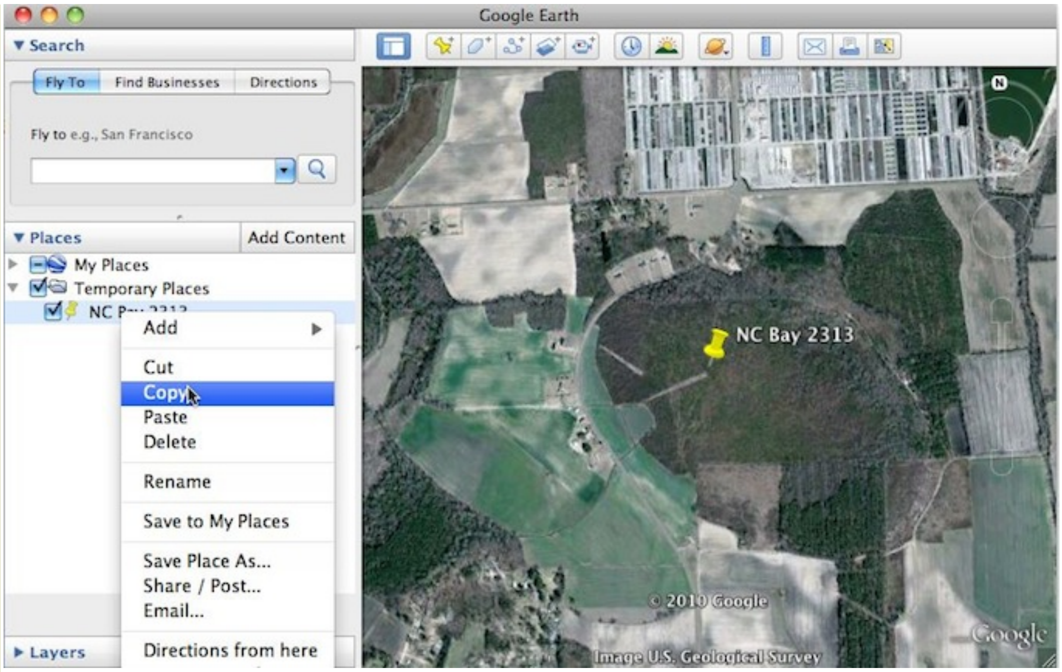


In the last post, a beta version of a "de-skew" calculator was offered, which only addresses the loft time. A version of that is still being developed that would allow a user to create a two-point path in Google Earth as they perceive the orientation, and then de-skew that input to create a path to the proposed crater.

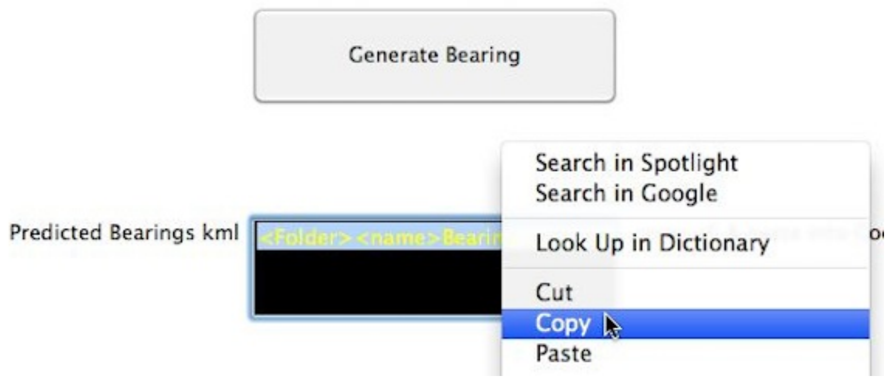
Here, I'd like to offer another Java web-based calculator which attempts to generate inferred bearings at a user-chosen location. These "predicted" orientations can then be compared by the user to the actual visual orientations. The predictions are based on the systematic-by-loft and systematic-by-latitude computations we have discussed previously. The code is a bit easier than the de-skewing goal, as I only need to parse out a single point rather than a two-point path segment. I believe the forum visitors would benefit from having both capabilities.

The process of using the calculator < **Linked HERE** > is straight forward for the Google Earth user. A more detailed help page < **Linked HERE** > is available on line, but a few shots are shown here.

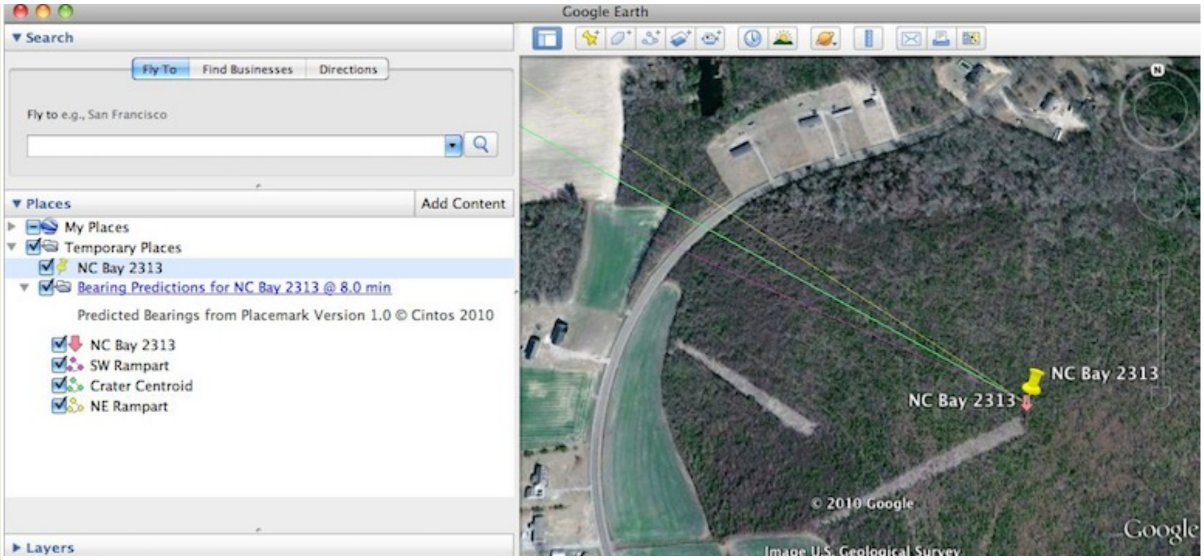
Create a placemark { Add Placemark } within a bay or field of bays. Add a useful name to the placemark. Use the copy function to place the placemark's kml on the clipboard.



Next, access the calculator and paste the copied kml data into the input window (be sure to clear out any old entries there). Click the "generate" button. Click into the result window at the bottom, and { select all } & { copy } to place the generated kml on the clipboard.



Finally, go back to Google Earth and paste in the kml.



The defaults for a solution set are pre-set in the calculator window; they should generate a set of bearings that bracket the site's inferred orientation. It would be neat if I could figure out how to integrate the generator directly into GE, but for now, copy/paste will need to be leveraged.

UPDATE!! The calculator has been updated significantly, and will be the subject of a new post soon. IT should be usable now in Windows environments. In the meantime, have a look at the Prediction Calculator .

Attachments
Predicting_Bay_Orientation_GE.kmz (62 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: kml network link containing elements for evaluating the distal ejecta hypothesis as a solution to the Carolina bay enigma.

Edited by Cintos (05/06/10 11:54 AM)
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

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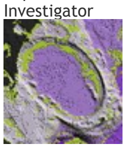
Carolina bay Bearing Calculator [Re: Cintos] #1316027 - 03/19/10 08:39 PM

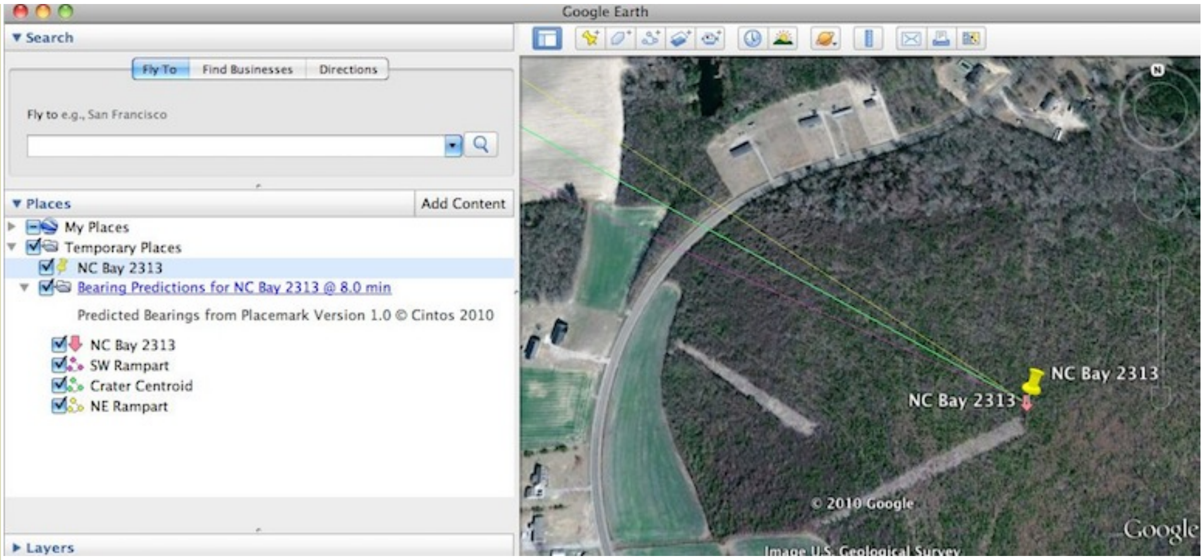
Cintos
Impactor Investigator

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

Greetings:

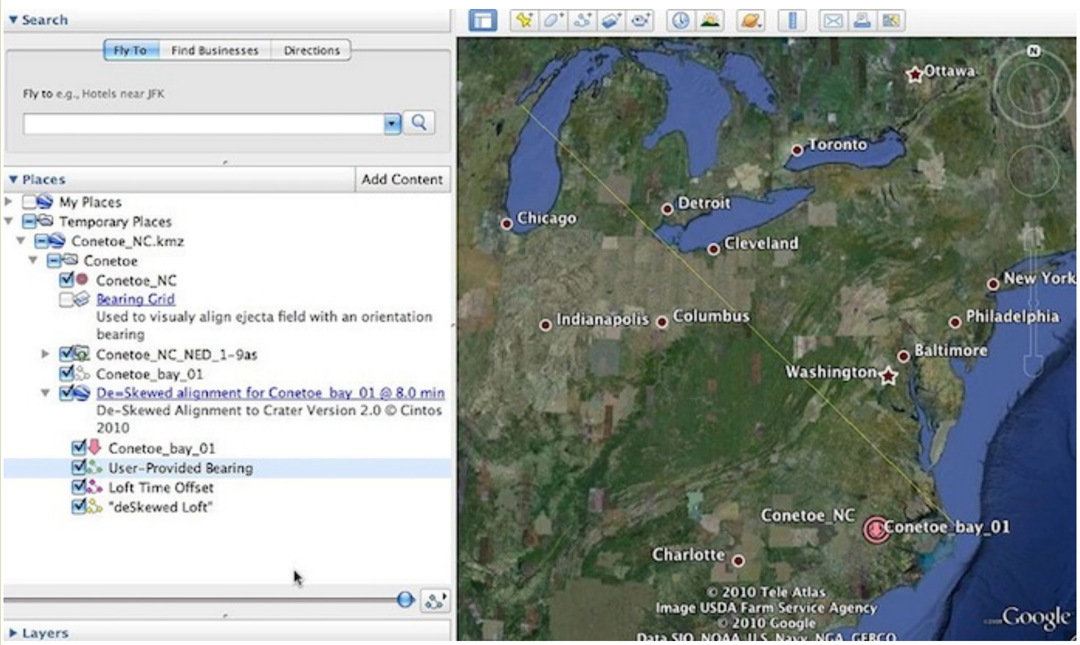
In out last post we introduced an early version of a java web-based calculator to generate Google Earth kml elements for visualization of our numerical model. The code has improved enough to re-introduce it here, along with a discussion of its new features. The earlier version had me challenges running on many windows installations; we hope this one functions better.

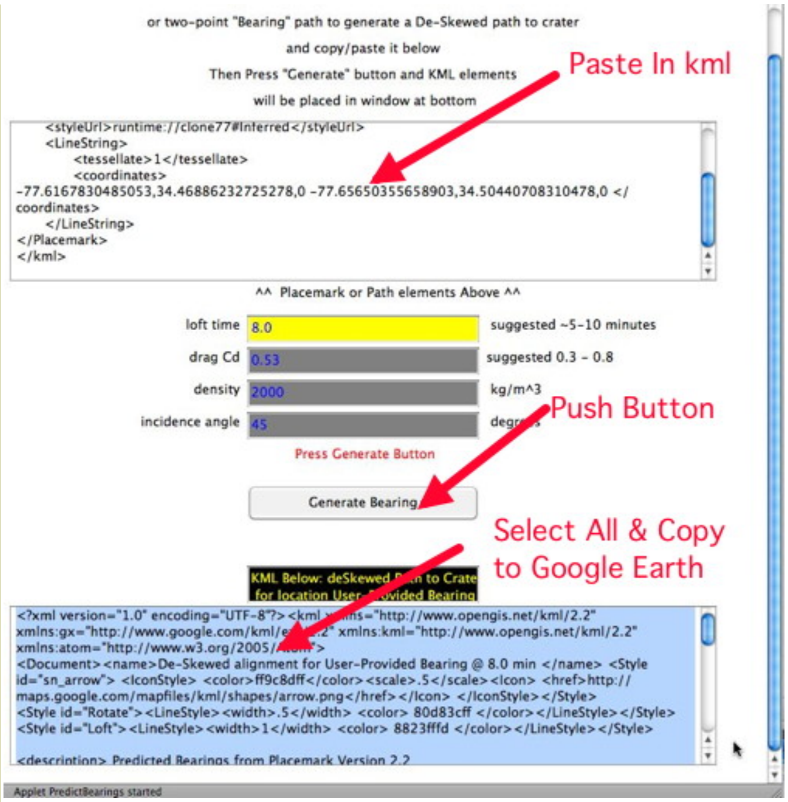
To allow the user to interact with the model, a java web-based application was written. The "Bearing Calculator" can be driven with two different sets of data, resulting in two different types of Google Earth visualizations.
By creating a simple placemark in Google Earth, the calculator can generate predicted bearing sets which you can compare visually against a bay at that location. The calculator can generate correlations directly against a user's (that's you) measured bearing (by starting with a "Bearing Arrow (overlay) you create in the placemark case), which is then programmatically de-skewed back to the triangulation points. The series of tests using both methods also generated sensitivity tests for the solutions.

In the first case (POINT) the user creates a single placemark in Google Earth near a bay. That placemark is copied into the calculator and a set of elements is generated for use back inside of Google Earth. The elements identify a "Predicted" set of orientations for the site: one path shows the model's prediction for a path to the oval Saginaw craters' centroid, and two other paths predict the alignment if the ejecta had been lofted from the crater at the northerly and southerly ramparts. Positive correlations is found when the bay's alignment falls within the predicted set. (Link to the **Point HELP** page)



In the second case (Arrow) processes the "Bearing Arrow" (generated above) in Google Earth, after it has been aligned by the user along their best-guess inferred alignment. That overlay kml is copied into the calculator and a set of elements is generated for use back inside of Google Earth. The elements identify a set of orientations for the site: one path shows the user's input path, another path visualizes the loft time offset due east as a function of loft time, and the final path flows back along the model's de-skewed bearing. Positive correlation comes from a series of triangulation's between eastern and western fields which fall within the suggested oval Saginaw crater. (Link to the [Arrow HELP] page)





The calculator defaults to an 3 km/sec average velocity and a Cd of 0.3. These values can be changed, along with the density of the ejecta and the angle of incidence of the fall. The calculator determines which case is being requested by reviewing the user's input kml.

Please reference the two help pages and the calculator (Linked **HERE**), located at the Cintos.org web site.

Attachments
Predictions_Calculator_Support.kml (59 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: Support items for using calculator

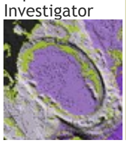
Edited by Cintos (05/06/10 12:06 PM)
Edit Reason: update calc feature list

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: Inferred Orientation of Distal Ejecta [Re: Cintos] #1316860 - 03/22/10 11:19 AM

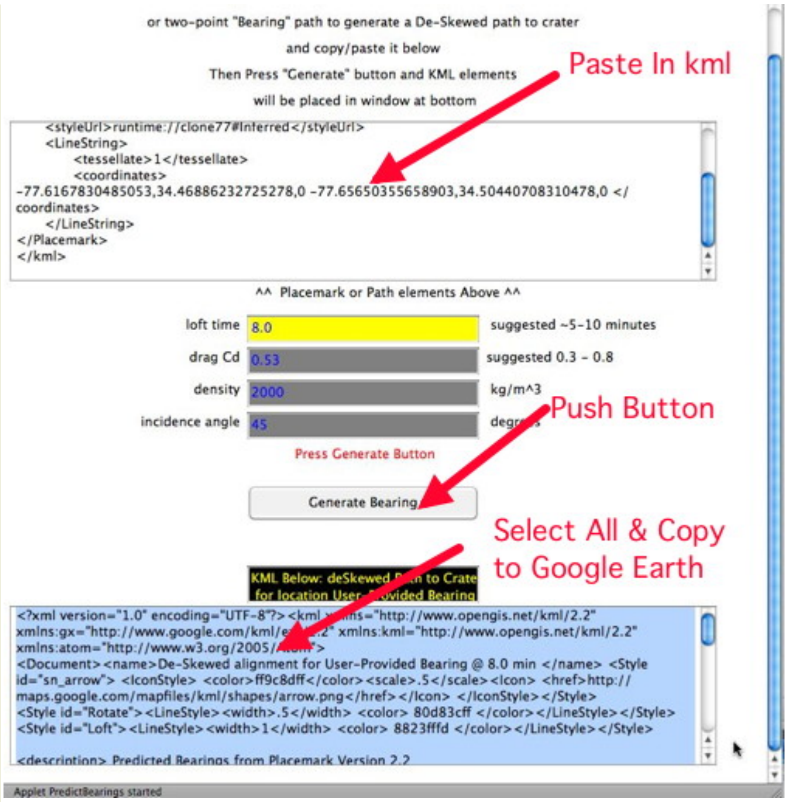
Cintos
Impactor Investigator



Greetings:

The calculator at **Version 2.2** has been enhanced with a variation of the trigonometric approach to de-Skewing or re-Skewing based on the terminal velocity. I encourage the reader to try your hand at comparing the calculator's predicted bay alignments against what you perceive to be a correct orientation (create a placemark in the bay and copy/paste that placemark into the calculator), or for you to create a path which is aligned with the orientation you personally perceive, and copy/paste that into the calculator to see where it predicts the bay "came from". (Link to the **HELP pages**)

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

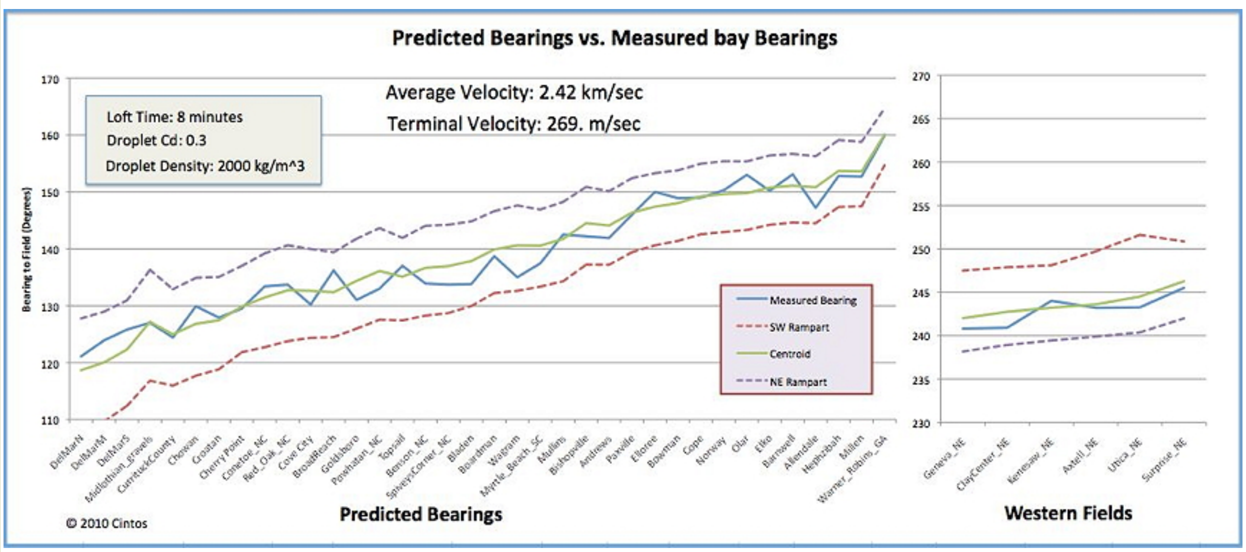


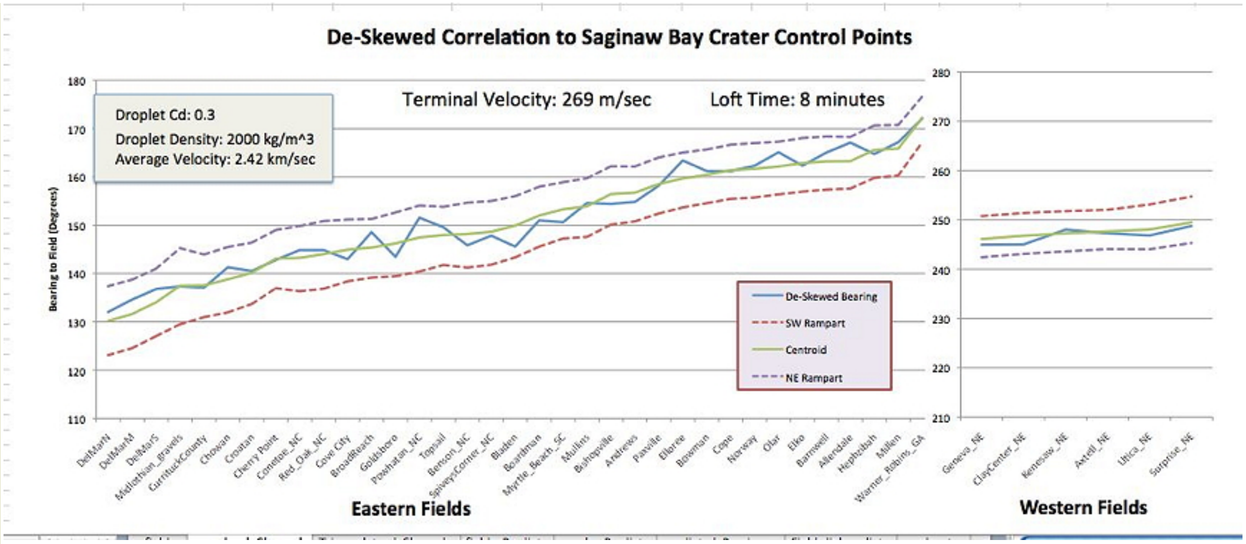
The earlier code used arcTangent to deduce the adjusted bearing, using the terminal velocity's n>s component along with the new w>e component (after adding or subtracting the w>e lattitude-driven differential ground velocity vector). That process did not yield reciprocal results for the two cases.

What I overlooked was that, since I am lengthening or shortening the w>e component, and the terminal velocity is a constant for the case, that the n>s component must change for the triangle to remain right. So it is inappropriate to rely on the n>s component in the reconstruction unless that change is accounted for. It is far easier to just simply use the the terminal velocity (hypotenuse) along with the w>e component (adjacent) and use arcCosine to recover the angle.

The numerical model now generates predicted bay bearings and de-skews empirically measured bearings such that they now have an even higher correlation to the proposed Saginaw crater site. Please note that the solved solution sets' Cd (and the calculator's defaults) have are now changed slightly (.3 vs .53 @ 8 min).

The graphs for the two cases, simultaneously-solved across the current 43 sites, are shown in the graphics below. In addition, the kml results for each case is included in the **attached keyhole file**, for both an 8 minute loft time and a 10 minute loft time.





Attachments
[Predictions_Calculator_Support.kmz](#) (51 downloads)
[Preview this file with the Google Earth Plugin](#) ([learn more](#))Description: support for calculator

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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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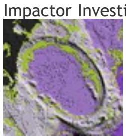
More Carolina bay "Fields" Documented [[Re: Cintos](#)] #1319312 - 03/30/10 04:15 PM

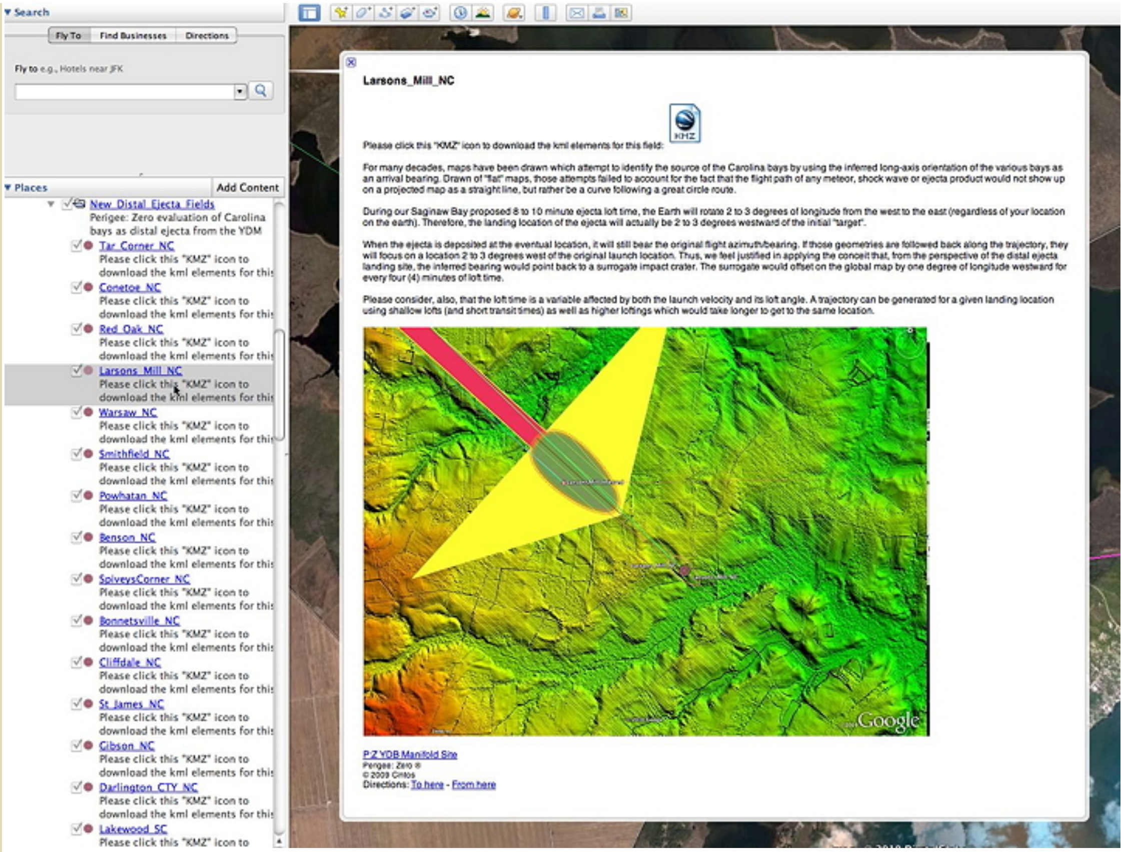
[Cintos](#)
Impactor Investigator



Greetings:

Much time has been spent scouring the continent for new fields of Carolina bays. The process is quite rewarding on the Eastern Seaboard, and the Ejecta Field count is up to 55, 48 of them in the east. These likely represent 10,000 individual bays. The attached file contains the index placemarks to the 17 latest Eastern fields. As before, the index placemark needs to be selected in Google Earth. In this example, we chose the Larson Mills, NC field:

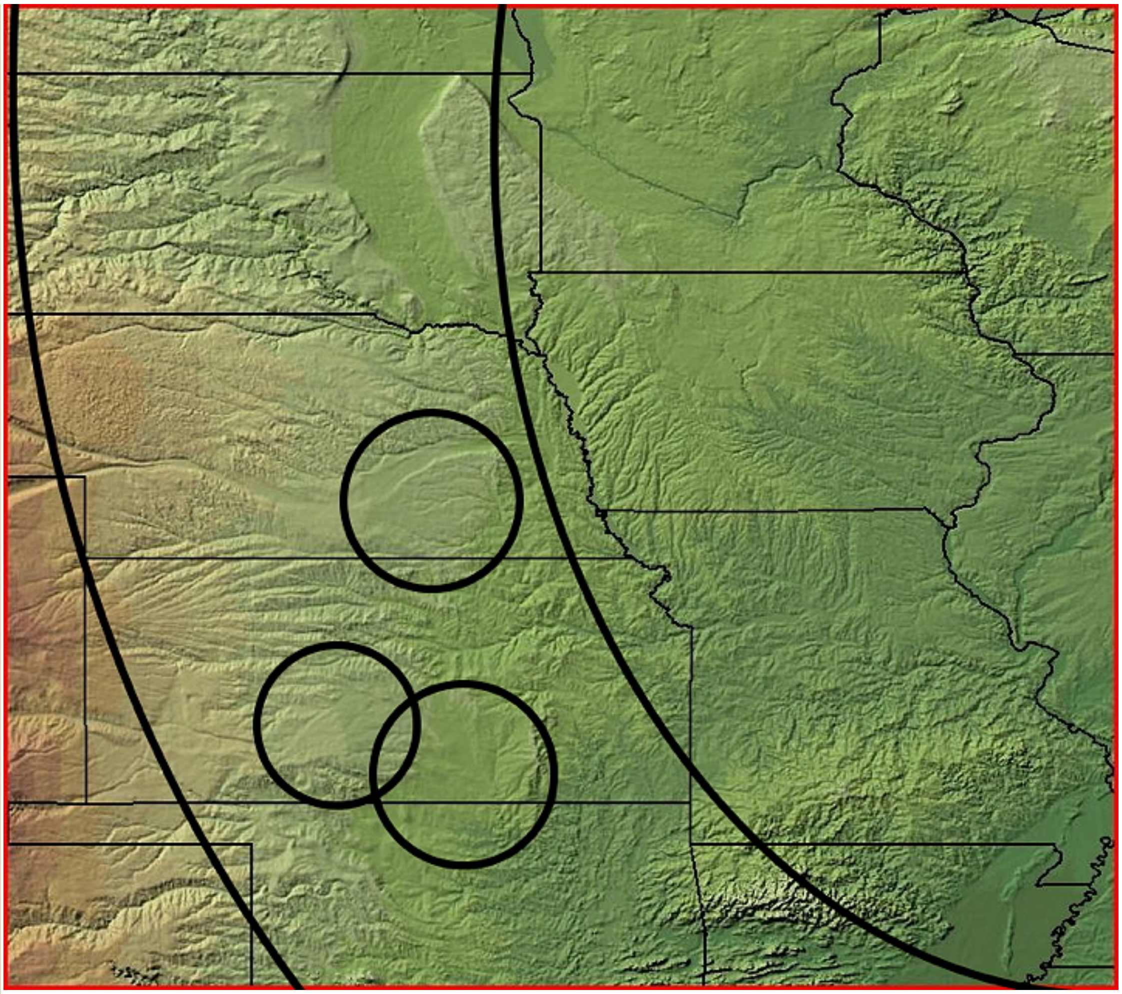
Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA



Clicking on the "KMZ" icon will retrieve a set of kml elements that include a color-ramp DEM image overlay. These really bring out the bay details!

The triangulation to Saginaw is dependent on the Western fields, but at the present we have only documented the Nebraska locations (initially identified by George Howard) which exist across a relatively small area of the proposed ejecta arc. The location is actually quite appropriate, as it is one of the few locations in the west that offer a relatively flat hosting terrain. Complicating the search is the understanding that much of the proposed arc was actually covered by glacial ice at the time, and while those areas across North Dakota, South Dakota, and Minnesota contain thousands of lakes, they are very random in shape and offer no orientation beyond that driven by river channels.

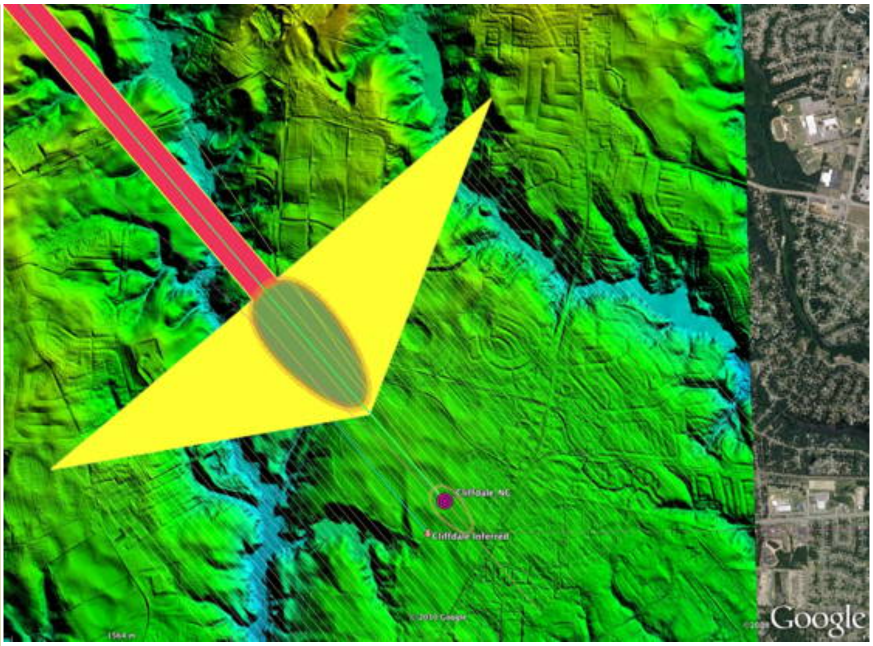
Here is a low resolution elevation map of the western areas. The current fields are located within the circle in the middle, and the relative flatness of the area is evident. The other two circles identify areas in Kansas we are continuing to explore for aligned lakes. The smooth flow-like areas to the north describe the glacial lobe paths.



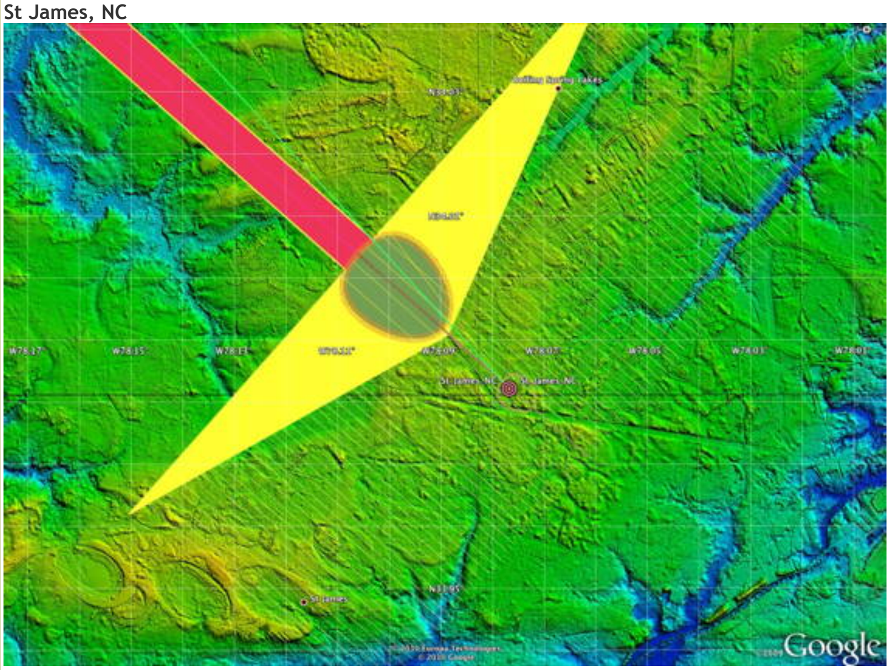
I find it quite stunning that these states, considered to be "flat and boring" have a considerable amount of rugged terrain, which shows up in the higher resolution NED data I have been using in the search (courtesy of the USGS Seamless Server). An occasional oval feature will show up in Google Earth imagery, but the NED data will then show it to be at the head of a ravine, or perhaps an oxbow on a river. Identification of a true "field" of bays is required, and when they are there, it is quite obvious. Areas such as Heron Lake, Storm Lake and Worthington with a couple of oval lakes are dismissed as unsatisfactory.

Just for a taste, here are three new field portraits:

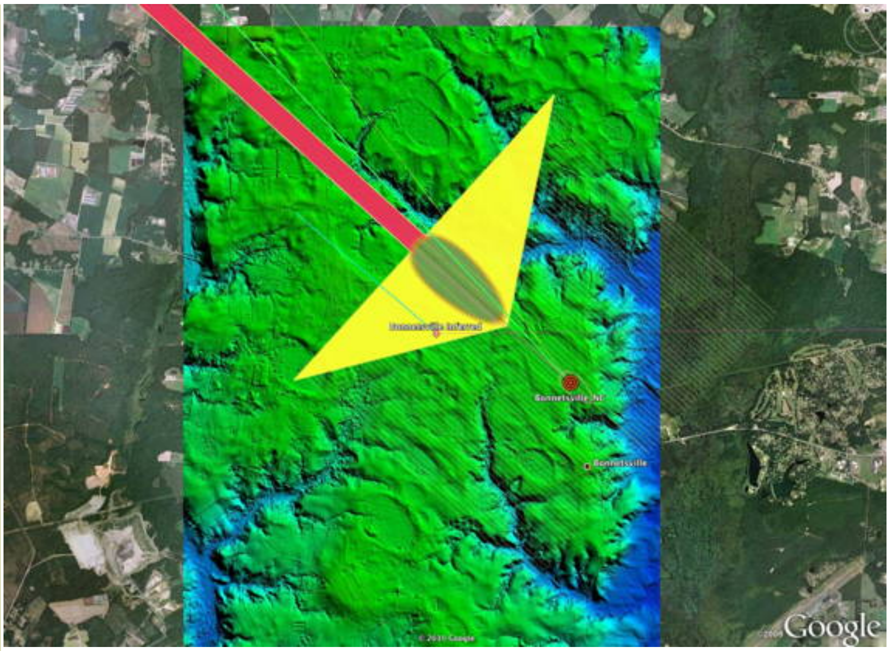
Cliffdale, NC



St James, NC



and **Bonnetsville, NC**



Attachments
[New_Distal_Ejecta_Fields.kmz] (53 downloads)
[Preview this file with the Google Earth Plugin] ([learn more])Description: 17 Carolina bay Fields

Edited by Cintos (03/30/10 07:14 PM)
Edit Reason: add file

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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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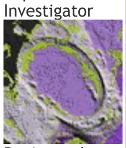
New Bearing Calculator Feature [Re: Cintos] #1320156 - 04/02/10 09:36 PM

Cintos
Impactor Investigator

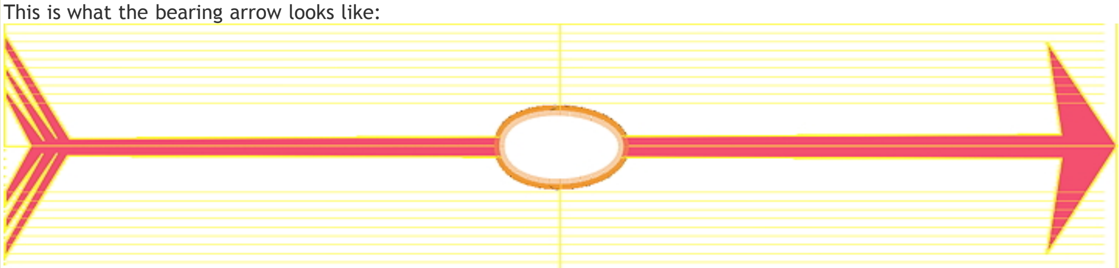


Registered: 01/27/06
Posts: 93
Loc: Connecticut, USA

Greetings:

A new feature has been added to the Bearing Calculator. In addition to a single placemark (to generate predicted arrival bearings), the calculator can now ingest a "Bearing Arrow" overlay. The Google Earth overlay kml element includes a "rotation" metric, such that when the user positions the bearing arrow overlay so that it aligns well with the local Carolina bay, that information can be passed to the calculator. The overlay also contains a large area of thin graticule lines to verify alignment with numerous bays at once.

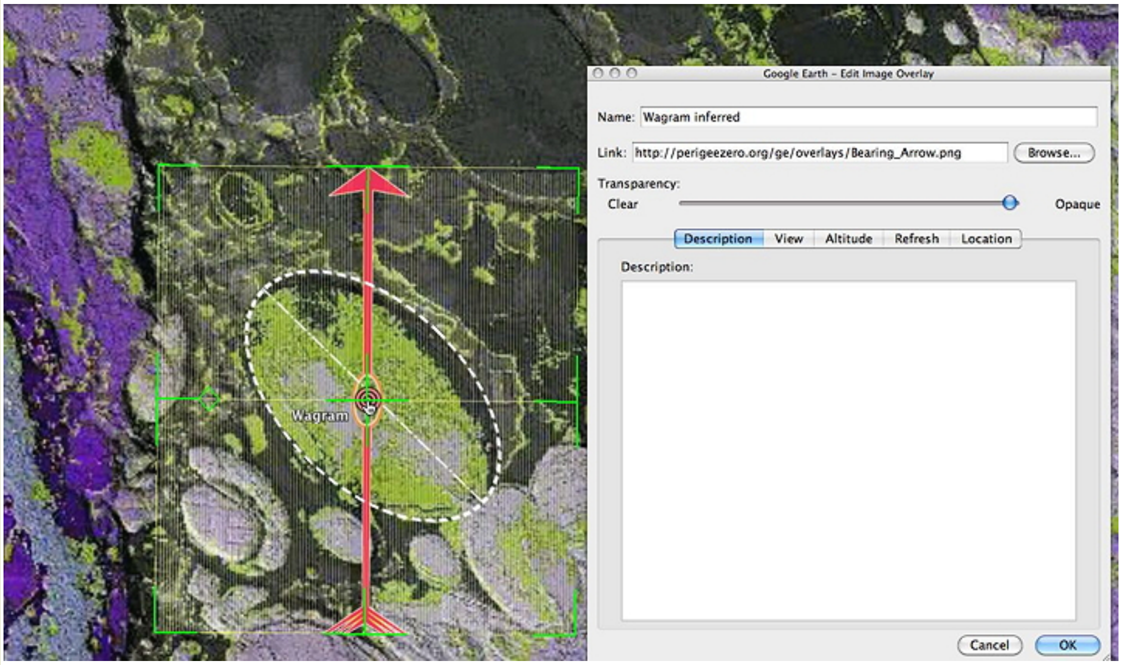
This is what the bearing arrow looks like:



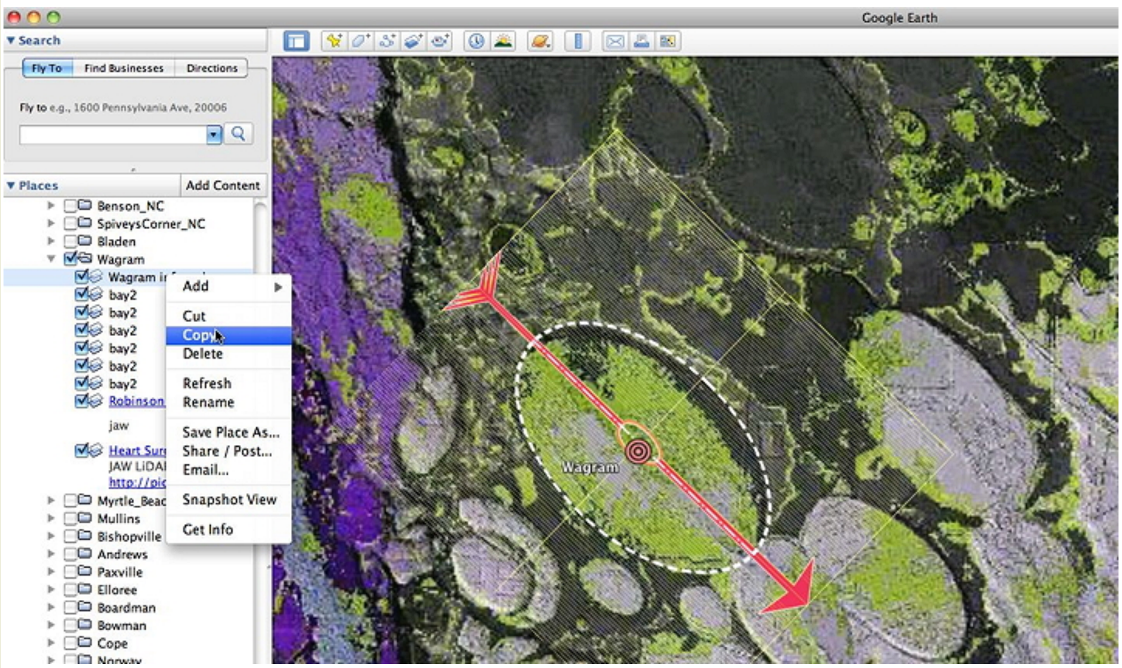
The url for the overlay is cintos.org/ge/overlays/Bearing_Arrow.png

A help page has been posted on the P:Z web site to discuss the use in more detail: Link To Bearing Arrow Help .

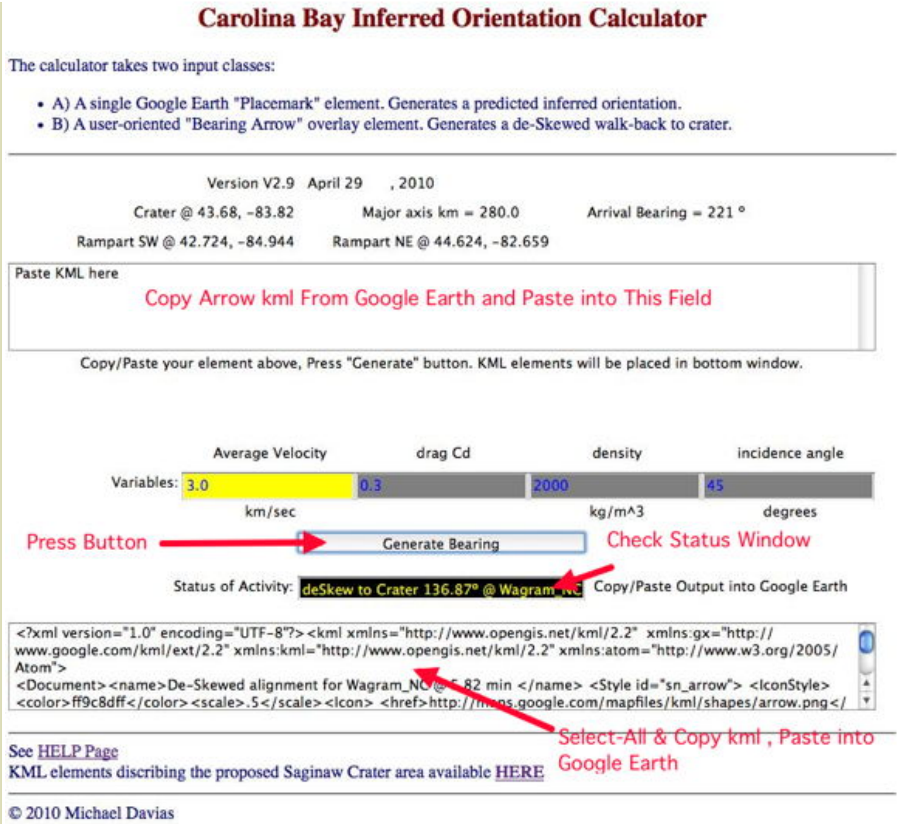
As a quick start, the graphic below shows a new overlay created at the Wagram bay field kmz .



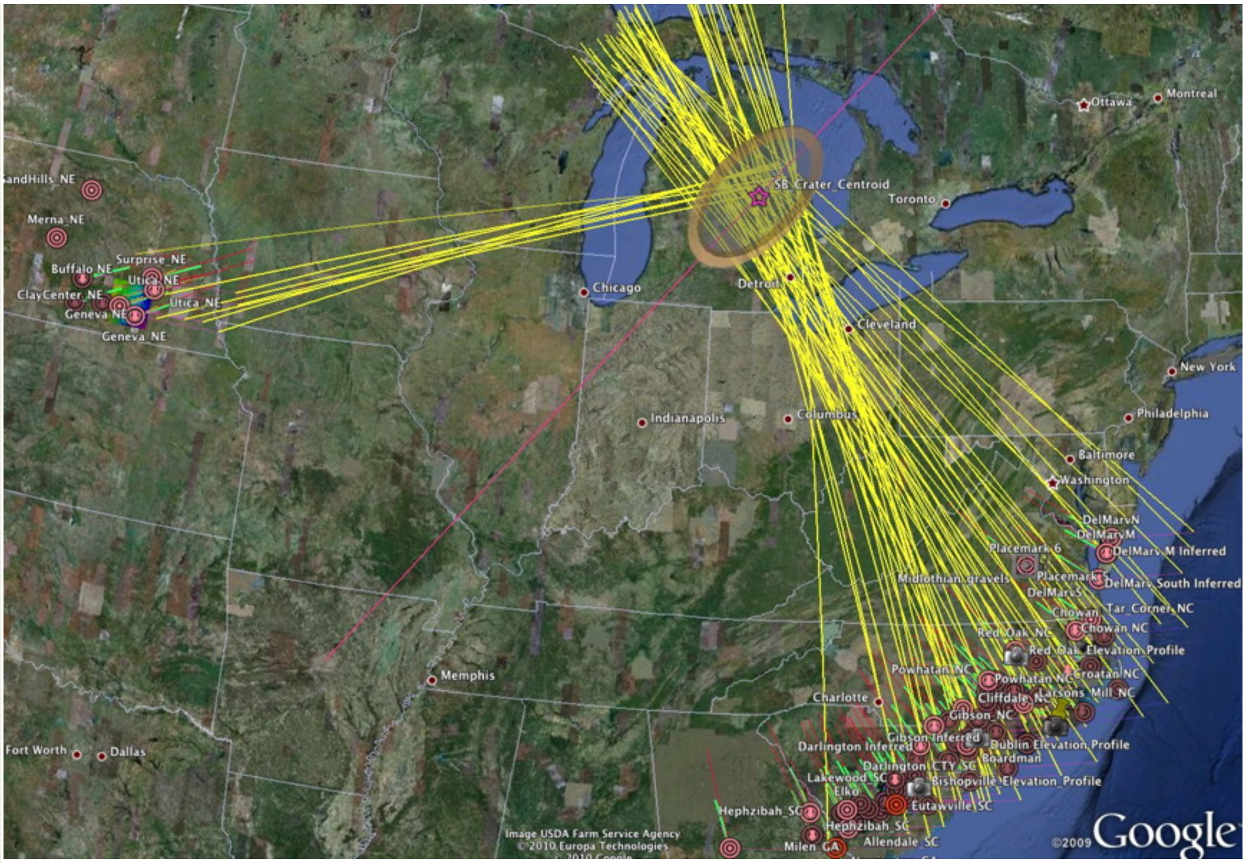
By selecting the overlay, then doing a "get info", the arrow can be stretched and rotated to suit the user's view of the bay field's orientation.



The overlay element is then copied from Google Earth and pasted into the Bearing Calculator's input window.



When the calculator's output is pasted back into Google Earth, a set of elements are created which "de-Skewes" the user's perceived bearing and traces back to the Saginaw area. The graphic here shows the full working set of about 65 Carolina bay fields as found in the attached file.



Thanks for ploughing through all this! There may not be a crater in Saginaw, but Google Earth is a whole lot of fun to explore in!!! Next up is a discussion of the Nebraska Sand Fields, and all the oriented bays across the area. Guess where their inferred orientation points?

UPDATE! The Bearing Calculator was enhanced beginning with V 2.4 to automatically include a Bearing Arrow as an element when the POINT case is used. Create a new placemark at the center of a bay, paste that into the calculator, and the Bearing Arrow will be provided oriented according to the predicted arrival bearing for that geographic location. You will still need to edit the arrow, as above, for fine tuning to the local bay orientation, then copy/paste the arrow back into the calculator to provide the de-skewed trajectory paths.

- michael

Attachments
BearingArrowPost.kmz (66 downloads)
Preview this file with the Google Earth Plugin (learn more)Description: kml for exploring Carolina bay orientations

Edited by Cintos (05/09/10 08:01 PM)
Edit Reason: update calculator feature

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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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Moderator: BeadieJay, Cyclonic, Delta102, Diane9247, dulce, esterrett, Frank_McVey, Hill, jeffryv, Jumble, Kempster, LuciaM, marinerfan, Noisette, NormB, no_stranger, tekgergedan, TheLedge
Hop to: Nature and Geography (Moderated) Go

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