

ORIGIN OF ATLANTIC COASTAL PLAIN PONDS IN NEW YORK AND NEW JERSEY

Shangtao Zhang and Gilbert N. Hanson

Department of Geosciences
Stony Brook University
Stony Brook, NY 11794-2100

The origins of the Coastal Plain ponds of New Jersey and North and South Carolina have been proposed as blowouts formed by eolian processes during the periglacial period between 20,000 and 13,000 years ago (French and Demitroff, 2001) or created by airburst related to a comet that broke up and then the pieces may have exploded over or on the Laurentian Ice Sheet near the Great Lakes and the Hudson Bay some 12,900 years ago (Howard et al, 2007), separately. The approach used in this study to test these models was grain-size analysis of the conspicuous rims of the Coastal Plain pond depressions. Cumulative curves and plots indicate that the rim sediments from these ponds have alluvial not eolian characteristics. Extensions of the long axes of the Coastal Plain ponds including those of the Carolina Bays, New Jersey and Long Island converge on the Great Lakes and Hudson Bay in Canada where the proposed comet pieces burst or impacted.

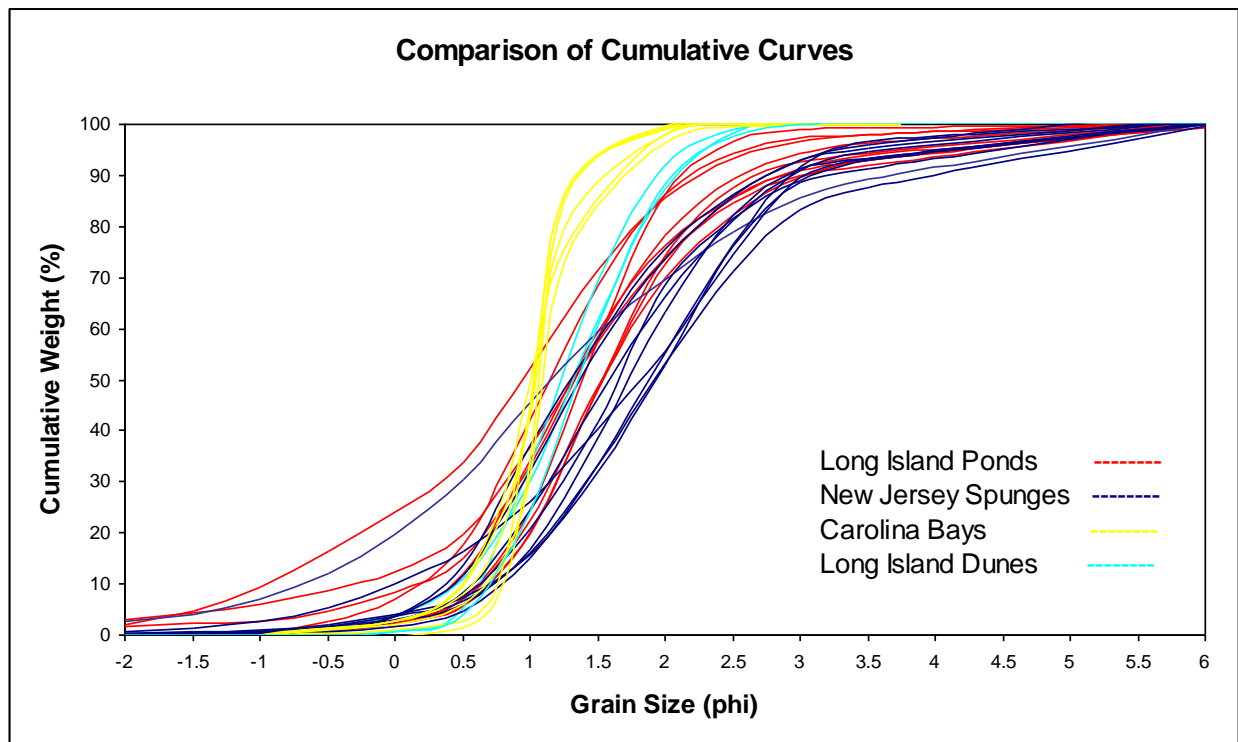


Figure 1 Comparison of the Cumulative Curves of sediments from the rims of New Jersey Spunges, Long Island Ponds, Carolina Bays and Long Island Dunes

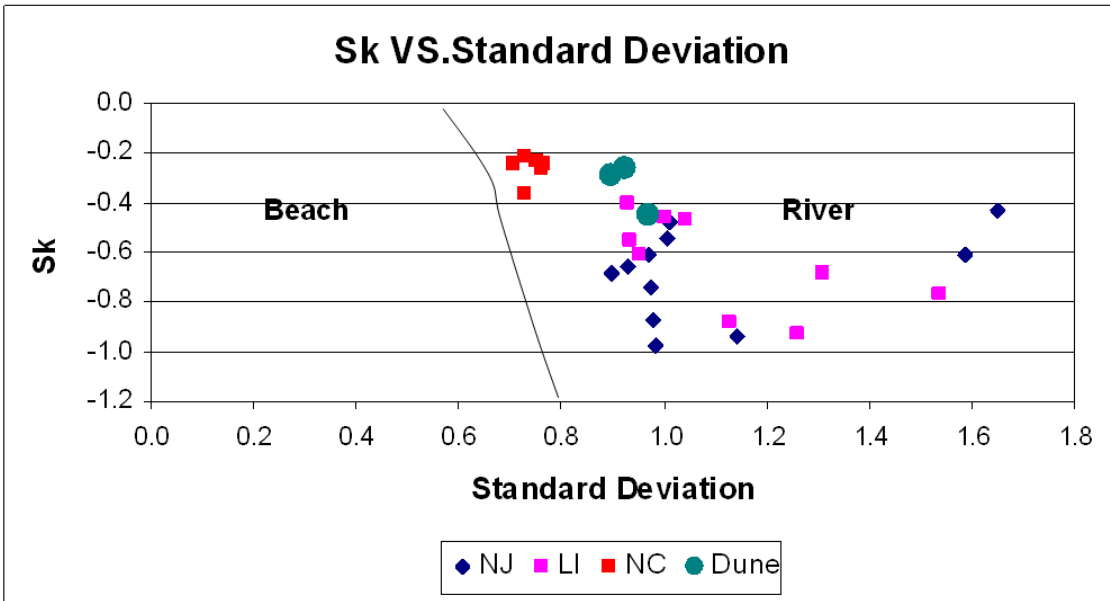


Figure 2 Plots of moment parameters: Skewness against Standard Deviation (After Friedman, 1961)

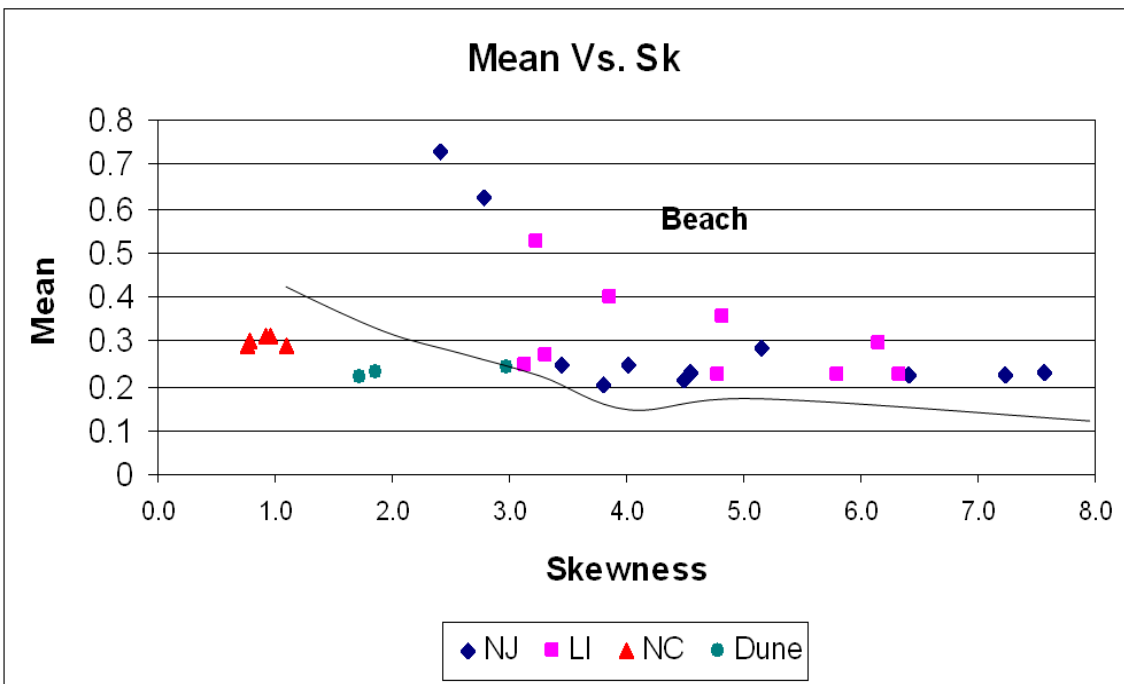


Figure 3 Plots of moment parameters: Mean against Skewness (After Friedman, 1961)

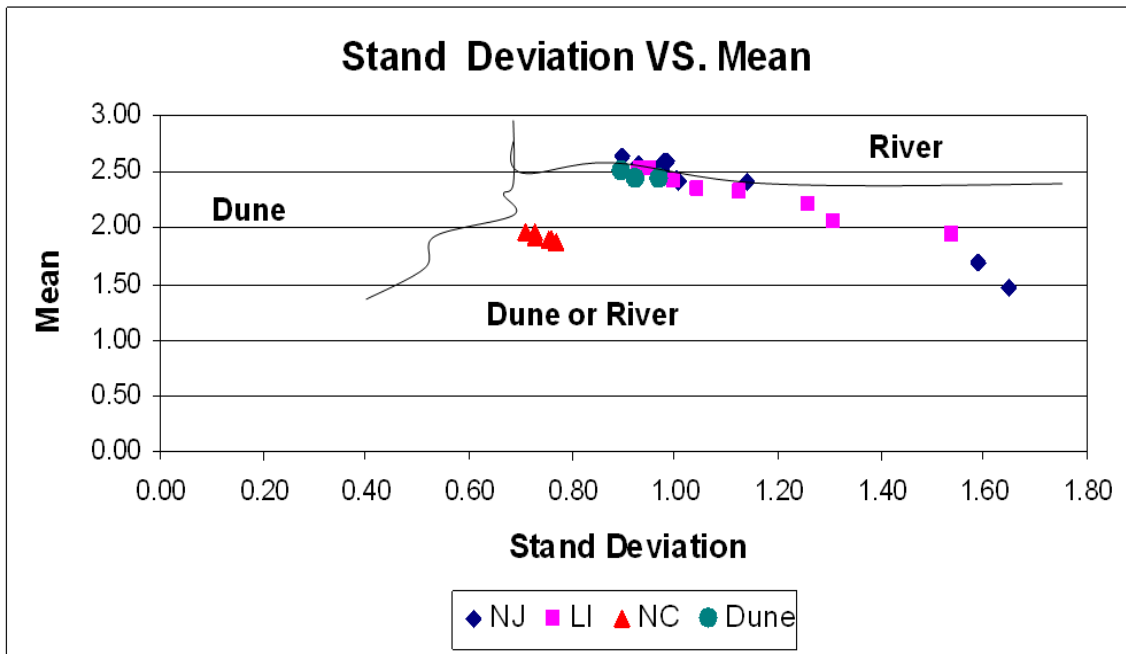


Figure 4 Plots of moment parameters: Mean against Standard Deviation (After Friedman, 1961)

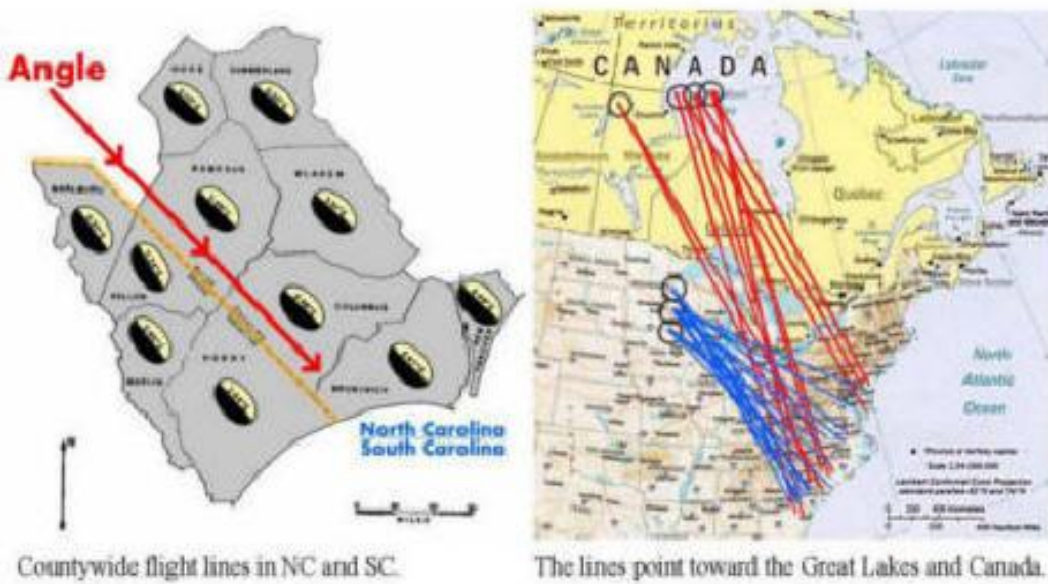


Figure 5 The orientation of the long axes of Carolina bays converge. (<http://www.georgehoward.net/cbays.htm>)

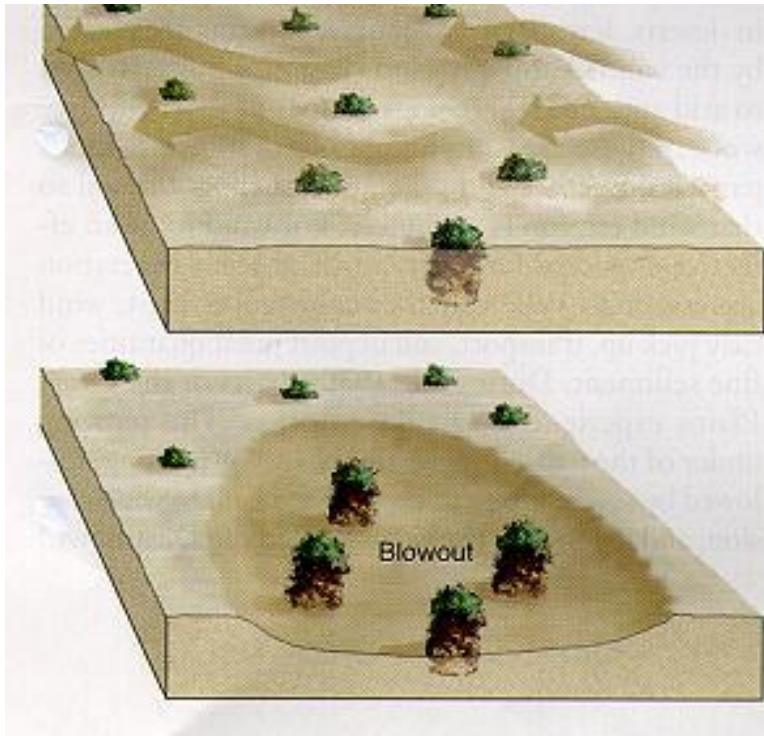


Figure 6 The Wind blowout model of New Jersey Spungs.

Table 1 Orientation of ponds selected in this study

Pond		Orientation
New Jersey	103	326°
	201*	276°
	202*	323°
	204*	327°
	205*	277.5°
	Cambria	296.5°
	Cedar	320°
	Willimas	338°
	Lee	323°
	Horse Break	323°
Long Island	Fox**	330°
	Sandy**	330°
	NF-2	329°
	NF-3	327°
	P-4	335.5°
	P-5	323°
	Slate	328°
	Jones	330.5°
	C-3	327.5°

* These ponds show an orientation of 320°

** This orientation is representative of the Calverton Ponds



The lines point toward the Great Lakes and Canada.

Figure 7 Comparison of orientation of Carolina Bays and ponds studied in this study (Modified from Figure 4.2)

Conclusions and Future Work:

Cumulative curves and plots indicate that sediments from these ponds have alluvial not eolian characteristics. Extensions of the long axes of the Coastal Plain ponds including those of the Carolina Bays, New Jersey and Long Island converge on the Great Lakes and Hudson Bay in Canada where the proposed comet pieces burst or impacted. Thus, the data are consistent with an impact model while in conflict with a blowout model.

While the data presented here are consistent with an impact model for the origin of the ponds in New Jersey and Long Island, at this stage that does not mean that an extra-terrestrial impact was the actual cause for the formation of the ponds. More information is needed to test this hypothesis.

- Use of DEM's based on LiDAR data. It was very useful in studying the Carolina Bays because it provides much more precise elevation data showing more details regarding the depressions than are visible with maps based on 10 foot contour intervals.
- Search for excessive charcoal, vitreous carbon, magnetic spherules and excess iridium in the rims of the depressions. These are indicators of an extra-terrestrial origin.
- Dating of the age of deposition of the rims. If it has an impact origin the age should be about 12,900 years. It is not clear what technique could be used for this dating. Radiocarbon dating of the charcoal may have excess radiocarbon, yielding ages that are too young.

The complete research report and references cited here can be found at <http://www.geo.sunysb.edu/reports/tao.pdf>