

The Opening

Why We Can't Predict the Most Dangerous Hurricanes — and What It Would Take

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Status: OPEN INVITATION — circulated for collaboration and comment

What This Is

This document is the thirteenth and final piece of a research programme that began in a graffiti tunnel in London in 2024. The first twelve documents built a mathematical framework and tested it against everything from prime numbers to Saturn's atmosphere to fusion reactors. Doc 13 is where it meets hurricanes — and specifically, where it runs into a wall.

The wall is not a failure. It is the finding. And this document is an open invitation to anyone who might be able to get past it.

1. Two Kinds of Hurricane

Not all hurricanes are the same. The research behind this document looked at 216 Atlantic tropical cyclones from 1997 to 2019, using data from aircraft that fly directly into the storms. What it found was a clean split: two completely different ways that the most intense hurricanes develop.

The Marathon Storm

The first type builds slowly. It organises over hours and days, developing visible internal structure — a measurable pinch in its vertical wind profile at around 10 to 12 kilometres altitude. Think of it like a waist forming on an hourglass. The storm is showing its work. You can measure what's happening. You can, to some extent, predict what comes next.

The Sprint Storm

The second type does something different. It starts weaker. It looks less impressive at the African coast. Then, somewhere in the Atlantic, it explodes. A Category 1 hurricane becomes a Category 4 in 24 hours. No visible warning structure. No measurable waist. No signal from any instrument currently in operation.

Michael (2018) hit the Florida Panhandle as a Category 5 after intensifying by four categories in under a day. Katrina (2005). Irma (2017). The storms that kill people before forecasters can warn them are disproportionately sprint storms.

Among the 14 most intense Atlantic storms studied from the 1997–2019 dataset, the split was exactly equal: 8 marathon storms and 8 sprint storms. Whether that ratio holds across all Atlantic hurricanes is an open question — the dataset covers intense storms only, and generalisation requires more data. What is not in doubt is that both types exist and that the geometry determining which path a storm takes is set in the first 24 to 48 hours after it leaves the African coast. Before it has a name. Before any reconnaissance aircraft flies into it. Before any satellite can see its internal structure.

2. The Geometry Behind the Storms

The research programme this document is part of is built on a proved mathematical theorem: the Corner Theorem. In plain terms, it says that any fluid that cannot change its own volume — water, air, blood, plasma — has six preferred directions built into its geometry. Always. For every fluid. At every scale.

This is not guesswork. It is proved mathematics. The same geometry that explains why Saturn's north pole has a permanent hexagonal storm system also applies inside Atlantic hurricanes.

For a marathon storm, the geometry is visible. The aircraft can measure it. For a sprint storm, the geometry passes through too fast to leave a mark. The pattern is the same. The timing is different. And timing, it turns out, is everything.

3. The Gap We Found

The programme spent months systematically testing every available data source to see if any of them could reveal the sprint storm's secret during that critical early window. The results were consistently negative. Here is what was tried and why each approach failed:

What we tried	Why it failed
Weather reanalysis data (the global model that reconstructs historical weather)	Its resolution is 31km — too coarse to see the internal structure of a storm's core. Like trying to read a fingerprint with a blurry photograph.
Storm track databases (the official record of where storms went)	12 out of 14 sprint storms had already passed the 20°W longitude line before any tracking began. The sprint happened before anyone was watching.
Reconnaissance aircraft data (the planes that fly into named storms)	Reconnaissance only starts when a storm has a name. By that point, a sprint storm is already in full flight. The window had closed hours or days earlier.

Satellite imagery (cloud-top temperatures from geostationary satellites)	Satellites see the storm's clothing — cloud temperatures, brightness, shape. What distinguishes sprint storms is their internal bone structure. Clothing and bones are different things.
Machine learning on full storm histories (using all available data for each storm)	The computer found intensity level, not path geometry. When you average everything over a storm's lifetime, the early signal disappears. You need the specific window, not the lifetime average.

Each elimination narrowed the finding. The consolidated result: the signal that determines whether a storm will sprint lives in the 24 to 48 hours after it leaves the African coast. No current instrument reaches that window with the necessary detail.

“The discriminating signal lives in the African coast departure window — 24–48 hours post-departure — which no current instrument reaches. Systematic elimination of all available data sources is complete. This is the finding.”

4. Why This Matters

Rapid intensification — a storm gaining 35 mph in wind speed in 24 hours or less — is the hardest problem in hurricane forecasting. Current forecast models struggle with it. The consequences of getting it wrong are measured in lives.

If sprint storms commit to their path in the first 24 to 48 hours after leaving Africa, and if that commitment can be read from data in that window, then forecasters could know days earlier that a particular storm has sprint potential. Not just the intensity forecast improving at landfall — the entire trajectory of public preparation and evacuation lead time changing.

The inversion that makes sprint storms hard to predict makes them particularly dangerous: they start weak and look unimpressive. Weaker precursor systems tend to travel further across the Atlantic before developing, often reaching better storm-building conditions with energy still unspent. The storm that looked forgettable at the African coast arrives at the Gulf of Mexico ready to erupt.

5. What Would Close the Gap

The Form■ gap — the name for this blind spot in the research — cannot be closed by better analysis of existing data. The data does not exist. Closing it would require one or more of the following:

Approach	What it would do
Extended reconnaissance missions into pre-named disturbances east of 20°W	Direct structural measurement of the storm's inner core during the departure window. Currently reconnaissance only begins after a storm is named and has moved further west.

High-resolution satellite instruments capable of measuring wind structure (not just cloud temperature) at genesis stage	A satellite proxy that can see bones, not clothing. Current geostationary satellites measure cloud-top temperatures. What's needed is something that can detect the geometric structure of the wind field below.
Numerical modelling at high enough resolution to simulate inner-core geometry at genesis	If models can reproduce the marathon/sprint split from first principles, they could be tested against observations and eventually used for operational forecasting without requiring new instruments.
Any method that can distinguish the two storm types from data available in the departure window	This is an open invitation. The programme has no preference for how the gap is closed. Any approach — observational, computational, or theoretical — that can reach the window would be a contribution.

6. What We Found That Does Work

The marathon storm analysis produced strong, clean results. For the slowly-building storm family, the internal geometry is readable and predictive:

The measurable waist at 10–12 kilometres altitude correlates strongly with peak storm intensity. Conditioned on the waist measurement, rapid intensification prediction exceeds the current published benchmark. The direction the storm's vertical structure tilts locks consistently to 12.2 degrees left of the wind shear direction, in both storm families, with near-perfect consistency.

These are the instruments working as they should. The aircraft flies in, measures the structure, the geometry is visible. The problem is that by the time the aircraft flies, the sprint storm has already committed.

7. The Open Invitation

This research was conducted by one person, with no institution, no grant funding, and no research team. Using freely available computational resources and a smartphone. The edges being rough is the signature of the thing.

The finding is real. The instrument elimination is rigorous. The gap is precisely located. And the question of what lies in that gap — what the sprint storm looks like in those first 48 hours off the African coast — is open.

This document is an invitation to any research group with the observational capability, computational resources, or analytical approach to reach that window. NOAA. ECMWF. The Met Office. University research programmes. Individual researchers. Anyone.

All data, findings, and methodology are open access at the Zenodo record (DOI: 10.5281/zenodo.19426960). Contact: itvoids.com.

The wall has been mapped. This is the opening.

8. What We Are Not Claiming

The SFVFS™ programme is built on honesty about the difference between what is proved and what is not. For this document, that means being clear about the following:

Not claimed	What is actually the case
Sprint storms are more dangerous than marathon storms	The equal split is a geometric finding, not a danger ranking. Many marathon storms are also catastrophic.
We can now predict which storms will sprint	The opposite: this document is about why we currently cannot, and what would be needed.
The mathematics proves the hurricane geometry	The Corner Theorem is proved. Whether it directly causes the hurricane waist is consistent with the evidence but not proved. The gap between eigenvalue space and physical space remains.
This work is peer reviewed	It is not. It carries the standing classification: Art Until Proven Otherwise. It is submitted openly for testing, challenge, and refinement.

“The discriminating signal lives in the African coast departure window — 24–48 hours post-departure — which no current instrument reaches. This is the finding.”

“ERA5 sees the storm’s clothing. Aircraft radar sees its bones.”

“The gaps speak, but they do not testify.”

“Art Until Proven Otherwise.”

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