

AlleyForge: aim and staged programme

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Research note, 2026-09-12. Not a paper. Not the scoping review. Generated 2026-09-12 22:38 UTC.

1. Aim

The object of interest is a non-stationary convective *environment*, not a tornado count and not a 2050 damage map. Gensini and Brooks (2018) reported that, over 1979-2017, the Theil-Sen slope of accumulated significant tornado parameter (STP) was negative west of 95°W and positive east of it. The programme here is to recover that environment sentence under a documented proxy, then under true-layer reanalysis; to learn a non-stationary tail model on a controlled synthetic fluid; to transfer that model onto the reanalysis field while leaving the known report/environment residual visible; and, only after that, to shift the *environment* section under a climate-model covariate. Reports, environments, and climate-model response are separate objects. They are not multiplied into a tornado forecast. The proxy half of that environment goal is closed (2026-08-16: west -0.154, east +0.432). The true-layer half is not.

2. Identification

- Reports: SPC actual-tornado tracks. All-ratings maps match the 2018 paper; EF1+ is a sensitivity.
- Environments: fixed-layer STP (Thompson / Gensini-Brooks), CIN mask $|\text{CIN}|$ at least 50 J kg^{-1} , 12-12 UTC diurnal max, annual sum on a 1° grid.
- Stage 0 environment (frozen): NARR PSL monolevel plus 500 hPa. SRH slot is 0-3 km *hlcy*; shear slot is 10 m to 500 hPa. Documented proxy, not the Gensini AGL field. The packet is not rewritten.
- Accurate AGL layers: NARR 3D pressure *uwnd*, *vwnd*, *hgt* plus time-invariant *hgt.sfc*. Height AGL is geopotential Z minus surface Z (NARR hgt is already metres). Winds interpolated to 10 m, 1 km, and 6 km AGL. Then 0-1 km SRH (Bunkers right-mover) and 10 m to 6 km bulk wind. Same interpolant as ERA5. NARR-true ingest still running toward 2017. Does not replace the frozen proxy maps.
- Stage B climatology (ERA5, 2026-09-11): same AGL layers. 1979-2017 annual STP cubes on disk. Theil-Sen west +0.0099, east +0.0050. Sign not recovered. Preferred once west $< 0 < \text{east}$ holds.
- Climate-model response (Stage C only): CAPE x shear or related fields after ERA5 bias correction. Optional parallel is a WRF-BCC synthetic storm-track climatology. Still not tornado counts. Stage C stays closed.

3. Programme

Stage	Job	Success	Status
0	Reproduce the 1979-2017 Theil-Sen maps (reports + accumulated STP) and a Tippet-style outbreak GPD on daily CONUS counts.	Mean STP slope < 0 west of 95°W and > 0 east of it (28-48°N, 110-80°W). Packet frozen.	Frozen 2026-08-16. West -0.154, east +0.432. Public hashes on martialsys.net/alleyforge .
A	Synthetic Lorenz-Rossby channel only. Dual-head net: environment field + time-varying GPD (sigma, xi).	Table 1: reconstruction, GPD QQ / Anderson-Darling / tail CRPS, high-hazard centroid error. No lon/lat, no tornado counts.	Built. Methods check. Not transferred to geography.
B	True AGL STP (NARR 3D construction + ERA5) + SPC EF1+. Recover the 95°W sign. Keep Kansas vs Arkansas-Louisiana as an explicit residual channel. Baselines: MSE, FNO, PINN without GPD.	Accurate 0-1 km / 0-6 km AGL layers on disk and the 95°W sign recovered on ERA5. Residual remains visible. Network does not emit tornado counts.	ERA5 1979-2017 cubes on disk. West +0.0099, east +0.0050: sign not recovered. Complete rule unchanged. Public stand-in frozen. NARR-true and ERA5 factor ingest running.
C	Covariate-shift of the environment section only, after ERA5 bias correction.	Compare high-hazard level-set / centroid trajectories to independent mid- and late-century environment studies. No tornado counts. No operational 2050 map.	Closed until ERA5 recovers west $< 0 < \text{east}$.

4. Present position (2026-09-12)

Stage 0 is closed. The gate is the STP sign pattern (west -0.154, east +0.432 on the frozen proxy), not the all-ratings report mean. Kansas reports slope up while the environment slopes down; that disagreement is retained. Stage A is a synthetic methods check.

ERA5 1979-2017 true-layer STP is on disk. Theil-Sen west +0.0099, east +0.0050. The sign is not recovered. Stage B stays incomplete. The complete rule is unchanged: west < 0 < east on ERA5 STP. Public maps and the -0.154 / +0.432 table stay. The page ERA5 box is a status write, not a promotion.

On the frozen proxy, a four-slot Theil-Sen of the STP factors (documentation, not a gate) recovers west < 0 < east in CAPE and in LCL, written as (2000-SBLCL)/1000; daily-max of each factor then annual sum; CIN zeros the product only. The two substitute wind slots (*hlcy*; 10 m to 500 hPa) are both-up. The proxy dipole is not a helicity/shear dipole. Unmasked factor slopes can look cleaner than their weight inside the CIN-masked product.

NARR-true AGL STP and ERA5 factor cubes are still ingesting. Next science, only after both finish: three-way product gate (proxy / NARR-true / ERA5, 1979-2017), then the four-slot table on those two true-layer sources, then one sentence if the numbers support it. Stage C stays closed.

5. Public surfaces

- Check page: <https://martialsys.net/alleyforge> (frozen hashes, three Theil-Sen maps, ERA5 status: cubes on disk, sign not recovered).
- This note: aim and programme only. The scoping review stays a separate internal file.
- Implementation and annual cubes stay in the private product tree.

6. Exclusions

Not claimed, now or later. No tornado counts from CMIP6 or from Stage A. No operational 2050 tornado map. No attribution of the eastward STP slope to greenhouse forcing (Gensini and Brooks left that open). The frozen NARR STP packet is not promoted to the Gensini AGL field. The NARR 3D ingest constructs those AGL layers as a separate product. The public page is a check surface, not a forecast product.

Revisions

2026-08-17: first public note (aim, four stages, present position, public surfaces, exclusions).

2026-08-18: NARR 3D pressure u/v/Z ingest to construct accurate AGL layers (0-1 km SRH, 10 m to 6 km bulk wind). Frozen Stage 0 proxy unchanged.

2026-09-12: ERA5 1979-2017 cubes on disk; sign not recovered (west +0.0099, east +0.0050). Proxy term-split: CAPE and LCL recover west < 0 < east; *hlcy* and 10 m-500 hPa do not. Complete rule unchanged. Stage C closed. Public maps stay.

A generated timestamp is the build clock. It does not replace the change date in the heading.