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University at Albany Study Benchmarks Google's WeatherNext AI Against NOAA Models Across 385 Tropical Cyclones

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An independent evaluation by researchers at the University at Albany, published in November 2026 in Geophysical Research Letters , shows that Google DeepMind's artificial-intelligence hurricane model -- WeatherNext Cyclone -- generally outperformed official U.S. National Oceanic and Atmospheric Administration (NOAA) models across 1-to-5-day lead times while producing fewer false alarms for rapid intensification. Analyzing 385 tropical cyclones worldwide between June 2022 and May 2026, the study also identified a critical caveat: at longer forecast ranges, the AI model tended to underestimate peak storm intensity.

Predicting how quickly a hurricane or typhoon will strengthen is one of the hardest challenges in meteorology . Even small shifts in ocean heat, wind shear, or inner-core thunderstorm structure can turn a modest tropical storm into a major hurricane within 24 hours -- giving coastal communities little time to prepare if models miss rapid intensification or cry wolf too often.

Benchmarking 385 Tropical Cyclones Worldwide

To test how machine-learning weather models stack up against traditional physics-based simulations and human forecasters, the University at Albany team evaluated forecasts across 385 global tropical cyclones spanning nearly four years from June 2022 through May 2026. Physics-based hurricane models such as NOAA's Hurricane Analysis and Forecast System (HAFS) solve fluid-dynamics and thermodynamics equations on supercomputers, which captures fine-scale storm physics but demands heavy computing time.

By contrast, AI models such as Google DeepMind's WeatherNext Cyclone learn atmospheric patterns directly from decades of historical weather data, generating forecasts in minutes. Across the 1-to-5-day forecast window, WeatherNext Cyclone matched or outperformed NOAA's operational guidance on overall storm-strength skill and issued fewer false-positive warnings for rapid intensification.

| Evaluation Metric | | University at Albany Benchmark (2022-2026) | | Forecasting Significance |

| Storm Sample | | 385 tropical cyclones worldwide (June 2022 - May 2026) | | Covers multiple ocean basins & storm seasons |

| AI Model Evaluated | | Google DeepMind WeatherNext Cyclone | | Compared against NOAA models & human forecasters |

| 1-to-5-Day Skill | | Outperformed NOAA model; fewer rapid-intensification false alarms | | Improves short-to-medium-range warning reliability |

| Longer-Range Limitation | | Tended to underestimate peak storm intensity | | Observed wind speeds sometimes exceeded AI spread |

Why AI Underestimates Peak Hurricane Strength

Despite its strong track and short-range skill, WeatherNext Cyclone showed a persistent blind spot at longer lead times: it tended to underestimate maximum sustained wind speeds in the strongest storms, with real-world peak winds occasionally falling outside the model's predicted range. Because AI weather models are trained on historical global datasets where extreme Category 4 and Category 5 eyewall dynamics are relatively rare and smoothed out on coarse grids, they can damp down extreme peak intensities.

Blending AI Guidance With Human Forecasters

Rather than replacing traditional physics-based models or National Hurricane Center (NHC) specialists, meteorological agencies are integrating AI into a broader consensus toolkit. NOAA and the NHC actively collaborate with Google DeepMind under research agreements to evaluate AI guidance alongside physics-based ensembles like HAFS -- pairing AI's speed and lower false-alarm rates with physical models and human expertise to catch extreme intensification before landfall.

References & Primary Sources

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