Weather Prediction Tools

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Mathematics and Statistics

Atmospheric scientist Bo-Wen Shen specializes in global numerical weather and climate modeling. One part of this research includes investigating chaos (behavior that is highly unpredictable due to sensitivity to small changes - but not random) in high-order Lorenz models to understand the impact of the Butterfly Effect on predictability.

Shen's work provides more accurate climate models for the earth's surface, taking into account change over time and specific regional variables. With better climate models, researchers and policymakers can better predict sweeping weather changes and better prepare for the potential harms of climate change.

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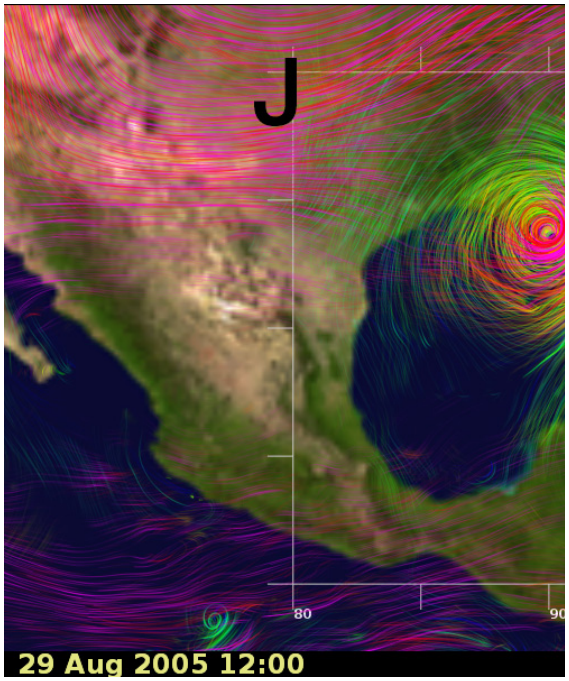
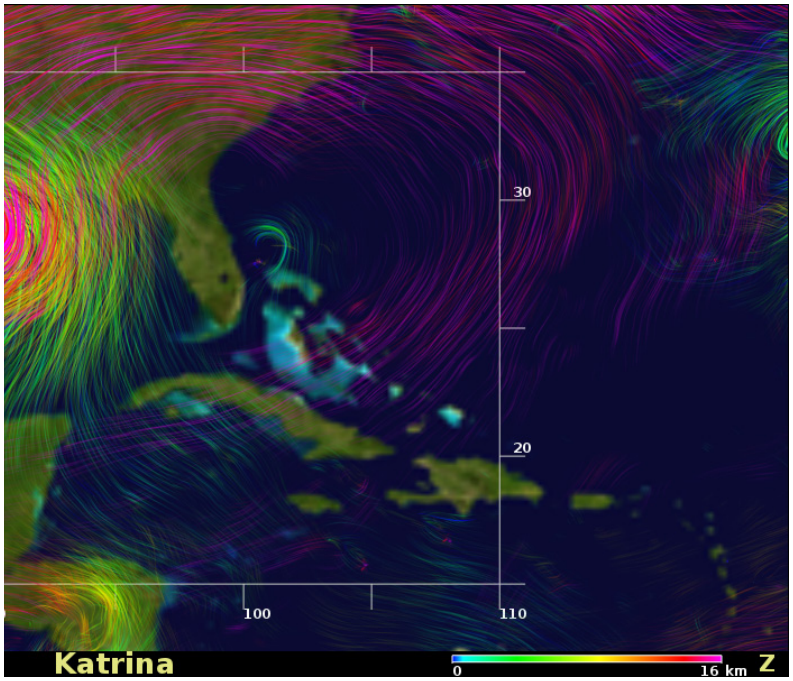
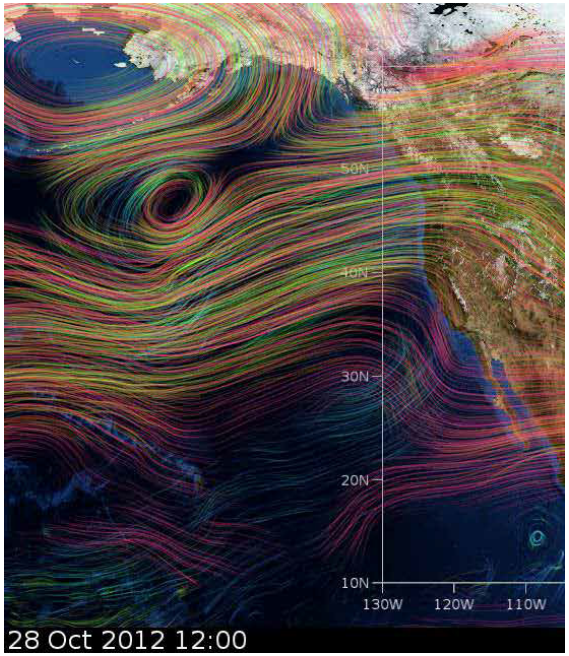
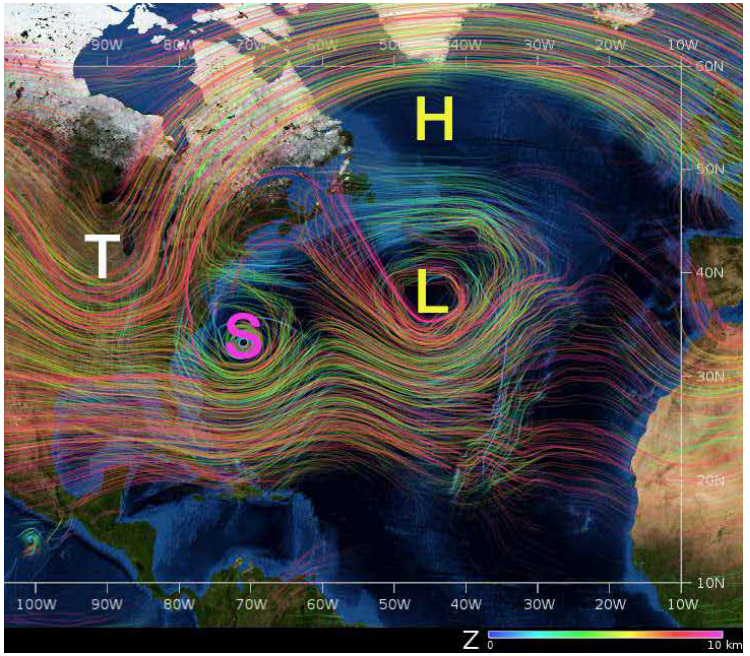




1 Snapshot from a multiscale simulation showing the interactions of Hurricane Katrina and an upper-level trough during landfall. Analyses of the 4D (X-Y-Z-time) visualization suggest that the horizontal phasing of an approaching jet stream and Katrina's southwesterly outflow (to the southeast of the jet) further strengthened the upper-level anticyclonic flow over the hurricane (dense, upper-level streamlines in expanding pink). The phasing thus enhanced Katrina's development and created strong, deep convections. Bron Nelson, NASA/Ames





2 Scale interactions of Hurricane Sandy and environmental flows. The Coupled Advanced Modeling and Visualization (CAMVis) framework produced a remarkable 7-day track and intensity forecast of Hurricane Sandy, made possible by improved simulation of the interactions among Sandy, the upper-level trough (labeled T) and the high-low blocking system (labeled H and L). David Ellsworth, NASA/Ames