Journal of Advances in Modeling Earth Systems (JAMES)

CMMAP NSF Site Review, May 15 2008

Issues and Successes in KT

Issue

- How to set up a journal structure where we retain editorial and publication control, but not take on production tasks we are not good at.
- For example, we have editorial experience and IT resources.
- However, we don't have the business infrastructure or copyediting and page-layout experience.

Issues and Successes in KT

Success: new partnership

- Center for Multi-scale Modeling of Atmospheric Processes (CMMAP)
- Institute of Global Environment and Society (IGES), which consists of the centers COLA and CREW

Roles of CMMAP and IGES

- CMMAP and IGES jointly design and operate the journal.
- CMMAP will function as Chief Editorial Office, handling submission, review, and online hosting.
- IGES will be represented on Advisory Board and Editorial Board, and will handle business aspects (e.g., collection of page charges).

★ Journal will contract with 3rd party publisher (The Charlesworth Group) to handle production aspects such as layout, copyediting (what we are not good at).

Journal Advisory Board

- Charts the Journal's scientific direction
- Appointment/reappointment of Chief Editor and, in consultation with Chief Editor, appointment of the other editors
- Reviews the financial aspects of the journal, including page charge rate
- Reviews the performance of outside contractor, who provides publishing services

Chair
Journal Advisory Board

Dr. James Kinter, Director
Center for Ocean-Land-Atmosphere Studies
Calverton, Maryland
kinter@cola.iges.org

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Journal Editorial Board

Timetable

- January 2008: Charlesworth runs tests
- February 2008: Composition of Advisory Board and Editorial Board completed
- March 2008: Negotiate contract with Charlesworth
- April 2008: Journal website available
- May 2008: Beta testing
- June 2008: Call for papers, send announcements, launch

JAMES

JOURNAL OF ADVANCES IN MODELING EARTH SYSTEMS

Highlights

JAMES Launches in June, 2008!

Announcing JAMES and JAMES Discussion, two new open access journals covering all aspects of global environmental modeling.

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The Journal of Advances in Modeling Earth Systems (JAMES) is an international, open-access, scientific journal for the publication of original and updated research. JAMES maintains high standards of formal peer-review and provides authors the opportunity to participate in the interactive discussion forum, JAMES-Discussion. JAMES is committed to removing publication barriers and offers high quality publication services at minimal cost.

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Short Topics

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Reviews

Scientific reviews of the present state of selected aspects of climate research.

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JOURNAL OF ADVANCES IN MODELING EARTH SYSTEMS
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The Journal of Advances in Modeling Earth Systems - Discussion (JAMES-D) is an international, open-access, scientific journal for the publication of original and updated research. JAMES-D is the interactive discussion forum for JAMES. Publishing in JAMES-D is free to submitting authors.

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Research articles on a wide range of topics in climate science, including atmospheric and ocean flows on multiple scales, model parameterizations, and numerical methods.

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Recent Submissions in Open Discussion - Vol 1 (2008) **Full TOC**

Research Articles

Shallow Water Quasi-Geostrophic Theory on the Sphere — ABSTRACT Comments
Wayne H. Schubert, Richard K. Taft, Levi G. Silvers — 1-21

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Rapid Filamentation Zones in Intense Tropical Cyclones

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Intense tropical cyclones often possess relatively little convection around their cores. In radar composites, this surrounding region is usually echo-free or contains light stratiform precipitation. While subsidence is typically quite pronounced in this region, it is not the only mechanism suppressing convection. Another possible mechanism leading to weak-echo moats is presented in this paper. The basic idea is that the strain-dominated flow surrounding an intense vortex core creates an unfavorable environment for sustained deep, moist convection. Strain-dominated regions of a tropical cyclone can be distinguished from rotation-dominated regions by the sign of $S_1^2+S_2^2-\zeta^2$, where $S_1 = u_x - v_y$ and $S_2 = v_x + u_y$ are the rates of strain and $\zeta = v_x - u_y$ is the relative vorticity. Within the radius of maximum tangential wind, the flow tends to be rotation-dominated ($\zeta^2 > S_1^2+S_2^2$), so that coherent structures, such as mesovortices, can survive for long periods of time. Outside the radius of maximum tangential wind, the flow tends to be strain-dominated ($S_1^2+S_2^2>\zeta^2$), resulting in filaments of anomalous vorticity. In the regions of strain-dominated flow the filamentation time is defined as $\tau_{fil}=2(S_1^2+S_2^2-\zeta)^{-1/2}$. In a tropical cyclone, an approximately 30-km-wide annular region can exist just outside the radius of maximum tangential wind, where τ_{fil} is less than 30 min and even as small as 5 min. This region is defined as the rapid filamentation zone. Since the time scale for deep moist convective overturning is approximately 30 min, deep convection can be significantly distorted and even suppressed in the rapid filamentation zone. A nondivergent barotropic model illustrates the effects of rapid filamentation zones in category 1–5 hurricanes and demonstrates the evolution of such zones during binary vortex interaction and mesovortex formation from a thin annular ring of enhanced vorticity.

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1. Introduction

Figures 1a,d show 133- and 123-min composites of the horizontal radar reflectivity for Hurricane Gilbert on 13 and 14 September 1988. On 13 September, Gilbert was at peak intensity with a central minimum sea level pressure (MSLP) reaching 888 hPa. During this time, Gilbert exhibited a compact eyewall between 8 and 20 km from the center. Except for two small spiral rain bands to the northeast of the eyewall, convective cells were absent between radii of 20 and 68 km. Although convection was sparse, there was widespread, but light stratiform precipitation. On 14 September, Gilbert's MSLP rose slightly to 895 hPa, corresponding to an eyewall replacement cycle. The inner eyewall was between 8- and 20-km radius and the newly formed outer eyewall between 55- and 100-km radius, with a 35-km weak-echo annulus (or moat) between the inner and outer eyewalls. Here, we define a moat as a weak-echo region outside of the primary eyewall of a storm, whereas Simpson and Starrett (1955) referred to a cloud-free region in the eye as a moat. Based on the National Oceanic and Atmospheric Administration (NOAA) WP-3D aircraft flight track described in Black and Willoughby (1992), Figs. 1b,e show the radial profiles of flight-level (700 hPa) tangential wind for 13 and 14 September. On 13 September, the tangential wind maximum was 75–80 m s^{-1} at 10-km radius. By 14 September, the inner tangential wind maximum was 66–69 m s^{-1} at 10-km radius, while the outer tangential wind maximum was 49–52 m s^{-1} at 61–67 km radius. The strong cyclonic circulation was very deep with 50 m s^{-1} winds reaching a height of 12 km.

Weak-echo moats, such as the one shown in Fig. 1, are often found in intense tropical cyclones (TCs). The tendency for convection to be suppressed in the moat region is generally attributed to mesoscale subsidence between two regions of strong upward motion. According to Dodge et al. (1999), there appears to be lower tropospheric subsidence in the moat, but the upper tropospheric vertical motion is apparently upward. Through analysis of Doppler radar data, Dodge et al. found that the moat of Hurricane Gilbert was characterized by weak stratiform precipitation with 0.5–1.0 m s^{-1} downward motion below the bright band observed near 5-km height, and 0.5 m s^{-1} upward motion above 5 km. Evidence that subsidence plays a role in the formation of moats is presented in Figs. 1c,f. These figures show the flight-level temperature and dewpoint temperature for radial legs across the storm. On 13 September, the dewpoint depressions in the moat reached 5°C. On 14 September, the dewpoint depressions in the moat were approximately 8°C,

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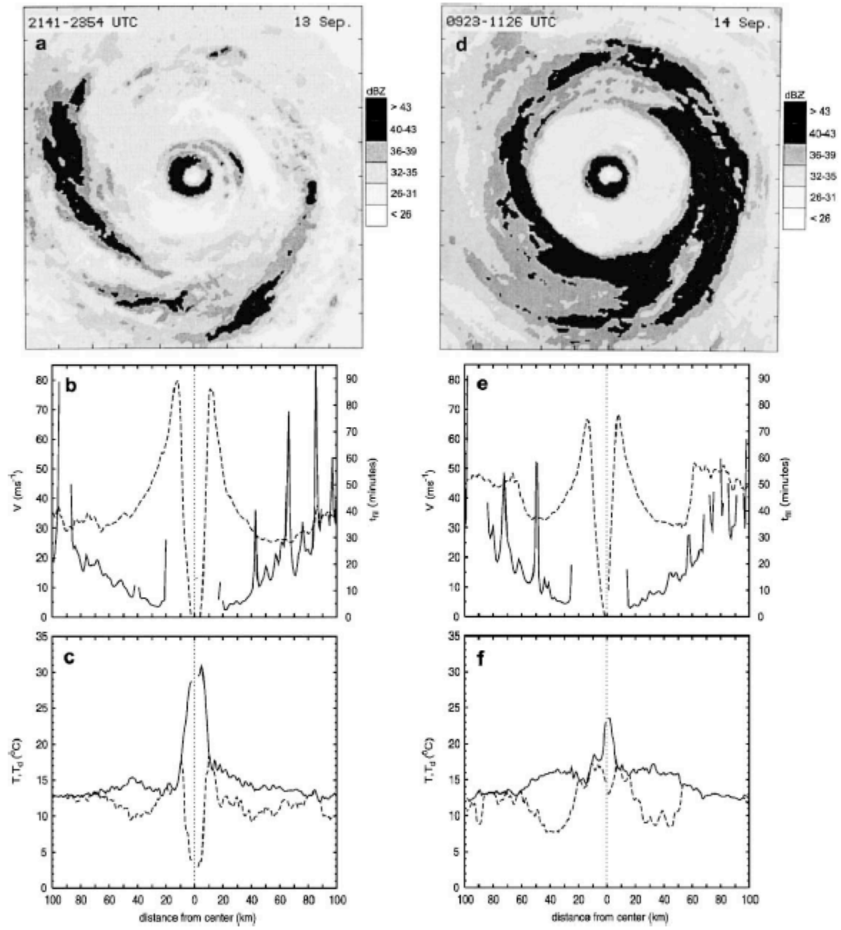

Figure 1. Composite horizontal radar reflectivity of Hurricane Gilbert for (a) 2141–2354 UTC 13 Sep 1988 and (d) 0923-1126 UTC 14 Sep 1988. The domain is 240 km × 240 km, with tick marks every 24 km. Also, flight-level tangential wind (dashed line) and filamentation time, as computed from (11), for the 700-hPa flights for (b) 13 and (e) 14 Sep; corresponding temperature and dewpoint temperature along the same flight track on (c) 13 and (f) 14 Sep. Detailed descriptions of Hurricane Gilbert are given by Black and Willoughby (1992), Samsury and Zipser (1995), and Dodge et al. (1999).