Wen-wen Tung

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(Last Updated: March 25, 2007)

EDUCATION

- Ph.D., Atmospheric Sciences, University of California, Los Angeles, May 2002
- M.S., Atmospheric Sciences, University of California, Los Angeles, March 1998

PROFESSIONAL EXPERIENCES

- Assistant Professor, Earth and Atmospheric Sciences, Purdue University — January 2005–present
- Visiting Scientist, Mesoscale and Microscale Meteorology Division, NCAR — July 2006
- Visiting Scientist, Mesoscale and Microscale Meteorology Division, NCAR — May–July 2005
- Visiting Scientist, Mesoscale and Microscale Meteorology Division, NCAR — August–December 2004
- Postdoctoral Fellow, Advanced Study Program, NCAR — August 2002–July 2004
- Research Assistant, Atmospheric Sciences, UCLA — August 1996–June 2002
- Teaching Associate, Atmospheric Sciences, UCLA — September–December 2001
- Teaching Assistant, Atmospheric Sciences, UCLA — September–December 1998

RESEARCH INTERESTS

- Dynamical predictability
- Multiscale convective systems
- Tropical dynamics (Monsoons, Waves, Intraseasonal oscillation, etc.)
- Observational data reduction in geophysics and bioinformatics
- Multiscale signal processing utilizing spectral analysis, wavelet analysis, principal component analysis, chaos and fractal theories, and other statistical methods.

TEACHING

- EAS309: Computer-Aided Analysis For Geosciences (Fall 2007)
- EAS534: Tropical Meteorology (Fall 2005)
- EAS536: Introduction to Atmospheric General Circulation (Spring 2006, Spring 2008)

- EAS591Y: From Hot Towers to Hurricanes - An intro. to multiscale tropical convective systems (Fall 2006)
- EAS637: Geophysical Fluid Dynamics in A Rotating System (Spring 2007)

STUDENT ADVISED

- Yi-Chi Wang, Fall 2006–present (Ph.D.)

PUBLICATIONS

A. Selected Referred Journal Papers:

1. Tung, W.-w., J.B. Gao, J. Hu, and Y.H. Cao, 2007: Quantifying dynamical prediction utility by relative entropy: the role of Kolmogorov-Sinai entropy, submitted to *J. Atmos. Sci.*
2. Gao, J. B., J. Hu, W.-w. Tung, and Y.H. Cao, 2007: Quantifying dynamical predictability by time-dependent exponent curves: the technique of pseudo ensembles, to be submitted to *J. Atmos. Sci.*
3. Tung, W.-w., J. Hu, J. B. Gao, V. A. Billock, 2007: Diffusion, intermittency, and noise-sustained metastable chaos in the Lorenz equations: Effects of noise on multistability, submitted to *Theme Issue on Multistability in Dynamical Systems, International Journal of Bifurcations and Chaos*.
4. Gao, J. B., J. Hu, W.-w. Tung, Y.H. Cao, 2006: Distinguishing chaos from noise by scale-dependent Lyapunov exponent. *Phys. Rev. E*, **74**, 066204.
5. Hsu, H.-m., M. W. Moncrieff, W.-w. Tung, and C. Liu, 2006: Temporal variability of warm season precipitation over north America: A study based on radar reflectivity. *J. Atmos. Sci.*, **63**, 2355–2368.
6. Hu, J., J.B. Gao, F.L. Posner, Y. Zheng, and W.-w. Tung, 2006: Target detection within sea clutter: A comparative study by fractal scaling analyses. *Fractals,*, **14**, 187-i-204.
7. Gao, J. B., V.A. Billock, I. Merk, W.-w. Tung, K.D. White, J.G. Harris, V.P. Roychowdhury, 2006: Inertia and memory in ambiguous visual perception, *Cogn. Process.* **7**, 105–112.
8. Gao, J. B., J. Hu, W.-w. Tung, Y.H. Cao, N. Sarshar, V. P. Roychowdhury, 2006: Assessment of long range correlation in time series: How to avoid pitfalls. *Phys. Rev. E*, **73**, 016117.
9. Hu, J., W.-w. Tung, and J.B. Gao, 2006: Detection of low observable targets within sea clutter by structure function based multifractal analysis. *IEEE Trans. Antennas & Propagation*,**54**, 135–143.
10. Tung, W.-w., Y. Qi, J.B. Gao, Y.H. Cao, and L. Billings, 2005: Direct characterization of chaotic and stochastic dynamics in a population model with strong periodicity. *Chaos, Solitons, and Fractals*, **24**, 645–652.
11. Gao, J.B., W.-w. Tung, Y.H. Cao, J. Hu, and Y. Qi, 2005: Power-law sensitivity to initial conditions in a time series with applications to epileptic seizure detection. *Physica A*, **353**, 613–624.
12. Hu, J., W.-w. Tung, J.B. Gao, and Y.H. Cao, 2005: Reliability of the 0-1 test for chaos, *Phys. Rev. E*, **72**, 056207.
13. Gao, J.B., Y. Qi, Y.H. Cao, and W.-w. Tung, 2005: Protein coding sequence identification by simultaneously characterizing the periodic and random features of DNA sequences, *Journal of biotechnology and biomedicine* special issue, 139–146, DOI:10.1155/JBB.2005.139.
14. Cao, Y.H., W.-w. Tung, J.B. Gao, and Y. Qi, 2005: Recurrence time statistics: Versatile tools for genomic DNA sequence analysis, *Journal of Bioinformatics and Computational Biology*, **3**, 677–696

15. Cao, Y.H., W.-w. Tung, J. B. Gao, V. A. Protopopescu, and L. M. Hively, 2004: Detecting dynamical changes in time series using the permutation entropy. *Phys. Rev. E*, **70**, 046217. (selected for the November 1, 2004 issue of Virtual Journal of Biological Physics Research: http://www.vjbio.org).

16. Tung, W.-w., M. W. Moncrieff, and J. B. Gao, 2004: A systematic view of the multiscale tropical deep convective variability over the tropical western-Pacific warm pool. *J. Climate*, **17**, 2736–2751.

17. Gao, J. B., W.-w. Tung, and N. Rao, 2002: Noise induced Hopf bifurcation-like sequence to chaos in the Lorenz equations. *Phys. Rev. Lett.*, **89**, 254101.

18. Gao, J. B., and W.-w. Tung, 2002: Pathological tremors as diffusional processes. *Biological Cybernetics*, **86**, 263–270.

19. Tung, W.-w., and M. Yanai, 2002: Convective momentum transport Observed during the TOGA COARE IOP. Part II: Case studies. *J. Atmos. Sci.*, **59**, 2535–2549.

20. Tung, W.-w., and M. Yanai, 2002: Convective momentum transport Observed during the TOGA COARE IOP. Part I: General features. *J. Atmos. Sci.*, **59**, 1857–1871.

21. Yanai, M., B. Chen, and W.-w. Tung, 2000: The Madden-Julian Oscillation (MJO) observed during the TOGA-COARE IOP: Global view. *J. Atmos. Sci.*, **57**, 2374–2396.

22. Tung, W.-w., C. Lin, B. Chen, M. Yanai, and A. Arakawa, 1999: Basic modes of cumulus heating and drying observed during TOGA-COARE IOP. *Geophys. Res. Lett.*, **26**, 3117–3120.

B. Book

1. Gao, J. B., Y. Cao, W.-w. Tung, and J. Hu, 2007: Multiscale analysis of complex time series — Integration of Chaos and Random Fractal Theory, and Beyond (to be published by Wiley Interscience in Summer 2007).

C. Conference Papers

1. Tung, W.-w., J. B. Gao, J. Hu, and M. W. Moncrieff, 2007: Quantifying dynamical predictability by time-dependent exponent curves: the technique of pseudo-ensembles, American Meteorological Society 87th Annual Meeting, 14–18 January 2007, San Antonio, Texas.

2. Tung, W.-w., 2006: Multiscale analysis for tropical convection, Tropical Convection and The Weather Climate Interface Retreat, 10–14 July 2006, NCAR, Boulder, Colorado.

3. Tung, W.-w., H.-M. Hsu, and M. W. Moncrieff, 2006: Convective systems in the Bay of Bengal during the Indian Summer Monsoon, 24–28 April 2006, Monterey, CA.

4. Hsu, H., M. Moncrieff, W. Tung, J. Tuttle, K. Manning, W. Wang, M. Dixon, C. Liu, and P. Sullivan, 2005: Warm-season precipitation spectra over north America: A comparison between radar observations and WRF forecasts, Joint WRF/MM5 User's Workshop, 27–30 June 2005, Boulder, CO.

5. Tung, W.-w., H.-m. Hsu, and M. W. Moncrieff, 2005: Diurnal to multi-day convective organizations in the Bay of Bengal during the Indian summer monsoon, American Meteorological Society 85th Annual Meeting, 9–13 January 2005, San Diego, California.

6. Qi, Y., J. B. Gao, Y. Cao, and W.-w. Tung, 2004: Deriving a novel codon index by combining period-3 and fractal features of DNA sequences, The Computational Systems Bioinformatics Conference (CSB2004), Stanford, CA, August 16–19, 2004.

7. Cao, Y.H., W.-w. Tung, and J.B. Gao, 2004: Recurrence time statistics: Versatile tools for genomic DNA sequence analysis, The Computational Systems Bioinformatics Conference (CSB2004), Stanford, CA, August 16–19, 2004.

8. Tung, W.-w., M. W. Moncrieff, and J. B. Gao, 2004: A Systemic analysis of multiscale convective variability in the Tropics. *Preprint, 26th Conference on Hurricanes and Tropical Meteorology*, 3-7 May 2004, Miami, Florida, Amer. Meteor. Soc., 393–394.

9. Tung, W.-w., and G. N. Kiladis, 2004: Climatological spatial and temporal features of the Madden-Julian oscillation. *Preprint, 26th Conference on Hurricanes and Tropical Meteorology*, 3-7 May 2004, Miami, Florida, Amer. Meteor. Soc., 226–227.

10. Gao, J. B., Y. H. Cao, and W.-w. Tung, 2004: Multifractal and recurrence time based methods for DNA sequence analysis, Conference on Data Mining in Biomedicine, February 16-18, 2004, University of Florida, Gainesville, FL.

11. Tung, W.-w., M. W. Moncrieff, and J. B. Gao, 2003: A systemic view of the multiscale tropical deep convective variability over the tropical western-Pacific warm pool, EGS-AGU-EUG Joint Assembly, 0611 April 2003, Nice, France.

12. Gao, J. B., and W.-w. Tung, 2002: The nature of essential and Parkinsonian tremors. *Proceedings, The Seventh Experimental Chaos Conference*, 25-29 August 2002, San Diego, California, Amer. Inst. Phy., 369.

13. Tung, W.-w., and J. B. Gao, 2002: Multifractality of the satellite-derived deep convective index in the tropics. *Proceedings, The Seventh Experimental Chaos Conference*, 25-29 August 2002, San Diego, California, Amer. Inst. Phy., 376.

14. Tung, W.-w., and M. Yanai, 2002: Convective momentum transport observed during the TOGA COARE IOP: Implications for parameterization. *Preprint, 25th Conference on Hurricanes and Tropical Meteorology*, 29 April-3 May 2002, San Diego, California, Amer. Meteor. Soc., 196–197.

15. Tung, W.-w., and M. Yanai, 2001: Convective momentum transport observed during the TOGA COARE IOP. Cumulus Parameterization Workshop, 3-5 December 2001, NASA GSFC, Greenbelt, Maryland.

16. Tung, W.-w., and M. Yanai, 2001: Convective momentum transport observed during the TOGA COARE IOP. Part II: Case Studies. 8th Scientific Assembly of International Association of Meteorology and Atmospheric Sciences, 10-18 July 2001, Innsbruck, Austria.

17. Yanai, M., and W.-w. Tung, 2001: Convective momentum transport observed during the TOGA COARE IOP. Part I: Background, momentum budget residual, and interpretation. 8th Scientific Assembly of International Association of Meteorology and Atmospheric Sciences, 10-18 July 2001, Innsbruck, Austria.

18. Tung, W.-w., and M. Yanai, 2000: Convective heating and momentum transport associated with tropical disturbances. *Preprints, 24th Conference on Hurricanes and Tropical Meteorology*, 29 May-2 June 2000, Fort Lauderdale, Florida, Amer. Meteor. Soc., 518–519.

19. Tung, W.-w., 1999: On the coupling of tropical motion systems with convection, The Yanai-Murakami Monsoon Symposium, 6-7 December 1999, Honolulu, Hawaii.

20. Yanai, M. and W.-w. Tung, 1999: Momentum budget over the TOGA COARE IFA and its interpretation. Convective Momentum Transport (CMT) Workshop, 7-8 October 1999, GFDL, Princeton, NJ.

21. Tung, W.-w., and M. Yanai, 1999: The coupling between convection and large-scale motion associated with MJO Observed during TOGA-COARE IOP. Preprints, 23rd Conference on Hurricanes and Tropical Meteorology, 10-15 January 1999, Dallas, Texas, Amer. Meteor. Soc., 715-722.

22. Tung, W.-w., 1998: The Madden-Julian Oscillation (MJO) observed during the TOGA-COARE Intensive Observing Period. Part II: Convection associated with the MJO. *Proceedings of the TOGA-COARE International Conference - COARE98*, Boulder, Colorado, 7-14 July 1998. WCRP, Geneva, Switzerland, 169–170.

23. Yanai, M., B. Chen, and W.-w. Tung, Madden-Julian Oscillation (MJO) during the TOGA-COARE IOP. American Geophysical Union 1997 Fall Meeting, 8-12 December 1997, San Francisco, CA.

C. Invited Talks

1. Tung, W.-w., 2006: Multiscale Analysis of Tropical Convective Variability. November 27, 2006. National Central Weather Bureau, Taipei, Taiwan.

2. Tung, W.-w., 2006: Multiscale Tropical Convective Systems – from Analytical to Systematic Perspectives. November 21, 2006, Department of Earth and Atmospheric Sciences, National Taiwan University, Taipei, Taiwan.

3. Tung, W.-w., 2005: Diurnal to Multi-day Convective Activities in the Bay of Bengal During the Indian Summer Monsoon. July 7, 2005, MMM/NCAR, Boulder, CO.

4. Tung, W.-w., 2004: Observations of multiscale convective systems. The Cumulus Parameterization Problem in the Context of Turbulence Studies, NCAR Geophysical Turbulence Program Workshop, 23-25 February 2004, Boulder, CO.