

## Curriculum Vitae

### Chuntao Liu

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### Education

- PhD of Atmospheric Science, May, 2003 University of Wyoming
- Master of Atmospheric Science, Dec, 2000 University of Wyoming
- Master of Meteorology, June 1996 Lanzhou University, Gansu, China
- Bachelor of Meteorology, June 1993 Lanzhou University, Gansu, China

### Professional Experiences

Research associate professor, 2010-current, Department of Atmospheric Sciences,  
University of Utah  
Research assistant professor, 2006-2009, Department of Meteorology, University of  
Utah  
Research associate, Jun 2003-Jun 2006, Department of Meteorology, University of  
Utah  
Research assistant, Aug 2000-May 2003, University of Wyoming  
Research associate, Aug 2001-Nov 2001, Aug 2002-Nov 2002, McMurdo station,  
Antarctica  
Research assistant, Aug 1998-July 2000, University of Wyoming  
Research scientist, Aug 1996-July 1998, Chinese Academy of meteorological Science

### Publications

#### 2012

- Liu C., and E. Zipser, 2012: Morphology of the organized convection in the tropics and subtropics, Part I: regional variation, *J. Geophys. Res.*, under review.
- Liu, C., and E. Zipser, 2012: Why does radar reflectivity tend to increase downward toward the ocean surface, but decrease downward toward the land surface?, *J. Geophys. Res.*, accepted.
- Peterson, M., and C. Liu, 2012: Lightning flashes illuminating large areas over the tropics and inner subtropics, *J. Geophys. Res.*, Submitted.
- Ferraro, R., and coauthors, 2012: An evaluation of microwave land surface emissivities over the continental United States to benefit GPM-era precipitation algorithms, *IEEE, transactions on geoscience and remote sensing*, 0196-2892.

- Liu, C., D. Cecil, and E. J. Zipser, 2012: Relationships between lightning flash rates and radar reflectivity vertical structures in thunderstorms over the tropics and subtropics. *J. Geophys. Res.*, doi:10.1029/2011JD017123.
- Wall, C. L., E. J. Zipser, and C. Liu, 2012: A regional climatology of monsoonal precipitation in the southwestern US using TRMM, *J. Hydrometeor.*, **13**, 310-323.

## 2011

- Liu, C., D. Cecil, and E. J. Zipser, 2011: Relationships between lightning flash rates and passive microwave brightness temperatures at 85 and 37 GHz over the tropics and subtropics. *J. Geophys. Res.*, **116**, D23108, doi:10.1029/2011JD016463.
- Peterson, M., and C. Liu, 2011: Global statistics of lightning in anvil and stratiform regions over tropics and subtropics observed by TRMM. *J. Geophys. Res.* **116**, D23201, doi:10.1029/2011JD015908.
- Liu, C., 2011: Rainfall contribution from precipitation systems with different sizes, intensities and durations, *J. Hydrometeor.*, **12**, 394-412.
- Jiang, H., C. Liu, and E. J. Zipser, 2011: A TRMM-based tropical cyclone cloud and precipitation feature database, *J. Appl. Meteor. Climat.*, **50**, 1255-1274.
- Robinson, F. J., S. C. Sherwood, D. Gerstle, C. Liu, and D. J. Kiehlbaum, 2011: Exploring the land-ocean contrast in convective vigor using islands, *J. Atmos. Sci.*, **68**, 602-618.

## 2010

- Xu, W., E. J. Zipser, C. Liu, and J. Jiang, 2010: On the relationships between lightning frequency and thundercloud parameters of regional precipitation systems, *J. Geophys. Res.*, **115**, D12203, doi:10.1029/2009JD013385.
- Gopalan, K., N.-Y. Wang, R. Ferraro, and C. Liu, 2010: Status of version 7 of the TRMM 2A12 land precipitation algorithm, *J. Tech.*, **27**, 1343-1354.
- Li, X., W. K. Tao, T. Matshu, C. Liu and H. Masunaga, 2010: Improving a spectral bin microphysical scheme using TRMM satellite observations, *Quart. J. Roy. Meteor. Soc.*, **647**, 382-399.
- Liu, C., E. Williams, E. J. Zipser, and G. Burns, 2010: Diurnal variations of global thunderstorms and electrified shower clouds and their contribution to the global electrical circuit, *J. Atmos. Sci.*, **67**, 309-323.
- Xu, W., E. J. Zipser, and C. Liu, 2009: Rainfall characteristics and Convective properties of Mei-Yu precipitation systems over south China and Taiwan, Part I: TRMM observations, *Mon. Wea. Rev.*, **137**, 4261-4275.

## 2009

- Liu, C., and E. J. Zipser, 2009: Implication of the day vs. night differences of water vapor, carbon monoxide and thin cloud observations near tropical tropopause, *J. Geophys. Res.*, **114**, D09303, doi:10.1029/2008JD011524.
- Wang, N.-Y., C. Liu, R. Ferraro, D. Wolff, E. J. Zipser, C. Kummerow, 2009: The TRMM 2A12 land precipitation product – status and future plans, *J. Meteor. Soc. Japan*, **87A**, 237-253.

Liu, C., and E.J.Zipser, 2009: "Warm rain" in the tropics: Seasonal and regional distribution based on 9 years of TRMM data. *J. Climate*, **22**, DOI: 10.1175/2008JCLI2641.1, 767-779.

## 2008

- Zhang, Y., S. A. Klein, C. Liu, B. Tian, R. T. Marchand, J. M. Haynes, R. B. McCoy, Y. Zhang, and T. P. Ackerman, 2008: On the diurnal cycle of deep convection, high-level cloud and upper troposphere water vapor in the Multi-scale Modeling Framework, *J. Geophys. Res.*, **113**, D16105, doi:10.1029/2008JD009905.
- Liu, C., E.J.Zipser, G.G. Mace, and S. Benson, 2008: Implications of the differences between daytime and nighttime CloudSat observations over the tropics. *J. Geophys. Res.*, **113**, D00A04, doi:10.1029/2008JD009783.
- Liu, C., E.J.Zipser, D.J.Cecil, S.W.Nesbitt, and S. Sherwood, 2008: A cloud and precipitation feature database from 9 years of TRMM observations. *J. Appl. Meteor. Climate*, **47**, 2712-2728. DOI:10.1175/2008JAMC1890.1
- Liu, C., and E.J.Zipser, 2008: Diurnal cycles of precipitation, clouds, and lightning in the triopics from 9 years of TRMM observations. *Geophys. Res. Letters*, **35**, L04819, doi:10.1029/2007GL032437.

## Before 2008

- Liu, C., E. J. Zipser, T. J. Garrett, J. Jiang, H. Su, 2007: How do the water vapor and carbon monoxide "tape recorders" start near the tropical tropopause? *Geophys. Res. Lett.*, **34**, L09804, doi:10.1029/2006GL029234.
- Liu, C., 2007: Geographical and seasonal distribution of tropical tropopause thin clouds and their relation to deep convection and water vapor viewed from satellite measurements, *J. Geophys. Res.*, **112**, D09205, doi:10.1029/2006JD007479.
- Liu, C., E. Zipser, and S. W. Nesbitt, 2007: Global distribution of tropical deep convection: Different perspectives using infrared and radar as the primary data source, *J. Climate*, **20**, 489-503.
- Zipser, E., C. Liu, D. Cecil, S. W. Nesbitt, and S. Yorty, 2006: where are the most intense thunderstorms on Earth?, *Bull. Am. Meteorol. Res.*, **87**, 1057-1071.
- Garrett, T., J. Dean-Day, C. Liu, B. K. Barnett, G. G. Mace, D. G. Baumgardner, C. R. Webster, T. Paul Bui, and W. R. Read, 2006: A redistribution of water due to pileus cloud formation near the tropopause, *Atmos. Chem. Phys.*, **6**, no5, 1185-1200.
- Liu, C., and E. Zipser, 2005: Global distribution of convection penetrating the tropical tropopause, *J. Geophys. Res.*, doi:10.1029/2005JD00006063.
- Liu, C., and L. Cheng, 1999: Parameterization of Mobilization and Transport of Sand-Dust during Black Storm and Mesoscale Numerical Experiments. *ACTA. Meteor. SINICA*, Vol.13, No.3, 316-330.
- Wang P., C. Liu, 1998: Numerical study of Mesoscale structure of Number 6 tropical depression in 1996, *ACTA. Meteor. SINICA*, **56** (3), 296-311 (in Chinese).
- Liu, C., L. Cheng, 1997: Study of Transport of Sand-Dust during Black Storm using Mesoscale Numerical model. *ACTA Meteo. SINICA*, **55**, 726-738. (in Chinese), 1997.

Cheng, L., and C. Liu, 1996: Mesoscale Numerical Experiments of Developing Mechanism for the "93.5" Black Storm and Parameterization of Sand-Dust Transport. *J. Hydrometeo. Ecolo.* No.4, 55-72.

### **Selected recent conference presentations**

- Liu, C., Event based dataset from TRMM and A-Train and their applications in the studies of tropical convection, AMS annual meeting, New Orleans (Invited presentation), 2012
- Liu, C., Counting storms from space: studies of cloud and precipitation using satellite observations. University of Chicago, (invited presentation), 2012.
- Liu, C., Correlations between lightning and characteristics of convective cells in tropical and subtropical thunderstorms, Brownbag seminar, Earth Research Center, University of Alabama-Huntsville (invited presentation). 2011
- Liu, C., Why does maximum radar reflectivity tend to increase downward toward the ocean surface, but tend to decrease downward toward the land surface? AGU fall meeting, San Francisco, 2011.
- Liu, C., Improvement of TRMM V7 product from precipitation feature perspective, TRMM science team meeting, Denver, 2011.
- Liu, C., Correlations between lightning and radar characteristics of convective cells in thunderstorms, AMS Radar conference, Pittsburg, 2011.
- Liu, C., The role of deep convection in the tropical tropopause layer, AGU fall meeting (invited presentation), 2010.
- Liu, C., Troposphere-stratosphere exchange over tropics – perspective from multi-satellite observations (invited presentation), NCAR ACP, Boulder, 2010
- Liu, C. and E. Zipser, Mesteries of the last minutes of rain drops: slopes of maximum radar reflectivity profiles below freezing level in precipitation systems, AMS microphysics conference, Portland, 2010.
- Liu, C. and E. Zipser, correlation between lightning and characteristics of convective cells in tropical thunderstorms, AMS tropical meteorology conference, Tucson, 2010.
- Liu, C., and E. Zipser, Rainfall contributions from precipitation systems with different sizes, intensities and durations over the tropics and subtropics, GPM science team meeting, Seattle, 2010.
- Liu, C. Precipitation Feature database - past and future, GPM science team meeting, Salt Lake City, 2009.
- Liu, C., Diurnal cycles of water vapor, clouds and deep convection near the tropical tropopause, AGU Chapman conference – water vapor, Kona, 2008.
- Liu, C., H. Jiang, E. Zipser, and E. F. Stocker, Online applications of the University of Utah TRMM precipitation features database, TRMM Science meeting, Fort Collins, 2008.
- Liu, C., and E. Zipser, Comparisons of Cloudsat and TRMM precipitation features, AMS tropical meteorology conferences, Orlando, 2008
- Liu, C., and E. Zipser, The importance of the “warm rain” contribution to tropical precipitation based on 9 years of TRMM statistics, 3<sup>rd</sup> International TRMM conferences, Las Vegas, 2008

- Liu, C., Comparisons between CloudSat and TRMM cloud and precipitation features, AGU fall meeting, San Francisco, 2007
- Liu, C., Geographical and seasonal distribution of TTL thin clouds and their relation to deep convection and TTL H<sub>2</sub>O viewed from satellite measurements, AGU fall meeting, San Francisco, 2006.
- Liu, C., E. Zipser, S.W. Nesbitt, E. Stocker, Global distribution of deep convection: Why do PR and VIRS give different perspectives?, 4<sup>th</sup> TRMM Science Conference, Monterey, 2006.
- Liu, C., and E. Zipser, Diurnal cycle of tropical deep convection and anvil clouds: Global distribution using 6 years of TRMM radar and IR data. 27<sup>th</sup> Conference on Hurricanes and Tropical Meteorology, Monterey, 2006.

### **Funds and grants**

#### Funded:

- NASA: Characteristics of various types of precipitation systems and their rainfall contributions observed by space-borne radar and microwave radiometers. Apr. 2011 – Mar. 2014 (Current year budget \$75K/yr, PI)
- Rockwell Collins: Geographical and seasonal distributions of radar profile, Sep. 2006 – Current (Year budget 100K/yr, PI)
- NASA: Population of precipitation systems observed by space-borne radar and microwave radiometers. Apr. 2008 – Mar. 2011 (Total budget \$230K, PI)
- NASA: From TRMM to GPM: Quantitative comparison and diagnostic evaluation of precipitation algorithms in a wide variety of meteorological regimes. Jan 2010 – Dec. 2013 (180K/yr, Co-PI)

#### Unfunded proposals:

- NASA: Seac4rs: The role of the different types of convection in the vertical transport of trace gases over Southeast Asia. Aug 2011-Jul 2014 (Total budget 290K, PI)
- NASA: A-Train. Extreme events of the vertical transport of aerosols and trace gases through the tropopause.
- NASA: AURA-Science. Regional variations of vertical transport of trace gases through tropopause due to different convective properties over tropics and subtropics.

### **Members**

AGU and AMS

### **Served as referee for peer review**

Journals: J. Atmos. Sci., J. Climate, J. Hydrometeorology, J. Appl. Meteor. Climat., Mon. Wea. Rev., J. Atmos. Ocean. Tech., J. Geophys. Res., Geophys. Res. Lett., Q. J. R. Meteor., Atmos. Chem. Phys., J. Climate, ANGIO, Adv. Atmos. Sci., Atmos. Sci. Lett., J. Remote Sensing, etc.

Proposals: NSF, NASA, NGS

### **Served as committee member of graduate students**

Michael Peterson, M.S., 2011 (Chair)

Weixin Xu, P.h.d, 2011  
Lis Cohen, M.S., 2009  
Yang Zhao, M.S., 2009  
Paul Staten, M.S., 2008

**Courses taught**

Introduction to Meteorology Lab, University of Wyoming, 2002  
Mesoscale Meteorology, University of Utah, 2010, 2012