

# Liming Li

Department of Physics

University of Houston, Houston, TX, 77204, USA

E-mail: [lli13@uh.edu](mailto:lli13@uh.edu), Tel: 713-893-1720

## Education

**Ph.D.**, Planetary Sciences, California Institute of Technology (2006)

Thesis: Dynamics of the Jovian Atmosphere from Observation and Theory.

Advisor: Prof. Andrew P. Ingersoll.

**M.S.**, Atmospheric Sciences (with honor), Peking University, Beijing, China (2001)

Thesis: Thermal effects of the Tibetan Plateau on Rossby Waves.

Advisor: Prof. Liu Shikuo

**B.S.**, Meteorology (with honor), Nanjing University, Nanjing, China (1998)

## Professional Experience

2001-2006 Graduate Research Assistant, Division of Geological and Planetary Sciences,  
California Institute of Technology

2006-2007 Researcher, Division of Geological and Planetary Sciences,  
California Institute of Technology

2007-2008 Research Associate, Center for Radiophysics & Space Research,  
Cornell University

2009-2012 Research Assistant Professor, Department of Earth and Atmospheric Sciences,  
University of Houston

2012- Assistant Professor, Department of Physics, University of Houston

## Research Experience

Combining observation, theory, and numerical modeling, I am interested in exploring multi-scale atmospheric processes on both giant planets and terrestrial planets including Earth. My main research interests are listed as below.

(1) *Theories and models of the convective storms and jets on giant planets (Li et al., 2006b, 2012a).*

(2) *Cassini observations of the atmospheres of giant planets (Li et al., 2006a, 2006c, 2008, 2011b).*

(3) *Global energy budget and climate change on planets and their moons (Li et al., 2010, 2011d).*

(4) *Time variation and spatial pattern of hydrological cycle on Earth (Li et al., 2011c).*

(5) *Atmospheric energetics and circulation on Earth and Mars (Li et al., 2007, 2011c, 2012b).*

## Teaching Experience

I organize my teaching experience into instructor, lecture, and laboratory working as below.

(1) Co-Instructor at University of Houston

*GEOL 3380: Physical Meteorology (Spring, 2009)*

(2) Lectures at Caltech, Cornell, and GFD

- *Invited lecture of "Atmospheric jets and waves on the four giant planets" in 2008 Geophysical Fluid Dynamics program at the Woods Hole Oceanographic Institution.*

- *Lectures contribution to some courses: Global Climate (Caltech, 2005), Atmospheric Radiation*

(Caltech, 2006), and *Planetary Atmospheres* (Cornell, 2008).

(3) Laboratory experiences

- *Organizing/Demonstrating fluid experiments for graduate students at Cornell University (2007).*
- *Organizing synoptic chart discussions for students at Peking University of China (2000).*

## Memberships

American Geophysical Union (AGU)

American Astronomical Society (AAS)

American Meteorology Society (AMS)

## Professional Review

Icarus (International Journal of Solar System Studies)

Geophysical Research Letters

Nature/Geosciences

NASA Postdoctoral Program Proposal

NASA Outer Planet Research Program Proposal

## Publications in Refereed Journals

(Please refer to my website <http://geossun2.geosc.uh.edu/web/li/publications.html>)

Li, L., R. Achterberg, B. Conrath, P. Gierasch, M. Smith, A. Simon-Miller, C. Nixon, G. Orton, F. Flasar, K. Baines, R. Morales-Juberías, A. Ingersoll, A. Vasavada, A. Del Genio, R. West, S. Ewald, 2012c. Strong Temporal Variability Over One Saturnian Year: From Voyager to Cassini. Submitted to *Nature Communications*.

Li, L., T. H. McConnochie, A. Toigo, D. Banfield, M. Smith, B. Conrath, P. Gierasch, 2012b. Mechanical energies of the upper atmosphere in the high latitudes of Mars. *JGR*, in revision.

Li, L., P. J. Gierasch, B. J. Conrath, and D. Banfield, 2012a. A toy model of the multiple bands and zonal jets on the giant planets, *Icarus*, in revision.

Li, L., K. Baines, M. Smith, R. West, H. Trammel, A. Simon-Miller, B. Conrath, P. Gierasch, G. Orton, C. Nixon, G. Filacchione, P. Fry, and T. Momary, 2012. Emitted Power of Jupiter Based on Cassini CIRS and VIMS Observations, *JGR*, In Press.

Li, L., C. A. Nixon, R. Achterberg, M. A. Smith, N. J. P. Gorius, X. Jinag, B. Conrath, P. Gierasch, A. A. Simon-Miller, F. M. Flasar, A. P. Ingersoll, K. Baines, R. A. West, A. R. Vasavada, S.P. Ewald, 2011d. The Global Energy Balance of Titan, *GRL* 38, Art. No. L23201.

**Please refer to the highlights on AGU**

[http://www.agu.org/news/press/jhighlight\\_archives/2011/2011-12-30.shtml#four](http://www.agu.org/news/press/jhighlight_archives/2011/2011-12-30.shtml#four)

**The paper was also selected to be the cover page of GRL Vol. 38, No. 23.**

<http://www.agu.org/pubs/gl/hi-res/2011/GRLV38N23cvr.pdf>

Li, L., X. Jiang, M. T. Chahine, E. T. Olsen, E. Fetzer, L. Chen, Y. L. Yung, 2011c. Recycling rate of atmospheric moisture over the past two decades. *Environmental Research Letters* 6, 2011.

**Please refer to the insight news on the ERL web**

<http://environmentalresearchweb.org/cws/article/news/47247>

**Li, L.,** X. Jiang, A. P. Ingersoll, A. D. Del Genio, C. C. Porco, R. A. West, A. R. Vasavada, S. P. Ewald, B. J. Conrath, P. J. Gierasch, A. A. Simon-Miller, C. A. Nixon, R. K. Achterberg, G. S. Orton, L. N. Fletcher, K. H. Baines, 2011b. Equatorial winds on Saturn and the stratospheric oscillation. *Nature-Geoscience*, doi:10.1038/ngeo1292.

**Li, L.,** X. Jiang, M. T. Chahine, J. Wang, Y. L. Yung, 2011a. Atmospheric energetics in El Nino and La Nina years. *Journal of the Atmospheric Sciences*, 68, 3072-3078.

**Li, L.,** B. Conrath, P. Gierasch, R. Achterberg, C. A. Nixon, A. A. Simon-Miller, F. M. Flasar, D. Banfield, K. H. Baines, R. A. West, A. R. Vasavada, A. Mamoutkine, M. Segura, G. Bjoraker, G. S. Orton, L. N. Fletcher, P. Irwin, P. Read, 2010. Emitted power of Saturn, *JGR-Planet*, 115, E11002, doi:10.1029/2010JE003631.

**Please refer to the NASA feature story titled “Saturn is on a cosmic dimmer switch”**  
[http://www.nasa.gov/mission\\_pages/cassini/whycassini/dimmer-switch.html](http://www.nasa.gov/mission_pages/cassini/whycassini/dimmer-switch.html)

**Li, L.,** P. J. Gierasch, R. K. Achterberg, B. J. Conrath, F. M. Flasar, A. R. Vasavada, A. P. Ingersoll, D. Banfield, A. A. Simon-Miller, L. N. Fletcher, 2008. Strong jet and a new thermal wave in Saturn's equatorial stratosphere. *Geophys. Res. Lett.* 35(23), Art. No. L23208.

**Li L.,** A. P. Ingersoll, X. Jiang, D. Feldman, and Y. L. Yung, 2007. Lorenz energy cycle of the global atmosphere based on reanalysis datasets. *Geophys. Res. Lett.* 34(16), art. No. L16813.

**Li L.,** A. P. Ingersoll, A. R. Vasavada, A. A. Simon-Miller, R. K. Achterberg, S. P. Ewald, U. A. Dyudina, C. C. Porco, R. A. West, and F. M. Flasar, 2006c. Waves in Jupiter's atmosphere observed by the Cassini ISS and CIRS instruments, *Icarus* 185, 416-419.

**Li L.,** A. P. Ingersoll and X. L. Huang, 2006b. Interaction of moist convection with zonal jets on Jupiter and Saturn, *Icarus* 180, 113-123.

**Li L.,** A. P. Ingersoll, A. R. Vasavada, A. A. Simon-Miller, A. D. Del Genio, S. P. Ewald, C. C. Porco, and R. A. West, 2006a. Vertical wind shear on Jupiter from Cassini images, *JGR* 111, art. no. E04004.

**Li L.,** A. P. Ingersoll, A. R. Vasavada, C. C. Porco, A. D. Del Genio and S. P. Ewald, 2004. Life cycles of spots on Jupiter from Cassini images, *Icarus* 172, 9-23.

**Li L.,** F. Huang, D. Chi, S. Liu, 2002. Thermal effects of the Tibetan Plateau on Rossby waves, *Advances in Atmospheric Science* 19, 901-913.

**Li L.,** D. Huang, F. Qiao, S. Liu, 2000. The diabatic waves in barotropic model, *Journal of tropical meteorology* 6, 1-12.

### **Selected Workshops**

• “Perspective and Challenges in GFD” - the fiftieth year of the Geophysical Fluid Dynamics (GFD) program at the Woods Hole Oceanographic Institution (WHOI), 2008 at WHOI in Woods Hole.

- The Explicit Planetary Isentropic-Coordinate (EPIC) atmospheric model workshop, September 2006 at Comparative Planetology Laboratory (CPL) of University of Louisville, Louisville.
- The NCAR/Mesoscale and Microscale Meteorology Division's the Advanced Research WRF(ARW), July 2005 at Foothills Laboratory in Boulder, Colorado.

### **Selected Talks and Conferences**

- Li, L., Comparative study of atmospheric dynamics between giant planets and Earth, The Atmospheric Science Department at University of Alabama in Huntsville, 2011.
- Li, L., *et al.*, Precipitation and global warming, NASA Sounder Science Team Meeting, 2010.
- Li, L., *et al.*, Emitted power of Saturn based on Cassini/CIRS observations, *EOS Transactions AGU*, Vol., **90**, P32C-03, 2009.
- Li, L., *et al.*, Hydrologic recycle of atmospheric moisture based on AIRS observations, NASA Sounder Science Team Meeting, 2009.
- Li, L., *et al.*, Equatorial jets and waves based on Cassini CIRS/ISS, DPS meeting. *Bull. Am. Astron. Soc.*, **40** 2008.
- Li, L., "Atmospheric jets and waves on the four giant planets", GFD, 2008 (invited talk).
- Li, L., "Atmospheric dynamics of giant planets", JPL, 2007 (invited talk).
- Li, L., "Jovian atmosphere from observation and theory", UCLA, 2006 (invited talk).
- Li, L., B. J. Conrath, F. M. Flasar, and P. J. Gierasch, *et al.*, Revisit of the thermal wind equation: application to planetary atmospheres, *EOS Transactions AGU*, Vol., **88(24)**, P41A-0208, 2007.
- Li, L., A. P. Ingersoll, X. Jiang, D. Feldman, Y.L. Yung, Lorenz energy cycle of the global atmosphere based on modern datasets, *EOS Transactions American Geophysical Union*, Vol., **87(43)**, A13D-0969, 2006.
- Li, L., *et al.*, Waves in Jupiter's atmosphere observed by the Cassini ISS and CIRS instruments, DPS meeting. *Bull. Am. Astron. Soc.*, **38**, 2006.
- Li, L., A. P. Ingersoll, A. R. Vasavada, A. A. Simon-Miller, A. D. Del Genio, S. P. Ewald, C. C. Porco, R. A. West, Vertical wind shear on Jupiter from Cassini images, *EOS Transactions American Geophysical Union*, Vol., **86(46)**, P11C-0134, 2005.
- Li, L., A. P. Ingersoll, and X. Huang, Interaction of moist convection with Jupiter's zonal jets, *EOS Transactions American Geophysical Union*, **85(47)**, P51B-1428, 2004.
- Li, L., and A. P. Ingersoll, Modeling the interaction of moist convection with the zonal jets of Jupiter, DPS meeting. *Bull. Am. Astron. Soc.*, **36**, 2004.

### **Current Grants**

#### **1. The Equatorial Region of Saturn: A Multi-instrument Study.**

**(NASA Cassini Data Analysis Program, ROSES08)**

PI: Dr. Liming Li

Collaborators: Peter Gierasch, Barney Conrath, Andrew Ingersoll, Ashwin Vasavada,  
Kevin Baines, Richard Achterberg, and Don Banfield

Program constact: Dr. Denis J. Bogan; Phone: (202) 3580359; E-mail:dbogan@nasa.gov

Period: 2/1/2009-1/31/2013

#### **2. Energy Balance of Saturn and Jupiter.**

**(NASA Outer Planets Research Program, ROSES09)**

PI: Dr. Liming Li

Co-Is: Kevin Baines, Robert West, and Richard Achterberg

Collaborators: Barney Conrath, Andrew Ingersoll, Peter Gierasch, and F. Michael Flasar  
Program contact: Dr. Curt Niebur; Phone: (202) 358-0390; E-mail: Curt.Niebur@nasa.gov  
Period: 10/1/2009-09/30/2013.

**3. Recycling Rate of Atmospheric Moisture Based on the AIRS Observations.  
(NASA/JPL Funded Project)**

PI: Dr. Liming Li

Program contact: Dr. Neil Bhuvan; Phone: (818) 354-4750; E-mail: neil.k.bhuvan@jpl.nasa.gov  
Period: 10/2009-09/2010