



Agenda



NCAR



The Extratropical UTLS:
Observations, Concepts and Future Directions
Community workshop at the National Center for Atmospheric Research, Boulder, Colorado
October 19-22, 2009
(Center Green Building 1)

Monday, October 19th

9:00 a.m.

Welcome

Workshop Introduction

William Randel

Session 1: UTLS Dynamical Structure, Tropopause
Chair: Paul Konopka

9:30 a.m.

CCMval overview

Andrew Gettelman, M. Hegglin

10:00 a.m.

Global observations in the UTLS region with GPS radio occultation data and MOZAIC aircraft measurements

Torsten Schmidt, J-P. Cammas, A. Haser, J. Wickert, S. Heise

10:15 a.m.

The tropopause inversion layer and its link to the mixing layer

Anne Kunz, P. Konopka, R. Mueller, L. Pan, C. Schiller, F. Rohrer

10:30 a.m.

Break

11:00 a.m.

Static stability in the extratropical UTLS: Observations of long-term mean structure and variability using GPS radio occultation data

Kevin Grise, D. Thompson, T. Birner

11:15 a.m.

Double tropopauses during idealized baroclinic life cycles

Shuguang Wang, L. Polvani

11:30 a.m.

Residual circulation and tropopause structure

Thomas Birner

11:45 a.m. **Global estimates of gravity wave parameters in the UTLS from the COSMIC/CHAMP GPS RO temperature retrievals**
Ling Wang, J. Alexander

12:00 p.m. –
2:30 p.m. *Lunch (provided in Center Green Lobby) & Poster Session*

Session 2 UTLS Chemical Structure, ExTL
Chair: Andrew Dessler

2:30 p.m. **UTLS tracer structure/transport overview**
Peter Hoor, L. Pan

3:00 p.m. **A global view on UTLS tracer distributions from the Canadian ACE-FTS satellite instrument**
Michaela Hegglin, G. Manney, C. Boone, K. Walker

3:15 p.m. **Characterizing the seasonal variation in position and depth of the mixing layer in the UTLS based on observations from the ACE-FTS and TES satellite instruments**
Dave MacKenzie, D. Jones, M. Hegglin, J. Worden, C. Boone, K. Walker, P. Bernath

3:30 p.m. **Stratospheric and tropospheric jet characterization and analyses of satellite and aircraft data in the context of jet structure and evolution**
Gloria Manney, M. Hegglin, W. Daffer, M. Santee, K. Walker, P. Bernath, J. Gille, N. Livesey, B. Nardi, S. Pawson

3:45 p.m. *Break*

4:00 p.m. **Characterization of the composition, structure, and seasonal variation of the mixing layer above the extratropical tropopause as revealed by MOZAIC measurements**
Jerome Brioude, J-P. Cammas, O. Cooper, P. Nedelec

4:15 p.m. **On the structure of the extratropical transition layer from in-situ observations**
Ignacio Pizzo, K. Law, F. Fierli, F. J'egou, P. Hoor, E. Palazzi, J. Ajtic, P. Haynes

4:30 p.m. **On the use of equivalent latitude/theta coordinates in UTLS studies**
Laura Pan

4:45 p.m. **A new tropopause definition for use in chemistry-transport models**
Jessica Neu, M. Prather, X. Zhu

Tuesday, October 20th

9:00 a.m. **Discussions from Monday's presentation,
20 minutes each**

Session 3: Transport & STE
Chair a.m.: Thomas Birner
Chair p.m.: Eric Ray

9:45 a.m. **Dynamics overview**
Peter Haynes

10:15 a.m. **START08 overview**
Laura Pan

10:30 a.m. *Break*

11:00 a.m. **Seasonal difference of UTLS exchange processes between spring and
summer in the Sub-Tropics and Polar Region based on START08 and
POLARCAT aircraft campaigns**
Simone Tilmes, L. Pan, L. Emmons, D. Kinnison, H. Schlager

11:15 a.m. **Transport timescales and surface source regions of UTLS air from
START-08 and HIPPO tracer correlations**
Eric Ray, F. Moore, K. Rosenlof

11:30 a.m. **Transport of air from the tropical upper troposphere into the
extratropical lower stratosphere**
Ken Bowman

11:45 a.m. **Identification of transport pathways and location of mixing in the
extratropical tropopause region using CO-O3 correlations and
Lagrangian model simulations**
Baerbel Vogel, L. Pan, P. Konopka, G. Guenther, R. Mueller, T. Campos, W. Hall,
I. Pollack, A. Weinheimer, J. Wei, E. Atlas, K. Bowman

12:00 p.m. **Model evolution of a mid-latitude tropospheric intrusion**
Dalon Stone, L. Pan, K. Bowman, S. Tilmes, D. Kinnison, E. Atlas

12:15 p.m. **Aircraft measurements and numerical simulations of gravity waves in
the extratropical UTLS region during the START08 field campaign**
Meng Zhang, F. Zhang, G. Ko, K. Bowman, L. Pan, E. Atlas

12:30 p.m. *Lunch*

2:00 p.m. **STE from ozonesonde and radar observed tropopause jump**
David Tarasick, W. Hocking, T. Carey-Smith

2:15 p.m. **Potential vorticity as a barrier to exchange between the troposphere
and lowermost stratosphere**
John Gille, S. Karol, V. Yudin, D. Kinnison, B. Nardi

2:30 p.m. **Satellite observations and simulation of subvortex processing and
related Upper Troposphere/Lower Stratosphere (UTLS) Transport**
Michelle Santee, G. Manney, W. Read, N. Livesey, R. Harwood, K. Walker

2:45 p.m.	MLS observations of fire smoke in the lower stratosphere Steven Massie
3:00 p.m.	Lagrangian modeling of mixing and mixed layer Paul Konopka, L. Pan
3:15 p.m.	<i>Break</i>
3:30 p.m.	Mixing processes and exchanges across the tropical and subtropical UTLS Ronan James, B. Legras
3:45 p.m.	Transport regimes and the distribution of CO and H2O in the UTLS Peter Hoor, H. Wernli
4:00 p.m.	Transport and mixing in the extratropical tropopause region in a high vertical resolution GCM Kazuyuki Miyazaki, S. Watanabe, Y. Kawatani, Y. Tomikawa, M. Takahashi, K. Sato
4:15 p.m.	Extratropical stratosphere-troposphere exchange in an AGCM with the horizontal grid size of 20 km Ryo Mizuta, H. Yoshimura
4:30 p.m.	Nonlinear modulation of O3 and CO induced by mountain waves in the UTLS during TREX Mohamed Moustouai, A. Mahalov, H. Teitelbaum, V. Grubisic
4:45 p.m.	Modeling study of thunderstorm effects on the upper troposphere during the early stages of the 2006 North America Monsoon Mary Barth, J. Lee, C. Boxe, J. Worden, A. Hodzic
5:00 p.m.	The impact of wind shear on the cross-tropopause transport of water vapor by deep convective storms Pao Wang
5:15 p.m. – 7:00 p.m.	<i>Poster Session & Reception</i>

Wednesday, October 21st

9:00 a.m. Discussion of previous day

Session 4: Chemical and Microphysical Distributions

Chair: David Tarasick

9:30 a.m. **CARIBIC overview**
Andreas Zahn

10:00 a.m. **Ability of global chemistry models to reproduce large scale UTLS features of CO, CH₄, CO₂ and oxygenated compounds assessed by comparison to airborne CARIBIC data**
Frans Alkemade, S. Szopa, T. Elias, P. van Velthoven, A. Zahn, T. Schuck, C. Brenninkmeijer, CARIBIC team

10:15 a.m. **Seasonal distribution and transport of CO₂ in the tropopause region based on frequent observations in the CONTRAIL project**
Yousuke Sawa, T. Machida, H. Matsueda

10:30 a.m. *Break*

11:00 a.m. **Organic trace gases in the extratropical UTLS**
Elliot Atlas, L. Pan, K. Bowman, S. Tilmes, D. Kinnison, D. Stone, S. Schauffler, X. Zhu, L. Pope, R. Lueb

11:15 a.m. **Seasonal variability of UTLS hydrocarbons observed from ACE and comparisons with WACCM**
Mijeong Park, W. Randel, L. Emmons, D. Kinnison

11:30 a.m. **Observations of cirrus clouds and trace gases in the extratropical UTLS by CRISTA-NF**
Martin Riese, K. Weigel, R. Spang, P. Preusse, L. Hoffmann, F. Olschewski, F. Stroh

11:45 a.m. **Clouds and water vapor in the northern hemisphere summertime stratosphere**
Andrew Dessler

12:00 p.m. **Water vapour in the extratropical UTLS as an indicator of dynamical processes**
Sergey Khaykin, A. Lukyanov, V. Yushkov, R. Kivi, M. Maturilli

12:15 p.m. **UTLS ozone and water vapor measurements in Kunming**
Jianchun Bian

12:30 p.m. *Lunch*

Session 5: Long-Term Variability and Trends

Chair: Michaela Hegglin

2:00 p.m. **MOZAIC overview**
Valerie Thouret

2:30 p.m. **Long-term ozone changes in UTLS in the northern hemisphere**
Johannes Staehelin, C. Poberaj

2:45 p.m. **Anthropogenic influence on stratospheric aerosol composition and trends through the Asian monsoon: observations, modeling and impact**

Susan Solomon, J-F. Lamarque, R. Portmann, T. Deshler, D. Hofmann, S. Smith, J. Liley, T. Trickl

3:00 p.m. **Impact of changes in climate and halocarbons on recent lower stratosphere ozone and temperature trends**

Jean-François Lamarque, S. Solomon

3:15 p.m. **The dynamical signal in stratospheric temperatures from satellites, 1979-2005: Long-term changes and the pole-tropics out-of-phase relationship**

Paul Young, S. Solomon, D. Thompson, S. Sherwood, Q. Fu

3:30 p.m. *Break*

3:45 p.m. **Changes in the tropical belt and their effect on trace gas distributions in the UTLS**

Sean Davis, K. Rosenlof

4:00 p.m. **Tropical broadening vs tropopause rising**

Juan Añel, A. Gettelman, J. Castanheira

4:15 p.m. **Broadening of the tropical UTLS in chemistry-climate models**

Andrew Gettelman, CCMVal Model PIs

4:30 p.m. **Another hint for a changing stratospheric circulation after 2001**

Harald Boenisch, A. Engel, P. Hoor

Thursday, October 22nd

9:00 a.m. Discussion 1: session 4 (20 minutes)
Discussion 2: session 5 (20 minutes)

Session 6: Future Missions

Chair: Elliot Atlas

9:45 a.m. **Deep Convective Clouds and Chemistry (DC3): Description of the proposed field campaign and what we can expect to see**
Mary Barth, C. Cantell, B. Brune, S. Rutledge, B. Skamarock, M. Weisman

10:00 a.m. **PREMIER: A proposed ESA earth explorer mission to observe atmospheric composition for a better understanding of chemistry-climate interactions**
Martin Riese on behalf of the PREMIER Mission Advisory Group

10:15 a.m. **An overview of future NASA airborne science field experiments**
Eric Jensen

10:30 a. m. *Break*

Workshop Summary

10:45 a.m. **Summary of all sessions: Lessons learned - main questions**

11:45 a.m. **Next Steps**

12:00 p.m. **Adjourn**

POSTERS

- 1** **Thermal stratification versus water vapor content in the upper troposphere**
Antonio Ferreira, J. M. Castanheira, L. Gimeno

- 2** **Identifying the tropopause using high-resolution sounding data**
Cameron Homeyer, K. Bowman, L. Pan

- 3** **Impact of the novel HNO₃-forming channel on tropospheric O₃ via WRF-Chem over the United States during the 2006 North American Monsoon**
Christopher Boxe, W. Ford, J. Worden

- 4** **A fine structure of atmospheric (static) stability near the tropopause with the Equatorial Atmosphere Radar (EAR) at Kototabang, West Sumatera**
Eddy Hermawan

- 5** **Attributes of the Nimbus 7 LIMS Version 6 dataset for studies of constituent transport in the lower stratosphere**
Ellis Remsberg, M. Natarajan, D. Fairlie, G. Lingenfelter

- 6** **Sounding the upper troposphere-lower stratosphere using a tomographic approach**
Enzo Papandrea, E. Arnone, E. Castelli

- 7** **A comparison of dynamical and thermal tropopause pressure from ERA-40 reanalysis data**
Juan A. Añel, G. Sáenz, M. Chamorro, D. Barriopedro, A. Garcia

- 8** **MLS/START08 comparisons and large-scale context for START08 from MLS and ACE-FTS satellite data**
Gloria Manney, M. Hegglin, W. Daffer, R. Fuller, E. Atlas, K. Bowman, L. Pan, S. Wofsy, R-S. Gao, A. Weinheimer, T. Campos, D. Hurst, N. Livesey, M. Santee, K. Walker

- 9** **Quantifying the ozone distribution and variability in the UTLS in relation to thermal and circulation features.**
John Merrill

- 10** **Observed vertical distribution of tropospheric ozone during the Asian summertime monsoon**
John Worden, D. Jones, J. Liu, M. Parrington, K. Bowman, I. Stajner, R. Beer, J. Jiang, V. Thouret, S. Kulawik, J-L. Li, S. Verma, H. Worden

- 11** **Increase of upper troposphere/lower stratosphere wave baroclinicity during the second half of the 20th century**
Juan Añel, J. Castanheira, C. Marques, J. Antuña, M. Liberato, L. de la Torre, L. Gimeno

- 12** **TRODIM Project and the PATXI Dataset**
Juan Añel, L. de la Torre, L. Gimeno, R. Garcia-Herrera, J. García, P. Ribera, Á. Redaño

- 13** **Equatorial atmospheric waves in the UTLS forced by latent heating estimated from TRMM rain rates**
Jung-Hee Ryu, J. Alexander, D. Ortland

14	Interannual variability of ozone in the winter lower stratosphere and the relationship to laminar transport and mixing Mark Olsen, A. Douglass, M. Schoeberl, J. Rodriguez, Y. Yoshida
15	Statistical analysis of double tropopause events utilizing HIRDLS temperature data Tanya Phillips, J. Gille
16	Upper-tropospheric ozone variability as observed by the Aura Microwave Limb Sounder Nathaniel Livesey, M. Santee, J. Logan, W. Read, L. Froidevaux
17	The tropopause inversion layer: New observations, new theories Neil Tandon, W. Randel, L. Pan, S-W. Son, L. Polvani
18	Simulation of the atmospheric tape recorder signal in HCN R. Pommrich, J-U. Grooß, P. Konopka, G. Günther, A. Heil, M. Schultz, H-C. Pumphrey, K. Walker, M. Riese, R. Müller
19	Interannual variability of the water vapor transport at 100 hPa induced by the large scale circulation and convective processes Ronan James, B. Legras, M. Bonazzola, K. Surbled, S. Fueglistaler
20	Finite-amplitude wave activity diagnostic and an eddy-free reference state of general circulation in the troposphere and stratosphere Noboru Nakamura, A. Solomon
21	The summer polar tropopause inversion layer William Randel
22	Radar reflectivity as a proxy for convective detrainment in the UTLS Gretchen Mullendore, A. Homann, J. Siegel
23	Nitrogen oxides in the UTLS: Observations from CARIBIC Helmut Ziereis, G. Stratmann, H. Schlager, P. Stock, M. Scheibe, U. Schumann, C.A.M. Brenninkmeijer, F. Slemr, A. Zahn, M. Hermann
24	Transport in the extratropical UTLS as revealed by chemical tracers during the START08 campaign Jasna Pittman, L. Pan
