

**Professional Addresses**

National Center for Atmospheric Research  
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**Education**

*Ph.D., Physics, Department of Physics, University of Bologna, Italy; July 1992*

▷ Dissertation Title:

The Semiannual Oscillation of the Equatorial Stratopause studied with CCM2

▷ Thesis advisor: Dr. R.R. Garcia

*M.S. Summa cum Laudae, Physics, Department of Physics, University of L'Aquila, Italy; December 1987*

▷ Dissertation Title: Lagrangian and Eulerian calculations of diffusion coefficients from satellite data.

▷ Thesis Advisor: Prof. G. Visconti

**Professional Experience**

- *Project Scientist* National Center for Atmospheric Research, October 1999 - present
- *Scientist* Atmospheric Systems and Analysis Corporation, September 1995 - 2001
- *Associate Scientist* National Center for Atmospheric Research, August 1994 - September 1999
- *Post-Doctoral Fellow*, Advanced Study Program, National Center for Atmospheric Research, July 1992 - July 1994
- *Visiting Scientist*, Atmospheric Chemistry Division, National Center for Atmospheric Research, July 1990 - July 1992
- *Graduate Research Assistant*, Department of Physics, University of Bologna (Italy), January 1988 - June 1990

**Fellowships/Awards**

- Advanced Study Program, Post-Doctoral Fellow, National Center for Atmospheric Research, 1992.
- SIF/ENEA (Italian Society of Physics/National Agency for Alternative Energy), 1988.

**Professional Memberships**

- American Geophysical Union
- American Meteorological Society

## Collaborators

J. Alexander, CoRA/NorthWest Research Associates, Boulder (CO)  
J. Bacmeister, NASA/Goddard  
S. Eckermann, Navy Research Laboratory  
M. Giorgetta, Max Plank Institute for Meteorology, Hamburg (Germany)  
H. Liu, High Altitude Observatory, National Center for Atmospheric Research  
D. Marsh, Atmospheric Chemistry Division, National Center for Atmospheric Research  
P. Kushner, Dept. of Physics, Univ. of Toronto (Canada)  
J. Perlwitz, CIRES, CU-Boulder  
E. Pierrazzo, Planetary Science Institute, Tucson (AZ)  
L. Polvani, Columbia University, New York City (NY)  
C.-Y. She, Dept. of Physics, Colorado State University, Fort Collins (CO)  
V. Yudin, Atmospheric Chemistry Division, National Center for Atmospheric Research

## Research Grants

- Improving gravity wave parameterizations for next generation of troposphere/middle atmosphere general circulation models. Funding Agency: NASA. PI: J. Bacmeister (NASA GODDARD). Co-I: S. Eckermann, J. Richter, and F. Sassi.
- Studies of atmospheric impact of 11-year solar variability using the Whole Atmosphere Community Climate Model. Funding Agency: NASA. PI: R.R. Garcia. Co-I: D. Kinnison, D. Marsh, R. Roble, F. Sassi, and S. Solomon.

## Community Services

- *Membership:*
  - ▷ Middle Atmosphere Committee of the American Meteorological Society, 2007-2010
  - ▷ SPARC Dynamics and Variability Initiative: Member of the Organizing Group
  - ▷ SPARC Dynamics and Variability Initiative: Analysis Area coordinating leader
- *Conferences/Workshops:*
  - ▷ Co-Organizer: American Meteorological Society/Middle Atmosphere Conference - Portland (OR) 2007
  - ▷ Convener: American Meteorological Society/Middle Atmosphere Conference - 2007: Special session on Tropical extra-Tropical Connections
  - ▷ Session chair: IUGG - Middle Atmosphere Workshop - Perugia - Italy - 2007
- *Reviewer:*
  - ▷ of papers submitted to the Journal of Geophysical Research Journal of Atmospheric Science, Geophysical Research Letters, Journal of Climate, Annales Geophysicae, and Atmospheric Chemistry and Physics
  - ▷ of proposals submitted to the National Science Foundation

- *Teaching:*
  - ▷ Climate Physics for undergraduates (Colorado University - Fall Semester, 2000)
  - ▷ Spectral Analysis (Colorado University - Fall Semester, 2002)
- *Board of Directors* of Atmospheric Systems and Analysis Corporation, 2002-2007.
- *Advisorship:*
  - ▷ MS student (I. Cionni) from Univ. of L'Aquila (Italy), 2003
  - ▷ Reviewer for PhD thesis (I. Cionni) submitted at Univ. of L'Aquila, Italy, 2006

## Internal

- *Graduate of Leadership Academy 2007.*
- *CSL proposals.* Leading or contributing author: PI: 2004-2005; Co-I: 2006-2007
- *Model development:*
  - ▷ Principal developer of WACCM1b: 1999-2002
  - ▷ Contributing developer of WACCM3
- Coordinating and contributing author to the WACCM Strategic Plan (2006).
- Various administrative duties in support of WACCM

## Refereed Publications

36. Marsh, D.R., R.R. Garcia, D.E. Kinnison, B.A. Boville, F. Sassi, S.C. Solomon, and K. Matthes. Modeling the whole atmosphere response to solar cycle changes in radiative and geomagnetic forcing. *J. of Geophys. Res.*, **112**, doi:10.1029/2006JD008306, 2007.
35. Kushner, P.J., J. Austin, M.P. Baldwin, N. Butchart, M.A. Giorgetta, .P.H. Haynes, E. Manzini, N.A. McFarlane, A. O'Neill, J. Perlwitz, L.M. Polvani, W.A. Robinson, F. Sassi, J.F. Scinocca, T.G. Shepherd. The SPARC DynVar Project: A SPARC Project on the Dynamics and Variability of the Coupled Stratosphere-Troposphere System. *SPARC Newsletter*, **29**, 9-14, 2007.
34. T. Yuan, C-Y She, D.K. Krueger, F. Sassi, R.R. Garcia, R.G. Roble, H-L Liu. Climatology of mesopause region temperature, zonal wind and meridional wind over Fort Collins, CO (41N, 105W) and comparison with model simulations. *J. of Geophys. Res.* In press, 2007.
33. Richter, J.H., F. Sassi, R.R. Garcia, K. Matthes, and C. Fischer. Dynamics of the middle atmosphere as simulated by the Whole Atmosphere Community Climate Model, version 3 (WACCM3). *J. of Geophys. Res.*. Submitted, 2007.
32. Sassi, F., J.H. Richter, and R.R. Garcia. A sensitivity study of the middle atmosphere to changes in the parameterized momentum drag of gravity waves. *J. of Geophys. Res.* Submitted, 2007.
31. Tilmes, S., D.E. Kinnison, R. R. Garcia, R. Muller, F. Sassi, D. R. Marsh, and B. A. Boville. Evaluation of Heterogeneous Processes in the Polar Lower Stratosphere in WACCM3. *J. of Geophys. Res.*. In press, 2007.
30. Kinnison, D.E., G.P. Brasseur, S. Walters, R.R. Garcia, F. Sassi, D. Marsh, B.A. Boville, P. Rasch, J.F. Lamarque, L.K. Emmons, P. Hess, J. Orlando, G. Tyndall, W. Randel, M. Park, L. Pan, A. Gettelman, L. Harvey, C. Randall, C. Singleton, C. Granier, T. Diehl,

- U. Niemeier, J.C. Wei, K. Patten, and D.J. Wuebbles. Sensitivity of Chemical Tracers to meteorological parameters in the MOZART-3 Chemical Transport Model. *J. of Geophys. Res.* doi:10.1029/2006JD007879, 2007.
29. Garcia, R. R., D. Marsh, D. Kinnison, B. Boville, and F. Sassi. Simulations of secular trends in the middle atmosphere, 1950-2003. *J. Geophys. Res.*. In press, 2007.
28. Charlton, A.J., L. Polvani, J. Perlwitz, F. Sassi, and E. Manzini, K. Shibata, S. Pawson, J.E. Nielsen, D. Rind. A new look at stratospheric sudden warmings. Part II: Evaluation of numerical model simulations. *J. of Climate*, **20**, 470-488, 2007.
27. Butchart, N., A.A. Scaife, M. Bourqui, J. de Grandpre, S.H.E. Hare, J. Kettleborough, U. Langematz, E. Manzini, F. Sassi, K. Shibata, D. Shindell, M. Sigmond. A multi-model study of climate change in the Brewer-Dobson circulation. *Climate Dynamics*. doi 10.1007/s00382-006-0162-4, 2006.
26. Beres J.H., R.R. Garcia, B.A. Boville, and F. Sassi. Implementation of a gravity wave source spectrum parameterization dependent on the properties of convection in the Whole Atmosphere Community Climate Model (WACCM). *J. Geophys. Res.*, **110**, doi:10.1029/2004JD005504, 2005.
25. Sassi, F., B.A. Boville, D. Kinnison, and R.R. Garcia. The effects of interactive ozone chemistry on simulations of the middle atmosphere. *Geophys. Res. Letters*, doi:10.1029/2004GL022131, 2005.
24. Cionni, I., G. Visconti, and F. Sassi. Fluctuation dissipation theorem in a General Circulation Model. *Geophys. Res. Letters*, **31**, doi:10.1029/2004GL019739, 2004.
23. Sassi, F., D. Kinnison, B.A. Boville, R.R. Garcia, R. Roble. The effect of ENSO on the dynamical, thermal and chemical structure of the middle atmosphere. *J. Geophys. Res.*. doi 10.1029/2003JD004434, 2004.
22. Salby, M.L., F. Sassi, P. Callaghan, W. Read, H. Pumphrey: Fluctuations of cloud, humidity and thermal structure near the tropical tropopause. *J. of Climate*, **16**, 3428-3446, 2003.
21. Horinouchi, T, S. Pawson, K. Shibata, U. Langematz, E. Manzini, F. Sassi, R.J. Wilson, K.P. Hamilton, J. de Granpre, A.A. Scaife. Tropical cumulus convection and upward propagating waves in middle atmosphere GCM. *J. of Atmos. Science*, **60**, 2765-2782, 2003.
20. Mahowald, N.M., R.A. Plumb, P.J. Rasch, J. del Corral, F. Sassi, and W. Heres: Stratospheric transport in a 3-dimensional isentropic coordinate model. *J. Geophys. Res.*. doi:10.1029/2001JD001313, 2002
19. Sassi, F., R.R. Garcia, B.A. Boville, H. Liu: On temperature inversions and the mesospheric surf zone. *J. Geophys. Res.*. doi:10.1029/2001JD001525, 2002
18. Sassi, F., M. Salby, H.C. Pumphrey, W.G. Read: Influence of Madden-Julian Oscillation on upper tropospheric humidity. *J. Geophys. Res.*. doi:10.1029/2001JD001331, 2002
17. Salby, M., Sassi, F., P. Callaghan, P. Keckhut, and A. Hauchecorne: Mesospheric inversions and their relationship to planetary wave structure. *J. Geophys. Res.*. doi:10.1029/2001JD000756, 2002
16. Gettelman, A., M. Salby, and F. Sassi, Distribution and influence of convection in the Tropical Tropopause Region. *J. Geophys. Res.*. doi:10.1029/2001JD001048, 2002.

15. Gettelman, A., M. Salby, W.J. Randel, and F. Sassi, Convection in the tropical tropopause region and stratosphere-troposphere exchange. *SPARC Newsletter*, **17**, 22-25, 2001.
14. Sassi, F., M. Salby, and W.G. Read, Relationship between Upper Tropospheric Humidity and Deep Convection. *J. Geophys. Res.*, **106**, 17,133-17,146, 2001.
13. Salby, M.L. and F. Sassi. Synoptic mapping of convective structure from undersampled satellite observations. *J. of Climate*, **14**, 2281-2295, 2001.
12. Horinouchi, T., F. Sassi, and B.A. Boville, Synoptic-scale Rossby waves and geostrophic distribution of lateral transport routes between the tropics and the extra-tropics in the lower stratosphere. *J. Geophys. Res.*, **105**, 26,579-26,592, 2000.
11. Garcia, R.R., and F. Sassi, Modulation of mesospheric Semiannual Oscillation by the Quasibiennial Oscillation. *Earth, Planets and Space*. **51**, 563-569, 1999.
10. Sassi, F. and M. Salby, Diurnal variations in the middle atmosphere observed by UARS *J. Geophys. Res.* **104**, 3729-3739, 1999.
9. Sassi, F. and M. Salby, Impacts of diurnal variation on UARS synoptic products *Geophys. Res. Lett.* **25**,4349-4352, 1998.
8. Sassi, F. and M. Salby, Fast Fourier Synoptic Mapping of UARS data. *J. Geophys. Res.*, **103**, 10,885-19,898, 1998.
7. Sassi, F. and R.R. Garcia, The role of equatorial waves forced by convection in the Tropical Semiannual Oscillation. *J. Atmos. Sci.*, **54**, 1925-1942, 1997.
6. Sassi, F. and R.R. Garcia, Maintenance of the tropical oscillations of the zonal-mean winds in the middle atmosphere by convectively-forced gravity waves. In "Gravity Wave Processes and Their Parameterization in Global Climate Models", K.P. Hamilton, Edt. 401pp, 1996.
5. Sassi, F. and R.R. Garcia, A One-dimensional model of the Semiannual Oscillation driven by convectively-forced gravity waves. *J. Atmos. Sci.*, **51**, 3167-3182, 1994.
4. Sassi, F., R.R. Garcia, B.A. Boville, The Stratopause Semiannual Oscillation in the NCAR Community Climate Model. *J. Atmos. Sci.*, **50**, 3608-3624, 1993.
3. Visconti, G., F. Sassi, and G. Pitari, Transport in the middle atmosphere from satellite data. In "The use of EOS for studies of atmospheric physics", J.C. Gille and G. Visconti, Eds., North Holland, 1992.
2. Sassi, F., G. Visconti, and J.C. Gille, Validation of parameterization scheme for eddy diffusion from satellite data. *J. Atmos. Sci.*, **47**, 2505-2515, 1990.
1. Visconti, G., F. Sassi, Satellite studies of transport processes in the atmosphere. In "Physics and Astrophysics in the space station era", Conference Proceedings, Italian Physical Society, **17**, 285, 1989.

## Invited talks

- Sassi, F., J.H. Richter, R.R. Garcia. A sensitivity study of the middle atmosphere to changes in the parameterized momentum drag of gravity waves. IUGG, 2007.
- Sassi et al. Experiments with WACCM: a sensitivity study. TIIMES Retreat on Gravity Waves. June 2006.
- Sassi, F., D. Kinnison, R.R. Garcia, B.A. Boville, R. Roble: The impact of variable sea-surface temperature on the circulation and thermal structure of the middle and upper atmosphere. Fall AGU Meeting, December 9-16, 2001.
- Sassi, F., and R.R. Garcia. Dynamics of the equatorial middle atmosphere. CEDAR SCOSTEP. June 2001.

## Conferences, Workshops, Meetings, Seminars

- Sassi, F. Modeling climate in the Whole Atmosphere: Should we care CGD/ESSL Seminar. November 2007.
- Sassi, F., J.H. Richter, R.R. Garcia. A sensitivity study of the middle atmosphere to changes in the parameterized momentum drag of gravity waves. AMS Middle Atmosphere Conference. Portland, 2007.
- Pawson S., Newman P.A., Nielsen J.E., Sassi F., Waugh D., . Stolarski R. Sensitivity of stratospheric climate and composition to sea-surface temperatures. AGU Fall Meeting, San Francisco, 2006.
- Yuan T., She C-Y, Krueger D.A., F. Sassi , R.R. Garcia. Climatology of mesopause region temperature, zonal wind and meridional wind over Fort Collins, CO (41N, 105W). AGU Fall Meeting, San Francisco, 2006.
- Sassi et al. WACCM simulations in 2006-2007. CCSM Workshop 2006 - Chemistry Climate Working Group. June 2006.
- Sassi, F., J. Richter, B.A. Boville, R.R. Garcia. Model consistent generation of gravity waves and their effects on simulations of the middle atmosphere: A case study with the WACCM model. Team Meeting, NASA Goddard. May 2006.
- D. Kinnison, R. Garcia, D. Marsh, B. Boville, F. Sassi, S. Tilmes. Chemistry-Climate Model Simulations of secular Trends in the Middle Atmosphere. AGU 2006, Spring Meeting.
- Charlton, AJ; Polvani, LM; Perlwitz, J; Sassi, F ; Manzini, E ; Shibata, K; Pawson, S ; Nielsen, JE; Rind, D Stratospheric Sudden Warmings: a new climatology with modelling benchmarks, and a validation of current Stratosphere-resolving GCMs. EGU (Vienna - Austria), April 2006.
- Sassi, F., J. Richter, B. Boville, R. Garcia. Model consistent generation of gravity waves and their effects on simulations of the middle atmosphere: A case study with the WACCM model. EGU (Vienna - Austria), April 2006.
- Sassi, F., J. Richter, B. Boville, R. Garcia. Model consistent generation of gravity waves and their effects on simulations of the middle atmosphere: A case study with the WACCM model. AMWG (Boulder), March 2006.
- Boville, B.A., R.R. Garcia, and F. Sassi Resolution Dependence of the Simulation of a GCM for

- the Surface to Lower Thermosphere. AGU Fall Meeting. San Francisco, 2005.
- C. E. Randall, V.L. Harvey, R. Garcia, D. Kinnison, D. Marsh, B. Boville, and F. Sassi. WACCM evaluation using satellite solar occultation data and Met Office analyses. CCMval Workshop, Boulder, October 2005.
- Charlton, A.J., L. Polvani, J. Perlwitz, F. Sassi, and E. Manzini, K. Shibata, S. Pawson, J.E. Nielsen, D. Rind. A new look at stratospheric sudden warmings. Part II: Evaluation of numerical model simulations. CCMval Workshop, Boulder, October 2005.
- Richter, J.H., A.K. Smith, F. Sassi. Effects of mesospheric dynamics on CO<sub>2</sub> concentration in the mesosphere and lower thermosphere. IAGA Conferene. Toulouse, July 2005.
- Sassi, F. Model consistent schemes to force gravity waves from tropospheric sources. AMWG workshop, Boulder (CO). March 2005.
- Sassi, F. Model consistent schemes to force gravity waves from tropospheric sources. GRIPS workshop, Toronto (Ontario, Canada). March 2005.
- Sassi, F. The effects of ENSO on the dynamical and thermal structure of the middle atmosphere. SOLAR Meeting on Decadal variability in the sun and climate. Meredith (NH), October 2004.
- Sassi, F., B.A. Boville, D. Kinnison, R.R. Garcia. The effect of interactive ozone calculations in simulations of the middle atmosphere. 3rd SPARC General Assembly. Victoria (Canada), August 2004.
- Sassi, F., B.A. Boville, D. Kinnison, R.R. Garcia, R. Roble. The effect of interactive ozone calculations in simulations of the middle atmosphere. GCM Reality Intercomparison Project for SPARC workshop. Bologna (Italy), April 2004.
- Sassi, F., B.A. Boville, D. Kinnison, R.R. Garcia, R. Roble. The effect of interactive ozone calculations in simulations of the middle atmosphere. Atmosphere Model Working Group Meeting. Boulder (CO), March 2004.
- Sassi, F., B.A. Boville, R.R. Garcia. The effects of spectral resolution in gravity waves parameterizations. Chapman Conference on gravity waves processes and parameterizations. Kona (Hawai'i), January 2004.
- Sassi, F., D. Kinnison, B.A. Boville, R.R. Garcia, R. Roble. WACCM2: Early results with WACCM2. 8th CCSM Workshop, Breckenridge, June 2003.
- Sassi, F.. WACCM, new model development and future plans. GRIPS Annual Workshop. Washington DC, March 2003.
- Roble, R., R.R. Garcia, B.A. Boville, F. Sassi, and D. Kinnison. A Whole Atmosphere Community Climate Model (WACCM) for studying Solar-Terrestrial Interactions. 2nd Living with a Star Science Workshop. November 2002.
- Sassi, F., B.A. Boville, D. Kinnison, R.R. Garcia, and R. Roble. The effect of gravity waves breaking in the upper mesosphere. 12th AMS Conference on the Middle Atmosphere. San Antonio (TX). October, 2002.
- Garcia R.R. and F. Sassi. Simulation of the 2-day wave in the Whole-Atmosphere Community Climate Model (WACCM). 12th AMS Conference on the Middle Atmosphere. San Antonio (TX). October, 2002.

- D.R. Marsh, F. Sassi, D. Kinnison, R.R. Garcia, and B.A. Boville Simulations of the influence of increasing green house gases on the structure and composition of the stratosphere and mesosphere. COSPAR. October 2002.
- Garcia, R.R., and F. Sassi. Tropical sea-surface temperatures and middle atmosphere variability. Workshop on Trends in the Middle Atmosphere, Kuhlungsborn, Germany, May 2002.
- Sassi, F.: The Whole Atmosphere Community Climate Model. AMWG Meeting, April 2002.
- Sassi, F., D. Kinnison, R.R. Garcia, B.A. Boville, R. Roble: The impact of time dependent ozone and sea surface temperature in numerical simulations of the middle atmosphere. IAMAS Conference, Innsbruck, Austria, July 2001.
- Sassi, F., D. Kinnison, R.R. Garcia, B.A. Boville, R. Roble, Development and Status of General Circulation Model Extending from the Ground to the Lower Thermosphere. SPARC Conference, Mar de La Plata (Argentina), 2000.
- Sassi, F., D. Kinnison and B. A. Boville, Looking up: Introducing a new generation of Whole Atmosphere General Circulation Model (WACCM) to study the climate of the upper atmosphere. GRIPS Workshop. Toronto (Canada), 2000.
- Sassi, F, Diurnal variations in the middle atmosphere observed by UARS UARS Science Team Meeting. Pasadena (CA), 1998.
- Sassi, F, Parcel calculations in the lower stratosphere using NCAR/CCM3. GRIPS Meeting. Greenbelt (MD), 1998.
- Sassi, F. and M. Salby, Fast Fourier Synoptic Mapping of UARS data. UARS Science Team Meeting. San Antonio (TX), 1997.
- Sassi, F. and R.R. Garcia. Maintenance of the tropical oscillations of the zonal-mean winds in the middle atmosphere by convectively-forced gravity waves. NATO Workshop on Gravity Wave Processes and Their Parameterization in Global Climate Models. Santa Fe (NM), 1996.
- Sassi, F. and R.R. Garcia, Contribution of the convectively-forced gravity waves to the momentum budget of the equatorial middle atmosphere. XXI IUGG General Assembly, Boulder (CO), 1995.
- Sassi, F. and R.R. Garcia, The role of convectively-forced gravity waves in the tropical semiannual oscillation. 9th Conference on the middle atmosphere, Monterey (CA), 1994.
- Sassi, F. and R.R. Garcia, Equatorial semiannual oscillation driven by gravity waves excited by tropospheric heating. XVIII EGS General Assembly, Wiesbaden (Germany), 1993.
- Sassi, F. and R.R. Garcia, Simulation of the stratopause semiannual oscillation with the NCAR Community Climate Model. 8th Conference on the Middle Atmosphere, Atlanta (GA), 1992.
- Sassi, F. and R.R. Garcia, Simulation of the equatorial semiannual oscillation in the NCAR Community Climate Model. XX IUGG General Assembly, Vienna (Austria), 1991.
- Sassi, F. and G. Visconti, Diffusion coefficients for tracers in the middle atmosphere calculated from LIMS data. IV Meeting of the Italian National Group of Atmospheric and Oceanic Physics, Rome (Italy), 1987.

## **Current activities**

### *Projects*

- ▷ Analysis of WACCM and CAM simulations coupled to SOM: climate sensitivity in a double CO<sub>2</sub> scenario.
- ▷ CCSM/WACCM simulations: solar variability and effect of the QBO.
- ▷ Tropospheric sources of gravity waves: frontogenesis
- ▷ Dynamical variability and model biases: understanding and documentation with WACCM and comparison to other models.