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**Current employment:**

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**Education:**

Licenciatura en Ciencias Meteorológicas, Universidad de Buenos Aires, Argentina. (1983).  
PhD. in Atmospheric Sciences, University of Washington, Seattle, USA. (1989).

**Professional experience:**

Graduate Research Assistant

University of Washington, USA. 1983-1984. Supervisor: Dr. Dennis Hartmann.

Graduate Research Assistant

University of Washington, USA. 1984-1988. Supervisor: Dr. Marcia Baker.

NSERC Visiting Fellow (postdoctoral position)

Atmospheric Environment Service. Toronto. Canada. January 1989 - April 1991.  
Supervisor: Dr. Ronald E. Stewart.

Research Associate

Department of Pure and Applied Physics. University of Manchester Institute of Science and Technology (UMIST). Manchester, England. May 1991 - December 1994. Supervisor: Prof. Peter R. Jonas.

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Centro de Ciencias de la Atmósfera Universidad Nacional Autónoma de México.  
February 1995 - February 1996. Supervisor: Dr. Fernando García García.

Investigador Titular "A"

Centro de Ciencias de la Atmósfera Universidad Nacional Autónoma de México.  
March 1996 - February 2001.

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Centro de Ciencias de la Atmósfera Universidad Nacional Autónoma de México.  
March 2001- May 2006.

**Refereed publications**

**Raga, G.B.**, J.B. Jensen and M.B. Baker, **1990**: Characteristics of cumulus band clouds off the coast of Hawaii. *J. Atmos. Sci.*, **47**, 338-355.

**Raga, G.B.**, R.E. Stewart and N.R. Donaldson, **1991**: Microphysical characteristics through the melting regions of midlatitude winter storms. *J. Atmos. Sci.*, **48**, 843-855.

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- Raga, G.B.** and A.C. Raga, **2000**: On the formation of an elevated ozone peak in Mexico City. *Atmos. Environ.*, , **34**, 4097-4102.
- Baumgardner, D., **G.B. Raga**, G. Kok, J. Ogren, I. Rosas, A. Baez and T. Novakov, **2000**: On the evolution of sub-micrometer aerosol properties in Mexico City. *J. Geophys. Res.*, **105**, 22243-22253.
- Raga, G.B.**, T. Castro and D. Baumgardner, **2001**: The impact of megacity pollution on local climate. *Atmos. Environ.*, **34**, 4097-4102.
- Baumgardner, D., **G.B. Raga**, G. Kok, J. Ogren, I. Rosas, A. Baez and T. Novakov, **2000**: On the evolution of sub-micrometer aerosol properties in Mexico City. *J. Geophys. Res.*, **105**, 22243-22255.
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- Baumgardner, D., **G. B. Raga**, O. Peralta, I. Rosas, T. Castro, T. Kuhlbusch, A. John and A. Petzold, **2002**: Diagnosing Black Carbon Trends in Large Urban Areas Using Carbon Monoxide Measurements. *J. Geophys. Res.* **107**, 10.1029/2001JD000626
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- Castro T, **G.B. Raga** y D. Baumgardner, **2003**: ¿Puede la contaminación atmosférica generada en la Zona Metropolitana de la Cd. de México afectar lugares mas allá de sus fronteras?. *CIENCIA* Vol. 54, núm. 1. 54-59
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- Rosenfeld, D., U. Lohmann, **G.B. Raga**, C. O'Dowd, M Kulmala, S. Fuzzi, A. Reissell, M. Andreae, **2008**: Flood or drought: How do aerosols affect precipitation? *Science*, **321**, 1309-1313.
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- Marin J.C., **G.B. Raga**, and D. Raymond, **2008**: Assessment of global numerical models in the East Pacific as evidenced from EPIC2001 project. *Dynam. Atmos. Ocean.*, **45**, (in press)

## **Books**

Baumgardner, D. and **G.B. Raga**, Editores. **1997**. Proceedings of the WMO Workshop on Measurements of Cloud Properties for the Forecasts of Weather and Climate. Ciudad de México. WMP REPORT No 30, WMO/TD 852. 403pp.

## **Chapters in books**

"**Particulate Matter Science for Policy Makers". Chapter 6. Spatial and Temporal Characterization of PM**: Rudolph Husar, Washington University; Robert Vet, Environment Canada. Meteorological Service of Canada; Thomas Dann, Environment Canada, Environmental Protection Service; Graciela Raga, Universidad Nacional Autónoma de México; Warren White, Washington University; Judy Chow, Desert Research Institute. A NARSTO Assessment. CD-Rom. February 2003.

"**Estado Actual y Prospectiva de la Ciencia en México". Capítulo: Sección de Geociencias**". Autores: Dante J. Morán Zenateno, Elva Escobar Briones, Victor M.V. Vidal Lorandi, Graciela Raga, Gerardo Carrasco Núñez, Javier Alcocer Durand, Hugo Delgado Granados, Luis Marín Stillman. Academia Mexicana de Ciencias. Pag. 119-152. ISBN: 968-7428-15-5, March 2003.

"**Climate Change 2007: The Physical Science Basis, Summary for Policymakers and Technical Summary**". **Coordinating Lead Authors**: Susan Solomon (USA), Dahe Qin (China), Martin Manning (USA, New Zealand) **Lead Authors**: Richard Alley (USA), Terje Berntsen (Norway), Nathaniel L. Bindoff (Australia), Zhenlin Chen (China), Amnat Chidthaisong (Thailand), Jonathan Gregory (UK), Gabriele Hegerl (USA, Germany), Martin Heimann (Germany, Switzerland), Bruce Hewitson (South Africa), Brian Hoskins (UK), Fortunat Joos (Switzerland), Jean Jouzel (France), Vladimir Kattsov (Russia), Ulrike Lohmann (Switzerland), Taroh Matsuno (Japan), Mario Molina (USA, Mexico), Neville Nicholls (Australia), Jonathan Overpeck (USA), Graciela Raga (Mexico, Argentina), Venkatachalam Ramaswamy (USA), Jiawen Ren (China), Matilde Rusticucci (Argentina), Richard Somerville (USA), Thomas F. Stocker (Switzerland), Ronald J. Stouffer (USA), Penny Whetton (Australia), Richard A. Wood (UK), David Wratt (New Zealand) **Contributing Authors**: Julie Arblaster (USA, Australia), Guy Brasseur (USA, Germany), Jens Hesselbjerg Christensen (Denmark), Kenneth Denman (Canada), David Fahey (USA), Piers Forster (UK), James Haywood (UK), Eystein Jansen (Norway), Philip D. Jones (UK), Reto Knutti (Switzerland), Hervé Le Treut (France), Peter Lemke (Germany), Gerald Meehl (USA), David Randall (USA), Daithí A. Stone (UK), Kevin E. Trenberth (USA), Jürgen Willebrand (Germany), Francis Zwiers (Canada)

"**Climate Change 2007: The Physical Science Basis, Chapter 2: Changes in Atmospheric Constituents and in Radiative Forcing**". **Coordinating Lead**

**Authors:** Piers Forster, V Ramaswamy. **Lead Authors:** Paulo Artaxo, Terje Bernsten, Richard Betts, Dave Fahey, Jim Haywood, Judith Lean, Dave Lowe, Gunnar Myhre, John Nganga, Ron Prinn, Graciela Raga, Michael Schulz, Rob Van Dorland

### Publications in Conference Proceedings

- Raga, G.B.**, E. Hicks, J. Jensen, C. Pontikis. A. Rigaud. M. Baker and G. Taylor, **1986**: A study of warm cumuli in midlatitude and tropical regions. Conference on Cloud Physics, Snowmass, Colorado. C56-C59.
- Raga, G.B.**, JB. Jensen and MB. Baker **1988**. Characteristics of cumulus band, clouds of the coast of Hawaii. Two case studies. Second International Cloud Modelling Workshop, Toulouse. France. 225-230.
- Jensen J.B., D. Baumgardner and **G.B. Raga**. **1988**: On the observations of cloud temperature and liquid water content using a Lyman- $\alpha$  and an FSSP in tradewind cumuli. 10<sup>th</sup> International Cloud Physics Conference. Bad Homburg, Germany. 40-42.
- Raga, G.B.**, JB. Jensen J. Wetlaufer and M B Baker, **1988**: Characteristics of cumulus band clouds of the coast of Hawaii. 10<sup>th</sup> International Cloud Physics Conference. Bad Homburg. Germany. 538-540.
- Raga, G.B.**, R.E. Stewart and N.R. Donaldson. **1990**: The structure of precipitation type transition region in a winter storm 4<sup>th</sup> Conference on Mesoscale Processes, Boulder, Colorado. 65-66.
- Raga, G.B.**, NR. Donaldson and RE. Stewart. **1990**: The precipitation type transition region in a winter storm. Conference on Cloud Physics, San Francisco, California, 577-581.
- Raga, G.B.** and P R. Jonas. **1992**: Initial droplet development in small cumulus clouds. 11<sup>th</sup> International Cloud Physics Conference. Montreal, Canada. 139-140.
- Raga, G.B.**, S.T. Siems and I.M. Brooks. 1995. A large eddy simulation of a nocturnal stratocumulus case observed during ASTEX. *Conference on Cloud Physics. Dallas. USA*, 160-161.
- Raga, G.B.** 1995. Turbulent structure of the nocturnal cloud-topped marine boundary layer during ASTEX *11th Symposium on Boundary Layers and Turbulence. Charlotte. USA*, 583-584.
- Raga, G.B.** 1995. Aerosols, clouds and radiation. *VII Congreso Mexicano de Meteorología. Chapingo. México*. 129-137.
- Raga, G.B.** and L. Le Moigne. 1996. The nature of air pollution dynamics in Mexico City. *9th Joint Conference on the Applications of Air Pollution Meteorology with the AWMA. Atlanta. USA*, 384-385.
- Raga, G.B.** and P R. Jonas. 1996. Sub-cloud concentrations and cloud droplet evolution in warm cumuli. Is there an observable link? *12th International Conference on Clouds and Precipitation. Zurich, Switzerland*. 316-319.
- Raga, G.B.** and J L López. 1997. The effect of aerosols and gases on visibility in Mexico City. *Proceedings of the 3<sup>rd</sup> Conference on Atmospheric Chemistry. Long Beach, USA, 2-7 February*. 132-133.
- Raga, G.B.**, D. Baumgardner and A.C. Raga. 1997. The effect of cloud haloes on the extinction of solar radiation. *WMO Workshop on Measurements of Cloud Properties for the Forecasts of Weather and Climate, Mexico City, 23-27 June*. 192-202.
- Raga, G.B.**, A.C. Raga and L.G. Ruiz-Suárez. 1997. The interaction of particles and gases with solar radiation in Mexico City. *AWMA Specialty Conference on Visual Air Quality, Aerosols and Global Radiation Balance, Bartlett, USA, 9-12 September*. 459-468.

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- Morfín, J and **G.B. Raga**, 1998: Modeling deep convective clouds over Mexico City. *Proceedings of the Conference on Cloud Physics*, Everett, USA, 17-21 August, 95-96.
- Raga, G.B.**, D. Baumgardner, T. Castro and J. Ogren, 1998: The direct radiative forcing by Mexico City aerosol on downwind climate. *Proceedings of the Joint International Symposium on Global Atmospheric Chemistry*, Seattle, USA, 19-25 August.
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- Raga, G.B.**, 1998: Modelos de calidad del aire. *Memorias del Tercer Coloquio Binacional México-Japón sobre gestión ambiental*. Ciudad de México, 28-29 Noviembre 1996, 9-15.
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- Raga, G.B.** and J. Morfín, 2000: On the modelling of deep convective clouds over Mexico City. *Proceedings of the 4<sup>th</sup> UNAM Supercomputing Conference*, 27-30 June, Mexico City (in press).
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- Jiménez, J.C., **G.B. Raga**, D. Baumgardner, T. Castro, I. Rosas y A. Baez, 2000: Influencia de emisiones volcánicas en la composición de partículas de aerosol en Tonantzintla, Puebla. *Memorias del Congreso Mexicano de Química*, 24-28 Septiembre, San Luis Potosí, México (in press).
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- Raga, G.B.**, David J. Raymond and D. Baumgardner. 2002. The Effects of Buoyancy, Shear and Humidity on Convection in the Eastern Tropical Pacific. 25<sup>th</sup> Conference on Hurricane and Tropical Meteorology. San Diego, CA., U.S.A. CD-Rom
- Stith, J., J. Haggerty, A. Bansemer, A. Heymsfield, D. Baumgardner, J. Jimenez, **G.B. Raga**. 2002. A Comparison of the Microphysical Characteristics of Clouds from Different Tropical Regions. 11<sup>th</sup> Conference on Cloud Physics, 3-7 june 2002. Ogden, Utah. American Meteorological Society. CD-Rom
- Baumgardner, D., **G.B. Raga** and Jose Carlos Jimenez. 2002. The Effect of Anthropogenic Pollution on Cloud Formation Within the ITCZ. 11<sup>th</sup> Conference on Cloud Physics, 3-7 june 2002. Ogden, Utah. American Meteorological Society. CD-Rom
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- Alfonso, L. and **G.B. Raga**. 2002. Estimating the Impact of Natural and Anthropogenic Emissions on Cloud Chemistry: The Influence of Organic Compounds. 11<sup>th</sup>

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- Raga, G.B.**, Baumgardner D., O. Peralta and M.I. Saavedra, **2003**: Carbon content of size fractionated particles in Mexico City. European Aerosol Conference, 1-5 September, 2003. Madrid. S477-S478.
- D. Baumgardner, G. Kok, **G.B. Raga**, G. Diskin and G. Sachse, **2003**: Black carbon measurements in the Arctic UT/LS. European Aerosol Conference. 1-5 September 2003, Madrid. S979-S980.
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- Sosa, K., F. Oropeza, **G.B. Raga** and S. Gomez, **2004**: A climatology of convective activity in the western end of the Isthmus of Tehuantepec. 26<sup>th</sup> Conf. On Hurricanes and Tropical Meteorology, 3-7 May, Miami, USA, 403-404.
- Pozo, D., I. Borrajero and **G.B. Raga**, **2004**: A simulation of hurricane Isidore (2002) using MM5. 26<sup>th</sup> Conf. On Hurricanes and Tropical Meteorology, 3-7 May, Miami, USA, 409-410.
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- Raga, G.B.**, D. Baumgardner and O. Peralta, **2004**: Correlation of EA thermographic patterns and OC/BC source regions in Mexico City. European Aerosol Conference, 6-10 September, Budapest, Hungary, S577-S578.
- Baumgardner, D., **G.B. Raga** and J.C. Jimenez, **2004**: Direct and indirect forcing by anthropogenic aerosols in the ITCZ over the Mexican Pacific. European Aerosol Conference, 6-10 September, Budapest, Hungary. S373-S374.
- Marin, JC, D. Raymond and **G.B. Raga**, **2006**: Wind patterns in FNL and MM5 simulations during the EPIC2001 Project. 27<sup>th</sup> Conference on Hurricanes and Tropical Meteorology, 24-28 April, Monterrey, USA. CD-Rom, 4pp.
- Romero-Centeno, R., J. Zavala-Hidalgo and **G.B. Raga**, **2006**: Mid-summer gap winds and low-level circulation over the Eastern Tropical Pacific. 27<sup>th</sup> Conference on Hurricanes and Tropical Meteorology, 24-28 April, Monterrey, USA. CD-Rom 11pp.
- Raga, G.B.**, D. Pozo, M. Torres-Brizuela and M. Nicolini, **2006**: A theoretical study of the impact of biomass-burning CCN on the dynamics of deep convective clouds with mixed phase. 8<sup>th</sup> Conference on Southern Hemisphere Meteorology and Oceanography, 24-28 April, Foz do Iguazu, Brasil. CD-Rom 6pp.
- Morales-Garcia, F., O. Mayol-Bracero, M. Repollet-Pedrosa, D. Ortiz-Montalvo, H. Caro-Gautier, A. Kasper-Giebl, L. Gomes, A. Andreae, G. Frank, J. Allan, D. Baumgardner, **G. Raga**, J. Lingard, J. McQuaid, S. Decesari and J. Anderson, **2006**: Chemical and Physical Properties of Marine Aerosol during the RICO-

- PRACS Experiment: Evidence of a Clean Period, Saharan Dust, and Anthropogenic Pollution, 12th Conference on Cloud Physics, July, 2006, Madison Wisconsin. CD-Rom.
- Baumgardner, D., **G. Raga**, F. García-García, G. Montero, O. Bracero-Mayol, F. Morales, S. Borrmann, J. Schneider, S. Mertes, **2006**: Aerosol-Cloud Interactions on a Mountain Peak in Puerto Rico, 12th Conference on Cloud Physics, July, 2006, Madison Wisconsin. CD-Rom.
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### **Technical Reports**

Baumgardner, D., T. Castro, A. Martínez-Arroyo and R. Navarro-González and **G.B. Raga**, **2001**: Review of Gases and Aerosols in Mexico City, ICN-UNAM-2.4, 54pp.

### **Professional Organizations:**

- American Meteorological Society.
- American Geophysical Union.
- Royal Meteorological Society.
- American Association for Aerosol Research.
- Sociedad Química de México.

### **Honors**

- Sistema Nacional de Investigadores de México (in the Physics and Maths area, since 1996)
- Aerosol-Cloud Interactions Committee, International Global Atmospheric Program (1998-2001)
- International Commission on Clouds and Precipitation (2000-2008)
- Mexican Academy of Sciences. Member since 2001.
- Group Achievement Award, Crystal Face Science Team. July 2002
- Intergovernmental Panel on Climate Change (IPCC), Working Group I, Chapter 2 (2004-2007). **The IPCC was awarded the Nobel Peace Prize in 2007.**
- International Global Atmospheric Program (IGAC). Member of the Scientific Steering Committee (2005-2008)
- Third World Organization for Women in Science (TWOVS), since 2005.
- Intergovernmental Panel on Climate Change (IPCC), Member of the team to prepare Technical Summary and Summary for Policymakers (2005-2007)
- Aerosol-Cloud-Precipitation-Climate Initiative. Scientific Steering Committee (2006-2008)

### **Supervision of students**

- 6 students graduated at Master's level (1997, 2000, 2001, 2003, 2005 and 2007)
- 2 students graduated at PhD. level (2002, 2007)
- Currently supervising 2 students at PhD level.