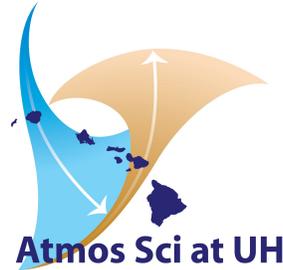


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EDUCATION

Ph.D., Atmospheric Sciences, from University of Washington, 1986
M.S., Astro-Geophysics, from University of Colorado, 1978
B.S., Atmospheric Sciences, from University of Washington, 1975 cum laude

RESEARCH INTERESTS

Rapid cyclogenesis over the ocean at all latitudes; tropical cyclone structure and evolution, storm surge and coastal overwash; thunderstorm dynamics leading to flooding and flash flooding; Arctic cyclones and sea-ice loss; numerical weather prediction and dispersion modeling; the statistics of extreme weather events in a warming climate; and disaster risk reduction.

PROFESSIONAL EXPERIENCE

- Chair, 2016 - present, Department of Atmospheric Sciences, University of Hawaii
- Professor: summer 1999 - present, Department of Meteorology, University of Hawaii
- Associate Professor: summer 1993 – spring 1999, Dept. of Meteorology, University of Hawaii
- Associate Professor: summer 1992 - spring 1993, Department of Marine, Earth and Atmospheric Sciences, North Carolina State University
- Assistant Professor: summer 1986 - Spring 1992, Department of Marine, Earth and Atmospheric Sciences, North Carolina State University
- Research Assistant: fall 1982 - summer 1986, University of Washington
- Meteorology Instructor: Evenings and in summer 1980 - 1985, University of Washington and Bellevue Community College
- Avalanche/Mountain Weather Forecaster: 1978 - 1982, United States Forest Service
- Research/Teaching Assistant: fall 1975 - spring 1978, University of Colorado

I. PUBLICATIONS

Peer reviewers' evaluations, editors' and readers' comments regarding these contributions are available on request.

A. Published Refereed Technical Papers

1. Businger, S., 1985: The Synoptic Climatology of Polar Low Outbreaks. *Tellus*, **37**, 419-432.
2. Businger, S., 1987: The Synoptic Climatology of Polar Low Outbreaks Over the Northern Pacific Ocean. *Tellus*, **39**, 307-325.
3. Businger, S. and P. V. Hobbs, 1987: Mesoscale and Synoptic Scale Structures of Two Comma Cloud Systems over the Pacific Ocean. *Mon. Wea. Rev.*, **115**, 1909-1928.

4. Businger, S. and B. Walter, 1987: Comma Cloud Development and Associated Rapid Cyclogenesis over the Gulf of Alaska: A Case Study using Aircraft and Operational Data. *Mon. Wea. Rev.*, **116**, 1103-1123.
5. Businger, S. and R. J. Reed, 1989: Cyclogenesis in Cold Air. *Weather and Forecasting*, **2**, 110-133.
6. Lee, L.G., R.F. Gonski, E.P. Auciello, J.R. Poirier, R.A. Marine, S. Businger, K. D. Lapenta, R.W. Kelly, and T.A. Nisiol, 1989: Summary of the Second National Winter Weather Workshop. *Weather and Forecasting*, **4**, 264-270.
7. Businger, S., D. I. Knapp and G. F. Watson, 1990: Storm-Following Climatology of Precipitation Associated with Winter Cyclones over the Gulf of Mexico. *Weather and Forecasting*, **3**, 378-403.
8. Businger, S., 1991: Arctic Hurricanes, *American Scientist*, **79**, 18-33.
9. Businger, S. and J.-J. Baik, 1991: An arctic hurricane over the Bering Sea. *Mon. Wea. Rev.*, **119**, 2293-2322.
10. Businger, S., B. H. Bauman III and G. F. Watson, 1991: The Development of the Piedmont Front and Associated Outbreak of Severe Weather on 13 March 1986. *Mon. Wea. Rev.*, **119**, 2224-2251.
11. Aneja, V. J., S. Businger, R. L. Lin, C. Claiborne, A. Murthy, 1991: Ozone climatology at high elevations in the southern Appalachians. *J. of Geophys. Res.*, **96**, 1007-1021.
12. Bevis, M., S. Businger, T.A. Herring, C. Rocken, R.A. Anthes, and R. H. Ware, 1992: GPS Meteorology: Remote Sensing of Atmospheric Water Vapor using the Global Positioning System. *J.G.R.-Atmospheres*, **97**, 15,787-15,801.
13. Chiswell, S.R., Businger, S., Bevis, M., Rocken, R., Solheim, F., and R. Ware, 1993: Improved Retrieval of Integrated Water Vapor from Water Vapor Radiometer Measurements using Numerical Weather Prediction Models. *J. of Atmos. and Ocean. Tech.*, **11**, 1253 - 1261.
14. Yuan, L.L., R. Anthes, R. Ware, W. Bonner, M. Bevis, S. Businger, 1993: Sensing climate-change using the global positioning system. *J. G. R.-Atmospheres*. **98**, 14925-14937.
15. Bevis, M., S. Businger, and Chiswell, S.R, Herring, T.A., Anthes, A., Rocken, C., Ware, R., 1994: GPS Meteorology: Mapping zenith wet delays onto precipitable water, *J. Appl. Met.*, **33**, 379-386.
16. Rocken, C., R. Ware, T Van Hove, F. Solheim, C. Alber, J. Johnson, M. Bevis and S Businger, 1994: Sensing atmospheric water vapor with the Global Positioning System. *Geophys. Res. Letters*, **20**, 2631-2634.
17. Businger, S., 1995: Mesoscale Phenomena in Winter Cyclones, *Reviews of Geophysics*, U.S National Report to International Union of Geodesy and Geophysics 1991-1994, American Geophysical Union, 2000 Florida Avenue N.W., Washington D. C., 20009, 907-915.
18. Mass, C. F., S. Businger, M. D. Albright and Z. A. Tucker, 1995: A Windstorm in the Lee of a Gap in a Coastal Mountain Barrier. *Mon. Wea. Rev.*, **123**, 315-331.
19. Keeter, K. S. Businger, Lee, L.G., and J.S. Waldstricher, 1995: Winter weather forecasting throughout eastern United States: Part III - The effects of topography and the variability of winter weather in the Carolinas and Virginia. *Weather and Forecasting*, **10**, 42-60.
20. Rocken, C., T. Van Hove, J. Johnson, F. Solheim, R.H. Ware, M. Bevis, S. Businger, and S.R. Chiswell, 1995: GPS/STORM GPS Sensing of Atmospheric Water Vapor for Meteorology. *J. Atmos. and Ocean Tech.*, **12**, 468-478.

21. Gurka, J.J., E.P. Auciello, A.F. Gigi, J.S. Waldstricher, Keeter, K., S. Businger, and Lee, L.G., 1995: Winter weather forecasting throughout eastern United States: Part II - An operational perspective of cyclogenesis. *Weather and Forecasting*, **10**, 21-41.
22. Ware, R., and S. Businger, 1995: Global Positioning for Geosciences Research, Transactions of the American Geophysical Union, *EOS*, **76**, 187. DOI: [10.1029/95EO00106](https://doi.org/10.1029/95EO00106)
23. Bauman, W. H. and S. Businger, 1996: Nowcasting for Space Shuttle landings at Kennedy Space Center, Florida. *Bull. of the Amer. Meteo. Soc.* **77**, 2295-2305.
24. Businger, S., S.R. Chiswell, M. Bevis, J. Duan, R. Anthes, C. Rocken, R. Ware, M. Exner, T. VanHove, F. Solheim, 1996: The promise of GPS in atmospheric monitoring. *Bull. Amer. Met. Soc.*, **77**, 5-18.
25. Businger, S., S.R. Chiswell, W.C. Ulmer, and R. Johnson, 1996: Balloons as a Lagrangian measurement platform for atmospheric research, *Journal of Geophysical Research*, **101**, 4363-4376.
26. Bevis, M., S.R. Chiswell, S. Businger, T. Herring, and Y. Bock, 1996: Predicting wet delays using numerical weather models, *Radio Sci.*, **31**, 477-487.
27. Duan, J., M. Bevis, P. Fang, Y. Bock, S.R. Chiswell, S. Businger, C. Rocken, F. Solheim, R. H. Ware, T. A. Herring and R.W. King, 1996: Remote sensing atmospheric water vapor using the Global Positioning System. *J. Appl. Meteo.*, **35**, 830-838.
28. Ware, R., M. Exner, D. Feng, M. Gorbunov, K. Hardy, B. Herman, W. Kuo, T. Meehan, W. Melbourne, C. Rocken, W. Schreiner, S. Sokolovskiy, F. Solheim, X. Zou, R. Anthes, and S. Businger, 1996: GPS Sounding of the Atmosphere from Low Earth Orbit: Preliminary Results. *Bull. Amer. Meteorol. Soc.* **77**, 19-40.
29. Bauman, W. H., S. Businger, and M. Kaplan, 1997: Nowcasting convective activity for Space Shuttle landings during easterly flow regimes. *Wea. and Forecasting*. **12**, 78-107.
30. Stull, R. and S. Businger, 1997: Survey of Graduate-Degree Procedures in Atmospheric Sciences. *Bull. Amer. Meteorol. Soc.*, **77**, 265-273.
31. Johnson, R., S. Businger, and R. Carter, 1998: Evolution of Smart Balloons for Lagrangian Air Mass Tracking, *GPS World*, **9**, 33-38.
32. Businger, S., T. Birchard, Jr., K.R. Kodama, P.A. Jendrowski, and J-J Wang, 1998: A bow echo and severe weather associated with a Kona Low in Hawaii. *Wea. and Forecasting*, **13**, 576-591.
33. Kodama, K.R. and S. Businger, 1998: A Brief Overview of Weather and Forecasting in the Pacific Region of the National Weather Service. *Wea. and Forecasting*, **13**, 523-546.
34. Suhre, K., C. Mari, T.S. Bates, J.W. Johnson, R. Rosset, Q. Wang, A.R. Bandy, D.R. Blake, S. Businger, F.L. Eisele, B.J. Huebert, G.L. Kok, R.L. Mauldin, A.S. Prevot, R.D. Schillawski, D.J. Tanner, and D.C. Thornton, 1998: Physico-chemical modeling of the First Aerosol Characterization Experiment (ACE-1) Lagrangian B 1. A moving column approach. *Journal of Geophysical Research*, **103**, 16,433-16,455.
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36. Businger, S., R. Johnson, J. Katzfey, S. Siems, and Q. Wang, 1999: Smart Tetroons for Lagrangian Air Mass Tracking During ACE-1. *J. Geophys. Res.*, **104**, 11,709-11,722.
37. Wang, Q., K. Suhre, P. Krummel, S.T. Siems, L. Pan, T.S. Bates, J.E. Johnson, D.H. Lenschow, B.J. Heubert, G.L. Kok, R.D. Schillawski, and S. Businger, 1999: Characteristics

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 39. Johnson, R, S. Businger, and A. Baerman, 2000: Lagrangian air mass tracking with smart balloons during ACE-2. *Tellus*, **52B**, 321-334.
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 41. Foster, J., M.G. Bevis, T. Schroeder, S. Businger, M. Merrifield, S. Dorn, S. Marcus, J. Dickey, Y. Bar-Sever, 2000: El Nino, water vapor, and the Global Positioning System. *Geophys. Res. Letters*, **27**, 2697-2700.
 42. Johnson DW, Osborne S, Wood R, Suhre K, Johnson R, **Businger S**, Quinn PK, Wiedensohler A, Durkee PA, Russell LM, Andreae MO, O'Dowd C, Noone KJ, Bandy B, Rudolph J, et al. 2000: An overview of the Lagrangian experiments undertaken during the North Atlantic regional Aerosol Characterisation Experiment (ACE-2) *Tellus, Series B: Chemical and Physical Meteorology*. 52: 290-320.
 43. Siems, S.T., G.D. Hess, K. Suhre, S. Businger, R.R. Draxler, 2000: A comparison of observed and simulated trajectories of the ACE-1 Lagrangian experiments. *Australian Met. Mag.*, **49**, 109-120.
 44. Suhre K, Crassier V, Mari C, Rosset R, Johnson DW, Osborne S, Wood R, Andreae MO, Bandy B, Bates TS, **Businger S**, Gerbig C, Raes F, Rudolph J. 2000: Chemistry and aerosols in the marine boundary layer: 1-D modelling of the three ACE-2 Lagrangian experiments. *Atmospheric Environment*. 34: 5079-5094.
 45. Businger, S. and J.A. Businger, 2001: Dissipation of turbulence kinetic energy in storms. *J. Atmos. Sci.*, **58**, 3793-3796.
 46. Businger, S., M.E. Adams, S.E. Koch, and K.L. Kaplan, 2001: Extraction of geopotential height and temperature structure from profiler and rawinsonde winds. *Mon. Wea. Rev.*, **129**, 1729-1739.
 47. Businger, S., R. McLaren, R. Ogasawara, D. Simons, and R.J. Wainscoat, 2001: Starcasting. *Bull. Amer. Met. Soc.*, **83**, 858-871.
 48. Morrison, I. and S. Businger, 2001: The synoptic structure and evolution of a kona low. *Wea. and Forecasting*, **16**, 81-98.
 49. Mazany, R, S. Businger, S.I. Gutman, and W. Roeder, 2002: A lightning prediction index that utilizes GPS integrated precipitable water vapor. *Wea and Forecasting*, **17**, 1034-1047.
 50. Motell, C., J.N. Porter, J. Foster, M. Bevis, and S. Businger, 2002: Comparisons of Water Vapor Derived from GPS, Sounding and the Split Window Technique, *Int. J. of Remote Sensing*, **23**, 11, 2335-2339.
 51. Hollingshead, A., S. Businger, R. Draxler, J. Porter, and D. Stevens, 2003: Dispersion modeling of the Kilauea plume. *Bound.-Layer Meteor.*, **108**, 121-144.
 52. Willis, M., M. Garces, C. Hetzer, S. Businger, 2004: Infrasonic observations of open ocean swells in the Pacific: Deciphering the song of the sea. *Geophys. Res. Lett.*, **31**, L19303.

53. Foster, J., M. Bevis, S. Businger, Y-L Chen, and Y. Zhang, 2004: The Kau storm (Nov 2000): Imaging precipitable water using GPS. *J. Geophys. Res.*, **108**(D18), 4585, doi:10.1029/2003JD003413.
54. Businger, S., T.M. Graziano, M.L. Kaplan, and R.A. Rozumalski, 2005: Cold-air cyclogenesis along the gulf-stream front: investigation of diabatic impacts on cyclone development, frontal structure, and track. *Meteor. and Atmos. Phys.*, **88**, 65-90.
55. Morrison, I., S. Businger, F. Marks, P. Dodge, and J.A. Businger, 2005: An observational case for the prevalence of roll vortices in the hurricane boundary layer. *J. Atmos. Sci.*, **62**, 2662–2673.
56. Foster, J., M. Bevis, and S. Businger, 2005: GPS Meteorology: Sliding-window analysis. *J. of Atmos and Oceanic Tech.*, **22**, 687–695.
57. Caruso, S. and S. Businger, 2006: Synoptic climatology of subtropical cyclogenesis. *Wea. and Forecasting*, **20**, 193-205.
58. Cherubini, T., S. Businger, C. Velden, and R. Ogasawara, 2006: The impact of satellite-derived atmospheric motion vectors on mesoscale forecasts over Hawaii. *Mon. Wea. Rev.*, **134**, 2009-2020.
59. Foster, J., B. Brooks, T. Cherubini, C. Shacat, S. Businger, and C. L. Werner, 2006: Mitigating atmospheric noise for InSAR using a high resolution weather model, *Geophys. Res. Lett.*, **33**, L16304, doi:10.1029/2006GL026781.
60. Mao, H., R., Talbot, D. Troop, B. Moore, R. Johnson, and S. Businger, 2006: Smart Balloon Observations over the North Atlantic: Part II - O₃ Data Analysis and Modeling. *J. Geophys. Res.*, **111**, doi: 10.1029/2005JD006507.
61. Businger, S., R. Johnson, and R. Talbot, 2006: Scientific insights from four generations of Lagrangian smart balloons in atmospheric research. *Bull. Amer. Meteor. Soc.*, **87**, 1539-1554.
62. Squires, K. and S. Businger, 2008: Analysis of Lightning Outbreaks in the Eyewalls of two Category 5 Hurricanes. *Mon. Wea. Rev.*, **136**, 1706–172.
63. Cherubini, T., S. Businger, R. Lyman, and M. Chun, 2008: Modeling Optical Turbulence and Seeing over Mauna Kea. *J. Appl. Meteor. Clim.*, **47**, 1140-1155.
64. Pessi, A. T., S. Businger, K. L. Cummins, N. W. S. Demetriades, M. Murphy and B. Pifer, 2009: Development of a long-range lightning detection network for the Pacific: construction, calibration and performance. *J. Atmos. and Ocean. Tech.*, **26**, 145–166.
65. Cherubini, T., S. Businger, and R. Lyman, 2008: Modeling turbulence and seeing over Mauna Kea: Validation and Algorithm Refinement. *J. Appl. Meteor. Clim.*, **47**, 3033-3043.
66. Pessi, A. T., and S. Businger, 2009: Relationships between lightning rate, rainfall rate, and hydrometeor profiles over the North Pacific Ocean. *J. Appl. Meteor.*, **48**, 833–848.
67. Pessi, A. T., and S. Businger, 2009: The impact of lightning data assimilation on a winter storm simulation over the North Pacific Ocean. *Mon. Wea. Rev.*, **137**, 3177–3195.
68. Ellis, R., and S. Businger (2010), Helical circulations in the typhoon boundary layer, *J. Geophys. Res.*, **115**, D06205, doi:10.1029/2009JD011819.
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70. Murphy, M. and S. Businger, 2010: Orographic Influences on an Oahu Flood. *Mon. Wea. Rev.*, **138**, 2198-2217.
71. Kealy, J, J. Foster, and S. Businger, 2012: GPS meteorology: An investigation of ocean-based precipitable water estimates, *J. Geophys. Res.*, doi:10.1029/2011JD017422.

72. Cherubini, T. and S. Businger, 2012: Another Look at the Refractive Index Structure Function. *Journal of Applied Meteorology and Climatology*. *Journal of Applied Meteorology and Climatology*, **52**, 498-506.
73. Foster, J., J. Kealy, T. Cherubini, S. Businger, Z. Lu, M. Murphy, 2012: The utility of atmospheric analyses for the mitigation of artifacts in INSAR. *J. Geophys. Res.*, DOI: 10.1002/jgrb.50093.
74. Chinn PWU, **Businger S**, Lance K, Ellinwood JK, Kapomaika'i Stone J, Spencer L, McCoy FW, Puakea Nogelmeier M, Rowland SK. 2014: Kahua A'o-A learning foundation: Using Hawaiian language newspaper articles for earth science professional development *Journal of Geoscience Education*. 62: 217-226. DOI: [10.5408/13-019.1](https://doi.org/10.5408/13-019.1)
75. Stolz, D. C., S. Businger, and A. Terpstra, 2014: Refining the relationship between lightning and convective rainfall over the ocean, *J. Geophys. Res. Atmos.*, 119, doi:10.1002/2012JD018819.
76. Pattantyus, A., and S. Businger, 2014: On the interaction of Tropical Cyclone Flossie and emissions from Hawaii's Kilauea volcano, *Geophys. Res. Lett.*, **41**, 4,082–4,089, doi:10.1002/2014GL060033.
77. Eaton, L. A. and S. Businger, 2014: Using a Snow Drift Model to simulate Aeolian Drift and Snowfall on the Summit of Mauna Kea, Hawaii. *Arctic, Antarctic, and Alpine Research*, Vol. 46, no. 4, pp. 719-734, doi:10.1657/1938-4246-46.4.719.
78. Pattantyus, A., and S. Businger, 2015: Ensemble Forecasting of Volcanic Emissions in Hawai'i. *Annals of Geophysics*. **57**, ISSN 2037-416X, doi:10.4401/ag-6607.
79. Businger, S., S. Yildiz, and T.E. Robinson, 2015: The Impact of Hurricane Force Wind Fields on the North Pacific Ocean Environment, *Wea. and Forecasting*, **30**, 742–753.
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81. Antonelli, P., H. Revercomb, G. Giuliani, T. Cherubini, S. Businger, R. Lyman, S. Tjemkes, R. Stuhlmann, and J. Moncet, 2017: Regional Retrieval Processor for Direct Broadcast High Resolution InfraRed Data. *JAMC*, <https://doi.org/10.1175/JAMC-D-16-0144.1>.
82. Businger, S., M. P. Nogelmeier, P. W. U. Chinn and T. Schroeder, 2018: Hurricane with a History: Hawaiian Newspapers Illuminate an 1871 Storm. *Bulletin of the American Meteorological Society*. **99**, 137–147. <https://doi.org/10.1175/BAMS-D-16-0333.1>.
83. Argüeso, D. and S. Businger, 2018: Wind power characteristics of Oahu, Hawai'i, *Renewable Energy*, **128**, 324 - 336.
84. Williamson, S. and S. Businger, 2018: Solar radiation resource analysis for Oahu. *Renewable Energy*, **128**, 432 - 443.
85. Schorghofer N, S. Businger, A. P. Ingersoll, M. Leopold, 2018: The coldest places in Hawaii: The ice-preserving microclimates of high-altitude craters and caves on tropical island volcanoes. *Bulletin of the AMS*, in press.
86. Andre Pattantyus, Steven Businger, and Steven Howell, 2018: Review of sulfur dioxide to sulfate aerosol chemistry at Kīlauea Volcano, Hawai'i. *Atmospheric Environment*, **185**, 262–271.
87. Robinson, T. E., S. Businger, 2019: A Novel Method for Modeling Lowest Level Vertical Motion, *Wea. and Forecasting*, **34**, 943 - 957.
88. Antonelli, P., P. Scaccia, T. Cherubini, S. Businger, S. de Haan, J.-L. Moncet, S. Migliorini, T. Aulignee, F. Venderberge, 2020: Towards Assimilation of Hyperspectral Satellite Data, *JAMC*, In press.

B. Published Text Books and Chapters (peer reviewed)

1. Businger S. and T. Cherubini, 2011: Seeing Clearly: The Impact of Atmospheric Turbulence on the Propagation of Extraterrestrial Radiation. Editors, VBW Publishing, 198 pp. ISBN 978-1-60264-698-8.
2. Carbone, R. and S. Businger, 2011: Meteorological Instrumentation. In Encyclopedia of Science & Technology. McGraw Hill Publishing, 375 pp.
3. Businger, S., 2006: Eye to the Sky. Novus Publishing, Ojai, CA 93023, ISBN 978-0-9787831-1-2 242 pp.
4. Businger, S: 1996: Measuring atmospheric water vapor with the Global Positioning System. p 13-17 in Yearbook of Science and Technology, McGraw-Hill, New York, N.Y., 13-17, 415 pp.
5. Businger, S: 1996: Experiments to Understand our Atmospheric Environment, McMillan-Prentice-Hall Publishing, Upper Saddle River, N.J. 07458, 190 pp.
6. Businger, S. and M. McVicker, 1996: Diurnal cycles, Encyclopedia of Climate and Weather, Edited by Stephen H. Schneider, Oxford University Press, 198 Madison Ave., New York, N.Y., 246-250, 929 pp. (90)
7. Businger, S. and R. J. Reed, 1989a: Polar Lows. Polar Lows, Edited by Twitchell, P. F., E. A. Rasmussen, and K. L. Davidson, A. DEEPACK Publishing, 421 pp.

C. Papers In Review (Refereed)

- Lyman, R., T. Cherubini, and S. Businger, 2017: Forecasting Seeing for the Mauna Kea Observatories. Monthly Notices of the Royal Astronomical Society, In review.
- Holland, L, S. Businger, E. Elias, and T. Cherubini, 2020: Two Ensemble Approaches for Forecasting Sulfur Dioxide Emissions From Kilauea Volcano. Wea. and Forecasting, In review.
- Corrigan, T.J., S. Businger, and K. Kodama, 2020: Anatomy of a Series of Orographically Anchored Supercells that Broke the US Rainfall Record. Monthly Weather Review, In review.

E. Published Monographs, Preprints, and Abstracts

A comprehensive list is available upon request.

II. SPONSORED RESEARCH

A. PI of Current Research Awards (Award amount reflect funds received to date)

Principal Investigator: Steven Businger
Source of Support: Office of Naval Research
Project Title: *Advanced Use of Soundings from Hyperspectral IR Spaceborne Observations to Improve Arctic Prediction*
Amount Awarded: \$ 902,534
Period Covered by Award: 6/25/18-5/31/21

Principal Investigator: Steven Businger

Source of Support: Hawaii Cane and Sugar Co.
Project Title: *Implementing and Improving Ensemble Vog Forecasts for the State of Hawaii*
Amount Awarded: \$ 142,500
Period Covered by Award: 9/1/16-8/31/21

Principal Investigator: Steven Businger
Source of Support: Merage Foundation
Project Title: *Expansion of the Colorado a Lightning Mapping Array for Improved Tornado Forecasting*
Amount Awarded: \$225,522
Period Covered by Award: 8/1/17-7/31/20

Principal Investigator: Steven Businger
Source of Support: Mauna Kea Support Services
Project Title: *Mauna Kea Weather Center*
Amount awarded: ongoing program at ~\$283,000/yr
Period Covered by Award: 1/1/99-present

B. PI of Past Research Awards (Award amount reflect funds received to date)

51 Principal Investigator: Steven Businger
Source of Support: HI Department of Health
Project Title: *Dispersion Modeling of Volcanic Emissions*
Amount Awarded: \$ 92,963
Period Covered by Award: 6/25/18-5/31/19

50 Principal Investigator: Steven Businger
Source of Support: County of Hawaii
Project Title: *Hydrogen Sulfide Dispersion and Plume Modeling Project*
Amount Awarded: \$362,719
Period Covered by Award: 8/1/17-7/31/19

49 Co-Principal Investigator: Steven Businger (PI-Richard Rocheleau)
Source of Support: DOE
Project Title: *Creation of Gridded Energy Datasets for Solar and Wind Power on Oahu*
Amount Awarded: \$222,278
Period Covered by Award: 8/1/15-9/30/18

48 Principal Investigator: Steven Businger
Source of Support: NSF - Unidata
Project Title: *Pacific THREDDS Data Server*
Amount Awarded: \$12,700
Period Covered by Award: 6/29/17-5/31/17

47 Principal Investigator: Steven Businger

- Source of Support: Merage Foundation
 Project Title: *Investigation of the Long-Range Lightning Datastream for Improved Storm Forecasting*
 Amount Awarded: \$120,000
 Period Covered by Award: 8/1/16-7/31/18
- 46 Principal Investigator: Steven Businger
 Source of Support: Merage Foundation
 Project Title: *Storm Balloons: Improving Severe Storm Intensity Forecasting*
 Amount Awarded: \$25,000
 Period Covered by Award: 8/1/16-7/31/17
- 45 Principal Investigator: Steven Businger
 Source of Support: USGS
 Project Title: *Vog Measurement and Prediction (VMAP) Project*
 Amount Awarded: \$322,802
 Period Covered by Award: 01/01/10-09/30/11
- 44 Co-Principal Investigator: Steven Businger
 Source of Support: NSF
 Project Title: Exploring Ways to Transform Teaching Practices to Increase Native Hawaiian Students' Interest in STEM
 Amount Awarded: \$299,977
 Period Covered by Award: 09/01/15 - 08/31/17
- 43 Co-Principal Investigator: Steven Businger
 Title: EarthCube Building Blocks: Specifying and Implementing ODSIP, A Data-Service Invocation Protocol (PI: David Fulker)
 Agency: National Science Foundation (NSF)
 Budget, Period: \$802,000 09/15/2013 – 08/31/2016
 Amount Awarded: \$802,000 (\$63,997 to UHM)
- 42 Principal Investigator: Steven Businger
 Source of Support: NOAA
 Project Title: *Tropical Pacific Testbed for GOES-R*
 Amount Awarded: \$297,976
 Period Covered by Award: 8/16/12-8/15/16
- 41 Co-Principal Investigator: Steven Businger
 Source of Support: NSF
 Project Title: *Kahua A'o, A Learning Foundation: Using Hawaiian Language Newspaper Articles for Place and Culture-based Geoscience Teacher Education and Curriculum Development*
 Amount Awarded: \$199,948
 Period Covered by Award: 09/01/11 - 08/31/14
- 40 Principal Investigator: Steven Businger

- Source of Support: Office of Mauna Kea Management
Project Title: *Climate Downscaling for Island of Hawaii*
Amount Awarded: \$230,174
Period Covered by Award: 8/16/12-8/15/17
- 39 Principal Investigator: Steven Businger
Source of Support: ONR
Project Title: Long-Range Lightning Detection over the Western Pacific Ocean
Amount Awarded: \$580,478
Period Covered by Award: 01/01/07-09/30/11
- 38 Source of Support: Office of Mauna Kea Management
Project Title: *Climatic Variability and Microscale Ecology of Mauna Kea*
Amount Awarded: \$170,000
Period Covered by Award: 8/01/07-12/31/11
- 37 Principal Investigator: Steven Businger
Source of Support: Vaisala
Project Title: Vaisala Data Implementation and Integration
Amount Awarded: \$40,000
Period Covered by Award: 11/01/09-10/30/10
- 36 Principal Investigator: Steven Businger
Source of Support: Vaisala
Project Title: Vaisala Data Implementation and Integration
Amount Awarded: \$ 40,000
Period Covered by Award: 11/01/09-10/30/10
- 35 Principal Investigator: Steven Businger
Source of Support: NOAA
Project Title: *Targeted Winds*
Amount Awarded: \$300,000
Period Covered by Award: 7/01/03-08/31/10
- 34 Principal Investigator: Steven Businger
Source of Support: NSF
Project Title: *A Symposium on Seeing*
Amount Awarded: \$57,333
Period Covered by Award: 11/01/06-10/31/08
- 33 Principal Investigator: Steven Businger
Source of Support: ONR
Project Title: *Assimilation of Lightning Data*
Amount Awarded: \$263,146
Period Covered by Award: 05/01/05-04/30/09

- 32 Principal Investigator: Steven Businger
Source of Support: NOAA
Project Title: *GroundWinds Hawaii*
Amount Awarded: \$334,178
Period Covered by Award: 6/01/99-09/30/07
- 31 Principal Investigator: Steven Businger
Source of Support: Army Corps of Engineers
Project Title: *Radar Winds in Typhoons.*
Amount Awarded: \$100,000
Period Covered by Award: 05/31/05-08/27/07
30. Principal Investigator: Steven Businger
Source of Support: NSF
Project Title: *Investigation of the Inflow Boundary Layer of Atlantic Hurricanes.*
Amount Awarded: \$197,000 (plus \$270,067 for NOAA)
Period Covered by Award: 12/01/99-11/30/03
29. Principal Investigator: Steven Businger
Source of Support: NASA
Project Title: *A Volcanic Plume Dispersion Monitoring and Prediction Capability.*
Amount Awarded: \$347,210
Period Covered by Award: 5/01/00-9/30/01
28. Principal Investigator: Steven Businger
Source of Support: NSF
Project Title: University of Hawaii VISION-LAB'98
Amount awarded: \$23,310 (plus 50% SOEST cost match)
Period Covered by Award: 10/1/98-9/30/99
27. Principal Investigator: Steven Businger
Source of Support: NSF
Project Title: *Development of a Second Generation Smart Balloon Capability*
Award Amount: \$106,254
Period of the Request: 1/97-04/00
26. Principal Investigator: Steven Businger
Source of Support: NOAA/UCAR
Project Title: *Flash Flood Prediction in the Tropical Pacific*
Award Amount: \$84,353
Period Covered by Award: 1/97-01/00
25. Co-Principal Investigator: with Milton Garces
Source of Support: ONR
Project Title: *Infrasonic Array for Location and Identification of Meteorological Events in Hawaii and the Pacific*
Period Covered by Award: 10/01-9/04

24. Co- Investigator: with Peter Mouginis-Mark
Source of Support: NASA
Project Title: *Role of Active Volcanism on the Quality of Life*
Award Amount: \$350,000 in year one
Period Covered by Award: 04/01-3/04
23. Co-Principal Investigator: with Michael Bevis
Source of Support: NOAA
Project Title: *Implementation of a real-time precipitable water capability using the Global Positioning System*
Award Amount: \$240,000
Period Covered by Award: 10/95-9/01+
22. Co-Principal Investigator: with Michael Bevis
Source of Support: NASA
Project Title: *Investigation Title: Atmospheric delay corrections for radar interferometry; Development and testing of a GPS-based approach at Kilauea, Hawaii*
Award Amount: \$320,000
Period Covered by Award: 7/95-6/99
21. Co-Principal Investigator: with Michael Bevis
Source of Support: NASA
Project Title: *Modeling and Assimilation of Water Vapor With a Mesoscale Atmospheric Model: A Proof of Concept Using the Southern California Integrated GPS Network*
Award Amount: \$40,000
Period Covered by the award: 1/96-12/98
20. Co-Principal Investigator: with Shiv Sharma and other investigators
Source of Support: NASA
Project Title: *Center for the Study of Water Vapor Fields and Their Radiative Effects over Hawaii.*
Amount awarded: \$310,000 (plus a \$125,000 UH cost match)
Period Covered by Award: 9/1/97 - 8/31/00
19. Co-Principal Investigator: with Michael Bevis and other investigators
Source of Support: NSF
Project Title: *Acquisition of GPS Equipment for Consortium Studies of Global Change and Tectonics of the Western Margins of the Americas*
Amount awarded: \$222,000 (plus a 33% UH cost match)
(\$2,000,000 awarded for UNAVCO Consortium as a whole)
Period Covered by Award: 9/1/95 - 8/31/98
18. Principal Investigator: Steven Businger
Source of Support: NOAA
Project Title: *Regional; Environmental Analysis Project for the Pacific (REAPP)*
Award Amount: \$90,673 (plus \$35,412 in equipment funds from NOAA)

- and a \$17,736 UH cost match)
 Period Covered by Award: 1/94-12/96
17. Principal Investigator: Steven Businger
 Source of Support: NOAA
 Project Title: *Pacific Mesoscale Tropical Workshop*
 Award Amount: \$ 16,675
 Period Covered by Award: 7/94-6/95
 16. Principal Investigator: Steven Businger
 Source of Support: NSF
 Project Title: University of Hawaii VISION-LAB
 Amount awarded: \$19,968 (plus a 50% cost match from UH)
 Period Covered by Award: 3/1/95 – 02/28/96
 15. Principal Investigator: Steven Businger
 Source of support: Air Force: Air Weather Service
 Project Title: *Nowcasting Convective Activity During Onshore Flow Regimes for Space Shuttle Launches and Landings.*
 Award Amount: \$ 46,638
 Period Covered by the award: 9/1/92-8/31/95
 14. Principal Investigator: Steven Businger
 Source of Support: NSF
 Project Title: *Development of a Smart Tetron Capability*
 Amount Awarded: \$238,894
 Period Covered by Award: 1/95-2/98
 13. Principal Investigators: Steven Businger and Michael Kaplan
 Source of Support: National Science of Foundation
 Project Title: *Investigation of Interactions Among Terrain Drag, Ageostrophic Frontogenesis, Mesoscale Cyclogenesis and Drylines*
 Award Amount: \$343,042
 Period Covered by the award: 12/1/91-12/31/96
 12. co-Principal Investigators: with Yuh-Lang Lin and Michael Kaplan
 Source of Support: NOAA
 Project Title: *SE Consortium/Tornado Outbreaks in the SE US.*
 Award Amount: \$396,000
 Period Covered by the award: 4/1/92-3/31/93
 11. co-Principal Investigators: Dr. Steven Businger and Dr. Sethu Raman
 Source of Support: Office of Naval Research
 Project Title: *Tetron Tracking for the ASTEX/MAGE Lagrangian Experiment*
 Award Amount: \$171,868
 Period of the Request: 1/1/92 - 12/31/93

10. co-Principal Investigator: with Drs. Harriet Stubbs and Walter Heck
Source of Support: National Science of Foundation
Project Title: *GLOBE-NET: Changes in the Global Environment: A Curriculum Development Project Grades 4-12*
Award Amount: \$1,400,739
Period Covered by Award: 9/91-8/95
9. Principal Investigator: Steven Businger; co-PI, J. Pelissier
Source of Support: National Weather Service/COMET
Project Title: *Storm Analysis, Research and Training (START) Center*
Award Amount: \$60,483 (plus \$8,300 data donation from COMET)
Period Covered by Award: 10/90-6/94
8. Principal Investigators: Steven Businger; PI
Source of Support: National Science of Foundation
Project Title: *Investigation of the Evolution of Mesoscale Systems and Processes Associated with East Coast Cyclones During GALE*
Award Amount: \$206,100
Period Covered by Award: 1/89-12/91
7. Principal Investigator: Steven Businger
Source of Support: National Science of Foundation
Project Title: *North Carolina State University NEXT-LAB*
Award Amount: \$192,000
Period Covered by Award: 9/90-12/91
6. co-Principal Investigator: Dr. Michael Kimberley and Dr. Steven Businger
Source of Support: National Science of Foundation
Project Title: *Field course in Marine Earth and Atmospheric Sciences in Northeastern Venezuela*
Award Amount: \$22,127.
Period Covered by Award: 9/90-12/91
5. Principal Investigator: Steven Businger
Source of Support: Environmental Protection Agency
Project Title: *Determination of Flow Fields Associated with Cloud Occurrence and Acid Deposition on Mt. Mitchell*
Award Amount: \$102,500.
4. Principal Investigator: Steven Businger
Source of Support: NCSU faculty development grant
Project Title: *Development of Global Climate Research Facility Based on Optical Disk Storage Technology at NCSU*
Award Amount: \$3,500.
3. Principal Investigator: Steven Businger
Source of Support: US Dept. of Education

Project Title: *Strengthening Research Library Data Resources in the Southeast US*
Award Amount: \$25,000.
Period Covered by Award: 8/31/92-9/1/93

2. Principal Investigator: Steven Businger
Source of Support: ONR
Project Title: *Pacific STARNET*
Amount Awarded: \$351,860
Period Covered by Award: 4/01/01-3/31/06
- 1 Principal Investigator: Steven Businger
Source of Support: NOAA/FSL
Project Title: *Development of a Real-Time Precip. Water Capability using GPS*
Amount Awarded: \$70,000
Period Covered by Award: 7/01/03-6/30/05

III. TEACHING AND ACADEMIC ACTIVITIES

I provide students with a detailed syllabus at the outset of each course that includes the topic of each lecture, reading assignments, and grading. I post my PowerPoint lectures, and most homework and exams to the web. See:

<http://www.soest.hawaii.edu/MET/Faculty/businger/courses.html>

Username: student, Password: weather

My cumulative GPA since 2002 from student evaluations that grade my teaching is 3.9 out of 4.
Recipient of UH Mānoa Chancellor's Citation for Meritorious Teaching in 2011

A. Courses Taught

| | |
|----------|--|
| MFE 659 | Environmental Finance and Weather Derivatives |
| MET 765 | Meteorology Seminar |
| MET 495 | Senior Thesis Option |
| MET 412 | Meteorological Analysis Lab |
| MET 416 | Tropical Analysis Lab |
| MET 405 | Satellite Meteorology |
| MET 305 | Meteorological Instruments and Observations |
| MET 200 | Atmospheric Processes and Phenomena |
| MET 101 | Introduction to Meteorology |
| MET 101L | Introduction to Meteorology Lab |
| OEST 101 | Natural Hazards (team taught) |
| MEA 512 | Meteorological Satellite Applications |
| MEA 630 | Advanced Weather Analysis |
| MEA 635 | Dynamical Analysis |
| MEA 635L | Dynamical Analysis Lab |
| MEA 443 | Weather Analysis and Forecasting I |
| MEA 443L | Weather Analysis and Forecasting I Synoptic Lab |
| MEA 444 | Weather Analysis and Forecasting II |
| MEA 444L | Weather Analysis and Forecasting II Synoptic Lab |
| MEA 130 | Introduction to Weather and Climate |
| MEA 135 | Introduction to Weather and Climate lab |

MEA 140 Natural Disasters and Global Change

B. Courses Developed or Formally Revised

MET 495 Senior Thesis Option
OEST 101 Natural Hazards
MEA 130 Weather and Climate (Revised)
MEA 140 Natural Disasters and Global Change
MEA 630 Advanced Weather Analysis

C. Academic Text Books Authored

Businger, S., 2006: Eye to the Sky. Novus Publishing, 242 pp, ISBN 978-0-9787831-1-2.

D. Master's and Doctoral Theses Directed and Completed

(Chair or co-Chair of Graduate Student Advisory Committees)

Student's name, year and degree awarded, thesis titles

Tom Robinson, Ph.D., 2018: Orographic Precipitation Over The Island Of Oahu.

Andre Pattantyus, Ph.D., 2016: Estimating volcanic sulfur dioxide to sulfate aerosol conversion rates in Hawai'i.

Vanessa Almanza, MS, 2015: Investigating Atmospheric Rivers Using Global Positioning Systems From Ocean Transits.

Tom Dunn, PhD. 2013: Weather and Dispersion Modeling of the Fukushima Daiichi Nuclear Power Station Accident

Doug Stolz, MS 2012: An examination of the relationship between lightning and rainfall over oceanic regions using the Global Lightning Dataset (GLD360)

Sara Couto da Silva, MS 2012: High altitude climate of the Island of Hawai'i

Leigh-Anne Eaton, MS 2011: Simulation of blowing snow over Mauna Kea

John Kealy, MS 2011: Variability of water vapor over the Island of Hawaii

Katherine Whitmire, MS 2010: A Comparison Between Precipitable Water Vapor and the Probability of Precipitation

Michael Murphy, MS 2009: Modeling of windward flooding on Oahu using WRF model

Antti Pessi, Ph.D. 2008: Long-range detection of sferics over the Pacific Ocean: thunderstorm characteristics and data assimilation in NWP models.

Ryan Ellis, MS 2008: The distribution of near-surface winds in Pacific typhoons.

Jon Tytell, MS 2007: Spatial and temporal distribution of ozone over Houston during the 2006 Texas Air Quality Study.

Kirt Squires, MS, 2006: The Morphology of Lightning Outbreaks in the Eyewalls of two Category 5 Hurricanes.

Mark Willis, MS, 2004: Observations and Modeling of Infrasound Produced by Ocean Waves.

Steven Caruso, MS 2003: Synoptic Climatology of Subtropical Cyclogenesis.

Annette Baerman, MS, 2001: Concentration and Dispersion Modeling of the Kilauea Plume.

Robert Mazany, MS, 2000: Application of GPS PW in Forecasting Convection at Cape Canaveral.

Thomas Birchard, MS, 1999: Investigation of Radar Reflectivity and Rain Rates in Hawaii.

Christopher Mello, MS, 1999: Damaging Trade Winds in Hawaii.

Ian Morrison, MS, 1999: The Structure and Evolution of a Kona Low.

Michael Adams, Ph.D. 1996, Terrain-induced Midtropospheric Frontogenesis and Jet Streak Development during STORM-FEST IOP 17, 8-9 March 1992. Currently employed by the Air Force at Scott Air Force Base.

Thomas M. Graziano, Ph.D., 1995: Analysis and Numerical Modeling of Convectively Driven Ageostrophic Circulations and Their Role in the Rapid Cold-Air Cyclogenesis during ERICA IOP8. Currently employed at National Weather Service Headquarters in Silver Springs, MD.

William H. Bauman III, Ph.D., 1995: Forecasting Convective Activity during Easterly Flow Regimes in Support of Space Shuttle Operations. Currently employed by the Air Force at Scott Air Force Base.

Steven R. Chiswell, Ph.D., 1994: Measuring Atmospheric Water Vapor Using the Global Positioning System. Currently employed at Unidata in Boulder, CO.

Craig Souza, MS, 1994: Precipitation Type Forecasting in the Southeastern United States.

Zena Tucker, MS, 1993: Orographic Microburst in a Severe Winter Windstorm.

Robert Rozumalski, MS, 1992: An Unusual Case of Rapid Cyclogenesis over the Continental United States.

Orbita Roswintiarti, MS, 1991: The Relationship between Clouds, Sea-Surface Temperature, and Lower Tropospheric Wind convergence over the Tropical Oceans

David Musick, MS, 1991: Sleet Storms over the Southeastern United States.

James Hammet, MS, 1991: Precipitation structure of Hurricane Hugo over Land.

Steven R. Chiswell, MS, 1990: Modeling Orographic Cloud Conditions at Mt. Mitchell, North Carolina.

Marsha Kinley, MS, 1990: Synoptic Analysis of Ozone Episodes at Mount Mitchell, North Carolina.

Kenneth S. Smith, MS, 1990: Investigation of a Gravity Wave during GALE.

Michael E. Adams, MS, 1989: A Case of Rapid Cyclogenesis over the United States Midwest.

Don Aycock, MS, 1989: Kinematic fields and precipitation associated with the mid-Atlantic coast cyclone of 27 February 1986: A GALE case study.

William H. Bauman, MS, 1989: Frontogenesis and Associated Severe Weather on 13 March 1986 (GALE IOP 13).

Kenneth F. Carey, MS, 1988: Mesoscale Structure and Climatology of Rain-Snow Lines over North Carolina.

David I. Knapp, MS, 1988: Storm-Following Climatology of Precipitation Associated with Winter Cyclones over the Gulf of Mexico.

Students in Progress

Terrence Corrigan, PhD candidate: Dynamics of tropical thunderstorms and extreme flood events.

Zachary Menzo, Ph.D. candidate: Numerical modeling of Arctic cyclones in summer.

David Bubbins, MS candidate: Hurricane Harvey analysis and simulation

Professor Businger served as a member of numerous other graduate student committees at UH and NCSU.

E. Supervision of Post Doctoral Fellows

Dr. Lacey Holland: Modeling of dispersion of volcanic emissions.

Dr. Federico Cossu: Objective analysis of water vapor distribution over Mauna Loa for SAR image correction.

Dr. Daniel Argueso: Assimilation of lightning data into hurricane model. Renewable wind resource analysis over Oahu.

Dr. Tiziana Cherubini: Data assimilation using the Local Analysis and Prediction System (LAPS). Dr. Cherubini has been promoted to senior modeler for the Mauna Kea Weather Center.

Dr. James Foster: GPS meteorology and data assimilation.

Antti Pessi, Four-dimensional lightning data assimilation in WRF.

Chris Chambers, Idealized hurricane simulations using WRF.

Steven Chiswell, Investigation of the utility of GPS PW data.

F. Summary of Teaching Evaluations at the University of Hawaii

In response to the question, “What grade would you give this instructor?” The average score for ten courses taught by Dr. Businger since 2008 is 3.8, where A=4, and F=1.

Professor Businger has served as the Undergraduate Advisor for the Meteorology Department from 2003 to 2010 and again from 2014 to present. Additionally, he served as faculty advisor to 31 meteorology majors at NCSU. In addition, he has constructed instructional computer labs at both the University of Hawaii (VisionLab) and NCSU (NEXT-LAB) with grant funds from the NSF.

IV. PROFESSIONAL ACTIVITIES AND SERVICE

A. SUPERVISION OF PROFESSIONAL STAFF

Dr. Tiziana Cherubini: Senior NWP modeler for the Mauna Kea Weather Center (MKWC). Dr. Cherubini operationally runs the LAPS/MM5 weather prediction system for use by the astronomy community. She also conducts research on the modeling of the atmospheric refraction and *seeing*.

Mr. Ryan Lyman: Lead forecaster for the MKWC. Ryan produces custom forecasts for Mauna Kea, including forecasts for a range of custom variables of interest to the astronomers.

Dr. Lacey Holland: Modeling of dispersion of volcanic emissions.

Roy Huff: GOES-R proving ground provides algorithms for POES satellite data to aid in forecasting.

B. Professional Societies and Honors

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| Recipient of UH Mānoa Chancellor’s Citation for Meritorious Teaching | 2011 |
| Elected Fellow of the AMS | 2009 |
| Certified Consulting Meteorologist (CCM) | 1993 |
| New York Academy of Science | 1993 |
| American Association for the Advancement of Science | 1991 |
| Sigma Xi | 1990 |
| American Geophysical Union | 1989 |
| American Meteorological Society | 1977 |
| Phi Beta Kappa | 1975 |

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| Phi Eta Sigma | 1973 |
| Rensselaer Mathematics and Science Award | 1970 |

C. Organizer and Participant in Field Experiments

- Arctic Cyclone Directed Research Initiative, Field phase scheduled for July-August, 2021
- TCS08 in the western Pacific Ocean, August-September 2008
- TexAQS II experiment, Houston, TX August-September 2006
- Hurricane Rainband and Intensity Change Experiment (RAINEX), August, 2005
- AIRMAP experiment, New England July-August, 2004
- Aerosol Characterization Experiment (ACE)-2 field experiment in the Canary Islands, June-July 1997
- Aerosol Characterization Experiment (ACE)-1 field experiment in Hobart, Australia, November and December 1995
- GPS/STORM field experiment in Oklahoma in May 1993
- ASTEX field experiment held in the Azores in June 1992
- ERICA Project, Washington DC, February 1989
- Genesis of Atlantic Lows Experiment (GALE); North Carolina, February 1986
- Fisheries Oceanography Experiment (FOX); Alaska, March 1985
- Artic Cyclone Experiment; Norway, February, 1984

D. Conferences Attended in which Papers were Presented

A comprehensive list of meetings with titles of papers presented is available upon request.

V. DEPARTMENT AND UNIVERSITY SERVICE

- Department Chair (2016-present)
- Served on UH TPRC (2016)
- Undergraduate Advisor for the Meteorology program (2003-2009)
- University of Hawaii Research Council (2004-2012)
- Convened and served on UH TPRC (2005)
- SOEST Research Council
- SOEST Computer Committee (2002-present)
- SOEST Web Committee (2005-)
- Served on search committee for a manager for RCF (2004)
- Served on search committee for a G&G Geodesy position (2003)
- Served on UH Tenure and Promotion Committee (1999-present)
- Meteorology Computer Committee (1994-present)
- University of Hawaii Research Council (1995-1998)
- SOEST Biennial Report Committee
- Meteorology Space Committee
- Meteorology Publicity Committee
- SOEST Young Investigator Search Committee 1994-1998
- SOEST Screening Committee for Excellence in Teaching Award 1997
- Chairman of the Department Personnel Committee 1996/97
- University of Hawaii Research Council (1995-1998, member)
- Computing Facilities Coordinating Committee (MEAS, 90/92-, member)

- Space Committee (MEAS, 89/92-, member)
- Departmental Brochure Committee (MEAS, 90/92-, member)
- SCI-LINK Steering Committee (NCSU, 91/92-, member)
- PAMS Freshman Computer Course Committee (PAMS, 90/92-, member)
- Publicity Committee ((MEAS, 87/90, chair/member)
- Search Committee for Department Head replacement (MEAS, 88/89, member)
- Search Committee for replacement for Dr. M. DeMaria (MEAS, 87/88, member)
- Search Committee for atmospheric chemist (MEAS, 90/91, member)
- Committee to Oversee Mt. Mitchell Field Program (MEAS, 88/89, member)
- NRRC Building Committee (MEAS, 87/89, member)
- Departmental Planning Committee (MEAS, 88/89, member)
- Undergraduate Programs Committee (MEAS, 91/92, member)
- Committee to develop MEA 140 Natural Hazards and Global Change (MEAS, 88/89, Chair)

VI. PROFESSIONAL SERVICE TO THE NATIONAL/INTERNATIONAL COMMUNITY

i. Service to Organize Meetings and Conferences

- Chair of the organizing committee for the “Symposium on Seeing” held in Kona, HI, 20-22 March 2007.
- Conference organizer, Convenor and Session Chair for conference on *Remote Sensing Applications of the Global Positioning System* in SPIE's Fourth International Asia-Pacific Environmental Remote Sensing Symposium, 8-12 November 2004, Honolulu, Hawaii.
- Organizer and Session Chair for Chapman Conference on Water Vapor in the Climate System, to be held in Virginia October 1999.
- Organizer and Session Chair for the AAAS Symposium entitled “The Global Positioning System: A Powerful Tool for Global Change Research in the 21st Century” held in Philadelphia, PA, February 1998.
- Chair of Planning Committee of the Second NWS Workshop and Symposium on Mesoscale Weather in the Tropical Pacific to be held in Honolulu in November, 2000.
- Chair of Planning Committee of the NWS Workshop and Symposium on Mesoscale Weather in the Tropical Pacific held in Honolulu in February 1995.
- Co-chair of the session “GPS Meteorology” at the Fall 1994 meeting of the AGU. San Francisco CA, December, 1994.
- Moderator for session entitled: Supercomputing for Environmental Applications, *EPA National Environmental Information Conference*, Philadelphia, PA, December 1991.
- Program Committee for the *NWS Winter Weather Workshop*, Raleigh, N.C., September 1988.

ii. Service on National Committees

- Members representative for UCAR, 2016-Present
- UCAR Nominating Committee, 2017-19
- Chairman of the Unidata Policy Committee. Unidata is an NSF funded program under UCAR that facilitates geosciences data delivery 2007- 2014.
- Unidata Policy Committee (UCAR) 2004-2007.

- Member of the US Weather Research Program Prospectus Development Team with focus on the hydrological aspects of weather prediction research. 1998.
- Member, International Association of Geodesy (IAG) Special Study Group (SSG 1.159) "Use of GPS Positioning for Atmospheric Monitoring" 1995-1999
- Elected to the Steering Committee of the University Navstar Consortium (UNAVCO) 1994-1995
- Chairman of the University Corporation for Atmospheric Research (UCAR): University Relations Committee (URC). 1992-1995
- Member of the AMS Board on Meteorological and Oceanographic Education in Universities (Co-authored revised guidelines for AMS undergraduate programs)
- Member of the University Corporation for Atmospheric Research (UCAR): University Relations Committee (URC). 1989-1992
- Senior JIMAR Fellow since 1996
- American Lung Association in Hawaii – Leadership Council

iii. Invited Presentations

A list of invited presentations is available upon request. Average is two professional invitations per year.

iv. Service to the community

Dr. Businger is an active member of the community. A list of talks at secondary schools, invited presentations to the public, and television interviews on vog and hurricanes is available upon request.