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GENNARO H. CRESCENTI

PROFESSIONAL EXPERIENCE

ArcVera Renewables (formerly Chinook Wind LLC and V-Bar LLC)

Senior Meteorologist, July 2014 – January 2020

Director, Energy Assessment – January 2020 – Present

Lead team of meteorologists and engineers who provide wind and solar resource analyses and project energy assessments to various clients. Project management of various energy assessment activities which include writing proposals, data processing and quality control, climatological reports, pre-construction wind and solar energy assessments, repowering energy assessments of existing wind farms, operational energy assessments, technical due diligence and research and development toward improving energy assessments.

Iberdrola Renewables (formerly PPM Energy), Portland, OR

Director, Meteorology, May 2008 – July 2014

Manager, Meteorology, July 2007 – May 2008

Lead/Senior Meteorologist, April 2006 – July 2007

Managed and lead team of meteorologists, engineers, and analysts that was responsible for internal wind and solar resource and project energy assessment for Iberdrola Renewables. Provided meteorological support to Business Development, Renewable Origination, and Asset Management. Responsibilities included on-site surveys and staking locations for meteorology towers, sodars and lidars, quality assurance and quality control of on-site data sets, data analysis, wind resource and energy assessments, wind turbine layout design using GIS, wake loss determination, turbine micrositing, site suitability analysis, and operational performance of wind farms and reconciliation against original energy predictions.

FPL Energy, Juno Beach, FL

Meteorologist, February 2003 – April 2006

Provided meteorological support to development and operation of numerous wind farms. Responsibilities include wind resource assessments, site surveys, wake losses analysis, turbine layout and optimization, investigation of operating assets, relocation of underperforming wind turbines. Evaluation of external wind resource assessments and reports from external consultants, specification of meteorological instruments, configuration, and meteorological tower deployments. Areas of interest include short-range forecasting, seasonal probability outlooks, and long-term variability of wind resource, and application of advance sensor technologies.

NOAA Air Resources Laboratory, Idaho Falls, ID
Meteorologist, September 1997 – February 2003

Provided meteorological support to Department of Energy's (DOE) Idaho National Engineering and Environmental Laboratory (INEEL). Analyzed meteorological data from INEEL Mesonet, including developing climatology of atmospheric boundary layer over Snake River Plain from radar wind profiler and radio acoustic sounding system. Participated in transport and diffusion experiments at several study sites (Dugway Proving Ground, Salt Lake City, Snake River Plain). Principal investigator of aircraft-based air-sea research studies using state-of-the-science instrumentation suite on Long-EZ aircraft. Helped in development of advanced instrumentation including extreme turbulence (ET) probe for measurement of turbulence in hurricane force winds. Continued research with Doppler sodars for various field studies.

NOAA Air Resources Laboratory, Research Triangle Park, NC
Physical Scientist, June 1992 – September 1997

Provided technical and scientific guidance to Environmental Protection Agency (EPA) on meteorological instruments and observation techniques. Helped develop guidance on ground-based remote sensors including Doppler sodars, radar wind profilers, and radio acoustic sounding systems (RASS). Aided in development of meteorological guidance for the Photochemical Assessment Monitoring Station (PAMS) network for ozone nonattainment regions. Other research activities included investigation of air pollution episodes from coal-burning power plant in northern Thailand, effect of clouds on incoming UV-B radiation, and dispersion of inert tracer gases.

North Carolina State University, Raleigh, NC
Graduate Research Assistant, August 1991 – June 1992

Air-sea interaction research of light-wind regimes over tropical oceans to improve understanding behavior of large scale global phenomena.

Woods Hole Oceanographic Institution, Woods Hole, MA
Research Assistant III Meteorologist, April 1988 – August 1991

Responsibilities included testing and evaluation of various in-situ meteorological instruments to improve turbulent flux measurements over the ocean from ships and buoys. Variables included wind speed and direction, air temperature, relative humidity, barometric pressure, precipitation, incoming solar and longwave radiation. Participated as flight scientist in the Experiment on Rapidly Intensifying Cyclones Over the Atlantic (ERICA) and on research cruise deploying research buoys.

Florida State University, Tallahassee, FL

Graduate Research Assistant, August 1984 – March 1988

Conducted air-sea interaction research of nonhomogeneous marine atmospheric boundary layer across sea-surface temperature fronts. Participated in the Frontal Air-Sea Interaction Experiment (FASINEX) as flight scientist on NCAR Electra and NRL P3 aircraft. Aided in design of research flight plans and forecasts.

EDUCATION

M. S. Meteorology, Florida State University, 1988

B. S. Earth Science, Southern Connecticut State University, 1984

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

American Wind Energy Association

Resource Assessment Working Group, Vice-Chair (2014)

American Meteorological Society (1983 - Present)

AMS Committee on Measurements, (1997 - 2002), Chair (1998 - 2001)

AMS Energy Committee (2009 - 2012)

AMS Renewable Energy Subcommittee (2010 - 2012), Co-chair (2011 - 2012)

AMS Renewable Energy Committee (2016-2019)

Co-chair, *Third Conference on Weather, Climate, and the New Energy Economy*, January 22-26, 2012, New Orleans, LA, American Meteorological Society.

Chair, *Eleventh Symposium on Meteorological Observations and Instrumentation*, January 14-18, 2001, Albuquerque, NM, American Meteorological Society.

Organizer, *Short Course on the Introduction to Meteorological Instrumentation and Observation Techniques*, January 14, 2001, Albuquerque, NM, American Meteorological Society.

NOAA / Office of Oceanic and Atmospheric Research (OAR) Outreach Committee (May 2000 - February 2003)

Co-chair, *Tenth Conference on Weather, Climate, and the New Energy Economy*, January 6-10, 2019, Phoenix, AZ, American Meteorological Society.

AWARDS

- U. S. Department of Commerce Bronze Medal, October 2000, with Timothy L. Crawford and Jeffrey R. French, *for design and application of a novel airborne instrument system to advance scientific knowledge of air-sea exchange.*
- U. S. Department of Commerce Bronze Medal, November 1994, with John E. Gaynor, Alan H. Huber, and J. J. Streicher, *for the provision of technical support to Thailand in an air pollution emergency.*

PUBLICATIONS - GENNARO H. CRESCENTI

- McDonald, S. L., and G. H. Crescenti, 2007: Sodar use to elucidate tower-based wind shear and hub height speed estimates. Proc., *WINDPOWER 2007 Conference & Exhibition*, Los Angeles, CA, Jun. 3-6, Amer. Wind Engery Assoc.
- Edson, J., T. Crawford, J. Crescenti, T. Farrar, N. Frew, G. Gerbi, C. Helmis, T. Hristov, D. Khelif, A. Jessup, H. Jonsson, M. Li, Larry Mahrt, W. McGillis, A. Plueddemann, L. Shen, E. Skillingstad, T. Stanton, P. Sullivan, J. Sun, J. Trowbridge, D. Vickers, S. Wang, Q. Wang, R. Weller, J. Wilkin, A. J. Williams III, D. K. P. Yue, and C. Zappa, 2007: The Coupled Boundary Layers and Air–Sea Transfer Experiment in Low Winds, *Bulletin of the American Meteorological Society*, **88**, 341-346.
- Sun, J., S. P. Burns, D. Vandemark, M. A. Donelan, L. Mahrt, T. L. Crawford, T. H. C. Hebers, G. H. Crescenti, and J. R. French, 2005: Measurement of directional wave spectra using aircraft laser altimeters. *Journal of Atmospheric and Oceanic Technolgy*, **22**, 869-885.
- Vandemark, D., B. Chapron, J. Sun, G. H. Crescenti, and H. C. Graber, 2004: Ocean wave slope observations using radar backscatter and laser altimeters. *Journal of Physical Oceanography*, **34**, 2825-2842.
- Crescenti, G. H., 2003: In memory of Dr. Timothy L. Crawford, NOAA Air Resources Laboratory Field Research Division, Idaho Falls, Idaho. Preprint, *Twelfth Symposium on Meteorological Observations and Instrumentation*, Long Beach, CA, Feb. 9-13, Amer. Meteor. Soc., KS1.1.
- Grimmett, T. K., G. H. Crescenti, T. L. Crawford, and D. C. Vandemark, 2003: Study of drag coefficient as a function of atmospheric turbulence and ocean wave state. Preprint, *12th Conference on Interactions of the Sea and Atmosphere*, Long Beach, CA, Feb. 9-13, Amer. Meteor. Soc., 4.3.
- Clawson, K. L., and G. H. Crescenti, 2002: Meteorological measurements during the URBAN 2000/VTMX field study. NOAA Technical Memorandum OAR ARL-243, Silver Spring, MD, 45 pp.
- Dobosy, R. J., E. J. Dumas, and G. H. Crescenti, 2002: Katabatic flow and turbulence as seen from airborne in-situ measurements and ground-based profiler measurements during VTMX. Preprint, *Fourth Symposium on the Urban Environment*, Norfolk, VA, May 20-24, Amer. Meteor. Soc., 186-187.

- Crescenti, G. H., J. R. French, T. L. Crawford, and D. C. Vandemark, 2002: An integrated airborne measurement system for the determination of atmospheric turbulence and ocean surface wave field properties. Preprint, *Sixth Symposium on Integrated Observing Systems*, Orlando, FL, Jan. 13-17, Amer. Meteor. Soc., 60-67.
- Crescenti, G. H., J. R. French, and T. L. Crawford, 2001: Aircraft measurements in the Coupled Boundary Layers Air-Sea Transfer (CBLAST) light wind pilot field study. NOAA Technical Memorandum OAR ARL-241, Silver Spring, MD, 82 pp.
- Mahrt, L., D. Vickers, J. Sun, T. L. Crawford, G. Crescenti, and P. Frederickson, 2001: Surface stress in offshore flow and quasi-frictional decoupling. *Journal of Geophysical Research*, **106**, 20629-20639.
- Dobosy, R. J., T. L. Crawford, D. L. Auble, G. H. Crescenti, and R. C. Johnson, 2001: The extreme turbulence (ET) probe for measuring boundary-layer turbulence during hurricane-force winds. Preprint, *Eleventh Symposium on Meteorological Observations and Instrumentation*, Albuquerque, NM, Jan. 14-19, Amer. Meteor. Soc., 50-54.
- Crawford, T. L., G. H. Crescenti, and J. M. Hacker, 2001: Small environmental research aircraft (SERA): the future of airborne geoscience. Preprint, *Eleventh Symposium on Meteorological Observations and Instrumentation*, Albuquerque, NM, Jan. 14-19, Amer. Meteor. Soc., 117-122.
- Crescenti, G. H., N. F. Hukari, R. C. Johnson, T. W. Strong, and S. A. Beard, 2000: Surface and upper-air meteorological data acquired during the Central California Ozone Study (CCOS). NOAA Data Report OAR ARL-21, Silver Spring, MD, 102 pp.
- French, J. R., G. H. Crescenti, T. L. Crawford, and E. J. Dumas, 2000: LongEZ (N3R) participation in the 1999 Shoaling Waves Experiment (SHOWEX). NOAA Data Report OAR ARL-20, Silver Spring, MD, 51 pp.
- Watson, T. B., G. H. Crescenti, R. C. Johnson, B. R. Reese, R. G. Carter, S. D. Turley, B. Grim, and C. A. Biltoft, 2000: The Over-Land Along-Wind Dispersion (OLAD) field experiment. NOAA Technical Memorandum OAR ARL-235, Silver Spring, MD, 141 pp.
- French, J. R., G. H. Crescenti, T. L. Crawford, E. J. Dumas, and D. Vandemark, 2000: Measurements pertaining to air-sea interaction with a small instrumented aircraft. Proc., *Sixth International Conference on Remote Sensing for Marine and Coastal Environments*, Charleston, SC, May 1-3, Veridian ERIM, II-110-II-113.

- Biltoft, C. A., S. D. Turley, T. B. Watson, G. H. Crescenti, and R. G. Carter, 2000: Final test report for the Over-Land Alongwind Dispersion field trials. Report No. WDTC/JCP-00/004, U. S. Army Dugway Proving Ground, Dugway, UT, 36 pp.
- Crescenti, G. H., and R. A. Baxter, 2000: Sodar based wind profiles as model inputs: Understanding the role of atmospheric conditions in assessing the quality of the data. Preprint, *11th Joint Conference on the Applications of Air Pollution Meteorology with the Air & Waste Management Association*, Long Beach, CA, Jan. 9-14, Amer. Meteor. Soc., 432-437.
- Crescenti, G. H., K. L. Clawson, B. R. Reese, D. W. Walker, W. J. Behymer, and A. Jensen, 2000: The Idaho Environmental Monitoring Program. Preprint, *Ninth Symposium on Education*, Long Beach, CA, Jan. 9-14, Amer. Meteor. Soc., 28-30.
- Crescenti, G. H., T. L. Crawford, and E. J. Dumas, 1999: Data report: LongEZ (N3R) participation in the 1999 Shoaling Waves Experiment (SHOWEX) pilot study. NOAA Technical Memorandum ERL ARL-232, Silver Spring, MD, 86 pp.
- Crescenti, G. H., 1999: A study to characterize performance statistics of various ground-based remote sensors. NOAA Technical Memorandum ERL ARL-229, Silver Spring, MD, 286 pp.
- Crescenti, G. H., T. B. Watson, R. E. Keislar, and C. A. Biltoft, 1999: Determination of along-wind diffusion from a quasi-instantaneous line source. Preprint, *13th Symposium on Boundary Layers and Turbulence*, Dallas, TX, Jan. 10-15, Amer. Meteor. Soc., 658-661.
- Crescenti, G. H., 1998: Some performance statistics of Doppler sodars as a function of atmospheric conditions. Preprint, *Fourth International Symposium on Tropospheric Profiling: Needs and Technologies*, Snowmass, CO, Sept. 21-25, Univ. Colorado, 67-69.
- Mulhern, M. R., B. D. Templeman, and G. H. Crescenti, 1998: User's guide for the SERDP mobile meteorological monitoring system. NOAA Technical Memorandum ERL ETL-290, Boulder, CO, 66 pp.
- Crescenti, G. H., 1998: The degradation of Doppler sodar performance due to noise: A review. *Atmospheric Environment*, **32**, 1499-1509.
- Crescenti, G. H., and R. A. Baxter, 1998: Examples of noise interference on Doppler sodar performance. Preprint, *Tenth Symposium on Meteorological Observations and Instrumentation*, Phoenix, AZ, Jan. 11-16, Amer. Meteor. Soc., 228-232.
- Crescenti, G. H., 1997: Meteorological measurements during the Lower Rio Grande Valley Environmental Monitoring Study. *Environment International*, **23**, 629-642.

- Crescenti, G. H., and B. D. Templeman, 1997: A mobile meteorological monitoring system for use in open burning and open detonation activities. Proc., *International Symposium on Measurement of Toxic and Related Air Pollutants*, Durham, NC, Apr. 29-May 1, Air & Waste Management Assoc., 531-537.
- Crescenti, G. H., 1997: The degradation of Doppler sodar performance due to noise. Proc., *International Symposium on Measurement of Toxic and Related Air Pollutants*, Durham, NC, Apr. 29-May 1, Air & Waste Management Assoc., 538-547.
- Crescenti, G. H., and D. T. Bailey, 1997: Status of PAMS meteorological monitoring activities. Proc., *International Symposium on Measurement of Toxic and Related Air Pollutants*, Durham, NC, Apr. 29-May 1, Air & Waste Management Assoc., 633-640.
- Crescenti, G. H., 1997: A look back on two decades of Doppler sodar comparison studies. *Bulletin of the American Meteorological Society*, **78**, 651-673.
- Crescenti, G. H., and B. D. Templeman, 1997: Development of an integrated mobile meteorological monitoring system for use in open burning and open detonation activities. Preprint, *First Symposium on Integrated Observing Systems*, Long Beach, CA, Feb. 2-7, Amer. Meteor. Soc., 145-149.
- Lansari, A., J. J. Streicher, A. H. Huber, G. H. Crescenti, R. B. Zweidinger, J. W. Duncan, C. P. Weisel, and R. M. Burton, 1996: Dispersion of automotive alternative fuel vapors within a residence and its attached garage. *Indoor Air*, **6**, 118-126.
- Estupiñán, J. G., S. Raman, G. H. Crescenti, J. J. Streicher, and W. F. Barnard, 1996: The effects of clouds and haze on UV-B radiation. *Journal of Geophysical Research*, **101**, 16807-16816.
- Crescenti, G. H., 1996: Development of quality assurance and quality control guidance for ground-based remote sensors for use in regulatory monitoring. Preprint, *Ninth Joint Conference on the Applications of Air Pollution Meteorology with the Air and Waste Management Association*, Atlanta, GA, Jan. 28-Feb. 2, Amer. Meteor. Soc., 551-555.
- Crescenti, G. H., and J. E. Gaynor, 1995: Meteorological measurements in the vicinity of a coal burning power plant. Preprint, *Ninth Symposium on Meteorological Observations and Instrumentation*, Charlotte, NC, Mar. 27-31, Amer. Meteor. Soc., 200-205.
- Estupiñán, J. G., S. Raman, G. H. Crescenti, J. J. Streicher, and W. F. Barnard, 1995: The effects of clouds on UV-B radiation. Preprint, *Ninth Symposium on Meteorological Observations and Instrumentation*, Charlotte, NC, Mar. 27-31, Amer. Meteor. Soc., 465-470.

- Crescenti, G. H., B. D. Templeman, and J. E. Gaynor, 1994: Combining a monostatic sodar with a radar wind profiler and RASS in a power plant pollution study. *Proc., 7th International Symposium on Acoustic Remote Sensing*, Boulder, CO, Oct. 3-7, Inter. Soc. for Acoustic Remote Sensing, 6.23-6.29.
- Templeman, B. D., G. H. Crescenti, and J. E. Gaynor, 1994: Ground-based remote sensor QA/QC at the Boulder Atmospheric Observatory. *Proc., 7th International Symposium on Acoustic Remote Sensing*, Boulder, CO, Oct. 3-7, Inter. Soc. for Acoustic Remote Sensing, 8.7-8.12.
- Crescenti, G. H., 1994: Overview of PAMS meteorological monitoring requirements. *Proc., International Symposium on Measurement of Toxic and Related Air Pollutants*, Durham, NC, May 3-6, Air & Waste Management Assoc., 245-253.
- Weisel, C. P., N. J. Lawryk, A. H. Huber, and G. H. Crescenti, 1993: Gasoline and methanol exposures from automobiles within residences and attached garages. *Proc., 6th International Conference on Indoor Air Quality and Climate*, Helsinki, Finland, Jul. 5-8.
- Lansari, A., J. J. Streicher, A. H. Huber, G. H. Crescenti, R. B. Zweidinger, and J. W. Duncan, 1993: Preliminary investigation of uncombusted auto fuel vapor dispersion within a residential garage microenvironment. *Proc., International Symposium on Measurement of Toxic and Related Air Pollutants*, Durham, NC, May 4-7, Air & Waste Management Assoc., 52-57.
- Crescenti, G. H., and R. A. Weller, 1992: Analysis of surface fluxes in the marine boundary layer in the vicinity of rapidly intensifying cyclones. *Journal of Applied Meteorology*, **31**, 831-848.
- Crescenti, G. H., S. A. Tarbell, and R. A. Weller, 1991: A compilation of moored current meter and wind recorder data from the Severe Environment Surface Mooring (SESMOOR) Volume XLIII. Woods Hole Oceanographic Institution, Technical Report WHOI-91-18, Woods Hole, MA, 49 pp.
- Hosom, D. S., G. H. Crescenti, G. L. Winget, S. Weisman, D. P. Doucet, and J. F. Price, 1991: An intelligent chilled mirror humidity instrument. *Journal of Atmospheric and Oceanic Technology*, **8**, 585-596.
- Friehe, C. A., W. J. Shaw, D. P. Rogers, K. L. Davidson, W. G. Large, S. A. Stage, G. H. Crescenti, S. J. S. Khalsa, G. K. Greenhut, and F. Li, 1991: Air-sea fluxes and surface layer turbulence around a sea surface temperature front. *Journal of Geophysical Research*, **96**, 8593-8609.

- Crescenti, G. H., and R. E. Payne, 1991: Evaluation of two types of thin film capacitive relative humidity sensors for use on buoys and ships. Preprint, *Seventh Symposium on Meteorological Observations and Instrumentation*, New Orleans, LA, Jan. 13-18, Amer. Meteor. Soc., 125-128.
- Weller, R. A., D. S. Hosom, K. E. Prada, and G. H. Crescenti, 1991: Improved meteorological instruments and data acquisition systems for buoys and ships. Preprint, *Seventh Symposium on Meteorological Observations and Instrumentation*, New Orleans, LA, Jan. 13-18, Amer. Meteor. Soc., 129-133.
- Crescenti, G. H., D. S. Hosom, and J. F. Price, 1991: Development of an intelligent chilled mirror dew point sensor. Preprint, *Seventh Symposium on Meteorological Observations and Instrumentation*, New Orleans, LA, Jan. 13-18, Amer. Meteor. Soc., 297-302.
- Crescenti, G. H., R. E. Payne, and R. A. Weller, 1990: Improved meteorological measurements from buoys and ships (IMET): Preliminary comparison on humidity sensors. Woods Hole Oceanographic Institution, Technical Report WHOI-90-18, Woods Hole, MA, 57 pp.
- Payne, R. E., G. H. Crescenti, and R. A. Weller, 1989: Improved meteorological measurements from buoys and ships (IMET): Preliminary report on barometric pressure sensors. Woods Hole Oceanographic Institution, Technical Report WHOI-89-49, Woods Hole, MA, 43 pp.
- Crescenti, G. H., R. E. Payne, and R. A. Weller, 1989: Improved meteorological measurements from buoys and ships (IMET): Preliminary comparison of pyranometers. Woods Hole Oceanographic Institution, Technical Report WHOI-89-47, Woods Hole, MA, 30 pp.
- Crescenti, G. H., R. E. Payne, and R. A. Weller, 1989: Improved meteorological measurements from buoys and ships (IMET): Preliminary comparison of solar radiation air temperature shields. Woods Hole Oceanographic Institution, Technical Report WHOI-89-46, Woods Hole, MA, 53 pp.
- Crescenti, G. H., R. A. Weller, D. S. Hosom, and K. E. Prada, 1989: Improved meteorological measurements from buoys and ships (IMET): Preliminary analysis of solar radiation and motion data from IMET test buoy. Woods Hole Oceanographic Institution, Technical Report WHOI-89-45, Woods Hole, MA, 38 pp.
- Crescenti, G. H., and R. A. Weller, 1989: Improved meteorological measurements from buoys and ships (IMET): Preliminary comparison of precipitation sensors. Woods Hole Oceanographic Institution, Technical Report WHOI-89-44, Woods Hole, MA, 32 pp.

- Stage, S. A., and G. H. Crescenti, 1989: Determination of turbulent fluxes in a nonhomogeneous region. Proc., *Third Airborne Geoscience Workshop*, La Jolla, CA, Feb. 21-24, National Aeronautics and Space Administration.
- Stage, S. A., M. -K. Wai, and G. H. Crescenti, 1988: Atmospheric secondary flows in the vicinity of an oceanic front. Preprint, *Seventh Conference on Ocean-Atmosphere Interactions*, Anaheim, CA, Feb. 1-5, Amer. Meteor. Soc., 59.
- Crescenti, G. H., 1988: Turbulent variances and covariances in the marine atmospheric boundary layer over the FASINEX front. M. S. Thesis, Florida State University, 167 pp.
- Stage, S. A., M. -K. Wai, and G. H. Crescenti, 1987: Atmospheric boundary layer structure near an oceanic SST front. Preprint, *Third Conference on Mesoscale Processes*, Vancouver, BC, Aug. 21-26, Amer. Meteor. Soc., 206-207.
- Crescenti, G. H., 1984: Analysis of permafrost depths on Mars. *Advances in Planetary Geology*, NASA Technical Memorandum TM-86247, Washington, D. C., 115-132.
- Crescenti, G. H., 1984: The Long Island Sound sea breeze of coastal Connecticut. Honors Thesis, Southern Connecticut State University, 117 pp.
- Goldstein, M., E. Terhaar, S. Blank, C. Buck, G. Crescenti, J. Edson, and S. Martin, 1979: Sea surface conditions and marine weather on Long Island Sound. Area Cooperative Educational Services (ACES), Working Paper No. 6, New Haven, CT, 29 pp.