

Certified Consulting Meteorologists Newsletter



Volume 5, Issue 3

Fall 2014

This newsletter is intended to enhance communications between CCMs, the BCCM, and the AMS. It is published quarterly to provide information about the on-going activities of the CCM program. All CCMs are reminded that there is a location on the AMS website for a forum to facilitate communication and exchanges between CCMs. The CCM forum can be accessed via the CCM webpage at: <http://amet soc.org/amscert/ccm/index.html>

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The Chair’s Column

Dear CCM Colleagues:

As mentioned elsewhere in this newsletter, regional orals in June resulted in two new Consulting Meteorologists becoming certified by the AMS.

The middle part of the year has been a little slower than the start, but so far we have a total of 8 new candidates who have applied for the CCM this calendar year. Some of them have completed the process to the point of being ready for oral exams in January, and others may yet be ready. Either way, any open application candidates that we pass along to the 2015 BCCM Chair (Buddy Ritchie) will have applied during 2014, but too late to get the written exam cycle completed in time for Phoenix orals.

If you are mentoring a future CCM candidate, you should know that applications received at AMS after September 1 of a given year are not likely to make it through the exam issuance—exam completion—exam grading process in time to be scheduled for an

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New CCMs

Since the last newsletter was published, the following individuals completed all requirements for certification and were added to the roll of active CCMs:

Jeffrey Cole, Louisville, CO CCM 706

Christopher Fiebrich, Norman, OK CCM 707

Be sure to welcome them to the CCM ranks at your next opportunity!

The Chair's Column

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oral exam at the following January AMS meeting. You might also let them know that they should contact the people that they list as references so that they are expecting the request from the AMS for a reference letter, and don't needlessly hold up the exam issuance process.

Mike Mogil is hard at work assembling the CCM Forum for next year. If you would like to help Mike make this year's CCM forum even better, feel free to contact him directly at: hmmogil@gmail.com.

As always, if you have any questions about the BCCM or would like to refer potential new CCMs to someone who can answer their questions about the CCM process, please contact me at bccm.chair@gmail.com or by telephone at 888-580-0747.

Dick Westergard, CCM #632

Chair, Board of Certified Consulting Meteorologists

American Meteorological Society

AMS Elections

Online voting for AMS elections is now open at <http://www2.ametsoc.org/ams/index.cfm/about-ams/ams-election-information/>. We encourage all of you to participate in the voting process. The deadline for voting is **November 4th**.

AMS Online Awards & Fellows Nominations Open Nov. 1st

The Council of the American Meteorological Society invites members and friends of the AMS to submit nominations for consideration for the Society Awards, Lecturers, Named Symposia, Fellows, Honorary Members, and nominees for elective Officers and Councilors of the Society.

Of particular interest to CCMs, are the following awards:

- The Henry T. Harrison Award for Outstanding Contributions by a Consulting Meteorologist
- The Award for Outstanding Contribution to the Advance of Applied Meteorology
- Fellows

The AMS Online Awards and Fellows Nominations will open starting November 1st. For a description of the awards and details on the nomination process, please see the AMS Awards site at <http://www.ametsoc.org/awards/index.html>.

Nomination Deadlines

- Online Awards and Fellows: 1 May 2015
 - Honorary members: 1 July 2015
 - Lecturers: 1 October 2015
-

Share Your Photos With AMS

The AMS is working on re-vamping the AMS Resource Center at the Annual Meeting and we are looking for photos of CCMs working with clients or in the field. The photos may be used on the Certification panels as well as in other promotional materials. If you would like to submit a photo, please forward a high resolution jpeg or tif file to Kelly Savoie (ksavoie@ametsoc.org) by **October 24th**.



CCM Articles

One of our fellow CCMs has recently prepared an article for the following publication:

Weatherwise July / August Edition

Anthony J. Sadar, CCM contributed a weather puzzle piece which can be viewed at the following link:

<http://www.tandfonline.com/toc/vwws20/67/4#.VDQ89U0tCM8>.

Several CCMs answered the call for articles for this newsletter! These featured articles can be found on pages 6-11.

The views expressed are those of the author(s) and do not necessarily represent those of the BCCM.

AMS Board of Operational & Government Meteorologists

Annual Conference Webinar

Title: AMS BOGM Annual Conference Webinar

Date: Thursday, October 30, 2014

Time: 10:15 AM - 4:00 PM EDT

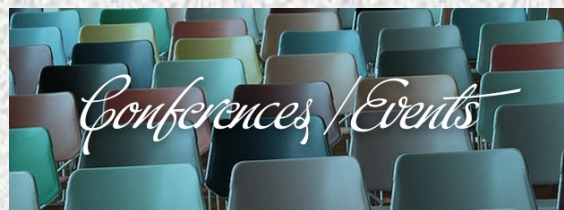
Space is limited.

Reserve your Webinar seat now at:

<https://www1.gotomeeting.com/register/159571153>

This virtual conference will feature several key speakers from the 2014 AMS annual conference. Each speaker will be given up to 30 minutes which includes time for questions from attendees.

After registering you will receive a confirmation email containing information about joining the Webinar.



For AMS Upcoming Meetings and Other Meetings of Interest, please visit:
<http://www.ametsoc.org/MEET/meetinfo.html>



The AMS Annual Meeting will be held 4-8 January 2015 in Phoenix, AZ. The theme of the 2015 AMS Annual Meeting is “Fulfilling the Vision of Weather, Water, and Climate Information for Every Need, Time, and Place”. There will also be 3 short courses offered the weekend prior to the start of the meeting. CCMs receive up to 8 professional development points for attending the meeting and completing a short course (4 point for the meeting, 4 points for a full day short course, 2 points for a ½ day short course). Early registration rates are valid through 1 December 2014. For details on the meeting and registration information, please visit the AMS Web site at <http://annual.ametsoc.org/2015/>.

Volunteer Opportunities

There are several volunteer opportunities available during the AMS Annual Meeting. We particularly would love to have a few CCMs available at the CCM Table during the Student Conference and Career Fair reception on Saturday night from 5:30pm – 7:30pm, if anyone is available. Please email Kelly Savoie (ksavoie@ametsoc.org) if you are interested in volunteering at the AMS Annual Meeting during any of the below days/times.

Student Conference and Career Fair:

- CCM Table
- Saturday (5:30pm - 7:30pm)

AMS Certification Booth at the AMS Resource Center during high traffic times:

- Monday (5:30–7:30 p.m.)
- Tuesday (3:00–3:30 p.m.)
- Wednesday (10:00–10:30 a.m. and 5:30–6:30 p.m.)

PowerPoint Display

There will once again be a PowerPoint display at the AMS Certification booth at the AMS Annual Meeting profiling the background and interests of active CCMs. If you would like to include a slide for the display, please email it to Kelly Savoie (ksavoie@ametsoc.org) by December 15th. A sample slide and PowerPoint template may be found at <http://www.ametsoc.org/amscert/ccmppslides.html>. If you participated last year, your slide will once again be included. Please email Kelly a revised slide if there are changes. Otherwise, your previous slide will be included. You may view the current PowerPoint display at <http://www.ametsoc.org/amscert/50th%20Anniversary%20CCM%20Show%20Web.ppt>.

CCM Breakfast

The CCM Breakfast at the Annual Meeting will take place at the Convention Center on Wednesday, January 7th from 7-8:15am. If you plan on attending, please RSVP to Kelly Savoie (ksavoie@ametsoc.org) by **November 3rd**.

Mentor Opportunities

Are you a professional working in private sector meteorology?

Serve as a mentor in the AMS Board for Private Sector Meteorology's Student Mentorship Program!

For the last seven years, the AMS Board for Private Sector Meteorologists (BPSM) has reached across private industry to connect a cross-section of professionals working in private sector positions related to meteorology with students interested in learning more about the private sector.

The highly successful BPSM mentorship program is seeking professionals working in the private sector to volunteer to serve as a mentor for some of the best students in our nation. This program is uniquely focused on skill development, coaching, and helping students grow their professional network and business acumen. The program gives students the skills to allow them to stand out in the eyes of employers, and mentors an opportunity to positively impact the lives of young men and women, and build life-long relationships.

The program is structured to pair students with a mentor who is active in the private sector discipline of greatest interest to the student protégé. Examples include—but are not limited to—energy forecasting, software development, project management, broadcasting, and catastrophe risk management. Every attempt is also made to pair students with a mentor in the same geo-

graphic region to facilitate face-to-face interactions, in addition to regular phone calls, e-mails, and other forms of communication.

In order to ensure students and mentors have an opportunity to build a strong working relationship during the 2014/2015 academic year, we request that mentor applications be submitted by November 15th, 2014.

Mentors can become an integral part of our program by completing a short application at

<http://www.ametsoc.org/boardpges/bpsm/mentorapp.html>

For more information about the BPSM mentorship program, including student testimonials and mentor profiles, please visit

<http://www.ametsoc.org/boardpges/bpsm/mentorshipprogram.html>

or contact BPSM@ametsoc.org.

Joshua Darr

BPSM@ametsoc.org



All CCMs are encouraged to submit items for this quarterly newsletter. We would like at least one article from a CCM about what they are doing for each issue. To submit items please forward them to:

Jennifer.M.Call@gmail.com.

Certified Weather Data, Do You Really Need It?

Have you ever prepared a past weather report for litigation and been asked to provide certified weather data with your report? If you frequently reconstruct the weather for insurance companies and law-firms, the answer to the above question is more than likely a "yes." The National Climatic Data Center (NCDC) maintains the world's largest climate data archive; and the NCDC is the only government source that can provide the Department of Commerce (DOC) gold seal with blue-ribbon certification of record authenticity. What does that gold seal denote? The gold seal signifies that authentic and true copies of meteorological records on file were printed at the National Climatic Data Center in Asheville, North Carolina. That's it! The NCDC does not guarantee the accuracy of the data since it has no direct knowledge of how the data was recorded. As the expert, it is your responsibility to determine the accuracy of the data and its value.

Pricing of certified weather data varies, and is based on whether you order it online or offline. RADAR and Satellite images are special orders that must be done over the phone with a NCDC representative. Regardless of the method you choose, all certified weather data has to be mailed to you. You cannot print certified data online. Step-by-step instructions on how to order certified weather data, along with the pricing can be found at: <http://www.ncdc.noaa.gov/customer-support/certification-data>. Some of the common types of weather data that can be certified are: local climatological data (METARS), National Weather Service (NWS) monthly COOP, Co-CoRaHS data, NWS zone forecasts, watches and warnings, public information statements, and much more.

Did you know that you can also view, download and print the non-certified weather data for free? The certified text products you order from the National Climatic Data Center are also available online at no cost. What is the difference between certified and non-certified data? There really is none. Certified and non-certified weather data look exactly the same and contain the same information. The only minor differences are: the cost, the DOC gold seal, and where the data was printed. Below, are the links to some of the more useful, free, non-certified NCDC text products:

1. <https://nes.ncdc.noaa.gov/subscriptions.html> - (METARS)
2. <http://www.ncdc.noaa.gov/IPS/coop/coop.html> - (NWS monthly COOP)
3. <http://www.ncdc.noaa.gov/stormevents/> - (Storm Events Database)
4. <http://has.ncdc.noaa.gov/pls/plhas/HAS.StationYearSelect?datasetname=9957ANX&subqueryby=STATION&applname=SRRS&BTNSEL&outdest=APPS&dtypesort=dtpeord&stationsort=id> (All National Weather Service Text Products that can be delivered to your inbox)

Besides text, you can also get certified level II and level III Doppler RADAR NEXRAD products. The one down side to ordering the RADAR over the phone is each radar image costs \$14. Imagine doing a past weather report on rain where you need to look at 24 hours or more of Base Reflectivity images from a single Doppler RADAR site. On average, the Doppler RADAR produces 12 images per hour. Multiply that by 24 hours and you are

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Certified Weather Data (Continued from page 6)

already up to a cost of several thousand dollars! And, that is without the Department of Commerce (DOC) certification charge of \$86 and a service charge of \$4. The good news is there is a way around that cost by doing the customization work yourself. All the RADAR images can be ordered online at

<http://www.ncdc.noaa.gov/nexradinv/map.jsp>.

The images are delivered directly to your inbox in less than 30 minutes after ordering.

You can then view and customize the images for free with the easy to use NOAA Weather & Climate Toolkit

<http://www.ncdc.noaa.gov/wct/>. For those that want to reference satellite data, the cost is noticeably higher than RADAR. Each satellite image runs \$85 plus the cost of certification (\$86) and a service charge (\$4). However, if you would like to view the satellite images for free and do your own customization, go to <http://www.nsof.class.noaa.gov/saa/products/catsSearch>.

How does viewing and printing the non-certified weather data benefit you? First and foremost, you have direct access to the data without waiting for it to arrive in the mail. This allows you to begin working on your report immediately. Second, you can offer the non-certified data to your client as an option to the more expensive certified data. Furthermore, most weather related cases settle prior to going to trial. The uncertified weather data may prove useful in the early stages of discovery. Down the road, if it goes to trial and the Judge requires certified weather data, you can order it then.

Can the National Climatic Data Center certify weather records obtained from other weather-related sites? Unfortunately, they cannot. The only data that can be certified by the NCDC is data that originates from their system. However, I and the company I work for, WeatherWorks, LLC, frequently reference weather data that did not originate from the NCDC. For instance, we like to incorporate private weather observation stations from Mesonets into our reports to supplement the certified METARS and/or NWS COOP data. As a qualified expert, it is your obligation to validate the reliability of the source and the accuracy of the data. The more sources you have showing the same or similar information, the stronger your case.

I hope this article has given you a clearer understanding of certified weather data and how to obtain the free copies of non-certified data. If you have any questions, please do not hesitate to contact me at: tommyelse@weatherworksinc.com

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Wind Energy Sound Monitoring Under High Shear Conditions

Post-construction sound level compliance measurements were made at a wind farm in the Midwestern United States during September 2013. The program was a combination of attended and unattended measurements focused on two 3 megawatt (MW) wind turbines with either 92 or 100-meter hub heights. In order to ascertain that worst-case sound levels were measured, the program sought high hub height winds (highest sound levels from the wind turbine) and low ground-level winds which minimized the contribution of wind-influenced noise near the microphone. Wind shear, defined as the wind speed changing with height, is often noted as an important element of characterizing worst-case sound levels from wind turbines.

The sound level measurement program generally followed ANSI S12.18 Method #1.¹ Weather conditions during the testing period found the site at the western edge of a large high pressure system with clear skies and light ground-level wind speeds (between 1 m/s and 3 m/s). Under these conditions, daytime winds at hub height were light and wind turbine operations were minimal. However, the nighttime periods saw a nocturnal jet develop with hub height wind speeds exceeding 10 m/s.

Under these conditions, the field technician deployed the sound level meter(s) and one 2-meter meteorological tower in the late afternoon. A photo of the meteorological tower is at the end of this article. The equipment would then run continuously until the following morning with occasional checks on the equipment by the field technician during the evening and/or late night hours. Based on real-time communication with the wind turbine operator that desired operational conditions were met, both wind turbines were shut

down for one hour to measure an ambient sound level.

Electrical output from both wind turbines were provided for this field program. The analysis focused on the 15-hour period from 1800 to 0900 the following day. At this time of year, sunset was at 1900 while sunrise was at 0700. A review of the wind turbine power output clearly showed the rapid ramp up of power after sunset and the rapid decline after sunrise. The sound level data and ground-level wind data were logged in 10-minute intervals while the wind turbine electrical power output was provided in 1-second resolution.

An issue often encountered in the wind energy industry is trying to extrapolate hub height wind speed from a surface (2-meter or 10-meter) anemometer. Knowledge of the hub height wind speed is critical in estimating energy yield for a wind turbine. One widely used wind shear model is the power law which employs a power law exponent α . For flat terrain, many use the one-seventh power law where α equals $1/7$ (0.14).² Using the wind speed data from the compliance measurement program, the nighttime wind shear for the layer from 2 meters above ground level (AGL) and 100 meters AGL was approximately 0.4 with several periods approaching 0.6. During the daytime, winds were generally 2-3 m/s at the ground and 4-5 m/s at hub height for a wind shear of approximately 0.1 to 0.15.

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Wind Energy Sound Monitoring (Continued from page 8)

Good data on measured wind shear in the Great Plains of eastern Colorado from 3 m AGL to 113 m AGL is found in Banta et al.³ The effects of a low-level nocturnal jet are presented in Figure 5 of that publication. Daytime wind shear values are less than 0.1 while nighttime values reach 0.4 each night with a maximum of 0.8.

This field compliance program reinforced the difficulty in trying to estimate modern utility-scale turbine hub height wind speeds from ground level wind speed data.

REFERENCES

- Procedures for Outdoor Measurement of Sound Pressure Level*, American National Standards Institute ANSI S12.18-1994 (Acoustical Society of America, New York, 1994).
- M.L. Ray, A.L. Rogers, and J.G. McGowan, "Analysis of wind shear models and trends in different terrains," presented at WINDPOWER 2006, Pittsburgh, PA, June 2006.
- Robert M. Banta, Yelena L. Pichugina, Neil D. Kelley, R. Michael Hardesty, and W. Alan Brewer, "Wind Energy Meteorology – Insight into Wind Properties in the Turbine-Rotor Layer of the Atmosphere from High-Resolution Doppler Lidar," *Bulletin of the American Meteorological Society* **94** (6), 883-902 (2013).



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Meteorological Analysis of a Storm Event for Litigation

A cruise line passenger was injured when the ship encountered severe weather while in route to the Bahamas. The passenger brought action against the cruise line to recover damages sustained as a result of the aforementioned events, stating that the ship should have avoided the inclement weather. The defendants indicate that the weather was unexpected and not forecasted.

Rainy and windy weather began well before 9 October 2011 along Florida's east coast and the Bahamas. The combination of the remnants of a weak front, an upper level disturbance, and a strong onshore wind flow produced frequent squalls on the 7th and 8th.

On the morning of October 9th – the day the ship sailed from Port Canaveral on the east coast of Florida -- a low-pressure area formed over the Bahamas and moved northwest towards Florida. The strong gale generated bands of thunderstorms and hurricane-force winds west of its center of circulation as it approached the coast. While not officially classified as a tropical cyclone, the system was being monitored closely by the National Hurricane Center and briefly possessed some tropical or subtropical characteristics.

Winds gusted over 50 knots (nautical miles per hour) near the gale, and as high as 90 knots (104 miles per hour) within the thunderstorm bands west of the center. The ship in question traveled directly through this solid area of thunderstorms, experiencing extreme winds and high seas.

Winds increased significantly in the first 30 minutes of the voyage. By 447PM hurricane-force gusts to 65 knots were recorded on the ship. Between 447PM and 600PM winds were clocked almost constantly above 40 knots, with the most common measurements in the 50s to the hurricane-force threshold of 65 knots. Be-

tween 600PM and 645PM as the wind shifted from northwest to southwest, recorded wind speeds dropped mostly into the 20 to 40 knot range, even below 20 knots on occasion. But after 645PM winds started to pick up, frequently above 40 knots and into the 50 knot range. At 707PM a period of rapidly shifting winds was observed, with rapid swings from southwest to southeast, back to southwest again, and eventually northwest and north, settling on that relatively constant direction until the instrumentation apparently failed at 752PM. Between 726PM and 752PM winds constantly remained at hurricane-force, peaking at or above 90 knots several times between 728PM and 750PM. It is important to note that the ship's instruments likely sit 200 or more feet above the surface of the ocean.

The ship "core punched" the intense low-pressure system that developed offshore the Florida coast with 80+ knot winds, torrential rain and lightning. The rapidly shifting hurricane-force winds provide a clear indication that the ship was under the most intense thunderstorm activity near the center of the cyclonic circulation. In addition, an overlay of the cruise liner's actual track based on the latitude and longitude coordinates from the ship's log vis a vis the Melbourne NEXRAD radar reflectivity and radial velocity depictions shows the ship converging with and intercepting the most intense part of the storm.

A thorough weather briefing of both current and forecast conditions from all NOAA, NHC, and NWS sources would have been easily attainable while in port. In addition, a new and state-of-the-art ship presumably would have modern means of communication that would allow for real-time monitoring and access to additional meteorological data so as to remain

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Meteorological Analysis (Continued from page 10)

constantly informed and avoid the most dangerous weather. High quality on-board radar, turned on and in fully operational mode, would also presumably be available.

Meteorologists understand why airline pilots use all tools on hand, including a thorough pre-flight and in-flight briefing as well as visual cues and the use of on-board weather radar, so as to never fly into thunderstorms. Pilots, and mariners presumably, know that conditions inside or under thunderstorms or clusters of thunderstorms are extreme, beyond any forecast of the “prevailing” conditions en route.

The status of the on-board weather instruments and systems is a particularly important question when looking at the ship’s log, which indicates that the watch condition was “yellow” coming out of the port, then dropped to “green” until 728PM when it changed to “yellow” and the captain was on the bridge in command. This time, 728PM, is after the two major listing events according to the ship’s data, and about the time the winds increased to 90 knots or above. From a meteorological point of view it’s hard to explain condition “green” as a ship approaches such intense thunderstorm activity near the center of a strengthening gale center.

A Gale Warning was in effect beginning Saturday 8 October, was still in effect when the ship arrived from Cozumel, and remained in effect into the afternoon and evening when the ship set sail for the Bahamas on Sunday 9 October. With a Gale Warning in effect, winds of up to 47 knots were forecasted. While a categorization of winds as being “more than three times what was forecasted”, when describing the gusts experienced when the ship encountered the gale center, is an exaggeration; experienced seamen and meteorologists would know that winds and seas are always higher in the middle of dangerous storms -- well worse, above and beyond, the prevailing conditions depicted in a

general forecast.

NOAA, NWS and NHC in numerous bulletins alerted all interests that an intensifying low-pressure system had developed on the morning of the 9th. Phrases such as “shower activity has become a little more concentrated” and “some development is still possible” as stated in NHC’s Tropical Weather Outlook, or “low pressure north of Grand Bahama Island is causing winds to increase further” as stated in the NWS Melbourne Special Weather Statement, would presumably generate concern that weather conditions, which were already precarious, could worsen given the proximity and path of the low pressure area in relation to Port Canaveral.

Furthermore, the use of either land-based weather radar (NWS Melbourne NEXRAD) or on-board radar would have clearly shown strong to extreme precipitation located near the center of the low-pressure system, indicating that conditions near the vortex were much worse than those experienced while in port, in the channel, or even as the ship left the channel on its initial south by southeast path.

This low-pressure system, which exhibited some tropical cyclone characteristics, intensified very rapidly. Its intensification was observed throughout the day on 9 October 2011, and accelerated in the late afternoon and early evening. The conditions affecting the immediate area near the ship while in port and by the Port Canaveral channel, including 20-foot seas (buoy) and hurricane-force winds (ship), should have been expected to get worse, and not better, based on all NOAA reports and weather radar indications in relation to the ship’s planned path towards the southeast which took it directly towards the center of the storm.

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