Report for CMOS

Project Atmosphere 2019

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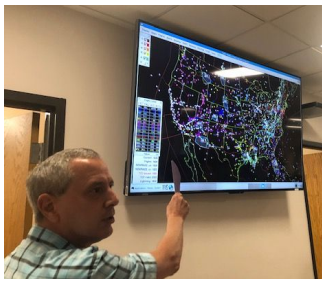
Overview

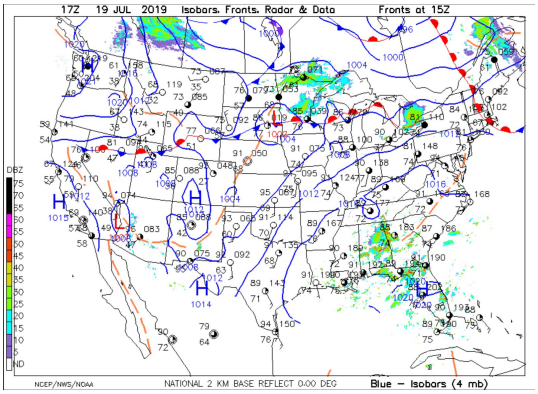
This year I was selected by the Canadian Meteorological and Oceanographic Society as the Canadian participant of Project Atmosphere. **Project Atmosphere** is a Summer Teacher's Workshop offered by the American Meteorological Society at the National Weather Service Training Center in Kansas City, Missouri. This year, the workshop was one week on-site in Kansas City, Missouri, with several pre and post workshop coursework modules. Finally, as an alumni of this workshop, I am to prepare and present a training session for teachers in my school division and/or area based on the activities we learned during this program.

Twenty four teachers from all over the US and one Canadian (me) participated in this professional development workshop designed for us to teach atmospheric content to students from K-12. The workshop was held at the National Weather Service Training Center (NWSTC). Having the workshop in this



meteorological training facility allowed us to have access to a large assortment of computerized weather information systems as well as to see first-hand the equipment used in forecasting such as the Automated Surface Observing System (ASOS) and surface stations. The Aviation Weather Center, responsible for aviation forecasting, is also in the building, allowing us to see real-world applications of weather forecasting.

Before the workshop



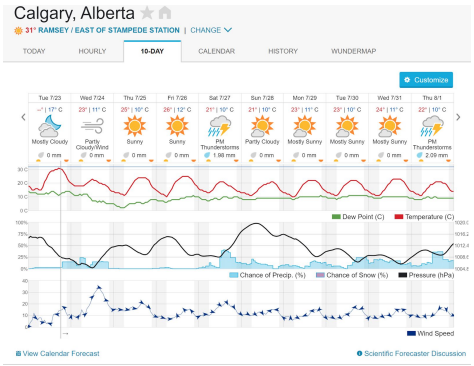
During the pre-workshop coursework, we were exposed to three very challenging MetEd Modules designed originally for forecasters and/or students of meteorology:

1. Basics of Visible and Infrared Remote Sensing,
2. Weather Radar Fundamentals
3. GOES-R Geostationary Lightning Mapper (GLM)

Although these modules were extremely difficult for a beginner such as myself, but I learned a lot of meteorological terms and concepts that were invaluable for the workshop itself as well as for applications in teaching physics.

We also had a chance to see and learn through two very hands-on modules for teaching some challenging and important meteorology topics:

1. Air-Sea interaction module
2. Coriolis Effect module



These two modules were very self-explanatory, well thought-out for K-12 students and I could see using them in my day-to-day teaching.

Finally, we had to write journal entries (blog) on weather parameters and clouds over a three week period. This reflection was meant to ignite our process

of thinking about weather and how some factors, such as temperature, pressure, wind, dew point, and fronts are connected to each other. This was an excellent introduction to meteorology and made me observe natural weather phenomena in a completely new way. This also reminded me how important writing in a journal or blog for students to reflect on their own learning. I have decided to implement a blog for my students similar to this process.

On-Site Workshop - Kansas City

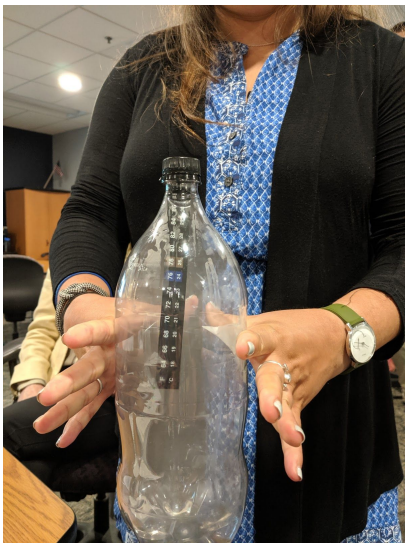
During the week on-site workshop, we learned from experts in the field, were taught weather and climate concepts by professors, and were given modules to apply the knowledge in the classroom. Topics such as satellite and RADAR imagery interpretation, thunderstorms and severe storms, and weather forecasting were addressed by experts in their fields.

One evening, we had a field trip to the National Weather Service (NWS) Topeka weather station to launch a weather balloon. We learned from the front-line meteorologists who are in charge of detecting tornadoes and any severe weather in the neighbouring area. We visited their tornado shelter and launched a weather balloon. The next day when we were able to take the raw data collected by the balloon and analyze it.

Throughout the week we had many impressive presentations by notable individuals:

- Dr. Louis Uccellini - director of NWSTC
- Ken Graham - DIrector, National Hurricane Center (NHC)
- Andy Bailey - Presentation on RADAR
- Kim Runk - Satellite Workshop
- Sarah Atkins & Tim Brice - How to request a video "Ask a Meteorologist" chat
- Barb Boustead - Presentation on Climate
- Lori Schultz - NASA Presentation
- Bill Bunting - Presentation from the Storm Prediction Center (SPC)
- John Mclaughlin - NOAA Education presentation

All of the presenters were extremely passionate about what they do and seemed very knowledgeable about in their domain. Their presentations were engaging and highly professional.



My favourite parts of the week were all the hands-on activities (modules) that we were introduced to. These activities were specifically designed for K-12 students and could be adapted for any grade level - I could see myself (and any of the science teachers) using these activities directly in my classroom. For instance, we learned about pressure highs and lows with the Hand Twist activity, the Extra-Tropical Cyclone slider activity, and the cloud-in-a-bottle activity.

Each day we also had a weather briefing with Jerry Griffin, Master Instructor in the Forecast Operations Programs, at the NWSTC. During these briefings, we observed RADAR and satellite imagery and learned to interpret surface station data and 500-millibar charts. We also followed storm systems as they moved near Hawaii and near Florida and explored many great online resources that we can use to forecast weather with our students.

During the workshop teachers were able to share their teaching experiences with the other teachers in so-called “sharing sessions”. I was the first teacher to share during one of these sessions. I discussed the Applied Science Project program which we offer at our school. I was also able to learn a lot about what is offered at other schools around the US and the very interesting science programs other teachers offer to their students. I was also able to connect with other AP Physics teachers, and we were able to share resources and their interesting teaching methodology.

At the end of the workshop, all the teacher-participants went out to tour Kansas City and socialize for the last time.

After the workshop

The post-Kansas City coursework was another set of modules:

1. The Weather Cycler Module
2. The El-Nino / La-Nina Module
3. Upper Air Weather Module

Once again, these modules were extremely well prepared for adults and students K-12. The modules lead students independently through a set of activities that progressively explain these difficult concepts.

As part of the post-workshop coursework, we were also asked to do a weather briefing (similar to ones we saw Jerry Griffin do each day) to remind ourselves of the amazing online tools and sites that were used during the briefings.

Finally, all the teacher-participants are expected to present a local workshop training for other teachers in their school or district. I plan to do this local workshop coming up in the fall of this year. Since I am a teacher at a K-12 school, I will be able to apply all the information I learned and have an in-school workshop for all the science teachers during one of our professional development days / meetings.

Acknowledgment

A huge thank-you goes out to our hosts and leaders, Wendy Abshire, Elizabeth Baugher, and Chad Kauffman, who did an amazing job of sharing their knowledge with us, keeping us organized and getting us ready to share what we've learned with other teachers. Also, I would like to thank the Canadian Meteorological and Oceanographic Society for continuing to support Canadian participation in this workshop.