LIFELONG LEARNING- UWGB WEATHER COURSE-ADDITIONAL REFERENCES

WEATHER APPS

Radarscope

www.radarscope.com

RadarScope is a specialized display utility for weather enthusiasts and meteorologists that allows you view NEXRAD Level 3 and Super-Resolution radar data along with Tornado, Severe Thunderstorm, Flash Flood and Special Marine Warnings, and predicted storm tracks issued by the U.S. National Weather Service. These aren't smoothed images, this is native radar data rendered in its original radial format for a high level of detail. RadarScope displays tornado, severe thunderstorm, flash flood, and special marine warnings issued by the U.S. National Weather Service. You can browse the list of active warnings, select a warning to view the details, and even zoom to the selected warning on the map. This is available for approximately $10/yr for Ipads, and Android phones. It was recommended by Jeff Last, the head meteorologist at the NWS in Green Bay. He has a copy of this on his personal cell phone, which is a significant recommendation.

Windy

This is a FREE app that is available for either IPads, IPhones ore Android phones. It is intuitive to use and displays a wealth of weather-related information that included isolines of pressure, radar and satellite images and weather forecast. Check it out, it is amazing, and best of all is FREE.

WEATHER TOPICS

https://weather.cod.edu/

The College of DuPage experience is nothing like any other meteorology program in the nation. Here, you can begin learning real meteorology right away and have more courses to choose from than anywhere else. **Whether you are interested in forecasting, severe weather, or more traditional atmospheric sciences, COD will allow students of all ages a chance to delve into how the atmosphere works.** There is some very interesting information about weather topics in general. This was recommended to the Weather Class I taught for the Green Bay Chapter of Sail and Power Squadron by a guest presenter for the NWS Office in Green Bay. They use it for reference at times themselves!

INSOLATION:

A great applet and brief article on how Insolation varies by latitude and by season. Shows the dramatic effect this variance of insolation has on temperature differences on the Earth.

http://www.applet-magic.com/insolation.htm

ATMOSPHERIC CIRCULATION:
Good video of atmospheric circulation. This shows the major air currents that create weather in the Earth. This is 22 mins in length, so beware.
https://youtu.be/WXuGYSM2D8k

This is a very well done video. 12 mins duration. It illustrates the various belts of high and low pressure in global circulation, the Coriolis Effect, and nice graphics overall.
https://www.youtube.com/watch?v=DOtKdyYdf5c&feature=youtu.be

This is a brief video of 2 mins duration that shows Hadley Cells, formation of global wind patterns. **I will show in class and include as a link for distance students.**
https://www.youtube.com/watch?v=DHrapzHPCSA

What Causes Wind?
2 Minute Video that graphically shows why winds flows from high to low pressure. Also nice graphics about Sea Breeze.
https://www.youtube.com/watch?v=edsNPCwU9lo

THE CORIOLIS EFFECT
The Coriolis Effect has an impact on the direction of winds. This shows an interesting example of it that makes it more understandable for those of us who are "Physics-challenged. **This is a three minute video and I will show in Class# 2**.
http://youtu.be/i2mec3vgeaI

This video gives an interesting demonstration of how Coriolis Effect influences the circulation of air molecules by winds within our atmosphere**.**

https://courses.lumenlearning.com/sanjac-earthscience/chapter/video-the-coriolis-effect/

This is a link to the Coriolis Effect from the Hyperphysics web site (www.hyperphysics.com). It discusses the relationship between the Coriolis Effect, centrifugal force and centripetal force.

http://hyperphysics.phy-astr.gsu.edu/hbase/corf.html

Boyle's Ideal Gas Law

This explains the relationships mathematically between Temperature, Pressure, and Volume. The text of the Weather course doesn't explicitly state this Thermodynamic Law, but seeing this relationship will help you to understand the physics that underlies all weather. Also, www.hyperphysics.com is an excellent web site for helping understand all things Physics, if you have that sort of interest.

http://hyperphysics.phy-astr.gsu.edu/hbase/Kinetic/idegas.html

Concept of "Latent Heat" in causing phase changes

This outlines in more detail the concepts of Latent Heat, and Phase Changes than was presented in class.

http://hyperphysics.phy-astr.gsu.edu/hbase/thermo/phase.html

The Bergeron Process: THIS WAS NOT PRESENTED IN CLASS

This is a 40 second You Tube Video that animates the process of forming ice crystals in clouds with supercooled particles. https://www.youtube.com/watch?v=gCNif1XFZk4

ADIABATIC HEATING and COOLING

This is a graphic video that shows the process of adiabatic heating and cooling using clouds over Wyoming. **This is a 1 ½ minute video** https://www.youtube.com/watch?v=XH_M4jItiKw

CLOUDS

Great web site on Clouds, but also Lightning, Atmospheric Optics. A great site to explore to learn more about clouds.

http://www.weatherscapes.com/index.

Sources of Internet Weather Forecasting

Marine Weather

1. This is the best site I have found for MARINE weather reports. It focuses on the Great Lakes. The web site was used by Chicago-Mackinac Racers as they plan their courses for the race. It organizes all of the Great Lakes into a easily accessible web site. I have this available on my cell phone and iPad when sailing. The link states Lake Erie Weather, but you can readily switch between lakes to pick the one you want. http://www.lakeeriewx.com/GreatLakes.html

2. Marine Forecasts from National Weather Service includes Great Lakes, and high seas.
   www.weather.gov/marine

3. Unisys Weather
   http://weather.unisys.com/index.php
   This is a commercial weather web site that is based upon NWS Data, and provides a quick link to many different facets of weather including the various "weather models" that are used by weather forecasters in reaching their predications. Has lots of easy link to weather satellite data as well. Great site to explore further.
4. National Weather Service

   http://www.nws.gov

   This is the National Weather Service website. It is very busy, but you can noodle around and find what you want. Explore. There is a wealth of information, you just need to find it!

5. Aviation Weather Service
   https://www.aviationweather.gov/This is for aviators, but useful for those of us that fly in the water too.! Go to Forecasts tab and then to Prog Charts, and provides very good surface analysis to clearly see lows/highs and how fronts will be moving. I like to dive into "Discussions" Section that lets you know how confident the Weather Forecaster really is on the forecast.

6. Tracking Tropical Storms in North Atlantic: European Model Weather Forecasting
   The web site below is used to "track hurricanes" and contains much information on a real time basis useful to those in the path of a hurricane. The recent Hurricane Florence (Sept 2018) was tracked by this web site. Check it out and compare with information given by national networks during a hurricane event.

   http://trackthetropics.com/euro-12z-tropical-atlantic-forecasts/

7. Numerical Weather Forecasting

   This explains the various models that are used by the NWS in developing a weather forecast. All of these models rely on inputting numerous observations into a supercomputer and then generating a forecast.

https://www.ncdc.noaa.gov/data-access/model-data/model-datasets/numerical-weather-prediction

LINKS TO ANIMATIONS FOR WEATHER COURSE

WEATHER BASICS PRESSURE AND FRONTS 12 mins excellent summary animation for review too long to use for lectures. Outlines high and low pressure, air masses; warm, cold, stationary and occluded fronts

https://www.youtube.com/watch?v=E-5rieCUPuc

Thunderstorms 2 mins

https://youtu.be/bOfOA3PTghM

NWS BURLINGTON: THUNDERSTORM LIFE CYCLE 2 mins INCLUDE THIS IN SECTION ON THUNDERSTORMS

https://youtu.be/bcJLqYH9AF4

Thunderstorms: 3 formation stages. 1min 12sec
INCLUDES ACTUAL PICTURES OF CLOUDS AND GUST FRONTS and ANVIL CLOUDS
http://youtu.be/AL8XDZkLEi0

HOW THUNDERSTORMS ARE FORMED 5 mins excellent.
https://youtu.be/O2k-quezPsA

Thunderstorm animation 45 secs
http://youtu.be/C4hhChXs9t4

Fronts - Animation. Pearson Hall 4 mins use for USPS
http://youtu.be/fdSWC5hYI0U

Cold Fronts and Warm Fronts 2 mins. EXCELLENT
http://youtu.be/huKYKykjcm0

AIR FRONTS 6 mins VERY EXCELLENT BUT LENGTHY describes cold fronts, warm fronts, stationary and occluded fronts
PUT THIS IN CHAPTER 6
https://www.youtube.com/watch?v=PJ4M6sERLM4

Fronts warm front rising over cold 2 mins
http://youtu.be/jch-sxx71ko

AIR MASSES AND FRONTS. 14 mins
http://youtu.be/OBz3fwXX64A

HOW TO READ A WEATHER MAP 5 mins

Weather maps, also known as the synoptic chart, are an example of an isoline map. Isoline maps are made up of lines that join points of equal value. This video shows you how to understand and read weather maps.

https://www.youtube.com/watch?v=bd7DcVnrSL8

HOW TO READ WEATHER MAPS 8 mins Excellent description of how to interpret weather maps. Very detailed and great graphics. Discusses ISOTHERMS and ISOBARS

https://www.youtube.com/watch?v=N5rJ1yWk4IU

Textbooks:

These were recommended to me by Jeff Last, who is the head of the National Weather Service Office in Green Bay.

Essentials of Meteorology: An Invitation to the Atmosphere, by Ahrens and Henson. 8th Edition. 2018. This is a very readable textbook that presents basic level information for a college level introductory course in Atmospheric Science. I took some excerpts from it to use in PowerPoint slides I have shown. Doesn't require any mathematics.

Link to Univ of Washington Meteorology Website also, A textbook I have been reviewing, **Atmospheric Science by Wallace and Hobb**s is used in upper-level college or grad school level Meteorology Courses and is taught at Univ. of Washington. There is a link below that has links to each chapter and many additional weather related websites. Interesting , if you want to explore the subject in much more depth. CAVEAT EMPTOR: this textbook begins with using differential equations to prove Boyle's Ideal Gas Law.

http://booksite.elsevier.com/9780127329512/software/Links_to_Webpages.html

Video Meteorology Course by Stefen Becker PhD

WEATHER VIDEOS by STEPHAN BECKER

A series of You Tube Videos with excellent graphics and descriptions of common weather processes that are described in USPS Weather Text. I have found them helpful to crystallize my understanding of complex weather processes. Stefan Becker PhD is a Physical Geographer who teaches at Lehman College in the New York University. He has a German accent that reflects his being a Native German, but speaks English perfectly. He has the ability to make complex concepts understandable. I found them interesting enough that I saved all the links I could find. Interestingly, he has ties to NE Wisconsin in that he taught for 6 years at UW Oshkosh. I highly recommend these to increase the depth of your understanding of weather. It is essentially an online Introductory Atmospheric Science Course with excellent graphics.

The videos last from 6 to 13 mins.

Chapter 1a Solar Energy

https://www.youtube.com/watch?v=hjXtOUuzBWw

Chapter 1b Earth's Seasons

https://www.youtube.com/watch?v=M7eEwCy-Upk

Chapter 2 The Atmosphere

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https://www.youtube.com/watch?v=l2JmVOMF3Ao

Chapter 3 Solar Radiation

https://www.youtube.com/watch?v=TkU6ZJfHki8

Chapter 4 Air Temperature

https://www.youtube.com/watch?v=WPegQ65_ebs

Chap 5 Air Pressure and Winds 11 ½ mins. Describes Coriolis Force

https://www.youtube.com/watch?v=RvdraTq2sdk

Chap 6 Global Circulation 6 ½ mins.

https://www.youtube.com/watch?v=SML5FIR_xT0

Chap 7 Upper Air Circulation 7 ½ min.

https://www.youtube.com/watch?v=KpFIIQDr4i8

Chapter 8 Wind Systems 7 ½ mins. Katabathc winds, Land and Sea Breezes

https://www.youtube.com/watch?v=A3dklZncayw

Chapter 9 Water in the Atmosphere

https://www.youtube.com/watch?v=FRsc-Ex82hM

Chap 10 Adiabatic Processes, Lapse Rates 12 mins

https://www.youtube.com/watch?v=ObnWb7yspxA

Chapter 11 Atmospheric Stability

https://www.youtube.com/watch?v=KDP_cLB8TCg

Chapter 12 Clouds

https://www.youtube.com/watch?v=m-rK2r0nmuY

Chapter 13 Precipitation

https://youtu.be/FM3T4n4QBgI

Chapter 14 Air Masses

https://www.youtube.com/watch?v=yTZ9_w1NJEA

Chapter 15 Mid-latitude Cyclones 8 ½ Mins

https://www.youtube.com/watch?v=ZkLUQZ-R_7o

Chapter 16 Thunderstorms

https://www.youtube.com/watch?v=TG9_p6NA7_c

Chapter 17 Tornados

https://www.youtube.com/watch?v=54dIMh6ZrCQ

Chapter 18 Hurricanes 11mins

https://www.youtube.com/watch?v=0WlLjlC4fnM

Chapter 19 Weather Forecasting

https://www.youtube.com/watch?v=2RZ5oNM8wSs

Chapter 20 Ocean Currents and El Nino

https://www.youtube.com/watch?v=Kl9xm2X6Sic

Chapter 21 Climate Change

https://www.youtube.com/watch?v=ib63S2KBA_4