WEBLINKS

Chapter 1
A Career Guide in the Atmospheric Sciences
http://www.ametsoc.org/AtmosCareers/index.html
Find out about a career in meteorology

AirNow
http://airnow.gov/
Track ozone in real-time and its impact on the Air Quality Index (AQI).

Answers @ NOAA _ Pressure
http://findanswers.noaa.gov/noaa.answers/consumer/Search.asp?catID2=221&catID1=52&SearchType=advanced
Check out answers from NOAA about barometric pressure questions.

Atmospheric
http://weather.uwyo.edu/upperair/sounding.html
Plot current and past soundings of the temperature and humidity high in the atmosphere.

Billion Dollar U.S. Weather Disasters
http://www.ncdc.noaa.gov/oa/reports/billionz.html
Search a comprehensive list of $1B weather disasters affecting the United States since 1980.

Global Measured Extremes of Temperature and Precipitation
http://www.ncdc.noaa.gov/oa/climate/globalextremes.html
View a continent-by-continent summary of weather extremes.

International Commission on History of Meteorology
http://www.meteohistory.org/
View a comprehensive history of meteorology from the International Commission on History of Meteorology.

Measuring, Visualizing, and Analyzing Wind
http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/circulation/digging_deeper_wind.html
Visualize the wind using the Beaufort Scale and other tools.

NWS Radiosonde Factsheet
http://www.ua.nws.noaa.gov/factsheet.htm
Get the basics on the NWS radiosonde program.

NWS Weather Fatality, Injury and Damage Statistics
http://www.nws.noaa.gov/om/hazstats.shtml
Explore the causes of weather-related fatalities in the United States.

Ozone Hole Education Resources
http://ozonewatch.gsfc.nasa.gov/education/index.html
This NASA site is an in-depth look at the causes of the ozone as well as its past, present and future.

Standard Atmosphere
http://ggweather.com/standard_atmosphere.htm
Use this table to determine the relationship of pressure, humidity and temperature.

The Hydrologic Cycle
Dive into the hydrologic cycle with this tutorial from the University of Illinois, Urbana.

**Trends in Carbon Dioxide**


Monitor atmospheric carbon dioxide from NOAA's Earth Systems Research Lab on Mauna Loa in Hawaii.

**Water Cycle Summary**


Visually track the course of water through the atmosphere, oceans and land.

**Weather Calculator**

[http://ggweather.com/calc.htm](http://ggweather.com/calc.htm)

Convert between temperature scales, plus calculate heat index and wind chill.
Chapter 2

Climate and Earth's Energy Budget
Visualize the sun and earth energy budget.

Geophysical Institute Aurora Forecast
http://www.gedds.alaska.edu/auroraforecast/
Monitor the latest effects of the solar wind in creating the Aurora Borealis and Aurora Australis.

News about Space Weather
http://www.spaceweather.com/
Find out news and events plus extensive background about space weather from this preeminent site on the topic.

Orbits and Light
http://astro.unl.edu/naap/motion1/orbits_light.html
The orientation of the sun's rays is graphically presented to show their radiant energy at different sun orientations.

Ozone Hole Watch
http://ozonewatch.gsfc.nasa.gov/education/index.html
Monitor the latest news and data about the earth's ozone hole.

Seasons and Ecliptic Simulator
http://astro.unl.edu/naap/motion1/animations/seasons_ecliptic.html
See an animated look at the tilt and rotation of the earth as it revolves around the sun.

The Electromagnetic Spectrum
http://imagine.gsfc.nasa.gov/docs/science/know_l2/emspectrum.html
See animations and explanations of the Electromagnetic Spectrum from NASA.

Today's Space Weather
http://www.swpc.noaa.gov/today.html
Track space weather and its impact on the atmosphere with daily data from NOAA.

What Is the UV Index?
http://www.epa.gov/sunwise/doc/what_is_uvindex.html
Explore the UV Index and its effects on health.
Contour Analysis

Learn to draw isotherms on a weather map through a series of contouring exercises.

NWS Jetstream - Wind Chill

Graphical charts and tables illustrate the combined effects of temperature and winds.

Synoptic Climatology Lab

Visit the preeminent laboratory researching heat health issues.

WMO Weather & Climate Extremes Map

Use a graphical interface to find worldwide temperature extremes by continent.

Weather Instrument Shelter

Build and site an instrument shelter for accurate temperature readings.

World Weather/Climate Extremes Archive

Browse through the official World Meteorological Organization archive of extreme temperatures.
Chapter 4

Cloud and Precipitation Online

http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/cld/home.rxml

Learn about the formation of clouds in this online tutorial.

Fog

http://www.sciencedaily.com/articles/f/fog.htm

Get the latest news and articles about fog.

NGA - Constable’s Greatest Landscapes

http://www.nga.gov/exhibitions/2006/constable/earlylife.shtm

Learn about the arguably world’s best cloud painter from the National Gallery of Art.

NWS Jetstream - Heat Index

http://www.srh.noaa.gov/jetstream//global/hi.htm

Graphical charts and tables illustrate the combined effects of temperature and humidity.

The Cloud Appreciation Society

http://www.cloudappreciationsociety.org/gallery/

Marvel at this amazing collection of every imaginable cloud type.

The Killer Fog of ’52


Listen and view this in-depth look at London’s "Killer Fog" of 1952.
Chapter 5

ADDS Icing
http://aviationweather.gov/adds/icing/
Monitor aviation icing conditions and warnings in near real-time.

About NEXRAD
Read this in-depth explainer about Doppler radar from Weather Underground.

Avalanche.org
http://www.avalanche.org/
Find out about all aspects of avalanches, from how and where they form to where there are warnings.

Calculating the LCL
http://san.hufs.ac.kr/~gwlee/session3/lcl1calc.html
Use an interactive JavaScript to calculate the Lifting Condensation Level.

Explanation of Atmospheric Stability/Instability
Find out more about atmospheric stability from this well-illustrated explainion on the topic.

Introduction to High Impact Meteorology
http://severewx.atmos.uiuc.edu/index.5.html
Watch animated examples of diurnal changes in atmospheric stability.

Lifting by Convection
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/cld/clvlp/cnvt.rxml
Walk through an excellent tutorial about cloud formation due to convection.

National Weather Service Doppler radar Images
http://radar.weather.gov/
Access the latest Doppler radar imagery from the official NWS NEXRAD site.

Rainfall Extremes
http://wmo.asu.edu/
Check out the official World Meteorological Organization archive of extreme precipitation events.

Science Daily Precipitation
http://www.sciencedaily.com/search/?keyword=precipitation
See the latest news and articles about precipitation.

Snow Flakes and Snow Crystals
http://www.its.caltech.edu/~atomic/snowcrystals/
Marvel at the myriad of beautiful snowflakes as well as in-depth snowflake physics.

Stability and Cloud Development
http://apollo.lsc.vsc.edu/classes/met130/notes/chapter6/index.html
Walk through step-by-step changes in stability.

TRMM Tropical Cyclones - Wind Tutorial
Take this Navy NRL TRMM Tropical Cyclone Wind tutorial to see wind fields around tropical storms and hurricanes.

Weather Modification and Cloud Seeding Fact Sheet

Find out the latest "state of the science" from UCAR.
Chapter 6

Beaufort Scale
http://ggweather.com/101/beaufort.htm
Estimate the wind speed on land or water using the Beaufort Scale.

Contour Analysis
http://itg1.meteor.wisc.edu/wxwise/contour/
Learn how weather maps represent data through a series of contouring exercises.

Coriolis Force and Noninertial Effects
http://www.physics.orst.edu/~mcintyre/coriolis/
Try a number of different animations to illustrate motion induced by the Coriolis Force.

Geostationary Satellite Server
http://www.goes.noaa.gov/WINDS/index.html
View high-density winds measured from satellites and plotted on satellite imagery.
Observe how the Coriolis effect influences wind direction.
http://www.classzone.com/books/earth_science/terc/content/visualizations/es1905/es1905page01.cfm?chapter_no=visualization
Explore the changes of wind direction due to the Coriolis Force.

Snow Roller Event
http://www.crh.noaa.gov/ilx/events/roller/roller.php
Find out how the fascinating phenomena known as snow rollers form.

Weather Maps
http://ww2010.atmos.uiuc.edu/(Gh)/guides/maps/home.rxml
Explore the basics of surface and upper air weather maps.

Wind Profiler Data
http://www.esrl.noaa.gov/psd/data/obs/
See PSD profiler winds from dozens of sites plotted on Google Earth.

Wind, Swell and Rouge Waves
http://www.srh.noaa.gov/jetstream//ocean/waves.htm
View this excellent NWS tutorial about "rogue" waves.

World: Maximum Surface Wind Gust
http://wmo.asu.edu/world-maximum-surface-wind-gust
Check out the new world record wind gust of 253 mph!
Chapter 7

ADD Turbulence

http://aviationweather.gov/adds/turbulence/

Check the latest aircraft turbulence maps and warning across the United States.

Average Global Wind Speed


See a global representation of average wind speeds across the world.

El Niño Southern Oscillation


Learn about El Niño and La Nino plus their impacts worldwide.

Evaluation of global wind power


Browse this up-to-date study of global wind energy potential.

Global Circulation

http://www.atmosphere.mpg.de/enid/3sj.html

Study this 3-D representation of the global circulation model.

Modeling Date: ENSO Impacts

http://www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml

Track past and present El Niño and La Nina events using the Oceanic Nino Index.

North American Winter Wind

http://www.cpc.noaa.gov/products/analysis_monitoring/ensocycle/nawinter.shtml

Compare the winter jet stream during El Niño or La Nina.

Seasonal ENSO Impacts


See the impact of El Niño on the temperature and precipitation of individual states.

The Pacific Decadal Oscillation (PDO)

http://jisao.washington.edu/pdo/

Take an in-depth look at the Pacific Decadal Oscillation and its impact on global weather.

The Santa Ana Winds

http://www.atmos.ucla.edu/~fovell/ASother/mm5/SantaAna/winds.html

Study this detailed UCLA analysis of Santa Ana winds in Southern California.
Chapter 8

Air masses and Fronts
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/af/home.rxml

Explore this online UIUC tutorial about the basic types of air masses.

Cyclogenesis - The Development of Mid Latitude Cyclones
http://msx4.pha.jhu.edu/ssip/asat_int/cyclogen.html

Discover the processes of cyclogenesis in the middle latitudes.

Ice Storm Hits the United States
http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=36886

View the impact of a historic ice storm across the upper Midwest in 2009.

Lake Effect Snow
http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=17770

Observe high-resolution satellite imagery and explanation from NASA.

Lake Effect Snow
http://www-das.uwyo.edu/~geerts/cwx/notes/chap10/lake_effect_snow.html

Read this in-depth look at what causes and the impacts of lake effect snow.

Nor' Easters
http://www.noaa.gov/features/03_protecting/noreasters.html

Study the impact of Nor'easters on New England.

Oregon Windstorms
http://www.wrh.noaa.gov/pqr/paststorms/wind.php

Explore a variety of severe Oregon storms, including the Columbus Day Storm of 1962.

Superstorm 1993
http://ww2010.atmos.uiuc.edu/(Gh)/arch/cases/930312/home.rxml

Take a detailed look at the infamous March 1993 "Storm of the Century".

The Perfect Storm 1991
http://www.ncdc.noaa.gov/oa/satellite/satelliteseye/cyclones/pfctstorm91/pfctstorm.html

Check out this scientific look at the "Perfect Storm."

Winter Storms
http://www.nesec.org/hazards/winter_storms.cfm.html

Rank storms in the Northeast US with the NESIS, the NE Snowstorm Impact Scale.

Winter storm - Deceptive Killers
http://www.nws.noaa.gov/os/brochures.shtml#winter

Check out winter storm information and safety tips for you and your family.
Chapter 9

AWS - International Satellite Imagery
http://aviationweather.gov/obs/sat/intl/
View mosaics of satellite imagery from around the globe.

Climate Prediction Center
http://www.cpc.ncep.noaa.gov/
See the latest weekly, monthly and seasonal forecasts plus expert assessments from these forecasts.

HPC Quantitative Precipitation Forecasts
http://www.hpc.ncep.noaa.gov/qpf/qpf2.shtml
See the latest forecast rainfall amounts from the Hydrologic Prediction Center.

Interpreting Weather-Satellite Images
http://funnel.sfsu.edu/satlab/
Walk through this online tutorial of basic satellite imagery interpretation from SFSU.

MODIS Rapid Response System Gallery
http://rapidfire.sci.gsfc.nasa.gov/gallery/
Zoom in on the very latest high-resolution satellite image that is updated daily.

NASA Earth Observatory
http://earthobservatory.nasa.gov/
Get the latest satellite imagery from NASA with in-depth explanation and an extensive archive.

NCEP Ensemble Products
http://www.emc.ncep.noaa.gov/gmb/ens/
View explanations plus operational ensemble model forecasts.

NCEP Loops page
http://ggweather.com/loops/ncep_loops.htm
Check out a wide variety of weather forecasts models from NCEP.

NWS/SPC Watch, Warning, Advisory Display
http://www.spc.noaa.gov/products/wwa/
View a graphical Display of all NWS Watches, Warnings and Advisories.

National Centers for Environmental Prediction
http://www.srh.noaa.gov/srh/jetstream/nws/ncep.htm
Follow links to all nine of the National Center for Environmental Prediction national centers.

National Environment Satellite
http://www.ssd.noaa.gov/
Find the latest satellite imagery and remote sensing data from the NOAA.

Project Datasreme
http://www.ametsoc.org/amsedu/dstreme/index.html
View real-time weather maps and charts used as part of the AMS Datasreme project.

SSEC - Images and Data
http://www.ssec.wisc.edu/data/
Explore the vast resources of satellite imagery and related data from the University of Wisconsin.

Weather Forecasting Online Guide
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/fcst/home.xml

Take this online tutorial that shows the various elements used in making a weather forecast.
Chapter 10

About Derechos
http://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm#bowecho
Check out everything you ever wanted to know about derechos.

About Thunderstorms
http://www.nssl.noaa.gov/research/thunderstorms/
Read the Severe Storms Lab's comprehensive FAQ about thunderstorms.

About Tornadoes
http://www.nssl.noaa.gov/research/tornadoes/
Find out about the basics of tornadoes in this FAQ from NSSL.

Center for Analysis and Prediction of Storms
http://www.caps.ou.edu/
Learn about the Oklahoma University Center for Analysis and Prediction of Storms (CAPS)

Components of Thunderstorms
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/svr/comp/home.rxml
Examine the components of thunderstorm development.

Enhanced Fujita Scale
http://www.spc.noaa.gov/efscale/
Learn about how tornadoes are ranked with the Enhanced Fujita Scale.

Flash Floods and Hail
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/svr/dngr/flood.rxml
View the variety of dangers from thunderstorms.

Lightning FAQ
http://www.nssl.noaa.gov/faq/faq_ltg.php
Browse this in-depth lightning FAQ produced by the National Severe Storms Lab.

May 1999 Tornado Outbreak
View this analysis of one of the deadliest tornado outbreaks in recent history

Microburst Handbook
Take an in-depth look at microbursts and downdrafts at this web version of the NOAA handbook.

National Severe Storms Laboratory
http://www.nssl.noaa.gov/
Check out the National Severe Storms Laboratory and the products they issue.

Severe and Hazardous Meteorology
http://severewx.atmos.uiuc.edu/index.17.html
View the elements of thunderstorms as a part of high impact meteorology.

Squall-Line/Bow echoes
http://www.crh.noaa.gov/lmk/soo/docu/bowecho.php
Study the structure and development of squall lines and bow echoes.

Storm Prediction Center Product & Report Archives
Check out the Storm Prediction Center archive of past thunderstorms

Monitor the latest activities of storm chasers looking for tornadoes.

Discover the dynamics of supercell thunderstorms.

Learn the basics about thunderstorms and storm spotting.

Browse information about tornadoes, storm chasing and oddities.

Peruse the NCDC database of tornado climatology.

Chase tornadoes with the latest and largest tornado research project.
Chapter 11
FAQ: Hurricanes, Typhoons, Tropical Cyclones
http://www.aoml.noaa.gov/hrd/weather_sub/faq.html
Read the official NOAA FAQ about tropical storms and hurricanes.
Glossary of NHC Terms
http://www.nhc.noaa.gov/aboutgloss.shtml
Browse the National Hurricane Center's Glossary of tropical storm terminology.
Hurricane Katrina
http://www.ncdc.noaa.gov/special-reports/katrina.html
Read this in-depth analysis of the meteorology and impact of Hurricane Katrina in 2005.
NAVY NRL Tropical Cyclone Page
Keep track of tropical cyclones worldwide with satellite imagery and storm tracks.
National Hurricane Center
http://www.nhc.noaa.gov/
Monitor the latest hurricane and tropical storm positions and forecasts.
Saffir-Simpson Hurricane Wind Scale
http://www.nhc.noaa.gov/sshws.shtml
Evaluate hurricanes, typhoons and tropical storms using the Saffir-Simpson Scale.
Tropical Meteorology Project
http://typhoon.atmos.colostate.edu/forecasts/
Check out the latest seasonal forecasts for the number of hurricanes and tropical storms in both the Atlantic and Pacific.
Worldwide Tropical Cyclone Names
http://www.nhc.noaa.gov/aboutnames.shtml
Look through the lists of names used for naming tropical storms.
Chapter 12

Camelot Climate Index
http://ggweather.com/camelot.htm

Do you live in the ideal climate?

Climates of the World

View these climate summaries for over 1000 locations worldwide.

Global Climate Maps

See how many climate parameters are visualized.

National Climatic Data Center
http://lwf.ncdc.noaa.gov/oa/ncdc.html

Explore the climate archives for not only the United States but also the world.

State of the Climate
http://www.ncdc.noaa.gov/sotc/

Monitor real-time information about world-wide climate trends.

US Drought Monitor
http://droughtmonitor.unl.edu/

Monitor the latest nationwide drought conditions.

World Climate Index
http://www.climate-charts.com/world-index.html

Check out over 4000 climate charts and tables for locations around the world.
Chapter 13

AMS Information Statement on Climate Change
Read this concise analysis of climate change from the American Meteorological Society.

Bad Greenhouse
http://www.ems.psu.edu/~fraser/Bad/BadGreenhouse.html
Look at why some explanations of the greenhouse effect are full of hot air.

Climate Change - US EPA
http://www.epa.gov/climatechange/
Read through this expansive array of climate change information from the EPA.

Climate Watch Magazine
http://www.climate.gov/#climateWatch
Follow the latest events related to climate change plus the Climate Change Dashboard.

Intergovernmental Panel on Climate Change
http://www.ipcc.ch/
See the official reports from and news about the Intergovernmental Panel on Climate Change

National Climate Data Center
http://lwf.ncdc.noaa.gov/oa/ncdc.html
Browse the archives of past weather observations, maps, imagery and forecasts.

Paleoclimatology
http://earthobservatory.nasa.gov/Features/Paleoclimatology_Evidence/paleoclimatology_evidence_2.php
Explore the concept of rapid climate change using paleoclimatology.

The Ice Ages
http://earthguide.ucsd.edu/virtualmuseum/climatechange2/01_1.shtml
Look at the impact of Ice Ages on climate change through history.

Understanding Climate
http://www.climate.gov/#understandingClimate
Read in-depth explainers about climate and climate change from the US Climate Service.

Volcanoes - Climate Change
http://earthobservatory.nasa.gov/Features/Volcano/
See how volcanic eruptions can influence climate in both the long and short term.
AQI - Air Quality Index
http://www.airnow.gov/index.cfm?action=aqibasics.aqi
Monitor the latest real-time air quality data and Air Quality Index.

Acid Rain Program
http://www.epa.gov/airmarkets/progsregs/arp/index.html
Find out in-depth information about acid rain in this backgrounder article.

Air Trends
http://www.epa.gov/airtrends/sixpoll.html
Track the long-term changes in a variety of atmospheric pollutants.

AirNow
http://airnow.gov/
Track ozone in real-time and its impact on the Air Quality Index (AQI).

Clean Air Act
http://www.epa.gov/air/CAA/
Read the details and background of the US EPA Clean Air Act.

Ozone Hole Education Resources
http://ozonewatch.gsfc.nasa.gov/education/index.html
This NASA site is an in-depth look at the causes of the ozone as well as its past, present and future.

The Killer Fog of '52
Listen and view this in-depth look at London's "Killer Fog" of 1952.
Chapter 15

An Introduction to Green Flashes
http://mintaka.sdsu.edu/GF/index.html
Solve some of the mysteries of this elusive phenomenon.

Atmospheric Optical Photography
Gaze through this collection of beautiful optical effects.

Atmospheric Optics
http://www.atoptics.co.uk/
Check out the preeminent site on the web related to atmospheric optical phenomena.

Atmospheric Optics Concepts
http://hyperphysics.phy-astr.gsu.edu/hbase/atmos/atmoscon.html#c1
Follow this concept map to the various branches of atmospheric optical phenomena.

Aurora FAQ
http://odin.gi.alaska.edu/FAQ/#color
Peruse this extensive FAQ about the Northern Lights.

Geophysical Institute Aurora Forecast
http://www.gedds.alaska.edu/auroraforecast/
Monitor the latest effects of the solar wind in creating the Aurora Borealis and Aurora Australis.

Light and Optics
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/opt/home.rxml
Learn the basics of light and optics in the atmosphere with this UIUC tutorial.