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GG 140 - The Atmosphere, the Ocean and Environmental Change with Professor Ronald B. Smith

Lecture 10 – Water in the Atmosphere II

Clouds slide deck

1. Satellite image of Earth. Image credit: Hasler, Chesters & Jentoft-Nilsen NASA Goddard Lab for Atmospheres & Nielsen University of Hawaii September 3, 1994. <http://goes.gsfc.nasa.gov/pub/goes/goes8.full.green.earth.jpeg> (Accessed Oct. 16, 2011)
3. Vapor pressure. Image credit: CalTech. <http://www.its.caltech.edu/~atomic/snowcrystals/ice/Vapor2.gif> (Accessed Oct. 16, 2011)
5. Sea Smoke. Image credit: Luanne Rice. <http://luannerice.net/2010/12/look-up/> (Accessed Oct. 16, 2011)
6. Contrails. Image credit: Steve Andrews. <http://www.consciousape.com/news/chemtrails-and-why-i-now-call-them-contrails-by-steve-andrews/> (Accessed Oct. 16, 2011)
7. Contrails. Image credit: Magnus Rosendahl. <http://www.public-domain-photos.com/vehicles/airplane-condensation-trail-3.htm> (Accessed Oct. 16, 2011)
8. Contrails and Cirrus Clouds. Image credit: Ed Donovan. <http://science-edu.larc.nasa.gov/SCOOL/contrail.html> (Accessed Oct. 16, 2011)
9. Water vapor from a cooling tower. Image credit: FreedomPoster. <http://www.freerepublic.com/focus/f-news/1927437/posts> (Accessed Oct. 16, 2011)
10. Water vapor consensing from breath. Image credit: J. Dana Hrubes. <http://www.polarwinter.com/2001/march.html>. (Accessed Oct. 16, 2011)
11. Radiation Fog. Image credit: Keith C. Heidorn, PhD. <http://www.islandnet.com/~see/weather/almanac/arc2002/alm02sep.htm> (Accessed Oct. 16, 2011)

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12. Radiation Fog. Image credit: Waypoints. http://randyswaypoints.blogspot.com/2010_09_01_archive.html (Accessed Oct. 16, 2011)
13. Advection Fog. Image credit: Keith C. Heidorn, PhD. <http://www.islandnet.com/~see/weather/almanac/arc2002/alm02sep.htm> (Accessed Oct. 16, 2011)
14. Advection Fog. Image credit: Keith C. Heidorn, PhD. <http://www.islandnet.com/~see/weather/almanac/arc2002/alm02sep.htm> (Accessed Oct. 16, 2011)
15. Advection Fog. Image credit: UC Berkeley Geo-Images Project. <http://geoimages.berkeley.edu/GeoImages/Johnson/WXPages/FogHMBay.html> (Accessed Oct. 16, 2011)
17. Cumulus Clouds. Image credit: First/Corbis http://www.corbisimages.com/?s_kwcid=corbis&gclid=CIj3rcTXlaoCFYaD5QodGgfCzw (Accessed Oct. 16, 2011)
20. Mackerel Sky. Image credit: weatherreport.com. <http://www.weatherreport.com/Local-weather-forecasts-Cloud-Reading.asp?printerFriendly=1&> (Accessed Oct. 16, 2011)
21. Atlantic Mackerel. Image credit: Westport River Marine Estuary http://web.bryant.edu/~langlois/coastalproject/westportproject_files/Wesport/inhabitants.htm (Accessed Oct. 16, 2011)
22. Cirro-stratus clouds. Image credit: St. Albert Protestant Schools. <http://mmem.spschools.org/grade5science/weather/cirrostratus.html> (Accessed Oct. 16, 2011)
23. Cumulus Congestus Clouds. Image credit: Roland Michael Laner. http://it.wikipedia.org/wiki/File:Cumulus_congestus-east_horizon.1996.jpg (Accessed Oct. 16, 2011)
24. Cumulonimbus. Image credit: Googie Man. <http://en.wikipedia.org/wiki/File:CumulonimbusFlorida.jpg> (Accessed Oct. 16, 2011)
25. Cumulonimbus. Image credit: Sfortis. http://en.wikipedia.org/wiki/File:Cumulonimbus-incus_mykonos.jpg (Accessed Oct. 16, 2011)

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26. Mammatus. Image credit: Raymundo Aguirre. http://apod.nasa.gov/apod/image/0406/clouds_aguirre_big.jpg (Accessed Oct. 16, 2011)
27. Sierra Nevada lenticular cloud. Image credit: Ronald B. Smith
28. Lenticular cloud over Mt. Fuji. Image credit: Ellie Crystal. <http://www.crystalinks.com/lenticular.html> (Accessed Oct. 16, 2011)
29. "Pile of plates" lenticular. Image credit: Arco Images/Alamy. http://science.nationalgeographic.com/science/photos/clouds/#/lenticular-clouds_1307_600x450.jpg (Accessed Oct. 16, 2011)
30. Funnel Cloud. Image credit: NOAA Photo Library, NOAA Central Library; OAR/ERL/National Severe Storms Laboratory (NSSL). <http://www.photolib.noaa.gov/htmls/nssl0064.htm> (Accessed Oct. 16, 2011)
31. "Flap tip" vortices. Image credits: Jan-Olov Newborg. <http://www.fluids.eng.vt.edu/msc/gallery/vortex/flap.htm> (Accessed Oct. 16, 2011)
33. Supersonic flight. Image credits: NASA. http://apod.nasa.gov/apod/image/0708/sonicboomplane_navy_big.jpg (Accessed Oct. 16, 2011)
34. Supersonic flight. Image credit: Steve Skinner /National Geographic Stock. <http://www.nationalgeographicstock.com/ngsimages/welcome.jsf> (Accessed Oct. 16, 2011)
36. Haze: Mountains in the distance. Image credit: Ron Smith
37. Ucayali Cloud Streets (Landsat). Image credit: USGS Landsat. <http://landsat.usgs.gov/> (Accessed Oct. 16, 2011)
38. "Comma clouds" from space. Image credit: SeaWiFS Project, NASA/Goddard Space Flight Center, and Orbimage. <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=11447> (Accessed Oct. 16, 2011)
39. Cumulonimbus anvil. Image credit: NOAA. <http://www.noaa.gov/> (Accessed Oct. 16, 2011)

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40. Hurricane shield. Image credit: NOAA. <http://www.noaa.gov/> (Accessed Oct. 16, 2011)

43. Riming on airplane wing. Image credit: Purdue University.

<http://www2.tech.purdue.edu/at/courses/aeml/airframeimages/wing%20ice%20alb.JPG> (Accessed Oct. 16, 2011)

44. Riming on ship. Image credit: 2.bp.blogspot. <http://2.bp.blogspot.com/->

[O_RTODrpu5o/ThS1ZPUZ93I/AAAAAAAAAgw/HTpAq7HFfw0/s1600/a200010h.jpeg](http://2.bp.blogspot.com/-O_RTODrpu5o/ThS1ZPUZ93I/AAAAAAAAAgw/HTpAq7HFfw0/s1600/a200010h.jpeg) (Accessed Oct. 16, 2011)

45. Glaciation of a thin alto-cumulus layer. Image credit: H. Raab. <http://en.wikipedia.org/wiki/File:HolePunchCloud.jpg>. (Accessed Oct. 16, 2011)