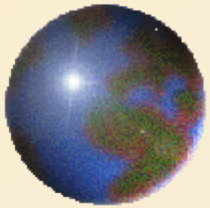
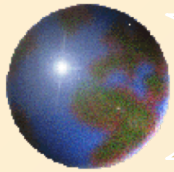


Introduction to Climatology

GEOG/ENST 2331:

Discussion and Lecture 1
(September 5, 10)



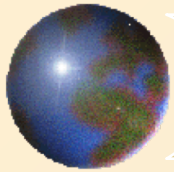
Us

- Graham Saunders
  graham.saunders@lakeheadu.ca

- Jason Freeburn (RC 2004)
  jtfreebu@lakeheadu.ca

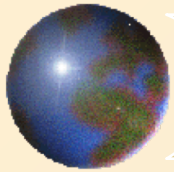
Graham Saunders

- Australian Weather Bureau
- Environment Canada
- Ministry of Natural Resources
- M.Sc. in Forestry and Climatology
- Teaching at LU since 1995
  - Climate Change Research – boreal forest
  - Severe Weather adaptation
  - Pricing carbon
- Decades of writing about weather, climate and related policy issues.



Course Objectives

- Understand the physics that drive weather systems
- Examine the features that create climatic patterns at small (micro) and large (macro) scales
- Consider the impacts that climate and weather have on human systems – and vice versa!



Course structure

- Lectures
  - Slides will be posted on our course site
  - Class lectures will have “value added”
- Labs
  - Lab Manual
  - Jason
- Attendance?
- Bulletin board, class emails, email response
- Field trip: Weather Station

Explore Your Resources

- **Text:**
  - Ahrens, Jackson and Jackson, 2016. *Meteorology Today, 2nd Canadian Edition* (Toronto: Nelson Education Ltd.).
- **Manual:**
  - Cornwell, Freeburn, and Saunders 2019. *Climatology Manual* (Thunder Bay: Lakehead University, Department of Geography).

Schedule and Mark Allocation

Lab 0		**0**
Lab 1		5
Lab 2		5
Lab 3		5
Lab 4		5
Midterm	October 10	20
Lab 5 – Lab Quiz		7
Lab 6		5
Lab 7 – Group Project*		8

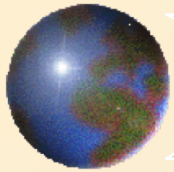
First Half of the Course

I. AIR

- Composition and Structure of the Atmosphere.
- Solar Radiation and the Seasons
- Energy Balance and Temperature
- Atmospheric Pressure and Wind

II. WATER IN THE ATMOSPHERE

- Atmospheric Moisture
- Cloud Development and Precipitation Processes



Second Half of the Course

III. DISTRIBUTION AND CIRCULATION

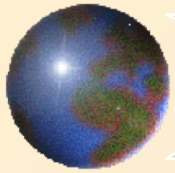
- Atmospheric Circulation and Pressure Distributions
- Air Masses and Fronts

IV. DISTURBANCES and SEVERE WEATHER

- Mid-Latitude Cyclones
- Lightning, Thunder, and Tornadoes
- Tropical Storms and Hurricanes

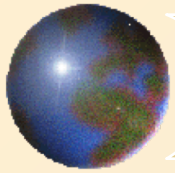
V. CLIMATE CHANGE AND VARIABILITY

- Global Climate Classifications
- Global Climate Change



Let's talk about past results in this class

- Class average: from 62 to 68%
  - Bimodal, not a bell curve
  - Labs 40%
- Slides, topics of interest, etc. will be posted on our course site. You have the text.
- Why come to class?



Let's talk about how we conduct Lectures

- Lectures
  - Slides, topics of interest, etc. will be posted on our course site. You have the text.
  - Is education merely the transfer of information?
- Eric Mazur: "Education should not be a spectator sport" https://uwaterloo.ca/magazine/fall-2018/heard-campus/education-should-not-be-spectator-sport
- Review slides and theme/question

Climate

- *A description of the weather in some location over a long period of time*
  - Averages, variabilities, and extremes
  - Typically at least 30 years of data are used

Thunder Bay climate: September

- Average $T_{max:}$ 17.3 ° C
- Average T_{min}: 5.1° C
- T mean 10.9° C: 1970s
- T mean 12.8° C: 2010s

- Average rain: 2.5 mm
- Days with precipitation: 13 (of 30)

Extremes

- T_{max} 34.0° C (Sept 11, 2005)
- T_{min}: -8.3° C (Sept 29, 1945)

- Max snow depth: 9.2 cm (1977)

Weather vs. Climate

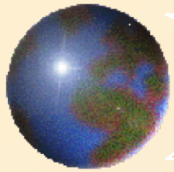
Weather is the condition of the atmosphere at any particular time and place.

Climate is "averaged weather", the long term averages of weather events (typically 30 years or more). It includes the compilation of weather statistics such as central tendencies, variability, and extremes.

Meteorology

- The science dealing with phenomena of the atmosphere; especially weather processes and weather forecasting

- 350 BCE: the text *Meteorology* was written by Aristotle



Climatology

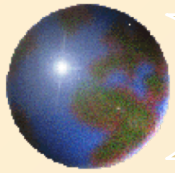
- The science of climate, phenomena and causes

Climate Change Impacts and Adaptation in the Lake Superior Basin: Insights and Perspectives from the North Shore of Superior

Monday September 23, 2019
Lakehead University, Thunder Bay, Canada
Sponsored by the International Joint Commission

AGENDA

8:30-09:00am ATAC 1003	Welcome from the International Joint Commission
9:00am -10:00am ATAC 1003	Keynote Address: ***'A History of Warming in Lake Superior'*** Jay Austin, Professor, Large Lakes Observatory, Univ. of Minn. Duluth



Next Lecture

- Composition and structure of the atmosphere
- Ahrens: Chapter 1