GPH100: Weather & Climate Lab **Quiz Two Study Aid** **Prof. Brian Cacchiotti**

Lab 5: Atmospheric Moisture

- 3 states of matter and the 6 changes of state
- Water vapor = water as a gas
- Humidity:
  - Absolute humidity
  - Relative humidity = Actual / Capacity (Capacity is related to temperature)
  - Dew point = temp where saturation is reached
- Saturation = 100% relative humidity
- Warmer the air, the high the capacity to hold water vapor
- As air rises, it cools, it can hold less water vapor, reaching saturation, then condensation takes place
- Condensation is NOT precipitation!
- Condensation in the atmosphere = Cloud development

Film: *Before the Flood* or *An Inconvenient Truth* / Boston Globe Articles

- The film presents several compelling investigations into the scientific analyses which may convince the viewer that the earth is undergoing a profound change.
  - Melting glaciers, melting ice caps, melting ice shelves, long term temperature records, sea level change, coral reef changes, forest loss, burning of the rainforest, fracking and more.
- It also presents information from the scientific community (government and scholarly researchers) and from the climate skeptics (politicians, policy officials and a very few scientists)
- I may pose one or two questions based on the film's ideas and content. You will be expected to provide examples from the film or articles to support your answers.

Lab LA1: Introduction to Isoline mapping

- Isolines = Iso (same) + line (line) = all points on a line have an equal value
- Isotherms = lines of equal temperature
- Isobars = lines of equal barometric pressure
- Drawing isolines (RULES)
  - They do not cross
  - Draw at fixed intervals (10°, 20°, 30°, 40°, etc.)
  - All values on one side will be HIGHER and on the other will be LOWER (except in unusual cases)
  - Lines only where the exact value exists (a 40° line does not go over a 42° value)
- Weather maps often display isotherms
  - In North America, temperatures tend to be higher in the south and west, and lower in the north
- Know how to plot isotherms on a map given station information

Lab 10: Experimental Lab: Air Masses and Fronts

- **Air masses**
  - Large body of air with similar characteristics of
    - Temperature
    - Humidity
  - Air masses form over **source regions**
    - Large uniform areas of the surface
    - Need to remain near stationary over these to obtain characteristics
  - Defined/Named
    - Humidity
      - m = Maritime = Ocean = Moist
      - c = Continental = Land = Dry
    - Temperature
      - A = Arctic = Very Cold
      - P = Polar = Cold
      - T = Tropical = Hot
      - E = Equatorial = Very Hot
  - Know the Air Masses that effect North America
    - cP, mP, cP, mT, cT
- **Fronts**
  - Where two air masses meet

- Types
  - Warm Front – Warm air overrunning Cold
  - Cold Front – Cold air overrunning Warm
  - Stationary Front – Air masses moving parallel
  - Occluded Front – Cold front overrunning warm front – lifts warm air
- Know the symbols for each type of front

Lab 10: Experimental Lab: Assessment

- **Give an honest and thorough assessment of the Warm and Cold Fronts Lab**
  - What worked, what didn't
  - What you would add to it
  - What would you change
  - What you learned
  - Overall satisfaction with the lab

Lab 14: Climate Classification

- Climate Classification based on Temperature and Precipitation patterns during a typical year
- Know how to use the Climate Classification 'decision tree'
- Know the BASICS of the 6 major Climate Classification types
  - A: Tropical Humid
  - B: Dry (deserts)
  - C: Temperate Humid (Hot summer, cool winter)
  - D: Temperate Humid (Warm summer, cold winter)
  - E: Polar (ice)
  - H: Highlands (altitude changes = fast climate transitions)
- Know (and be able to describe in temp/precip terms) the Climate Classification for Salem, MA

You may choose which questions to answer (4 of 7 for example), expect problems of a similar type as we have done in these labs. All formulae will be provided, no formulas need to be memorized, nor will you need to perform anything but the four basic math functions (addition, subtraction, multiplication and division). You should bring a calculator – cell phones may not be used. You will be allowed one sheet of 8-1/2 x 11 with any notes you choose to write on it. You may write on **one side only!**