

Name: _____ Section: _____ Date: _____

EXERCISE E: AIR MASSES, FRONTS AND STORMS

REFERENCE: Textbook: Geosystems: An Introduction to Physical Geography
Ch.8 Weather

PURPOSE: This lab exercise reviews air masses, fronts and weather. The key principles and processes for interpreting weather maps and for predicting weather systems (including severe weather) are reviewed. By the end of this lab, you should be able to interpret today's weather map and predict tomorrow's weather in Boulder!

KEY TERMS AND CONCEPTS:

*Hint: Be able to define and compare-contrast each of these terms for your exams!

air masses	polar front	stationary front
source regions	cold front	cyclones
front	warm front	tornadoes
aggressor air mass	occluded front	hurricanes

LINKS: Remember to check the links on-line; they may help!

Part I. Introduction

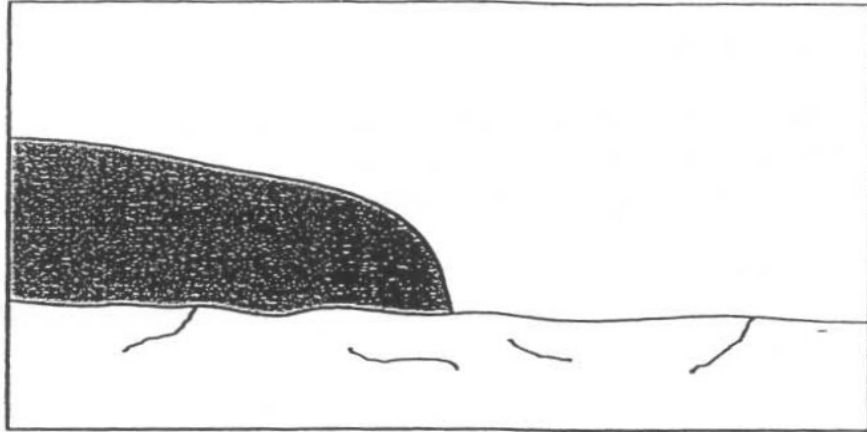
Five Basic Principles: (HINT: know these!)

1. Warm air rises and cold air sinks.
2. Characteristics of air masses with warm temperatures: low pressure, converging and ascending air, relatively high moisture
3. Characteristics of air masses with cold temperatures: high pressure, diverging and descending air, relatively low moisture
4. Air flows from high to low pressure
5. Coriolis deflects to the right in the northern hemisphere and to the left in the southern hemisphere.

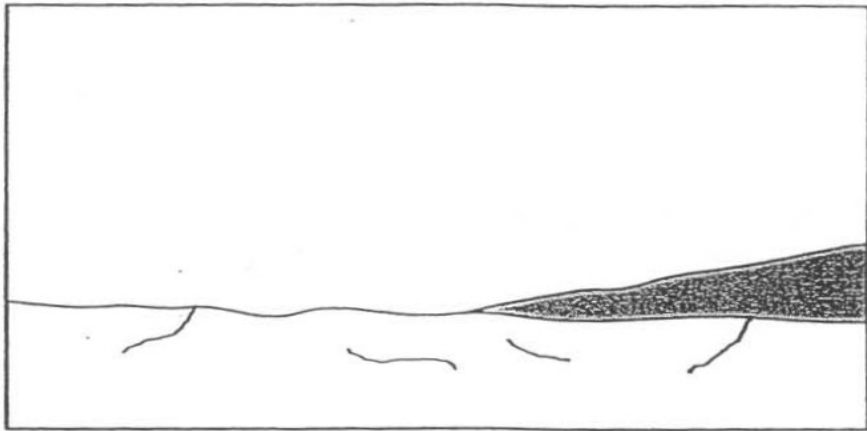
Air masses are large bodies of air that are relatively homogeneous with respect to temperature, density and water vapor content. They derive these properties from source regions but migrate and invade new regions becoming modified and coming in contact with other air masses. A front is the zone of contact between unlike air masses. The Polar Front is the zone of contact between cold, dry polar air and warm, moist tropical air. This front has a major influence on mid-latitude weather and migrates north and south with the seasons. Other fronts are named according to the "aggressor" air mass. They include cold fronts, warm fronts, occluded fronts and stationary fronts. Cloud formations, weather systems and storms are associated with the different types of fronts.

FRONTS

COLD FRONT



WARM FRONT



OCCLUDED FRONT

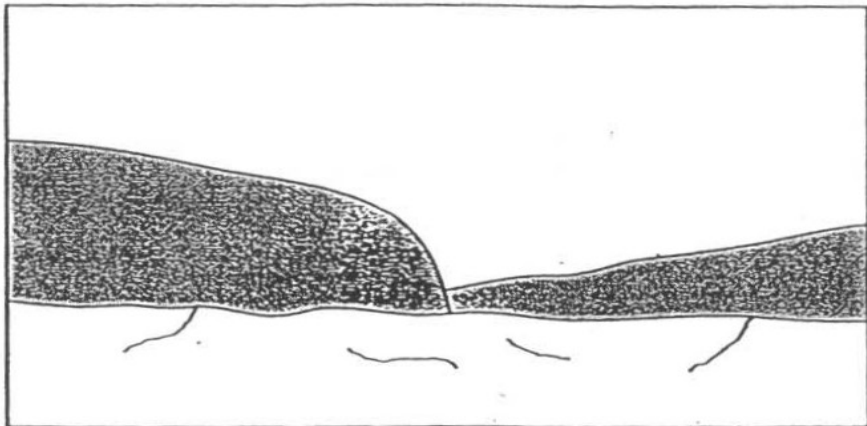
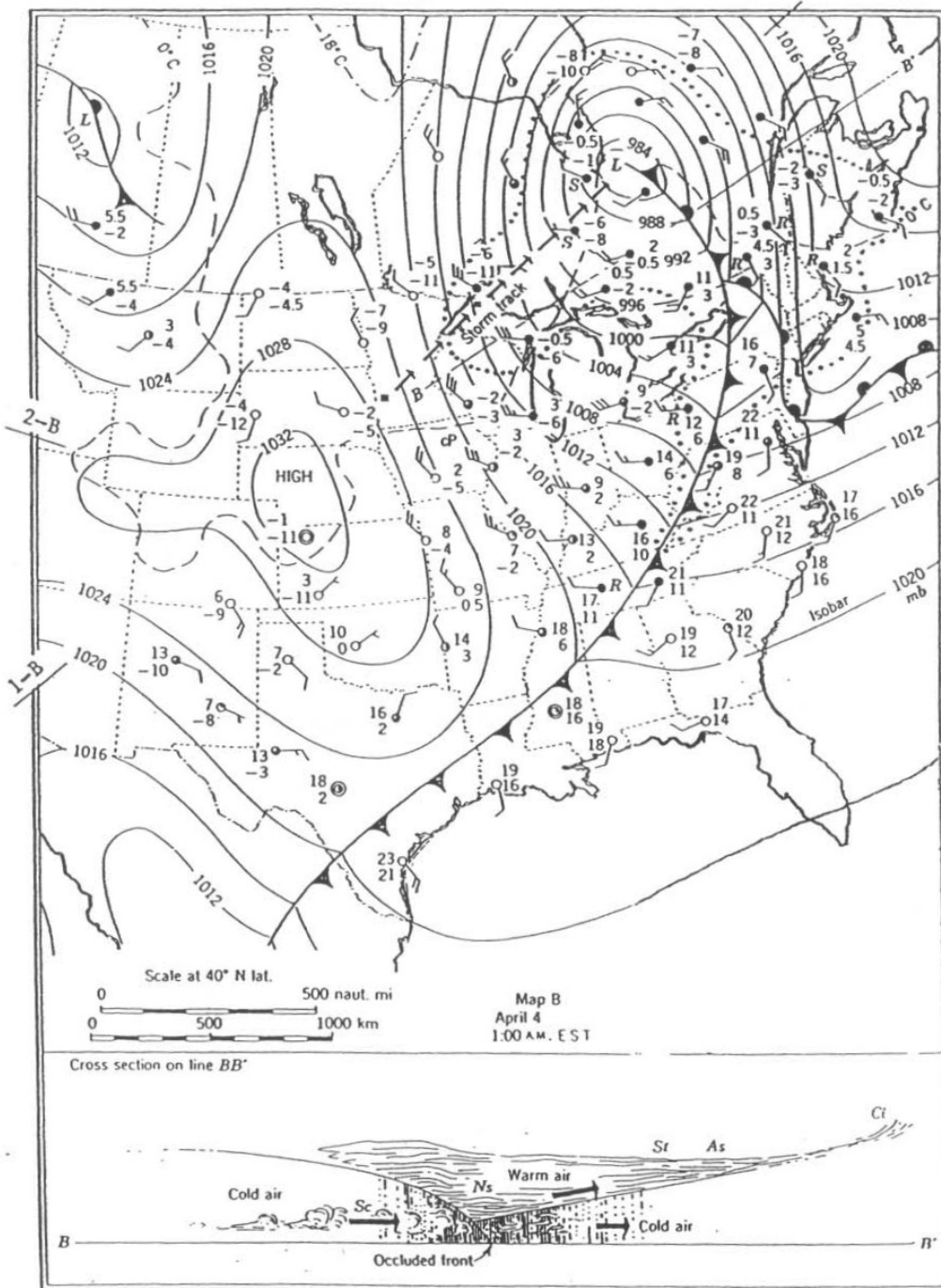


Figure 1

Weather Maps



Map 1

Excerpted from Strahler & Strahler, *Introducing Physical Geography*

Part IV. Storms

Short-answer questions (HINT: Answers can be found in your textbook):

1. Tornadoes, tropical cyclones and hurricanes all center on low/high pressure centers?
2. What type of front describes a “stalemate” between cooler and warmer air masses?
3. What two air masses tend to collide in the spring over North America, resulting in the time of strongest frontal activity?
4. During thunderstorms, violent updrafts and downdrafts result in what kind of clouds?
5. Intense tropical cyclones rarely develop at the equator. Rather, they tend to develop 10° to 20° north or south of the equator. Why?