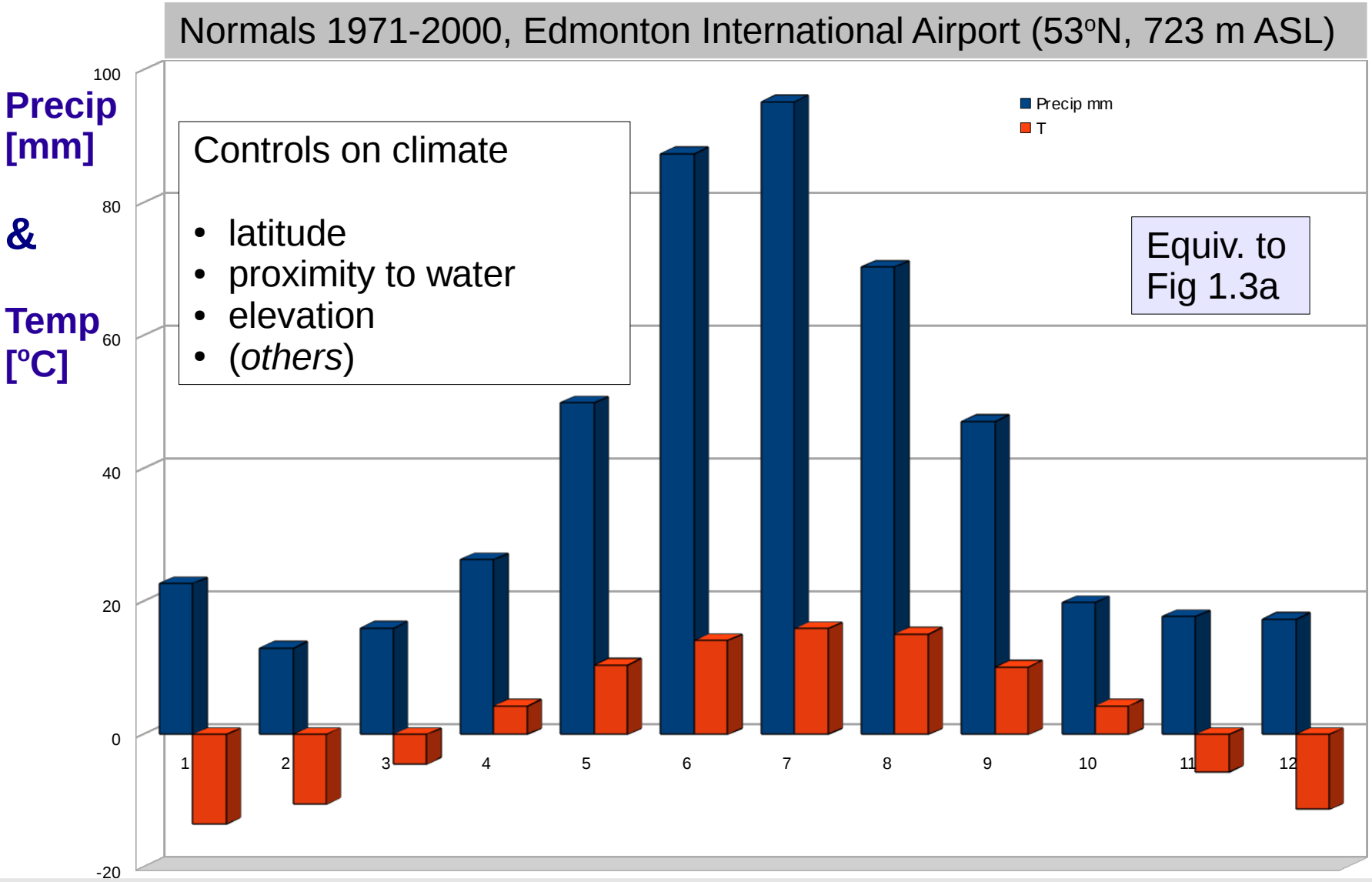
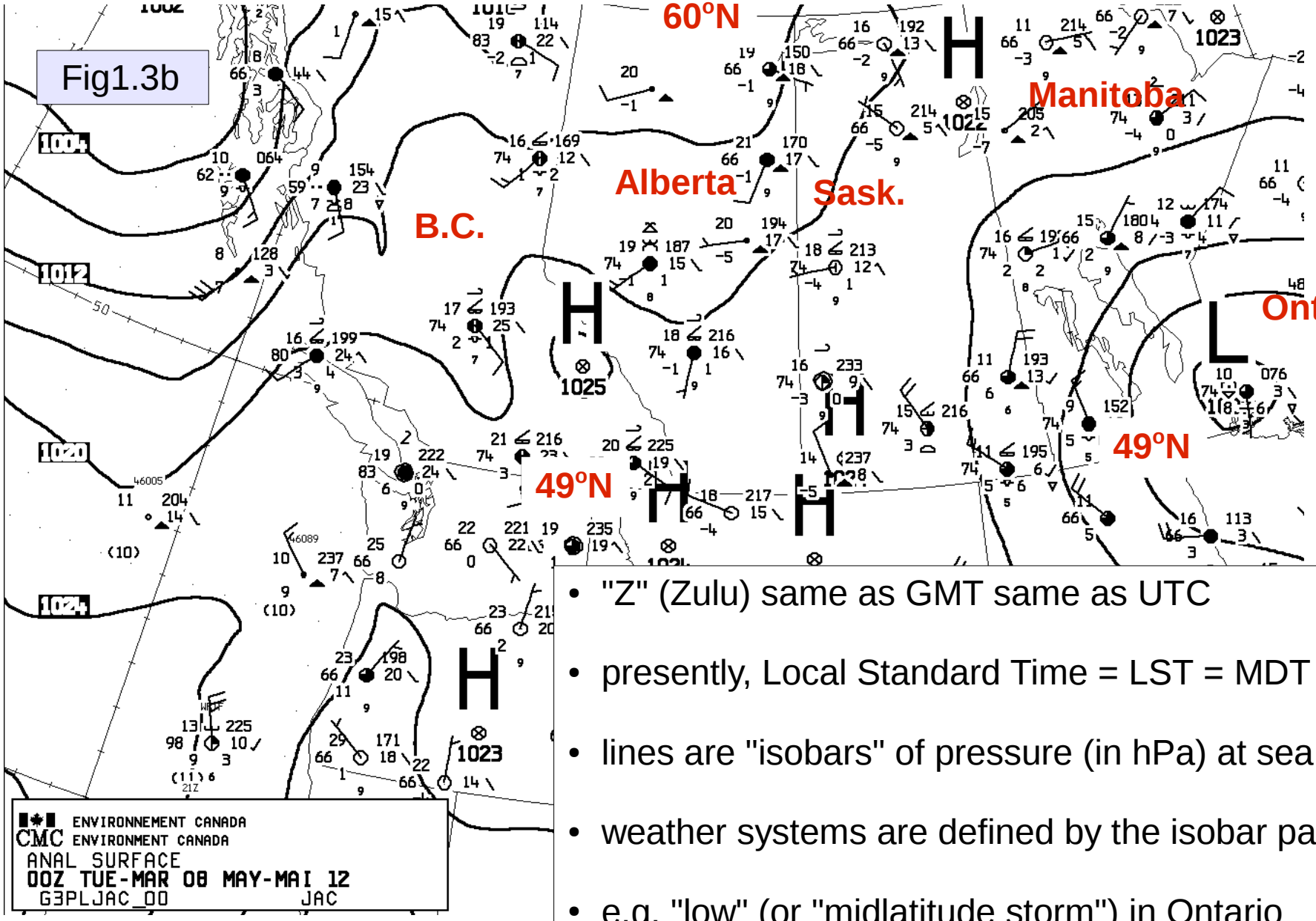
- **climate** "average weather" (Ross). Better definition: "all statistical properties of the climate system" (i.e. atmosphere-ocean-cryosphere)

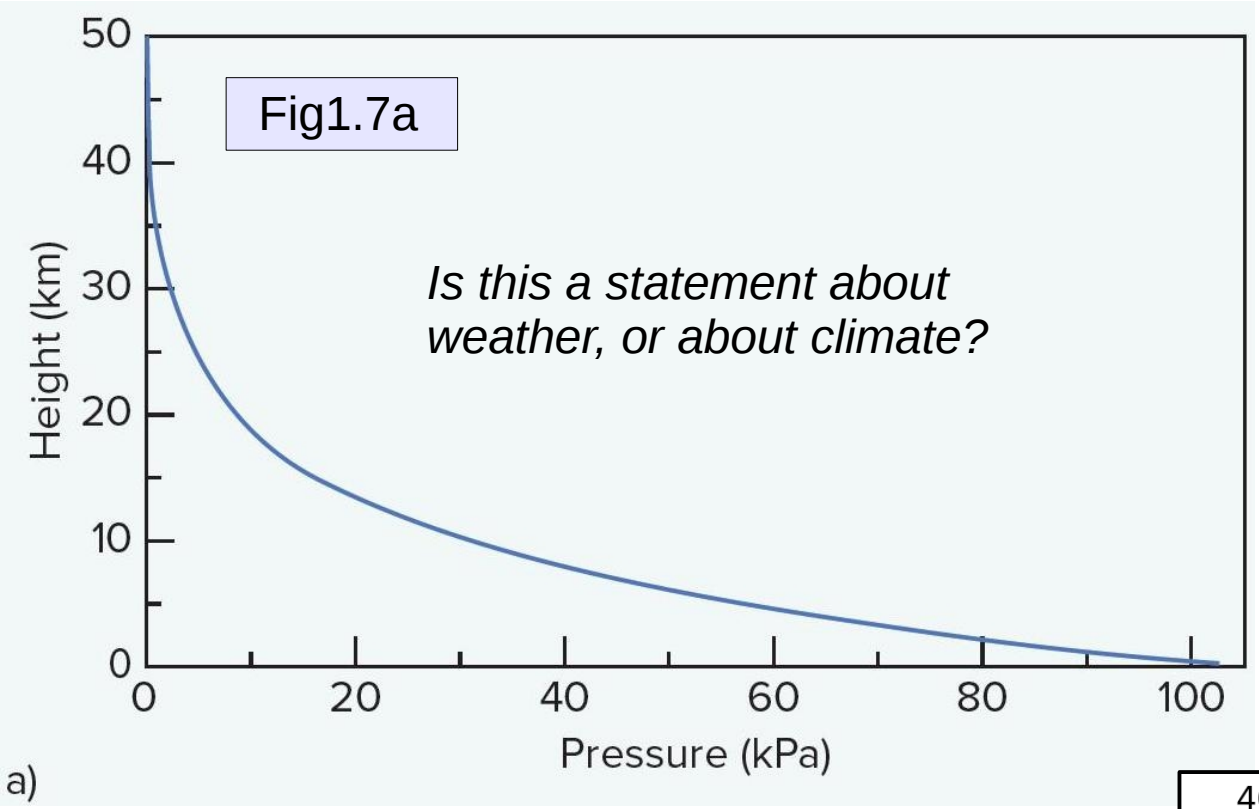
- must choose a sample duration to define "climate" (EC climate normals, based on 30 yr)



- **weather** "state of the atmos. at specific time & place" (or short term sequence of times)



- "Z" (Zulu) same as GMT same as UTC
- presently, Local Standard Time = LST = MDT = Z - 6
- lines are "isobars" of pressure (in hPa) at sea level
- weather systems are defined by the isobar pattern
- e.g. "low" (or "midlatitude storm") in Ontario



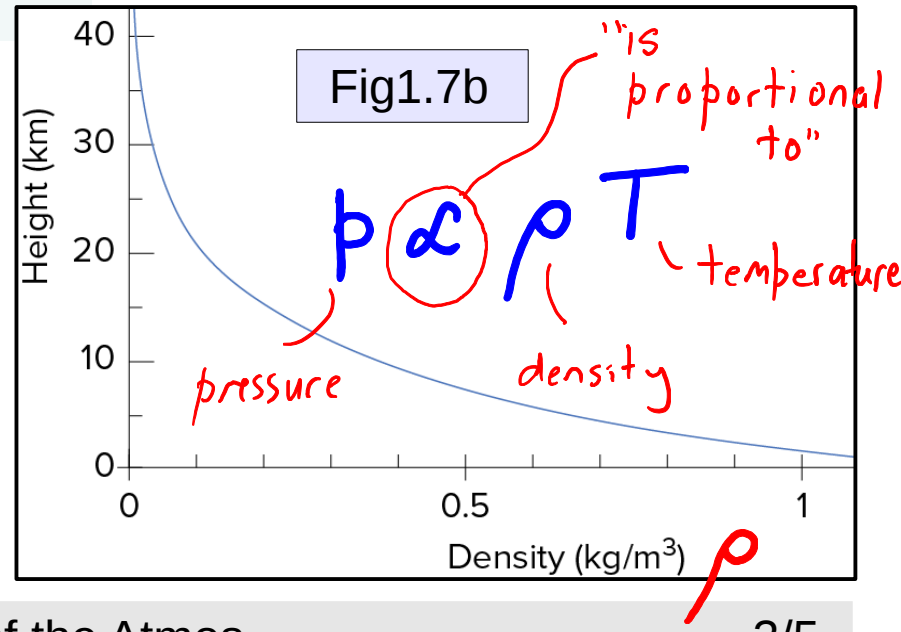
$$\frac{\Delta P}{\Delta z} = -\rho g \qquad \text{Eq. 3.9}$$

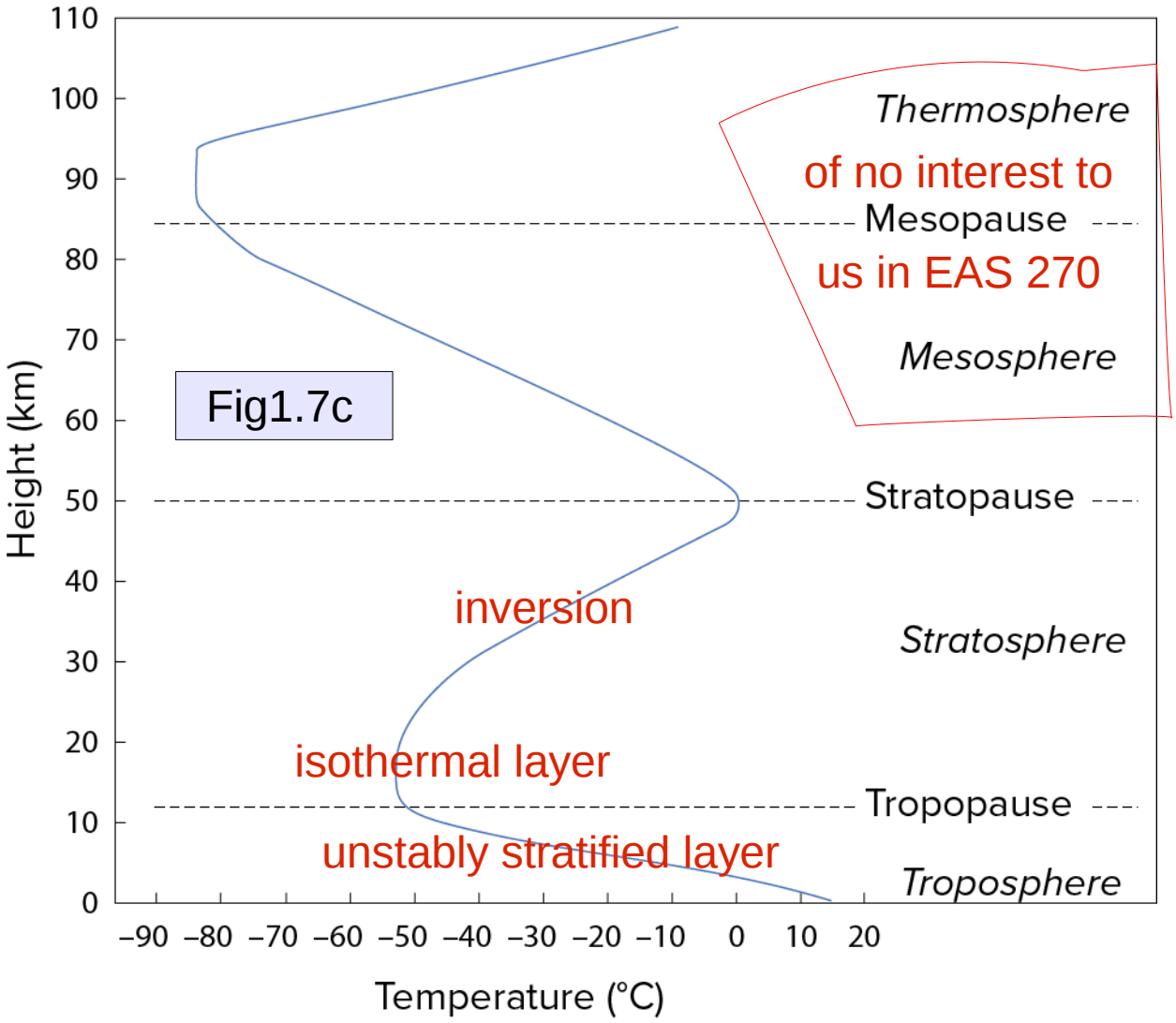
The hydrostatic law:

the change ΔP in pressure for an increase Δz in height equals (minus) air density x grav. acceleration

- pressure results from weight of overlying atmosphere, so decreases with incr. height *z* (in Ch 3 we learn the formula for this, Eq 3.9)

- half the atmos. mass lies below ~5.5 km where pressure *P* ~ 50 kPa (or 500 hPa)



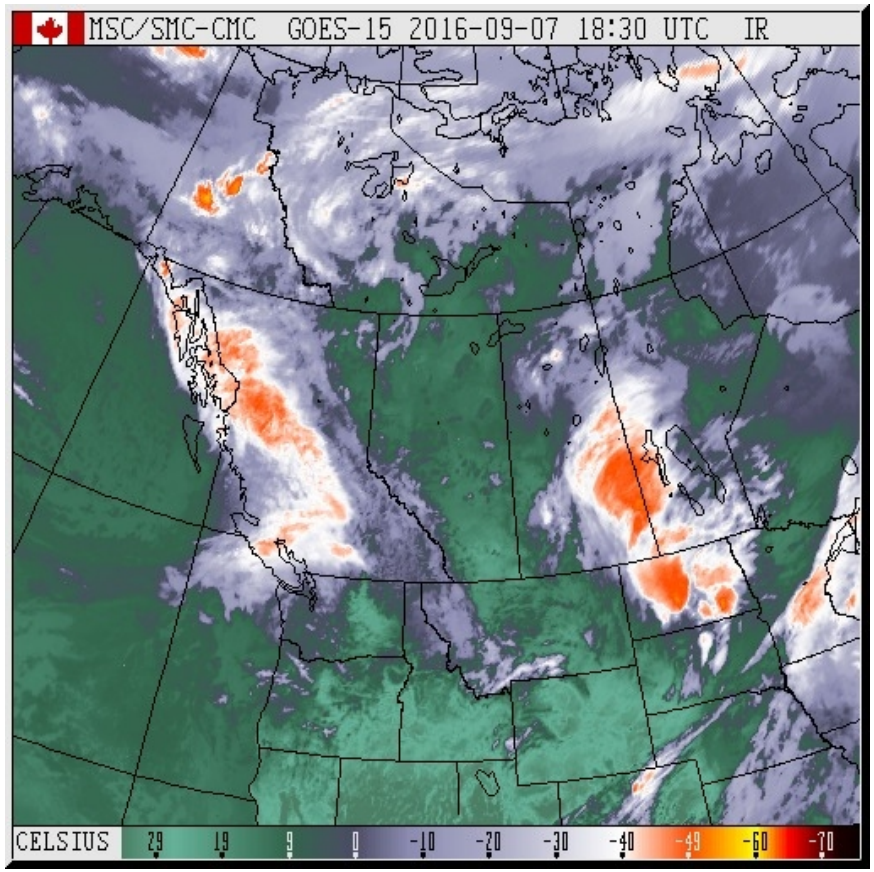


Controlling factors:

- vertical distribution of solar heating
- vertical distribution of ozone

Troposphere:

- layer that hosts "weather"
- depth varies seasonally, latitudinally and as weather varies
- well mixed in summer on a time scale of a day or so
- weaker mixing in winter
- subdivides into "free troposphere" and "boundary layer" (lowest 1-2 km)



We reviewed the usefulness of the infra-red satellite image (and how to get to it from the eClass file of course URLs)

This image (12:30 MDT) indicates it was nice and clear over C. Alberta – the image does not resolve the small fairweather clouds the eye would have seen

Tory camera 12:00 MDT September 7th – fairweather Cumulus clouds

Lecture of 7 Sept.

- climate/weather distinction
- definitions relating to time in meteo. (& geography of W. Canada)
- vertical structure
  - variation of pressure and density, and a first look at the hydrostatic equation
  - variation of temperature, and associated layering
- other important Ch1 content
  - heirarchy of spatio-temporal scales of description of atmos. (planetary... microscale)
  - cycling of mass thorugh the atmos. (covered in detail Ch2)
  - units! -- please do familiarize yourself with these
- *next class we'll begin Ch 2 (Composition of the atmos.)*

Fig 1.4a. Vancouver, upwind of Coast Mntns

Fig 1.4b. Osoyoos, leeward of Coast Mntns