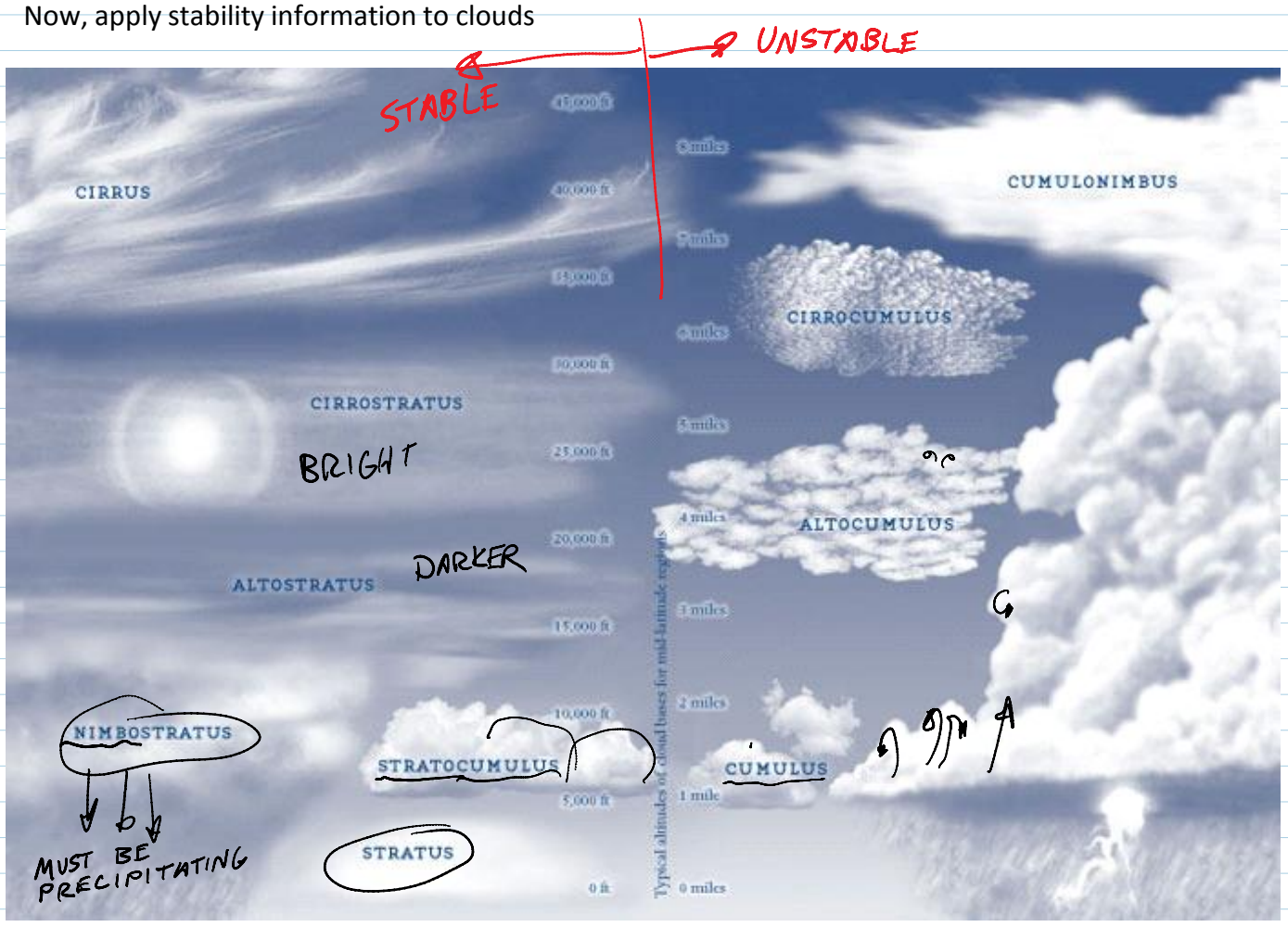
09b.Clouds3

Thursday, February 10, 2011
3:44 PM

Now, apply stability information to clouds

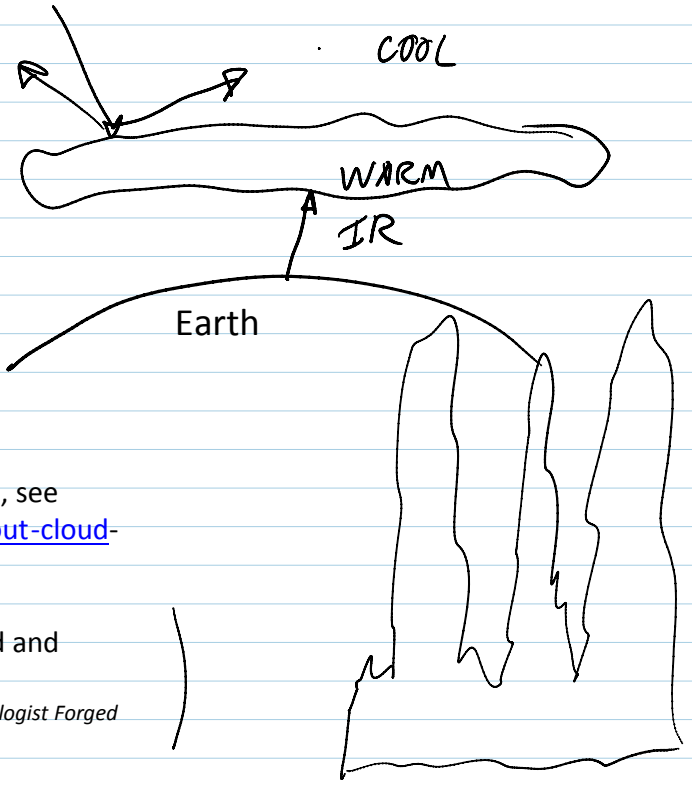



http://cloudappreciationsociety.org/collecting/

Stratocumulus Formation mechanisms:

1) Cumulus joined together, caused by an inversion, a stable layer that stops upward convection
2) Stratus broken up. Top reflects UV, visible light, cools (maybe radiates IR to space). Bottom absorbs IR from the earth, warms
   Cool on top, warm on the bottom = unstable,

Bottom absorbs IR from the earth, warms
Cool on top, warm on the bottom = unstable, wants to turn over, breaking up stratus layer.




Partial rule of thumb
Cumulus = from instability; local uplift
Stratus = more stable, from widespread uplift

These are GENUS

For info on Species, Varieties and Accessory Clouds, see http://cloudappreciationsociety.org/collecting/about-cloud-classifications/

Interesting book on how clouds were first classified and named ~1804, by Luke Howard
Richard Hamblyn, *The Invention of Clouds: How an Amateur Meteorologist Forged the Language of the Skies* (Picador, 2002).

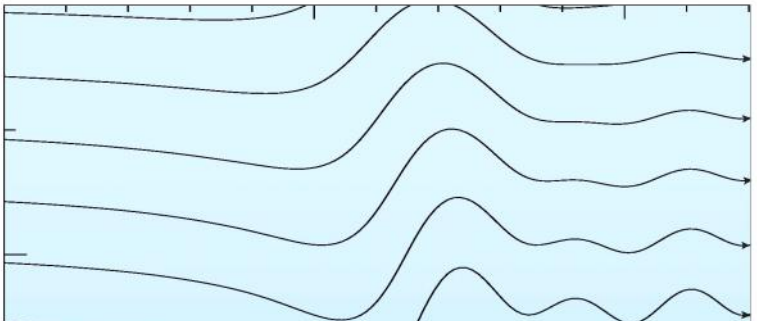
Most common interesting cloud in spring is the

Altocumulus lenticularis (higher than 6500 ft)
or
Stratocumulus lenticularis (lower)
or
Mountain Wave Cloud, trapped or lee

This is an example of an OROGRAPHIC cloud, one caused by topography, i.e. mountains

STANDING WAVE

Clouds Produced by Vertically ***Trapped*** Mountain Waves



Thomas Carney et al., *AC 00-57 Hazardous Mountain Winds and Their Visual Indicators* (Federal Aviation Administration, 1997), http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/780437D88CBDAFD086256A94006FD5B8

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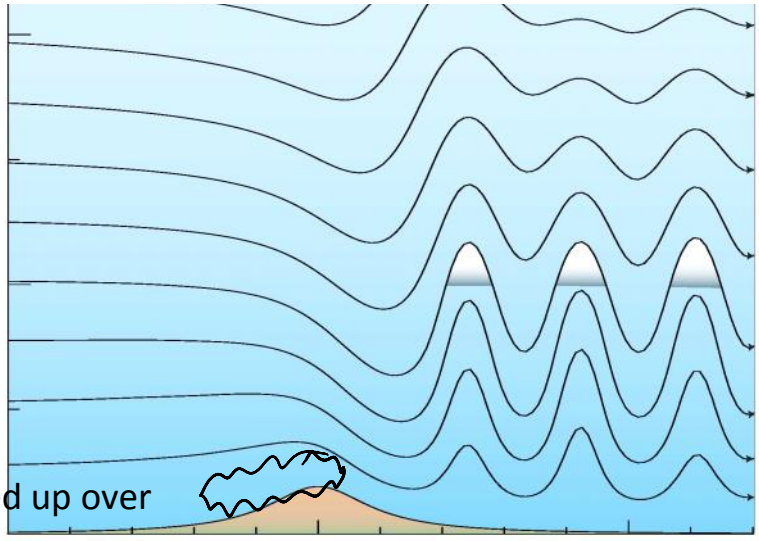


Occurs in STABLE atmosphere. Underdamped system, descending air overshoots (warms), bounces back up (overcools) repeats.

Clouds that sit right on the Divide = FOEHN cloud wall. From air being forced up over the mountains

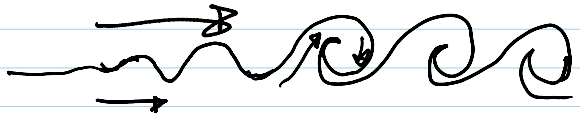
Altocumulus lenticularis. Typically 1 to 5 wave crests.
http://www.colorado.edu/MCEN/flowvis/galleries/2010/Clouds-1/index.htm
Clouds stay stationary, but may move off and reform periodically

Ben Britton, FV 2010

If there's more wave crests, or short wavelengths, it's probably NOT a mountain wave cloud; more likely altocumulus undulatus, from gravity waves in the atmosphere, like ripples on a liquid surface.
http://www.colorado.edu/MCEN/flowvis/galleries/2007/assignment2.html

Tracy Eliasson FV 2007

Could also be from wind shear, via the Kelvin Helmholtz instability



Rare to be able to see cross section like this

http://cloudappreciationsociety.org/collecting/terry-robinson/

OROGRAPHIC cloud = one caused by topography, i.e. mountains
Mountain wave cloud, Foehn cloud wall.

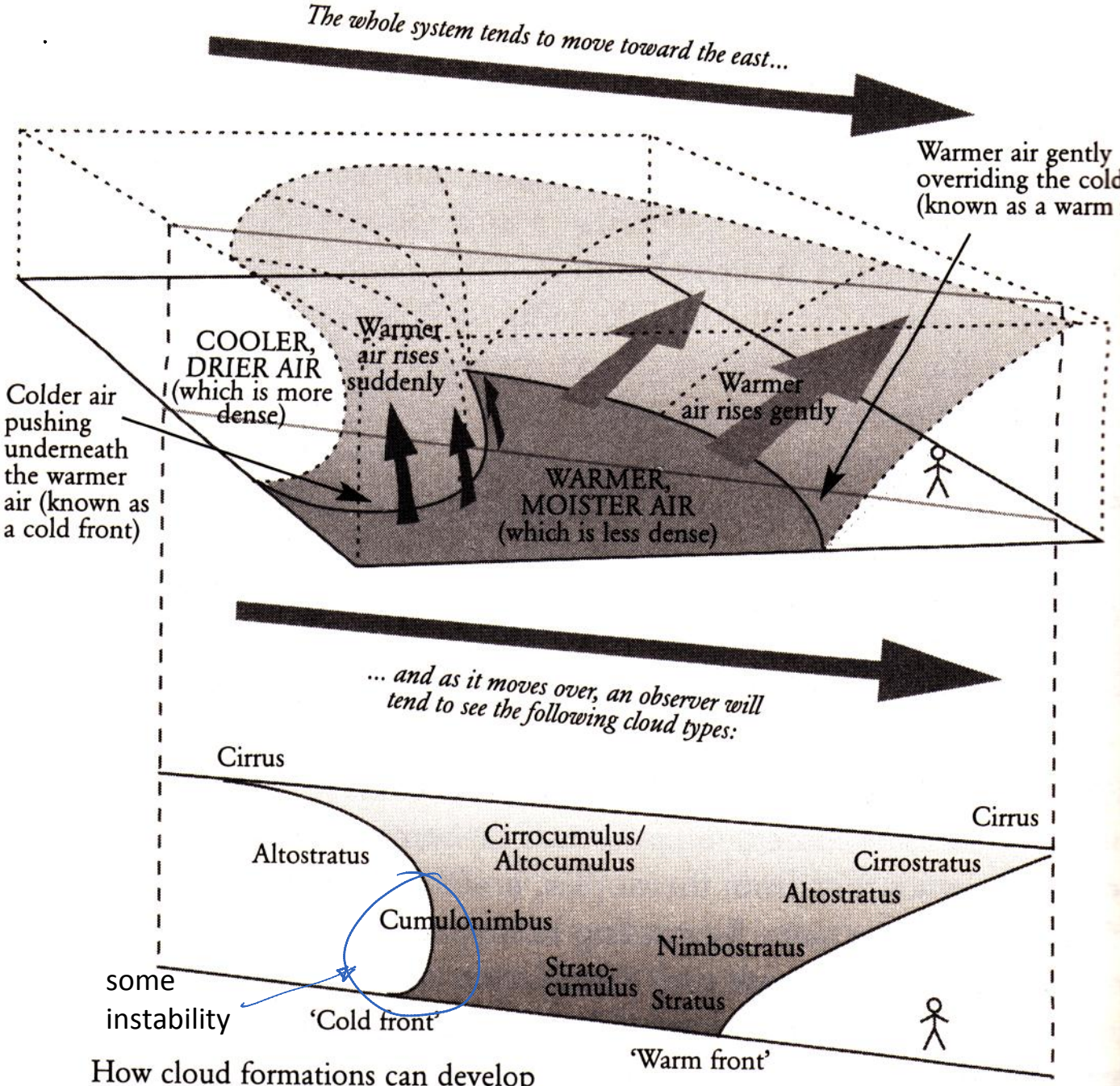
Foehn clouds suggest winds coming over the mountains: the presence of a CHINOOK (pre-cold-front, warm, strong, downslope winds, or a BORA (post-cold-front, cold, strong, downslope winds). Also called cap clouds.

TypWeather System

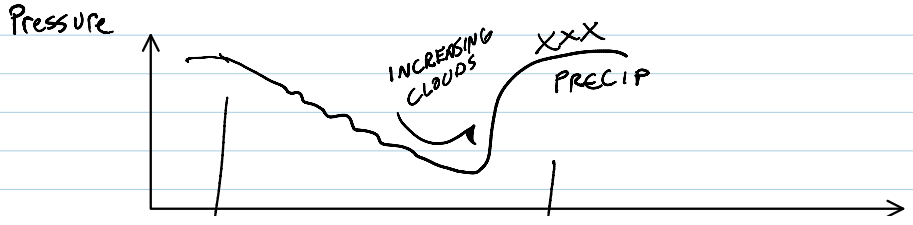
Other typical clouds: Weather system progressions; 'synoptic scale' uplifts (1000 km across).

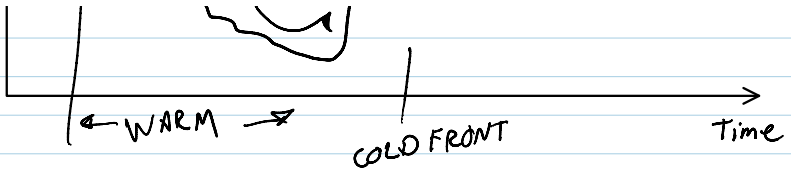
Inserted from: <file://C:\Users\hertzber\Documents\01CLASSES\FlowVis\Content\scanned images\TypWeatherSystem.tif>

The Cloudspotter's Guide pg186 THE HIGH CLOUDS




How cloud formations can develop as a region of low pressure, or 'depression', passes over. Those who think this looks complicated will be depressed to learn that it is in fact a very simplified diagram of a weather system.




WARM
COLD FRONT
Time