Now, apply stability information to clouds

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

Mountain Wave Cloud, trapped or lee

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),
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. 

Clouds stay stationary, but may move off and reform periodically.

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
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.

Other typical clouds: Weather system progressions; 'synoptic scale' uplifts (1000 km across).
The whole system tends to move toward the east...

Warmer air gently overriding the colder air (known as a warm front)

Colder air pushing underneath the warmer air (known as a cold front)

...and as it moves over, an observer will tend to see the following cloud types:

Cirrus

Altostratus

Cirrocumulus/Altostratus

Cumulonimbus

Some instability

'Cold front'

'Warm front'

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.