Weather satellite and cloud pattern reading
Meteorological / weather satellite

Geostationary weather satellites orbit the Earth above the equator at altitudes of 35,880 km.

Polar orbiting weather satellites circle the Earth at 850 km in a north to south path, passing over the poles

- visible band in 0.55-0.90 µm
- infrared bands in 3.5-4.0 µm, 10.5-11.5 µm
- 11.5-12.5 µm wavelength are called atmospheric windows.

- 3.5-4.0 µm wavelength band is called a 3.7 µm image
- observation of reflected sunlight in the daytime and of brightness temperature at night.

- absorption takes place from water vapor in the 6.5-7.0 µm band
**VIS image**

**Reflectance** of a cloud depends on the amount and density of the cloud droplets and raindrops in the cloud. **Low-level clouds contain a larger amount of cloud droplets and raindrops and appear brighter than high clouds.**

**Cumulonimbus** and other thick clouds that have developed vertically contain a lot of cloud droplets and **raindrops** and they appear bright in a VIS image.

**Texture** of the cloud top surface of a stratiform cloud is smooth and uniform while the top surface of a convective cloud is rugged and uneven. The texture is easily observed when sunlight hits the cloud top obliquely.
**IR image**

It represents a temperature distribution and can be observed day and night. In IR image, portions of low temperature are visualized bright and portions of high temperature dark.

It is possible to know the cloud top temperature with the IR image. In the troposphere, atmospheric temperature is generally lower at the upper layer, and therefore the lower cloud top temperature means a higher cloud top height. It is also possible to monitor the developing level of clouds in the vertical direction by referring to the cloud top temperature.

Water vapor (WV) image represents temperature distribution. In WV image, absorption by water vapor is dominant and this gives the feature that the brightness of an image corresponds to the amount of water vapor in the upper and middle layer.
Thermal Infra red band - Color composite – VIS + TIR image
Thank you