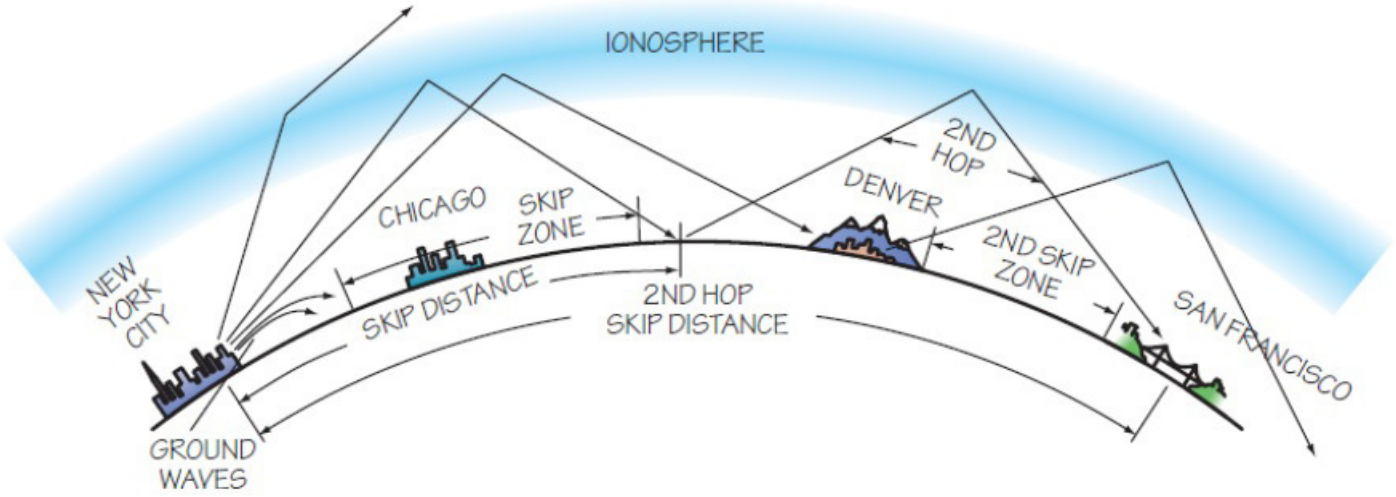
Propagation

Local reception is via ground waves. Ground wave signals hugs the ground traveling along Earth's surface.

Distance reception (DX) is via sky waves. Sky waves bounce off the ionosphere which is between 40 and 300 miles up. Radio waves may bounce ("skip") from the ionosphere back to Earth, and up again, all the way around the world.



When you transmit a radio wave, it goes toward the ionosphere and skips back to Earth.

The ionosphere is made up of air that is electrically charged by the sun and shaped by Earth's magnetic field. Radio waves entering the layers of the ionosphere can be bent and reflected back to Earth, or they can be absorbed by the ionosphere, or they may pass through the ionosphere, depending on the radio frequency and the height and thickness of the ionosphere's layers. The height and thickness of the layers will change as the angle and amount of sunlight changes over the day and the seasons of the year.

The layers are also affected by variations in the sun's light caused by sunspots and other effects. This is why the distance a radio transmitter may be heard (propagation) varies with the time of day, season, and the 11-year sunspot cycle.

As a rule, signals in the AM broadcast band (535 kHz to 1605 kHz) are limited to the relatively short distances of ground-wave propagation during the day, since this is when the lower layers of the ionosphere are thickest and absorb the signals. At night, these layers become thinner, and the AM signals can pass trough and be bent to "skip" down much farther away.

On the other hand, signals in the range of about 10 MHz to 30 MHz are bent by this thicker daytime layer, so they are useful for worldwide communications during the day, But at night, as the layer thins, it becomes too thin to bend the waves, and these signals are no longer capable of long-distance "skip."

A good check of radio propagation (the ability of radio signals to travel from one place to another) is to listen to radio station WWV in Colorado, or its sister station WWVH in Hawaii. These stations broadcast on exact frequencies in the shortwave radio spectrum. By tuning to each of the WWV and WWVH frequencies, a listener can get a good idea of how loud signals on these radio frequencies will be from ham radio stations or other radio services located in the West and the Pacific areas.