# *Editorial – Atmospheric effects on radio*

Not surprising to most, the Earth's atmosphere affects the working and performance of radio signals, whether that's due to weather or the air itself. What might be surprising is that our particular atmospheric composition of nitrogen, oxygen, $CO_2$ (carbon dioxide), and water vapor can attenuate (reduce the signal strength of) radio signals within specific radio frequency ranges. Other atmospheric gases such as $N_2O$ (nitrous oxide), $CH_4$ (methane), and $O_3$ (ozone) also play a part, but their small presence plays an insignificant effect on radio signals.

Most weather events don't affect radio signals under 1 GHz all that much. An exception is temperature inversion, which can noticeably modify the radiation direction and propagation of 2-meter signals. Another is lightning, whose broadband noise can interfere with SSB signals on HF. Rain, snow, and clouds tend not to adversely affect radio propagation below about 2 GHz, yet some have claimed a different experience.

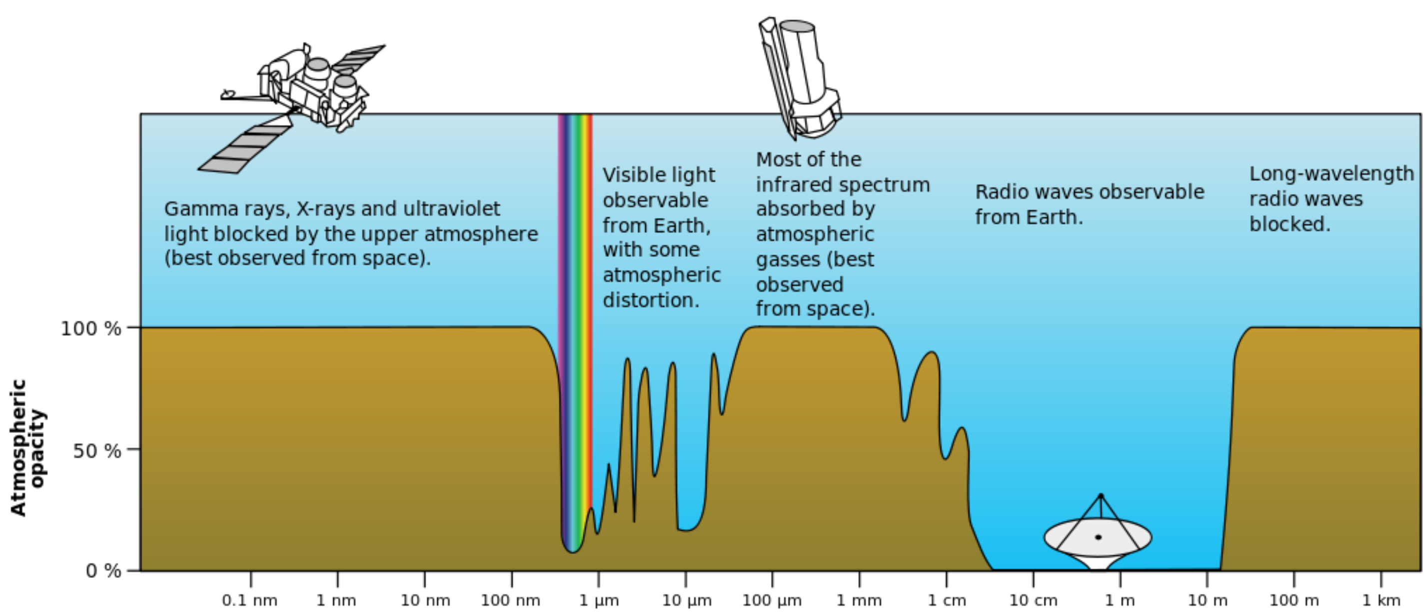
To our great health benefit, our atmosphere filters out much of the UV (ultraviolet), X-ray, and gamma radiation that arrives from the Sun. As you can see from the graphic below, it's also of great benefit to amateurs that our atmosphere also passes radio signals between about 27 MHz through 1 GHz with little attenuation. This allows us to install radio telescopes that can optimally receive signals within this range with little concern for atmospheric attenuation.

### The Relevance to amateur radio

The graphic below is attempting to portray the relative attenuation of EM (electromagnetic) signals that originate from outside our atmosphere by the time they arrive on Earth's surface. The reason we're discussing this is because it's possible that amateur radio signals will be affected similarly by atmospheric attenuation, even though they didn't originate extra-terrestrially. If that's the case, then we might be able to select an optimal radio band for crucial communication, all other things being equal.

The obvious side-effect to all of this, however, is that with less attenuation of desirable signal comes less attenuation of undesirable noise, meaning you're likely to hear more noise on the optimally unattenuated frequencies (27 MHz through 1 GHz).

*Anything to add? Email* ***editor@utaharc.org***




***Atmospheric attenuation of EM waves, by wavelength (27 MHz through 1 GHz are best)***