

The Influence of Tropospheric Ducts on Long Range Infrasonic Propagation

The troposphere is generally thought of as the lowest 15 kilometers of the atmosphere. In the simplest case it is characterized by a more or less linear decrease in temperature and a relatively thin elevated wind jet called the jet stream. The jet stream is typically centered about 10 kilometers from the ground surface and is mostly eastward flowing, but can vary from north-eastward to south-eastward. In addition, the troposphere is the region of the atmosphere that interacts directly with the Earth's surface which can lead to near-ground temperature inversions over cool ground and low altitude wind jets induced by ground topography. What results is a potentially complex and variable environment in which infrasonic signals can propagate efficiently, ensonifying the ground from tens to well over a thousand kilometers. Further, at infrasonic frequencies, the acoustic wavelength can be comparable to the vertical extent of the atmospheric structures in the troposphere, causing the resulting ducts to be highly dispersive and leaky leading to complex interactions between the tropospheric ducts and ducts in the middle/upper atmosphere. In this presentation numerous observations of infrasonic signals propagated in the troposphere will be presented, their features discussed and compared to theoretical predictions.

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