NASA's Airborne Visible/Infrared Imaging Spectrometer (AVIRIS): Concept, Calibration, Atmospheric Correction, Research and Applications

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The Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) has been developed by the NASA Jet Propulsion Laboratory. AVIRIS measures the total upwelling spectral radiance from 400 nm to 2500 nm at ~10 nm intervals through 224 spectral channels. From an ER-2 platform flying at 20 km altitude, AVIRIS measures spectra as images of 11 by up to 100 km with 20 m by 20 m spatial resolution. The spectral, radiometric, and spatial characteristics of AVIRIS are rigorously calibrated each year in the laboratory. In addition, these characteristics are validated in-flight where the actual research and applications measurements are acquired. An autonomous, radiative transfer based, atmospheric correction algorithm has been developed to invert the measured upwelling spectral radiance to apparent surface reflectance. The molecular absorption, constituent scattering and energy characteristics expressed in the AVIRIS spectral measurements are being used for research and application spanning the range of the Earth's land, water and atmosphere disciplines. An overview of the AVIRIS concept, calibration and atmospheric correction will be presented along with examples of research and applications including: Ecology, Wild Fires, Geology, Hazards, Atmosphere, Snow Hydrology, and Inland Waters.