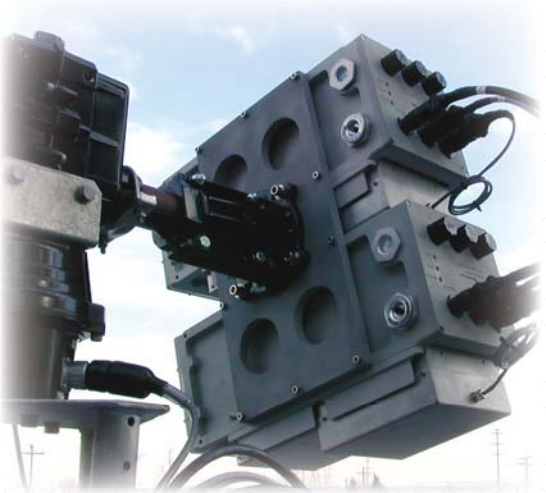
Downward-Looking Microwave Radiometry

Satellite-based microwave observations are increasingly used to obtain near-surface soil moisture, snow, ice, vegetation, and oceanic information. PR-Series radiometers are ideal for calibration and validation of AMSR, SSMI, SMOS and proposed SMAP satellite observations, and for other earth surface remote sensing applications.



Terrestrial remote sensing

Soil moisture

Soil dielectric constant and reflectivity are highly dependent on observation frequency, soil composition and moisture profile. Longer wavelengths emerge from greater depths, and sky reflection depends on observation angle and polarization. Surface or airborne dual- polarized multi-frequency microwave observations provide soil moisture profile and shallow water table depth information essential for satellite validation.

Snow depth, history and water content

Dielectric constants of snow, ice, soil, and rock differ significantly. Additionally, ice crystals scatter and depolarize microwave reflection depending on grain size and observation frequency, while liquid water is a strong absorber/emitter. Emission and reflection from snow depends on depth, density, history and liquid water content as well as underlying ground characteristics. Polarized multi-frequency microwave observations provide information on these important parameters.

Rugged, all-weather polarized PR-Series radiometers have been mounted in aircraft, on trailers, and even on dogsleds. These portable moduler sensors feature precise internal temperature control for optimal accuracy, extended operational ambient temperature range, sealed housing, integrated antenna (except PR-1475), dual RS-232 ports for user interface and data logger output, and calibration-user configuration data storage in non-volatile memory.

Sea surface temperature, salinity and wind

Global climate and weather are strongly influenced by temporal and spatial variability of near-surface sea temperature and salinity. Since dielectric constant and conductivity are salinity dependent, polarized multi-frequency microwave observations carry information on near surface salinity. Microwave emission of the ocean surface also depends on wave and capillary wave size and direction. Polarized multi-frequency microwave observations provide sea surface temperature, salinity and wind information.

Sea ice distribution, temperature and age

Because emission and reflectivity of water and ice are very different, microwave radiometry can be used to map sea ice distribution. Additionally, since sea ice salinity is dependent on both age and temperature, polarized multi-frequency microwave observations provide information on these important parameters.

Snow pack moisture sensing