

SPECTRUM MANAGEMENT AND INTERFERENCE MITIGATION IN PASSIVE EARTH REMOTE SENSING

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Increasing use of previously quiet radio bands for communications and radar applications imposes a growing problem for passive remote sensing of many key environmental variables, including soil moisture, sea surface temperature, water vapor, ocean surface winds, cloud water content, and rain rate. We review in this talk the status of major passive microwave environmental observing systems, sensitivity and spectral requirements for Earth remote sensing, useful RFI mitigation techniques, and major regulatory issues affecting passive Earth remote sensing.

The problem of anthropogenic radio frequency interference (RFI) in passive Earth remote sensing is similar to that of RFI in radio astronomy, thus engendering a mutual interest among users of the Earth Exploration Satellite Service (EESS) and Radio Astronomy Service (RAS) to regulate emissions in several key bands of common interest. Being that the two services are based upon distinct viewing geometries and locations, integration times, spectral features, and applications of the data, however, there are a number of vexing issues specific to Earth remote sensing. Foremost among these distinctions is the need in passive Earth remote sensing to maintain interference-free operation while regularly viewing downward over the entire globe, including (and especially) major urban and coastal areas. In addition, certain key bands necessary for passive microwave surface observation have never been provided primary EESS allocation.

Progress over the past several years in developing RFI mitigation techniques for passive Earth remote sensing has been substantial, and the use of such techniques promises to at least temporarily sustain environmental observation capabilities. Countering this trend, we anticipate that new applications of passive microwave sensors relying upon direct assimilation of data into modern numerical models will further magnify the impact of RFI as these models improve their representational accuracy.

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2. F - Wave Propagation and Remote Sensing
3. (a) Plenary
4. I - Invited Paper, Program chair:
Karen St. Germain
5. Second of two talks in plenary on spectrum management