SPECIAL ISSUE ANNOUNCEMENT

The American Society for Photogrammetry and Remote Sensing (ASPRS) *Photogrammetric Engineering & Remote Sensing* (*PE&RS*)

Special Issue on

Hyperspectral Remote Sensing (imaging spectroscopy) to make Gigantic Leaps in Land and Water Science

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Deadline for submission of manuscripts: rolling submission starting now until August 31, 2026
Tentative publication date: Expect multiple issues in 2025 and 2026

Hyperspectral remote sensing or HRS (imaging spectroscopy) changes the very paradigm of remote sensing data acquisition and, as a result, remote sensing science. HRS sensors typically acquire data in hundreds or thousands of near-continuous hyperspectral narrowbands (HNBs). In contrast, multispectral broadbands (MBBs) such as Landsats, Sentinels, and PlanetScope Doves and SuperDoves acquire data in a few broad spectral bands. HNBs are typically ≤15 nanometers in bandwidth whereas multispectral broad bands (MBBs) are typically >15 nm in bandwidth. However, many spectroradiometers have bandwidth as narrow as 1 nm. HRS data have hundreds or thousands of HNBs along the electromagnetic spectrum (e.g., 400-2500 nm) whereas multispectral sensors have around 10 MBBs in 400-2500 nm. Hyperspectral data can be considered as "signatures" whereas multispectral data are acquired in "a few data points along the spectrum". Currently, we are acquiring remotely sensed data in four distinct modes. These are defined below (defining characteristic for each type is highlighted in ***italic bold***):

1. **Hyperspatial broadband (HBB) data:** (a) Spectral resolution (band width): >15 nm (typically >30 nm), (b) Number of bands in 400-2500 nm: 4-10, ***(c) spatial resolution: sub-meter to 5 m***, (d) radiometric resolution: 8 to 12 bits, (e) temporal resolution: 1-20 days.
2. **Multispectral broadband (MBB) data:** ***(a) Spectral resolution (band width): >15 nm (typically >30 nm),*** (b) Number of bands in 400-2500 nm: 4-10, (c) spatial resolution: sub-meter to 1000 m (typically 30 m or better), (d) radiometric resolution: 8 to 12 bits, (e) temporal resolution: 5-16 days.
3. **Superspectral broadband (SBB) data:** (a) Spectral resolution (band width): >15 nm (typically >30 nm), ***(b) Number of bands in 400-2500 nm: around 20 optimal bands (Landsat Next has 26 bands in 400-12,000 nm with 21 bands in 4000-2500 nm range),*** (c) spatial resolution: typically 30 m or better, (d) radiometric resolution: 8 to 12 bits, (e) temporal resolution: 5-16 days.
4. **Hyperspectral narrowband (HNB) data:** (a) Spectral resolution (band width): ≤15 nm (typically ≤30 nm), ***(b) Number of bands in 400-2500 nm: 200+,*** (c) spatial resolution: 30 m, (d) radiometric resolution: 8 to 12 bits, (e) temporal resolution: 1-20 days.

Great advances are taking place in remote sensing science and in particular hyperspectral remote sensing with a suite of new generation spaceborne hyperspectral sensors such as:

1. **Planet Lab's Tanager-1** acquiring data in 420 hyperspectral narrow bands (HNBs) over 400-2500 nm spectral range in 5 nm bandwidths,
2. **German Space Agency's DESIS** (DLR Earth Sensing Imaging Spectrometer) onboard the International Space Station (ISS) acquiring data in 235 hyperspectral narrow bands (HNBs) over 400-1000 nm spectral range in 2.55 to 10 nm bandwidths,
3. **German Space Agency's EnMAP** (Environmental Mapping and Analysis Program) acquiring data in 222 HNBs over 400-2500 nm spectral range and 10 nm bandwidth,
4. **Italian Space Agency's PRISMA** (PRecursore IperSpettrale della Missione Applicativa, Hyperspectral PRecursor of the Application Mission) acquiring data in 238 HNBs over 400-2500 nm spectral range and 10 to 12 nm bandwidth.
5. **NASA's Earth Surface Mineral Dust Source Investigation (EMIT)** acquiring data in 285 HNBs over 380-2500 nm spectral range and 7.4 nm bandwidth.
6. **Other novel ground-based and drone-borne hyperspectral sensors.**

Given the above fact, the **overarching goal of the special issue(s)** will be to critically evaluate hyperspectral narrowband (HNB) data and establish their challenges, strengths, and limitations relative to other types of remotely sensed data such as the HBB, MBB, and SBB data to advance remote sensing science in the study of Earth's land and water resources. Specific manuscripts of interest will be as follows:

1. **Characterizing, harmonizing, standardizing, calibrating and comparing:** Studying distinct remote sensing data types such as hyperspatial broadband (HBB), multispectral broadband (MBB), superspectral broadband (SBB), and hyperspectral narrowband (HNB) in the study of land and water resources. However, there are no restrictions in use of other data types such as SAR or LiDAR to integrate those data as well as other data such as MBB, HBB, SBB data types with HNB data to enhance information.
2. **Data redundancy and Hughes' phenomenon:** Addressing issues of data redundancy and overcoming Hughes' phenomenon in hyperspectral data.
3. **Data mining:** Exploring data mining methods and approaches to best utilize hyperspectral data.
4. **Spectral libraries:** Generating hyperspectral spectral libraries of agricultural crops and vegetation.
5. **Hyperspectral Vegetation Indices (HVIs):** Establishing specific hyperspectral vegetation indices (HVIs) to study specific land and water characteristics.
6. **Modeling and mapping:** Developing agricultural crop biophysical, biochemical, plant health, plant stress, and plant structural quantity models and maps using HNB and HVI data and comparing the same with HBB, MBB, and SBB data.
7. **Data analysis philosophies:** Discussing full spectral analysis (FSA) versus optimal hyperspectral narrowbands (OHNBs).
8. **ML/AI:** Implementing machine learning (ML) and artificial intelligence (AI) methods and approaches, especially on the cloud platforms such as Google Earth Engine (GEE), Amazon Web Services (AWS), Microsoft Azure, and high-power computing (HPC).
9. **Other innovations:** in methods, techniques, approaches, and a wide array of science applications pertaining to land and water.

All submissions will be peer-reviewed in line with *PE&RS* policy. Because of page limits, not all submissions recommended for acceptance by the review panel may be included in the special issue. Under this circumstance, the guest editors will select the most relevant papers for inclusion in the special issue. Authors must prepare manuscripts according to the *PE&RS* Instructions to Authors, available on the ASPRS website at Instructions to Authors.

Important Dates: Manuscripts due: rolling submissions starting now through August 31, 2026. When we have 5 or more accepted papers, we will publish a special issue. So, if you have a relevant manuscript ready, you can submit right now and submissions with be accepted until August 31, 2026. **Please submit your manuscript** at https://www.editorialmanager.com/asprs-pers/ and select **"Hyperspectral Remote Sensing."**

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