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Journal of Remote Sensing & GIS

Editorial

Recent Advances in Remote Sensing and Modeling Towards a Changing Climate

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EDITORIAL

Aerosols, clouds, and their interaction contribute the largest uncertainty to estimates and interpretations of the energy budget of Earth-atmosphere system. Over the last several decades, radiation measurements from satellites, aircraft and the ground have been successfully employed for characterizing their radiative properties. However, some challenges still remain for delivering climate-quality aerosol and cloud products. One of them involves the development of reliable and accurate procedures for inversion of the observations.

We solicit articles that emphasize the various aspects of numerical inversion. The contributions are expected to address such important attributes of inversion as multi-source data inversion, construction of novel a priori information, inverse modeling, information content assessment, retrieval error estimations, retrieval acceleration, joint inversion of aerosol/gas/cloud properties, and data assimilation.

We encourage explorations of new retrieval concept and new or improved products for existing and next generation satellite missions and ground-based networks. These products include (but not limited to) the types, composition and vertical profiles of aerosols, surface particulate matter and speciation, trace gas abundance, cloud microphysical properties, and land and ocean reflection. Development of forward radioactive transfer models for complex media and particle light scattering models to improve remote sensing inversion are also welcome. Climate change, increased drought occurrence, and limited water resources put immense pressure on the sustainability of agricultural systems in an increasingly over-populated world. Improved management of available resources is critically needed to avoid impending risks of over exploitation. At the same time, optimization of water and nutrient use efficiencies is fundamental for improving crop yields and the long-term sustainability of agriculture. Traditional and emerging remote sensing capabilities combined with developments in machine learning present unrealized opportunities to inform upon agricultural systems at relevant spatiotemporal scales and address impending food security concerns.

The focus of this article collection is broadly to explore the utility of remote sensing to improve food security in a changing climate. We are particularly interested in submissions with a high resolution focus both spatially (field scale or smaller) and temporally in order to facilitate timely in-field monitoring and modeling of surface characteristics. Studies that demonstrate the utility of remote sensing for directing sustainable management practices for increasing agricultural efficiency, optimize productivity, and enhance profitability, are highly encouraged. We also welcome contributions that attempt to tackle integrated field level to continental scale crop monitoring and prediction using multiple sensors and advanced modeling. We will be accepting contributions related to one or more of the following overall topics in the context of agricultural monitoring and management:

- Use of high resolution remote sensing to: monitor, model, and optimize water and nutrient use efficiencies; diagnose within-field variations in surface characteristics and vegetation function on a routine basis; optimize crop production via spatially explicit management practices
- Evaluation and integration of proximal sensors for spatial irrigation and fertility management
- Synergistic cross-platform (e.g., geostationary, polar-orbiting, unmanned aerial vehicles) approaches to enhance monitoring capacity, spatiotemporal resolution, and retrieval robustness from field to continental scales
- Integration of remote sensing, process modeling, and machine learning to advance agricultural monitoring and management
- Monitoring and management of climate induced impacts on crop functioning and yield
- Integration of short-term climate projections or weather forecasting for improved crop yield monitoring and prediction
- Integrated cloud-based agricultural monitoring systems to deliver informed decision support, early warning and directed location-specific management in near real-time.

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Received: October 08, 2020; **Accepted:** October 22, 2020; **Published:** October 29, 2020

Citation: Li S (2020) Recent Advances in Remote Sensing and Modeling Towards a Changing Climate. J Remote Sens GIS. 9:e114. DOI: 10.35248/2469-4134.20.9.e114