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# Special Section Guest Editorial: Advances in Remote Sensing for Renewable Energy Development: Challenges and Perspectives

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With energy demand increasing around the world, it is increasingly recognized that renewable energy will play an important role in reducing greenhouse gas emissions and local air pollutants associated with the burning of fossil fuels. Improved understanding of renewable energy potential, and particularly the spatiotemporal patterns of this potential, is important for improving energy-economic models and delivering better information to decision makers in government and industry.

Remote sensing techniques have been extensively used as useful and cost-effective tools to evaluate the potential of renewable energy and its spatial distribution over large areas. On the one hand, remote sensing can provide data applicable in the evaluation of renewable energy sources such as solar and wind. On the other hand, remote sensing can serve as a key input in process-based modeling relevant to renewable energy (e.g., hydropower and bioenergy). Renewable energy development is subject to spatial constraints such as environmental and ecological factors, which must be taken into account in determining the suitable location of generating facilities. Remote sensing, a powerful tool for monitoring surface characteristics, can help evaluate these spatial constraints in renewable energy development.

This special section of the *Journal of Applied Remote Sensing* provides some progress of research on application of applied remote sensing for renewable energy development. This section includes six papers with focus on solar energy and bioenergy. Three papers selected in this special section are related to solar energy evaluation. Hamada and Crippo have developed a remote sensing supported methodology to support long-term, financially sustainable, environmental monitoring strategies for utility-scale solar energy development. Omitaomu et al. present a methodology to identify a suitability index for siting concentrated solar power in the contiguous United States. Yilmaz et al. evaluate the solar energy potential from photovoltaic panels that can be installed on building roofs in Kahramanmaras, Turkey.

The second theme of this special section includes three papers related to bioenergy development. Kumar et al. present a comprehensive review of biomass assessment techniques using remote sensing in different environments (forests, savannah, and grasslands/rangelands) and using different sensing techniques. Sharifi and Amini estimate forest biomass using polarimetric synthetic aperture radar images. Jiang et al. present a method for assessing the energy potential of cassava on marginal land using a geographic information system-based biogeochemical process model.

Finally, we would like to express our deep appreciation to all authors and reviewers for their enthusiastic efforts. We hope that this special section will inspire further advancement in application of applied remote sensing for renewable energy development.

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and their potential solutions. He has published more than 50 journal papers on energy and environmental sciences.

**Lalit Kumar** is an associate professor in the Ecosystem Management Department, University of New England, Australia. His research focuses on applications of GIS and remote sensing to solving environmental issues. Most of his recent work has been in the area of climate change impact assessment. He has published over 120 papers in international peer-reviewed journals.

**Warren Mabee** is an associate professor in the Department of Geography and Planning, Queen's University, Kingston, Canada. His research focuses on the development and implementation of renewable energy technology and the policy drivers that can facilitate this transition. He has published more than 70 journal articles in the areas of energy, forestry, and policy.