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The 21st century will experience widespread global changes due to climatic variations, shifting demographics, population migration, and economic development. These environmental changes are expected to have significant impacts on the quantity and quality of water, air, and land resources across the globe. The complexity of global environmental changes will pose significant challenges to the scientific community. Remote sensing, with its capability for handling spatial and temporal information of the earth's systems, has been extensively used to understand the problems of global environmental changes and their potential solutions. This special section focuses on advances in remote sensing for monitoring global environmental changes, and is comprised of ten full-length papers selected from a number of areas of expertise. Such a collection improves our understanding of global environmental changes through various types of assessment in which remote sensing technologies have demonstrated their application potential in dealing with different sustainability issues. This special section elucidates three important themes related to remote sensing for addressing global environmental changes: (1) land use and land cover changes; (2) environmental monitoring to address physical and ecological variations; and (3) cyber-enabled assessment of environmental changes via data quality improvement and visualization.

Remote sensing is used to monitor land use and land cover changes, especially those associated with the impact of urbanization on water and carbon cycles as well as energy balance through the modification of the earth surface. Four out of ten papers selected in this special section are related to this theme from local to global scales. Esch et al. introduce the TanDEM-X (TDX) for supporting analysis and monitoring global human settlement patterns. This paper shows the high potential of using the TDX mission to aid in population estimation and vulnerability assessment and modeling of the global change impact. Keramitsoglou et al. evaluate a number of air- and land-surface temperature products for assessing ten European cities, and they demonstrate how these products can provide a complementary view, both for thermal patterns and heat waves. Liu et al. improve the SLEUTH cellular automata model and simulate the urban expansion in the city of Tangshan, China. Their research highlights the importance of remote sensing to support not only model inputs, but also model calibration. Li et al. compare a number of classification algorithms using different combinations of remote sensing datasets, and emphasize the importance of selecting an appropriate classification algorithm in a specific land-cover classification project.

Remote sensing is also useful for environmental monitoring to address physical and ecological variations, which is one of the most important research areas in global environmental changes. The second theme of this special section thus includes four papers. Wang et al. analyze remote sensing data and derive the Normalized Difference Vegetation Index, length of growing season, and net primary production in the Appalachian Mountains and analyze their spatial and temporal trends. Their findings provide an improved understanding of environmental changes in this unique geographic region. Yang et al. propose a revised Penman-Monteith equation driven

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by remote-sensing data for estimation of regional evapotranspiration and prove remote sensing a reliable method through ground truth measurements. In the paper by Hunt et al., fuel moisture content is estimated by using different ratios of water index and the Normalized Dry Matter Index, which is important for predicting the occurrence and spread of wildfire. Their findings emphasize the progress of improved temporal frequency of the planned NASA mission Hyperspectral InfraRed Imager. Ričko et al. compare three water-level products derived from satellite radar altimetry and conclude that the current products can support climate application in providing long-term and seasonal trends of water levels with acceptable accuracy, although further validations and the provision of ice-detection flags are needed.

Geospatial data provenance, particularly remote-sensing imageries, is of great significance in the studies of global environmental changes. The remaining two papers in this special section contribute to cyber-enabled assessment of environmental changes via data quality improvement and visualization. Ji, Chen, and Wang develope an improved intensity-hue-saturation based fusion method to achieve a better spectral fidelity of the spatially enhanced image. Their method provides avenues to improve the quality of remote-sensing data for monitoring global environmental changes, especially in areas with data limitations. Zong et al. propose a new method to visualize the data through Google Earth and NASA World Wind. Their findings help identify the potential hot moments and spots of environmental change around the globe, thereby prioritizing areas with limited resources.

It is a great pleasure for us to receive so many quality submissions from all over the world. We wish to express our deep appreciation to all authors and reviewers for their enthusiastic efforts to this special section.