

**Weekly Report – March 18, 2022**  
Satellite Climate Studies Branch (SCSB)/CISESS  
NOAA/NESDIS/STAR  
Acting Branch Chief: John Knaff

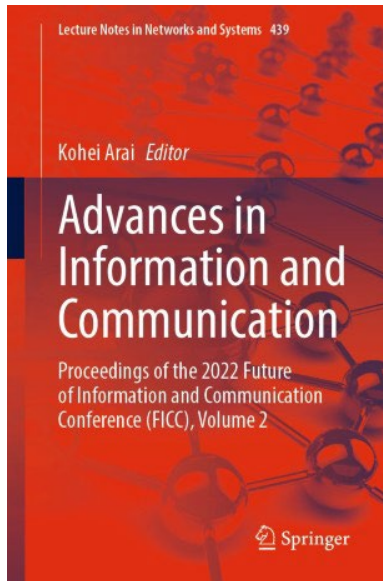
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## PUBLICATIONS

### Advances in Information and Communication



**Liang, Xingming**, Quanhua Liu, and Kohai Arai (2022). Exploring Potential Improvement of Daytime Clear-Sky Radiance for VIIRS by Using Deep Learning Approach. In: Arai, K. (eds) *Advances in Information and Communication*. FICC 2022, Vol. 2. Lecture Notes in Networks and Systems, vol 439. Springer, Cham. [https://doi.org/10.1007/978-3-030-98015-3\\_16](https://doi.org/10.1007/978-3-030-98015-3_16). On March 12, Springer released the second volume of conference papers from the 2022 *Future of Information and Communication Conference*. CISESS Scientist Xingming Liang and STAR Scientist Quanhua Liu (SMCD/SCDAB) included their artificial intelligence work on estimating daytime clear-sky radiance for the JPSS Visible/Infrared Imager Radiometer Suite (VIIRS). Daytime radiances associated with infrared bands are more difficult to calculate from a radiative transfer model than nighttime because of effects of reflected solar radiation. To overcome this difficulty, the scientists used a deep learning approach to create a radiative

transfer *forward* model and tested this model based on its ability to recreate VIIRS five thermal emission bands. The new model produced accurate nighttime infrared bands as well as the old model, but more quickly. For daytime runs, the new model matched the performance of the old model, but had an abnormally high standard deviations (STDs). Further study will investigate the causes of high STDs. (Xingming Liang, CISESS, [xingming.liang@noaa.gov](mailto:xingming.liang@noaa.gov), JSTAR & JPSS PGRR)

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**Climate Change and a Sustainable Earth**

**John J. Qu** and Raymond P. Motha, 2022: Climate Change and a Sustainable Earth, Cambridge Scholars Publishing, 475 pp., ISBN (13): 978-1-5275-8044-2

<https://www.cambridgescholars.com/product/978-1-5275-8044-2>. CISESS Consortium Scientist John J. Qu (GMU) is the lead

author of a new textbook released by Cambridge Scholars that was publishing on March 10. The book focuses on the principles of climate change that can be used to help develop long-term strategies to cope with the resulting broader environmental, societal, and economic impacts. Using a multidisciplinary approach, the book combines the principles of changing climate with specialized fields that are part of the Water-Energy-Food-Health (WEFH) Nexus to examine how the Earth operates as an integrated system. The book can be used for introductory-level courses offered in the high school, undergraduate, and graduate programs, or as a scientific reference book. Thus, preparing students for challenges associated with future climates, and expose them to opportunities to better meet those challenges. (John J. Qu, CISESS Consortium (GMU), [jqu@gmu.edu](mailto:jqu@gmu.edu) , JSTAR & JPSS PGRR)

