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Editorial

Editorial for the Special Issue "ASTER 20th Anniversary"

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The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) is a research facility instrument on NASA's Terra spacecraft. We celebrated the 20th anniversary of ASTER since its launch in December 1999. ASTER has been providing high spatial resolution multispectral data in the visible to near infrared (VNIR), short wave infrared (SWIR) and thermal infrared (TIR) regions, and along-track stereo data. Starting April 2016, ASTER data have been distributed to the public at no cost. Another important, and the most popular data set, is the ASTER Global digital elevation model (DEM), which covers almost the entire land surface at 30 m grid size. ASTER data have been widely used in a variety of application areas such as land surface mapping and change detection, volcano and other natural hazard monitoring, mineral exploration, and urban heat island monitoring.

This special issue consists of 12 papers (2 reviews, 9 articles and 1 technical note), and covers topics including the development of new techniques to process ASTER data, calibration activities to ensure long-term consistency of ASTER data, validation of the ASTER data products, and scientific achievements using ASTER data. Abrams and Yamaguchi [1] provide a comprehensive review on ASTER contribution to lithological mapping and mineral exploration. Ramsey and Flynn [2] present the history of ASTER's contribution to volcanology, highlighting unique aspects of the instrument and its data. Kurata and Yamaguchi [3] propose a method of combining and visualizing multiple lithological indices derived from ASTER data and topographical information derived from DEM data. Gonzalez et al. [4] propose a new methodology to build an Earth-wide mosaic using ASTER images in pseudo-true color. Fu et al. [5] analyze the geomorphologic and lithologic features of Wudalianchi volcanoes in northeastern China by using the ASTER multispectral and DEM data. Kouyama et al. [6] assess sensitivity degradations of the ASTER bands based upon lunar and deep-space observation data obtained in 2003 and 2017. Tonooka and Tachikawa [7] develop a method for ASTER cloud coverage assessment using the Moderate Resolution Imaging Spectroradiometer (MODIS) cloud mask product, and also evaluated performance of the cloud avoidance function implemented in the ASTER observation scheduler. Cudahy et al. [8] show that ASTER mineral maps revealed both the compositional heterogeneity of loess, as well as the complexity of the sediment transport pathways of individual loess components around the Great Wall of China, built during the Ming Dynasty. Tsuchida et al. [9] discuss the sensor degradation curves of the ASTER VNIR bands based on the results of the onboard calibrator, the vicarious calibration, and the cross calibration since February 2014. Batbaatar et al. [10] propose a method to map the "zero curtain" as a precursor for delineating permafrost boundaries, determined from ASTER and MODIS land-surface temperature data. Mushkin et al. [11] provide validation of the ASTER emissivity product by using data from the airborne TIR hyperspectral Mako sensor. Fujisada et al. [12] describe the technical methodology for improving the initial tile-based waterbody data that are created during production of the ASTER GDEM.

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