Geophysical Research Abstracts
Vol. 18, EGU2016-8507, 2016
EGU General Assembly 2016

The Moon as Possible Calibration Reference for Microwave Radiometers

Martin Burgdorf, Stefan Buehler, Imke Hans, Theresa Lang, and Simon Michel
University of Hamburg, Meteorological Institute, Radiation and Remote Sensing, Hamburg, Germany

Instruments on satellites for Earth observation on polar orbits usually employ a two-point calibration technique, in which deep space and an on-board calibration target provide two reference flux levels. As the direction of the deep space view is in general close to the celestial equator, the Moon moves sometimes through the field of view and introduces an unwelcome additional signal. One can take advantage of this intrusion, however, by using the Moon as a third flux standard, and this has actually been done for checking the lifetime stability of sensors operating at visible wavelengths. We discuss the advantages and problems of extending this concept to microwaves, concentrating on the frequency of appearances of the Moon in the deep space view, the factors limiting the accuracy of both measurements and models of the Moon's brightness, as well as benefits from complementing the naturally occurring appearances of the Moon with dedicated spacecraft maneuvers. Such pre-planned rotations of the instrument would allow to observe the Moon at a well-defined phase angle and to put it at the exact center of the field of view. This way they would eliminate the need for a model of the Moon's brightness temperature when checking instrumental stability. Finally we investigate the question, whether foreground emission from objects other than the Moon can contaminate the measurements of the Cosmic Microwave Background, which provides the low reference flux in the deep space view. We show that even the brightest discreet sources do not increase significantly the signal from a single scan.