

# **Calibration, validation and retrievals on satellite-based microwave instruments**

HE Jieying<sup>1</sup> (Member, IEEE), DONG Xiaolong<sup>1</sup> (Member, IEEE), Ralf Bennartz<sup>2,3</sup> (Member, IEEE)

1.Key Laboratory of Microwave Remote Sensing, National Space Science Center,  
National space science center,,  
Chinese Academy of Sciences, Beijing 100190, China

2 Space Science and Engineering Center, University of Wisconsin – Madison, US;

3 Earth and Environmental Sciences, Vanderbilt University, Nashville, US;

Email:hejieying@mirslab.cn

Telephone/fax:86-010-62582907

Different from the work last year, the paper develops a all-weather and all-day passive sub-millimeter precipitation retrievals algorithm for Microwave Humidity and Temperature Sounder (MWHTS) onboard the Chinese Feng Yun 3C (FY-3C) satellite. The retrieval algorithm employs a number of neural network estimators trained and evaluated using the validated global reference physical model NCEP/WRF/ARTS, and works for seawater. NCEP data per 6 hours are downloaded to run the Weather Research and Forecast model WRF, and derive the typical precipitation data from the whole world. The Atmospheric Radiative Transfer Simulator ARTS is feasible for performing simulations of atmospheric radiative transfer. Rain detection algorithm has been used to generate level 2 products. Retrievals are reliable for surface precipitation rate higher than 0.1 mm/h at 15km resolution, which is in good agreement with those retrieved using the Precipitation retrieval algorithm version 1(ATMP-1) for Advanced Technology Microwave Sounder (ATMS) aboard Suomi NPP satellite.

Meanwhile, calibration and validation between similar instruments onboard different satellites are also important to ensure the validity of observations and accuracy of precipitation retrievals. In the ongoing work, we are going to carry out the calibration and validation among FY-3C MWHTS, FY-3B MWHS and ATMS, and some preliminary results can be shown in the conference materials.