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Author: Dr. Guang Ming Chen

1Science and technology on aerospace flight dynamics laboratory, Beijing, China2Beijing aerospace control center, Beijing, China;, China, chen\_g\_m@126.com

Mr. Xie Li

1Science and technology on aerospace flight dynamics laboratory, Beijing, China2Beijing aerospace control center, Beijing, China;, China, lixie\_afdl@163.com

Prof. Hong Gao

National Space Science Center (NSSC), Chinese Academy of Sciences, China, hgao@swl.ac.cn

Prof. Maosheng He

Germany, hmq512@gmail.com

Mr. Zhengxu Pan

National Key Laboratory of Aerospace Flight Dynamics, Northwestern Polytechnical University, Xi'an, China, pzxmlgj@163.com

Dr. Shushi Liu

1Science and technology on aerospace flight dynamics laboratory, Beijing, China2Beijing aerospace control center, Beijing, China;, China, lss\_880211@aliyun.com

Mr. Haijun Man

1Science and technology on aerospace flight dynamics laboratory, Beijing, China2Beijing aerospace control center, Beijing, China;, China, hjman@foxmail.com

THERMOSPHERIC DENSITY OBSERVATIONS FROM APOD SATELLITES AND COMPARISON  
WITH NEW EMPIRICAL MODELS

**Abstract**

The Chinese APOD (Atmospheric density detection and Precise Orbit Determination) satellites, include one nano-satellite called APOD-A and three pico-satellites, were launched on September 20, 2015. One of the main purposes of the mission is to observe thermospheric density. The APOD-A satellite carries a pressure gauge density detector, which can perform in-situ detection of atmospheric density with high temporal resolution. The satellite also carries a high-precision GPS receiver to achieve high-precision orbit determination. Based on the high-precision orbit determination data, the average atmospheric density along the orbit can be retrieved, and the retrieved average atmospheric density can be used for on-orbit calibration of atmospheric density detector observations. The APOD satellite can observe the global thermospheric density at dawn and dusk. At present, it has accumulated high-level atmospheric density data for more than six years. These data provide an important data source for the study of high-level atmospheric density. The JB2008, MSIS2.0 and DTM2020 models are the latest thermospheric atmospheric models, and we used APOD data to compare the JB2008, MSIS2.0 and DTM2020 model results to assess the accuracy of these models.