

Simulation studies for humidity profile retrieval from SAPHIR

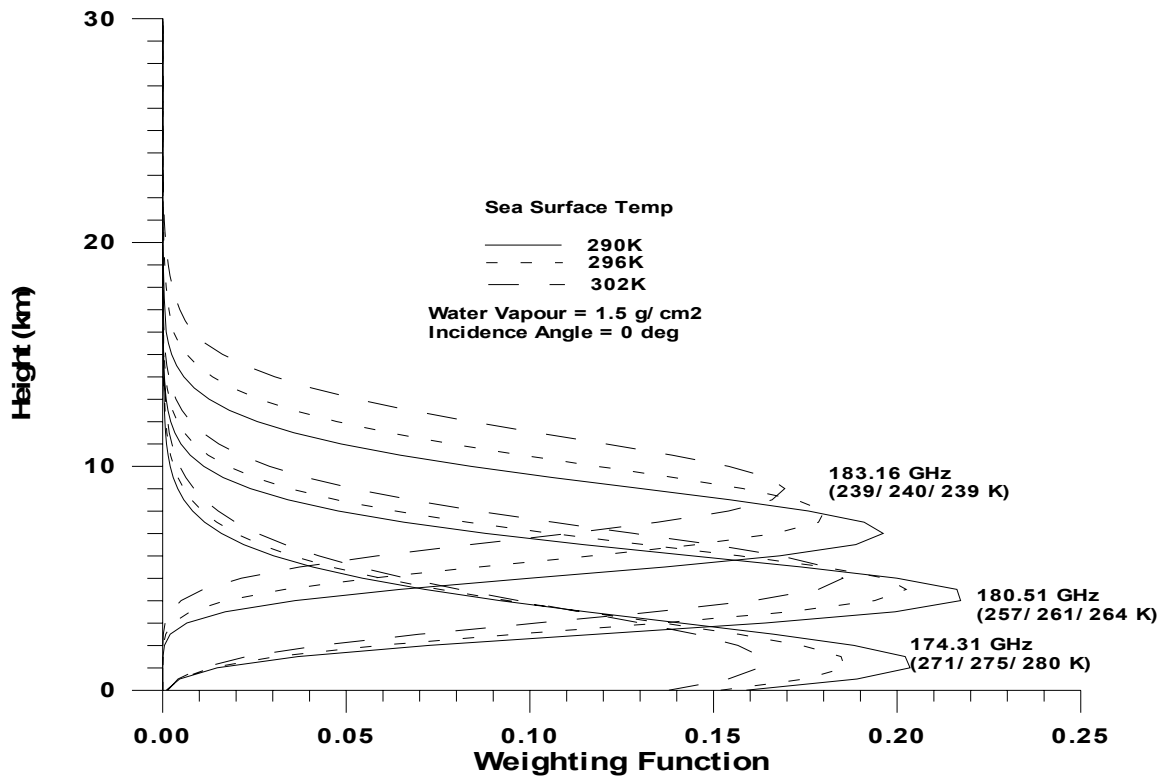
**B.S. Gohil, B.G. Vasudevan, A.K. Mathur,
S.K. Basu and V.K. Agarwal**

**Oceanic Sciences Division
Meteorology & Oceanography Group
Space Applications Centre (ISRO)
Ahmedabad – 380015, India
Email: bsgohil@yahoo.com
Fax: 91-79-6762829, Ph: 91-79-6774360**

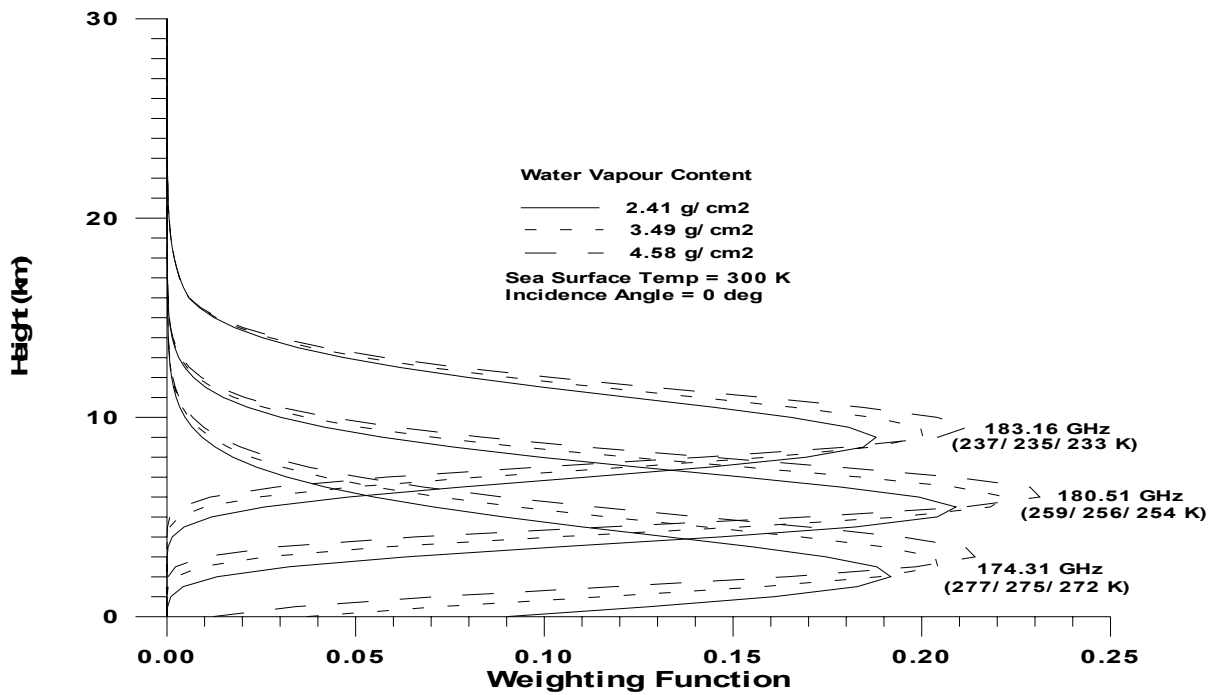
MEGHA-TROPIQUES 2nd Scientific Workshop, 2-6 July 2001, Paris, France.

Abstract

Radiative transfer based simulations have been carried out to study the retrieval of clear sky atmospheric humidity profiles from SAPHIR. Preliminary results suggest that the retrieval of humidity profile using 183 GHz absorption band is complex due to dependence of emitted microwave radiation on water vapour and temperature profiles, variable incidence angle of SAPHIR and channels with frequencies away from water vapour resonance line at 183.31 GHz. Added to this complexities is the lack of models of surface emissivity for land/ocean at such high frequencies. Apart from this, the problem is further complicated due to the sounding levels of various SAPHIR channels varying with amount of water vapour in the atmosphere. Part solutions to these problems have been sought through proper selection of statistical approaches used in remote sensing. In this regard, information of total water vapour content available from MADRAS is found to be important. Results of systematic studies of these related issues shall be presented.

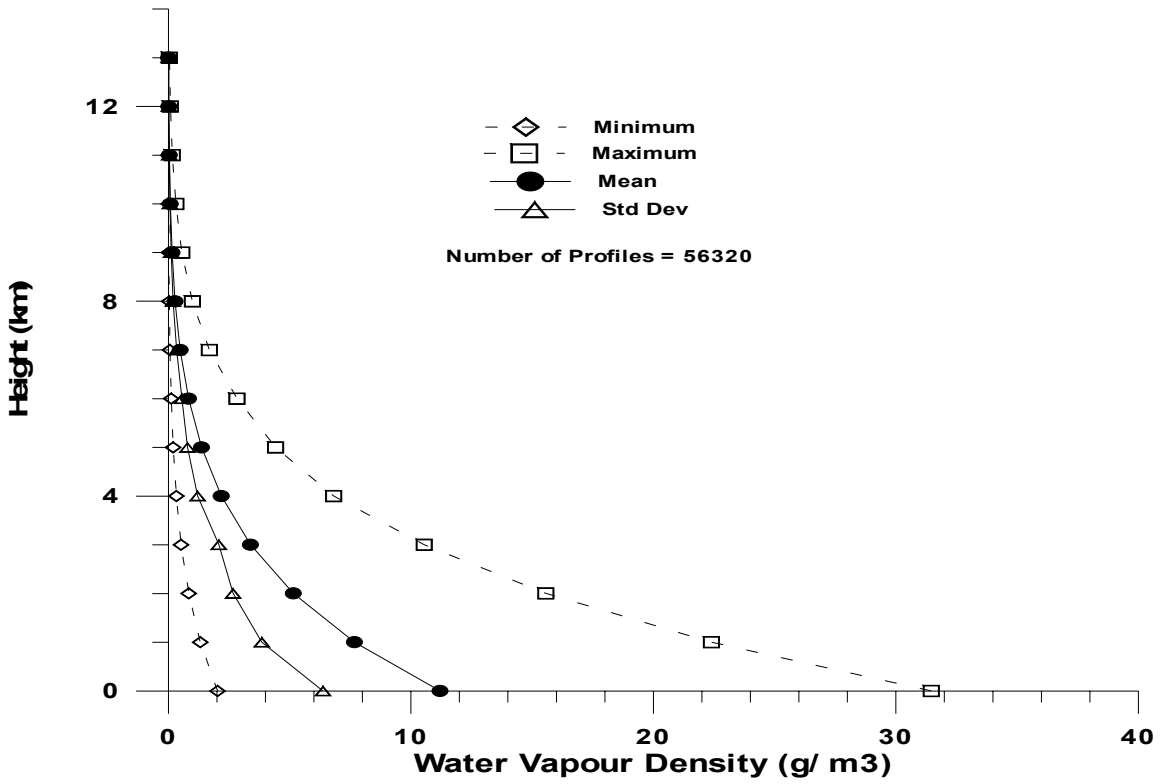


(a)



(b)

Figure (1): Impact of profile of temperature (a) and humidity (b) on weighting functions of SAPHIR channels.



Figure(3): Statistics of simulated humidity profiles used in the study

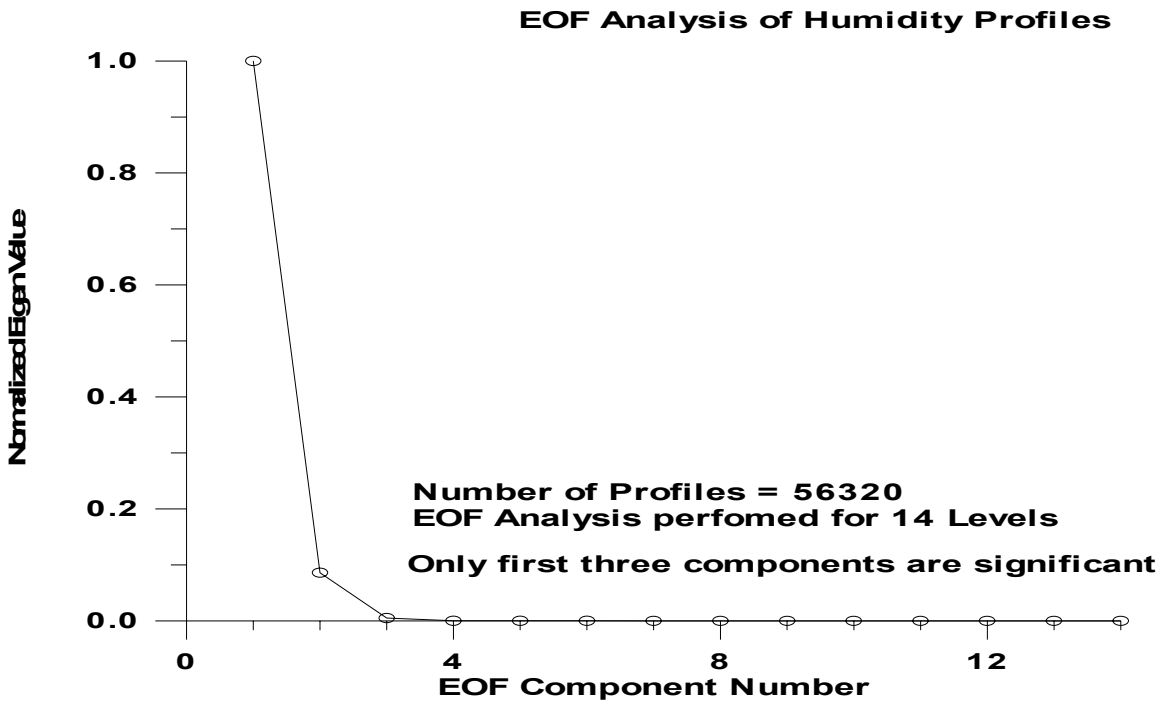
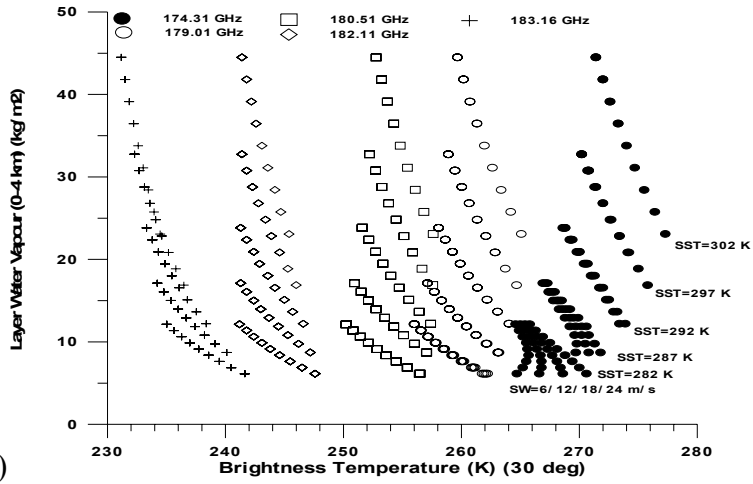
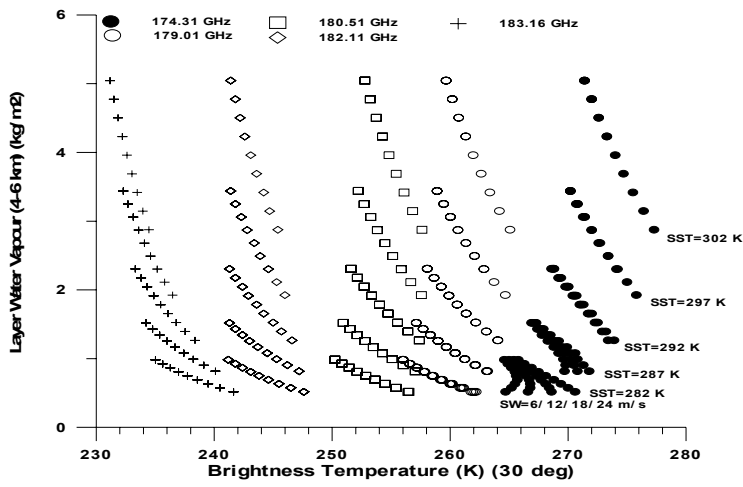


Figure (4): EOF analysis of simulated humidity profiles.



(a)



(b)

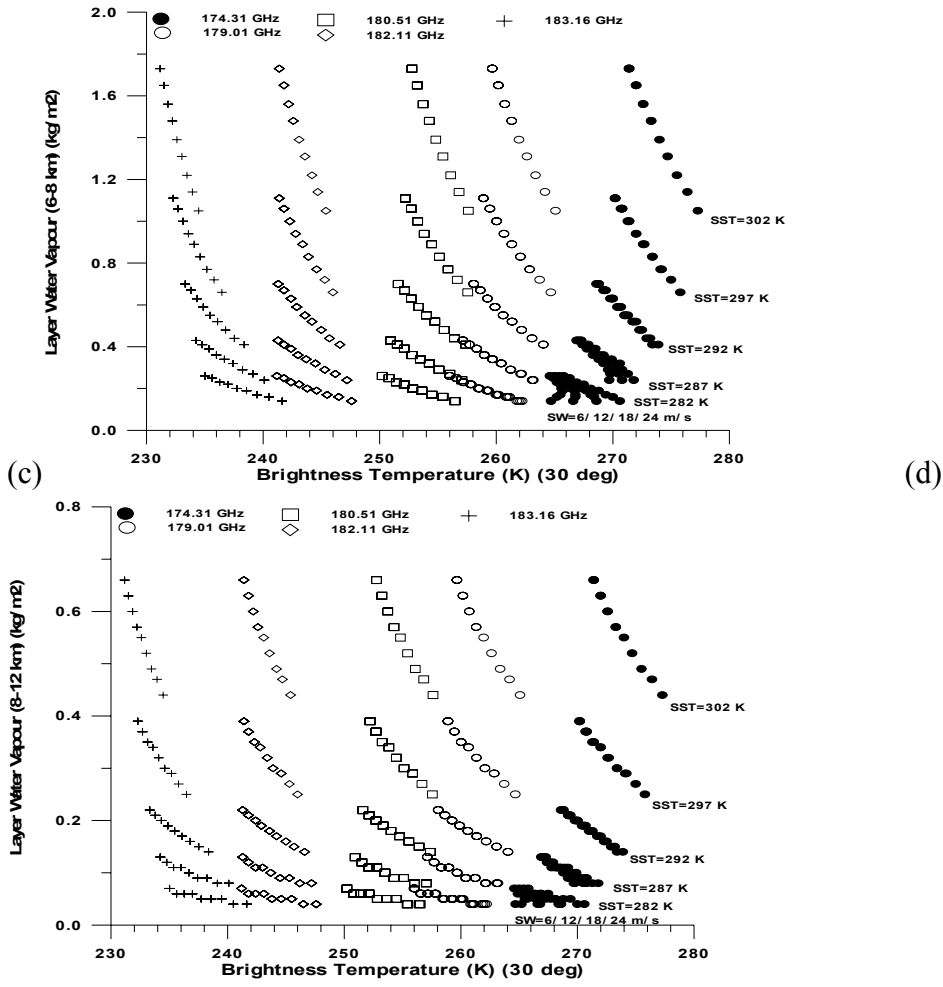
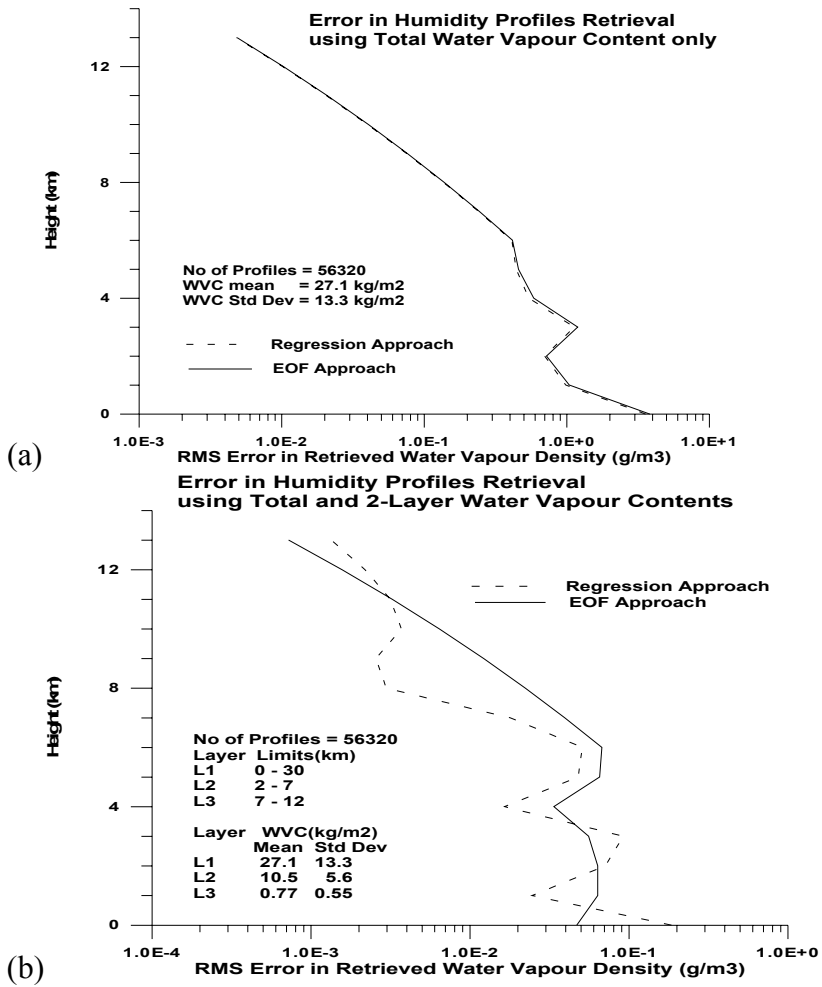


Figure (2): Variation of brightness temperatures of SAPHIR channels with moisture in different atmospheric layers and surface winds.



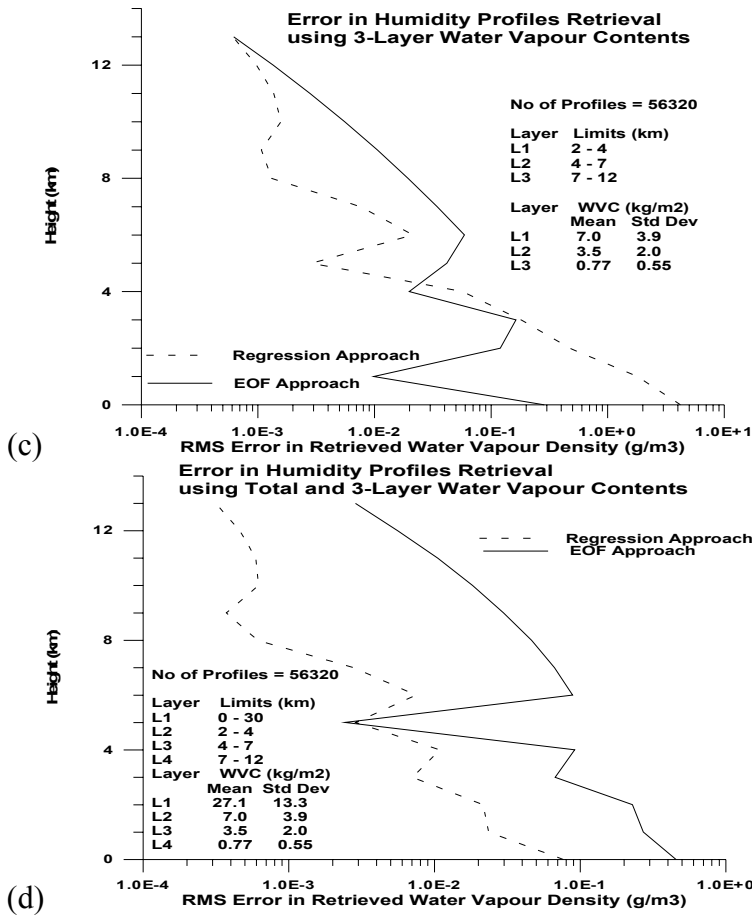


Figure (5): Errors in humidity profile retrieval using layer integrated water vapour contents from SAPHIR and total water vapour content from MADRAS