

VALIDATION OF COSMIC RADIO OCCULTATION DERIVED NEAR SURFACE RELATIVE HUMIDITY OVER INDIA

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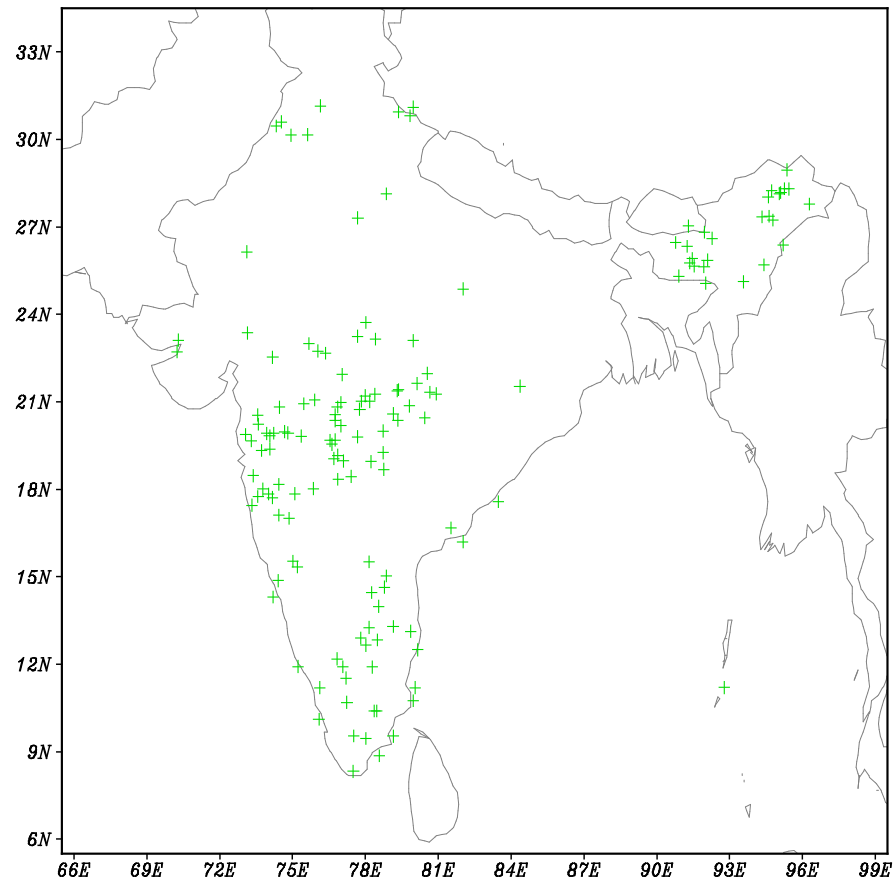
Introduction

- É GPS Radio Occultation (GPS-RO) is a technique which holds potential for precise humidity measurements in the earth's atmosphere**
- É Recent advances have lead GPS RO profiles to penetrate lower in to the troposphere often less than a kilometer from the surface.**
- É Indian Space Research Organization has a dense network of AWS which can be used to validate GPS-RO derived near surface relative humidity from missions like COSMIC.**

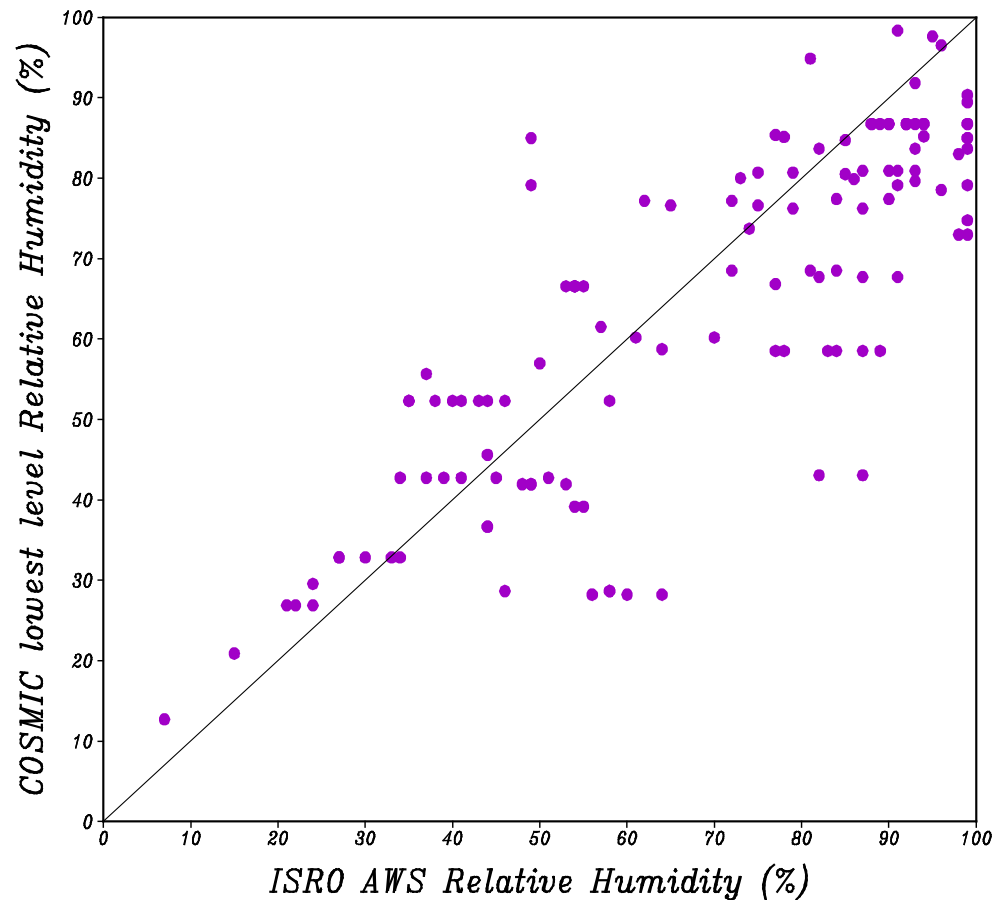
Data

- É 149 COSMIC profiles (taken from <http://cosmic-io.cosmic.ucar.edu>) whose tangent points located within 50 Km radius from 290 ISRO AWS. Difference in times of measurements is less than one hour.
- É 127, 40, and 13 COSMIC-RO and ISRO AWS collocated pairs penetrated with a difference between ISRO AWS and COSMIC-RO lowest level of observed refractivity within 100 hPa, 50 hPa and 20 hPa respectively.

LOCATIONS OF COSMIC-RO TANGENT POINTS COLLOCATED WITH ISRO AWS



COSMIC-RO lowest level within 100 hPa from ISRO AWS

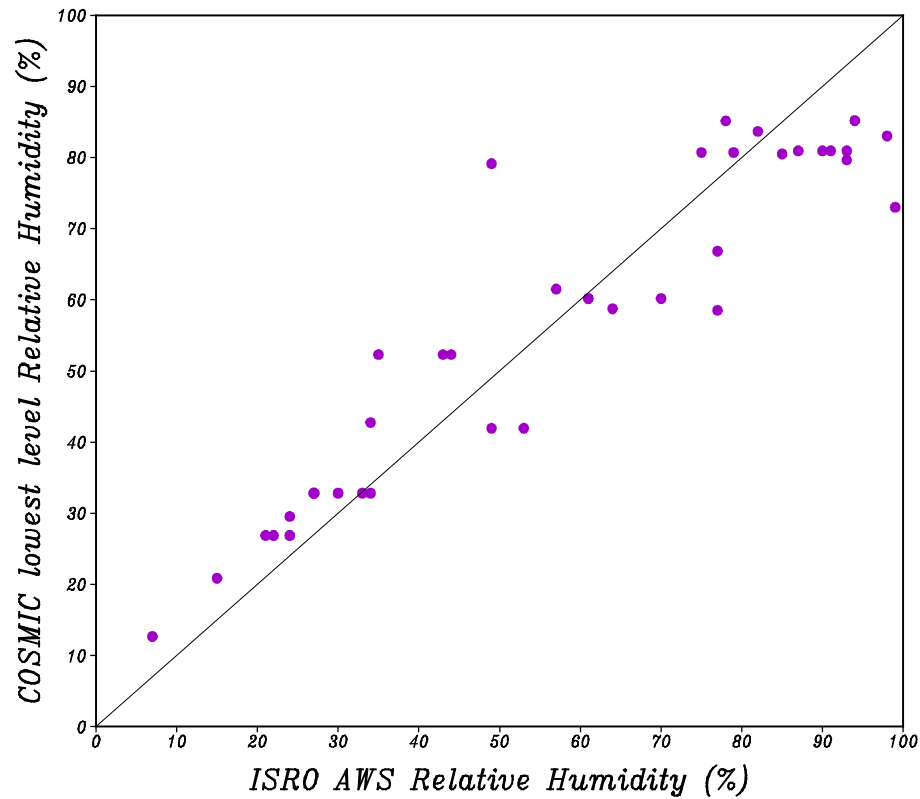


Mean deviation
= 4.71

RMS Difference
= 14.37

No. of Collocation
Pairs = 127

..Within 50 hPa..

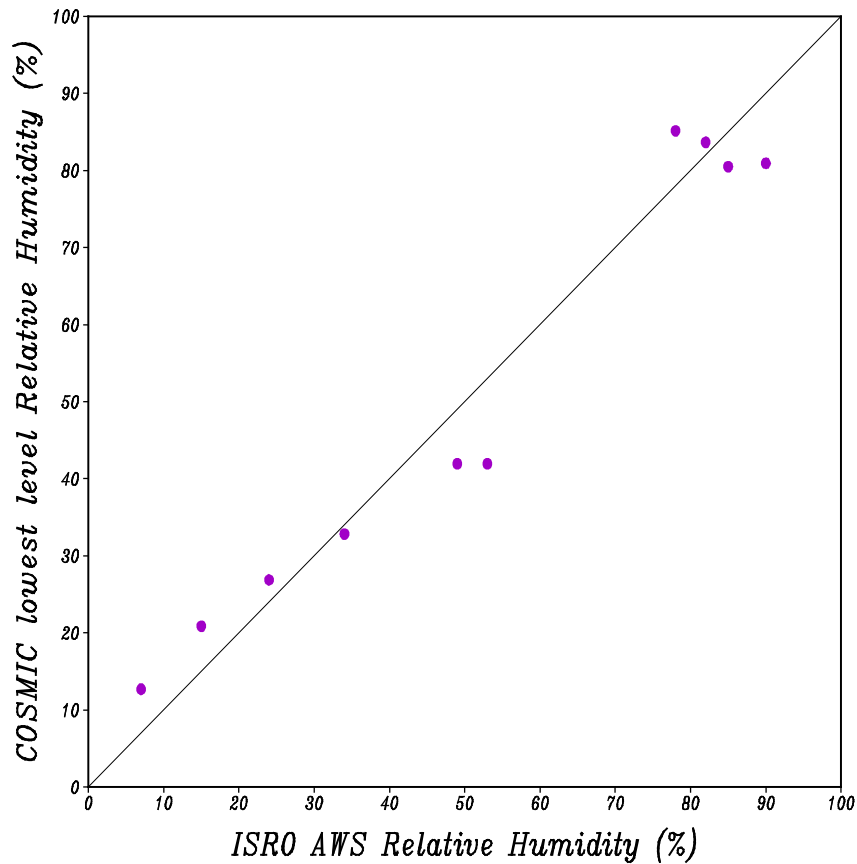


Mean Deviation
= **0.78**

RMS Difference
= **10.1**

No. of collocation
pairs = **40**

..Within 20 hPa..



Mean Deviation
= 0.96

RMS Difference
= 5.58

No. of Collocation
pairs = 13

Discussion

- É Comparison of COSMIC near surface relative humidity with ISRO AWS indicate unbelievably better results (better than 10% RMS).
- É This may be due to dense ISRO AWS network with more than 5 AWS collocating with a COSMIC RO profile and resulting averaging.
- É Collocation time within less than an hour and collocation distance within 50 Km may also be the reason for better comparison.
- É ISRO AWS instantaneous hourly observations prove useful in validation campaigns for future Indian missions like Oceansat-2, Megha-Tropiques, INSAT-3D.