Inter-comparison of CHAMP N and Radiosonde N

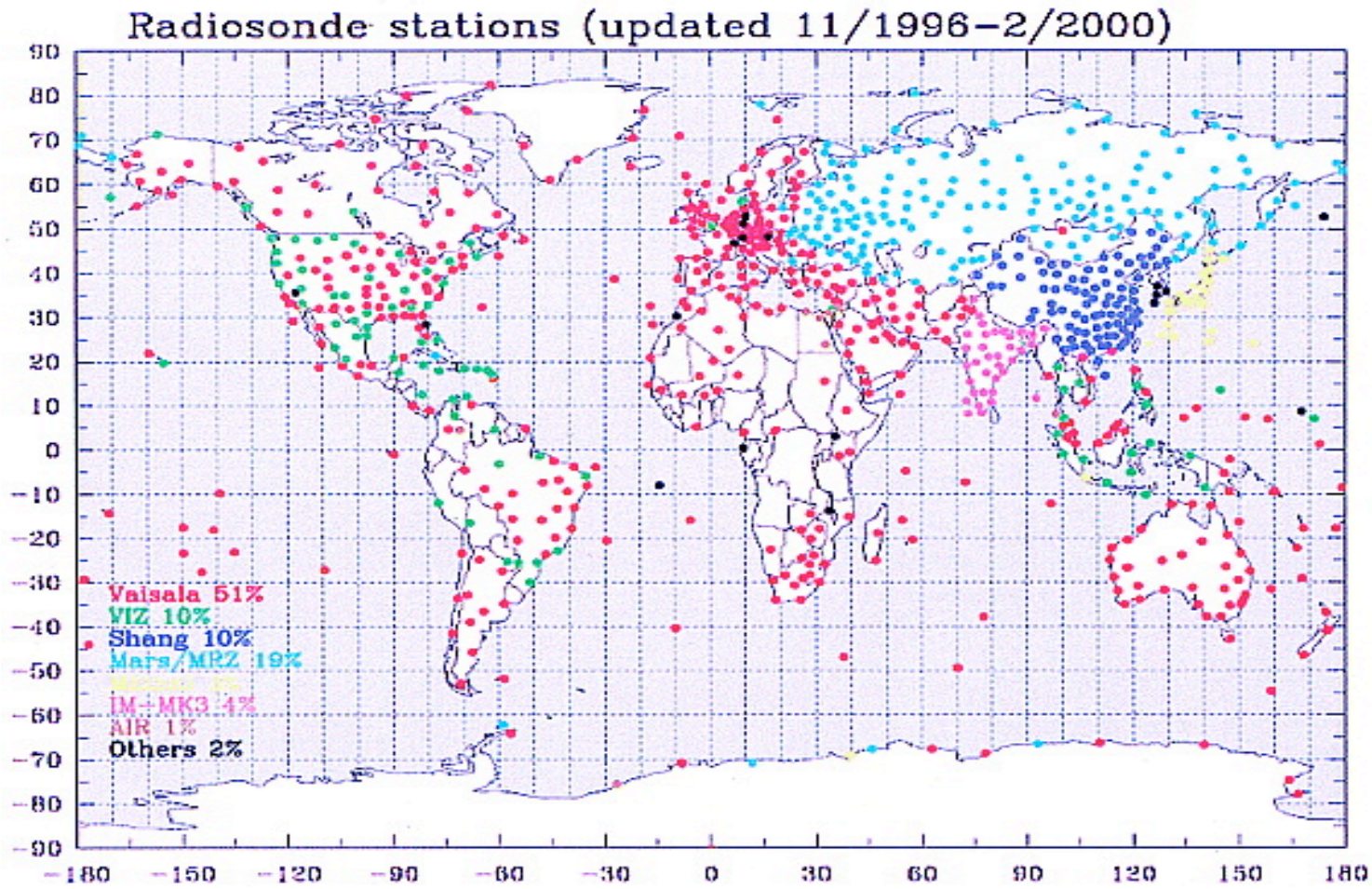
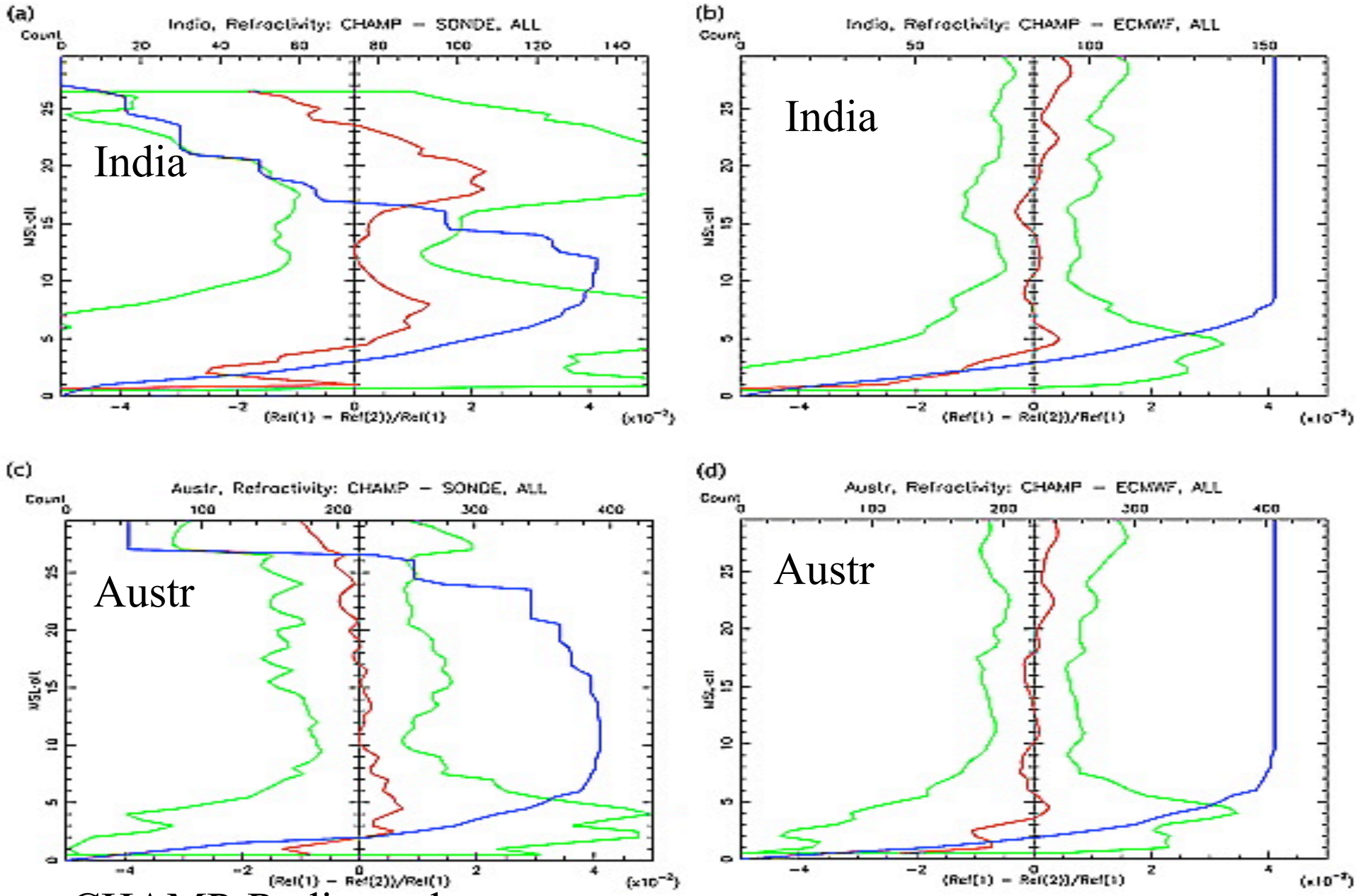


Fig. 1



CHAMP-Radiosonde CHAMP-ECMWF

Fig. 2 (Kuo et al., GRL, 2005)

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Mean Absolute Fractional Differences and Standard Deviation (S.D.) of Refractivity Between CHAMP RO Soundings and the Soundings From Five Different Types of Radiosonde System

Regions	Sonde Type	#of Matches	Del Nradio/S.D.	Del Necmwf/S.D.
India	IM-MK3	87	0.82/3.2	0.15/1.
Russia	Mars	1003	0.3/1.3	0.09/0.9
Japan	MEISEI	107	0.26/1.7	0.14/1.1
China	Shanghai	402	0.19/1.4	0.15/1.0
Australia	Vaisala	366	0.18/1.3	0.13/0.9

Table 1

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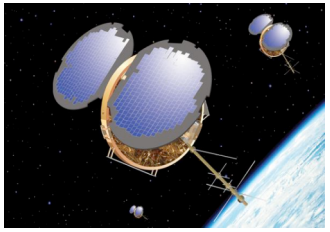
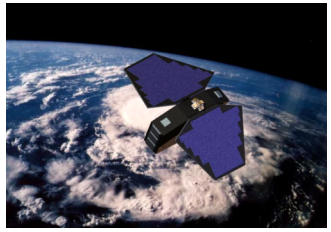


Information of 1D-var WV is mainly from RO Refractivity



Simulation results, using radiosonde T, W, P + noise to generate N

1D-var WV not sensitive to initial WV

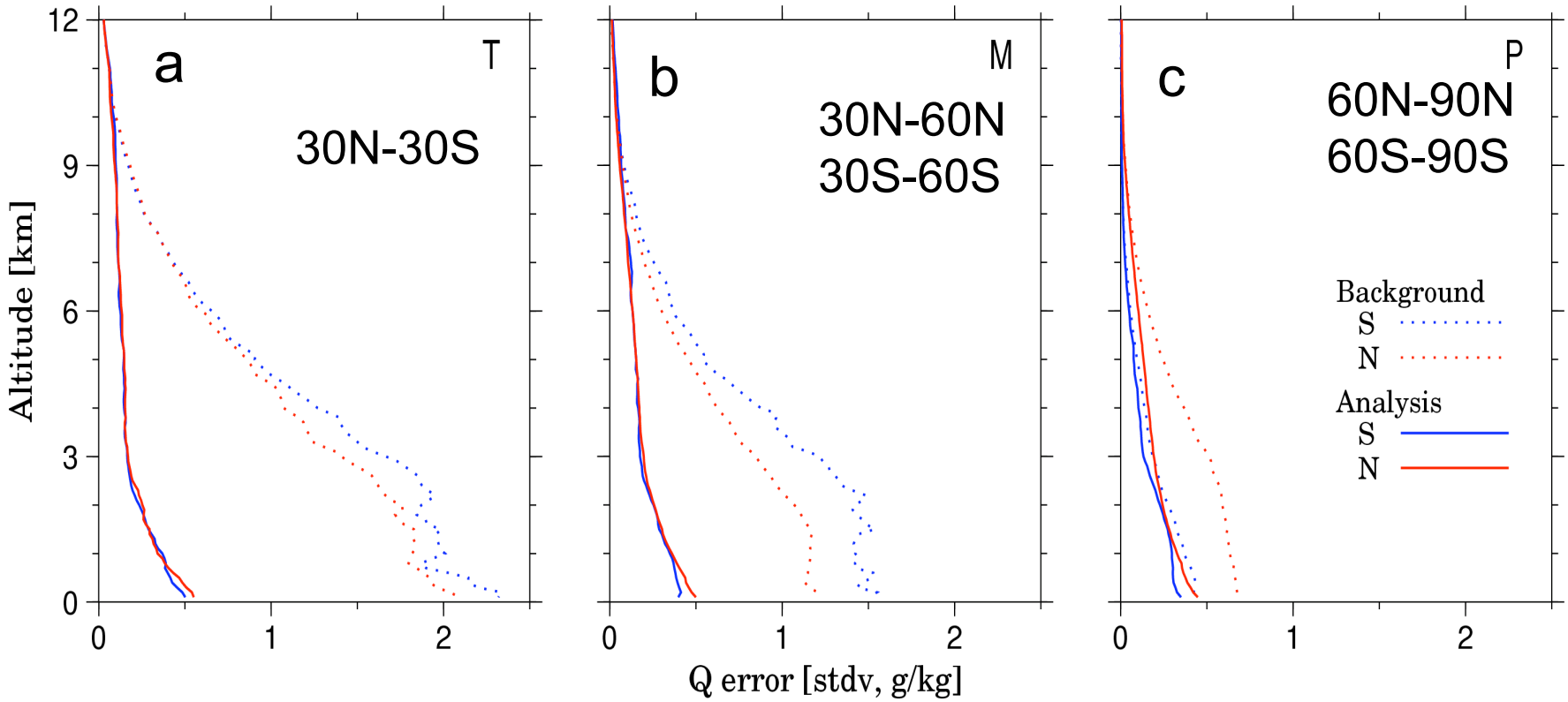
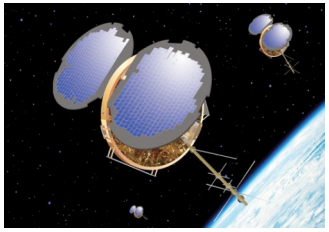
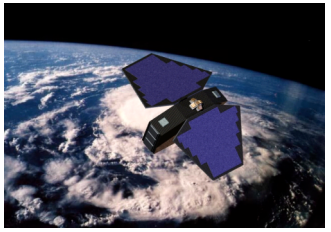


Fig. 3 Standard Deviation of 1D- Var WV - Radiosonde WV



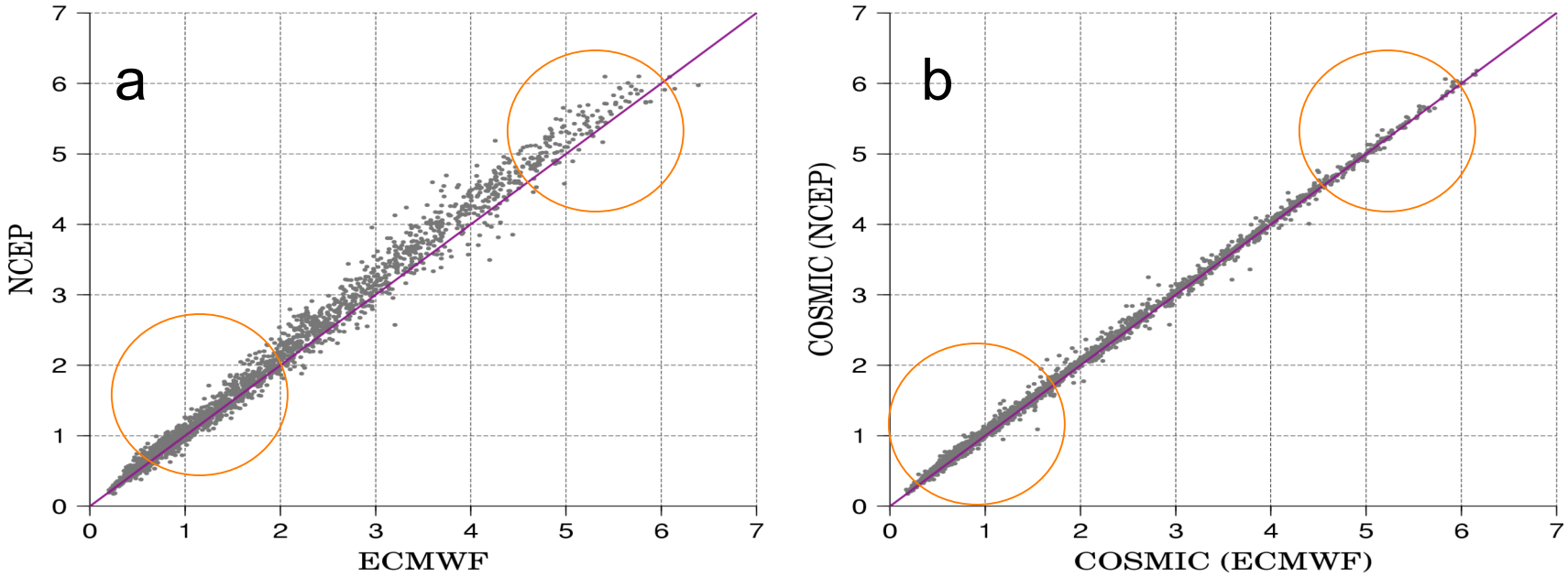
Q. Does 1D-var WV results depend on initial WV ?



Information of 1D-var WV is mainly from observations
1D-var WV is not sensitive to initial WV

PW derived from NCEP or ECMWF analyses

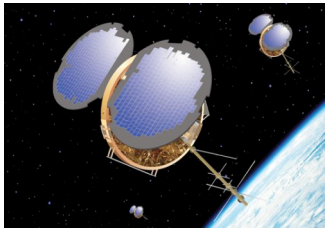
PW retrieved from COSMIC GPS RO data using NCEP or ECMWF analysis as first guess



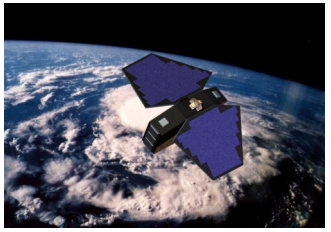
From: Wee and Kuo (2007)

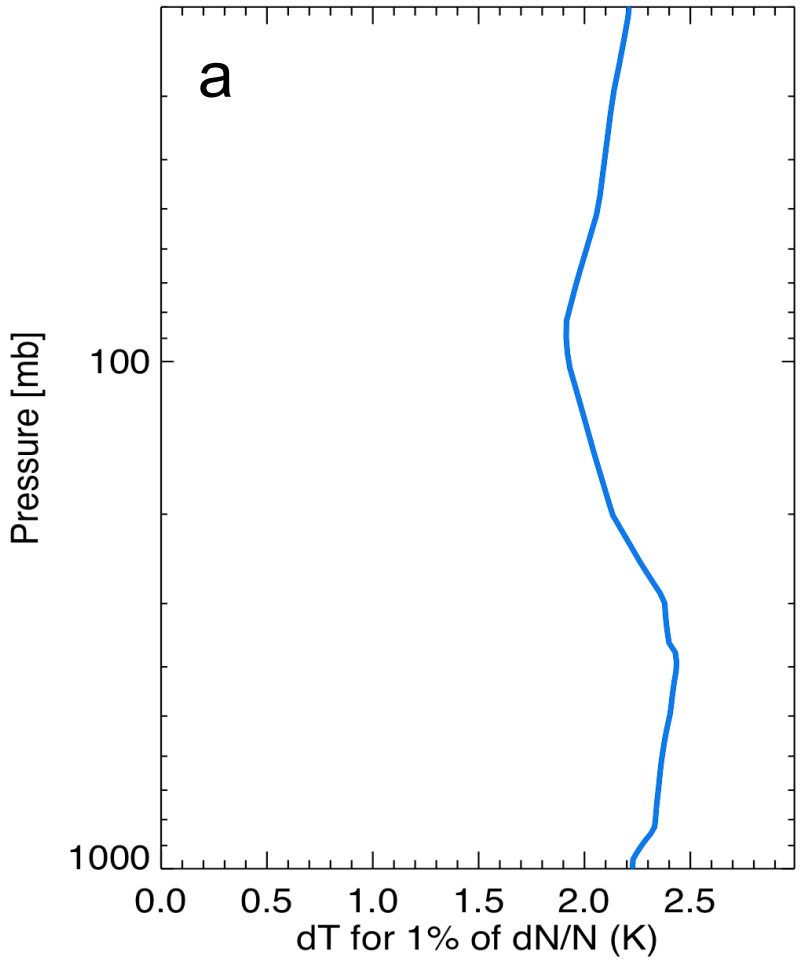
Fig. 4

Comparison of PW data from COSMIC and global analyses



Q. How the uncertainty of initial T and retrieved T will affect 1D-var Water vapor ?





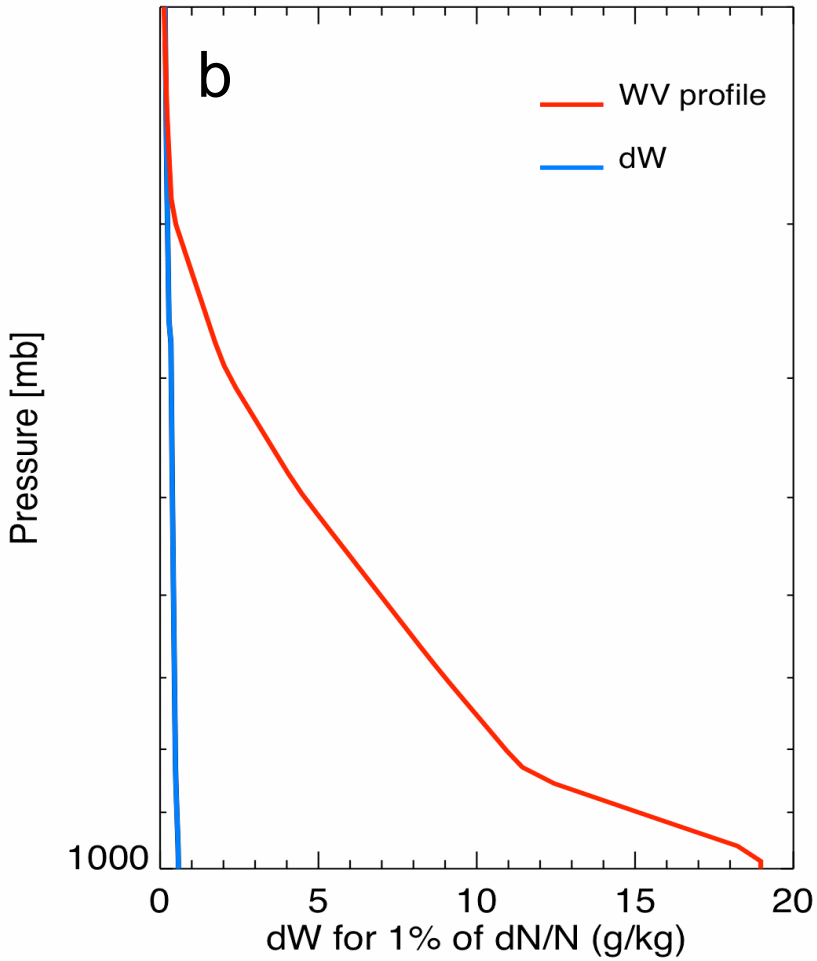


Fig. 5

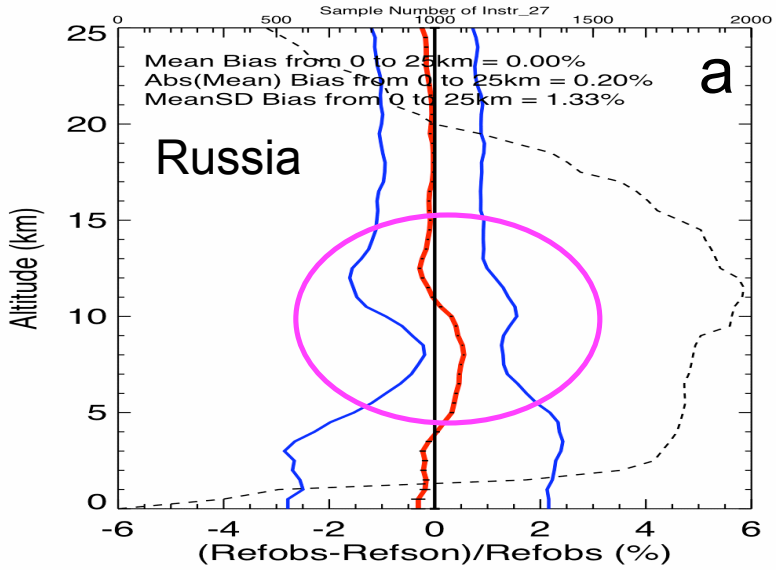
Shu-peng Ben Ho, UCAR/COSMIC

Mean Difference, Mean Absolute Fractional Differences, and Standard Deviation (S.D.) of Refractivity (%), Temperature (K) (from surface to 25 km) and water vapor (g/kg) (from surface to 10km) between COSMIC RO Soundings and the Soundings from four regions with several types of radiosonde System.

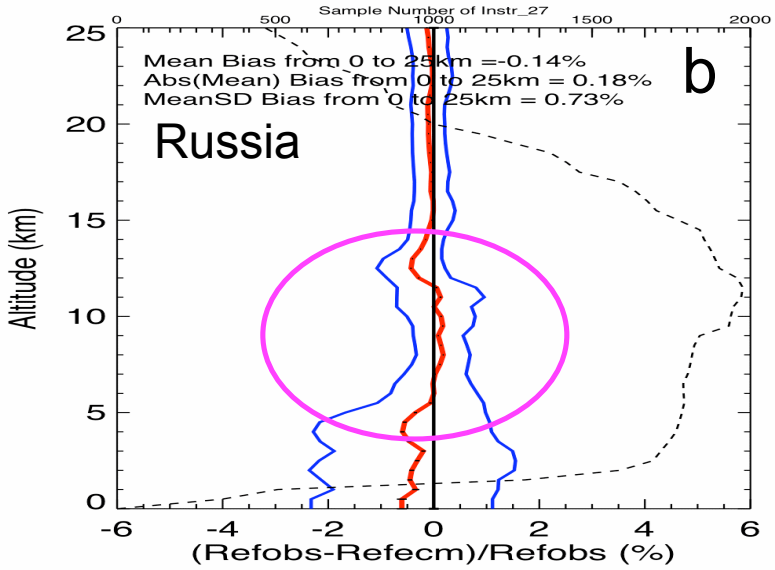
Regions	Sonde Type	#of Matches	Del Nradio/ Absolute mean (S.D.) (%)	Del Necmwf/ Absolute mean (S.D.) (%)	Del Tradio/ Absolute mean (S.D.) (K)	Del Tecmwf/ Absolute mean (S.D.) (K)	Del Wradio/ Absolute mean (S.D.) (g/kg)	Del Wecmwf/ Absolute mean (S.D.) (g/kg)
Russia	Mars	2000	0.0/0.2 (1.33)	-0.14/0.18 (0.73)	-0.28/0.3 (1.9)	-0.04/0.11 (0.6)	**-0.03**/0.08 (0.57)	-0.004/0.04 (0.32)
Japan	MEISEI	125	0.13/0.2 (1.53)	0.08/0.2 (0.91)	0.15/0.23 (1.88)	-0.11/0.16 (0.62)	**0.07**/0.09 (0.83)	0.06/0.09 (0.53)
China	Shang	625	**0.07/0.46 (1.43)**	**-0.04/0.20 (0.9)**	-0.2/0.37 (1.7)	-0.11/0.16 (0.55)	**0.25/0.34 (0.85)**	**0.03/0.13 (0.48)**
Others	Vaisala	3000	0.08/0.18 (1.6)	-0.02/0.09 (0.81)	-0.01/0.1 (1.78)	-0.03/0.08 (0.6)	**0.11**/0.11 (0.61)	-0.001/0.034 (0.37)

Table 2

N Comparison



100*(COSMIC-Son N)/COSMIC N (%)



100*(COSMIC N-ECMWF N)/COSMIC N (%)

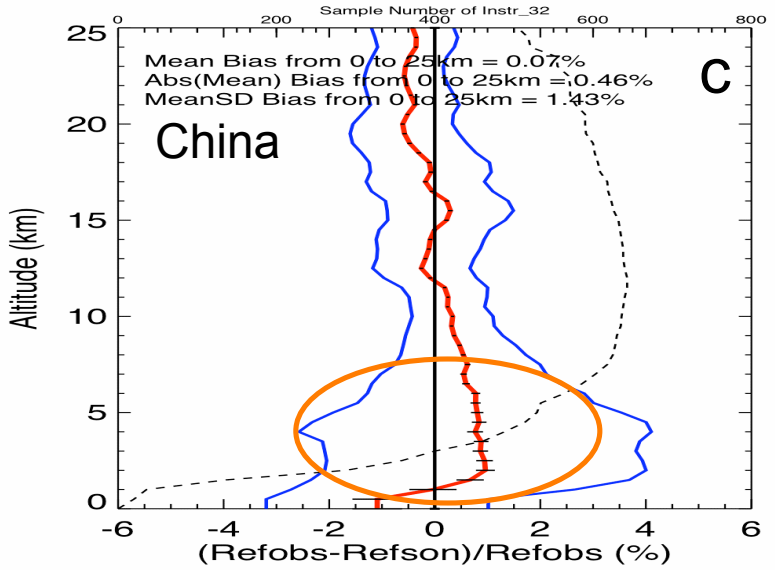
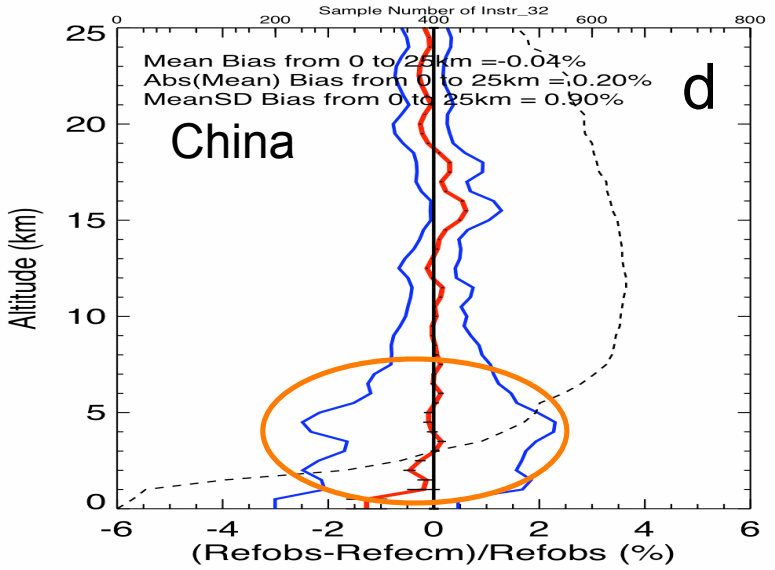
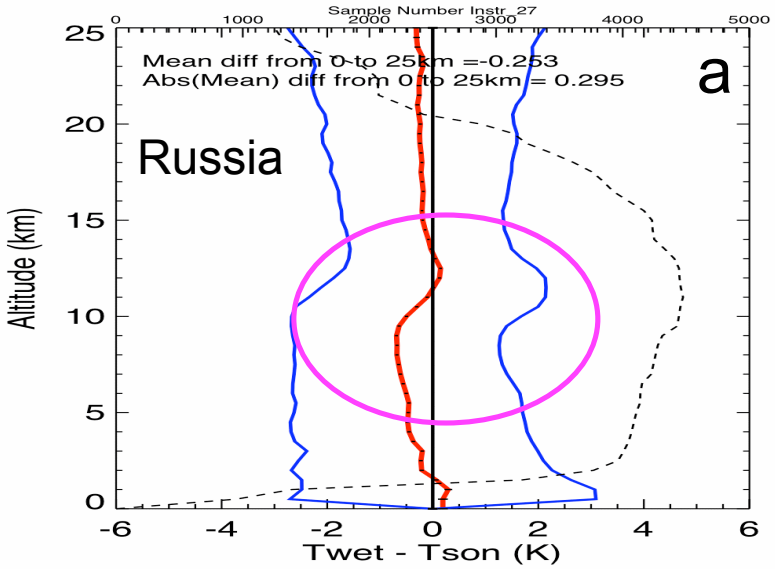


Fig. 6 100*(COSMIC-Son N)/COSMIC N (%)

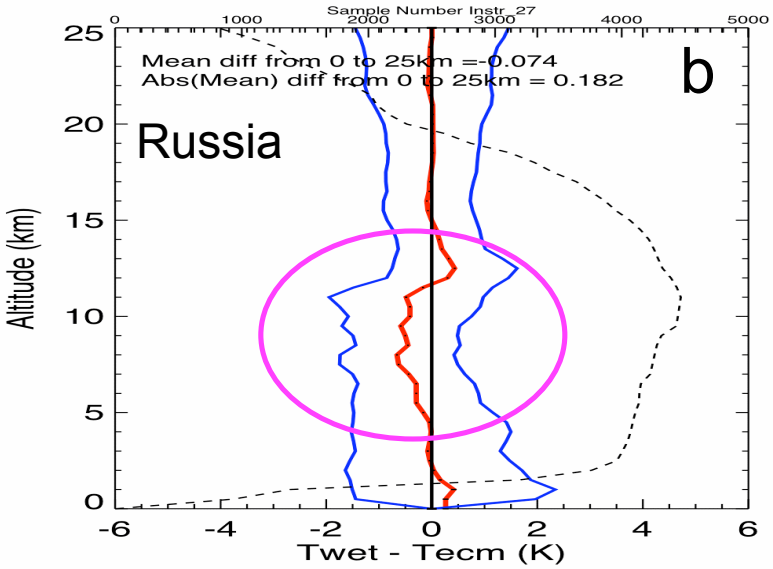


100*(COSMIC N-ECMWF N)/COSMIC N (%)

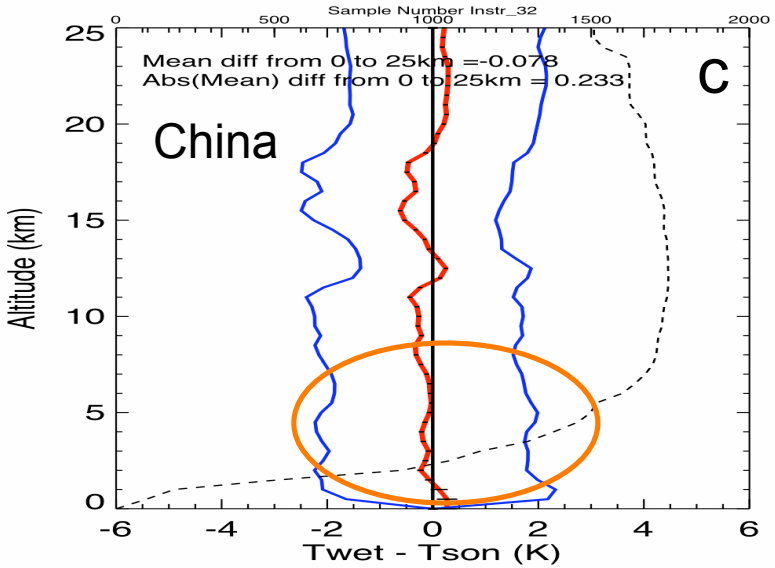
Temperature Comparison



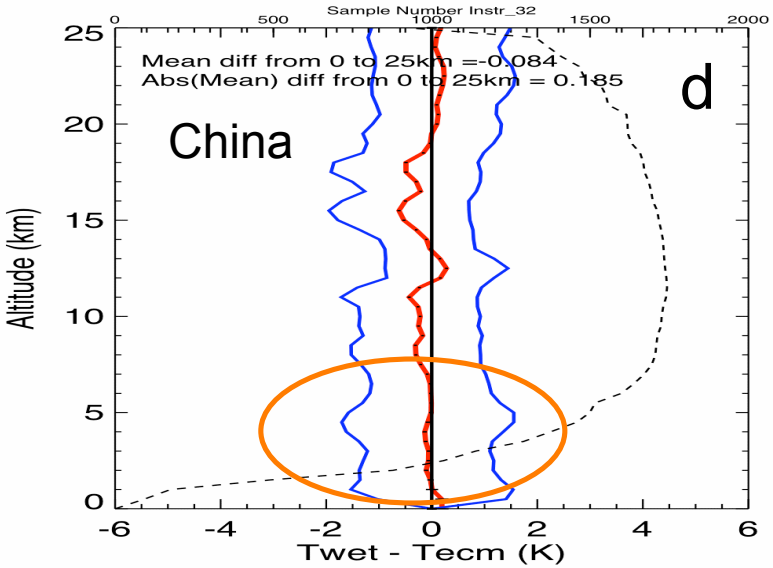
COSMIC T -Sounding T (K)



COSMIC T - ECMWF T (K)



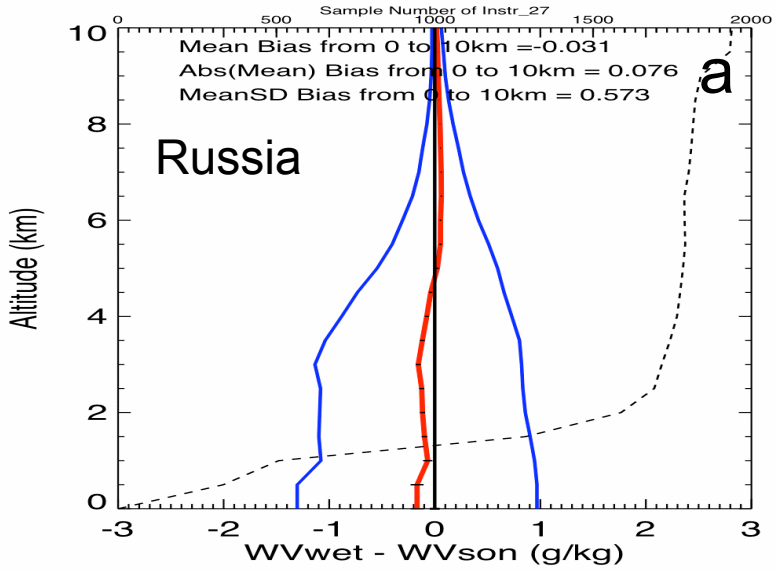
COSMIC T -Sounding T (K)



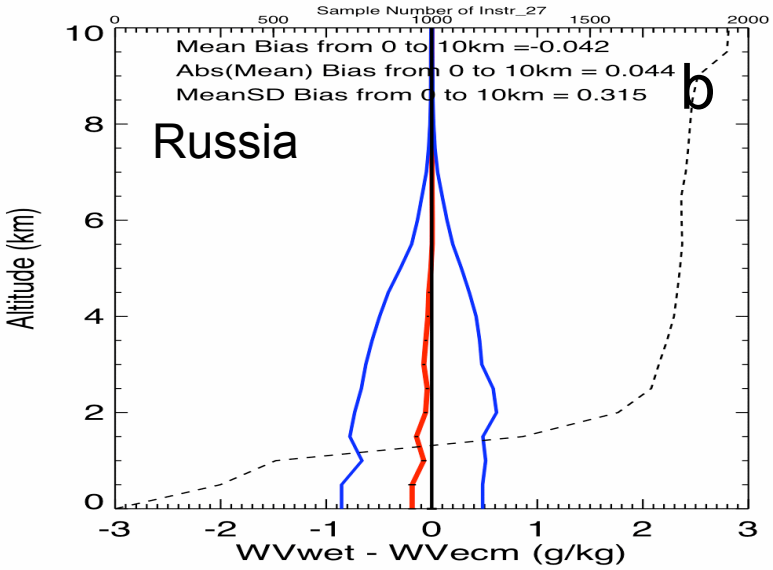
COSMIC T - ECMWF T (K)

Fig. 7

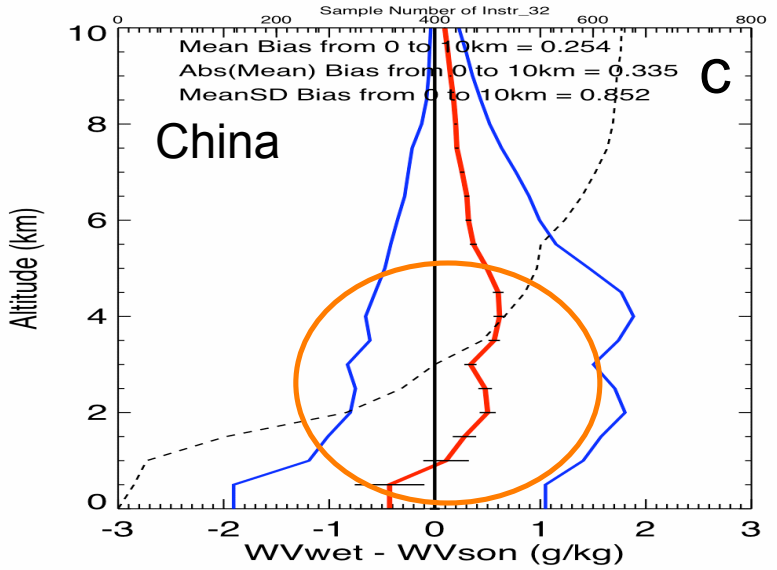
Water Vapor Comparison



COSMIC WV - Sounding WV (g/kg)



COSMIC WV - ECMWF WV (g/kg)



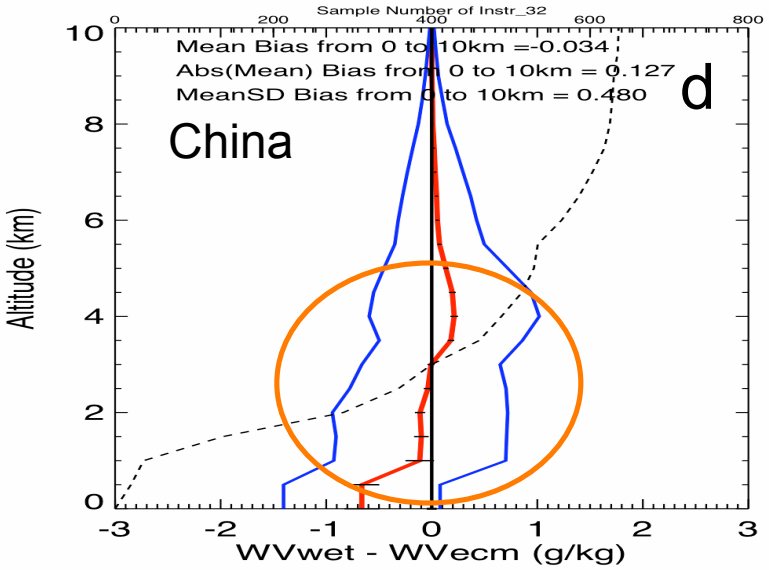


Fig. 8 COSMIC WV - Sounding WV (g/kg)

COSMIC WV - ECMWF WV (g/kg)