

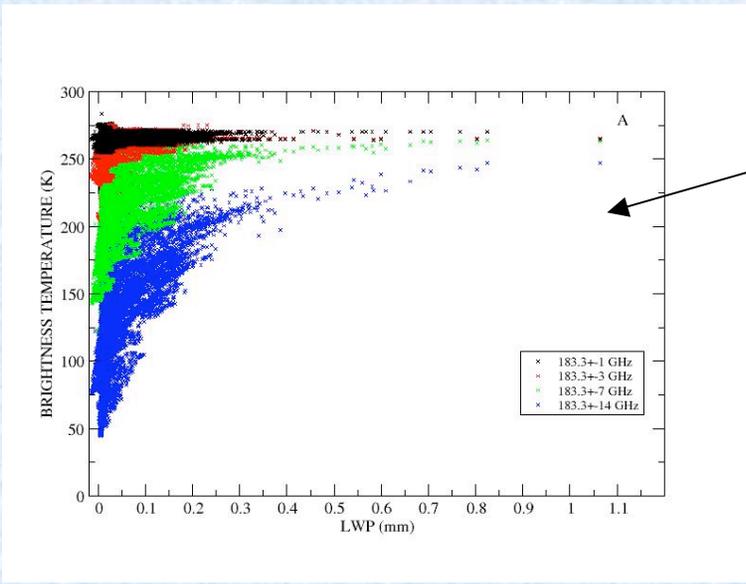
GVR

(G-Band Vapor Radiometer)

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- **Deployed in Barrow 4/14/2005**
- **4 double side-band channels at 1, 3, 7, 14 GHz from 183.3 GHz**
- **Bandwidth 0.4, 1.0, 1.4, 2.0 GHz**
- **Successful data stream collection and processing**
- **Improved PWV and LWP retrieval**

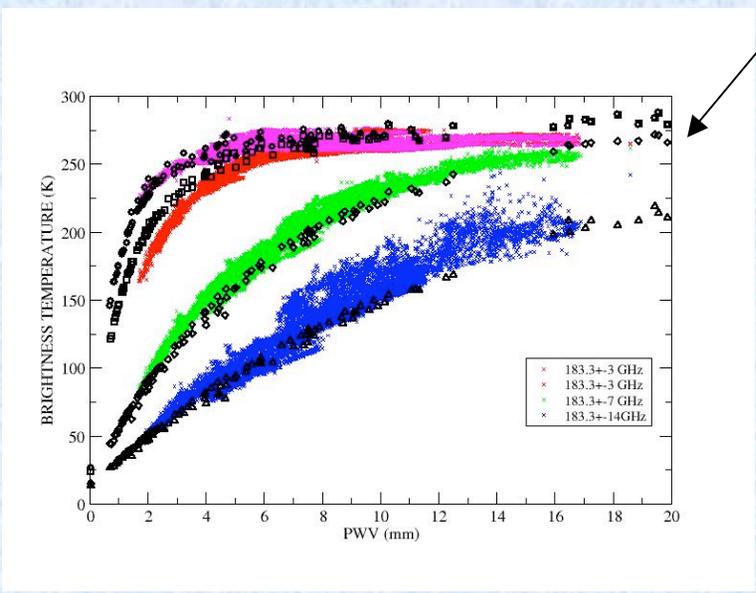
CPWG/IRF Meeting, Annapolis, MD, November 2-4, 2005



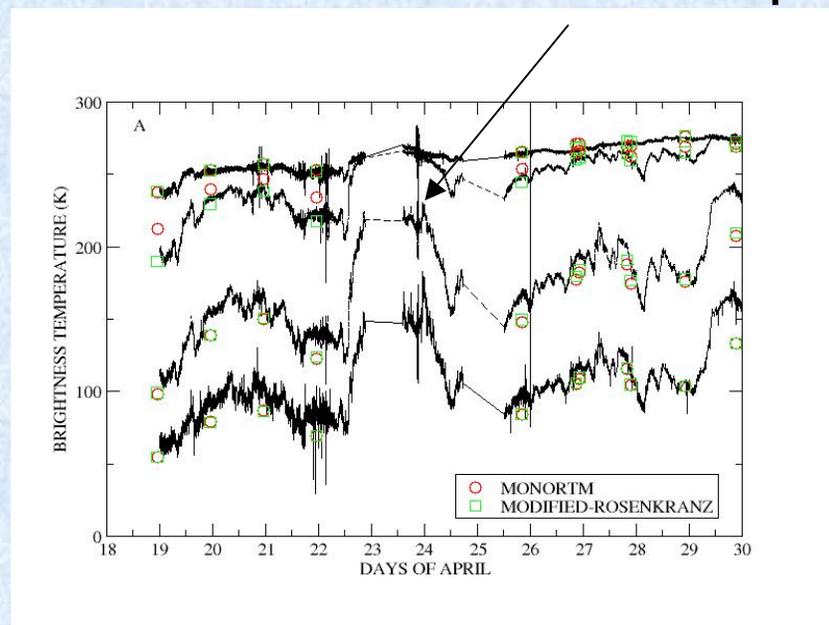
**LWP from MWR
BT from GVR**

**PWV from MWR
Black dots: 1 yr of
MonoRTM
clear sky
computations**

MonoRTM Model	
Freq. GHz	Bias(me-mo) Apr+May
183.3±1	-1.8
183.3±3	-5.7
183.3±7	12.0
183.3±14	7.9



Occasional RFI spikes



PWV and LWP Retrieval

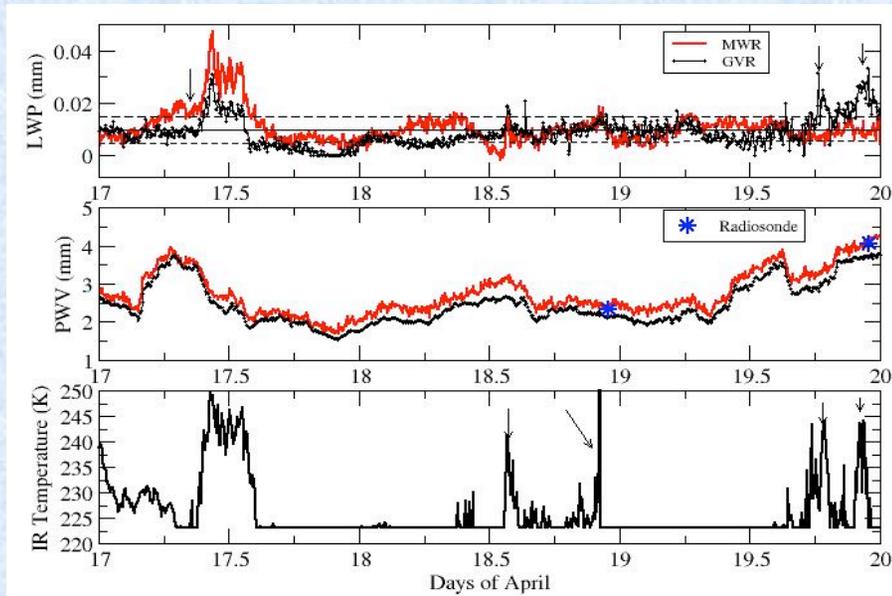
$$\mathbf{x}_{n+1} = \bar{\mathbf{x}} + \mathbf{BK}^T (\mathbf{KBK}^T + \mathbf{E})^{-1} [\mathbf{y} - \mathbf{y}_n - \mathbf{K}(\bar{\mathbf{x}} - \mathbf{x}_n)]$$

$$\mathbf{x} = (LWP, RH_j) \quad J=1,26$$

$$\text{BLACK LINE: } \mathbf{y} = (T_{GVR,i}) \quad I=1,4$$

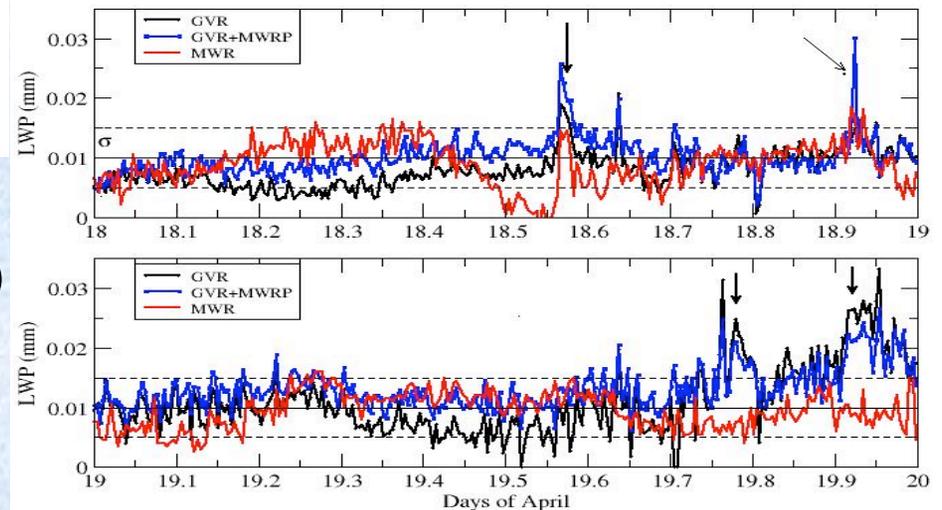
$$\bar{\mathbf{x}} = 1 \text{ yr radiosonde average}$$

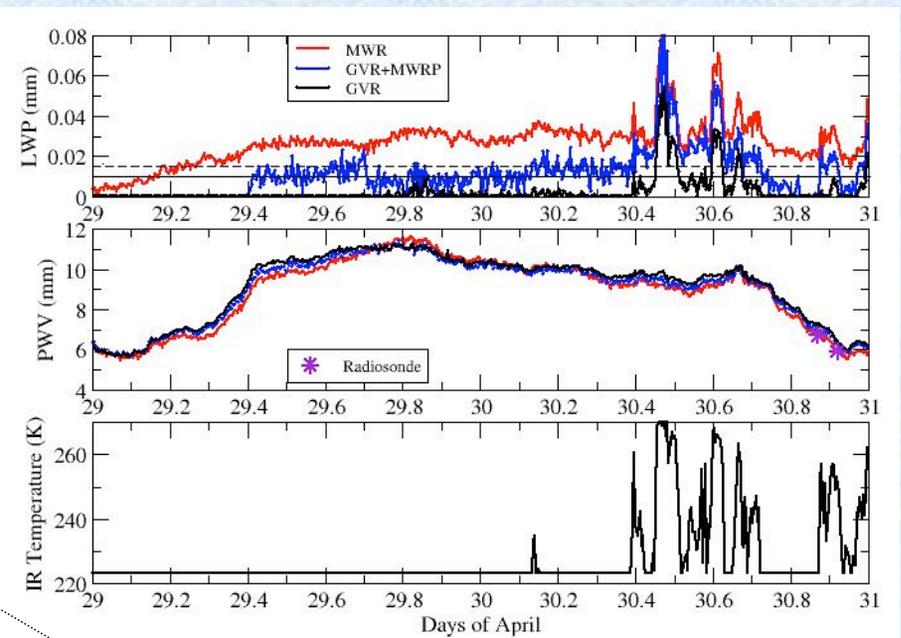
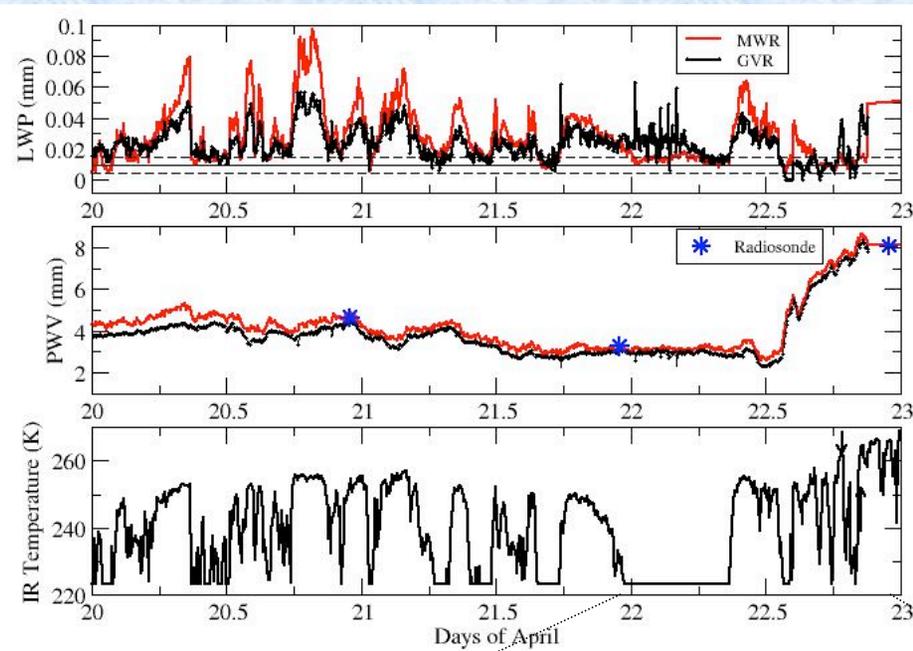
$$K(i,j) = \partial T b_{ij} / \partial x_j \quad \begin{matrix} I=1,4(\text{or } 1,9) \\ J=1,27 \end{matrix}$$



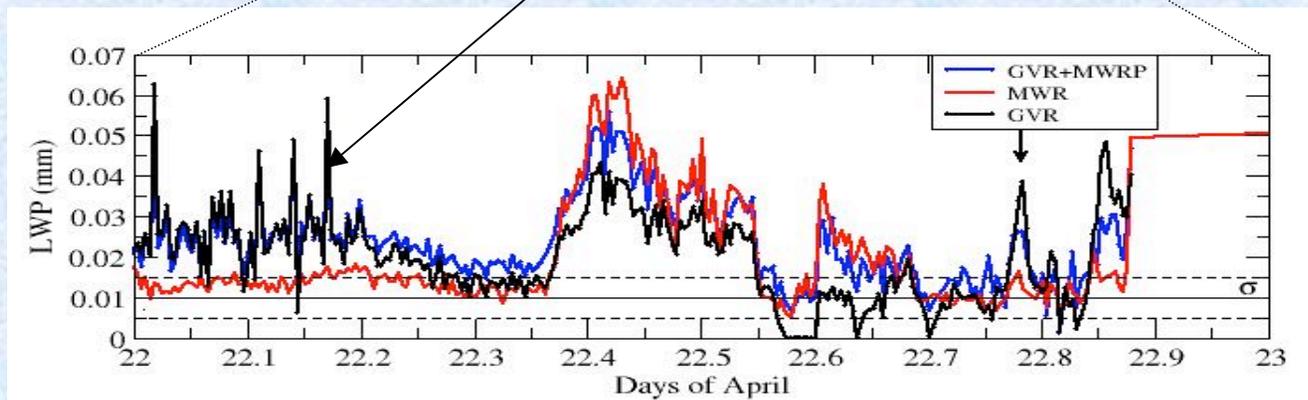
$$\text{BLUE LINE: } \mathbf{y} = (T_{GVR,j}, T_{MWRP,k})$$

$$j = 1,4; k = 1,5$$





Noisy data



CONCLUSIONS

- **The addition of GVR measurements can improve LWP retrieval.**
- **Additional validation and fine-tuning of retrieval algorithm needed especially in very low-humidity conditions.**
- **Discrimination between LWP and IWP needs to be addressed.**