

***Discussion Item:***  
**Scale Babble\***

**What is it, and  
What should/shall we do about it?**

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***\*Coined by Jim Liljegren***

# What do we mean by 'Scale Babble?'

Refers to time and spatial (FOV) sampling differences between instruments or their uses (e.g., in 'climate' models)

## Can cause

- An 'inconvenience' to intercomparisons
- Wreaks havoc in multi-sensor retrievals

It's an old issue (not just ARM)

Need to get a better handle on it, esp. for CLOWD

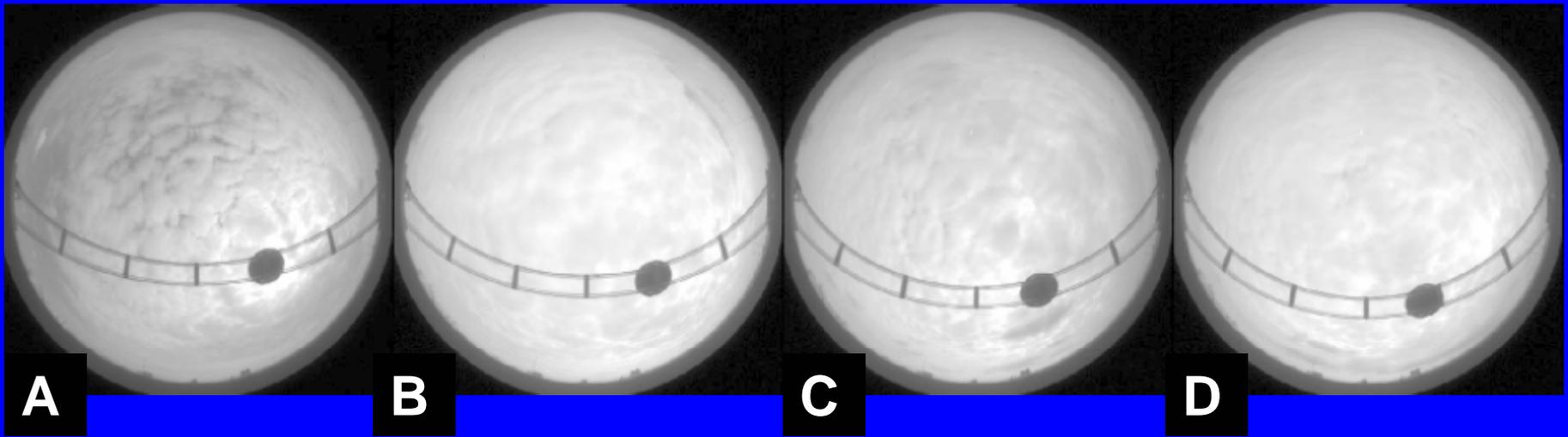
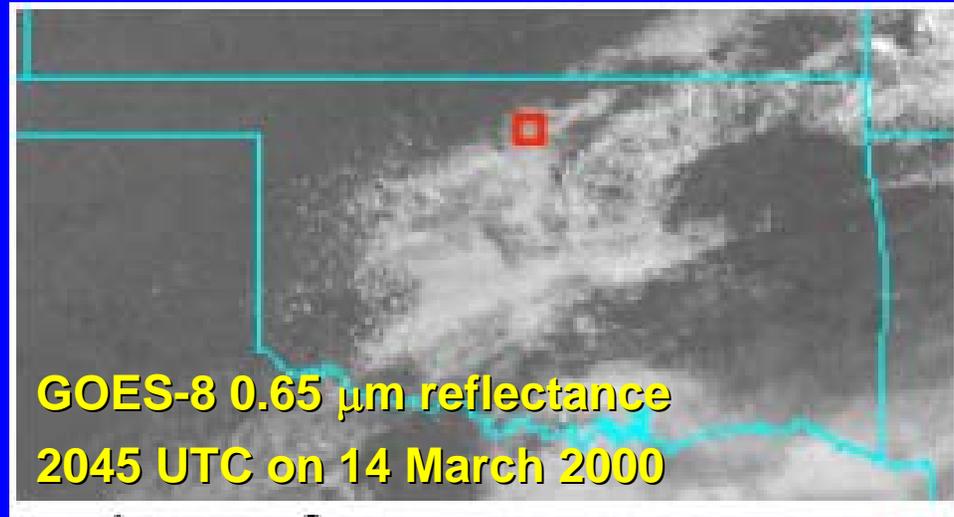
Even IF both were identical, could have differently sized 'radiative footprints' (e.g., visible scattering Vs. MWR)

# Examples within ARM

*(A community issue, not just an ARM issue, but  
ARM frequently needs to combine different types of data)*

	<b>FOV</b>	<b>Footprint Diameter at at 2 km (m)</b>	<b>Dwell Time</b>	<b>Report Frequency</b>
<b>MWR</b>	4.4/5.7°	150/200	1 sec	20 sec
<b>AERI</b>	2.6°	90	3 min 12 sec	8 min 20-30s w/ 1-2 min BB gaps (→ 20sec)
<b>MMCR</b>	0.31° 0.19 (SGP)	10 7	1.1 sec 1 sec	~3-4 sec (BL mode) ~3-4 sec (BL mode)
<b>MFRSR</b>	Dir./Hem.	20/3k	20 sec	20 sec
<b>NFOV</b>	1.2°	40	1 sec	1 sec
<b>CIMEL</b>	1.2°	40	1 sec @9s for 90 s	13-15 min
<b>SWS</b>	1.4°	50	1 sec (300 ms)	1 sec

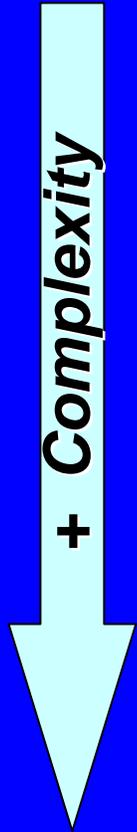
# CLOWD Cloud Example



WSI images at A) 20:30, B) 20:50, C) 21:10, and D) 21:30 UTC

from Turner et al. (BAMS, 2006)

# Cloud Paradigms



**Infinite & Plane-parallel**  
‘Single valued’

**Overcast w/ Sub-pixel scale variability**  
Cloud property PDF

**Broken clouds**  
PDF & cloud fraction

**Sampling time and FOV effects in each**

# Different Types of Scale Babble

## 1) Retrievals (Instrumental)

- Single instrument
  - Time averaging period relative to phenomena
- Combination of multiple instruments
  - Time matching & time averaging & FOVs

## 2) Validations & Intercomparisons (Products)

“Inconvenient” --> Averages and/or PDFs

## 3) Cloud/Climate model validations (Consumers)

- What do modelers need?
- IF had ‘instantaneous’ retrievals, would that provide additional info on cloud processes?
- Or are PDFs to verify the model good enough (all they want)?

# Questions/Primer for Discussion

**How important do you think Scale Babble is to:**

Retrievals (Instrumental)?

Validation (Products)?

Modelers (Customers)?

**If important, what shall we do?**

**PI-level to some extent, but can we help?**

Suggest modifying sampling periods?

Suggest 'standard' procedures of how to handle it?

(And, what do we do in cases we can't treat it?)