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Pasadena, California

V5 AND V6 VALIDATION PLANS AND STATUS

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General Goals of Sonde/GPS Analyses

- **Systematic, global analysis of data base of dedicated radiosondes**
 - ***Examine T , q for a variety of geophysical states.***
 - NOTE: Many individual studies already performed.
 - ***I'll show the sonde coverage today.***
 - ***Bill Irion, Nikita Pougatchev, Nick Nalli will show comparisons later.***
- **Look at temperature trends versus sondes and GPS-Met soundings**
 - ***Bill Irion will show trends versus sondes.***
 - Eric Maddy, Chris Barnet did so earlier.
 - ***We also have a large number of matched GPS soundings.***
 - Baijun Tian showed upper trop results last year



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Radiosonde Data Base

- **Create an atlas of all dedicated radiosondes in common format, including graphics by site.**
- **Add operational sondes for temperature bias trending.**
- **Why?**
 - ***V6 testing***
 - To supplement ECMWF comparisons.
 - ***Constrain AIRS accuracy and precision.***



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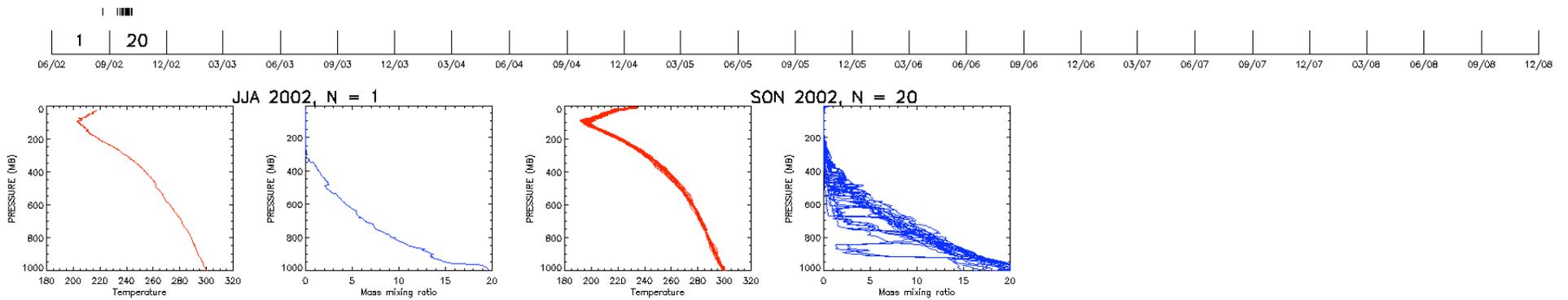
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An Atlas of Dedicated Sondes

An example: Andros Island

Time series of soundings, and plots by season

Station = andros, Total sondes = 21

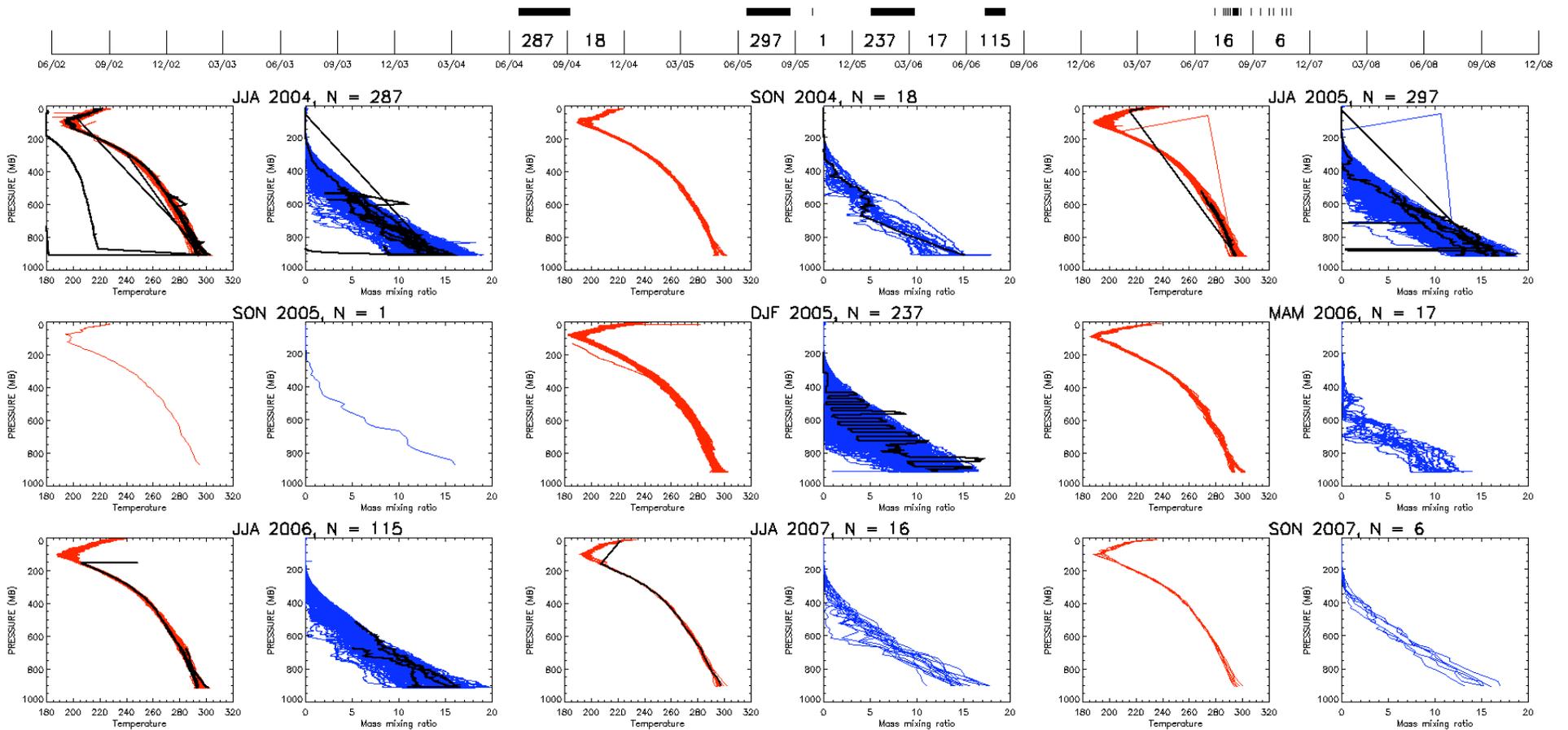




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An Atlas of Dedicated Sondes another example: Alajuela, Costa Rica

Station = alajuela, Total sondes = 994



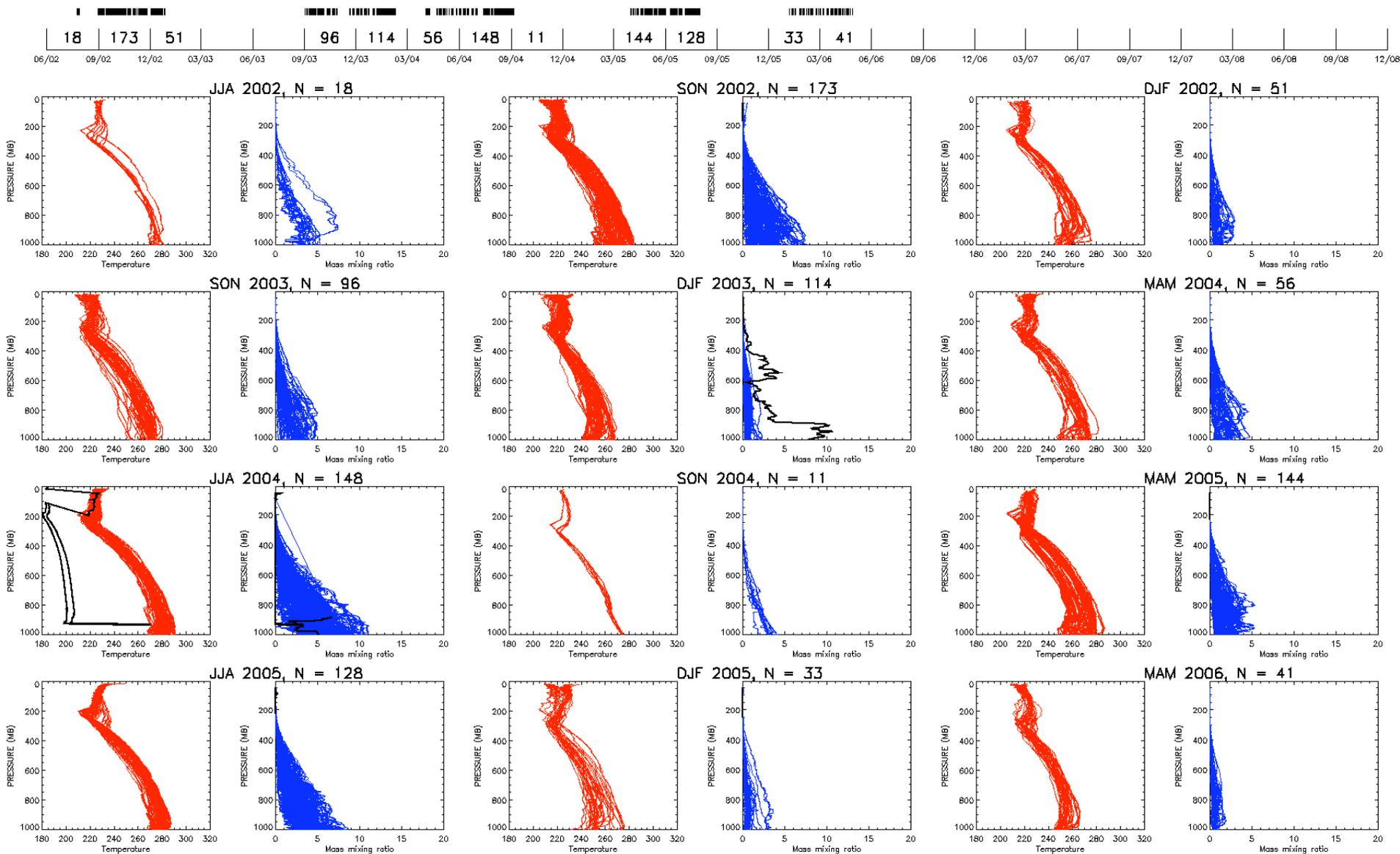


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Another example: ARM North Slope of Alaska

Station = nsa, Total sondes = 1013





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Next Step: Summarizing the Sondes from 30 Site

- **How well covered are:**
 - *Low, middle, high latitudes?*
 - *Land and ocean?*
 - *Different surface types?*



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Dedicated Sondes by Site

Green = bias only (N ~ 10), 1 Season
Blue = bias, variance (N~20, 1 Season)
Red = bias, variance, >1 Season

Total Sondes / # separate seasons (e.g. JJA 02, JJA 03)

| Site | # DJF | # MAM | # JJA | # SON |
|------------------------------|--------|-------|----------|-------|
| Alajuela, Costa Rica | >100 | 17 | >100 / 3 | 25 |
| Andros Is., Bahamas | | | | 20 |
| Ascension Is., E. Trop. Atl. | 9 | 7 | 4 | |
| Bandung, Indonesia | 8 / 2 | | | |
| Beltsville, Maryland | | | 28 / 2 | |
| Biak, Indonesia | 15 / 2 | | | |
| Boulder | 4 / 3 | 6 | 9 / 4 | 5 / 2 |
| Chesapeake Light | | | | 60 |
| Garmisch, Germany | | | | 143 |



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Total Sondes / # separate seasons (e.g. JJA 02, JJA 03)

| Site | DJF | MAM | JJA | SON |
|---------------------------------------|-----------|----------------|-----------|---------------|
| Hanoi, Vietnam | 6 | | | |
| Heredia, Costa Rica | 22 | 3 | 29 | 6 / 2 |
| Hilo, Hawaii | 5 / 3 | 3 / 3 | 1 | 6 / 2 |
| Huntsville, Alabama | | | | 3 |
| Kototabang, Indonesia | 5 | | | |
| Lauder, New Zealand | | 2 | | |
| Lindenberg, Germany | 1 | | 1 | 1 |
| Minnett ships, Caribbean | 47 | 55 | 61 | 91 / 2 |
| Nalli ships, Tropical Atlantic | | 258 / 3 | 87 | |



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Total Sondes / # separate seasons (e.g. JJA 02, JJA 03)

| Site | DJF | MAM | JJA | SON |
|-----------------------------------|----------------|----------------|----------------|----------------|
| Natal, Brazil | 11 | 5 | | 9 |
| ARM North Slope Alaska | 197 / 3 | 241 / 3 | 294 / 3 | 280 / 3 |
| Reunion Is., Indian Ocean | | 4 | 4 | 1 |
| RICO Experiment, Caribbean | 324 | | | |
| San Cristobal, Galapagos | 17 | 4 / 2 | 18 / 3 | 16 / 2 |
| San Juan, Puerto Rico (?) | 122 | | | 2 |
| ARM Southern Great Plains | 120 | | 19 | 160 / 2 |
| Sondakyl, Whatever | 12 / 4 | 2 | 8 / 2 | |
| Table Mountain, So. Cal. | | | | 20 / 2 |



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Total Sondes / # separate seasons (e.g. JJA 02, JJA 03)

| Site | DJF | MAM | JJA | SON |
|------------------------------|-------|-----|-----|-----|
| Tarawa, Micronesia | 5 / 2 | | | |
| Toulouse, France | | | | 128 |
| ARM Tropical Western Pacific | 116 | 71 | 15 | 91 |
| Dome C, Antarctica | ~60 | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |



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Summarizing

We have 30 total sites, consisting of:

- **7: 'Supersites' with >20 sondes for multiple seasons.**
- **8: Good sites with >20 sondes for 1 season.**
- **3: Okay sites with ~10 sondes for 1 season.**
- **12: poor sites with too few sondes**
 - *May be useful for global bias constraints.*



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How is coverage by geophysical regime?

1. Tropics are well covered

- **ARM TWP, OCEAN**
- **Minnett sondes, OCEAN**
- **Nalli sondes from AEROSE, OCEAN**
- **Costa Rica, Aura Validation Experiments (AVE), LAND**
- **Puerto Rico (AVE?), MIXED**
- **Andros, Bahamas, OCEAN, SON**
- **RICO Experiment, Caribbean OCEAN, DJF**
- **San Cristobal, Galapagos, OCEAN, DJF**
- **Ascension Is., E. Trop. Atl., OCEAN, DJF**
- **Natal, Brazil, LAND, DJF**



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How is coverage by geophysical regime?

2. Middle Latitudes well covered at 1 land site.

- *ARM Southern Great Plain, LAND, All seasons*
- *Beltsville, Maryland, LAND, JJA*
- *Chesapeake Light Platform, OCEAN, SON*
- *Garmisch, Germany, LAND, SON*
- *Toulouse, France, LAND, SON*
- *Table Mountain, So. California, SON*

3. Polar Regions have limited sonde coverage.

- *ARM NSA, MIXED, All seasons*
- *Dome C, Antarctica, LAND DJF*



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Conclusion

- **Dedicated sonde coverage varies. Best in tropics, limited in middle latitudes, few sites at high latitudes.**
 - *Both land and ocean covered.*
- **Some climate conditions are poorly sampled. For example:**
 - *Only Table Mountain, CA is near a continental desert.*
 - *Few sondes over extensive tropical forests like Amazon, Congo, Indonesia.*
 - *Few sondes at middle and high latitude oceanic sites.*