Customizing and Understanding Wavelet Stats

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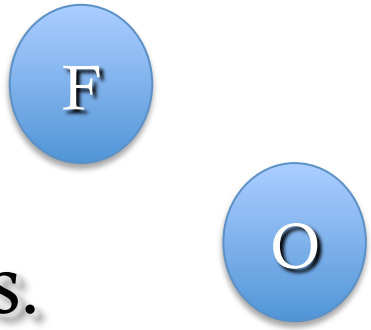
Options for Handling Missing data



- Points with valid forecasts.
- Points with valid observations.
- Points with both valid forecasts and observations. $F \cap O$
- All points. $F \cup O$

Thresholds

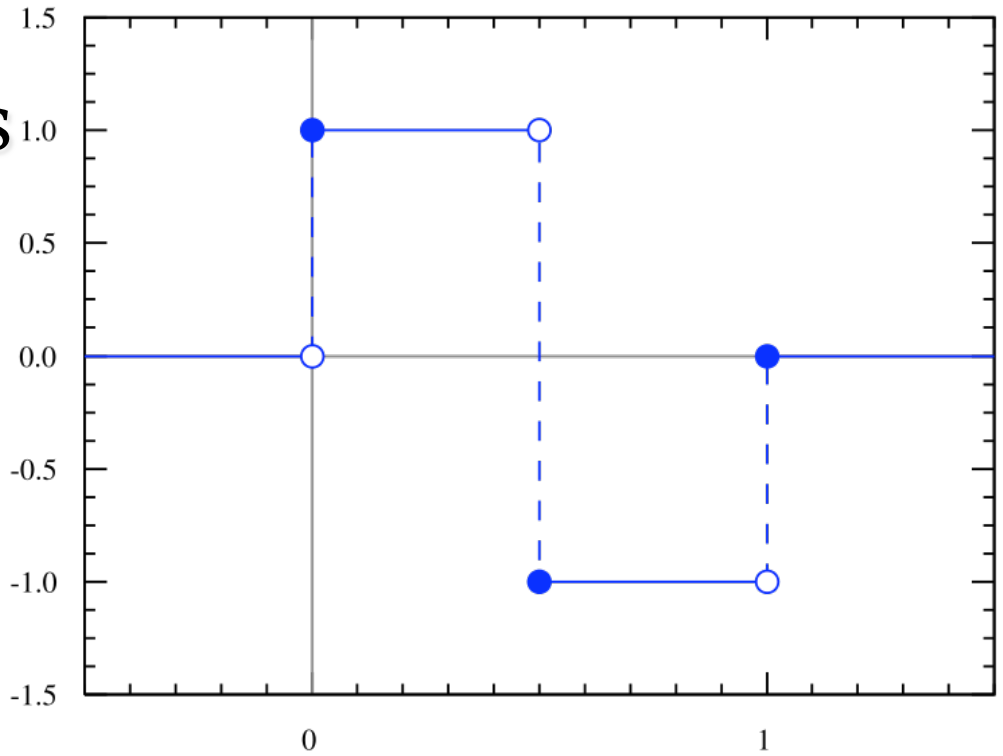
Forecast		Threshold	Event
0.05	<	0.2	0
0.17	<	0.2	0
0.45	>	0.2	1
2.15	>	0.2	1
0.05	<	1	0
0.17	<	1	0
0.45	<	1	0
2.15	>	1	1

Tiles – Grid must be 2^n x 2^n

- Cut down – user selected subset (square)
- Tiles – automated selection of subset(s)
- Pad with zeros – not recommended unless adds very small number of points.

Wavelets

- Haar
- Centered Haar
- Daubechies
- Centered Daubechies
- B spline
- Centered B spline

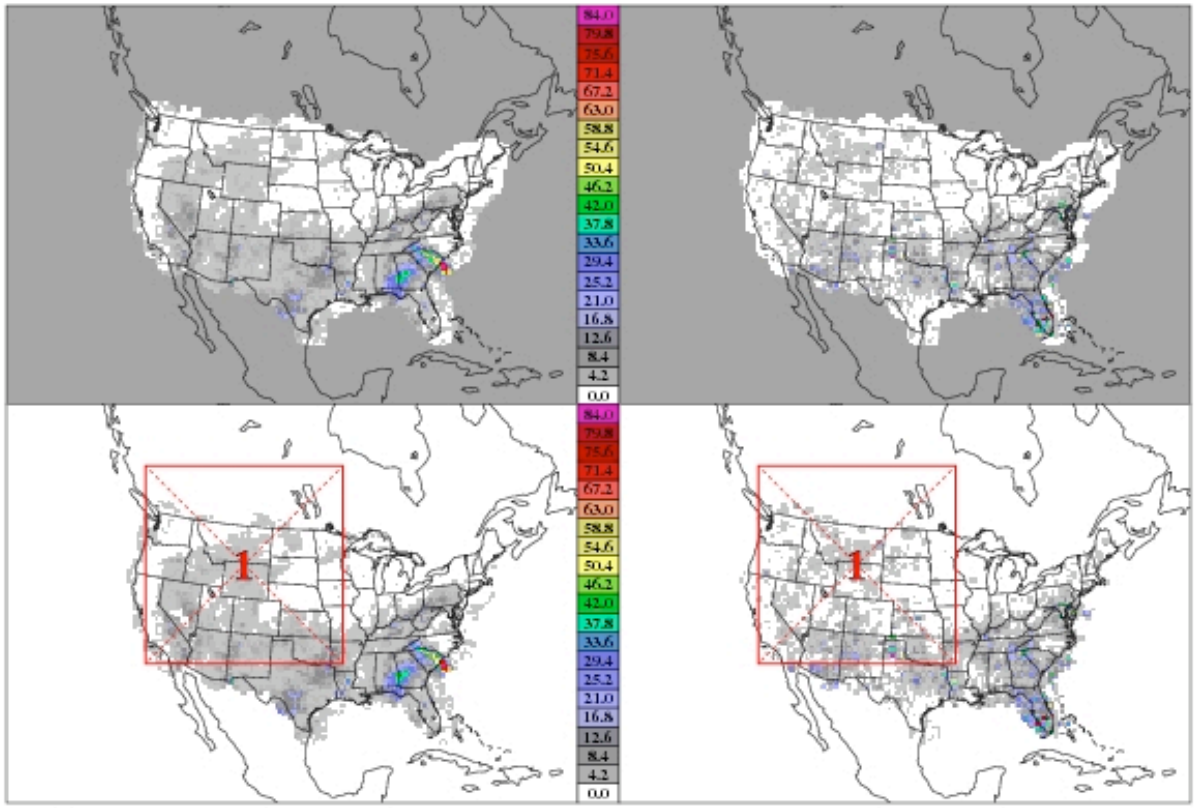


Output

- Text files
  - Options
  - Statistics
  - Can be read into stat analysis tool.
- PostScript files
  - Graphics
  - Options
  - Statistics

Wavelet-Stat: APCP at A24

Forecast | Observation



Model Name: WRF

Init Time: Aug 7, 2005 00:00:00
Valid Time: Aug 8, 2005 00:00:00
Lead Time: 24:00:00
Accum Time: 24:00:00

Tile Method: User-Defined
Tile Count: 1
Tile Dim: 64 x 64
Tile Corner: (45, 45)

Mask Missing: Fcst/Obs
Wavelet(k): Haar (2)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Binary

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	0.37311
Base Rate:	0.14233	Fcst Energy Squared (%):	0.22949 (100.00)
Mean-Squared Error (%):	0.19214 (100.00)	Obs Energy Squared (%):	0.14233 (100.00)

Overall forecast has skill (ISS > 0)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 1

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	-0.95852
Base Rate:	0.14233	Fcst Energy Squared (%):	0.04102 (17.87)
Mean-Squared Error (%):	0.08575 (44.63)	Obs Energy Squared (%):	0.05170 (36.32)

Errors at this scale account for nearly half of the MSE.

At this scale, forecast does not have skill (ISS < 0)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 2

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	-0.03746
Base Rate:	0.14233	Fcst Energy Squared (%):	0.03201 (13.95)
Mean-Squared Error (%):	0.04543 (23.64)	Obs Energy Squared (%):	0.02391 (16.80)

Forecast transitions from no skill to skill at scale 3.

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 3

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	0.44982
Base Rate:	0.14233	Fcst Energy Squared (%):	0.01656 (7.22)
Mean-Squared Error (%):	0.02409 (12.54)	Obs Energy Squared (%):	0.01278 (8.98)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 4

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	0.70019
Base Rate:	0.14233	Fcst Energy Squared (%):	0.02332 (10.16)
Mean-Squared Error (%):	0.01313 (6.83)	Obs Energy Squared (%):	0.00954 (6.70)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 5

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	0.87362
Base Rate:	0.14233	Fcst Energy Squared (%):	0.02745 (11.96)
Mean-Squared Error (%):	0.00553 (2.88)	Obs Energy Squared (%):	0.01600 (11.24)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 6

Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	0.75764
Base Rate:	0.14233	Fcst Energy Squared (%):	0.03646 (15.89)
Mean-Squared Error (%):	0.01061 (5.52)	Obs Energy Squared (%):	0.00815 (5.72)

Wavelet-Stat: APCP at A24, Tile 1, >1.000, Scale 7

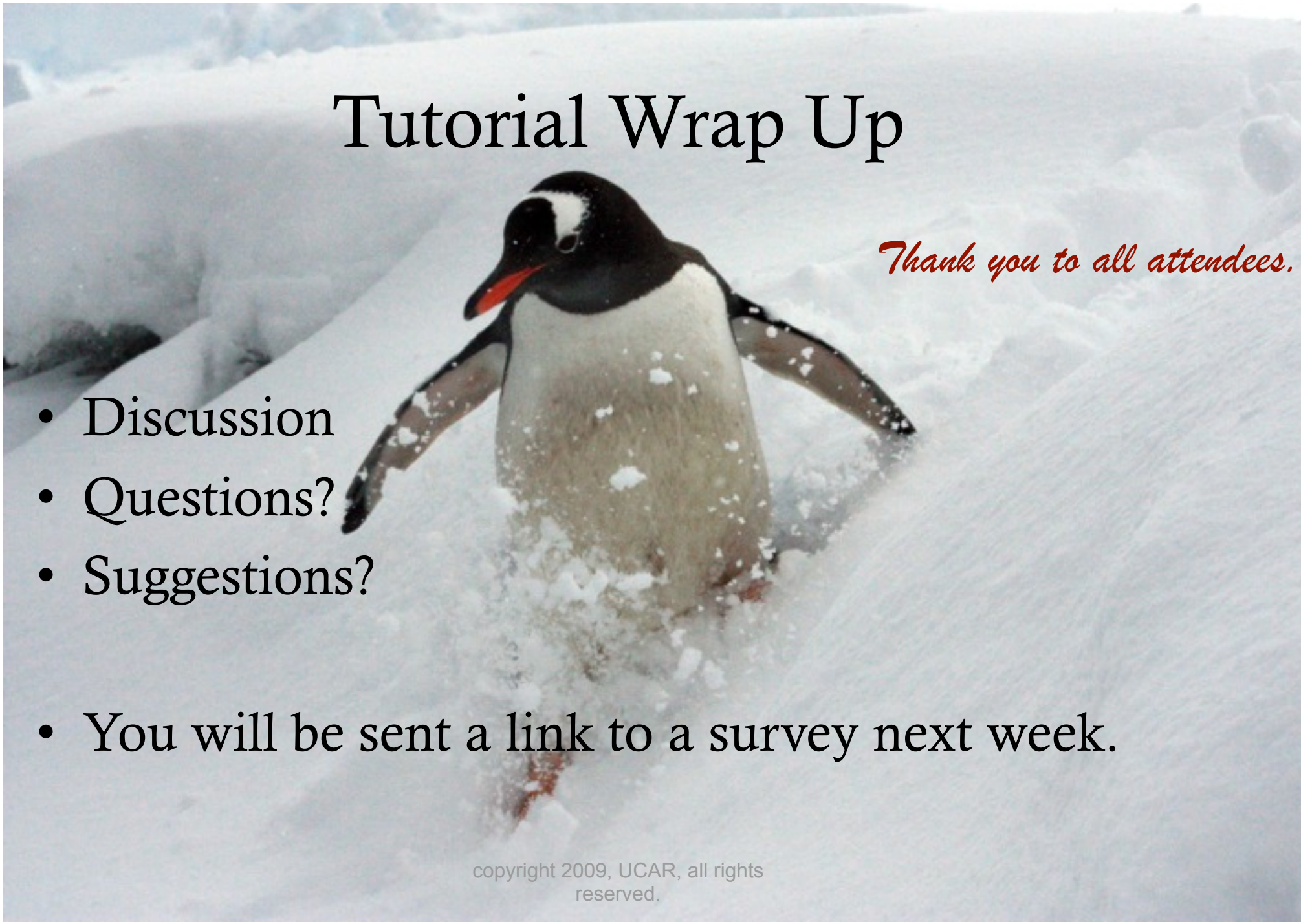
Difference (F-0)

Frequency Bias:	1.61235	Intensity Skill Score:	0.82650
Base Rate:	0.14233	Fcst Energy Squared (%):	0.05267 (22.95)
Mean-Squared Error (%):	0.00760 (3.95)	Obs Energy Squared (%):	0.02026 (14.23)

Summary

- Wavelet tool provides a flexible method for decomposing spatial fields into different scales.
- Once decomposed, verification measures at each *physical* scale can be examined and compared.

Tutorial Wrap Up



Thank you to all attendees.

- Discussion
- Questions?
- Suggestions?

- You will be sent a link to a survey next week.