The CERES S'COOL Project

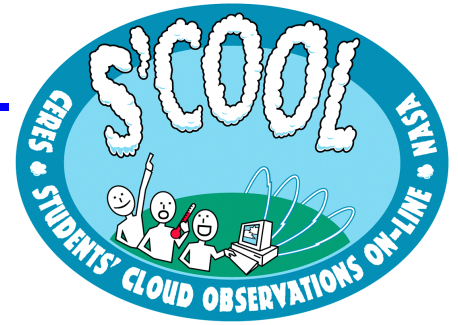**Lin Chambers and David Young**
NASA LaRC, Hampton, VA

Carolyn J. Green, Doug B. Stoddard, & Roberto Sepulveda
SAIC

Amanda Falcone
**Trinity University**

23rd CERES Science Team Meeting
Williamsburg, Virginia
January 23-2225, 2001

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S'COOL Accomplishments
# Since September 2000
CERES Science Team Meeting

- Reached the 694 Participant Milestone (Added 44 Schools)

- Over 12 Presentations at Conferences and Schools

- Sent the Latest Newsletter to over 750 Subscribers

- Held Intensive Observation Period During October 2000 (Over 600 Observations)

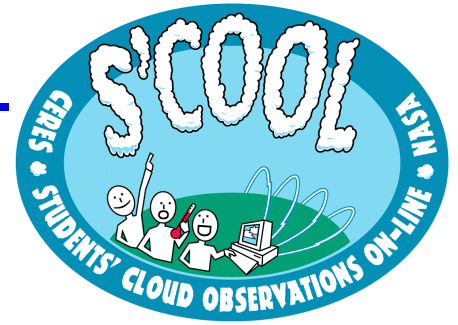- Announcement of July 16-20, 2001 S'COOL Teacher Workshop. Open to all 50 states.

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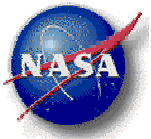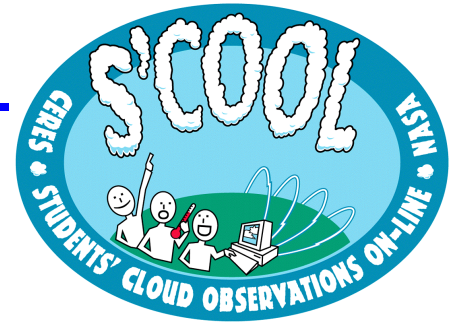
Comparing Student and Satellite Cloud Observations

❑ What We Compare

❑ How to Match Observations

❑ Examples

❑ Understanding the Results

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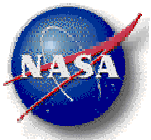
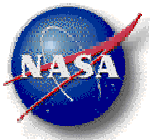# What We Compare

- ❑ Cloud Amount
  - Clear
  - Partly Cloudy
  - Mostly Cloudy
  - Overcast
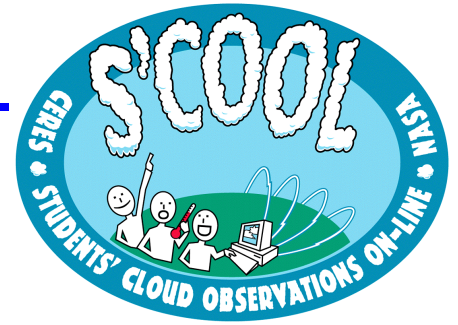- ❑ Cloud Height
 - Low
  - Mid
  - High
- ❑ Number of Cloud Layers
- ❑ Cloud Visual Opacity
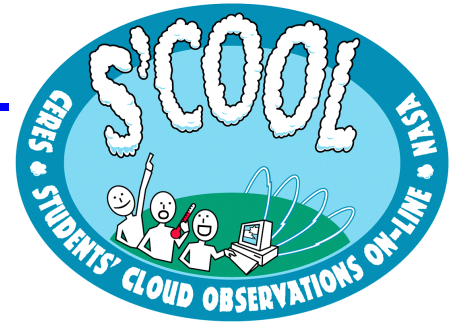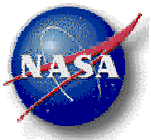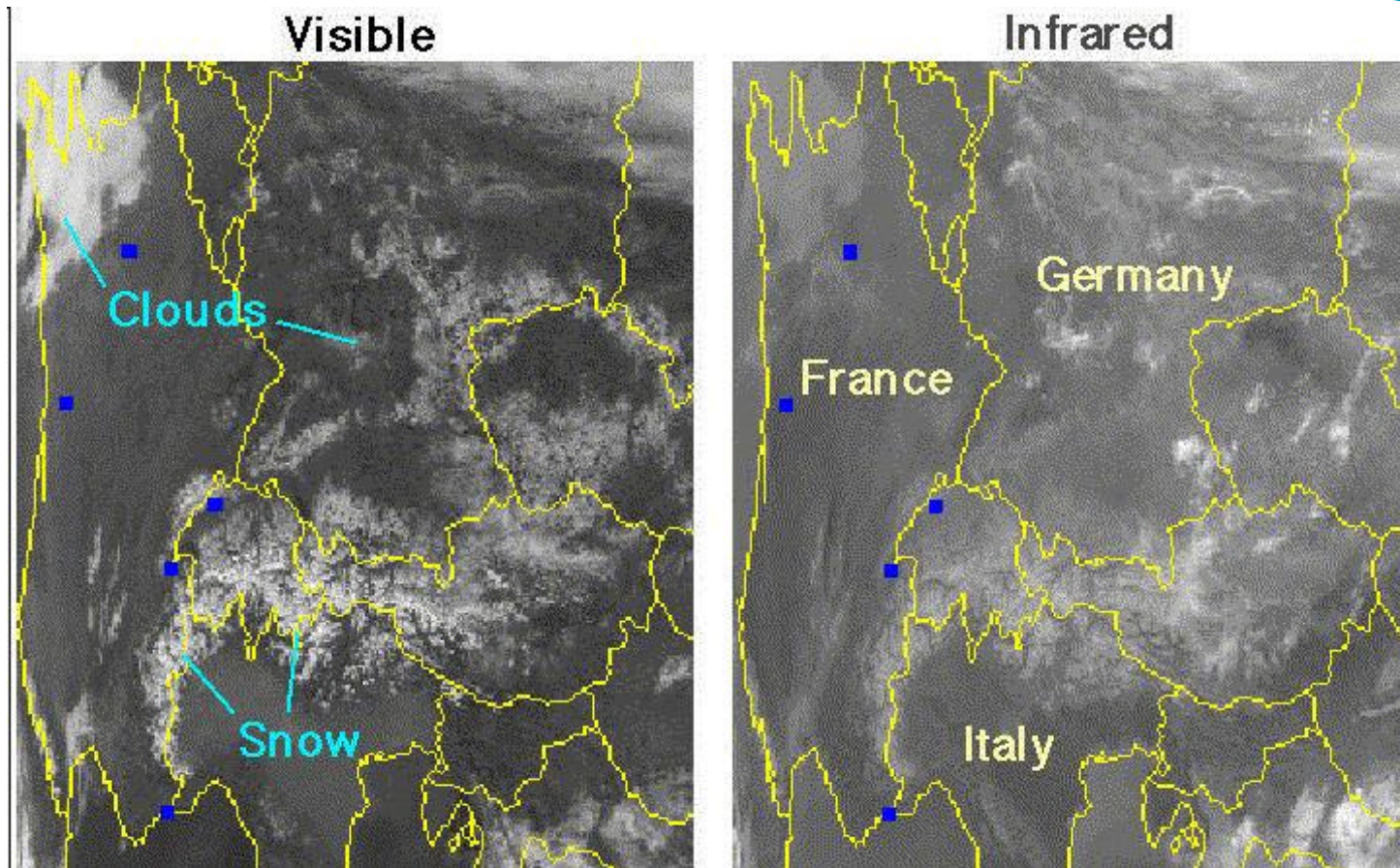
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How to Match Observations
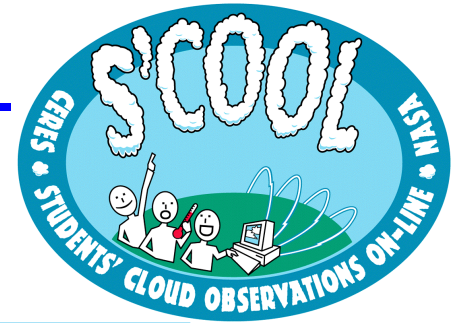
❑ Satellite and Student Observations Are Entered Into the S'COOL Database

❑ S'COOL Site Must Be Within Satellite Area (1° x 1° grid)

❑ Satellite and Student Observation Times Must Be Within 15 Minutes

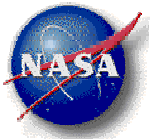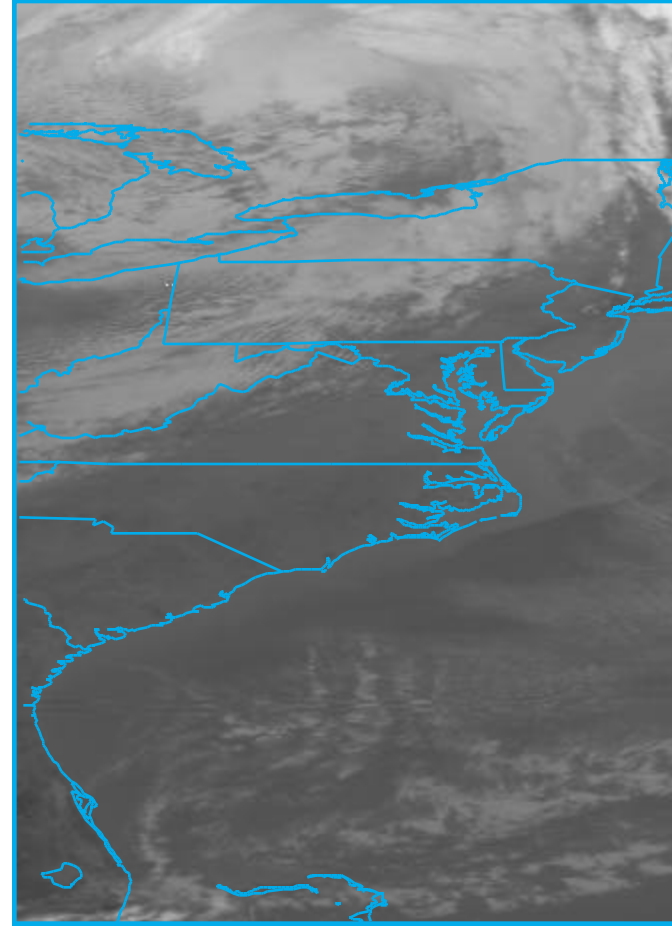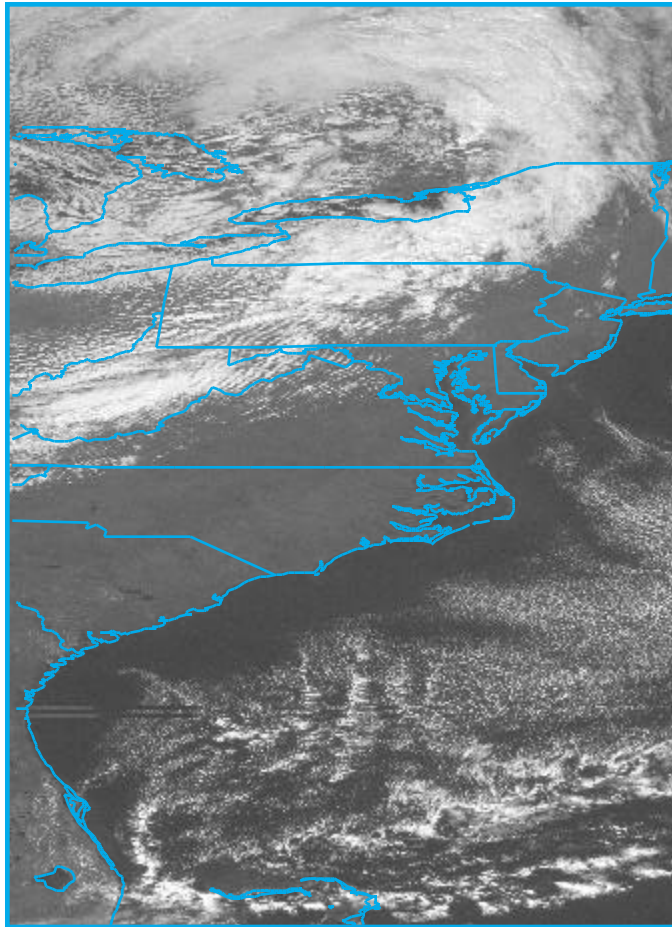NASA Langley Research Center / Atmospheric Sciences
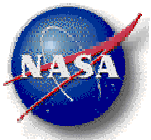
The Difficulty of Satellite Detection of Clouds

Clear Day Comparison

October 20, 1997 17:45 GMT

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Comparison Results

October 20, 1997 17:45 GMT

	Poquoson Student Observations	Newport News Student Observations	CERES Cloud Measurements	Do They Agree?
Cloud Type	None	None	None	Yes
Cloud Fraction	0%	0%	0%	Yes
Cloud Height	-	-	-	-
Visual Opacity	-	-	-	-

Comment: Comparisons of Clear-Sky Observations Are Very Important!

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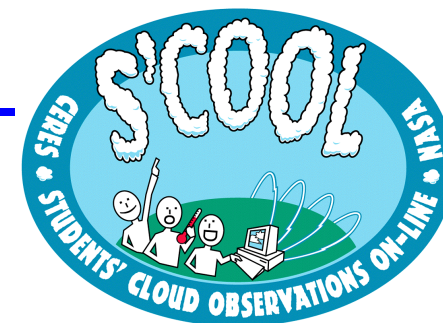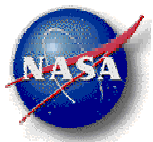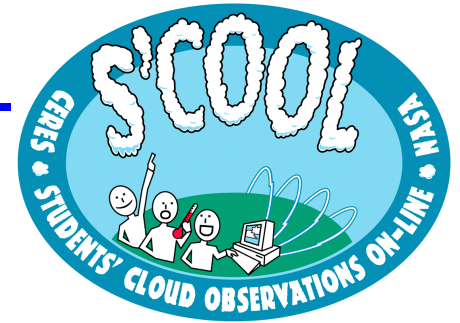
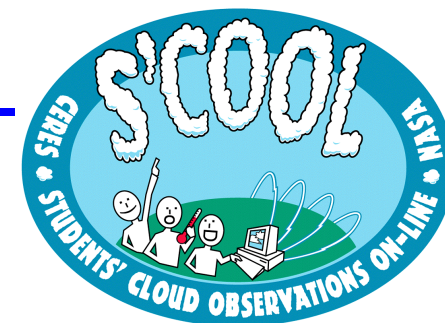# Cloudy Day Comparison

October 22, 1997 17:45 GMT
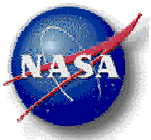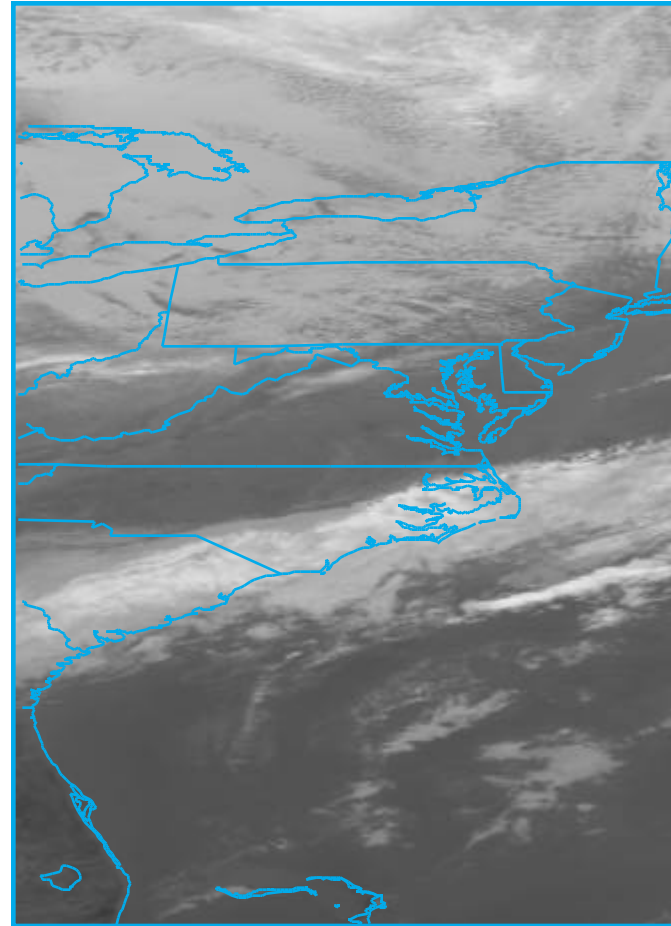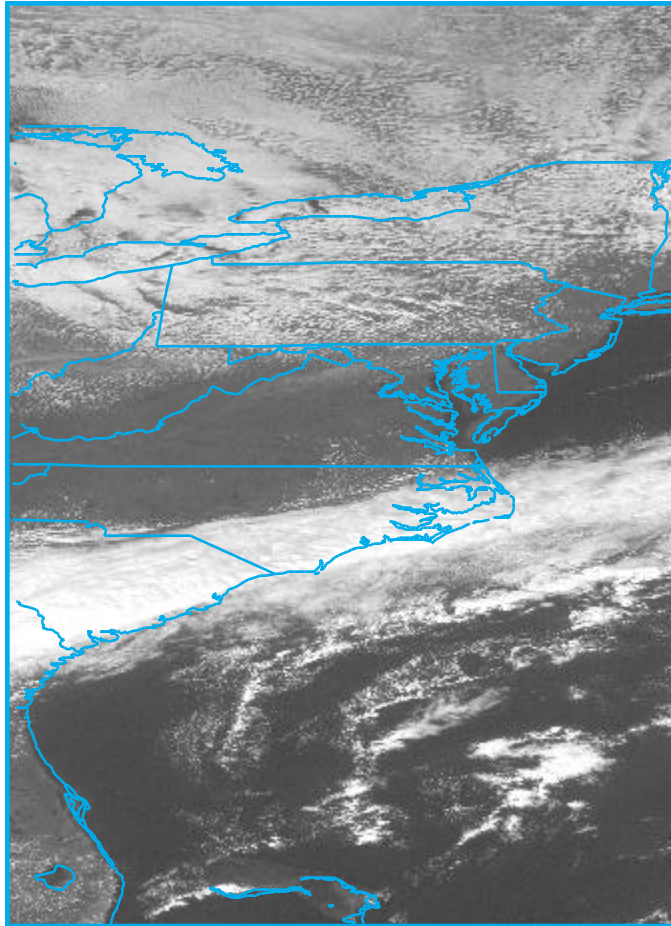
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Comparison Results

October 22, 1997 17:45 GMT

|	Poquoson Student Observations	Newport News Student Observations	CERES Cloud Measurements	Do They Agree?
Cloud Type	Cumulus	Altocumulus + Cirrus	Low water clouds	Poq: Yes NN: No
Cloud Fraction	0 - 5% (Clear)	5 - 50% (Partly Cloudy)	7%	Close
Cloud Height	Low	Mid / High	Low	Poq: Yes NN: No
Visual Opacity	Translucent	Transparent	Translucent (optical depth = 6.6)	Poq: Yes NN: No

Comment: Poquoson observed contrails - These may be what the Newport News students were reporting. There also was a mid-level layer cloud to the south.
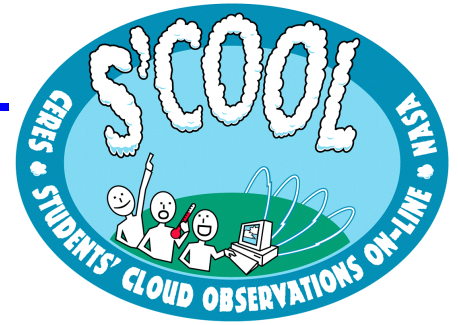
NASA Langley Research Center / Atmospheric Sciences
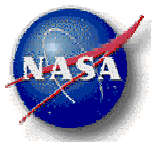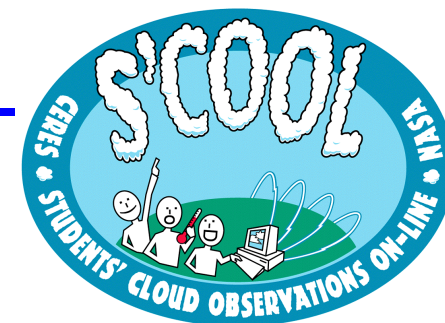
Pre-CERES Cloud Amount Comparison
(CERES Algorithm with AVHRR Data)

		S'COOL Students			
		Clear	Partly Cloudy	Mostly Cloudy	Overcast
Satellite	Clear	13	1	0	0
	Partly Cloudy	4	6	0	1
	Mostly Cloudy	2	0	9	2
	Overcast	0	1	0	6

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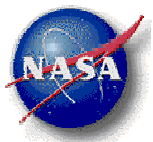
Summary of Cloud Comparison

The Students and Satellite Observations:

Agree	34 Out of 45 Times	(76%)
Weakly Agree	7 Out of 45 Times	(15%)
Disagree	4 Out of 45 Times	(9%)
Strongly Disagree	0 Out of 45 Times	(0%)

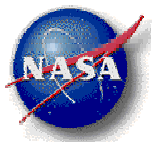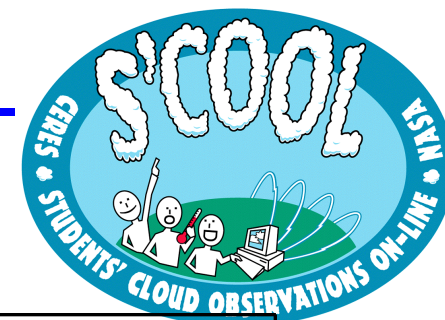NASA Langley Research Center / Atmospheric Sciences
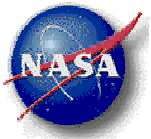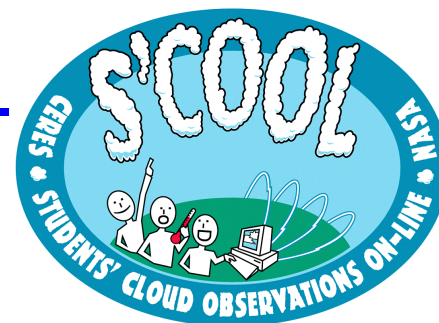
Comparison Update Project
by Amanda Falcone

❑ Before CERES - 15 Minute Matching

- Percentages of cloudiness
  - 34 out of 45 agree totally
  - 75.6% total agreement
  - 0 third class errors
- Cloud level comparisons
  - 28 out of 45 agree totally
  - 62.2% total agreement
  - 1 second class error

❑ With CERES - 15 Minute Matching

- Percentages of cloudiness
  - 60 out of 99 agree totally
  - 60.6% total agreement
  - 1 third class error
- Cloud level comparisons
  - 52 out of 99 agree totally
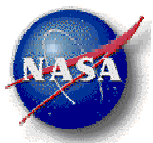 - 52.5% total agreement
  - 3 second class errors

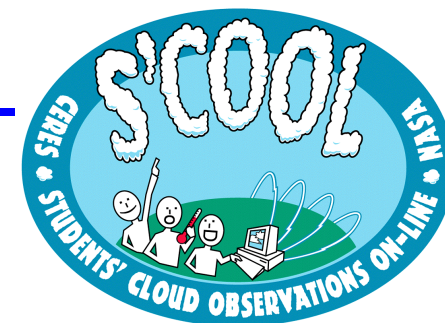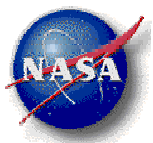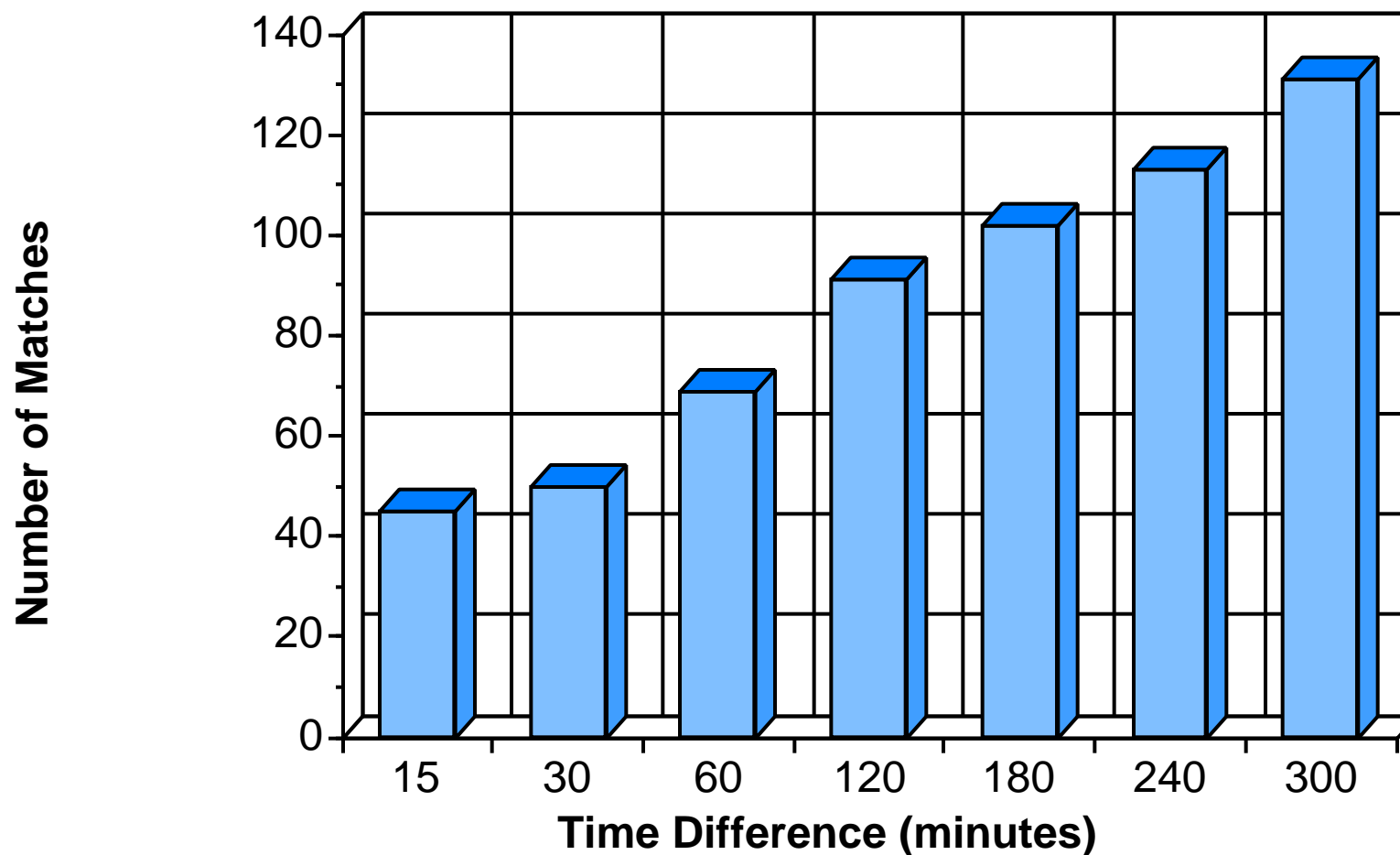## Major Discrepancy Observed was for Thin, Sparse Cirrus

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Updated Cloud Amount Comparison

(Observations within 15 minutes)

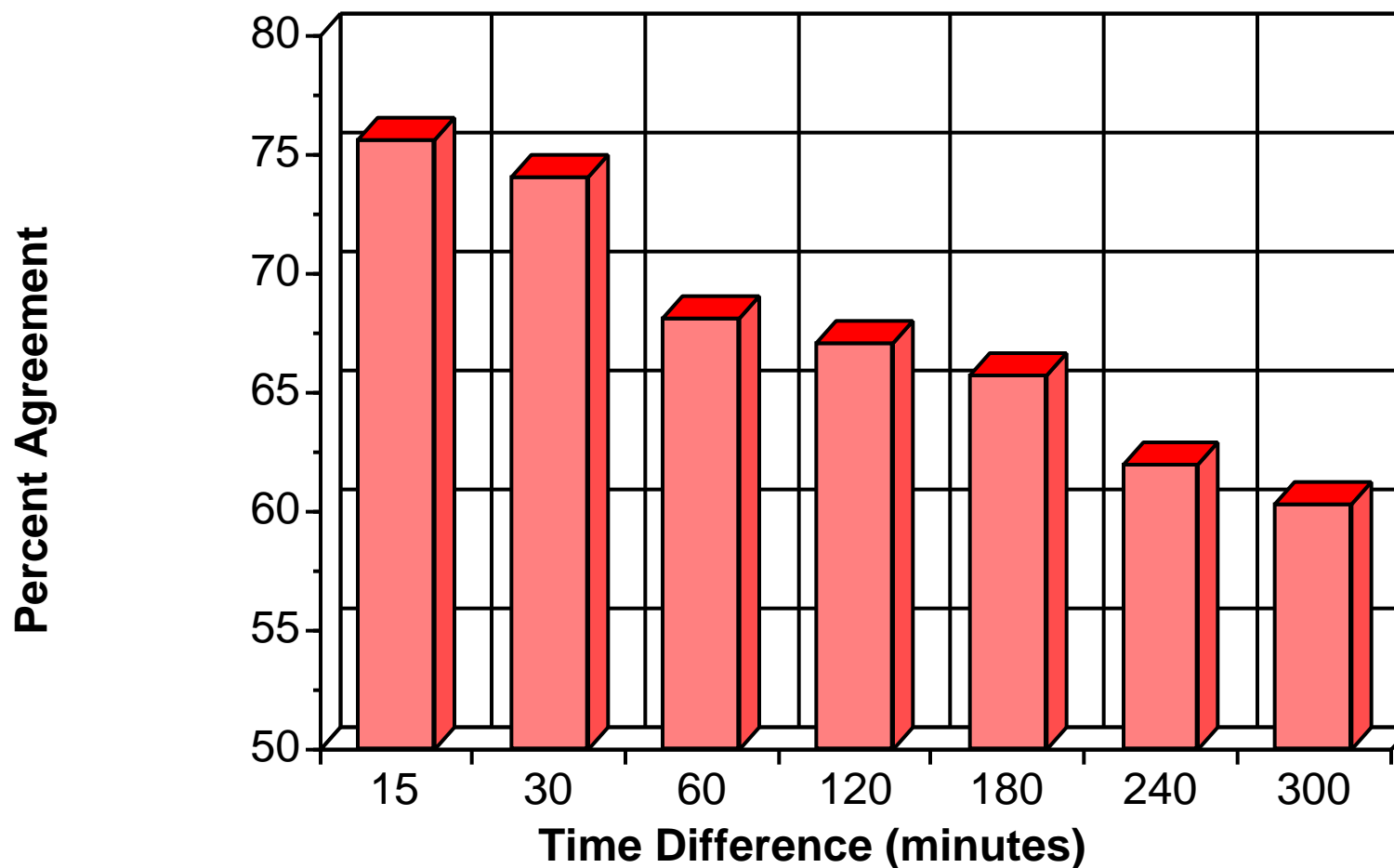|		S'COOL Students			
		Clear	Partly Cloudy	Mostly Cloudy	Overcast
Satellite	Clear	27	2	2	1
	Partly Cloudy	7	10	2	1
	Mostly Cloudy	5	3	12	7
	Overcast	0	1	8	11

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Number of Matched Observations

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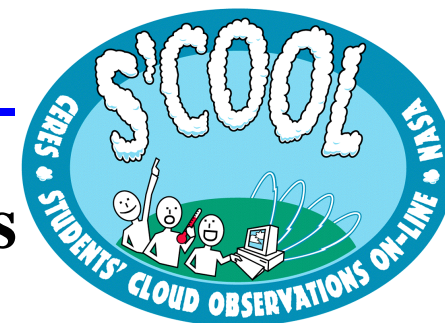
Effect of Mismatched Observation Times

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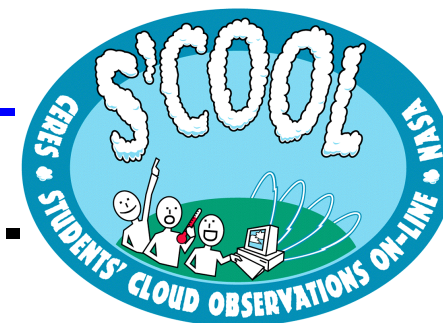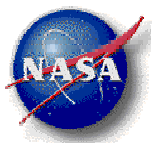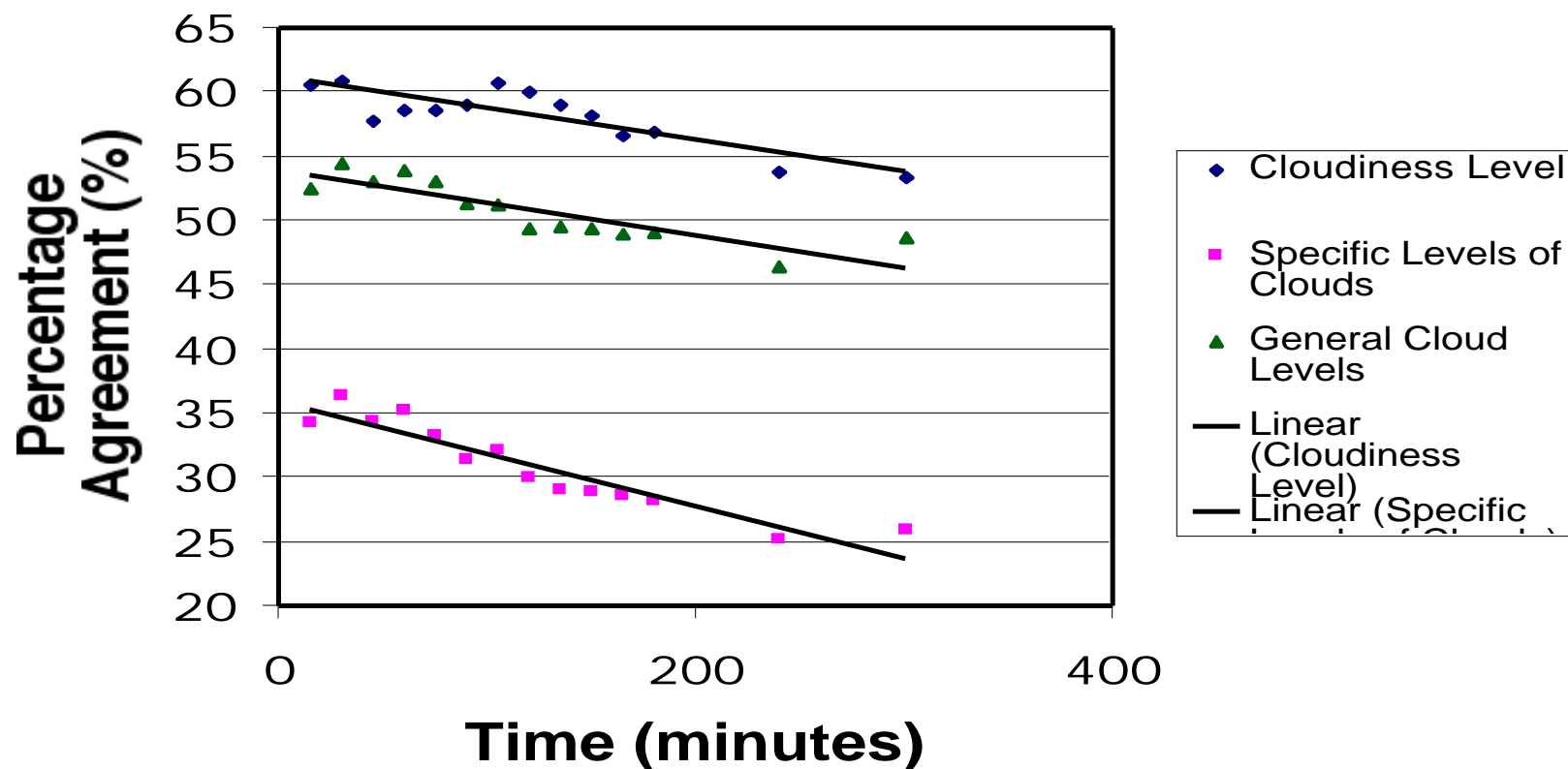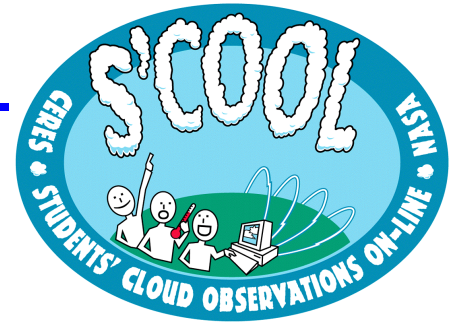
Percentage Agreements vs. Time

What's Next?

❑ Automate Matching Procedure

- Database growing quickly since launch of Terra
- Waiting for CERES cloud parameters

❑ Compare Other Quantities

- Cloud heights
- Multi-level clouds
- Cloud optical thickness

❑ Perform ERBE-like comparison

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