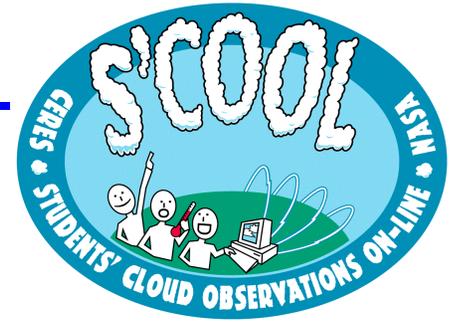


Comparing Student and Satellite Cloud Observations

- What We Compare
- How to Match Observations
- Examples
- Understanding the Results

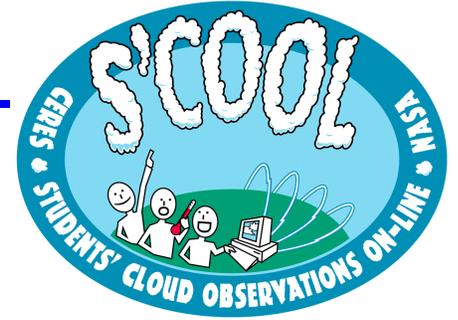




What We Compare

- Cloud Amount
 - Clear
 - Partly Cloudy
 - Mostly Cloudy
 - Overcast
- Cloud Height
 - Low
 - Mid
 - High
- Number of Cloud Layers
- Cloud Visual Opacity

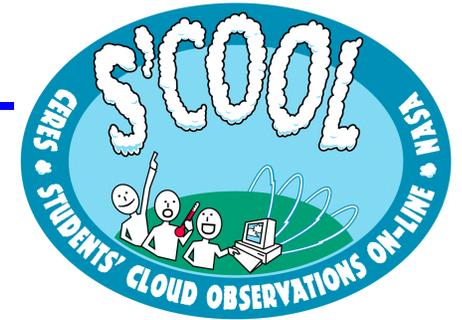




How to Match Observations

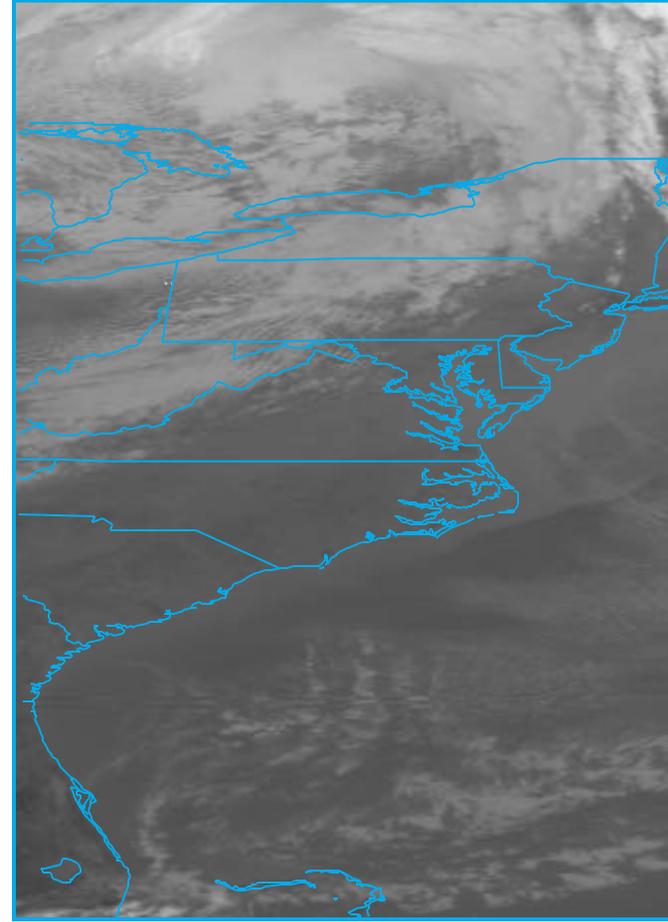
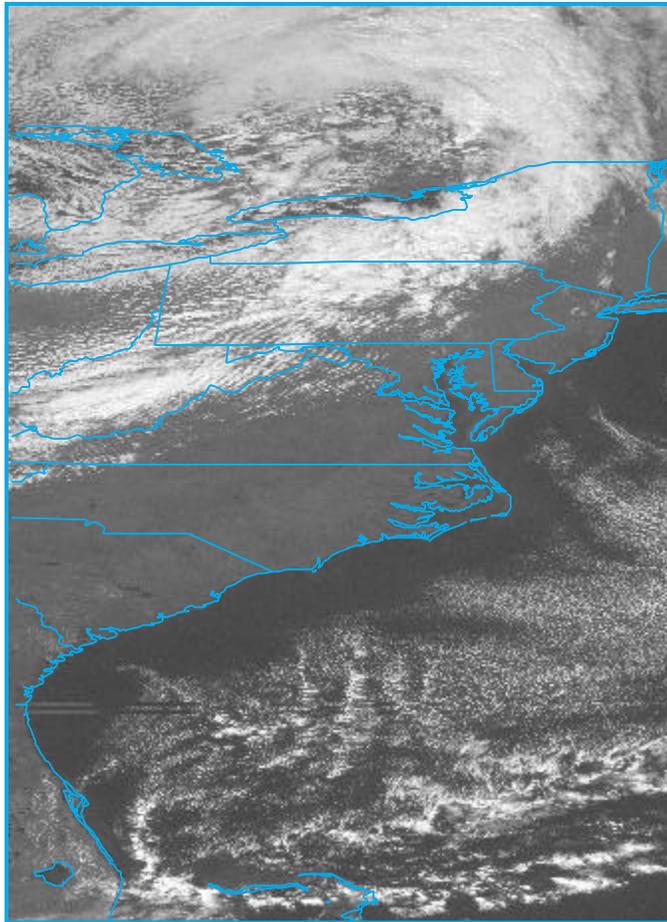
- Satellite and Student Observations Are Entered Into the S'COOL Database
- S'COOL Site Must Be Within Satellite Area
- Satellite and Student Observation Times Must Be Within 15 Minutes

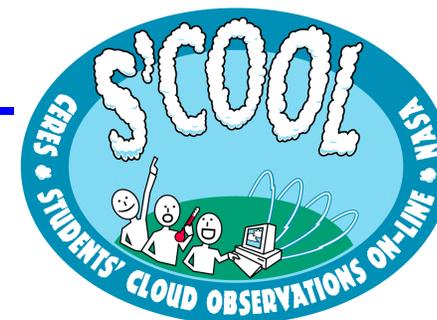




Clear Day Comparison

October 20, 1997 17:45 GMT





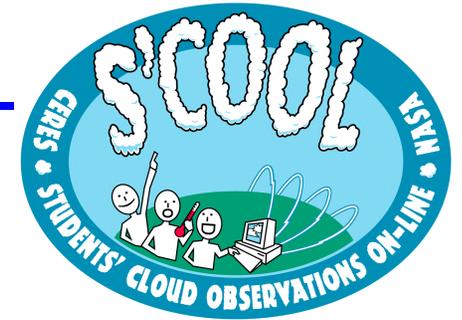
Comparison Results

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	-	-	-	-

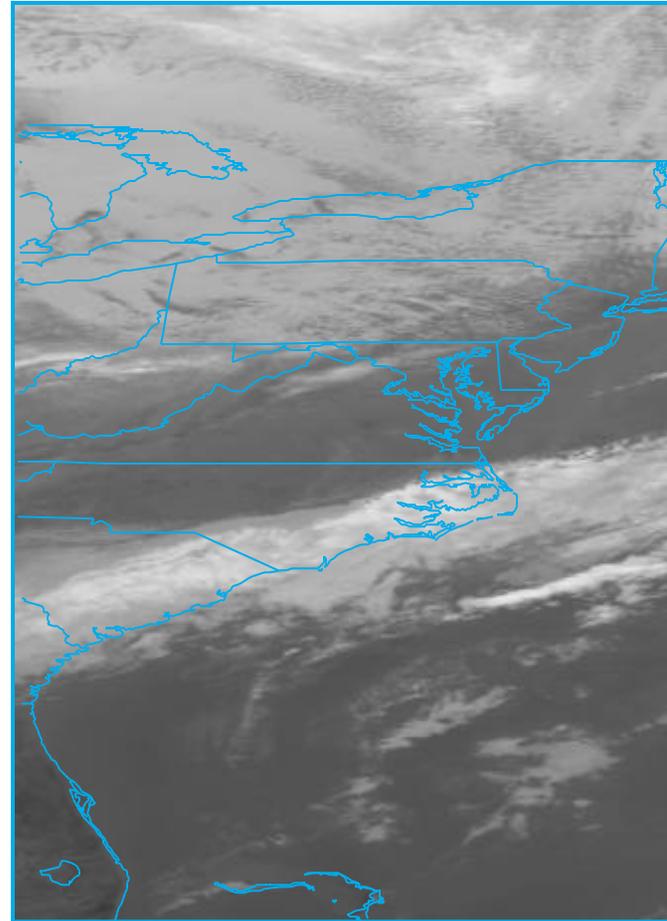
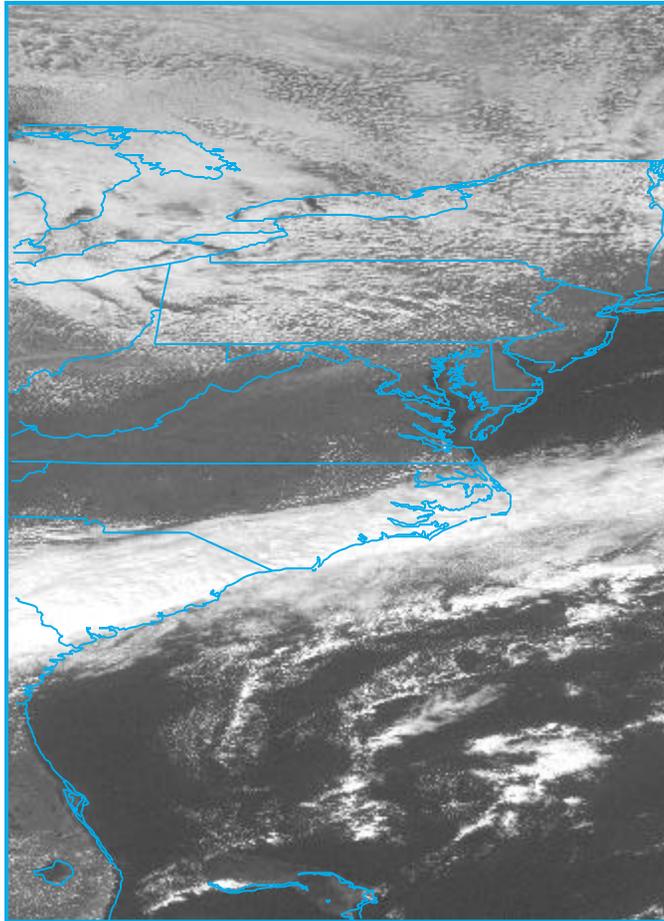
Comment: Comparisons of Clear-Sky Observations Are Very Important!

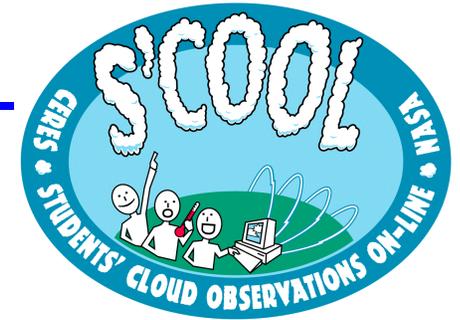




Cloudy Day Comparison

October 22, 1997 17:45 GMT





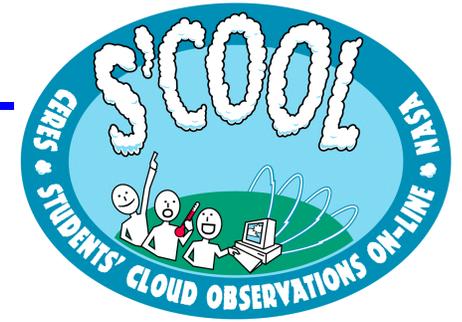
Comparison Results

October 22, 1997 17:45 GMT

	Poquoson Student Observations	Newport News Student Observations	CERES Cloud Measurements	Do They Agree?
Cloud Type	Cumulus	Alto cumulus + 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.

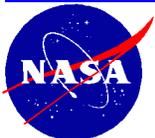


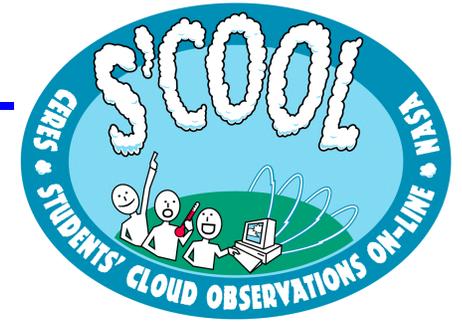


Cloud Amount Comparison

(Observations within 15 minutes)

		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



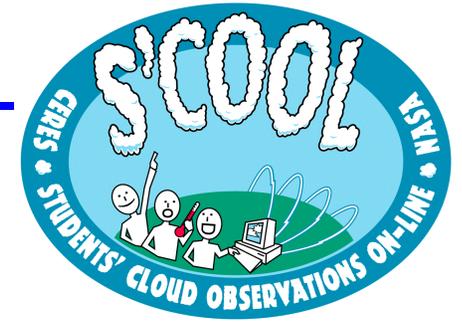


Summary of Cloud Comparison

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%)





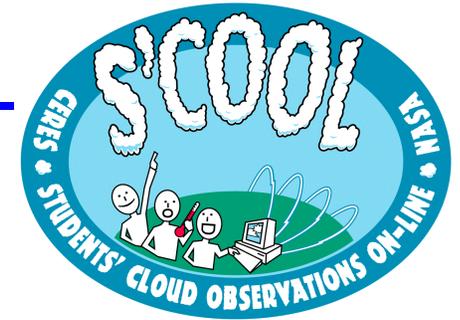
Understanding the Comparisons

- The Importance of Accurate Time Matching

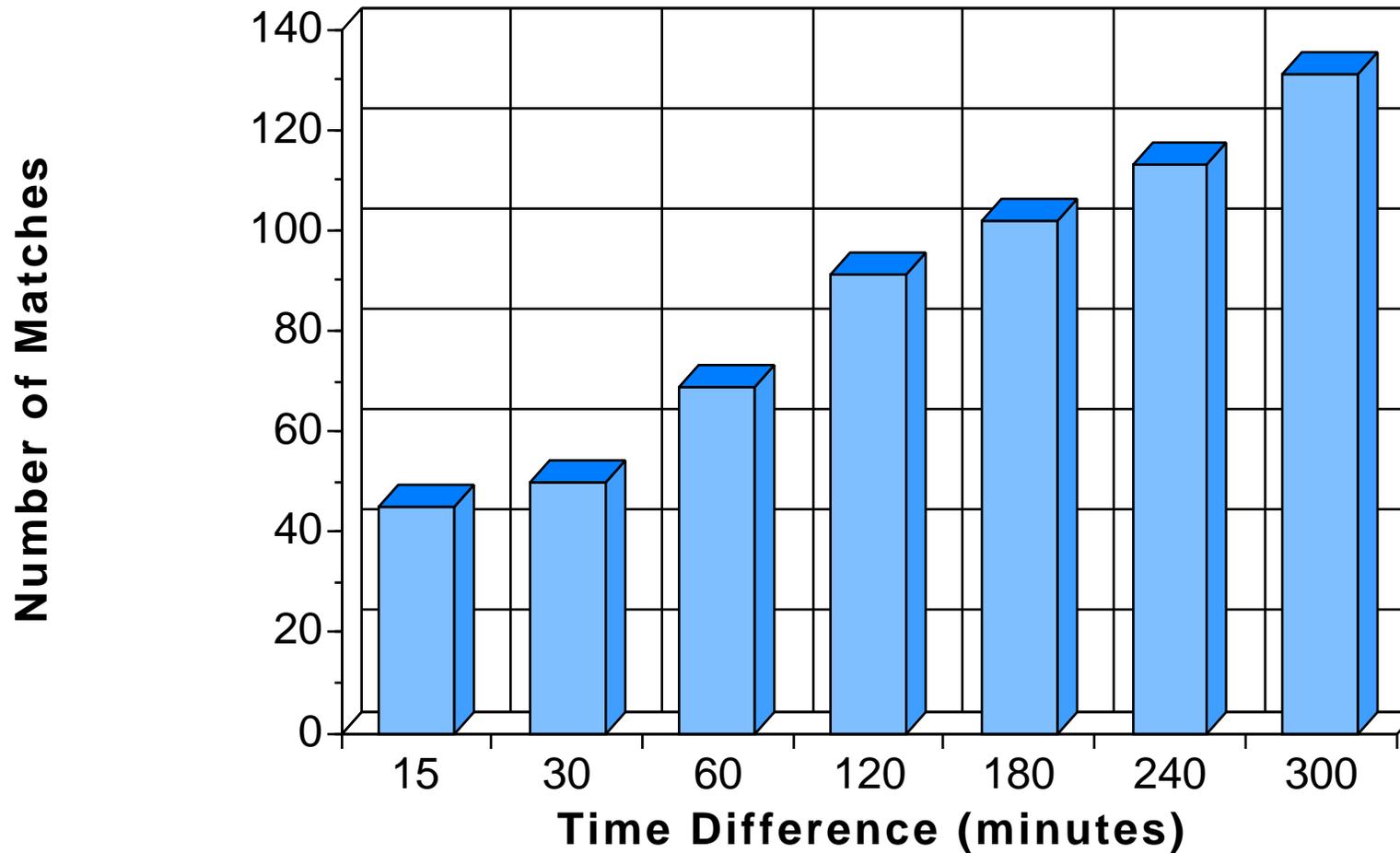
- The Value of Making Many Observations
 - The “Guess the Cloud Amount” Exercise

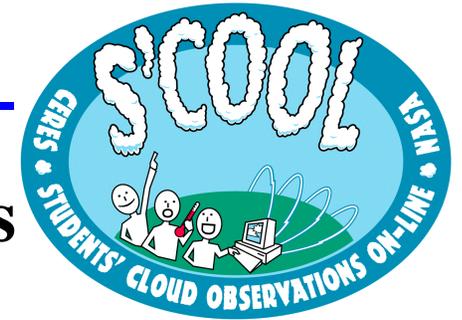
- The Comparison With Random Observations



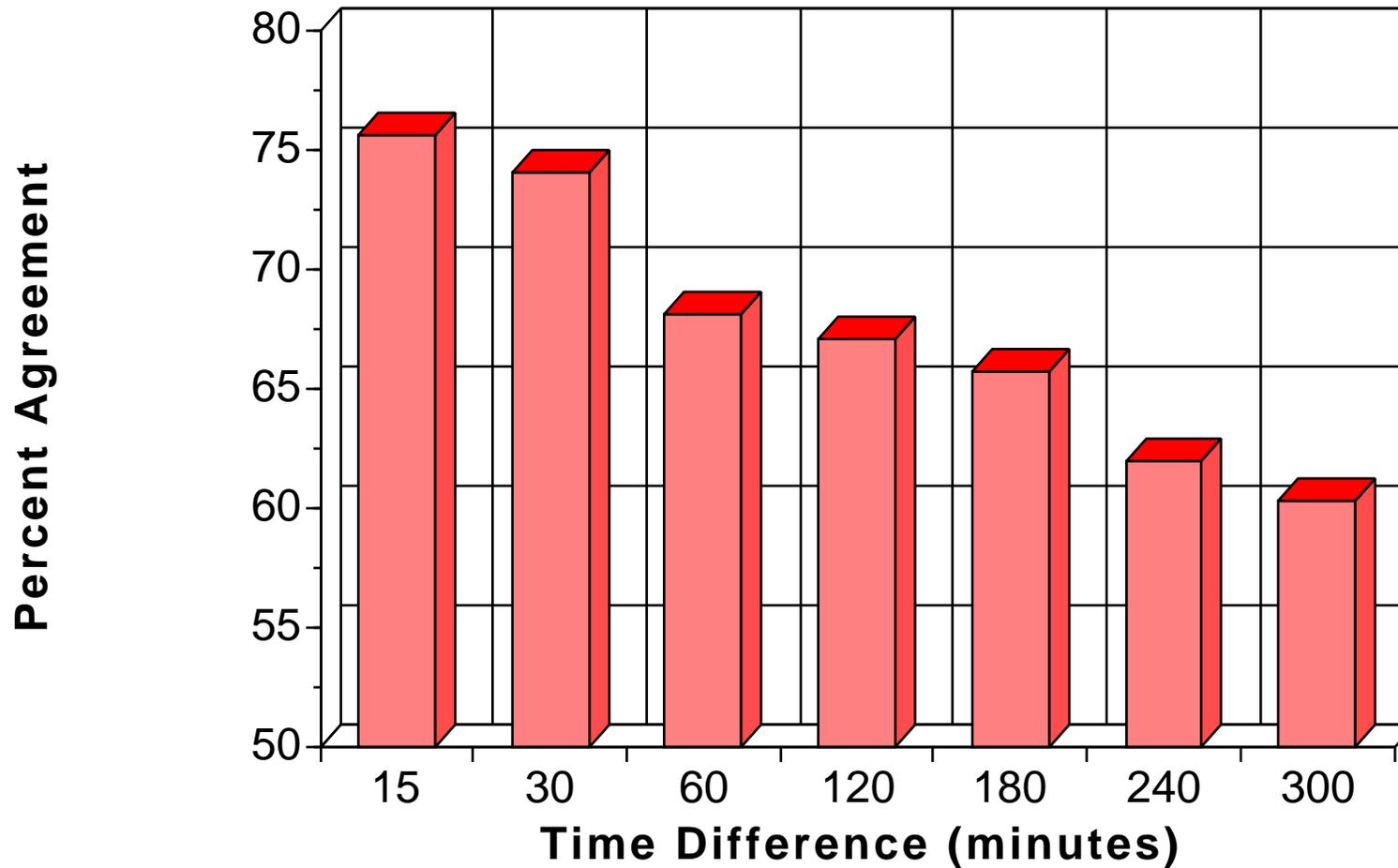


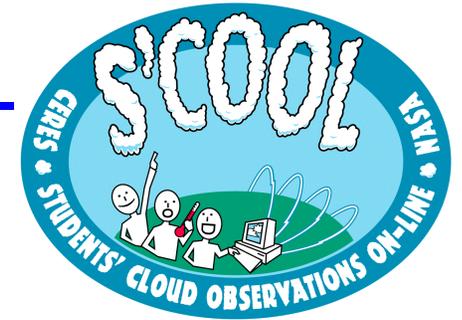
Number of Matched Observations





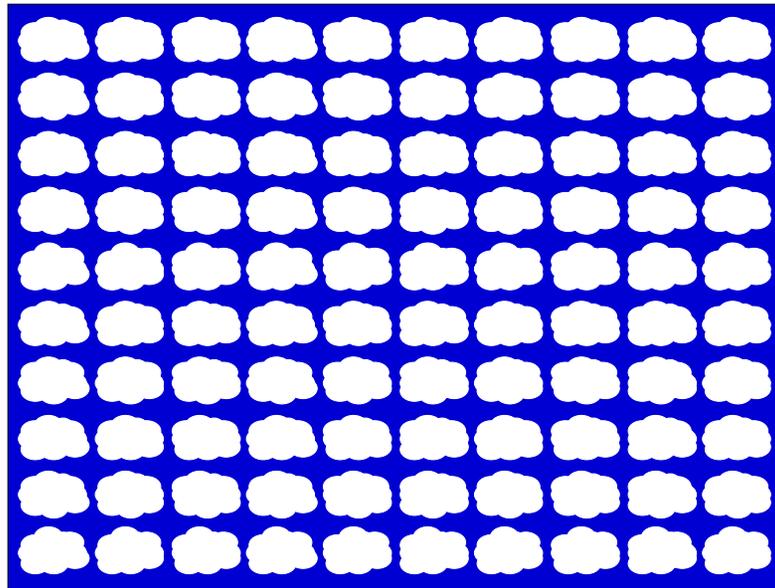
Effect of Mismatched Observation Times



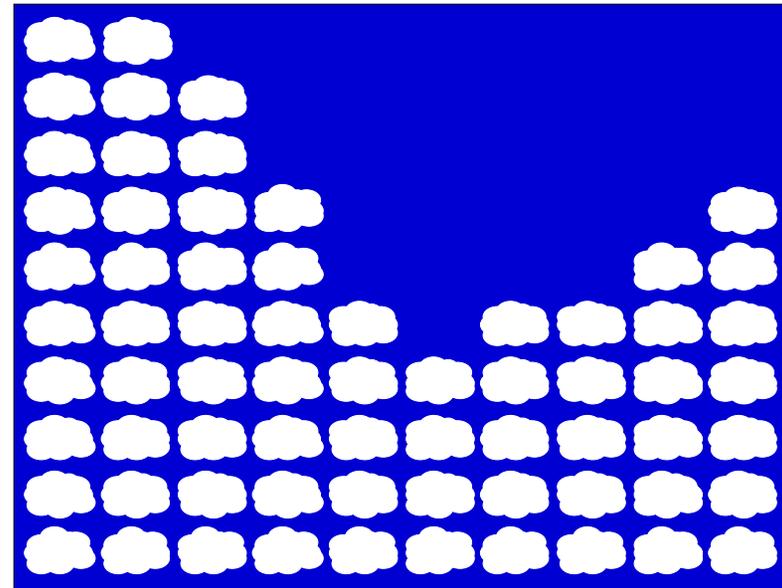


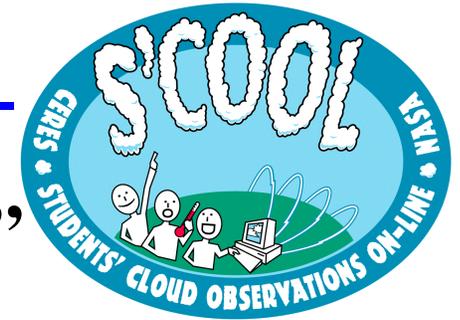
“Guess the Cloud Amount”

100 Clouds

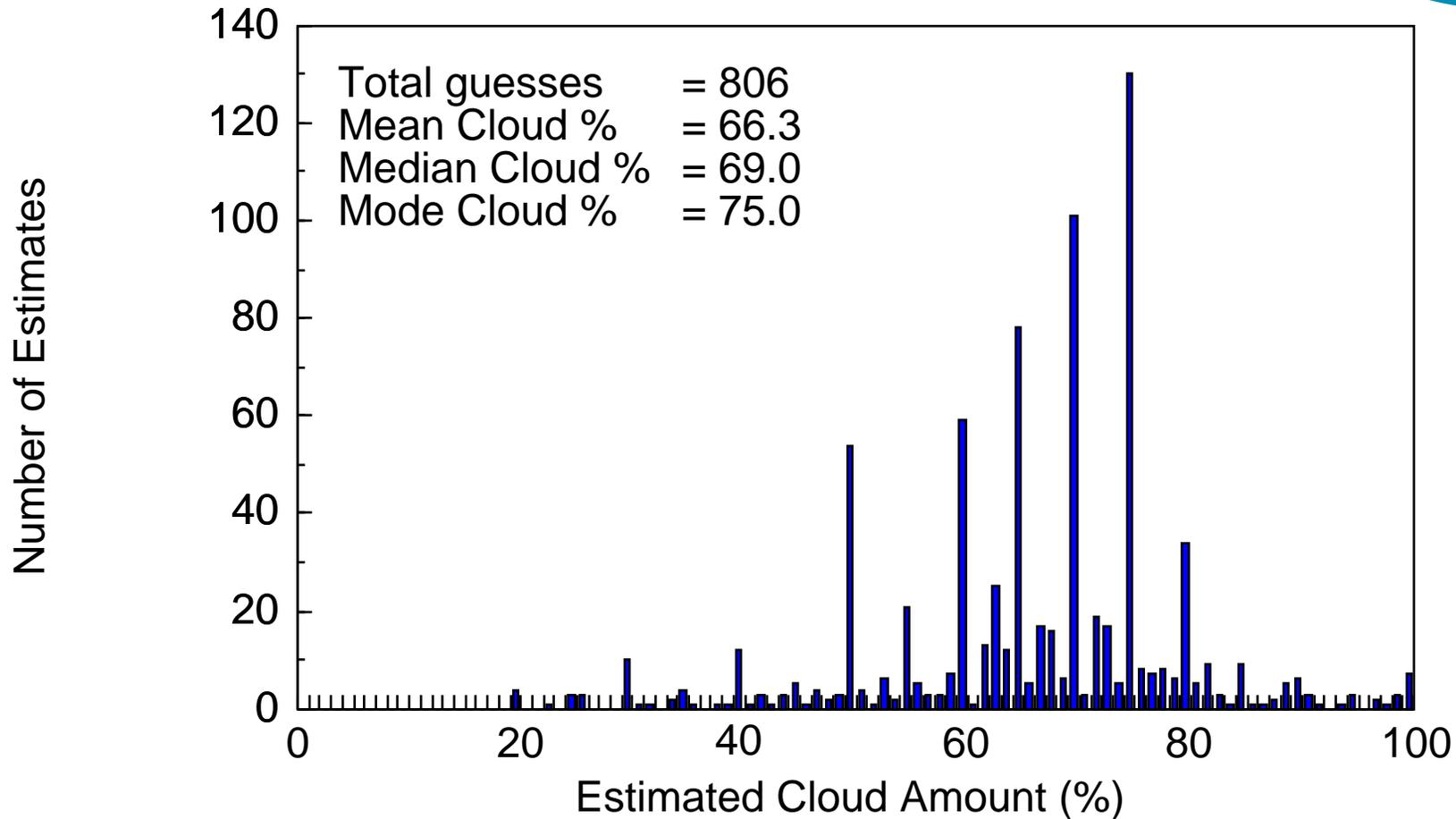


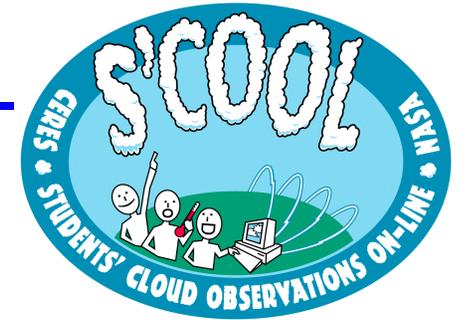
Guess The Cloud Amount





Results From "Guess The Cloud Amount"

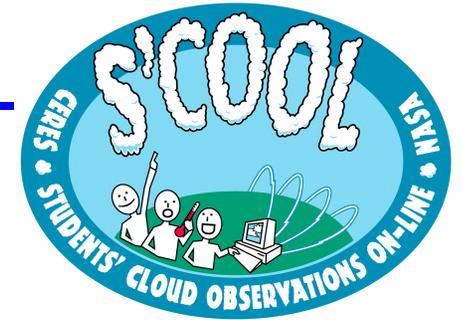




Results From 50 Dice Rolls

		Red Die			
		#1	#2	#3	#4
Blue Die	#1	7	5	2	4
	#2	2	5	0	3
	#3	3	3	4	3
	#4	1	3	3	2

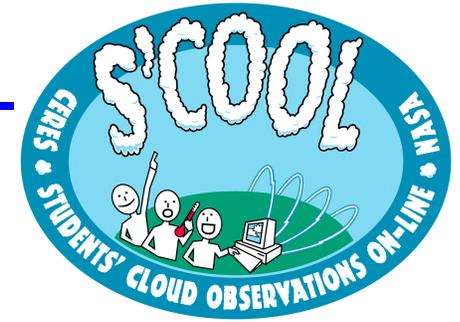




Results From 500,000 Dice Rolls

		Red Die			
		#1	#2	#3	#4
Blue Die	#1	31,420	31,209	31,097	31,569
	#2	31,030	31,060	31,236	31,356
	#3	31,357	31,220	31,504	31,240
	#4	31,150	31,371	31,231	31,130





Statistical Comparison

		Red Die			
		#1	#2	#3	#4
Blue Die	#1	7	5	2	4
	#2	2	5	0	3
	#3	3	3	4	3
	#4	1	3	3	2

- Chi-squared = 8.3
- Probability of Occurring by Chance = 49.9%

		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

- Chi-squared = 65.9
- Probability of Occurring by Chance = 0.00000001%

