Proposed EOS Level 3 Grid

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MODIS Science Team Meeting
Gridding and Averaging Roundtable Session

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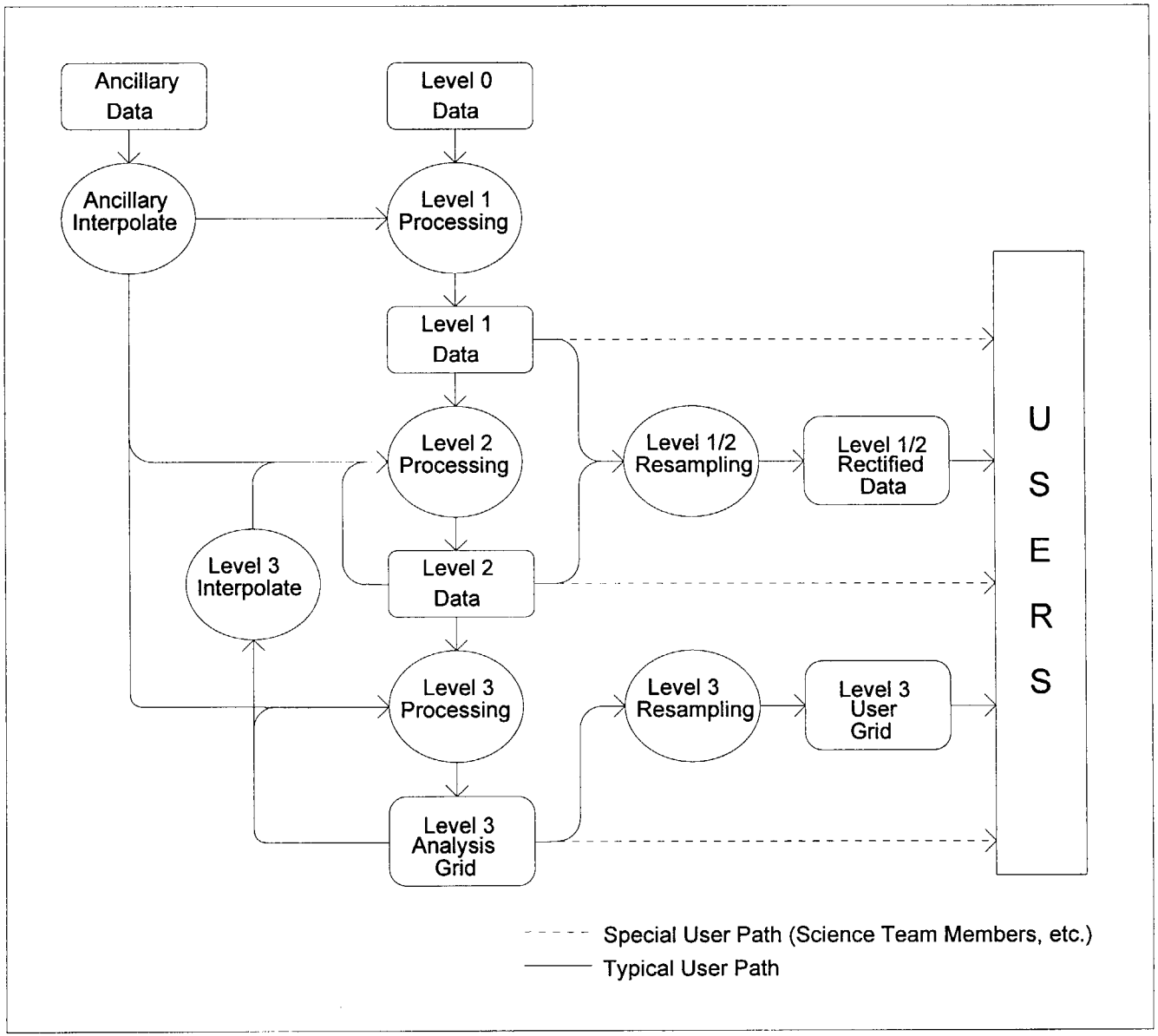
Processing Scenario

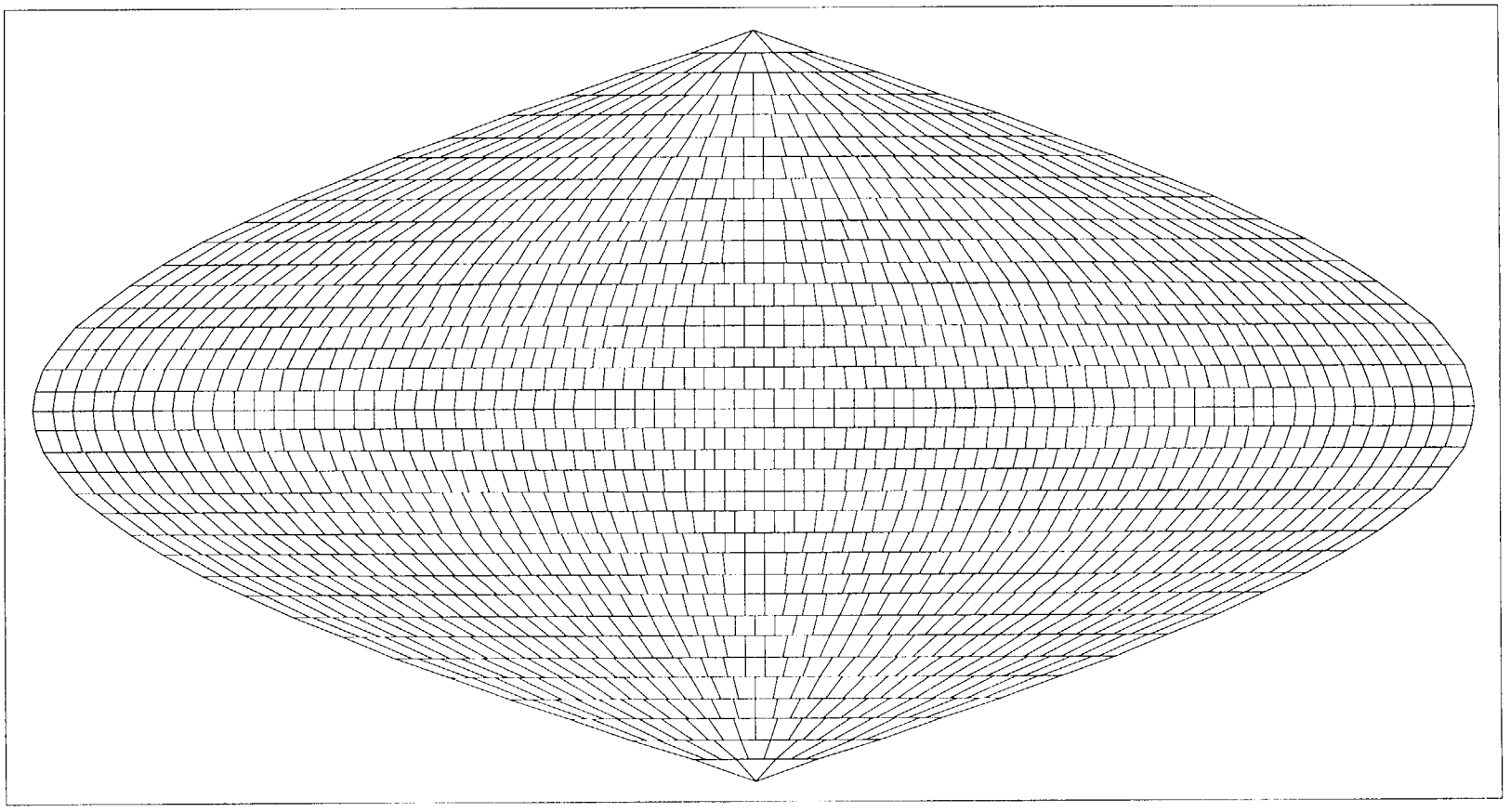


Proposed EOS L3 Grid

- Sinusoidal Binned and Nested Grid Proposed (sometimes referred to as ISCCP Grid)
- Nested down from 1.25 deg. by powers of 2

Grid	Char. angle (deg.)	Char. length (km)	Number of Divisions	Subregions per Ref. Region
Ref.	1.25	140	1	1
1	0.625	70	2	4
2	0.3125	35	4	16
3	0.1563	17	8	64
4	0.0781	8.7	16	256
5	0.0391	4.3	32	1,024
6	0.0195	2.2	64	4,096
7	0.0098	1.1	128	16,384
8	0.00488	0.54	256	65,536
9	0.00244	0.27	512	262,144

ISCCP Grid (5 deg. Example)



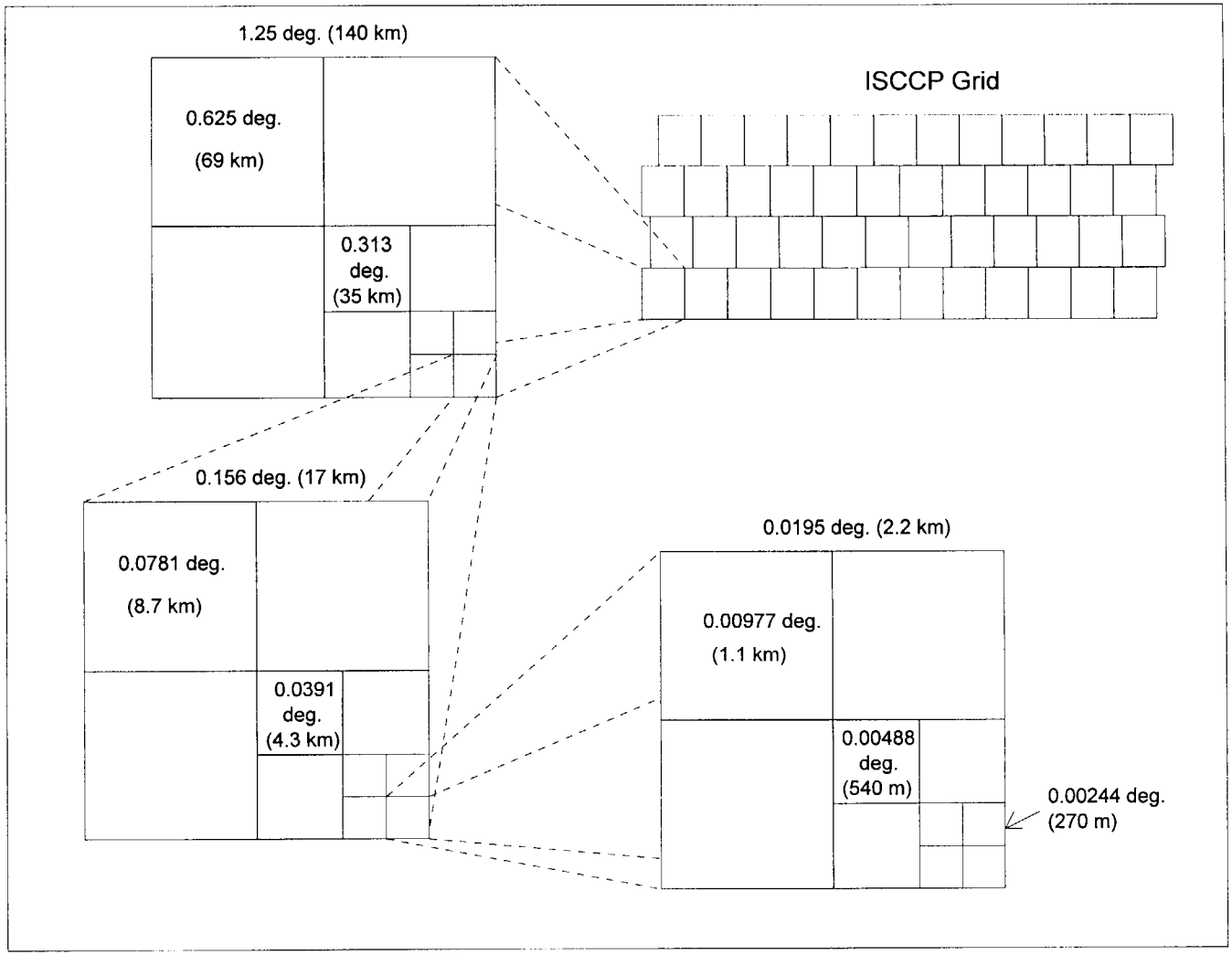
Grid Based on Sinusoidal Map Projection Equations:

$x = r\ lon \cos(lat)$

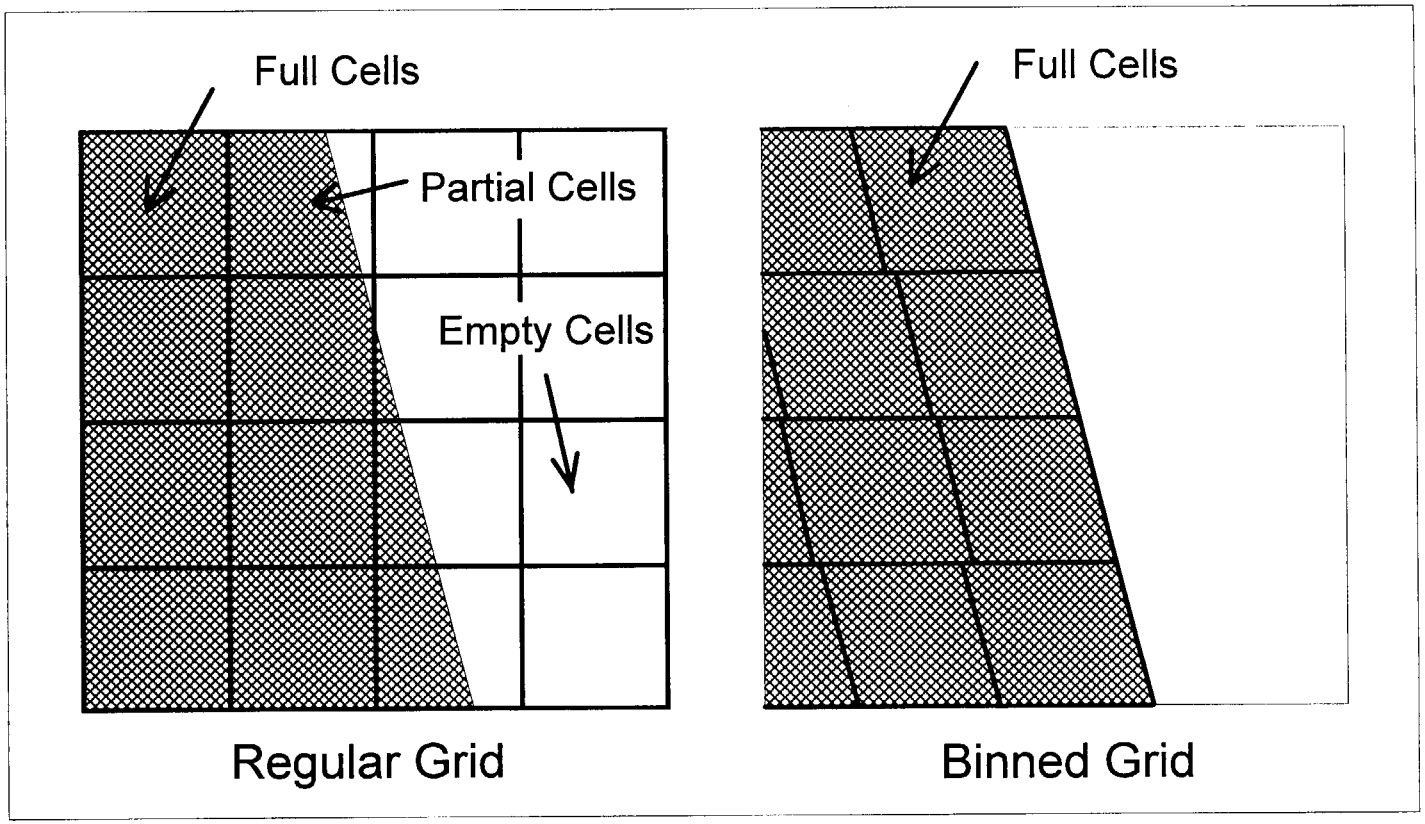
$y = r\ lat$

r - Earth Radius

Nested Cells (1.25 deg. Size)



Binned Grid



- Regular Grid Has Partially Filled Cells and Empty Cells
- In Binned Grid All Cells Are Full

Relative Cell Area of 1 km Nested Cells

Char. angle (deg.)	Char. length (km)	Cell Area Ratio: Bottom/Top			
		Equator $\theta = 0$	Mid-lat. $\theta = 30$	High-lat. $\theta = 75$	Near Pole $\theta = 82.5$
2.5	280	1.0000	1.0254	1.1766	1.3955
1.25	140	1.0000	1.0126	1.0842	1.1792
0.625	70	1.0000	1.0062	1.0409	1.0850
0.3125	35	1.0000	1.0031	1.0199	1.0410
0.1563	17	1.0000	1.0015	1.0096	1.0196
0.0781	8.7	1.0000	1.0007	1.0045	1.0091
0.0391	4.3	1.0000	1.0003	1.0019	1.0039
0.0195	2.2	1.0000	1.0001	1.0006	1.0013
0.0098	1.1	1.0000	1.0000	1.0000	1.0000

Ratio of 1 km nested cells at bottom of region vs. one at top of region.

- 1.25 deg. chosen because it is not as bad as 2.5 deg.
- Ideal would be around 17 km (0.1563 deg.)
- Statistics based on counting pixels should be weighted with area of cell

Proposed EOS Grid Issues

- Single Dimensional Resampling Step to Go to Plate Carrée (Equal Angle) Grid
- Multiple Distribution Grids Must Be Available.
- Tools To Re-map (Resample) to Any Other Grid Must Be Provided.

  Should be Available to Run Either On Demand At The DAAC or On User's Computer.

  Care Should Be Taken Re-mapping Causes Resolution Changes.
- Standard Tools for Grid Not Currently Available
- Vertical Gradients (and Other Multiple Point/Spatial Operations) Difficult