Panel 2. GRIDDING AND AVERAGING

"Discussion should focus on the data structures for Level 2 and gridding and compositing of Level 3 products, and the use of models."

Panelists: Alan Strahler, Moderator; Bob Evans, Alfredo Huete, Robert Wolfe, Chris Justice, Paul Menzel, Joann Harnden, Peter Muller, Ed Masuoka, Dave Diner (or designate).

Goals and Objectives:

* Enhance understanding of ISSCP Level 3 grid and related issues
* Explore usefulness of Level 2G (and 1G?) for standard products
* Explore compositing issues: timing, selection, pixel size

Policy Issues/Follow-ons

* Which products are to be archived on which grid?
* To nest or not to nest -- do we have a position?
* Are there community research issues? If so, how do we resolve them?

Discussion Outline:

I. Level 3 Grid

* Presentation of nested ISSCP grids as adopted by SWAMP (R. Wolfe)
* Goddard DAAC views on ISSCP grid (S. Ungar)
  -- Storage requirements
  -- Others
* Problems of grid boundaries in nested scheme for finding geographically-nearest neighbors (S. Ungar)
* Utility Functions needed for Toolkit
  -- Lat-long to grid cell
  -- Grid cell to lat-long
  -- Going from one nesting level (resolution) to another
  -- Finding geographic neighbors across grid discontinuities in nested case
  -- Others?
* Handling the Level 3 Grid in HDF
  -- How will sparse gridded data be handled? Does it matter?
  -- What about varying numbers of observations per grid cell?
* Viewing Level 3 Products
  -- Need cartographic routines to go from ISSCP grid to common map projections: Goode's homolosine; UTM; polar stereographic; Lambert conic conformal (resampling method(s)?)
* ISSCP Grid and Modeler's needs
  -- Grid to modeler's formats -- i.e., equal-angle grid.

  (resampling method(s)?)

II. Level 2G Products -- E.g., surface reflectance

* Description of format
  -- Scan cube geometry is forward-projected to ISSCP grid without resampling
* Advantages
  -- Easy to combine with Level 3 data
  -- No resampling of data

Conclusions:

* It is probably better to work with a fine-resolution grid ($\approx$ 250 m) and collapse to coarser grids than to use a nested-grid.

Action Items

* Evans (lead) w/ Wolfe, Diner, & Barkstrom to take to SWAMP

Need to resolve quickly - Beta coding of L3 algorithms needs this

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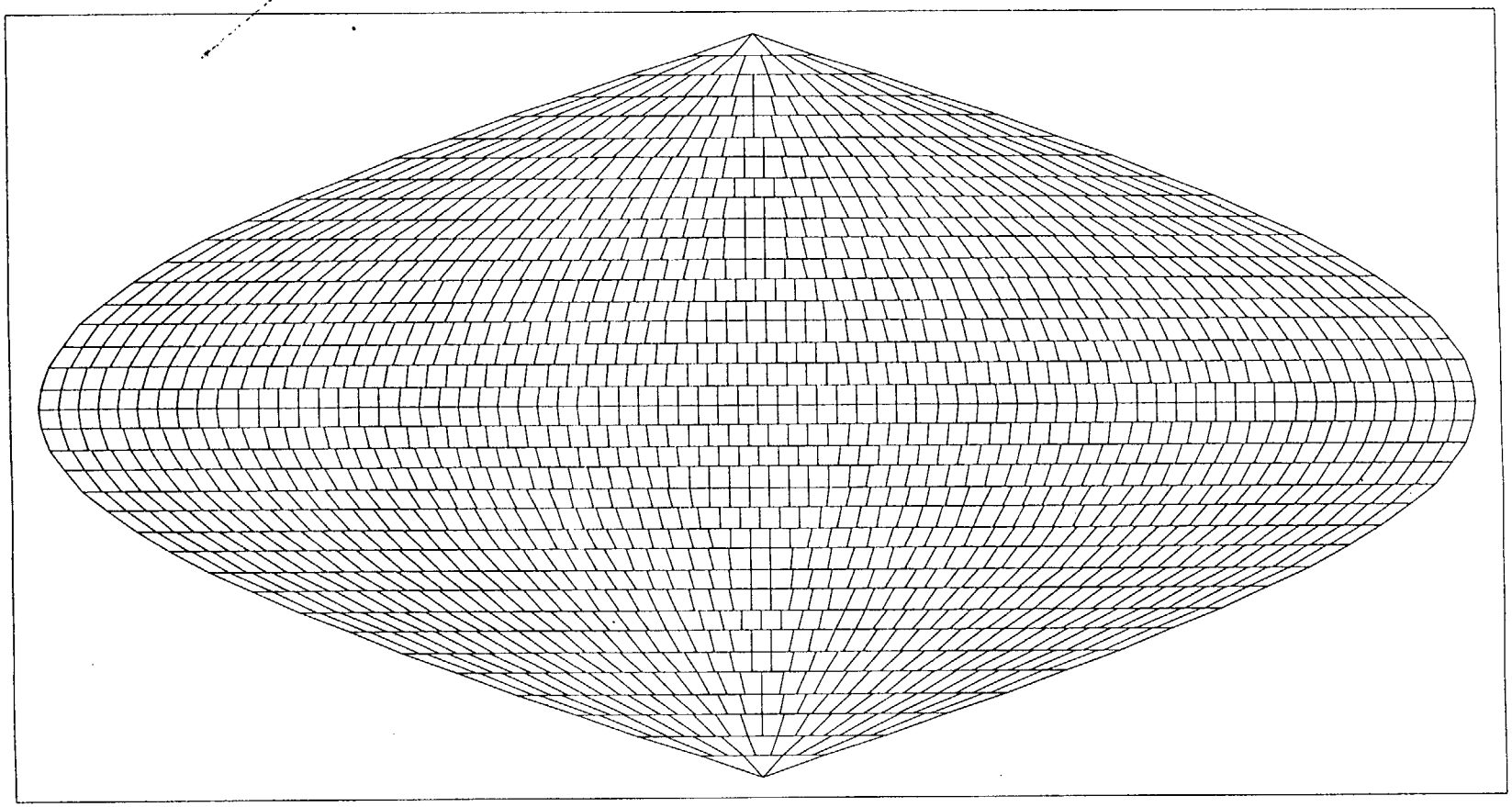
* Nested Grid
* Problems - Area errors; boundaries
* Grid Implications
  - HDF vs. the Grid - sparse data; duplicate obs
  - Cartographic tools & resamplers } EOS tools
    - = angle grids for modelers
    - map projections from the grid

ISCCP Grid (5 deg. Example)



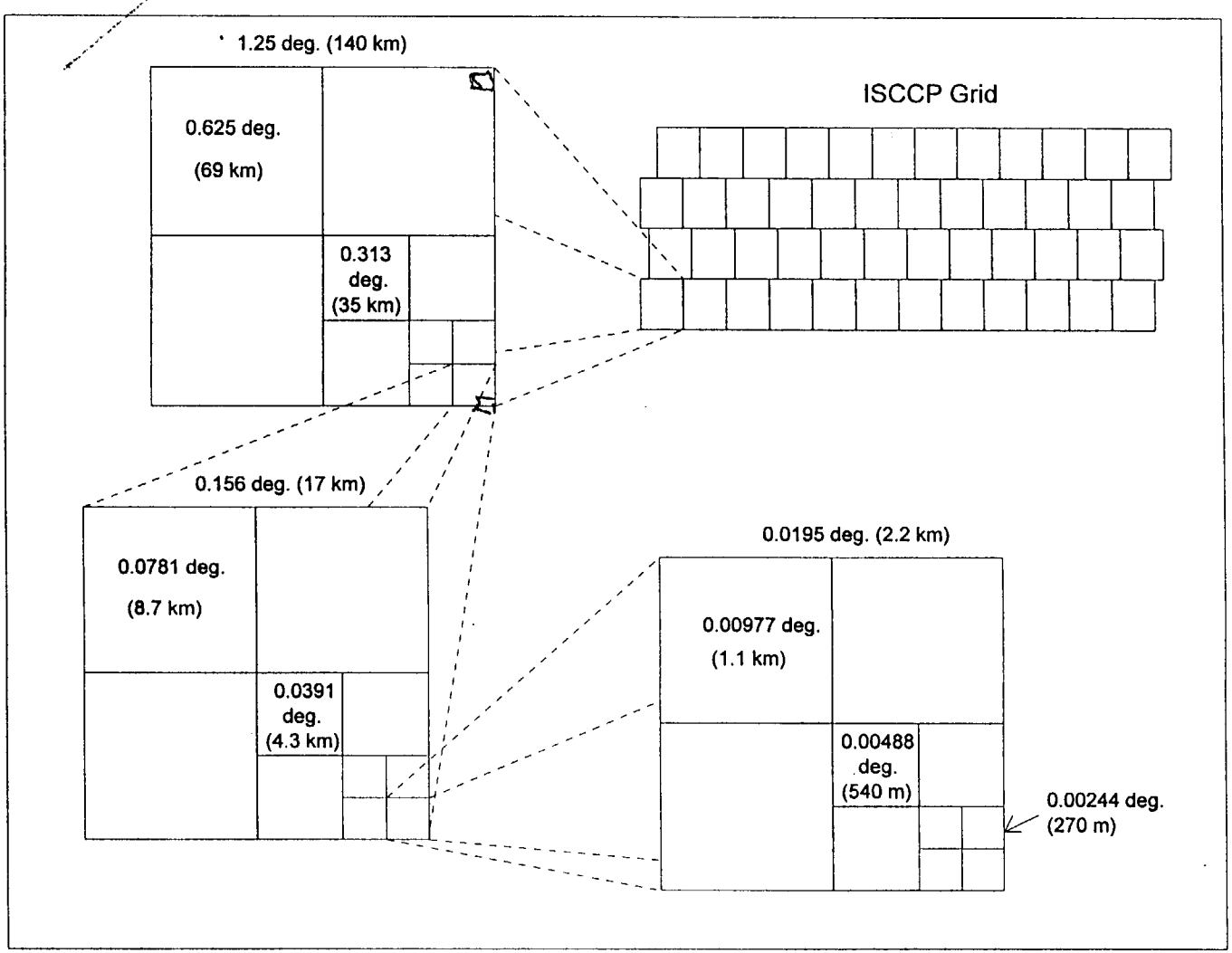
Grid Based on Sinusoidal Map Projection Equations:

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

$y = r\ lat$

r - Earth Radius

Nested Cells (1.25 deg. Size)



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