



**PATHFINDER OF R20**

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<http://isccp.giss.nasa.gov>

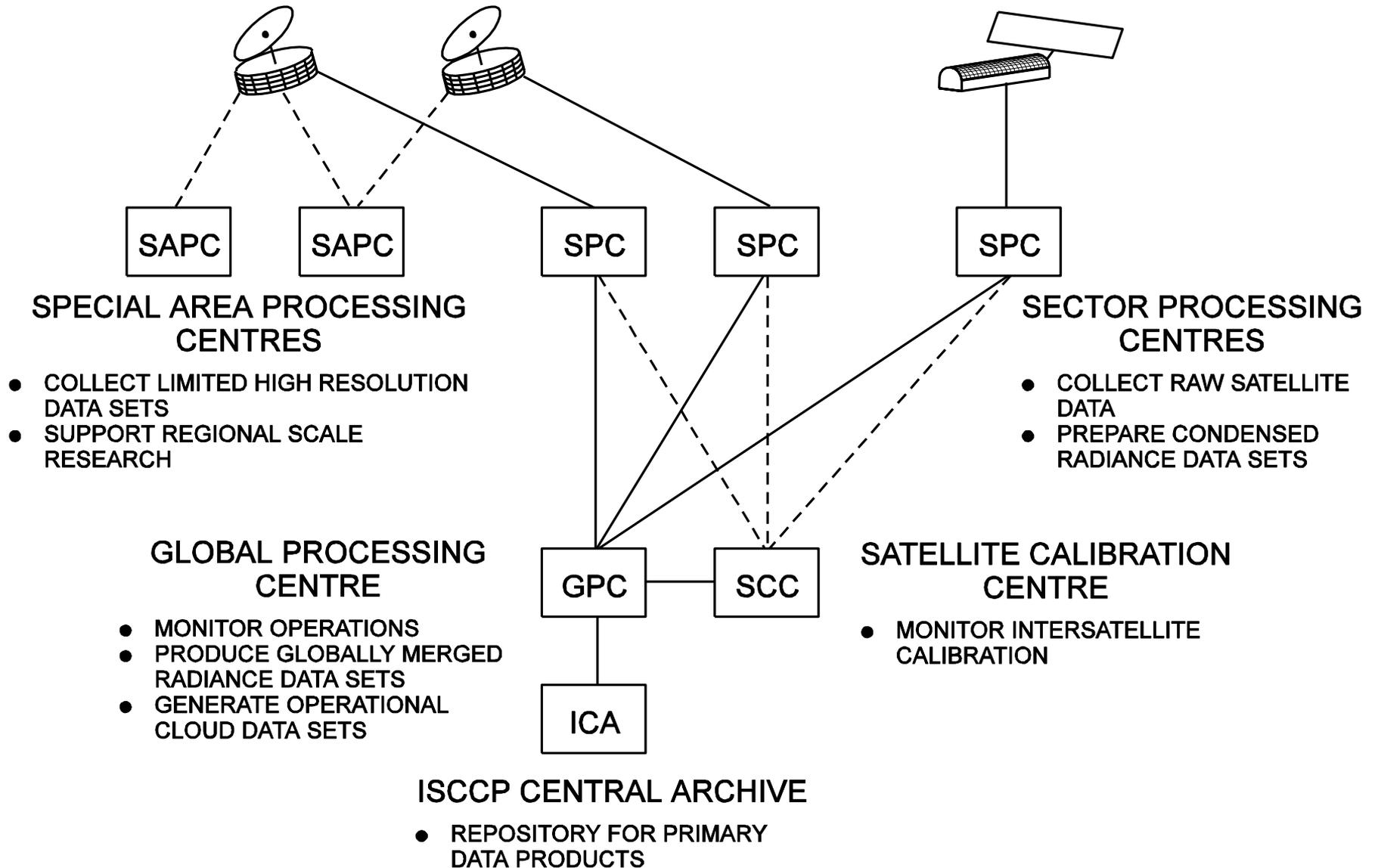
# USUAL CHARACTERISTICS OF RESEARCH DATA PROCESSING

- “Single-Run” processing
- If multiple steps, executed manually
- One input and one output dataset (same format)
  
- Only offline QC (if any)
- Sketchy software documentation
- No version control
  
- **No record of branching (statistics) in output**
- **Output does not contain inputs**

# KEY CHARACTERISTICS OF ISCCP

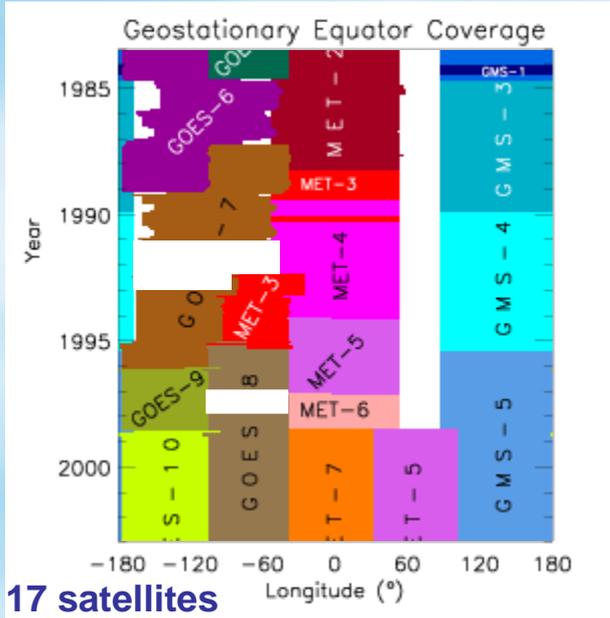
## (novel at the time)

- Multi-center (multi-national) data exchange & distributed processing
- Multi-Stream into Single-Stream analysis
  - (requires “homogenizing” inputs)
- **Hierarchical data product design**
  - L1b-reversible, Ancillary, L2-remote sensing
  - L3-process, L3-statistics, L4-derived

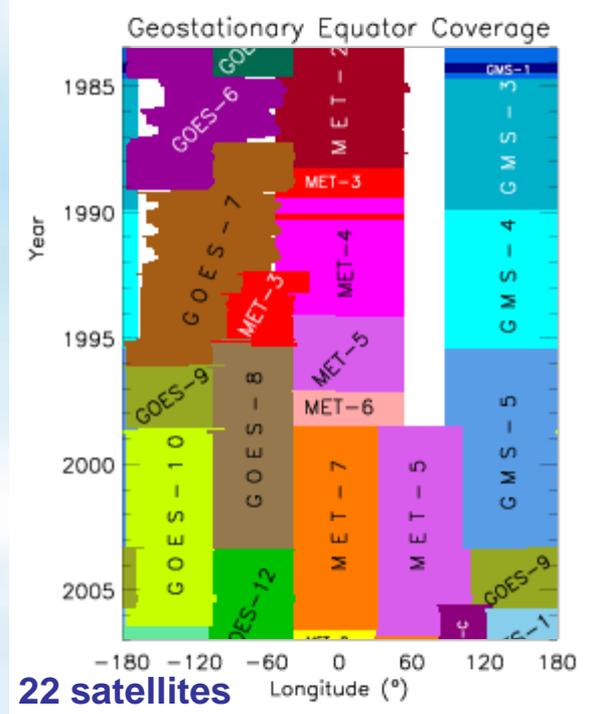


# Data Rescue Efforts

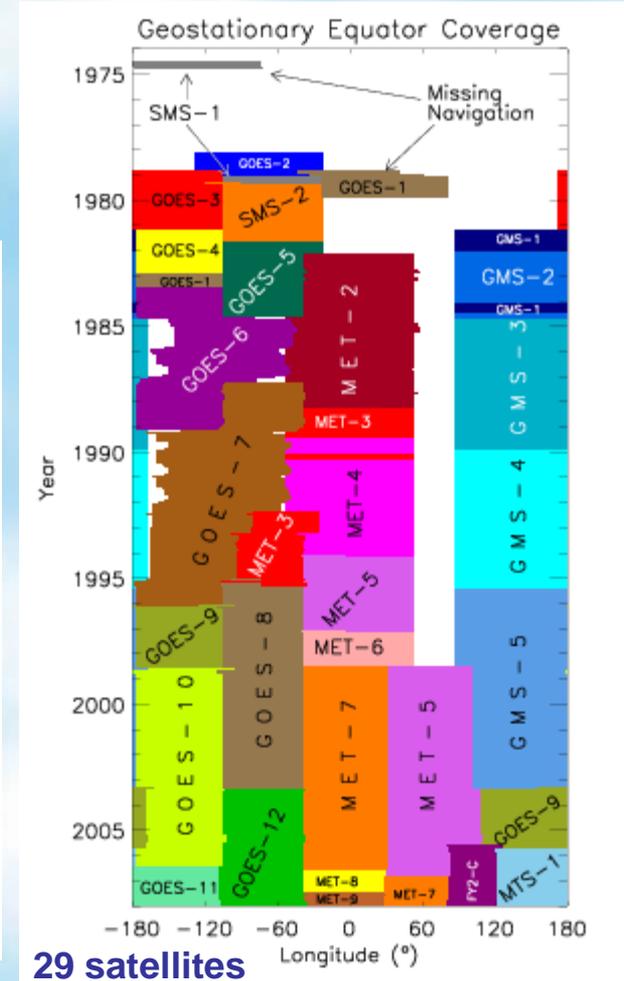
B1 Status - 2003



B1 Status - 2006



B1 Status - 2007



Ken Knapp -- NOAA

**PLUS 11 POLAR ORBITERS**

# Products Description

<b>B3:</b> Reduced Resolution Radiances	1.1 Gb/month
<b>BT:</b> Radiance Calibration Tables	48 Mb/month
<b>IS:</b> Ice/Snow	250 Kb/month
<b>TV:</b> TOVS Atmosphere	6 Mb/month
<b>DX:</b> Pixel-Level Cloud Product	5 Gb/month
<b>D1:</b> Gridded 3-hr Cloud Product	320 Mb/month
<b>D2:</b> Gridded Monthly Cloud Product	8 Mb/month
<b>FD:</b> Radiative Flux Products	540 Mb/month
<b>RE:</b> Cloud Particle Sizes	100 Mb/month

# **OBSTACLES TO “OPERATIONAL” DATA PROCESSING**

**IDEAL = Fully Automated & Untended Processing**

**MURHY’S LAW HOLDS**

**What Can Go Wrong Will**

**BILL’S COROLLARY HOLDS**

**What CAN’T Go Wrong Will Anyway**

# CONSEQUENCES

- Never “disappear” data: count inputs & outputs, keep underflow-overflow statistics, count “failures”
- Record branching and “choice” statistics in output
- Have software option for all possible outcomes
- Have multiple levels of QC and multiple re-entry points in code
- Need “expert” human to monitor processing
- Always need people to investigate anomalies

# NECESSARY CHARACTERISTICS OF CLIMATE DATA PROCESSING SOFTWARE

**(aka “Operational”)**

- Multi-module structure -- script controlled chain of procedures, multiple re-entry points
- QC at all key stages of processing to monitor & support anomaly investigations
- **Re-processing must be easy as it will always be required**
- Processing system will always require “expert” human involvement -- interpreting data errors & observing system changes & computer system malfunctions, deciding fixes that are “physically” best
- Plan for aging effects -- changes of operating system & hardware limits, changes of coding practices

# KEY CHARACTERISTICS OF CLIMATE DATA RECORDS

- Stable Processing Procedures [robust code with nothing too fancy – ie, nothing system specific]
- Approximate Homogeneous Sampling in Space-Time
- Flags to indicate branching & choices
- Documentation of What was Done
- **Documentation of Why it was Done that Way**
- Supporting website

## What is the International Satellite Cloud Climatology Project (ISCCP)?

## What is the World Climate Research Programme (WCRP)?

## What is the Global Energy and Water Experiment (GEWEX)?

### PROJECT DESCRIPTION

Participants & Status

CLOUD DATA  
Maps & Plots  
Available On-Line

OTHER RELATED DATA  
Maps & Plots  
Available On-Line

DATA ANALYSIS  
To Understand Climate



### WHAT'S NEW

DATA PRODUCT  
DOCUMENTATION  
& Software Available  
On-Line

RELATED PROJECTS  
Web Sites & Data Centers

FURTHER INFORMATION

ISCCP ANALYSIS  
SOFTWARE

## WEB SITE HIGHLIGHTS

**Security/Privacy Statement**

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**Contact for Technical Issues: Dr. Chris Brest**

**NASA Goddard Space Flight Center**

