MODIS DATA SYSTEM STUDY

TEAM PRESENTATION

May 5, 1989

AGENDA

1. Status of the MODIS Data System Study
2. Delivery of the EosDIS/MODIS Interface Comparison Document
3. Updated MODIS Core Data Products and Production Data Flow Chart
4. Team Member Proposed Products, Algorithms, and Associated Data Flows: Preliminary Detailed Analysis
5. Action Item Form

STATUS OF THE MODIS DATA SYSTEM STUDY

As reported in the minutes of the March 17 MODIS meeting, the MODIS Data Study Team will concentrate its efforts on the following tasks:

a. Review EosDIS functionality and design to ensure that MODIS Science Team Member requirements are met.

b. Develop top-level software design and specifications for MODIS Level-1 products. This effort is to include consideration of all data system components related to MODIS instrument calibration.

c. Develop top-level software design and specifications for the MODIS instrument monitoring software.

d. Develop top-level data processing system structures and component specifications required to support the integration of software developed by MODIS Science Team Members into the EosDIS.

Since that time, much of our effort has concentrated on item (a). Associated deliverables for the month of April are consistent with this emphasis and included:

- <u>EosDIS/MODIS Interface Comparison Document</u>

  This document reviewed the EosDIS Interface Definition Document (IDD) and compared the interface data flows and related functions from the EosDIS IDD to those in the MODIS data system reports (which were based primarily on the requirements of the MODIS science team).

- <u>Data Acquisition and Processing Scenarios Document</u>

  This document evolved scenarios for the acquisition and processing of MODIS data based on science team member input and requirements. These scenarios were used to exercise the design of the MODIS data system portions of EosDIS (as published) to ensure that the concept would adequately support the science team members' requirements, goals, and objectives.

- <u>Non-Advocacy Review Materials</u>

  Materials have been and will be delivered on an ongoing basis to support this activity.

More recently, the MODIS science team leader has requested that detailed information on a set of candidate core data products be developed. It is the intention of the MODIS science team to have in place and implemented on the CDHF at NASA/GSFC by launch of NPOP-1 a set of algorithms capable of producing a complete set of "core" MODIS data products. We define the term Core MODIS Data

Product as a product that: (a) is of interest to the scientific community, particularly the members of the MODIS science team, other Eos instrument science teams, and the interdisciplinary investigations; (b) would be an important contribution towards meeting the scientific objectives of Eos; (c) can be produced using primarily, though not exclusively, MODIS data; and (d) is sufficiently well understood such that retrieval algorithms already exist or will be fully developed within the next several years using simulated MODIS data. Revision B of the Core Data Product List was distributed on April 24, 1989, as is presently awaiting review and comment by members of the MODIS science team.

This list of the core MODIS data products is being developed to fulfill several crucial requirements. First, the list will highlight the importance of the MODIS instrument (both MODIS-N and MODIS-T) when presented as a part of the upcoming nonadvocacy review. Second, the list will ensure that the MODIS instrument adequately supports the requirements of the Eos interdisciplinary investigations, many of which have very specific requirements for MODIS data products. Third, emphasis on the processing, storage, and data requirements for these core MODIS products will provide accurate (initial) sizing estimates to be used in the specification of EosDIS components including the CDHF, DADS, and IMC. The efforts on core data product development largely support item (d).

Future deliverables for the months of May through August are consistent with this emphasis and include:

- <u>Preliminary Team Member Science Product Summary</u>

  The purpose of this document to summarize, consolidate, and categorize the joint set of MODIS data products proposed by the science team members. The science product summary document is in progress at this time and is based on the following outline:

1. INTRODUCTION
   - 1.1 The Role of MODIS Data Products Within Eos
   - 1.2 Synopsis of the Interests of the MODIS Science TEam
   - 1.3 References
2. CORE DATA PRODUCTS
   - 2.1 Core Data Flows
   - 2.2 Core Data Products
   - 2.3 Core Algorithms
   - 2.4 Core Input Data Requirements
3. TEAM MEMBER PROPOSED DATA PRODUCTS
   - 3.1 Proposed Data Products
   - 3.2 Required Data Flows
   - 3.3 Input Data Requirements
4. ISSUES RELATED TO MODIS DATA PRODUCTS
   - 4.1 Compatibility with Requirements of Other Teams
   - 4.2 Selection of Product Domains
   - 4.3 Selection of Standard Grids
   - 4.4 Selection and Implementation of Algorithms

4.5 Location and Type of Processing
4.6 Availability of Required Input Data
4.7 Timeliness Requirements and Product Interrelationships

- Input Data Attributes Report

The purpose of this document is to identify, quantify, and develop the set of attributes for all ancillary and auxiliary input data required to generate the proposed MODIS data products.

- MODIS Data Product Algorithm Report

The purpose of the MODIS Data Product Algorithm Report is to identify, quantify, and evaluate the set of algorithms required to generate the proposed MODIS data products.

- Team Member Data Product Analysis Report

The purpose of the Team Member Data Product Analysis Report is to document the functional and performance requirements on the MODIS data system that result from the generation of the set of proposed MODIS data products.

Items of emphasis (b) and (c) are not fully developed at this time, though the Level-1 products are core products and will also be covered by the above-mentioned deliverables and the associated analysis.

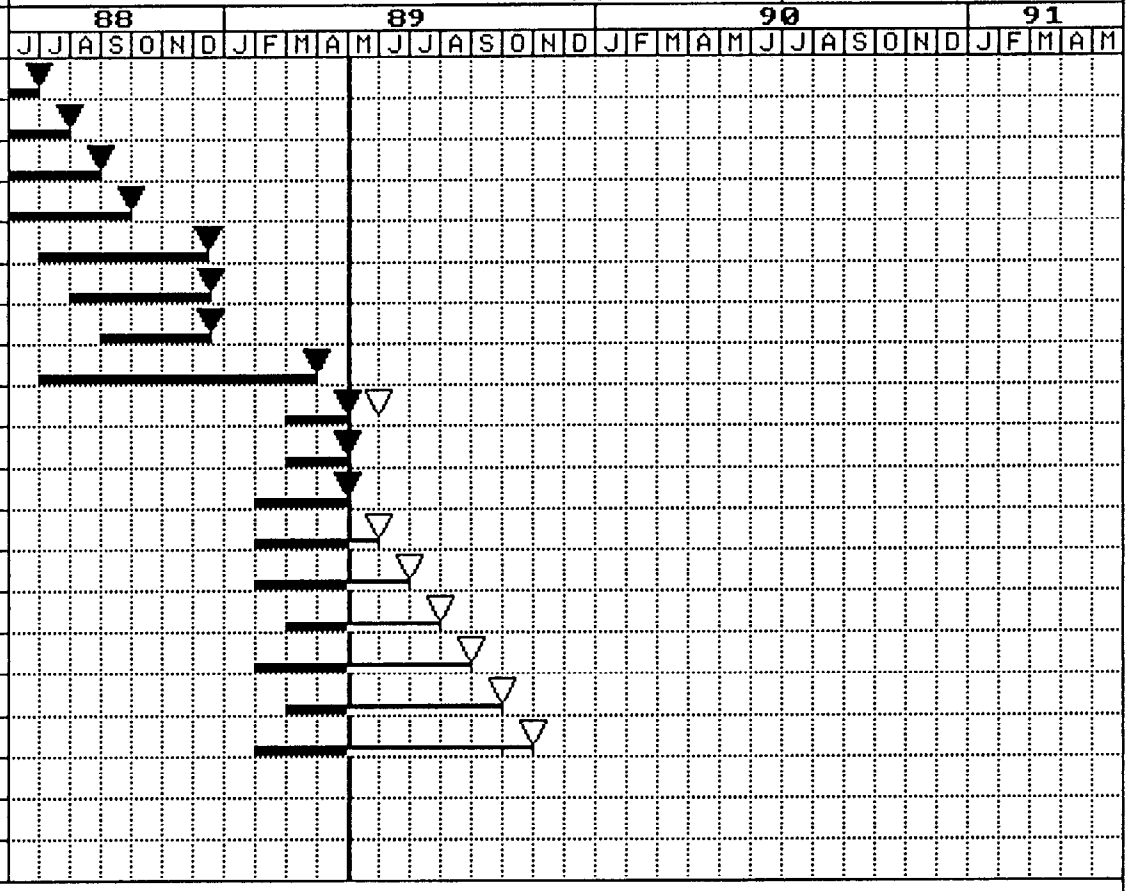
A current milestone chart is attached.

MODIS DATA SYSTEM STUDY
APPROVAL
ACCOMP.

Summary of Deliverables

ORIG. APPVL. 06/24/88
LAST CHANGE 05/01/89
STATUS AS OF 05/01/89

MILESTONES	
01	WBS Study Plans
02	Prelim User Data Prod Req'ts
03	Preliminary Operations Concept
04	Functional Requirements Doc
05	Prelim Data Processing Plan
06	Prelim System Specification
07	Operations Concept
08	Prelim Data Requirements Doc
09	Non-Advoc'y Rev'w Mat'ls
10	EosDIS/MIDACS I/F Comparison
11	Scenarios for Science Team
12	Prel TM Sci Product Summary
13	Input Data Attributes Report
14	MODIS Data Prod Algorithm Rep
15	TM Product Analysis Report
16	MODIS SDST/ICT Req'ts Doc
17	Data Requirements Doc
18	
19	
20	



Note:

CANDIDATE MODIS CORE DATA PRODUCTS AND PRODUCTION DATA FLOWS

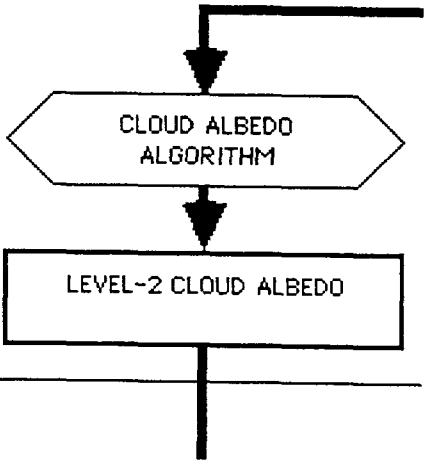
This flow chart shows major data flows and processing steps in the production of MODIS core data products. To assemble a large chart from the pages provided, note the assembly code located in the upper right-hand corner of each page. The number portion of the code denotes the column where the page should be placed for assembly, i.e. numbers increase in sequence from left to right. Likewise, letters denote rows in the assembled chart, i.e. letters increase sequentially from top to bottom. Page 1A is in the upper left-hand corner, page 10A is in the upper right-hand corner, page 1C is in the lower left-hand corner, and page 10C is in the lower right-hand corner.

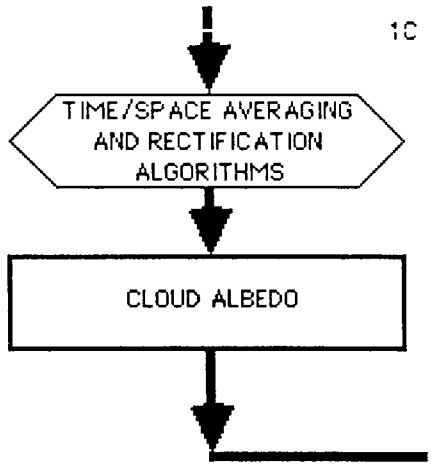
Please note that the information in the table is preliminary. Updates to the chart will be provided as requirements are further defined. Comments and suggested revisions are welcome.

LEVEL-0 DATA PRODUCTS

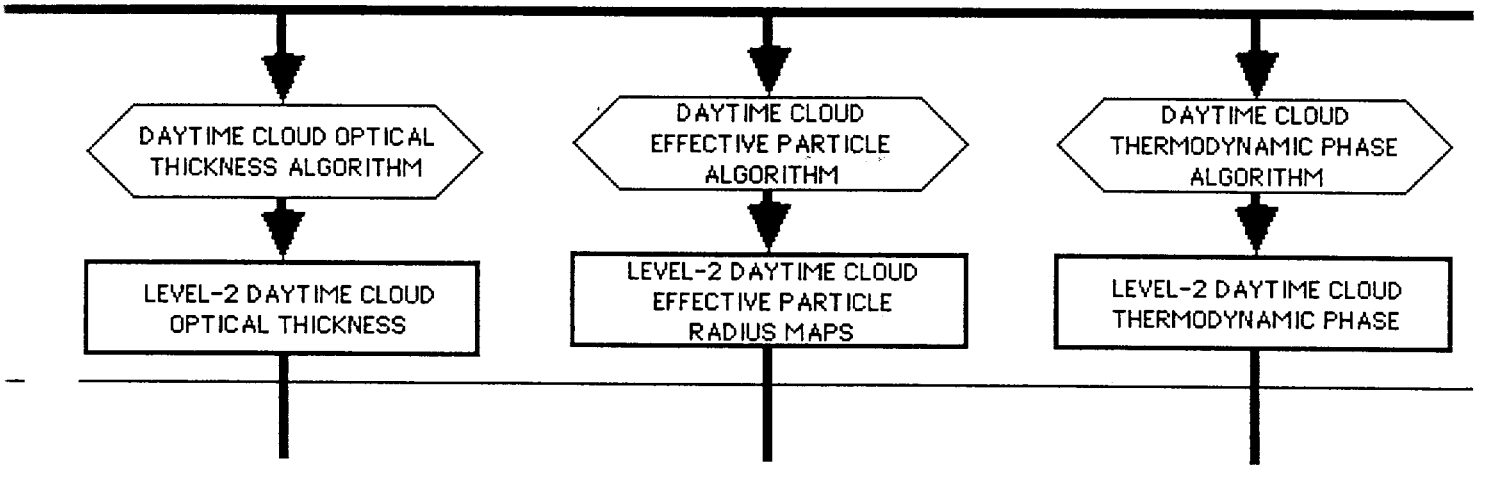
LEVEL-1 DATA PRODUCTS

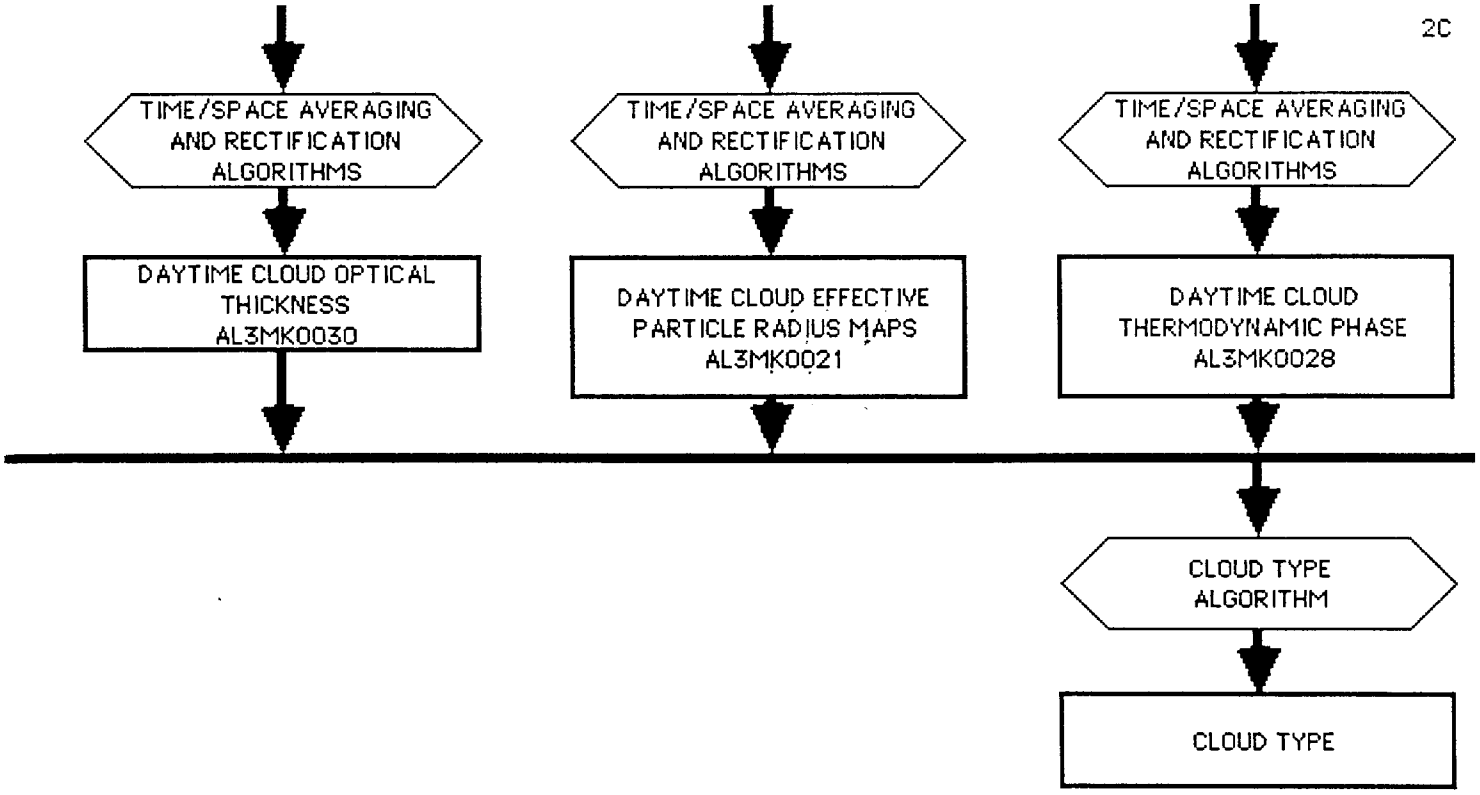
LEVEL-2 DATA PRODUCTS



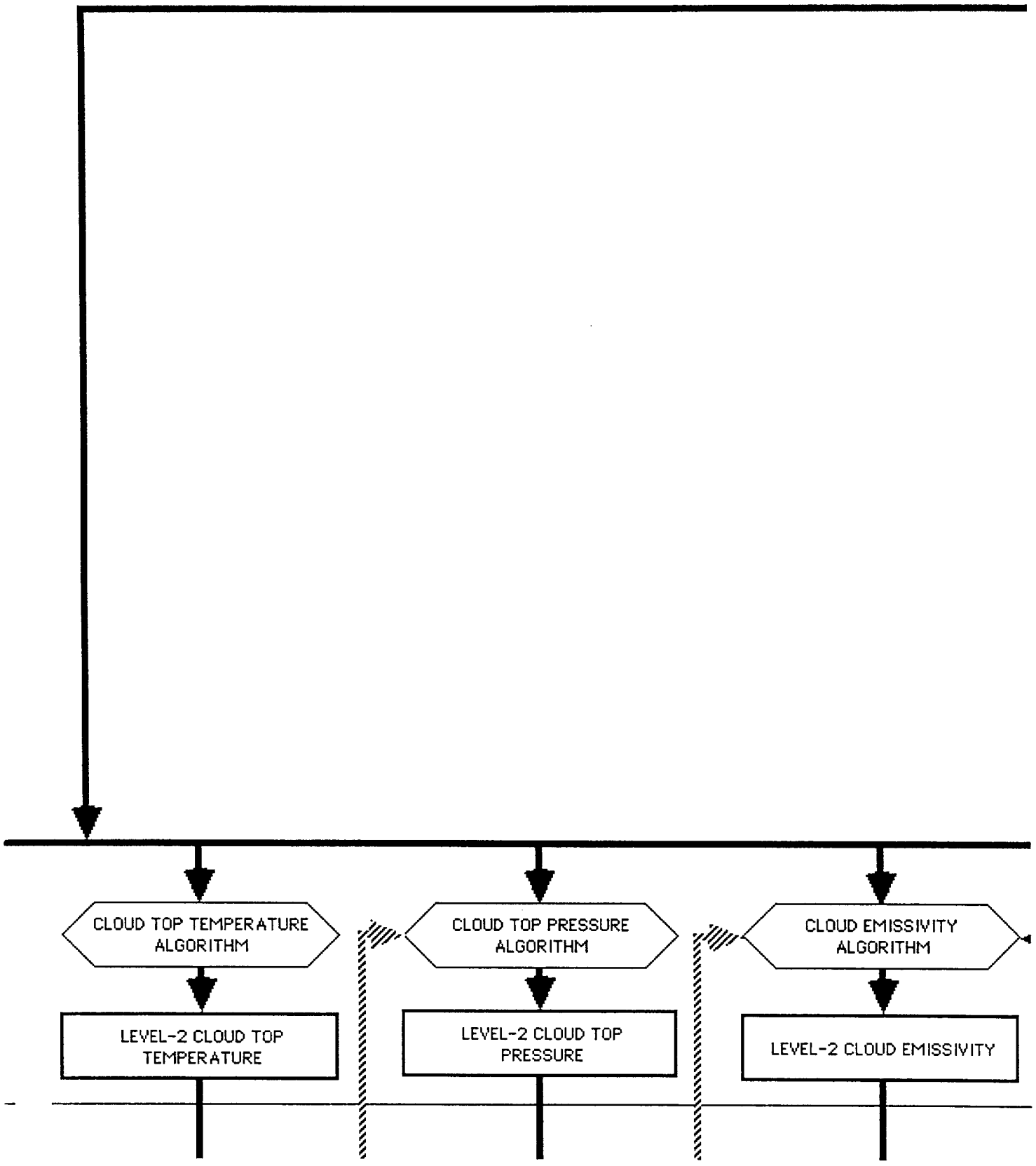


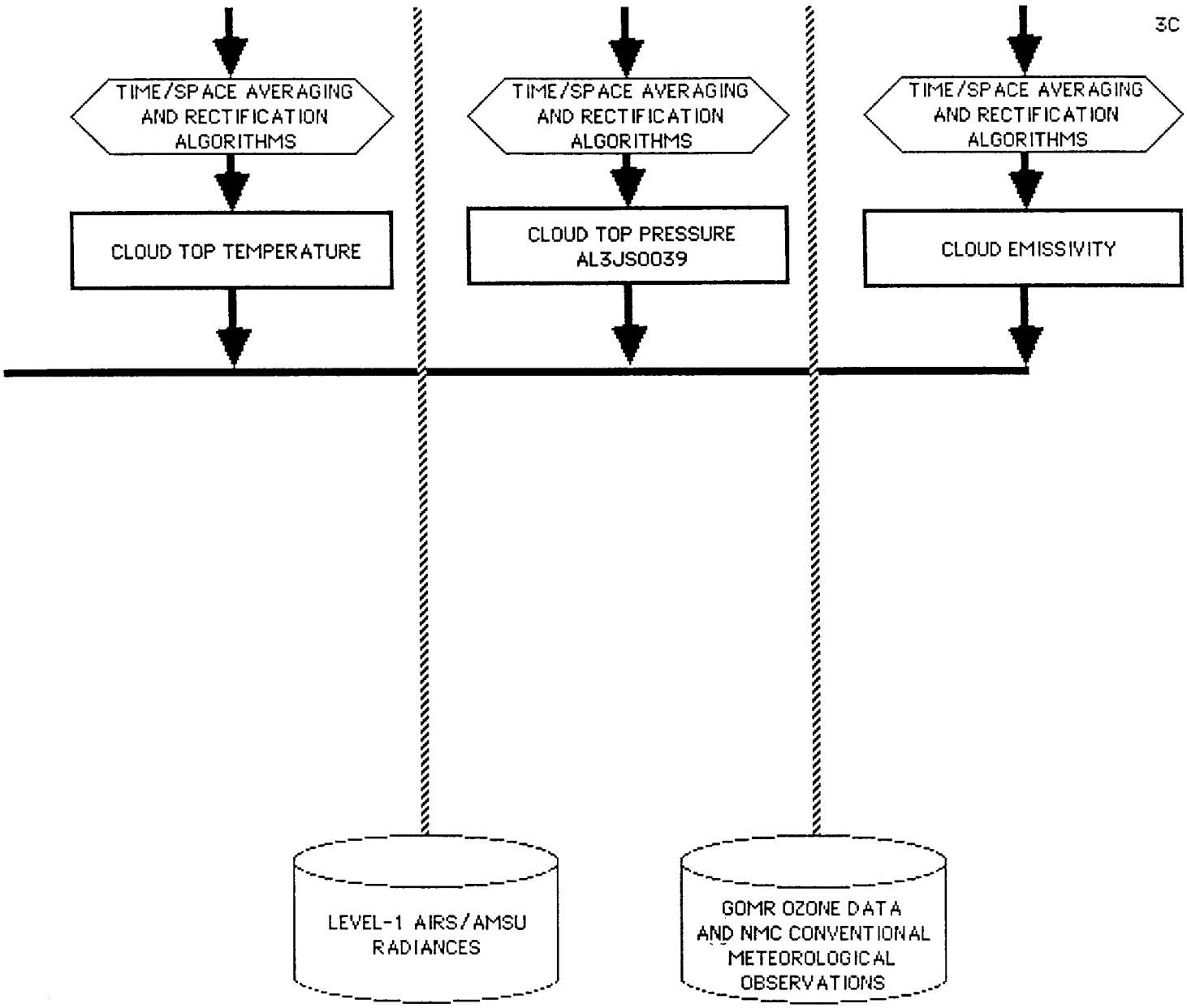
LEVEL-3/4 DATA PRODUCTS

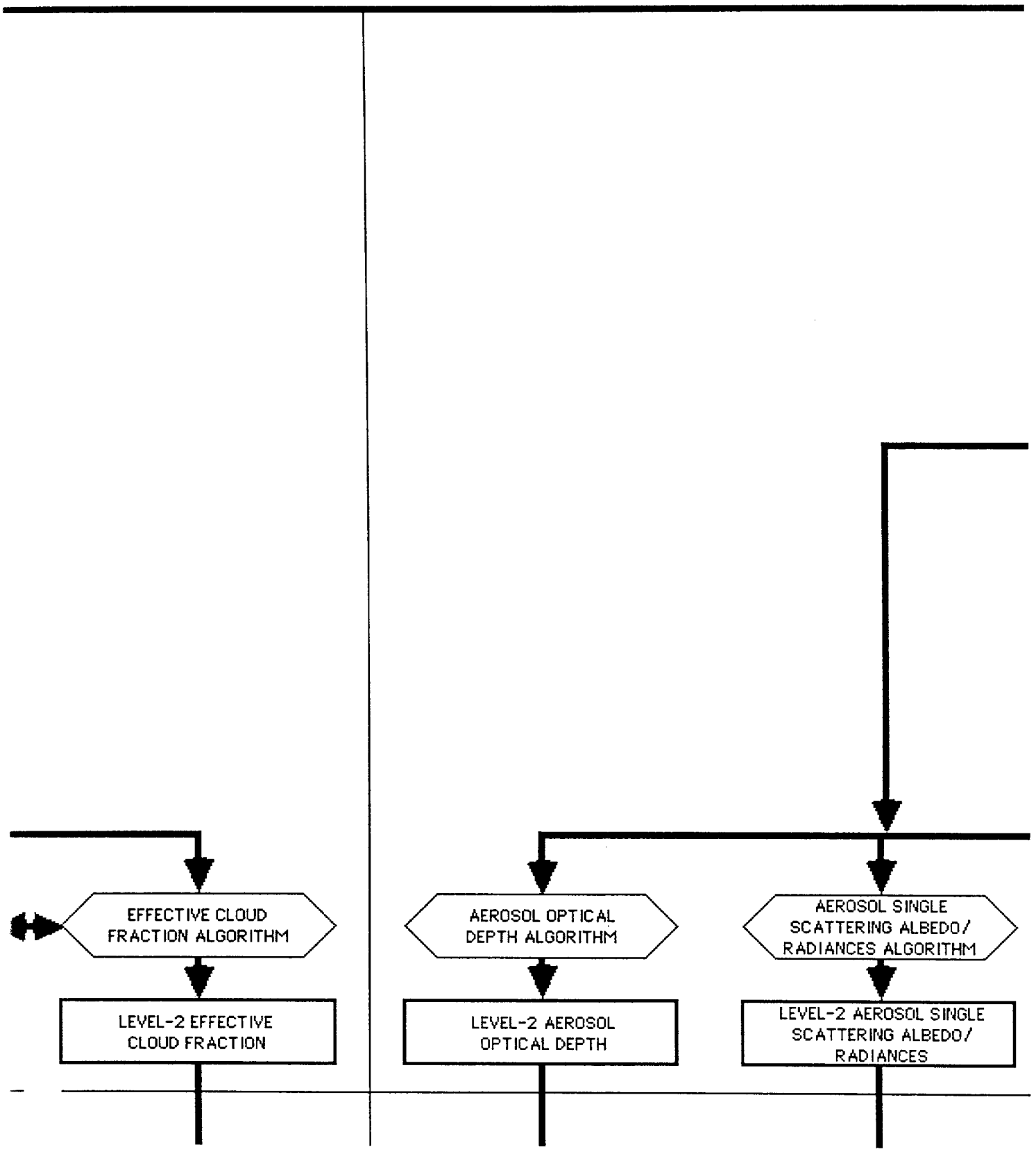

DAYTIME CLOUD OPTICAL THICKNESS ALGORITHM
DAYTIME CLOUD EFFECTIVE PARTICLE ALGORITHM
DAYTIME CLOUD THERMODYNAMIC PHASE ALGORITHM
LEVEL-2 DAYTIME CLOUD OPTICAL THICKNESS
LEVEL-2 DAYTIME CLOUD EFFECTIVE PARTICLE RADIUS MAPS
LEVEL-2 DAYTIME CLOUD THERMODYNAMIC PHASE

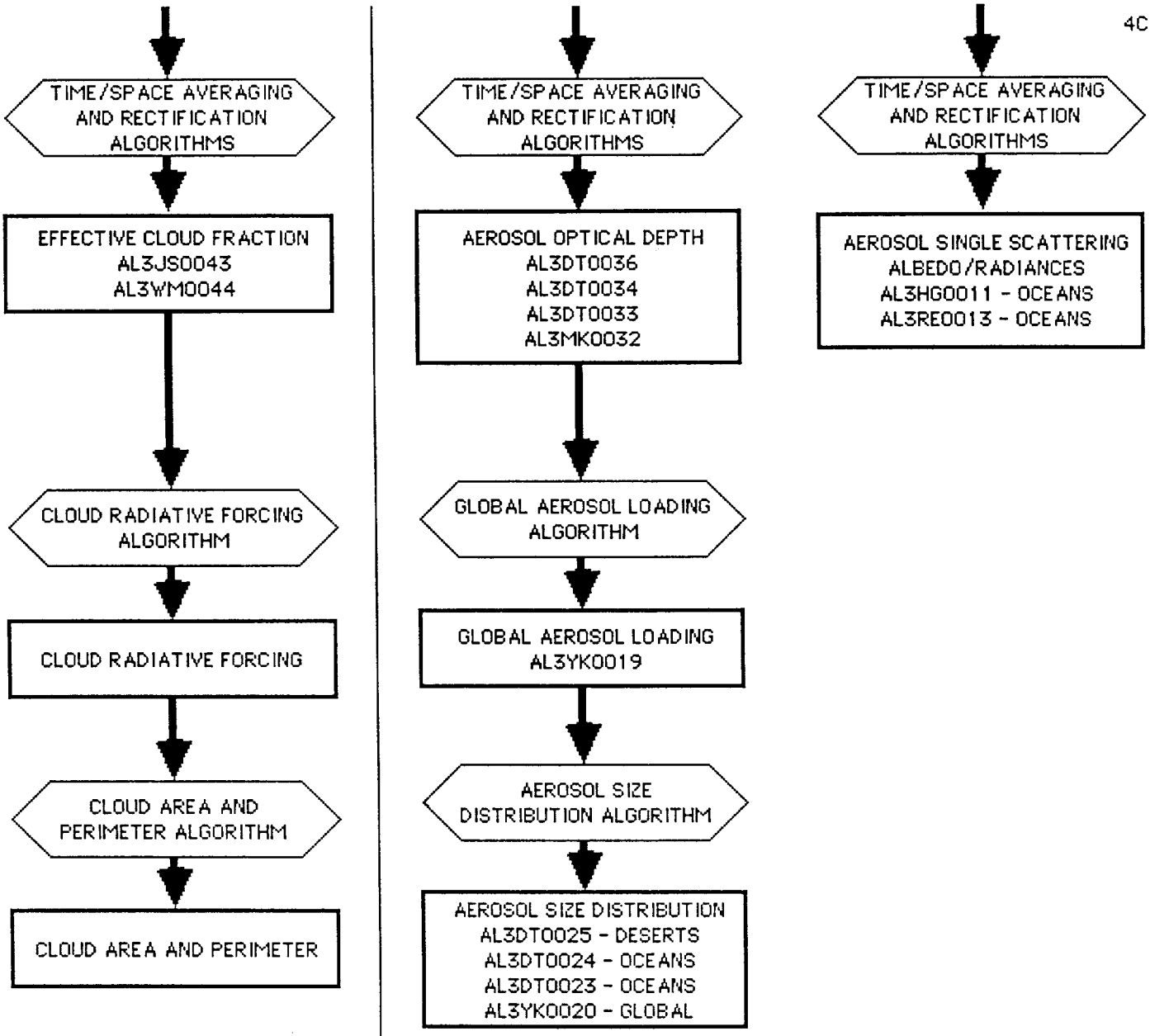


CLOUD DATA PRODUCTS


CLOUD TOP TEMPERATURE ALGORITHM
CLOUD TOP PRESSURE ALGORITHM
CLOUD EMISSIVITY ALGORITHM
LEVEL-2 CLOUD TOP TEMPERATURE
LEVEL-2 CLOUD TOP PRESSURE
LEVEL-2 CLOUD EMISSIVITY

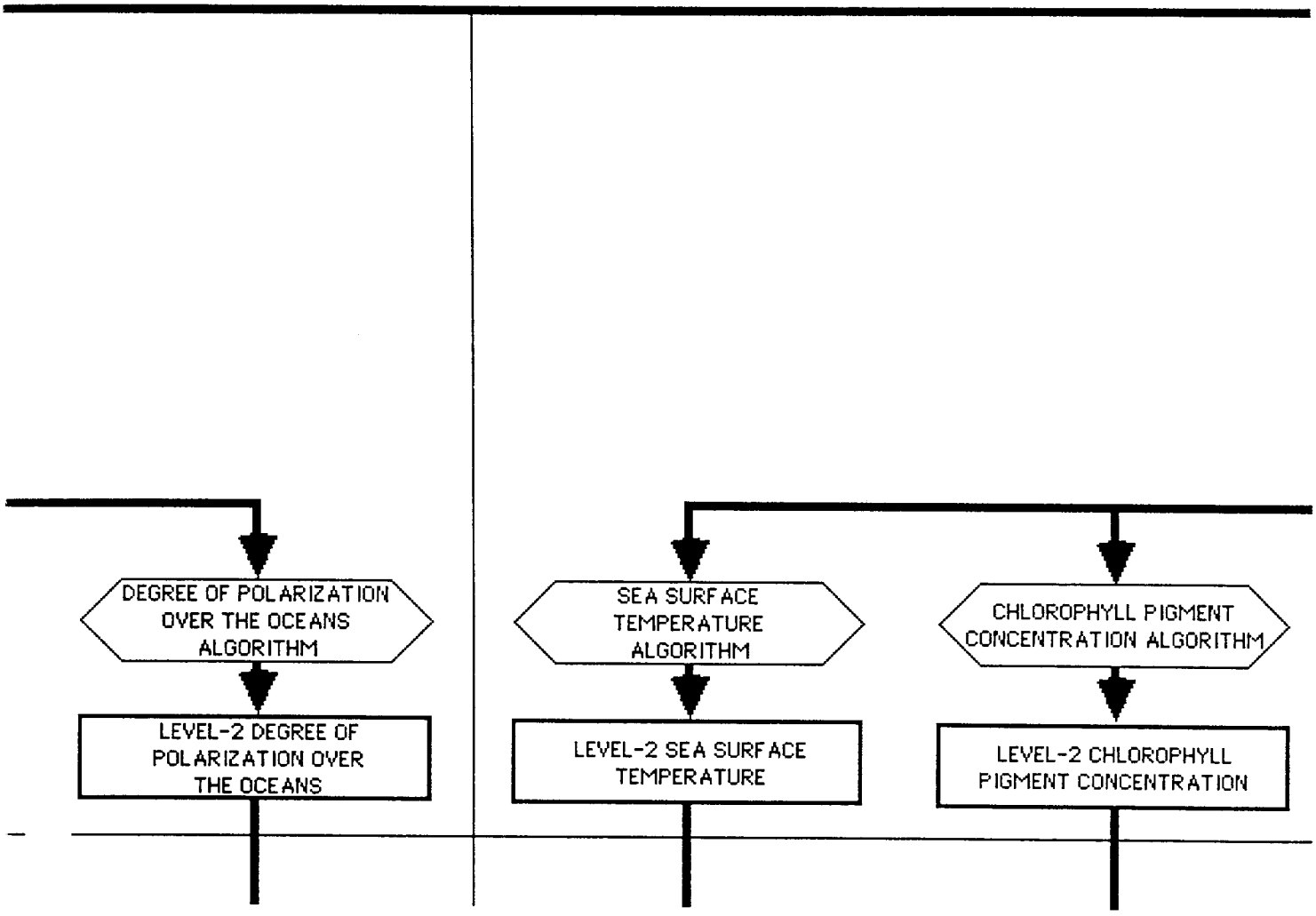

TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
CLOUD TOP TEMPERATURE
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
CLOUD TOP PRESSURE AL3JS0039
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
CLOUD EMISSIVITY
LEVEL-1 AIRS/AMSU RADIANCES
GOMR OZONE DATA AND NMC CONVENTIONAL METEOROLOGICAL OBSERVATIONS

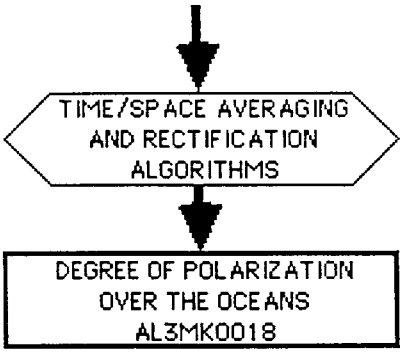

EFFECTIVE CLOUD FRACTION ALGORITHM
LEVEL-2 EFFECTIVE CLOUD FRACTION
AEROSOL OPTICAL DEPTH ALGORITHM
LEVEL-2 AEROSOL OPTICAL DEPTH
AEROSOL SINGLE SCATTERING ALBEDO/ RADIANCES ALGORITHM
LEVEL-2 AEROSOL SINGLE SCATTERING ALBEDO/ RADIANCES

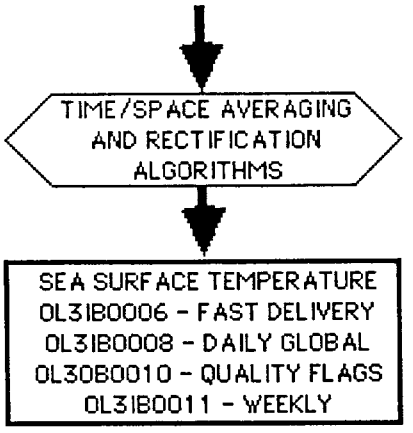

TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
EFFECTIVE CLOUD FRACTION
AL3JS0043
AL3WM0044
CLOUD RADIATIVE FORCING ALGORITHM
CLOUD RADIATIVE FORCING
CLOUD AREA AND PERIMETER ALGORITHM
CLOUD AREA AND PERIMETER
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
AEROSOL OPTICAL DEPTH
AL3DT0036
AL3DT0034
AL3DT0033
AL3MK0032
GLOBAL AEROSOL LOADING ALGORITHM
GLOBAL AEROSOL LOADING
AL3YK0019
AEROSOL SIZE DISTRIBUTION ALGORITHM
AEROSOL SIZE DISTRIBUTION
AL3DT0025 - DESERTS
AL3DT0024 - OCEANS
AL3DT0023 - OCEANS
AL3YK0020 - GLOBAL
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
AEROSOL SINGLE SCATTERING ALBEDO/RADIANCES
AL3HG0011 - OCEANS
AL3RE0013 - OCEANS

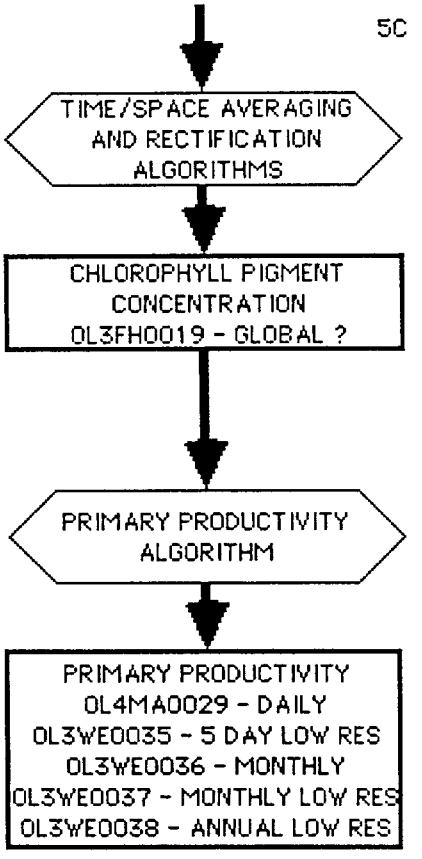
CLEAR SKY

CANDIDATE MODIS CORI


DEGREE OF POLARIZATION OVER THE OCEANS ALGORITHM
LEVEL-2 DEGREE OF POLARIZATION OVER THE OCEANS
SEA SURFACE TEMPERATURE ALGORITHM
LEVEL-2 SEA SURFACE TEMPERATURE
CHLOROPHYLL PIGMENT CONCENTRATION ALGORITHM
LEVEL-2 CHLOROPHYLL PIGMENT CONCENTRATION

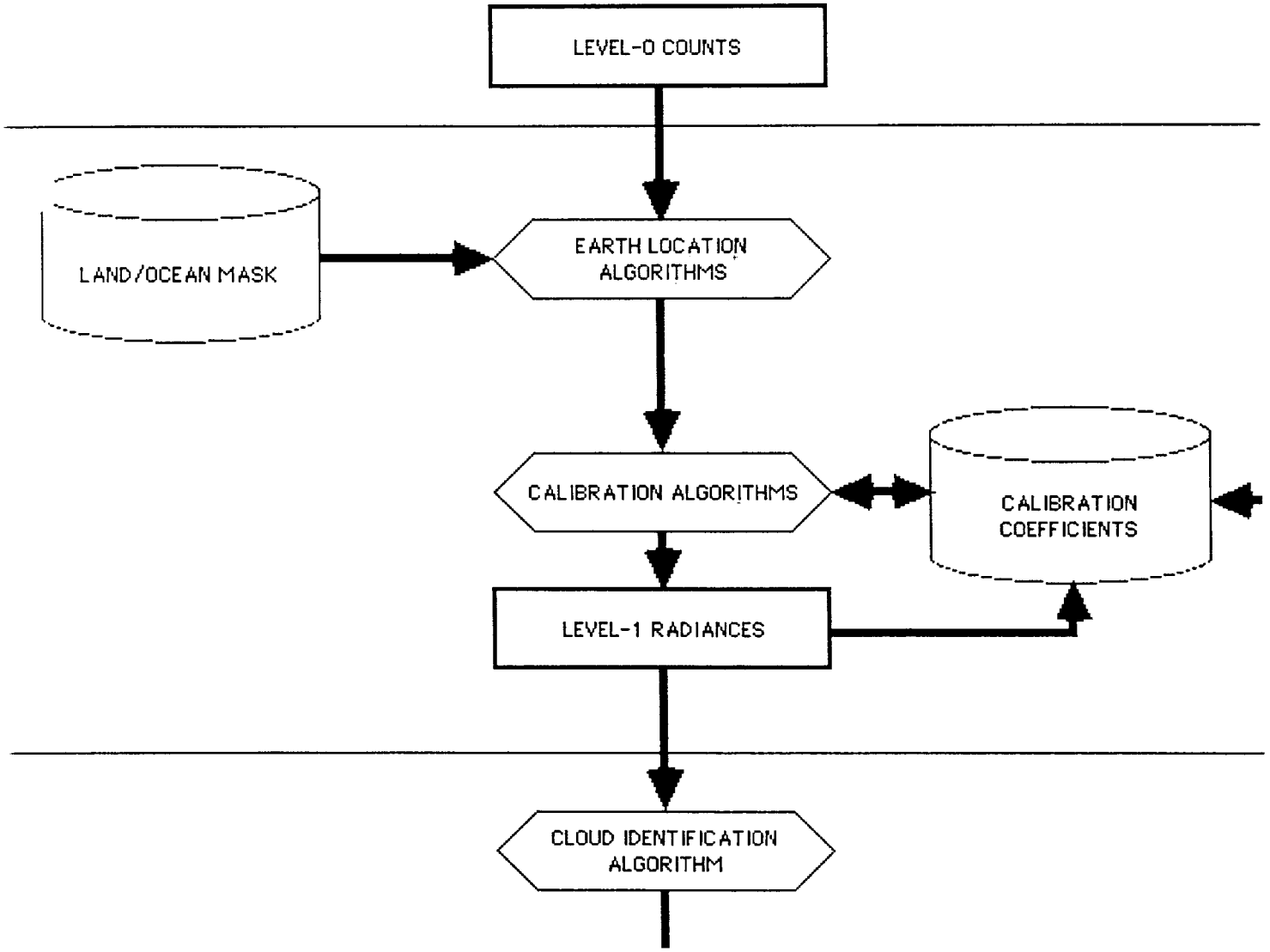


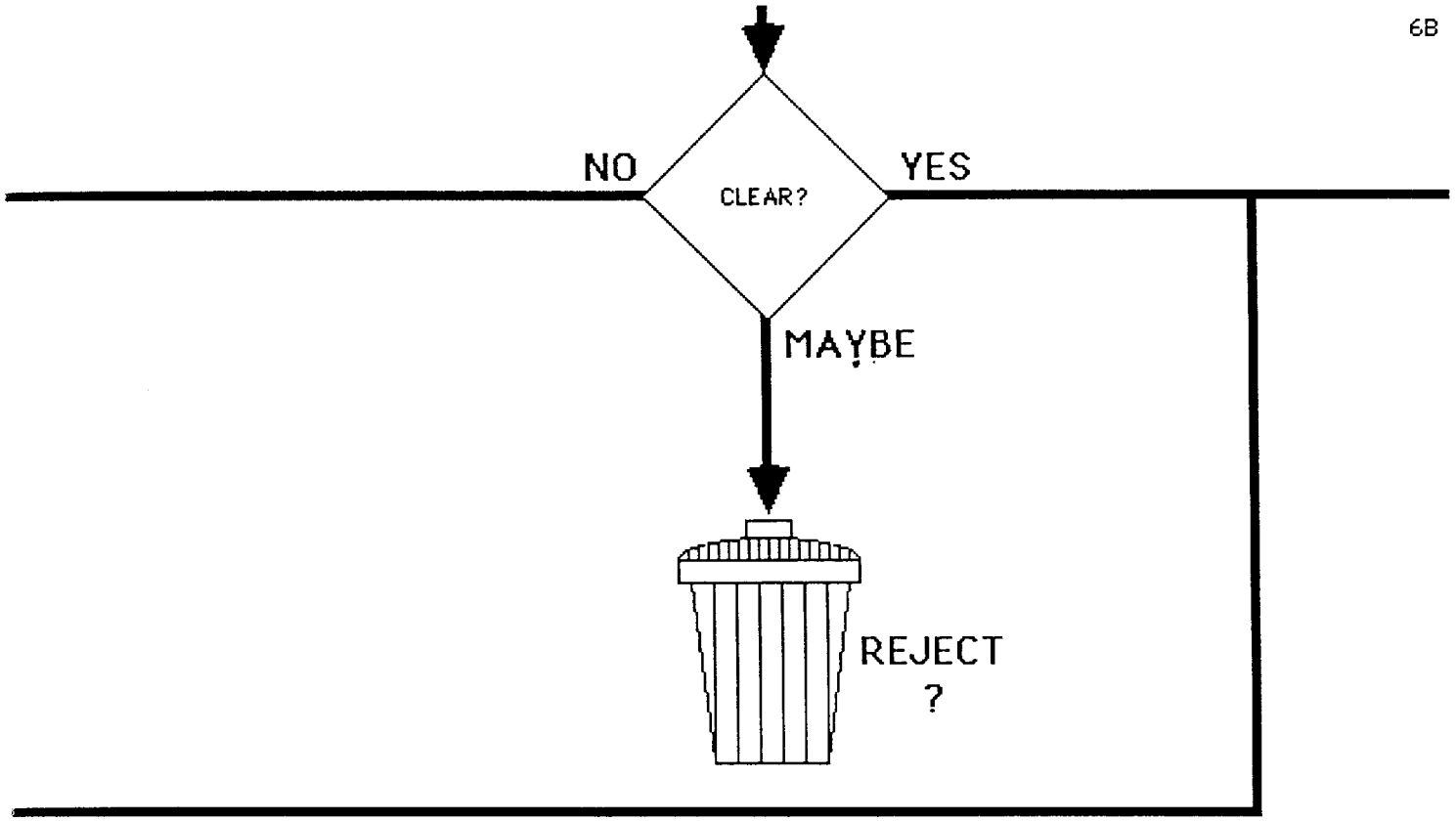




DATA PRODUCTS

DATA PRODUCTS AND P




NO
CLEAR?
YES
MAYBE
REJECT
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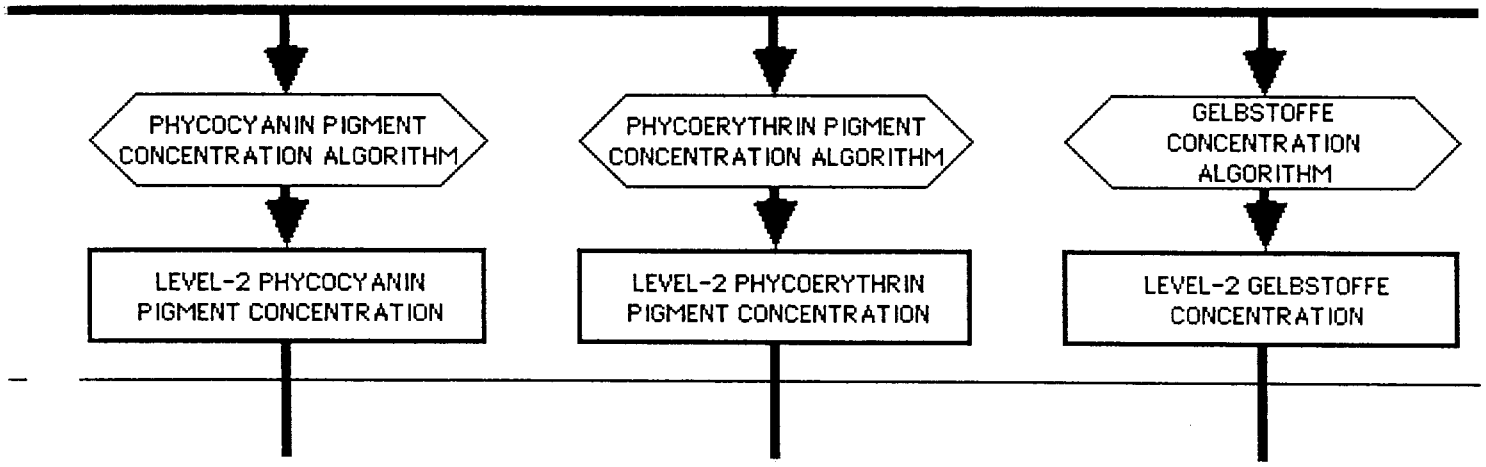
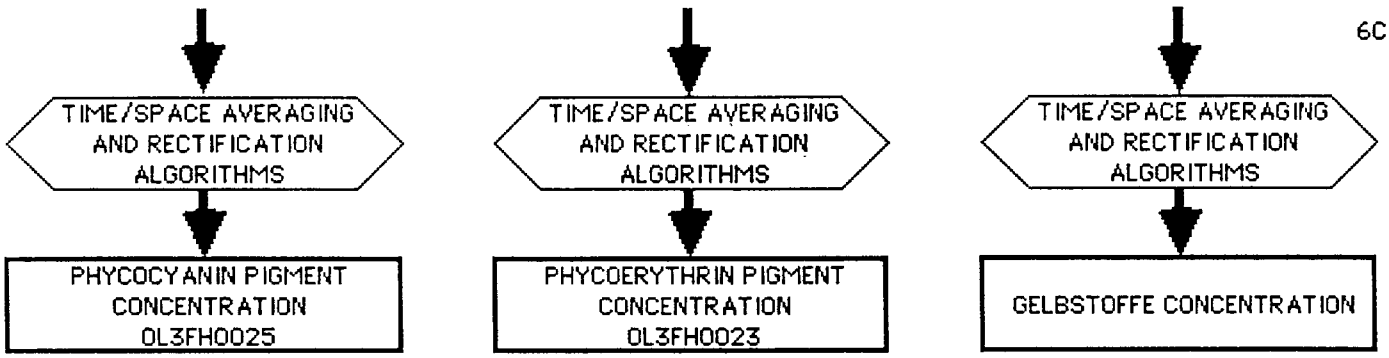
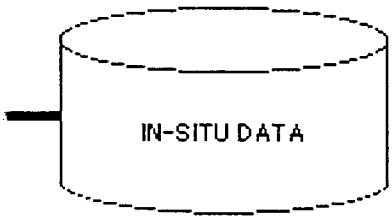
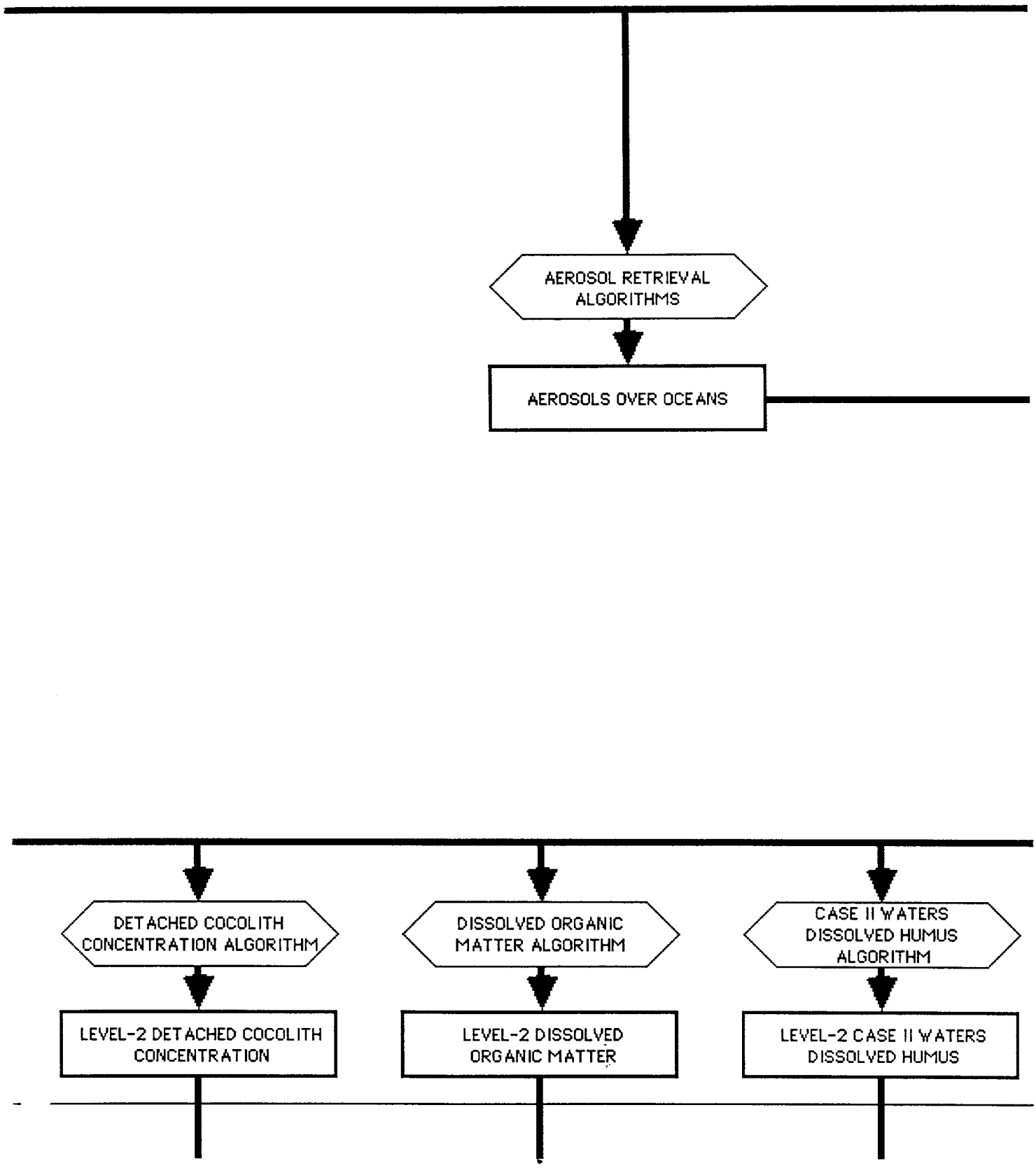
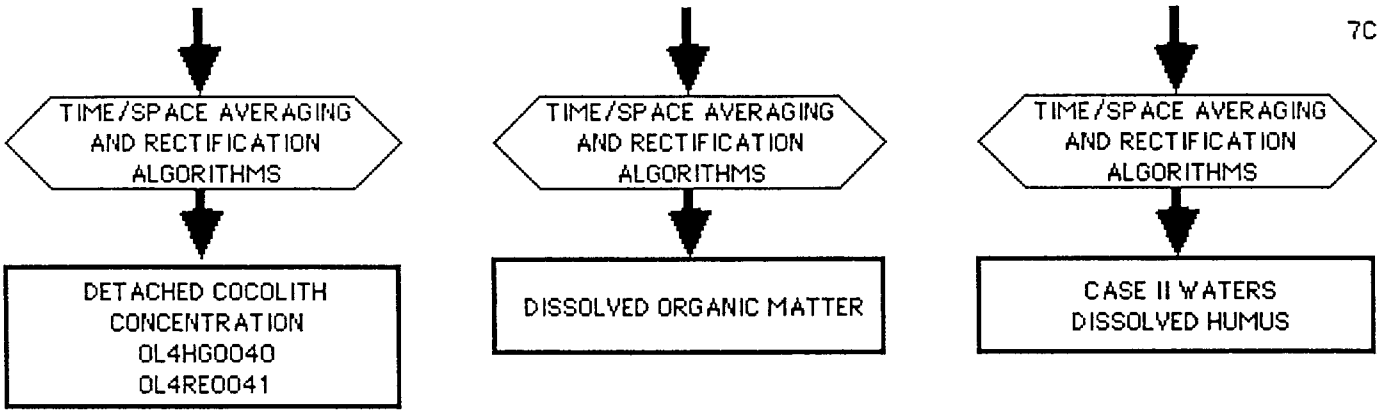

PHYCOCYANIN PIGMENT CONCENTRATION ALGORITHM
PHYCOERYTHRIN PIGMENT CONCENTRATION ALGORITHM
GELBSTOFFE CONCENTRATION ALGORITHM
LEVEL-2 PHYCOCYANIN PIGMENT CONCENTRATION
LEVEL-2 PHYCOERYTHRIN PIGMENT CONCENTRATION
LEVEL-2 GELBSTOFFE CONCENTRATION


TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
PHYCOCYANIN PIGMENT CONCENTRATION 0L3FH0025
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
PHYCOERYTHRIN PIGMENT CONCENTRATION 0L3FH0023
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
GELBSTOFFE CONCENTRATION

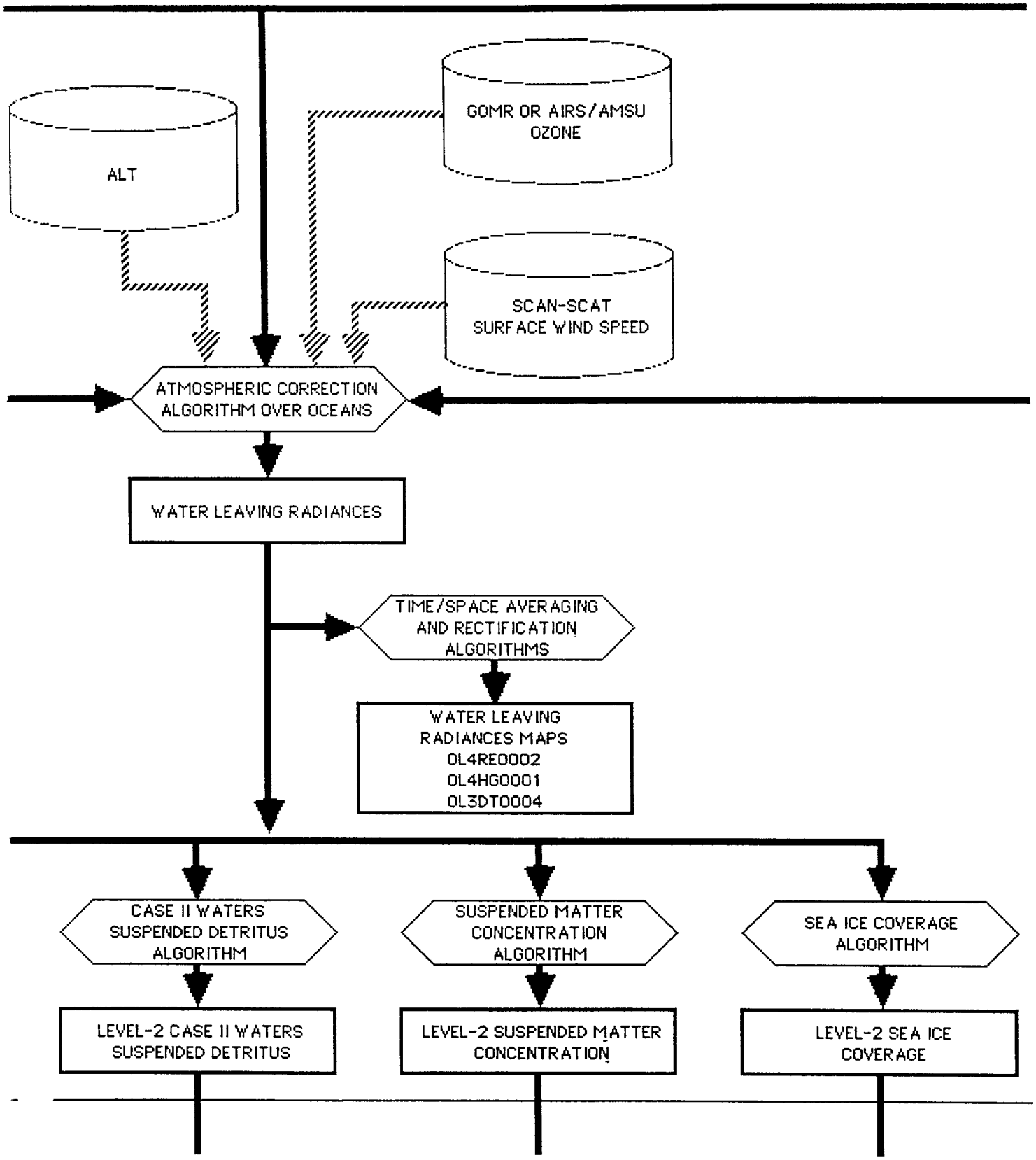
RODUCTION DATA FLOW!

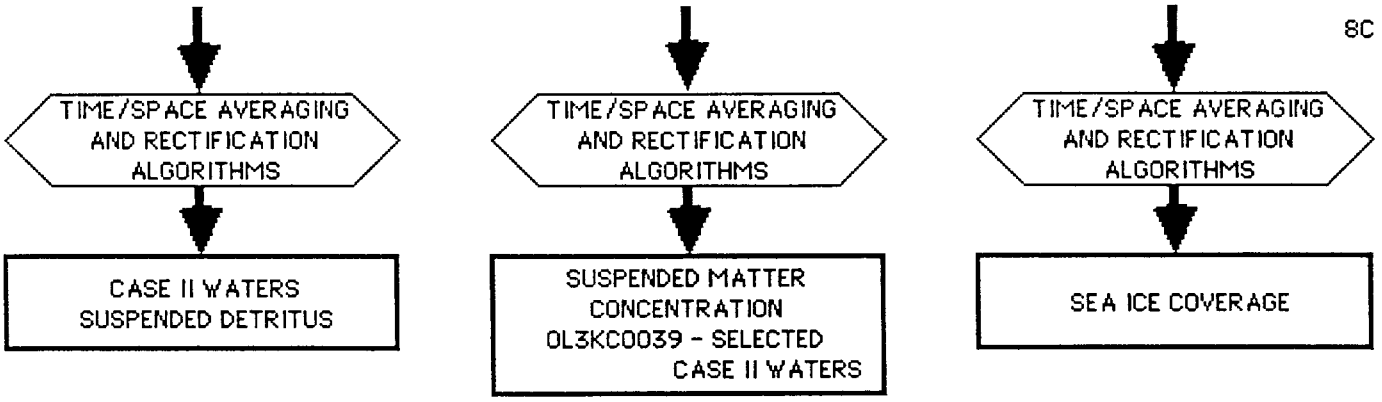


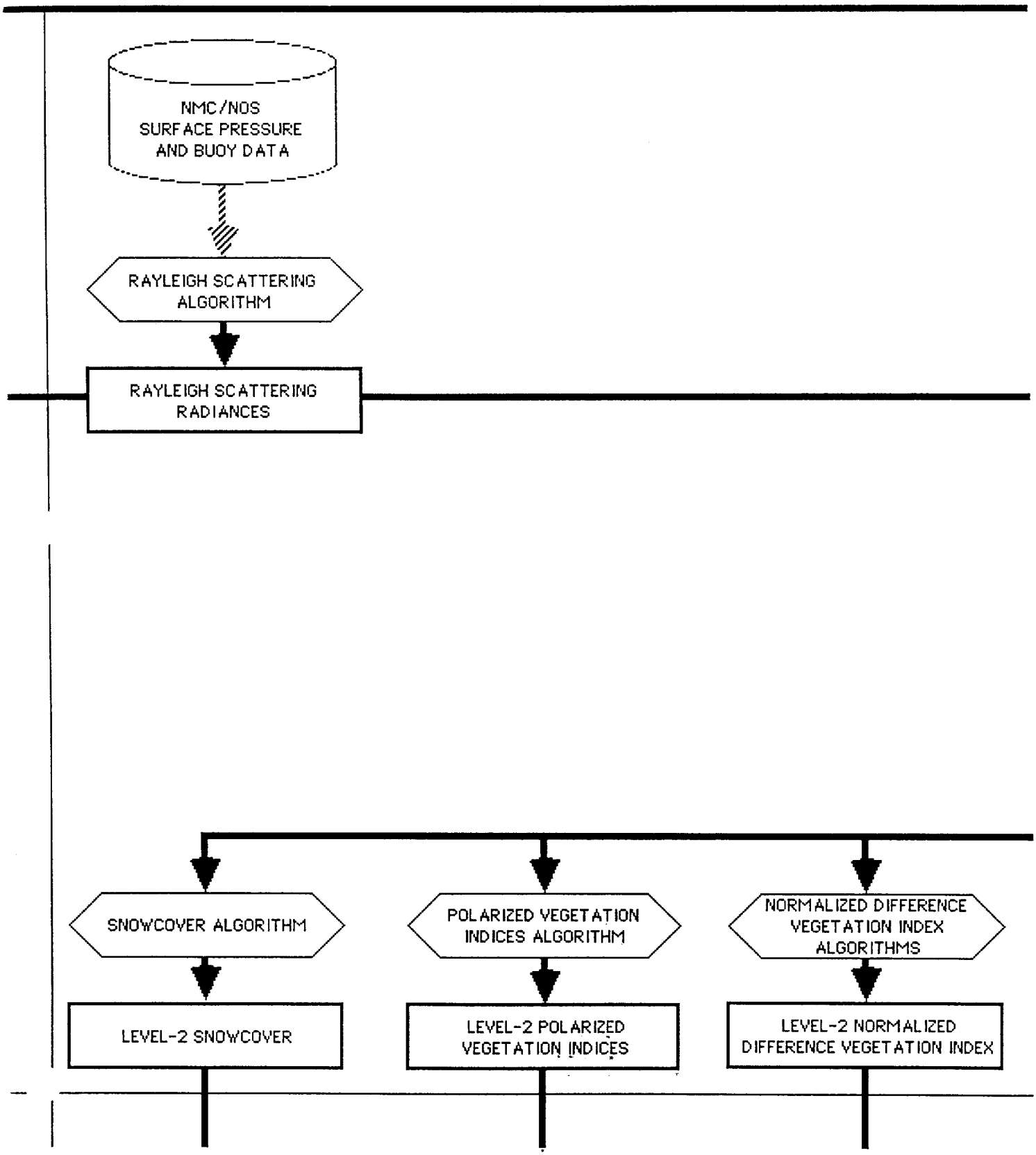

AEROSOL RETRIEVAL ALGORITHMS
AEROSOLS OVER OCEANS
DETACHED COCOLITH CONCENTRATION ALGORITHM
DISSOLVED ORGANIC MATTER ALGORITHM
CASE II WATERS DISSOLVED HUMUS ALGORITHM
LEVEL-2 DETACHED COCOLITH CONCENTRATION
LEVEL-2 DISSOLVED ORGANIC MATTER
LEVEL-2 CASE II WATERS DISSOLVED HUMUS

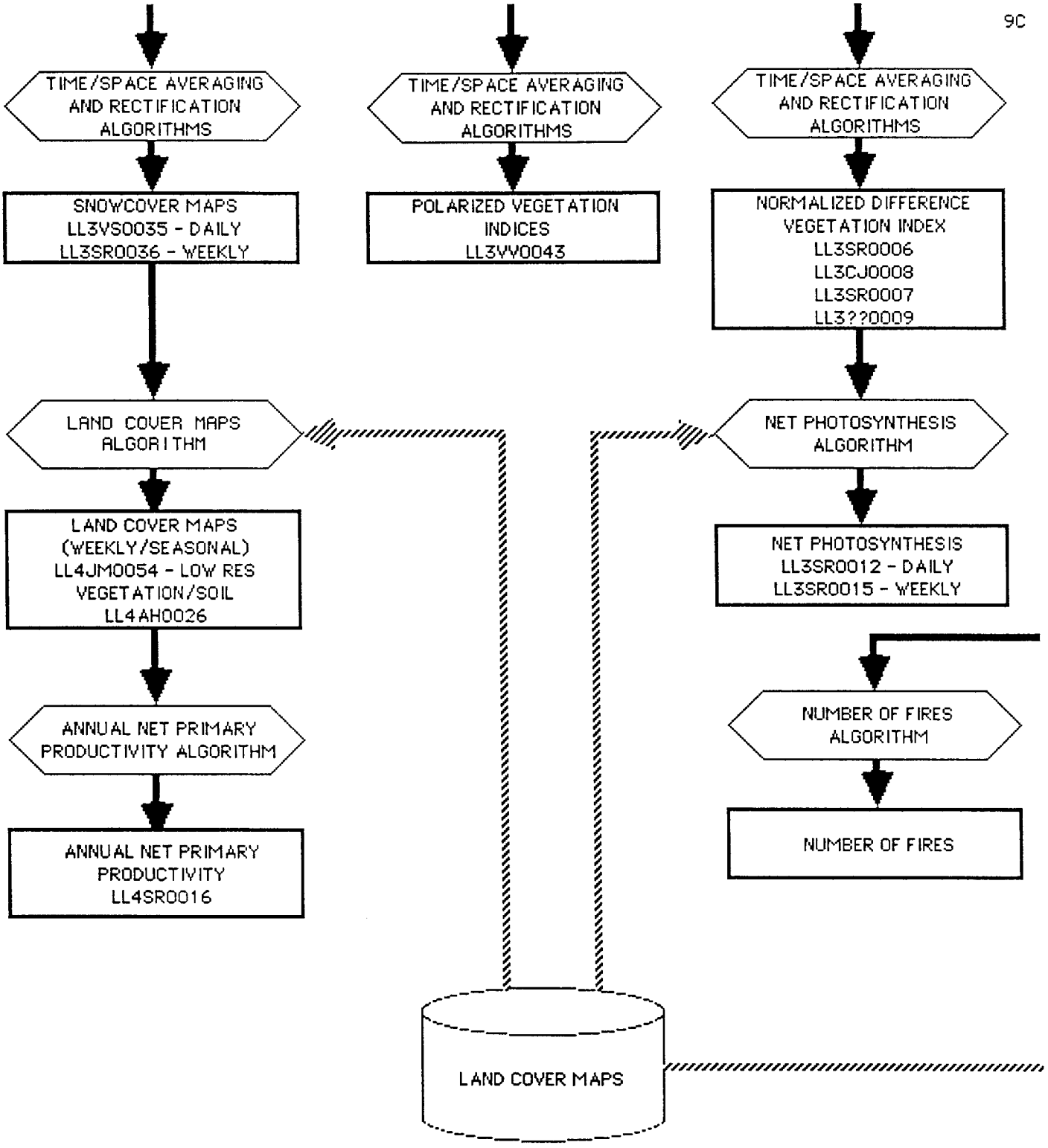


OCEAN DATA PRODUCTS


ALT
GOMR OR AIRS/AMSU
OZONE
SCAN-SCAT
SURFACE WIND SPEED
ATMOSPHERIC CORRECTION
ALGORITHM OVER OCEANS
WATER LEAVING RADIANCES
TIME/SPACE AVERAGING
AND RECTIFICATION
ALGORITHMS
WATER LEAVING
RADIANCES MAPS
OL4RE0002
OL4HG0001
OL3DT0004
CASE II WATERS
SUSPENDED DETRITUS
ALGORITHM
SUSPENDED MATTER
CONCENTRATION
ALGORITHM
SEA ICE COVERAGE
ALGORITHM
LEVEL-2 CASE II WATERS
SUSPENDED DETRITUS
LEVEL-2 SUSPENDED MATTER
CONCENTRATION
LEVEL-2 SEA ICE
COVERAGE

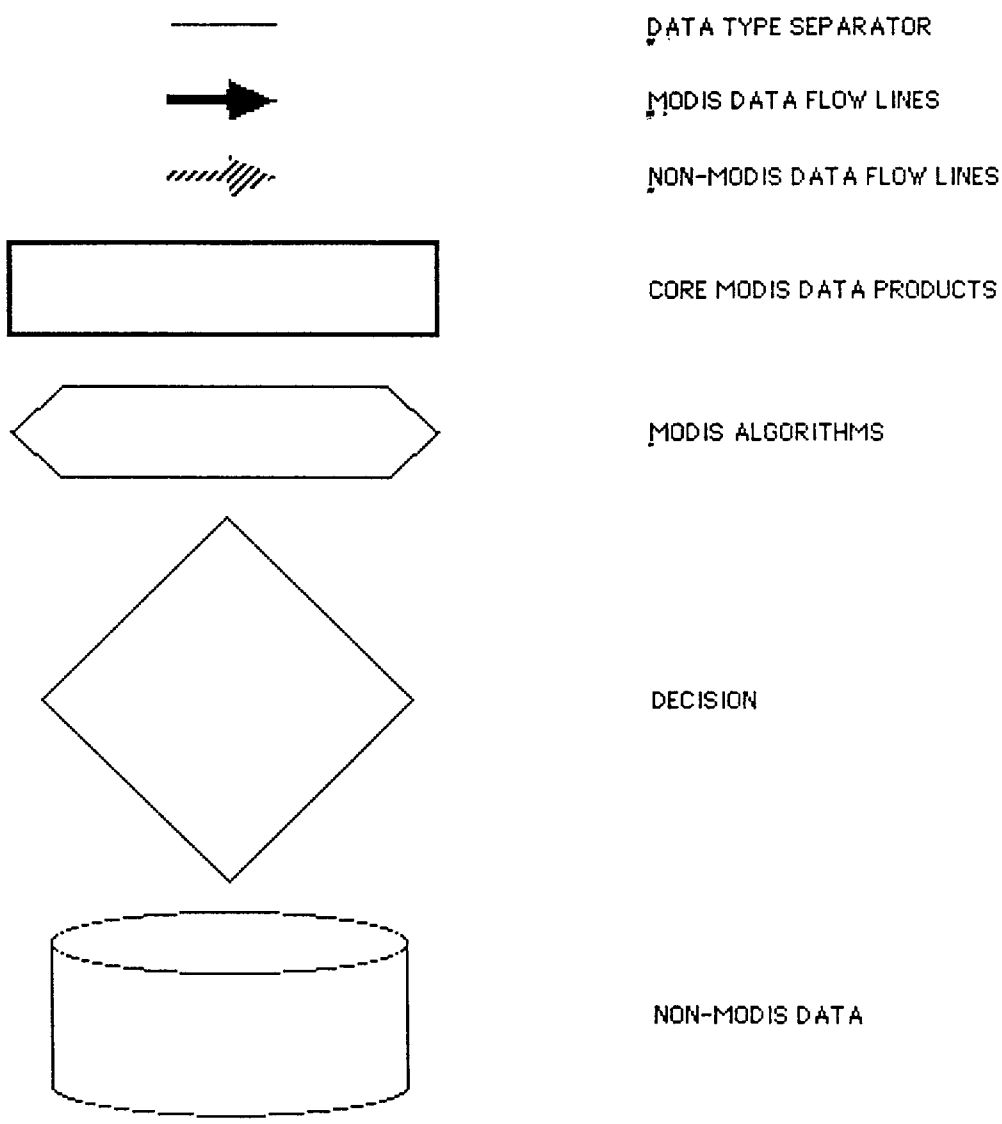

TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
CASE II WATERS SUSPENDED DETRITUS
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
SUSPENDED MATTER CONCENTRATION OL3KC0039 - SELECTED CASE II WATERS
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
SEA ICE COVERAGE

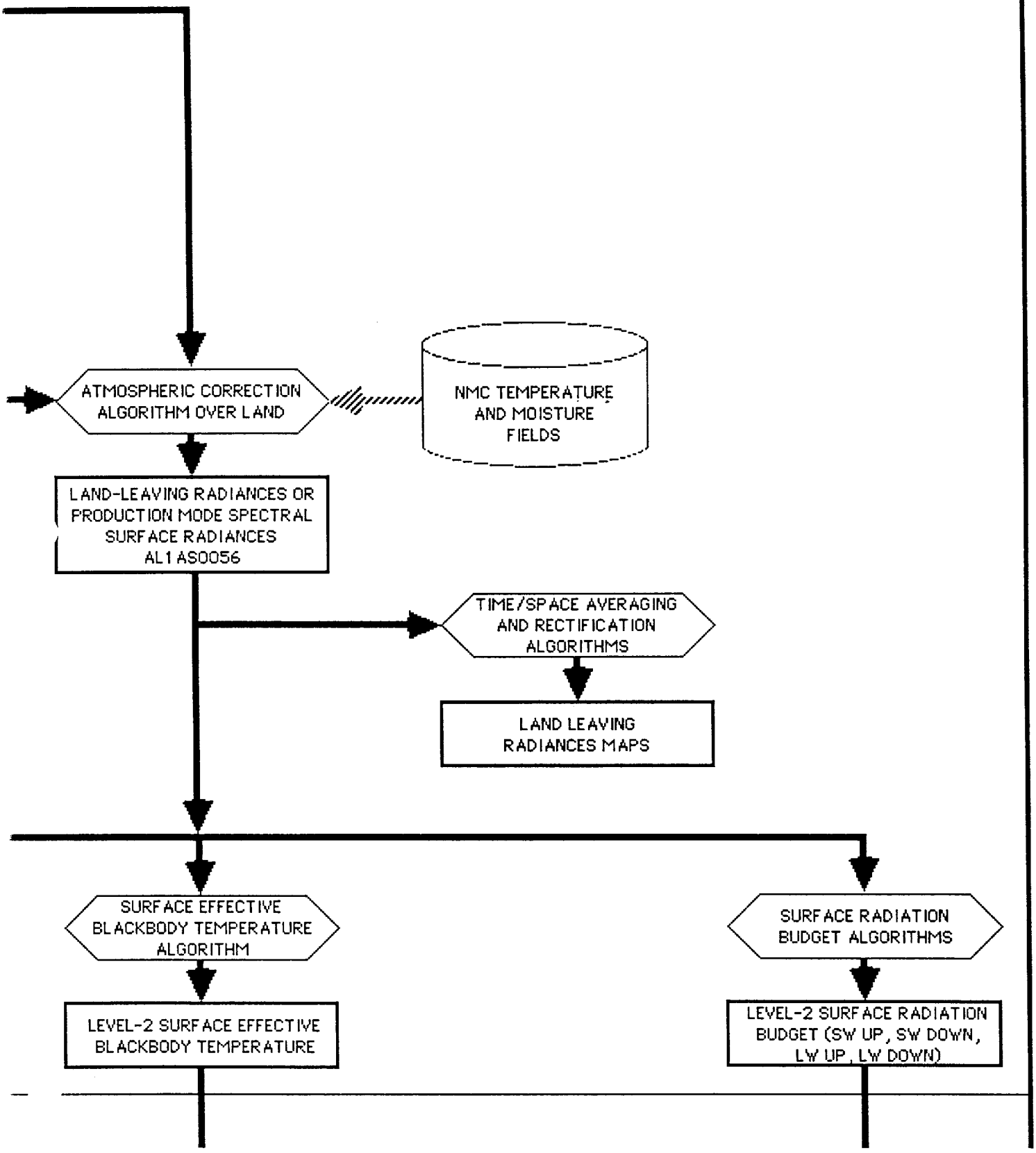

NMC/NOS
SURFACE PRESSURE
AND BUOY DATA
RAYLEIGH SCATTERING
ALGORITHM
RAYLEIGH SCATTERING
RADIANCES
SNOWCOVER ALGORITHM
POLARIZED VEGETATION
INDICES ALGORITHM
NORMALIZED DIFFERENCE
VEGETATION INDEX
ALGORITHMS
LEVEL-2 SNOWCOVER
LEVEL-2 POLARIZED
VEGETATION INDICES
LEVEL-2 NORMALIZED
DIFFERENCE VEGETATION INDEX

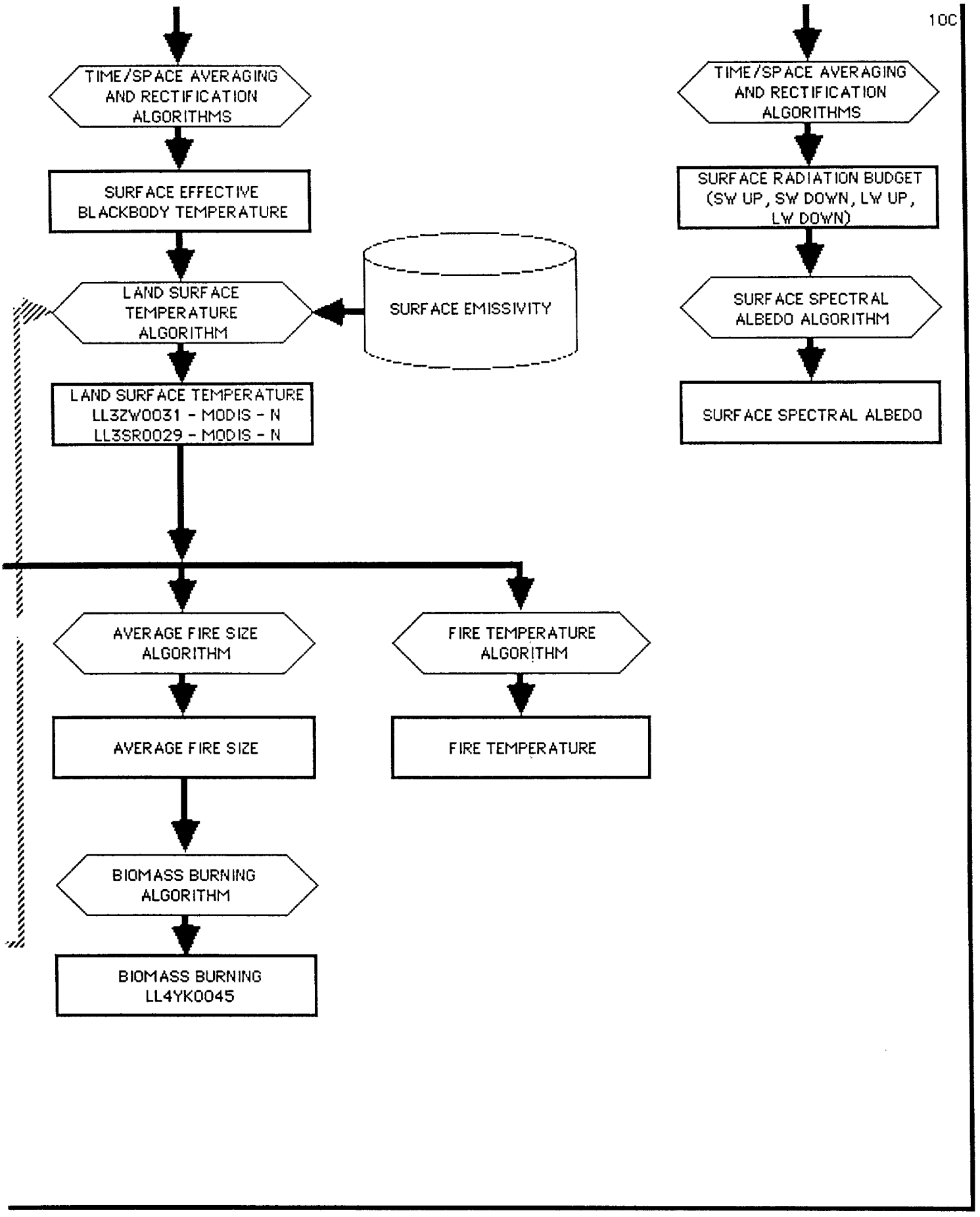


LAND DATA PRODUCTS

KEY


DATA TYPE SEPARATOR
MODIS DATA FLOW LINES
NON-MODIS DATA FLOW LINES
CORE MODIS DATA PRODUCTS
MODIS ALGORITHMS
DECISION
NON-MODIS DATA


ATMOSPHERIC CORRECTION ALGORITHM OVER LAND
NMC TEMPERATURE AND MOISTURE FIELDS
LAND-LEAVING RADIANCES OR PRODUCTION MODE SPECTRAL SURFACE RADIANCES AL1AS0056
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
LAND LEAVING RADIANCES MAPS
SURFACE EFFECTIVE BLACKBODY TEMPERATURE ALGORITHM
SURFACE RADIATION BUDGET ALGORITHMS
LEVEL-2 SURFACE EFFECTIVE BLACKBODY TEMPERATURE
LEVEL-2 SURFACE RADIATION BUDGET (SW UP, SW DOWN, LW UP, LW DOWN)


10C
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
SURFACE EFFECTIVE BLACKBODY TEMPERATURE
LAND SURFACE TEMPERATURE ALGORITHM
SURFACE EMISSIVITY
LAND SURFACE TEMPERATURE LL3ZW0031 - MODIS - N LL3SR0029 - MODIS - N
AVERAGE FIRE SIZE ALGORITHM
AVERAGE FIRE SIZE
BIOMASS BURNING ALGORITHM
BIOMASS BURNING LL4YK0045
FIRE TEMPERATURE ALGORITHM
FIRE TEMPERATURE
TIME/SPACE AVERAGING AND RECTIFICATION ALGORITHMS
SURFACE RADIATION BUDGET (SW UP, SW DOWN, LW UP, LW DOWN)
SURFACE SPECTRAL ALBEDO ALGORITHM
SURFACE SPECTRAL ALBEDO

MODIS DATA SYSTEM STUDY TEAM

ACTION ITEM

Title (Subject) _____

Assigned to _____ Organization/Phone No. _____

Action Item Identifier _____ Data Assigned _____ Date Due _____

Action Item Description:

Action Item Response:

MODIS DATA SYSTEM STUDY TEAM

ACTION ITEM STATUS

Action Item Identifier	Action Item Name	Responsible Organization/Person	Date Due	Date Assigned	Comments