

Science Product Generation

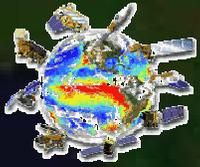
Strategic Evolution of
ESE Data Systems (SEEDS)

Robert Wolfe

EOS SWGD Representative

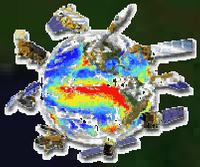
NASA GSFC Code 922, Raytheon ITSS

June 18, 2002

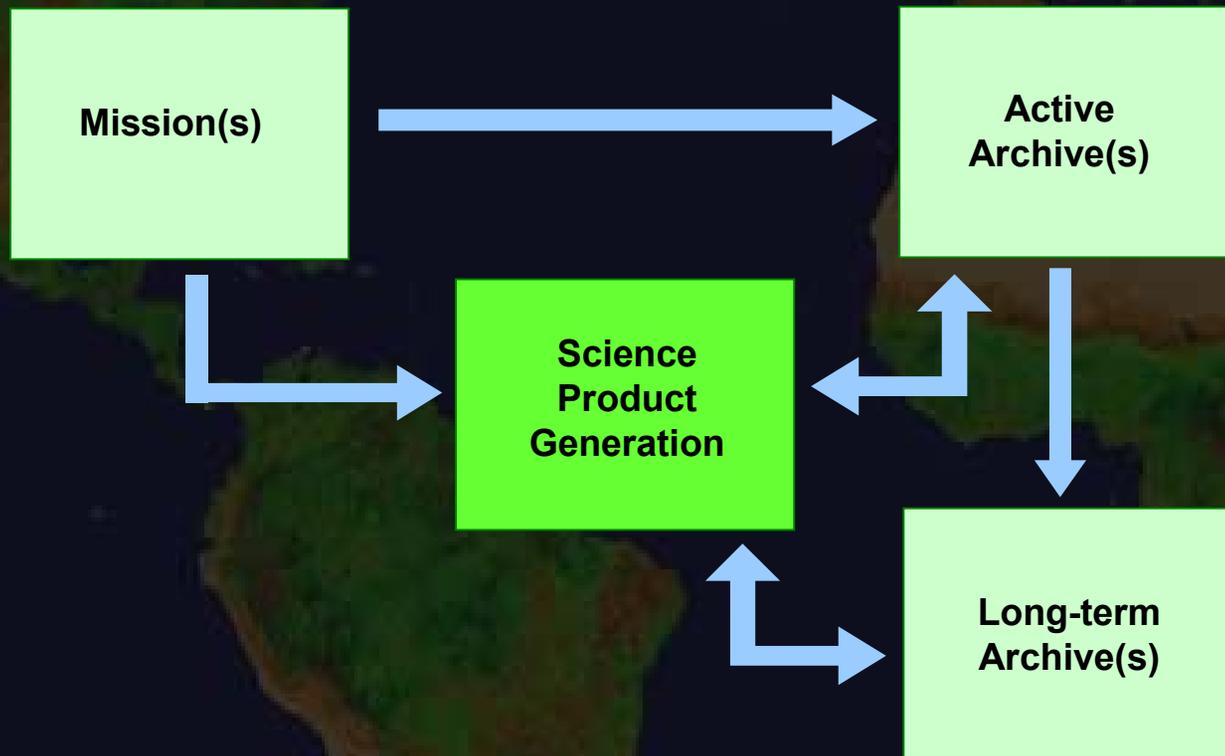


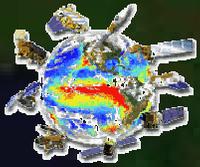
Science Product Generation

- Algorithms
- Science Team
- Product Generation



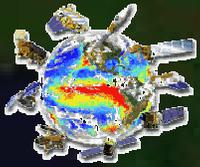
Science Product Generation Context





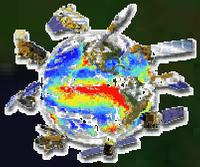
Algorithms

- ❑ Produce measurements of interest to the community
 - Primarily the Earth sciences community
 - Others communities as well
- ❑ L1 algorithms generate calibrated measurements of physical quantities
 - based on good instrument characterization
- ❑ L2+ algorithms generate validated measurements of geophysical parameters
 - L2 products in instrument geometry
 - L3/4 gridded products
- ❑ Typically peer reviewed
- ❑ May incorporate data from other instruments and missions



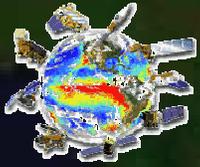
Algorithm Types

- Heritage algorithms
 - adapted to specific instrument(s) – specific band pass, spatial resolution, etc.
 - may have operational applications
- New algorithms; three types:
 - use new instrument features (new bands, etc.)
 - use new techniques to derive existing parameters
 - measures new parameters



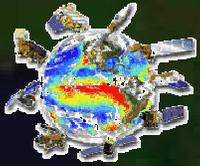
Algorithm Implementation

- ❑ Source code -- FORTRAN, C, C++, IDL, etc.
 - 10^5 to 10^6 lines of code
- ❑ Lookup tables
 - may be based on large quantity of analysis
 - may be derived from other data sets
- ❑ Production rules – scripts, database queries based on metadata
 - describes what inputs to use and when to use them
 - may include specification of run-time parameters based on acquisition time, spatial location, and/or availability of inputs
 - rules for handling errors and data anomalies
- ❑ Quality assurance tools



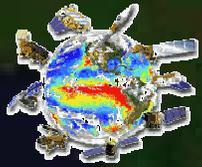
Algorithm Documentation

- Algorithm Theoretical Basis Documents
- Product guides and format descriptions
- Peer-reviewed literature
- Project documentation



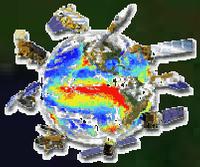
Science Team (1/2)

- Competitively selected – either as individuals or as a team
- Performs algorithm development, documentation, testing and refinement
- Performs quality assurance and validation
- Provides feedback to other algorithms (including L1)
- Primary users of products (front line)



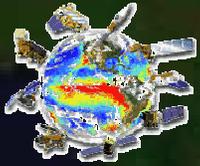
Science Team (2/2)

- Some participation in other areas
 - Outreach and training
 - Limited distributions
 - Tools
 - Feedback on archive/distribution
- Support team
 - Integrates and tests algorithms
 - Coordinates and/or performs processing and reprocessing
 - Helps in other areas: science testing, QA, validation, documentation



Product Generation (1/2)

- ❑ Processing – to produce long-term records
 - 10X or greater needed for algorithm refinement
 - about 1 reprocessing year – science driven
 - on-demand processing (optional)
 - requires large data flows to/from active archive(s)
- ❑ Ancillary data sets
 - may be entire mission
 - may be operational data sets
- ❑ Science testing of algorithms
 - of new and refined algorithms
 - simulated data used pre-launch
- ❑ Provide some tools/distribution



Product Generation (2/2)

□ Location:

- at Science Investigator Led Computing Systems (SIPS)
- at Science Computing Facilities (SCFs)
- within the active archive
- within operational systems (NOAA)

□ Data flows

- from instrument (optional)
- from/to active archive(s)
- from/to long term archive(s) (optional)