CLIMATE DATA RECORDS (CDRs)

A Personal Perspective

Technical Interchange Meeting
April 19-20, 2011

Bryant Cramer
GST Consultant

What is a Climate Data Record (CDR)?

A CDR is a fundamental environmental variable that is essential in understanding the regulation of climate:

- They are inherently global
- Generally involve space-based instruments
- Must be processed to be transparent to the instruments and missions that originally gathered the data
- May be “fused” or “anchored” with multiple ground-based measurements
- These measurements require high accuracy and stability to confidently resolve small differences buried within diurnal and seasonal variances
- The CDR dataset must remain uninterrupted and extend over decades
- Must be developed and maintained through a science peer-reviewed process
- Often integrated into multiple related application products

Why are CDRs Important?

- CDRs represent a dataset wherein the technical details of the instruments and missions that produced these data are no longer driving considerations
- Research teams using CDRs no longer need all of the specialized aerospace skills involved in originally collecting the data
- CDRs consequently enable more scientists to be involved in climate research
- These additional scientists can potentially accelerate our understanding of critical questions in climate research
- CDRs leverage our current space mission investments

Status of CDRs

- The systematic comprehensive development of CDRs is still ahead of us --- this is an opportunity
- Multiple individual independent efforts have been undertaken and we should learn from these --- that is a goal of this meeting
- Nevertheless we must resist a purely bottom-up inductive solution based on what we know today
- We also need a top-down strategic solution emanating from a comprehensive vision of how we see CDRs contributing to future climate research
- A balanced approach will work best:
  - Top-down provides a strategic framework
  - Bottom-up experience provides tactical insight

Presentation Objective

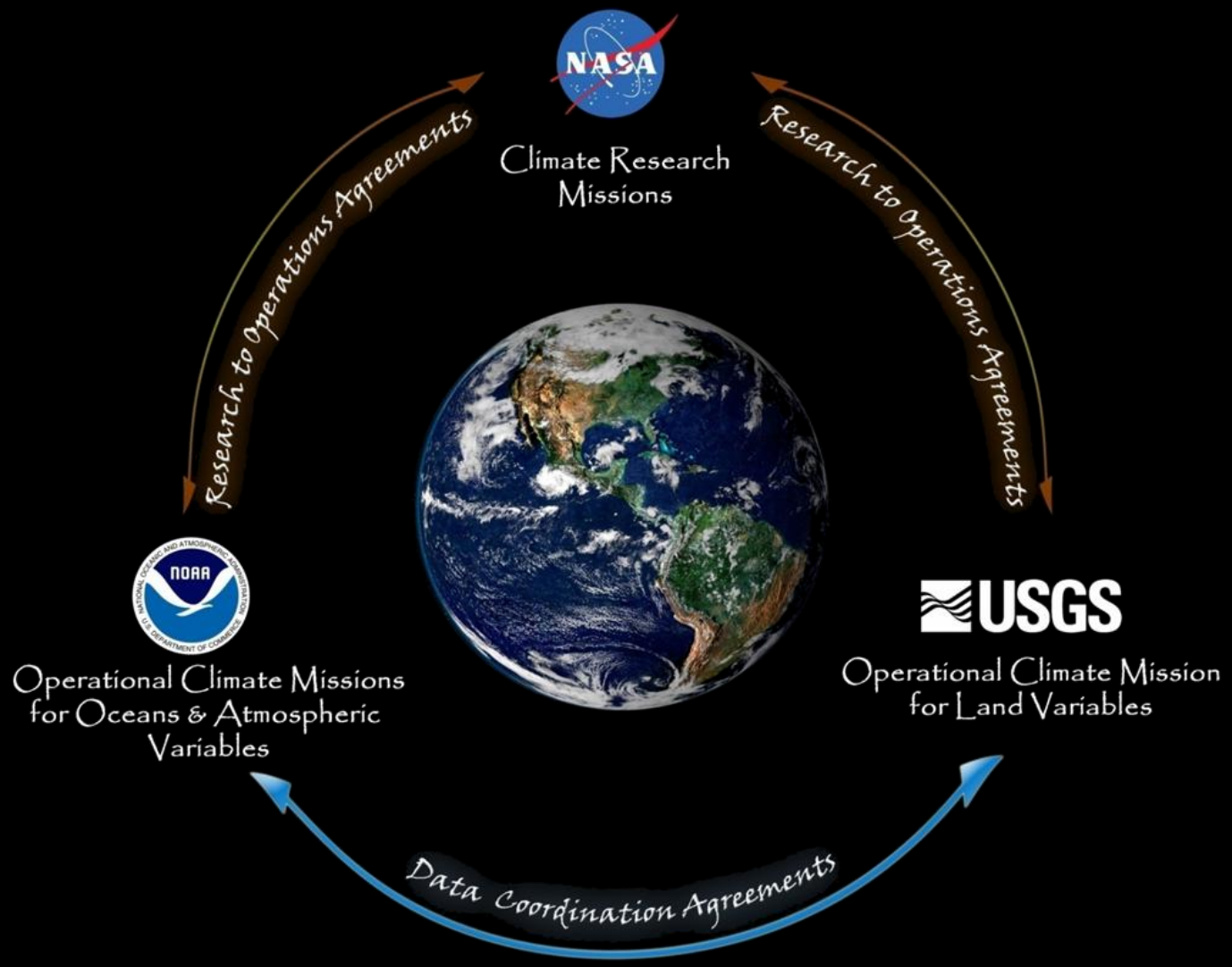
- To motivate a discussion as to the best strategic approach to developing CDRs
- The development of CDRs is still in its infancy
- The best strategic approach to developing CDRs is still a relevant question
- We need a sound strategic approach to CDRs:

Comprehensive	Emerging Technologies
Efficient	Opportunistic
Affordable	Science-Driven
Resilient	Peer-Reviewed
Global	International Partners

Diversity of Solutions

- As CDRs vary significantly so should the approaches to develop them
- A federal monolithic approach may well make CDRs unaffordable
- Universities and research institutions have an important role to play and should be able to host CDR development and maintenance
- CDRs are based on trust and one should identify scientifically trusted institutions to develop and maintain CDRs
- Look for competency, capability, and commitment

Early Partnering – Federal Possibilities



7

Early Partnering - International

- We are dealing with global datasets that are EXPENSIVE to develop and maintain
- We don’t need U.S. and European datasets for the same variable
- Such competition is WASTEFUL and will inhibit the expanding use of CDRs
- Co-opt this competition by aggressively pursuing international partners NOW
- Approach ESA, CEOS, WMO, GEO, etc. – they too are having meetings just like this one!
- Strong international partnerships will increase political support and make raising new funding easier

Role of Scientists

- A CDR is fundamentally a scientific product
- CDRs must be developed through a science peer-reviewed process to establish the trust that enables subsequent widespread use
- There needs to be a Science Working Group with subcommittees for individual CDRs that supports prioritization and coordination of CDR development and maintenance
- There needs to be a U.S. multiagency plan for CDR development and maintenance that is periodically peer-reviewed by the NRC
- This then becomes the CDR work plan and it must be updated annually
- If the federal managers responsible for CDRs “lead with science” – then raising the significant money required for CDRs will be easier

Securing Funding

- Developing and maintaining CDRs and the associated application products are all EXPENSIVE
- Securing funding is easier if you have the following:
  - Strong U.S. interagency cooperation/coordination
  - Efforts are coordinated with international partners reducing the required funding
  - Multi-level participation of scientists to ensure science-driven products
  - Periodic NRC review and endorsement
  - Utilize emerging technologies to reduce collecting, processing, archiving, and distribution costs
  - Carefully track CDR utilization to get quick feedback on new products – CDRs WILL EVOLVE

Summary

- CDRs:
  - Represent fundamental climate data,
  - Enable more scientists to engage in climate research, and
  - Leverage our current space mission investments
- Early partnering with other U.S. agencies and international partners avoids subsequent competing programs
- Entire process must be science-driven to generate the essential trust to make it work
- Universities and research institutions have a significant role to play
- NRC review and endorsement are very valuable
- Harness emerging technologies to lower the costs of collecting, processing, archiving, and distributing CDRs
- The time is right to define a global strategy for CDR development – GO FOR IT!