



# Climate Data Records – The Role of the Climate Program Office (C<sup>2</sup>D<sup>2</sup>)

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Meeting Focus: Progress toward initiating and sustaining climate data records

[C<sup>2</sup>D<sup>2</sup> ARC for Data Set Development + Scientific Data Stewardship/CDR Project]

Meeting Plan is to:

1) Review:

- Progress to date of individual projects and strategies for success
- Roles and relationships of supporting programs and individual projects

2) Discuss:

- Adequacy of current strategy and mode of operation
- Complementary C<sup>2</sup>D<sup>2</sup>/ARC – NCDC/CDR roles



# Climate Change Data and Detection (C<sup>2</sup>D<sup>2</sup>)

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## Components

- Competitive grants program
- ARC (Applied Research Center for Data Set Development)

## Philosophy:

- Commitment to sustained observations, their analysis, and the long-term preservation of the resulting data

## Overarching Goal:

- Develop and interpret reference data sets to provide a long-term, seamless history and understanding of the Earth's climate



# What Defines the C<sup>2</sup>D<sup>2</sup> Program?



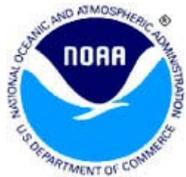
## Attributes:

“End-to-End” - from data archeology to climate-quality data appropriate for demanding detection/attribution studies

“Comprehensive” – (1) temporal scales from diurnal to centennial and spatial scales ranging from local observing stations to global networks;

(2) in situ and remotely-sensed data; model “data”

“Scientific Oversight” - data sets are exercised by scientists to understand the strengths and weaknesses of the data and shed light on the behavior of the climate system



# Characteristics of C<sup>2</sup>D<sup>2</sup>



Common thread that runs through all components of the program (Data Set Development/Analysis; Detection/Attribution; Paleoclimatology):

Produce (or move toward) reference climate data sets to support:

- national and international programs and assessments;
- climate reconstructions;
- detection of statistically significant climate variations and the attribution of these variations to natural or anthropogenic causes

Methods:

Blending of data sets from different platforms and sensors, calibration, error estimation, bias identification/adjustment, validation

Products:

- Entirely new data sets
- Rehabilitated or upgraded/expanded data sets



# Applied Research Center (ARC) for Data Set Development

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**How did this activity get started ?**

**and**

**Where do we want to go with it ?**



# History of the ARC (funded by C<sup>2</sup>D<sup>2</sup>)

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ARC began in 2003 to transition C<sup>2</sup>D<sup>2</sup> research projects to operations, i.e., ARC projects culled from C<sup>2</sup>D<sup>2</sup> portfolio (projects that had attained a level of scientific maturity and were relied upon by the scientific community for their currency and integrity)

- A near-term, practical solution to sustain the updating/reprocessing of important data sets
- Preceded introduction of the concept of SDS-CDR
- There have been some successes, i.e., data sets transitioned
- Each data set presents a unique set of challenges e.g., what does operationalization mean in practice? who is ultimately responsible for a data set (institutionally and financially)?



# ARC Data Set Characteristics

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Essential to long-term climate variability/change studies

Relevant to ongoing national and international climate assessments

Has a history of support from C<sup>2</sup>D<sup>2</sup>

Has a “champion” who is responsible for its scientific integrity (throughout the “transition to operations” phase and at appropriate points downstream as quality issues arise or as new science becomes available to improve the data set)

Will be updated in a timely and routine fashion

Is a candidate for migration to operational status, i.e., data set is well-suited to the requirements of an operational environment; there is a host facility committed to the data set by mission and resources



# Scientific Data Stewardship (SDS)/Climate Data Records (CDRs)

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## Goal:

- provide high quality Climate Data Records (CDRs) for data from the atmosphere, oceans, and land surface
- CDR candidates are identified as essential climate variables within the Global Climate Observing System

## Strategy:

- select candidate CDRs for which initial development has occurred within NOAA or other agency programs
- place initial emphasis on the use of satellite observations that can demonstrate:
  - \* high levels of maturity in scientific and preservation attributes
  - \* high societal benefit
- produce CDRs routinely on an operational basis

## Funding:

- □ provided by NCDC



# Challenge for CPO/C<sup>2</sup>D<sup>2</sup> and NCDC

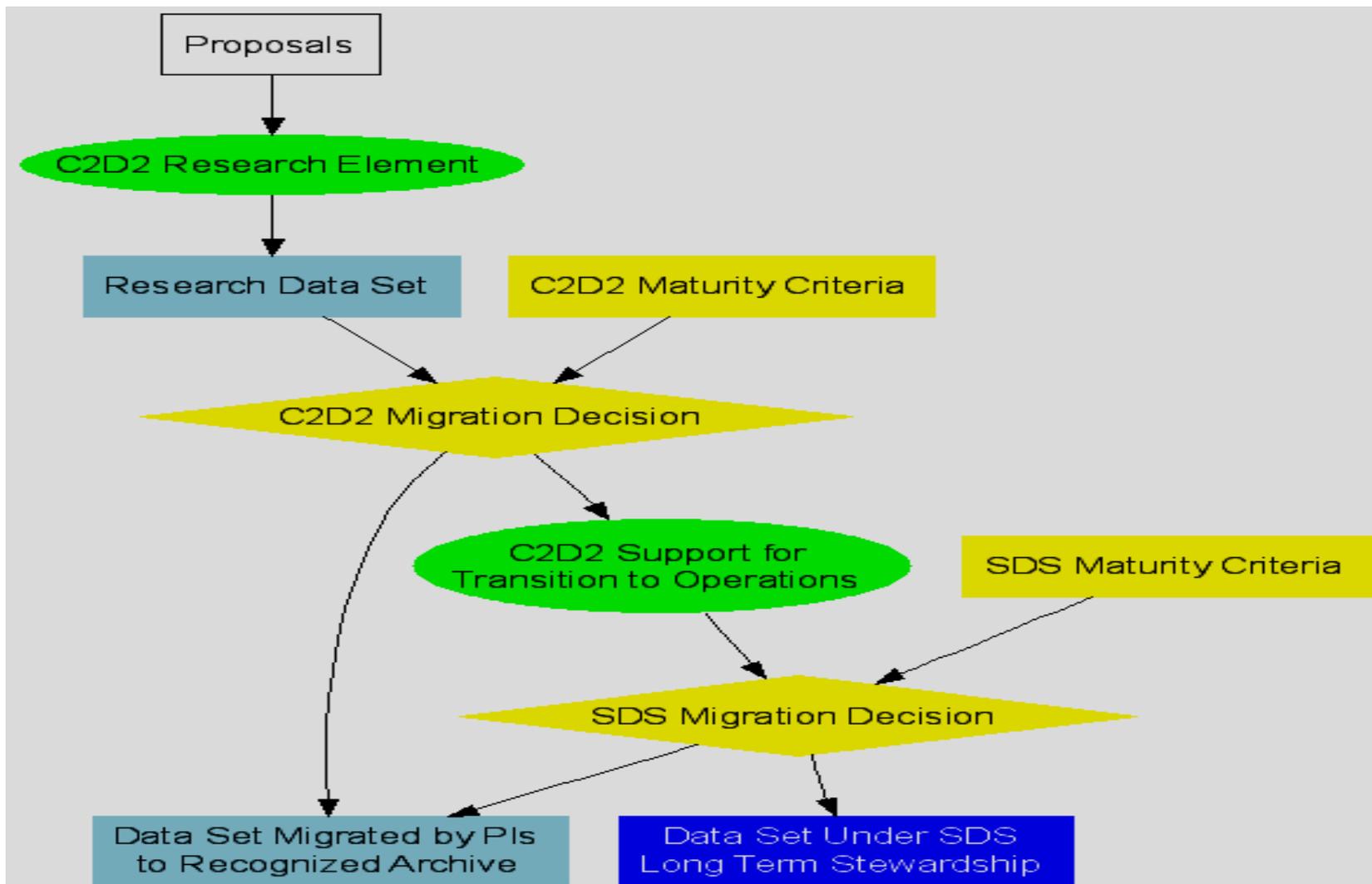


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## Effective coordination of complementary efforts

- C<sup>2</sup>D<sup>2</sup> focuses on research in data set development;
- ARC focus on sustaining data sets developed in the research mode with a short-term, i.e., identifying a pathway for moving a data set to a permanent production environment
- SDS focuses on operational production of CDRs for those data that have achieved a specified level of maturity in their science and preservation characteristics

# Life Cycle of a Climate Data Set?





# Recent Programmatic Drivers

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- C<sup>2</sup>D<sup>2</sup> has moved to the Climate Observations and Monitoring cluster within CPO [the other clusters within CPO are Earth System Science (ESS); Modeling, Analysis and Prediction and Projection (MAPP); Climate and Societal Interactions (CSI)]

COM has been re-examining its overarching goals (ongoing). These goals include:

1. Build and sustain a global climate observing system that will respond to the long-term observational requirements of the operational forecast centers, international research programs, and major scientific assessment and other stakeholders;
2. Develop and maintain long time-series indicators of climate variability and change;
3. Develop and maintain standard data sets for initialization and evaluation of climate forecast models, and for assessment and attribution of climate change;
4. Develop and maintain continuous analyses of global patterns of climate variability and change suitable for downscaling to regional impacts



# Recent Programmatic Drivers (continued)

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- This will involve forging new linkages with MAPP (e.g., model requirements for observations and observation-based products; shared responsibility for “indicators”) and CSI (e.g., identification of stakeholder needs for societally-relevant products and analyses, including “indicators”)
- Another driver is the movement toward a government-wide National Climate Service in the long-term and a NOAA Climate Service Office in the short-term [with an end-to-end focus that reflects a growing societal (defined broadly) demand for accessible, reliable, timely climate services, including data and information products]



# Questions/Issues (C<sup>2</sup>D<sup>2</sup> Perspective)

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- Turnover in ARC portfolio (i.e., a transition plan)
- Convergence (or Complementarity) of ARC and SDS/CDR Project activities
- One PI or multiple, independent teams to produce individual climate records (to address structural uncertainty associated with analysis assumptions)
- “Standards” for production of ARC => CDR data sets
- Continuation of C<sup>2</sup>D<sup>2</sup> support, or other mechanisms
- Opportunities given new programmatic drivers