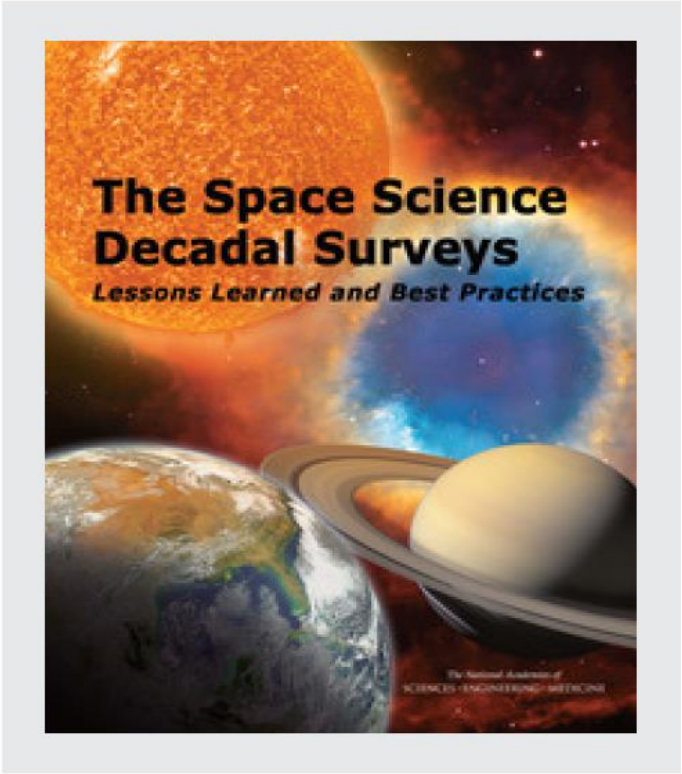
Harnessing the Heartland

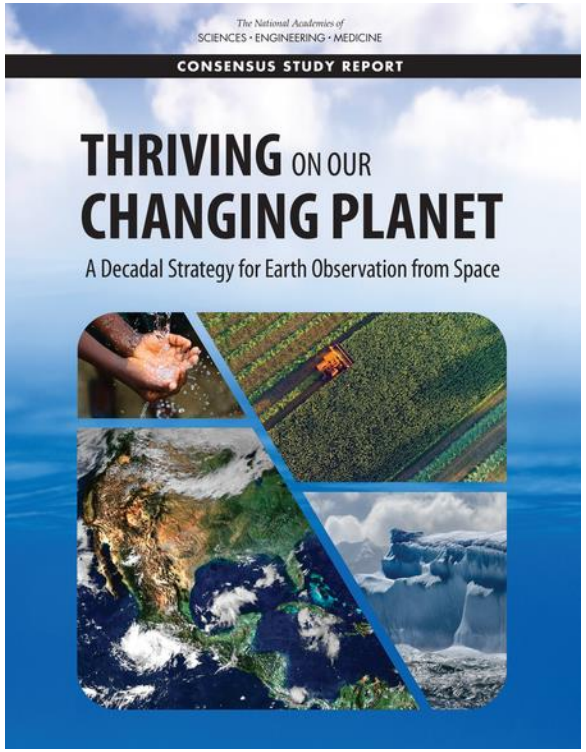
NASA +NOAA + USGS

Earth Sciences and Applications from Space Decadal Survey

Mid-Term review
mandated by Congress
Others prompted by NASA etc

2007 Decadal Survey





http://nap.nationalacademies.org/21788

Published in 2015

Published in 2018

(Simplified) Process

1. NASA Lead with input from NOAA, USGS and NRC/NASEM Staff and CESAS (Committee on Earth Science and Applications from Space) define **Task & Process**

2. Form Committee and Subcommitees; Issue RFI

3. RFI period (outreach to community) Opportunity!!!!

4. Reading and Synthesis

5. Committee Meetings including Cross-Disciplinary Meetings

6. Writing & Review

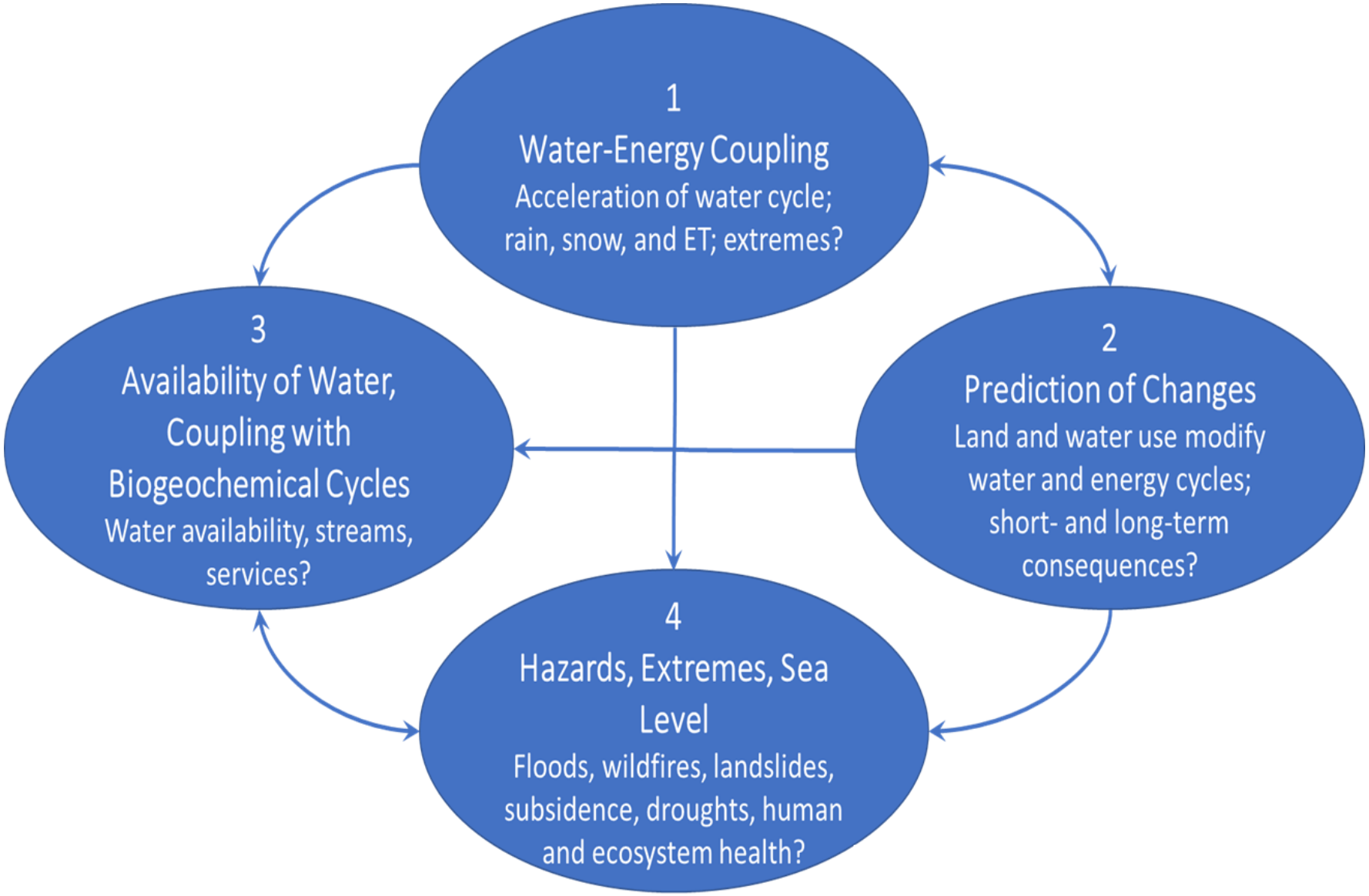
7. Dissemination and Publication

Ultimate Goal: Science & Applications Traceability Matrix (SATM)

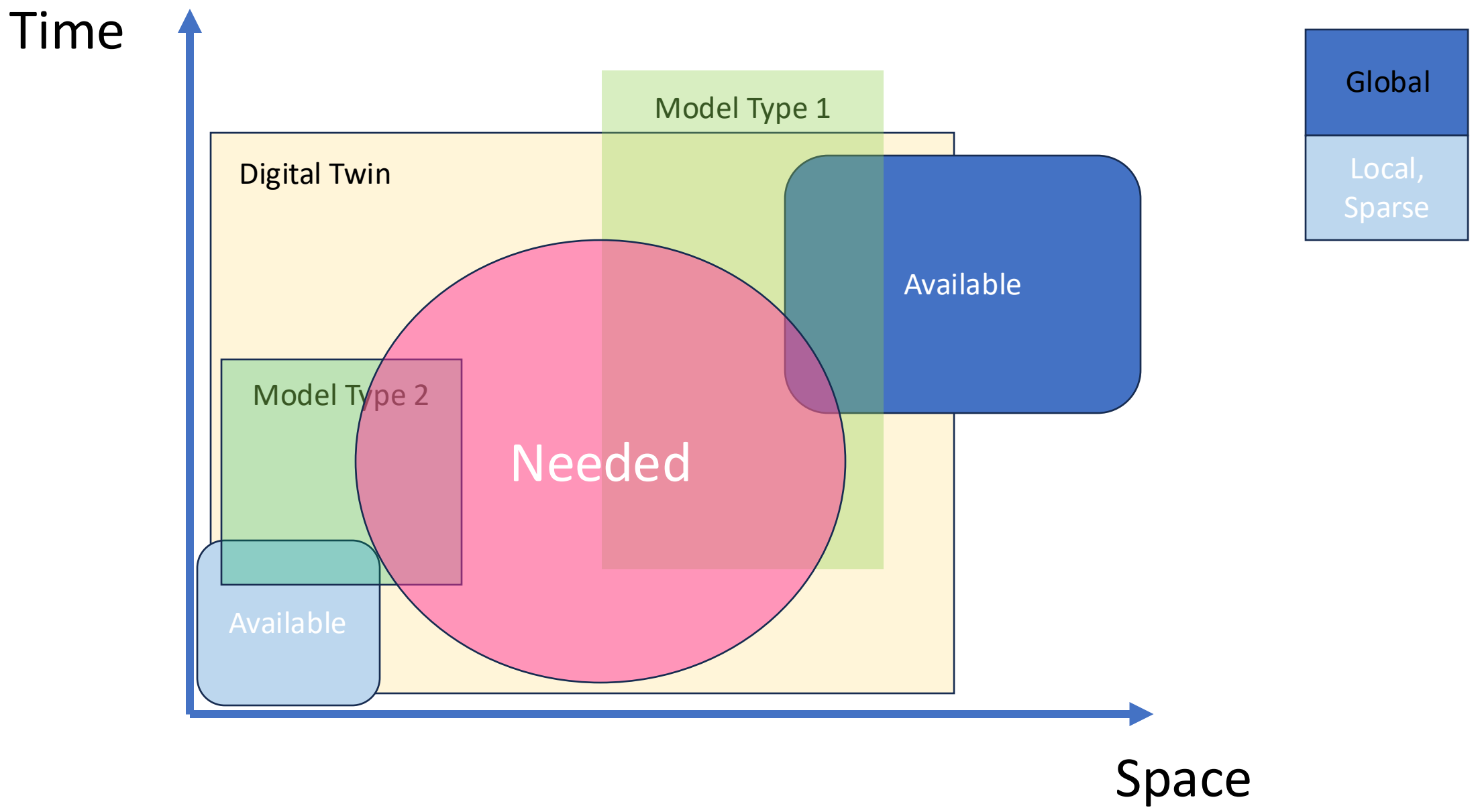
NASA Strategic Goals	Earth Science Decadal Survey Priorities
1.1: Understand the Earth system and its climate	**Water & Energy Cycle** H-1. How is the water cycle changing? *(Most Important)* H-1c. Quantify rates of snow accumulation, snowmelt, ice melt, and sublimation from snow and ice worldwide at scales driven by topographic variability. *(Most Important)* H-4. Influence of water cycle on natural hazards and preparedness *(Very Important)* **Weather & Air Quality** W-3. Influence of Earth surface variations on weather and air quality *(Very Important)* **Climate Variability & Change** C-6. Can we significantly improve seasonal to decadal forecasts of societally-relevant climate variables? *(Very Important)* C-8b. Improve understanding of high-latitude variability and mid-latitude weather linkages *(Very Important)* **Earth Surface** S-4b. Quantify weather events, surface hydrology, and changes in ice/water content of near-surface materials that produce landscape change. *(Important)*

SnowGlobe Science and Application Objectives		
SnowGlobe Science Goal: Discern the role of seasonal snow in the Earth's water and energy cycles	S1	Reduce uncertainty in global snow mass estimates
	S2	
	S3	
	A1	
	S4	
	S5	
	A2	

Toward an Earth Observing System (Digital Twin Earth) framework using satellite observations and models



earth observatory


Time
Model Type 1
Digital Twin
Available
Model Type 2
Needed
Available
Space
Global
Local, Sparse

Opportunity for Impact

It does not have to be about specific missions/architectures/technologies

1. Most Important - Focus on **(1) Science and, or (2) Applications**

Why remote sensing measurements are necessary (and transformative)
What measurements are desired
What measurements are sufficient
Coverage, resolution in space and time, accuracy, uncertainty

2. Very Important and Important

(a) Technical Readiness
"Landscape" Analysis

(b) Evaluation
What would it take for you to be convinced S&A reqs are met?
How?
Ground Validation (GV), Suborbital Campaigns, Operational Demo,etc

SnowGlobe -Global Snow Water Equivalent Observations from Space

https://snowglobe.Illinois.edu

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