



Earth System Explorers: Phase A Kick-Off

Evaluation Process Overview

Science Evaluation

Thorsten Markus, Program Scientist

Eric McVay, Program Executive

Argyro Kavvada, Program Applications Lead

ESE 2023 Step 1 Selections

- **Carbon Investigation Mission (Carbon-I)**
 - PI: Christian Frankenberg, California Institute of Technology
 - Targeted Observable: Greenhouse Gases
- **Earth Dynamics Geodetic Explorer (EDGE)**
 - PI: Helen Fricker, University of California, San Diego
 - Targeted Observables: Terrestrial Ecosystem Structure, Ice Elevation
- **Ocean DYnamics and Surface Exchange with the Atmosphere (ODYSEA)**
 - PI: Sarah Gille, University of California, San Diego
 - Targeted Observable: Ocean Surface Winds and Currents
- **Stratosphere Troposphere Response using Infrared Vertically-resolved light Explorer (STRIVE)**
 - PI: Lyatt Jaegle, University of Washington
 - Targeted Observable: Ozone and trace gases

Guidelines for Website and Social Media

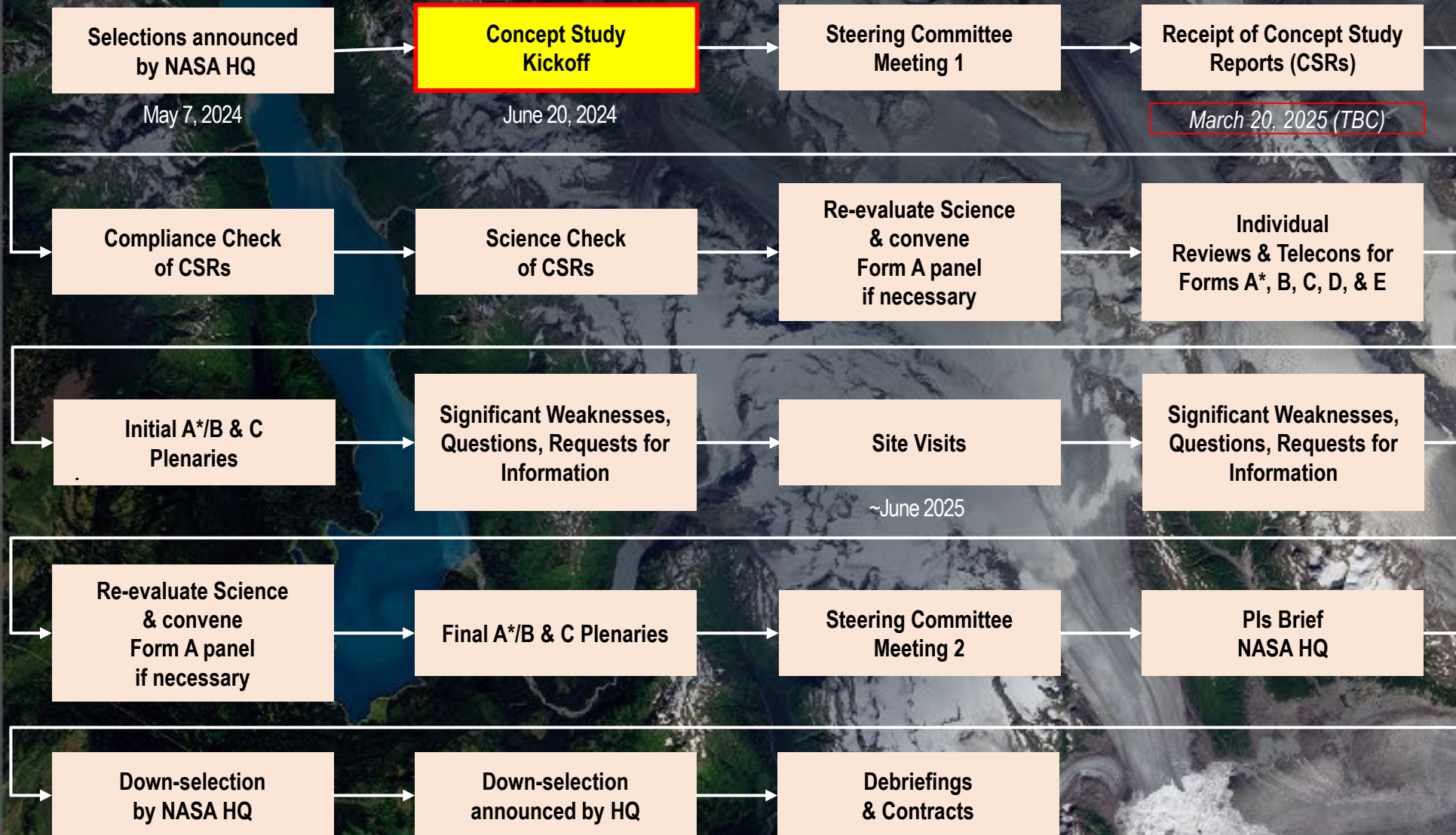
If you choose to create new websites or new social media campaigns, or web features on existing websites, about your mission concept, please follow these guidelines:

1. NASA-provided Phase-A funding should not be used to create or manage such activities without the prior approval of the appropriate SMD Division Director.
2. The NASA name and emblems should not appear on social media accounts or website banners. So, if your mission's name is Next Great Mission, NGM, then your website shouldn't be named NASA-NGM.edu nor should your official Twitter account be @NASA_NGM; NextGreatMission.edu or @NextGreatMsn are both fine, though.
3. Websites and social media campaigns cannot be lobbying efforts aimed at affecting the Step-2 down-selection.
4. All content must accurately portray the status of the mission concept with regards to overall selection process. So, don't describe your investigation as a "NASA mission" until after the down-selection. A Phase A selection is for a "Concept Study" of a particular investigation.

Consistent with the language of the Announcement of Opportunity, press releases and web articles should be coordinated with NASA ESD Communications.

What Follows Selection?

National Aeronautics and
Space Administration



***If required due to change in Science. If not required, use Forms A from Step1**



Evaluation Organization

Evaluation Panel

Thorsten Markus, Program Scientist
Eric McVay, Program Executive
Science Mission Directorate (SMD), NASA
Headquarters

Science Evaluation Panel

Thorsten Markus, Program Scientist
Eric McVay, Program Executive
Argyro Kavvada, Program Applications Lead
Earth Science Division, SMD, NASA HQ

TMC Evaluation Panel

Tony Tyler, Acquisition Manager
Waldo Rogriguez, Acquisition Manager
Renee Lake, Acquisition Manager
Science Office for Mission Assessments,
NASA Langley Research Center



Criteria and Requirements for the Phase A Concept Study

Earth System Explorers Program 2023 Earth System Explorers (ESE)

Draft Version at:

<https://explorers.larc.nasa.gov/2023ESE/>

(Details in SOMA talk)

Evaluation Criteria

- **Scientific merit of the proposed investigation: approximately 20%;**
- **Scientific implementation merit and feasibility of the proposed investigation: approximately 40%**
- **TMC feasibility of the proposed mission implementation: approximately 40%.**

Please note:

Scientific merit of the investigation:

Program Scientist will determine whether any issues that may have emerged in the course of the Concept Study have resulted in significant changes to the science objectives or other aspects of the proposed Baseline and Threshold Science Investigations in such a manner as to have impacted the basis for the evaluation of the scientific merit of the investigation as determined by the peer review panel for the Step-1 proposal.

If no significant changes, Scientific Merit (Form A) will not be re-evaluated. Otherwise, Program Scientist will convene peer review panel for new review of Form A.
(See also Requirement CS-20)

Form B evaluation elements

B-1: **Merit of the instruments and mission design for addressing the science goals and objectives.** This factor includes the degree to which the proposed mission will address the goals and objectives; the appropriateness of the selected instruments and mission design for addressing the goals and objectives; the degree to which the proposed instruments and mission can provide the necessary data, *including details on data collection strategy and plans*; and the sufficiency of the data gathered to complete the scientific investigation

B-2: **Probability of technical success.** This factor includes the maturity and technical readiness of the instruments or demonstration of a clear path to achieve necessary maturity; the adequacy of the plan to develop the instruments within the proposed cost and schedule; the robustness of those plans, including recognition of risks and mitigation plans for retiring those risks; the likelihood of success in developing any new technology that represents an untested advance in the state of the art; the ability of the development team—both institutions and individuals—to successfully implement those plans; and the likelihood of success for both the development and the operation of the instruments within the mission design. *This factor includes assessment of technology readiness, heritage, environmental concerns, accommodation, and complexity of interfaces for the instrument design.*

B-3: **Merit of the Open Science and Data Management Plan (OSDMP) and including Data Analysis plan, Data Management Plan (DMP), Software Management Plan (SMP), and Open Science Plan (OSP).** This factor includes the merit of plans for data analysis and data archiving to meet the goals and objectives of the investigation; *to result in the publication of science discoveries in the professional literature*; and to preserve data and analysis of value to the science and societal applications communities. Considerations in this factor include assessment of planning and budget adequacy and evidence of plans for well-documented, high-level data products and software usable to the entire science communities; *assessment of societal applications of the mission data, a plan to engage users to facilitate feedback on mission products pre-launch, and accelerate the use of mission products post-launch to inform decisions, and budget adequacy to implement these activities*; assessment of adequate resources for physical interpretation of data; reporting scientific results in the professional literature (e.g., refereed journals); and assessment of the proposed plan for the timely release of the data to the public domain for enlarging its science impact.

B-4: **Science resiliency**. This factor includes both developmental and operational resiliency. Developmental resiliency includes the approach to descoping the Baseline Science Investigation to the Threshold Science Investigation in the event that development problems force reductions in scope. Operational resiliency includes the ability to withstand adverse circumstances, the capability to degrade gracefully, and the potential to recover from anomalies in flight.

B-05: **Probability of science team success**. This factor will be evaluated by assessing the experience, expertise, and organizational structure of the science team and the mission design in light of any proposed instruments. The role of each Co-Investigator will be evaluated for necessary contributions to the proposed investigation; the inclusion of Co-Is who do not have a well-defined and appropriate role may be cause for downgrading during evaluation. The inclusion of career development opportunities to train the next generation of science leaders will also be evaluated.

B-6: **Merit of the Diversity and Inclusion Plan**. ~~This factor includes the alignment of the proposal with NASA's core value of inclusion, the effectiveness of the plan in achieving its objectives in the context of mission success, the inclusion of mentoring and career development opportunities to train the next generation of science leaders, and transparency of annual reporting to NASA.~~ *This factor includes the extent to which the Inclusion Plan provided appropriate processes and goals for both creating and sustaining a positive and inclusive working environment for the investigation team; the extent to which the Inclusion Plan demonstrates awareness of systemic barriers to creating inclusive working environments that are or may be specific to the proposal team; whether the Inclusion Plan contains appropriate activities for equipping team members to build and maintain inclusive working environments; whether roles and responsibilities for those participating in the proposed activities are well described and justified; whether the proposed timeline is reasonable for the proposed Inclusion Plan activities; whether the Inclusion Plan provides reasonable and appropriate assessment mechanisms for measuring progress in and success of the proposed activities; and whether reasonable resources are requested to carry out the proposed activities and if funds are requested, with appropriate justification.*

B-7 (A-3 in Step 1 evaluation): **Likelihood of scientific success.** This factor includes how well the anticipated measurements support the goals and objectives; the adequacy of the anticipated data to complete the investigation and meet the goals and objectives; and the appropriateness of the mission requirements for guiding development and ensuring scientific success.

B-8: ***Maturity of proposed Level 1 science requirements and Level 2 project requirements.*** *This factor includes assessment of whether the Level 1 science requirements are mature enough to guide the achievement of the objectives of the Baseline Mission and the Threshold Mission, and whether the Level 2 requirements are consistent with the Level 1 requirements. The Levels 1 and 2 requirements will be evaluated for whether they are stated in unambiguous, objective, quantifiable, and verifiable terms that do not conflict and for whether they are traceable to the science objectives. They will be evaluated for the adequacy, sufficiency, and completeness, including their utility for evaluating the capability of the instruments and other systems to achieve the mission objectives. The stability of the Level 1 science requirements and Level 2 project requirements will be assessed to determine whether the requirements are ready, upon initiation of Phase B, to be placed under configuration control with little or no expected modifications for the lifecycle of the mission.*

B-9: ***Scientific Implementation Merit and Feasibility of any Science Enhancement Options (SEOs), if proposed.*** *This factor includes assessing the potential and appropriateness of the selected activities to enlarge the science impact of the mission and the costing of the selected activities. Although evaluated by the same panel as the balance of Scientific Implementation Merit and Feasibility factors, this factor will not be considered in the overall criterion rating. The panel will provide comments to NASA on their findings for this factor.*

Science Enhancement Option (SEO) - was deferred to step 2

If an SEO is proposed, this section shall define and describe plans for the proposed activities (see AO Section 5.1.6). The SEO shall be directly related to the mission (*i.e.*, analyze mission data, not enhance theory). The SEO shall be clearly separable from the Baseline Science Investigation and Threshold Science Investigation. The SEO shall [support the NASA Earth Science to Action Strategy; promoting integration of innovation, scientific discovery, and emerging user needs to accelerate the use of Earth science and enable solutions that generate the science-based decision support information needed by users](#). Additionally, a justification and a cost plan for SEO activities are required in Section J of this document.

Earth Science to Action Strategy

Earth Science to Action

Virtuous Cycle

- User needs inform next iteration of programs, missions and initiatives

Public Understanding & Exchange

- Put more scientific understanding into public sphere
- Deliver applied science to users
- Participate in multi-way info exchange
- Use input to inform subsequent work

Solutions & Societal Value

- Offer models, scientific findings and info through Open-Source Science principles
- Support climate services
- Provide science applications and tools to inform decisions

Earth System Science & Applied Research

- Grow scientific understanding of Earth's systems
- Develop predictive modeling for science applications and tools to mitigate, adapt and respond to climate change

Foundational Knowledge, Technology, Missions & Data

- Technology innovation
- Earth observations missions
- Data collected from space, air and ground

NASA
earth

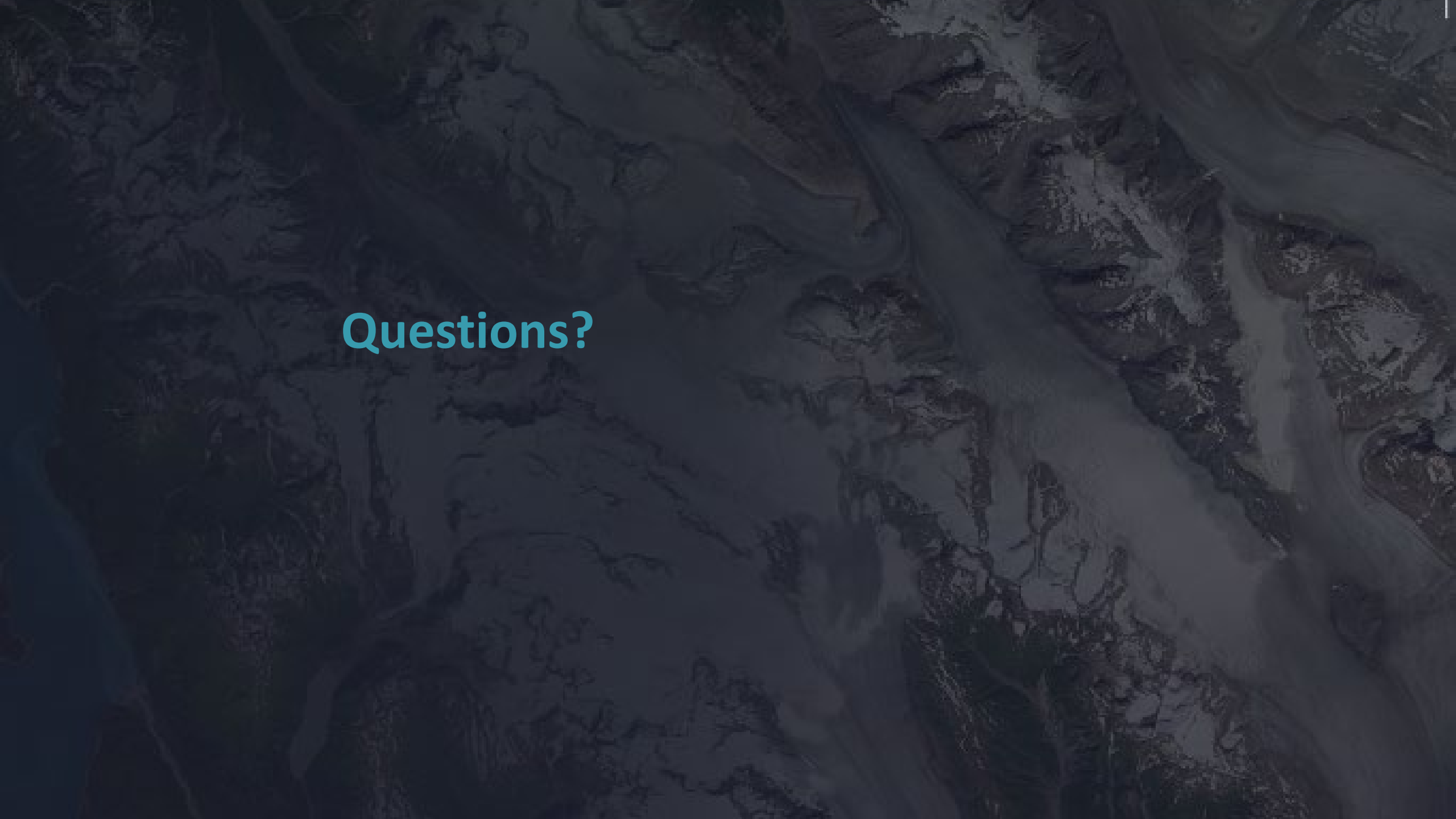
02.13.2024

(recap) Evaluation Elements re: Applications

- B-3: Merit of the Open Science and Data Management Plan (OSDMP) ~~and including Data Analysis plan, Data Management Plan (DMP), Software Management Plan (SMP), and Open Science Plan (OSP)~~. This factor includes the merit of plans for data analysis and data archiving to meet the goals and objectives of the investigation; *to result in the publication of science discoveries in the professional literature*; and to preserve data and analysis of value to the science and societal applications communities. Considerations in this factor include assessment of planning and budget adequacy and evidence of plans for well-documented, high-level data products and software usable to the entire science communities; *assessment of societal applications of the mission data, a plan to engage users to facilitate feedback on mission products pre-launch, and accelerate the use of mission products post-launch to inform decisions, and budget adequacy to implement these activities*; assessment of adequate resources for physical interpretation of data; reporting scientific results in the professional literature (e.g., refereed journals); and assessment of the proposed plan for the timely release of the data to the public domain for enlarging its science impact.
- Science Enhancement Option (SEO): If an SEO is proposed, this section shall define and describe plans for the proposed activities (see AO Section 5.1.6). The SEO shall be directly related to the mission (i.e., analyze mission data, not enhance theory). The SEO shall be clearly separable from the Baseline Science Investigation and Threshold Science Investigation. *The SEO shall support the NASA Earth Science to Action Strategy, promoting integration of innovation, scientific discovery, and emerging user needs to accelerate the use of Earth science and enable solutions that generate the science-based decision support information needed by users.* Additionally, a justification and a cost plan for SEO activities are required in Section J of this document.

NOAA Operational Enhancement Opportunity (OEO) – was deferred to Step 2

1. If OEO activities are proposed, they shall be clearly separable from the Baseline Science Investigation and Threshold Science Investigation. The OEO shall be submitted via the NASA Box service, as a separate pdf document (no greater than five pages) along with the CSR. Proposers shall indicate that they consent to the release of the supplementary information to NOAA.
2. If NOAA OEO activities are proposed, the submission shall define and describe the proposed activities and their costs per the guidance in the AO (5.1.8 *NOAA Operational Enhancement Opportunity*) and shall be in the form of additional file(s) to be submitted with the CSR.

An aerial photograph of a river delta, showing a complex network of channels and distributaries. The water is a light, silty color, contrasting with the darker, vegetated land. The text "Questions?" is overlaid in a light blue, sans-serif font on the left side of the image.

Questions?

