Pathways from ESKB to Candidate Solutions

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Outline

- Define ESKB & Candidate Solution
- Overview of ESKB content
- Conceptualizing pathways
- An example pathway
- Partnerships
- Benefits
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Definitions

- **ESKB** – *Earth Science Knowledge Base*
  A guided research exploration tool which enables navigation and examination of the connections which produce Earth Science related research and results generated therein.

- **Candidate Solution** – A concept which utilizes NASA research results and resources and is derived from NASA Earth Science research results that has the potential to enhance future operational systems for societal benefit.
Why traverse this pathway?

- ESKB has been developed to provide connectivity and deliver content for the research information needs of the NASA Applied Science Program and related scientific communities of practice.

- The pathway serves as a mechanism for testing theories about advancing research streams into the operational realm.

- The generation of candidate solutions is the first step in developing rigorously tested applications for operational use from the normal yet chaotic process of natural discovery.
Brainstorming a New Concept

Concept

- Satellites
- Models
- Measurements
- Sensors
- Decision Systems
- Data Products
- Societal Benefits
Conceptualizing Pathways

Science Questions

Data Products

Models

DSTs

Observation Systems

Societal Benefits

National Applications

Measurements

Sensors

Concept
E SKB Content

Solicitations
Grants & Contract Awards
Partnerships
Research and Project Abstracts
Data Harvesting Tools

NASA Resources
- Observation Systems
- Sensors
- Measurements
- Data Products
- Models
- Decision Support Tools

ESKB Content
Earth Science Knowledge Base (ESKB)

This pre-beta release of the Earth Science Knowledge Base (ESKB) is provided for evaluation of the application's functionality against design specifications and requirements. The ESKB application links data about awarded NASA research projects and their research results, relevant national applications and science focus areas. The ESKB enables association of projects and results with resources such as data products, models, and decision support tools used to develop results. The addition of research content will occur over time as Principal Investigators (PI) and others add vital results to the ESKB. The developers of this tool are not responsible for the content submitted by others. User feedback is essential to enhancing application capabilities and addressing maintenance needs. Your input is valued and encouraged so please use the feedback mechanism to help us improve and enhance the ESKB.
An Example Pathway

- Choose a National Application to refresh a list of preset keywords
- Select a date range
- Use a keyword search to select a topic to investigate
  - Preset keywords
  - User-defined keywords
- Choose search characteristics
- Search!
An Example Pathway

1. Review the set of projects related to your keyword search

2. Review the award and publication abstracts to determine relevancy

3. Flag relevant results

4. Save selected results to excel file for later use

5. Choose specific project criteria to generate a keyword string

6. Search the web for publications through any of these search engines
An Example Pathway

Search for research results by utilizing imbedded web search tools
An Example Pathway

Search for research results that leverage specific NASA resources and determine relevance.

Abstract:
Satellite radar altimetry has the ability to monitor variations in surface water height (stage) for large wetlands, rivers, and associated floodplains. A clear advantage is the provision of data where traditional gauges are absent. As part of an international program, a complete altimetric analysis of the Amazon Basin is being undertaken. Here, an updated and more rigorous evaluation of the TOPEX/POSEIDON (T/P) data set is presented for the first 7.5 years of the mission. With an initial study group of 230 targets, height variability at many ungauged locations can be observed for 30-50% of the range reflecting the clarity of the variations in lieu of instrument limitations. An assessment of the instrument performance confirms that the minimum resolution attainable is ~1 km in the presence of some inundated floodplains. This constraint does allow observation of the main stem (Solimões/Amazon) and the larger tributaries, but rugged terrain in the vicinity of the target additionally places severe limitations on data retrieval. First-order validation exercises with the deduced 1992-1999 time series of stage fluctuations reveal accuracies ranging from tens of centimeters to several meters (mean ~1.1 m rms). Altimetric water levels in the Solimões and Amazon are particularly well defined with amplitudes <13 m and variations in peak-level timing from May to July. The water-surface gradient of the main stem is found to vary both spatially and temporally, with values ranging from 1.5 cm/km downstream to 4.0 cm/km for more upstream reaches. In agreement with ground-based estimates, the seasonal variability of the gradients reveals that the hysteresis characteristic of the flood wave varies along the main stem and the derived altimetric velocity of this flood wave is estimated to be 0.35 m/s. Overall, the altimetric results...

Important Research Results and Findings:
First-order validation exercises reveal that the deduced 1992-1999 time series have variable accuracies (mean ~1.1 m rms) with the best results (0.410.6 m rms) being obtained from the Solimões, Amazon, Xingu, and Urini rivers. This accuracy though can be highly variable being dependent on the target width (river channel or floodplain) and study season. In comparison with ground-based gauge measurements, these values could be considered good but they do allow for general interannual and seasonal intercomparisons across the basin. In addition, the results indicate how new data can be obtained at ungauged locations, with particular relevance to main stem sites, floodplains, and major wetland zones. Because absolute basin elevations are still unknown, the assembly of the T/P river heights into one reference datum is also an advantage when considering river gradients and overall basin hydrodynamics. The results present spatial and temporal variability of the main stem gradients compares well with ground-based estimates.

Keywords: TOPEX/POSEIDON, Amazon Basin, altimetric analysis, floodplain
• Review the NASA Earth Science resources for potential substitute components or methods.

• Analyze substitution possibilities for their innovation or likelihood to further research streams.
An Example Pathway

Use new concept to draft candidate solution reports or proposals. Obtain additional references for citation from ESKB using the Guided Data Exploration Tools.

Solutions Network Hub: http://www.asd.ssc.nasa.gov/snh/
NSPIRES: http://nspires.nasaprs.com/external/
Finding and Forming Partnerships

Example: Coastal Partnerships

Use ESKB to:

• Discover Potential Collaborating Institutions or Principal Investigators
• Identify Subject Matter Experts
• Review Current Project Abstracts
• Evaluate Research Results
Building a Community of Practice

One of the greatest potential assets of ESKB is the ability to bring together communities of practice to construct stronger networks.
Summary

Benefits of using ESKB to generate candidate solutions

- Structured
- Guided
- Flexible
- Repeatable
- Enabling
- Extensible
- Associations and Linkages
- Efficient
- Quick evaluations
- Community building
THANK YOU!