



NSF's Antarctic Science Strategy

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Discussion Topics

- Introduction to the USAP
- Criteria for funding Antarctic research
- Antarctic research portfolio and strategy
- High impact science: An example
- Logistics and operations to support research



United States Antarctic Program

- USAP supports research within NSF, across Federal agencies, internationally
- U.S. Presence underpinned by Antarctic Treaty (1959)
 - Reserved for peaceful uses, environmental protection, and scientific research



United States Antarctic Program

- **Established by Presidential Memorandum (1982)**
 - An “active and influential presence” in Antarctica
 - Year-round occupation of three research stations
 - Directs NSF to budget for, and oversee, USAP
 - Provide logistical support to sustain presence



United States Antarctic Program

- Long history of policy affirmation supporting USAP mission
- NSB and NSF have a joint responsibility
 - To ensure research is central to U.S. strategy in the Antarctic
 - To manage USAP for the Nation



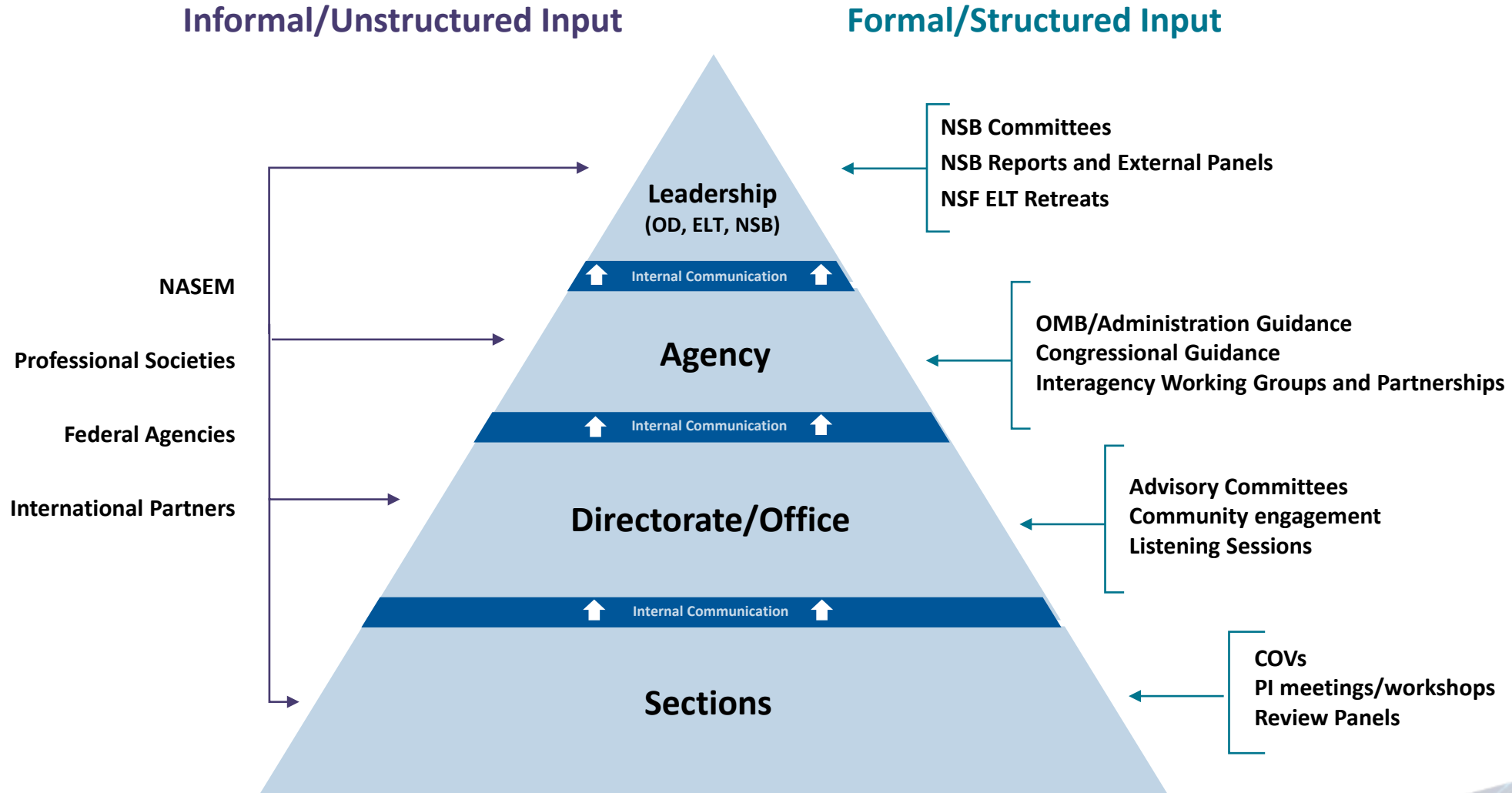
Criteria for Antarctic Research Projects

- Improve understanding of interactions among the Antarctic region and global systems
- Expand fundamental knowledge of Antarctic systems, biota, and processes
- Utilize unique characteristics of the Antarctic region as an observing platform

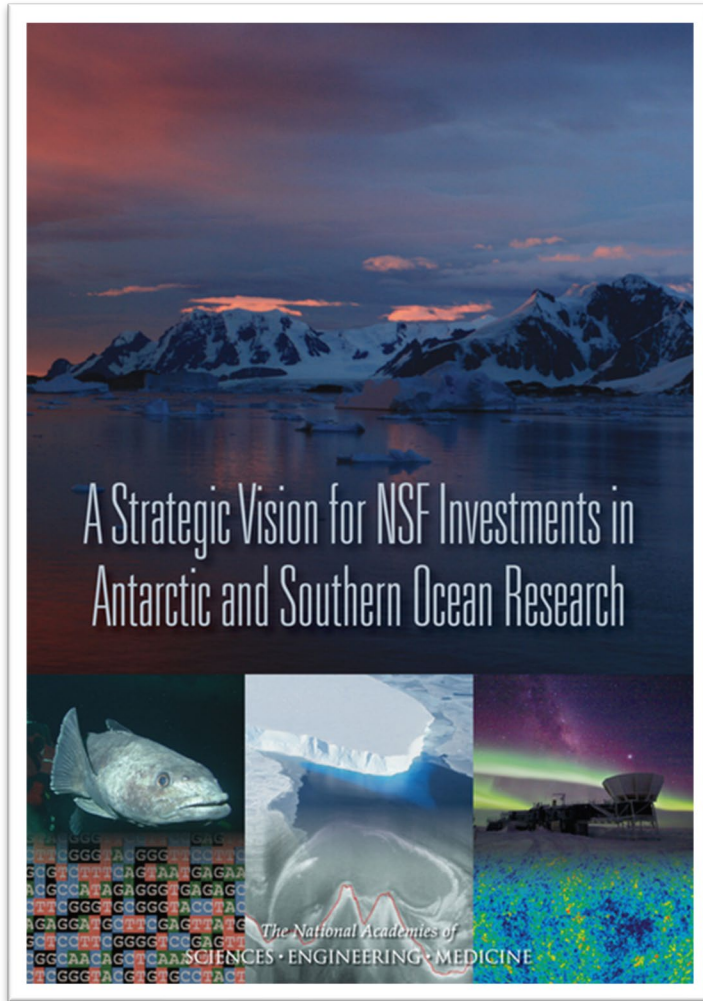
Best or only place to do the research



Current Antarctic Research Priorities



Current Antarctic Research Priorities



Priority 1 Changing ice sheets

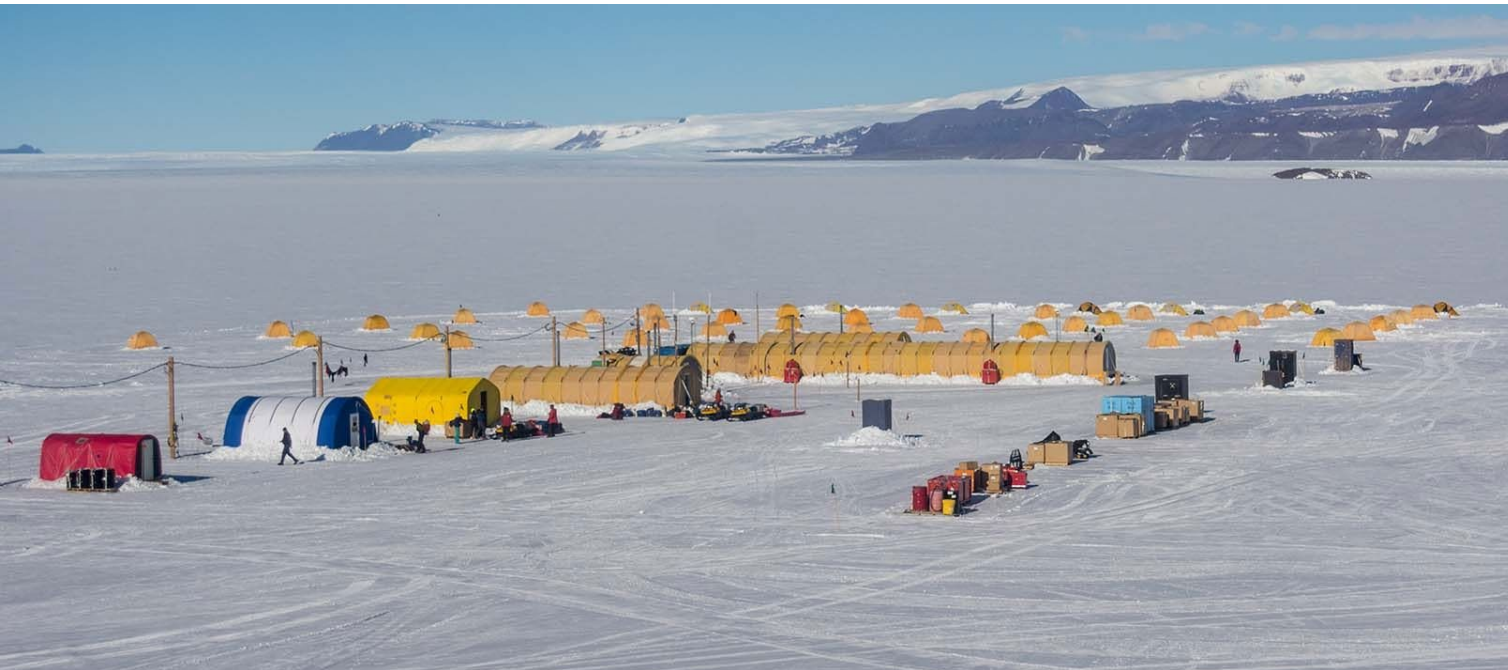
Priority 2 Biological adaptation and response

Priority 3 Next generation cosmic microwave background

Antarctic Research: Implementation Strategy

USAP Vision

World-class science to serve the nation



Approach

- Science prioritization
- Interdisciplinary research sites
- “Survey to Synthesis”

Outcomes

- Portfolio planning
- Optimized deployments
- Efficient science support



HIGH IMPACT SCIENCE ROSETTA-Ice

Full Ross Sea ice shelf system: ice, seafloor, and ocean interaction

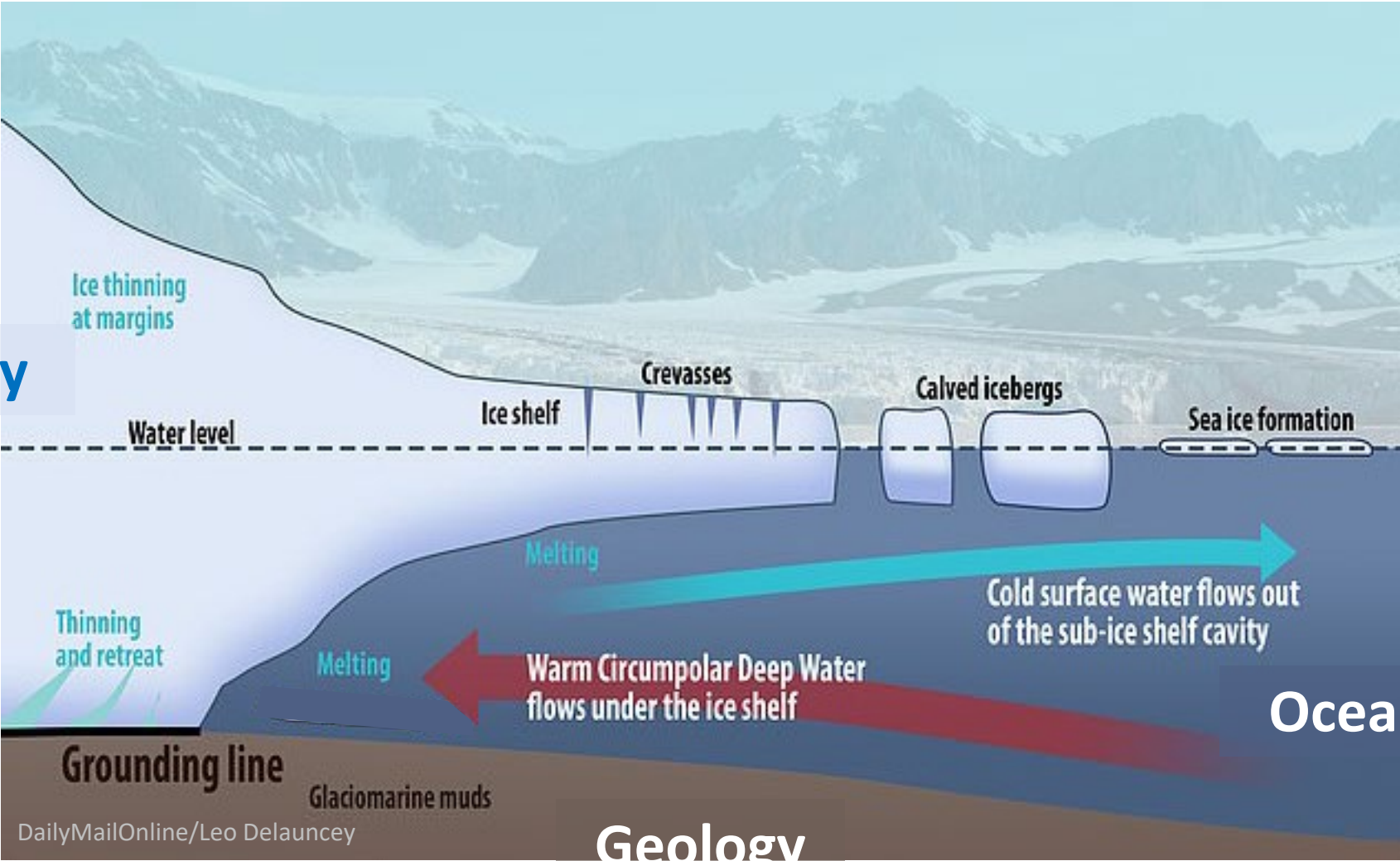


Ross Sea Ice Shelf
The world's largest body of floating ice



Ross Ice Shelf: ROSETTA-Ice Project

Glaciology



Oceanography

Geology



ROSETTA-Ice



ROSETTA-Ice: Logistics and Support

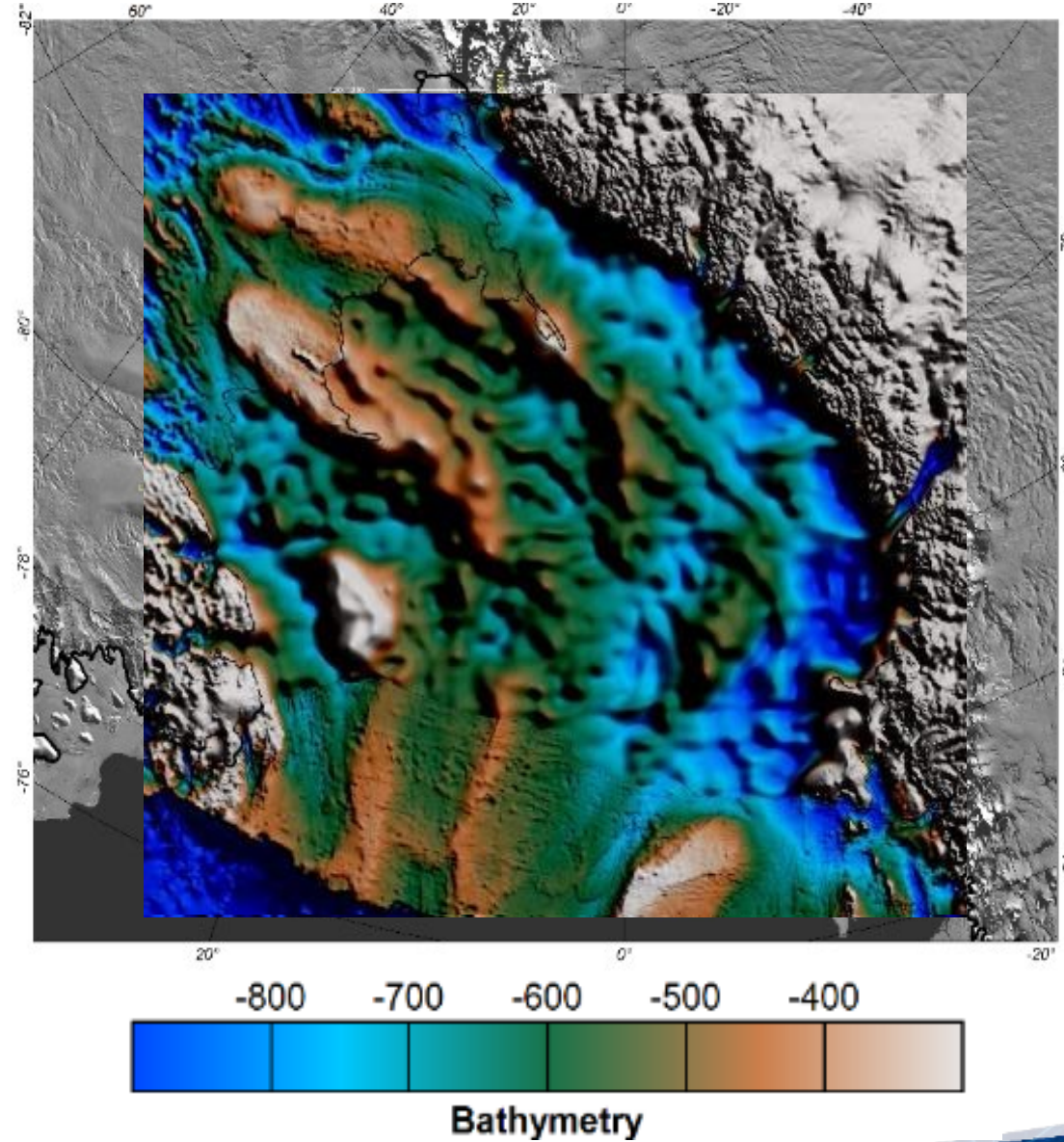


Credit: Columbia University

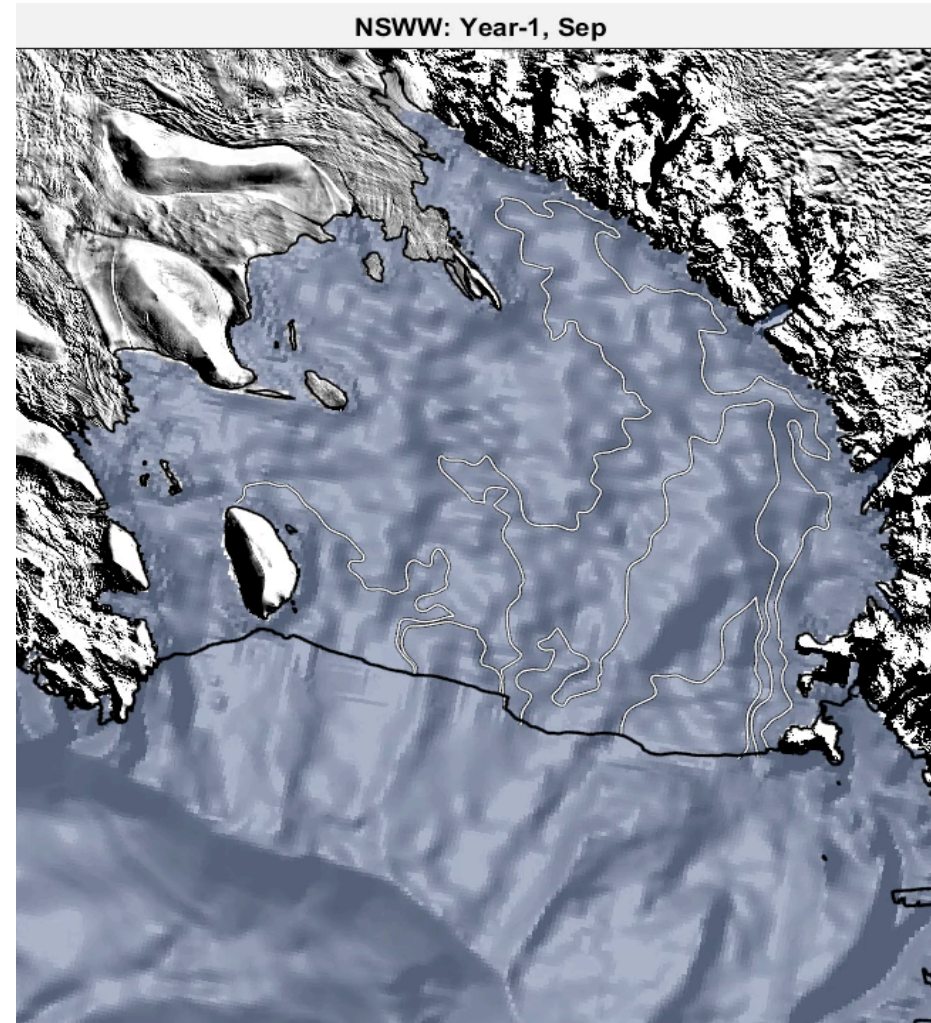
- **3 Field Seasons**
- **IcePod MRI – extensive testing/coordination**
- **Dedicated LC-130 aircraft support – 45 missions**
- **250,000 gallons of aviation fuel**
- **Enhanced weather forecasting**
- **Specialized airfield building**



1. High-resolution model of bathymetry

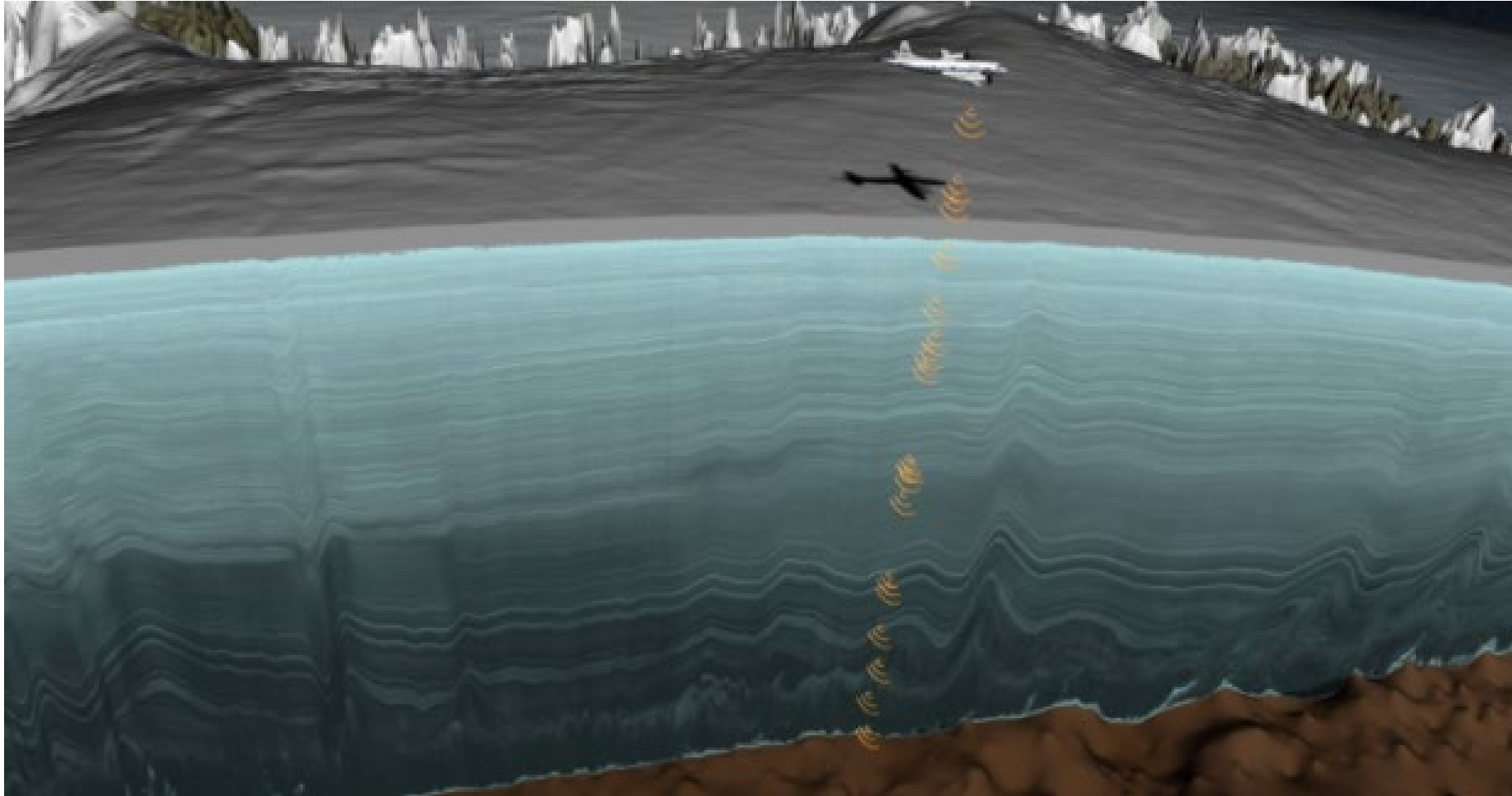


2. Extended record of basal melt to century-scale



Ocean simulation

3. Identified major vulnerability at the Ross Ice Shelf - *Ice Front*



Future Antarctic Research Initiatives

Priority 1: Changing Ice Sheets

- The Center for Oldest Ice Exploration (new STC)
- Ice loss from the East Antarctic Ice Sheet

Priority 2: Biological Adaptation and Response

- Ocean Ecosystems and Carbon Cycling
 - Palmer LTER
 - Southern Ocean Carbon and Climate Observations and Modeling

Priority 3: Next Gen Cosmic Microwave Background

- CMB Research (in partnership with MPS and DoE)



Infrastructure and Research Priorities

Infrastructure Support	Priority 1: Changing Ice Sheets	Priority 2: Biological Adaptation and Response	Priority 3: Next Gen Cosmic Microwave Background
McMurdo Station	X	X	X
Significant MCM Cargo	X		X
Significant MCM Fuel	X		X
South Pole Station	X		X
Significant SP Cargo	X		X
Significant SP Fuel	X		X
SP Building Raise			X
Palmer Station		X	
Vessels	X	X	
Deep Field Camp	X		
Data/Communication	X	X	X
LC-130 Airlift	X	X	X
Science Traverse	X		



Questions for Discussion



- How can NSF and NSB more effectively support U.S. government strategy in the Antarctic?
- How can NSB and NSB collaborate to advance USAP research and infrastructure priorities?
- How can we articulate to the community a long-term strategy for Antarctic investments when budgets are decided on a short-term basis?