

The Arctic Ocean And Marine Transportation



George B. Newton, Chair

Dr. Lawson W. Brigham, Deputy Executive Director

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US Arctic Research Commission

- **Created by Arctic Research and Policy Act of 1984**
- **7 members appointed by the President**
- **3 full-time staff employees**
- **Second smallest US Government agency**



US Arctic Research Commission

- **Duties**

- Recommend Arctic research policies and priorities to the President and Congress
- Promote data sharing and cooperation at all levels: international, federal, state, local and people of the North
- Encourage cooperation in Arctic research logistics

- **USARC Funds No Research**

- Our effectiveness is our ability to convince you that “it is important”

- **Deliverables**

- Goals Report
- Annual Report



The Arctic Ocean

Some Facts

- **Smallest Ocean: 5 times larger than the Mediterranean Sea**
- **Over 50% is shallow (less than 200 meters)**
 - 1/4 of world's continental shelf area
- **Receives 10% of world's fresh water runoff**
- **Ice Cover Now: ~55% multi year**
 - ~45% first year**
 - represents slow change
- **In a given year, first year ice can grow to 2 meters (~6 feet)**
 - insulation stops growth



The Arctic Ocean

- **The world's most poorly understood ocean**
 - Know more about the topography of Venus and Mars than the bottom of the Arctic Ocean
 - Climate/remoteness/money control
- **First passage through the Canadian Archipelago:**
 - 1906 (Amudsen) (E-W)
 - 1946 (RCMP) (W-E)
- **First surface ship to North Pole**
 - 1977-Russian icebreaker “Arctica”
- **Considerable submarine activity since 1957**



The Arctic Ocean

Sea Ice

- **Sea ice is dynamic...constantly moving**
<2 knots of wind puts the sea ice in motion
 - Grows on the bottom
 - Melts on the top
- **Sea ice moves primarily with the wind**
 - Transpolar drift
- **Icebergs move with the ocean current**
- **Average sea ice thickness has declined ~35% since 1950s**
 - Area extent decreased ~7%
- **Ridges as deep as 150' (or more)**
- **There will always be ice in the Arctic winter**
- **Reflectivity: Sea Ice ~90%**
Open water ~10%



The Arctic Ocean

- **Mediterranean Sea Analogy**
- **International cooperation difficult**
- **UNCLOS compounds challenge**
 - Article 76
 - Article 234



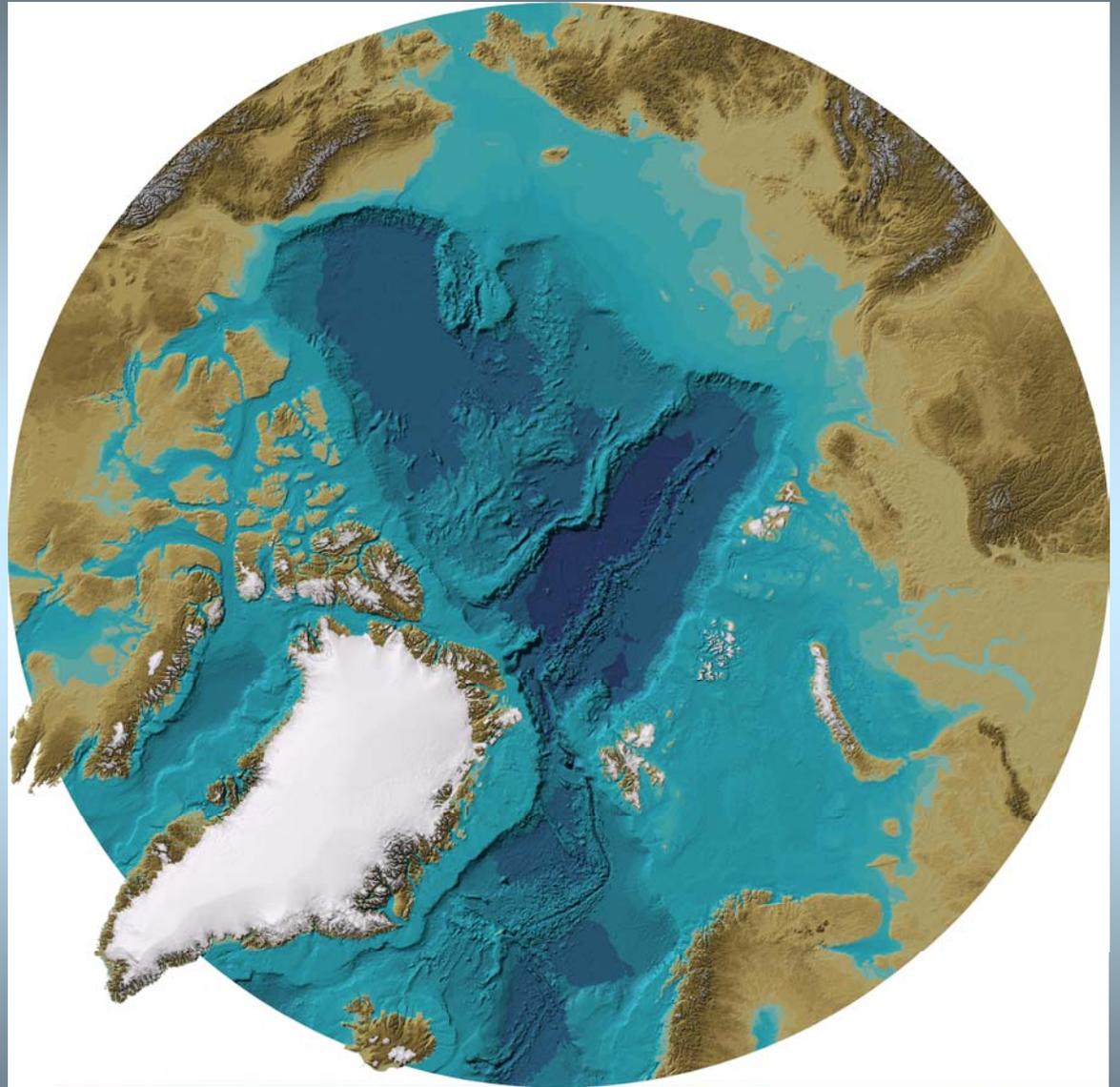
The Arctic Ocean

What's Causing the Interest?

- **Improving Access**
- **Security**
 - terrorists/sea control
- **Economic Development**
 - oil
 - natural gas
 - coal
- **Commerce**
 - nearly a great circle route
 - ports
- **Ocean Resources**
 - fisheries
 - marine mammals
- **Research**
- **Ocean Infrastructure**

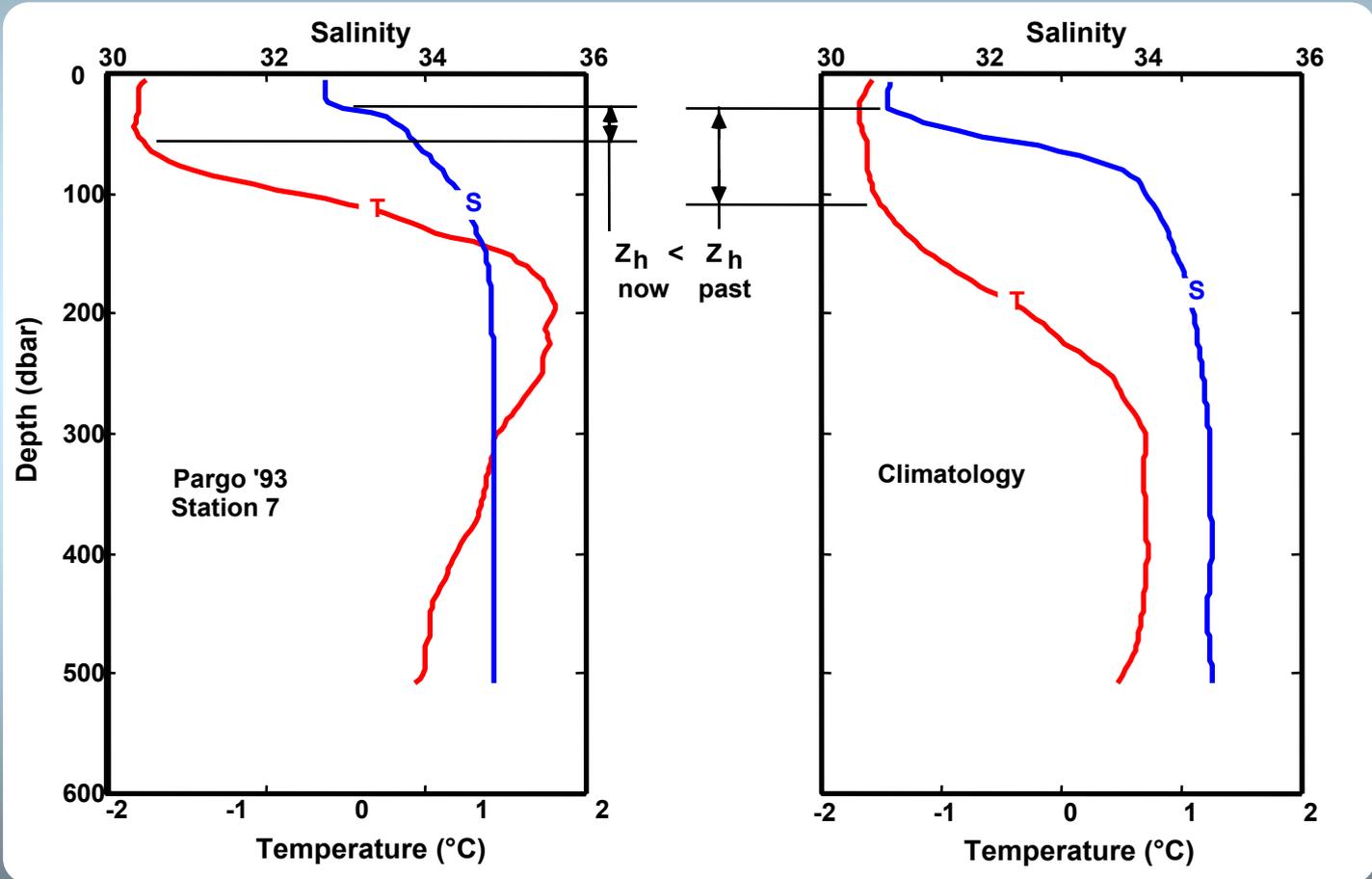


ARCTIC OCEAN BATHYMETRY





THE DECAY OF THE COLD HALOCLINE IN THE ARCTIC OCEAN





Submarine Tracks Between 1957-1982