Overview of Studies of NW Atlantic Seamounts for ISA

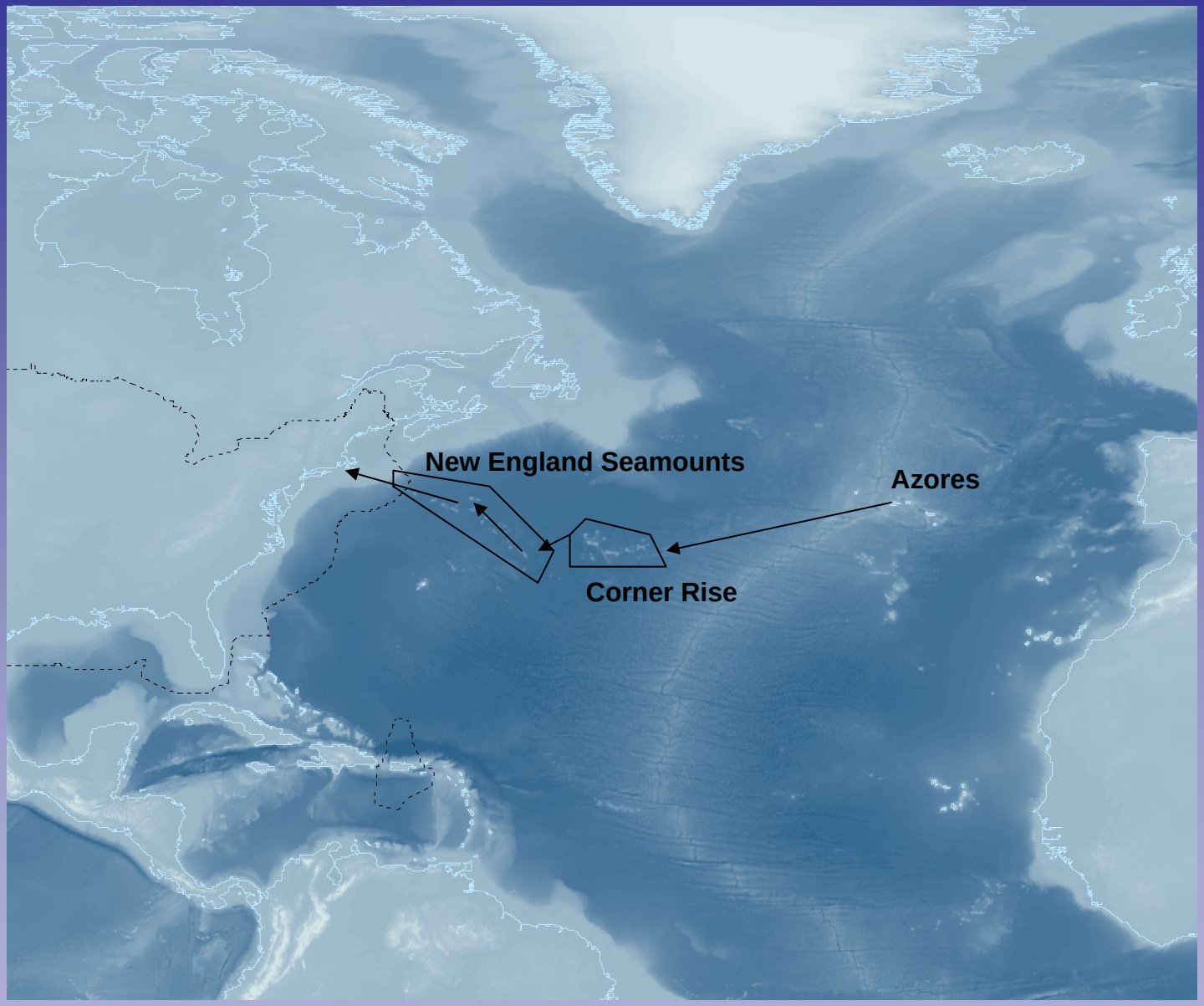
R/V Atlantis & DSV Alvin

Funded for three years by
NOAA Office of Ocean Exploration

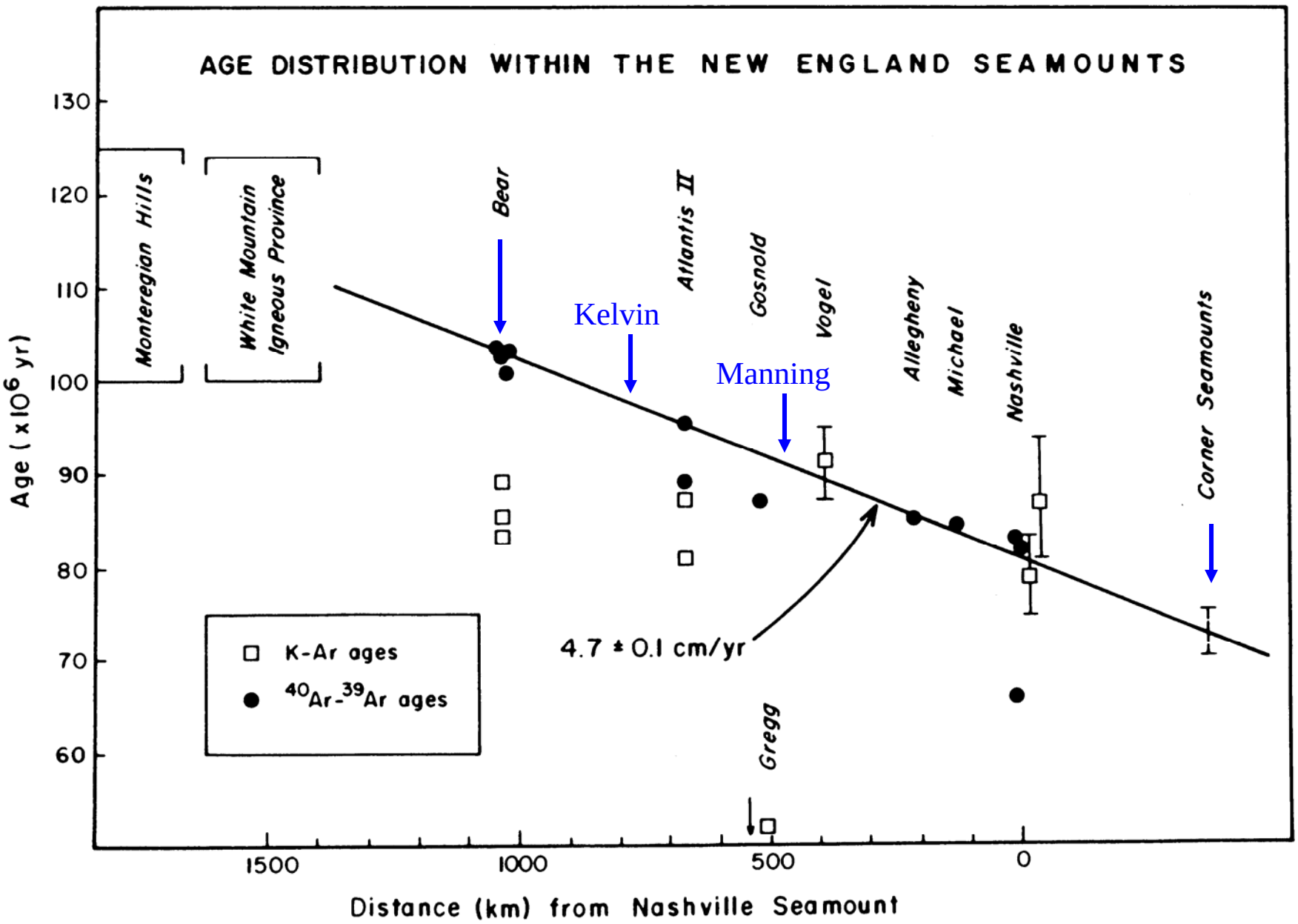
The Ship:
R/V Ronald H. Brown, 274 ft LOA

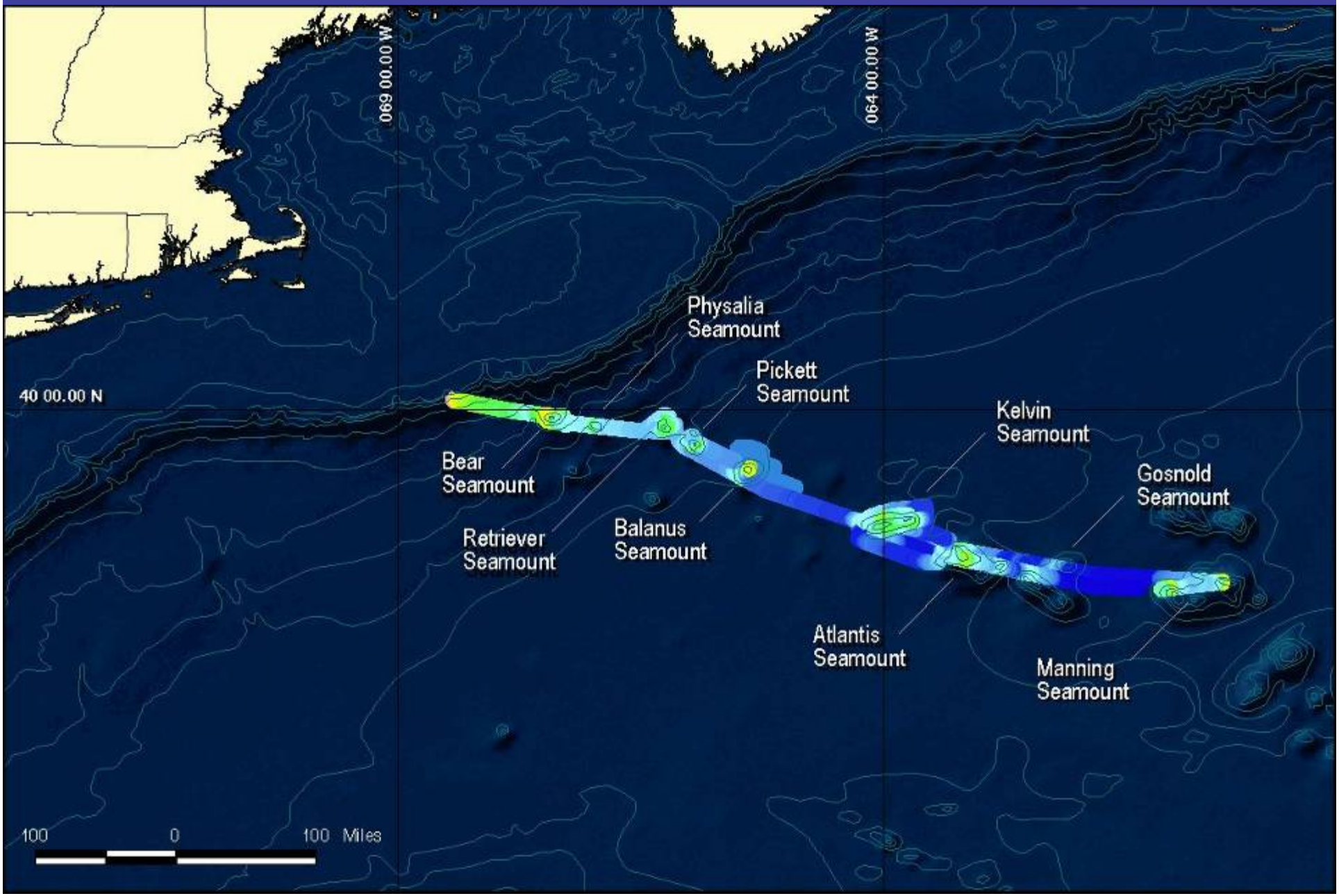
ROV System: Argus & Hercules
Operated by Institute for Exploration

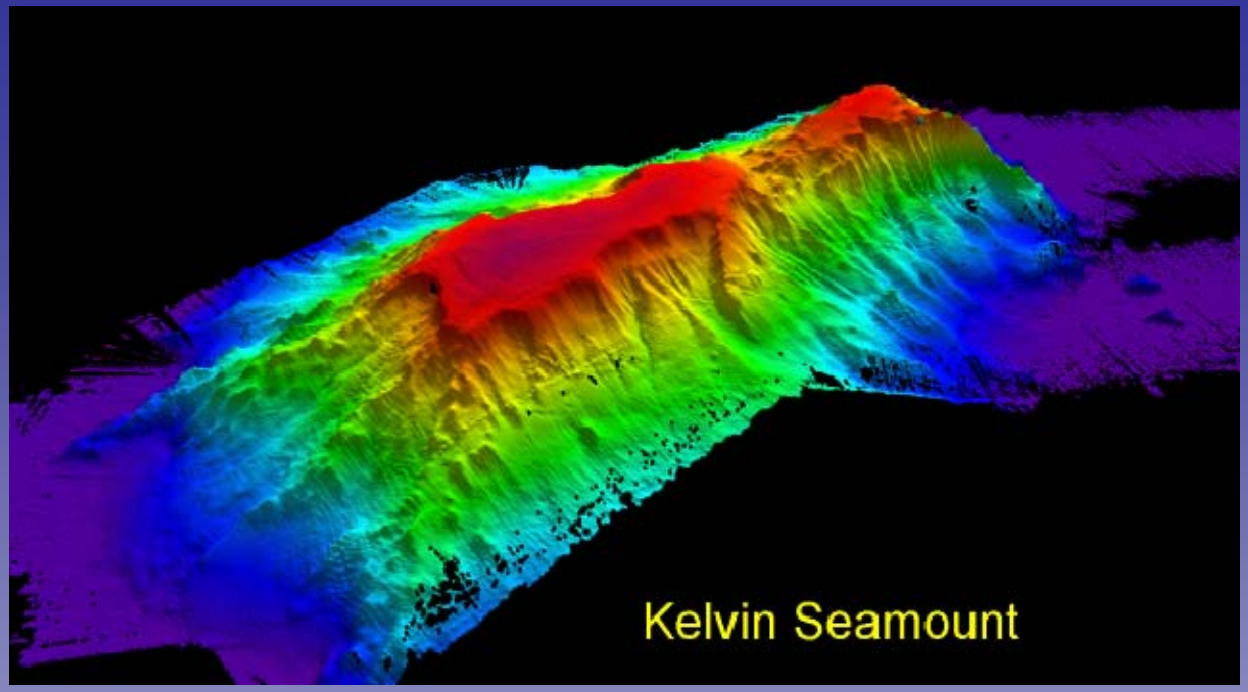
The New England Seamount Chain and Corner Rise Project

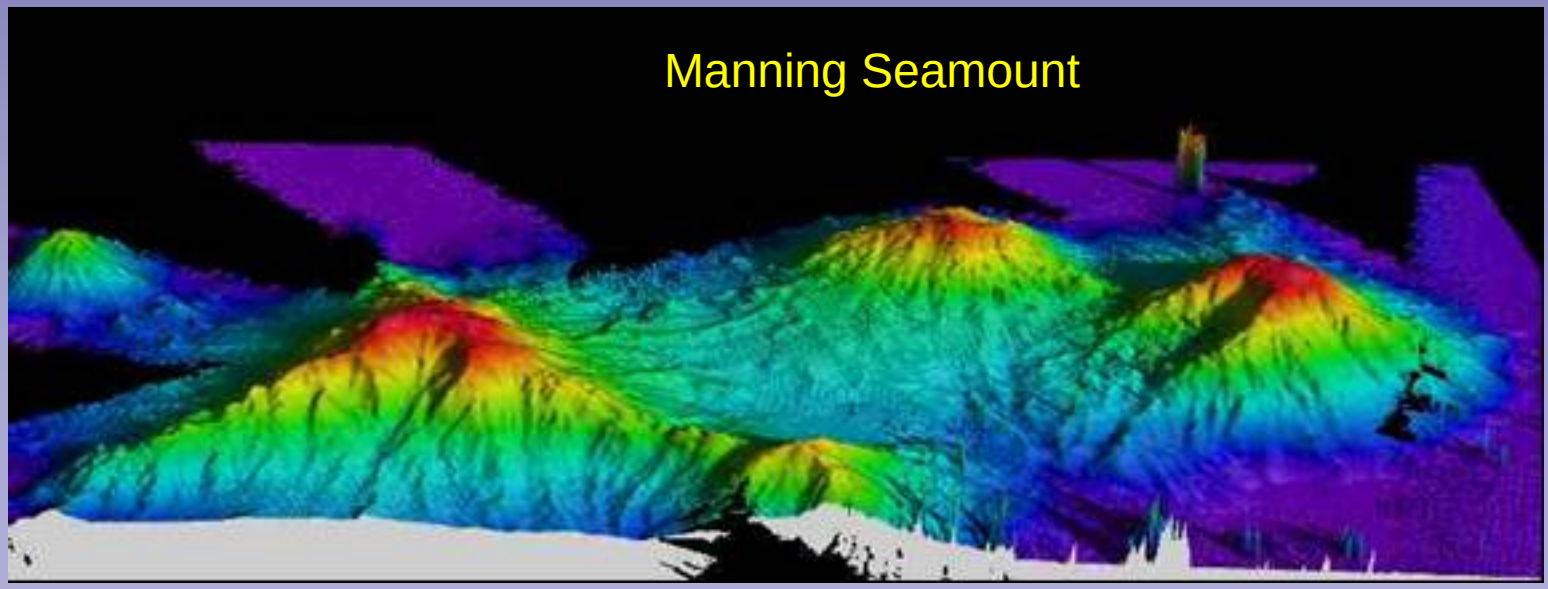


Total voyage length: 2300 nautical miles (not including multibeam mapping tracks)

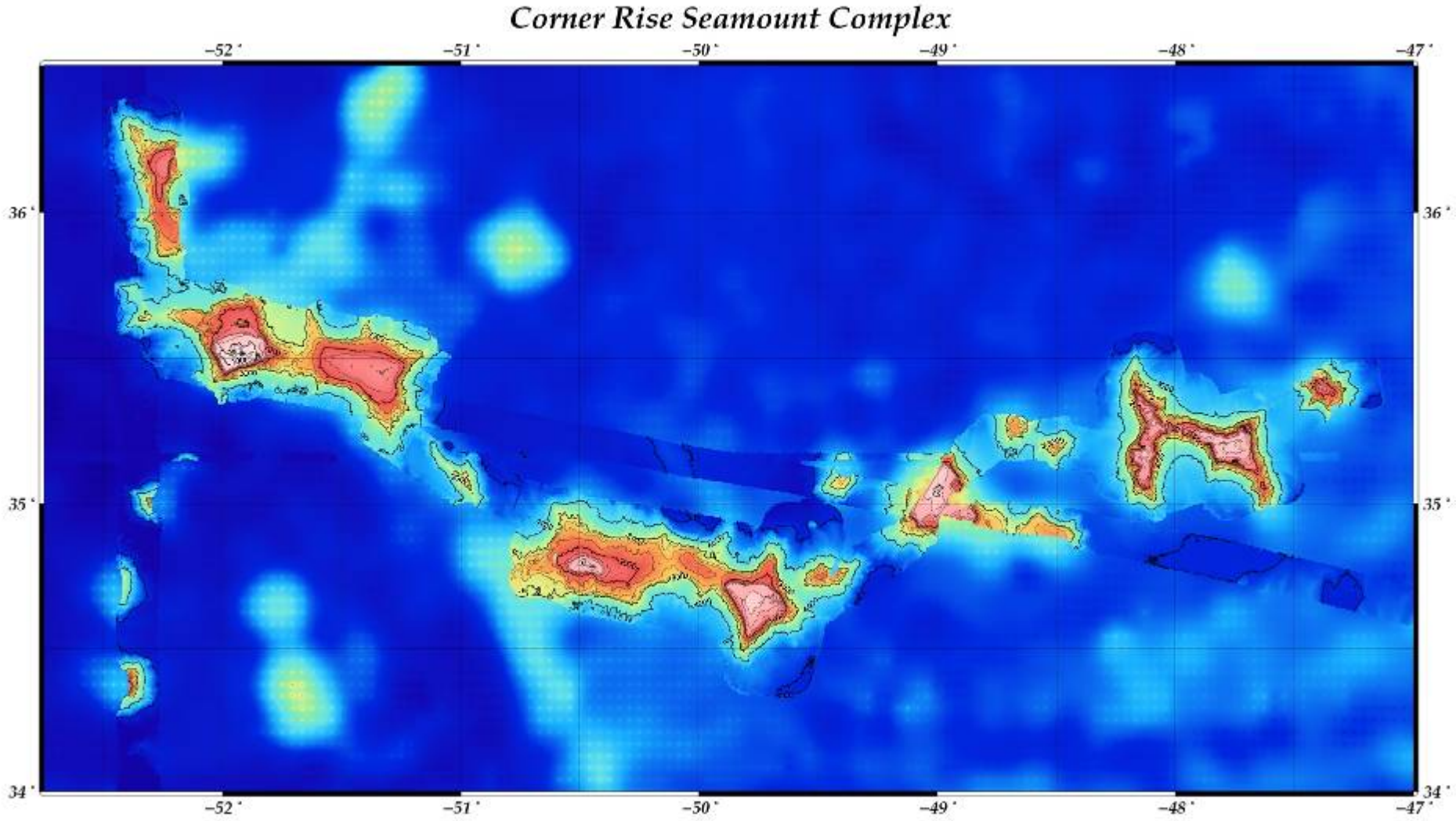

AGE DISTRIBUTION WITHIN THE NEW ENGLAND SEAMOUNTS
Age (x10^6 yr)
130
120
110
100
90
80
70
60
Monteregian Hills
White Mountain Igneous Province
Bear
Atlantis II
Gosnold
Vogel
Allegheny
Michael
Nashville
Corner Seamounts
Kelvin
Manning
4.7 ± 0.1 cm/yr
Gregg
K-Ar ages
40Ar-39Ar ages
1500
1000
500
0
Distance (km) from Nashville Seamount


069 00.00 W
064 00.00 W
40 00.00 N
Physalia Seamount
Pickett Seamount
Kelvin Seamount
Gosnold Seamount
Bear Seamount
Retriever Seamount
Balanus Seamount
Atlantis Seamount
Manning Seamount
100 0 100 Miles


Kelvin Seamount


Manning Seamount

Details of 13 seamounts revealed from 8000 km^2 of multibeam survey.
Only 1 seamount previously named; we are proposing names for all others



New England and Corner Rise Dives 2003-2005

15 seamounts; 52 dives; >500 hours bottom time

	Number of dives		
	2003	2004	2005
Bear Smt	3	2	
Retriever Smt		2	
Picket Smt			4
Balanus Smt		1	3
Kelvin Smt	2	4	1
Gregg Smt	1		
Manning Smt	6	3	1
Rehoboth Smt			2
Nashville Smt			2
Muir Smt	6		
Kukenthal Peak			2
Goode Peak			1
Verrill Peak			2
Milne-Edwards Peak			1
Lyman			3
Total Dives per Year	18	12	22

Cruise Objectives from all Projects

1. Collect octocorals and antipatharians for taxonomy using morphology and molecular genetics.

2. Collect invertebrate symbionts for taxonomy and molecular genetic studies.

3. Videotape fish and invertebrates for habitat relationships.

4. Collect selected octocorals for analysis of ages and growth.

5. Study recruitment of octocorals using settlement blocks.

6. Collect octocorals for studies of reproductive morphology and fecundity.

7. Collect fossil scleractinians for analyses of past ocean climate.

Types of Associations

1. Facultative (Casual): substrate dwellers settle on any available substrate

2. Obligate (Symbiosis): require the presence of gorgonian, e.g., for food (by improving position in water) or shelter

Commensal: the gorgonian host receives no benefit from the species living with it; no metabolic dependence on the gorgonian

(epizoites, inquilines)

Parasitism (including micro-predation): parts of the gorgonian are eaten by other species; metabolic dependence on host

Mutualism: both the gorgonian and the associated species benefit; metabolic interdependence (no known case in cold water), possibly defence

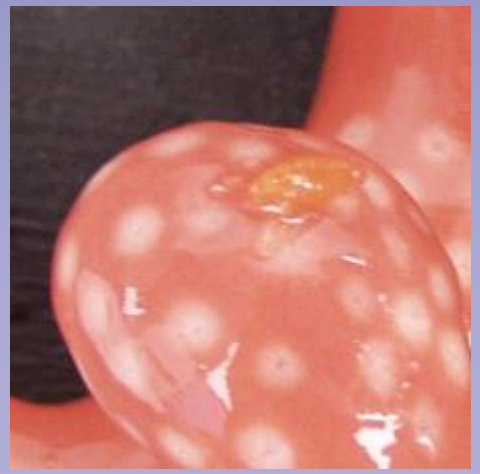
Overview of known associations of warm and cold water gorgonians

1. Only a few invertebrate phyla are represented, predominantly crustaceans, polychaetes, and echinoderms.

2. Within a phylum, only selected families are represented.

   Examples include scale worms and syllids, 3 of 60-70 polychaete families, 6 of 17 brittle star families

3. Associates of cold and warm water gorgonians may differ at the family level.



Major Biogeographic Patterns of Atlantic Octocorals

1. “Global 2000m Highway”; not quite world-wide fauna

2. Basin Edge, i.e., continental slope fauna

3. Deep low latitude fauna; “Deep Gulf Stream Driven”

4. Eastern Atlantic and Seamount fauna

5. New England or Corner Rise endemics