

From the Arctic to the Tropics:

The U.S. UNCLOS Bathymetric Mapping Program

James V. Gardner

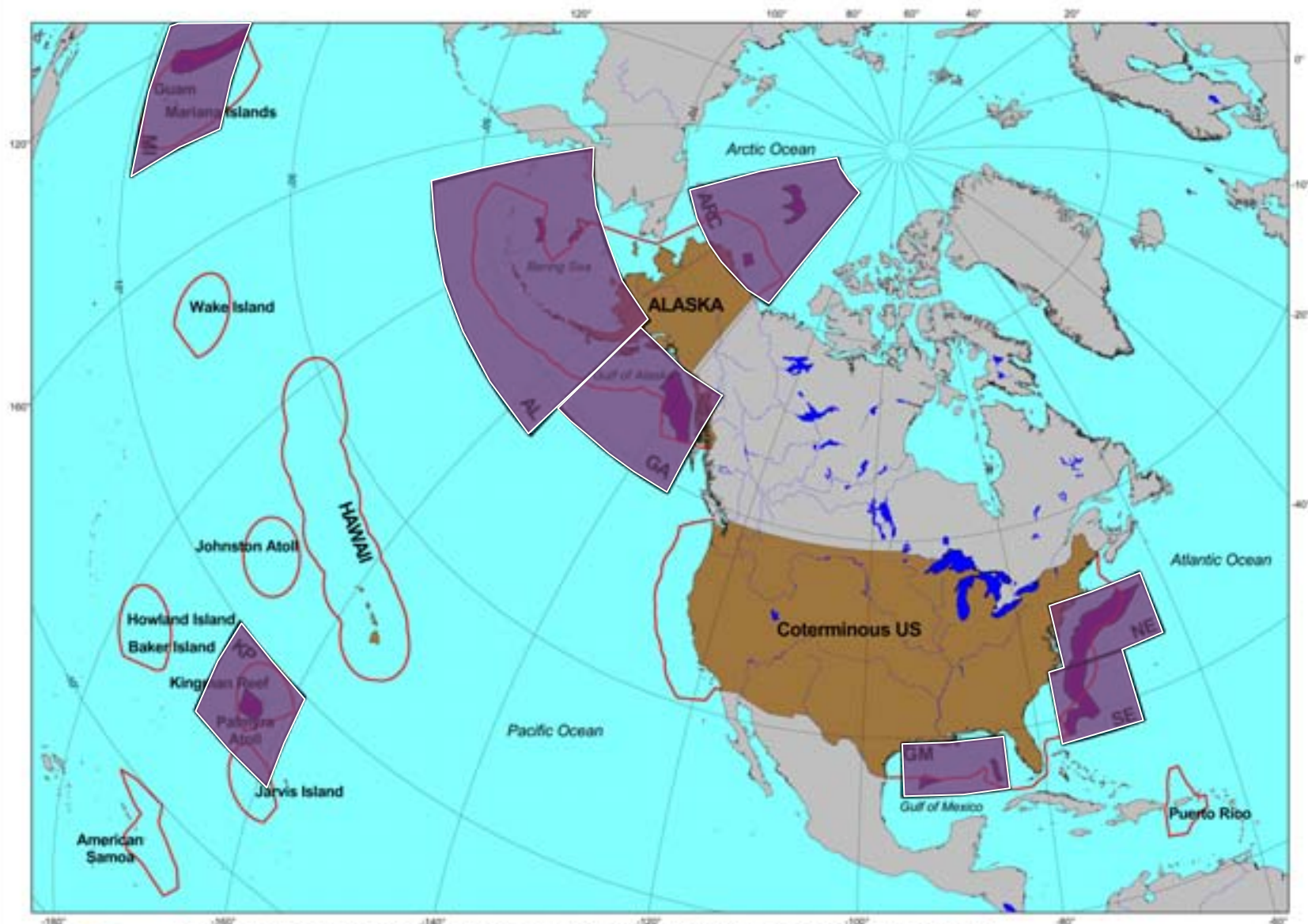
Larry A. Mayer

Andrew A. Armstrong

Center for Coastal and Ocean Mapping

Joint Hydrographic Center

University of New Hampshire



US EEZ

area of interest



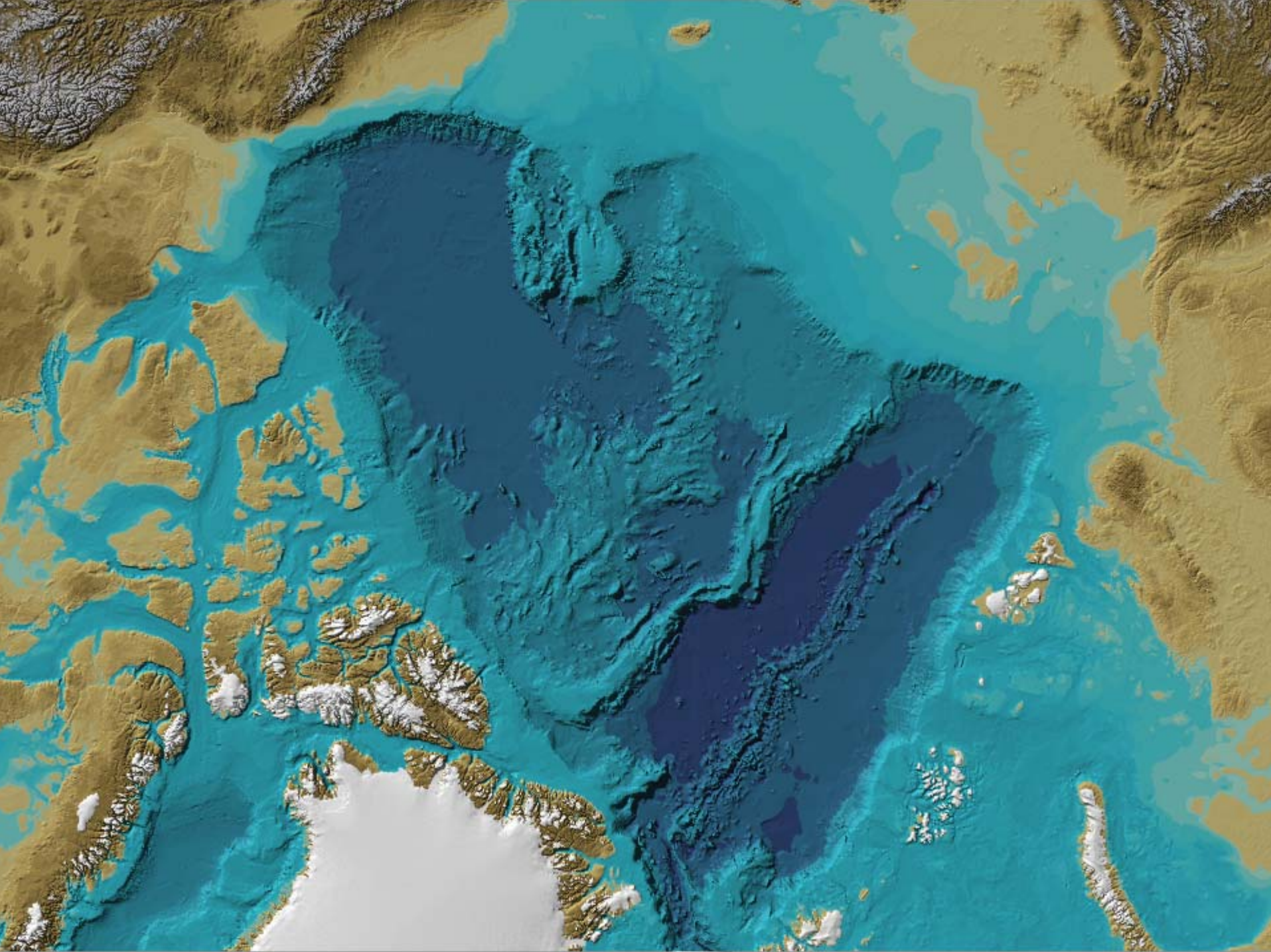
U.S Coast Guard Cutter Healy

L3 SeaBeam 2112 Multibeam Sonar Bathymetry and Backscatter

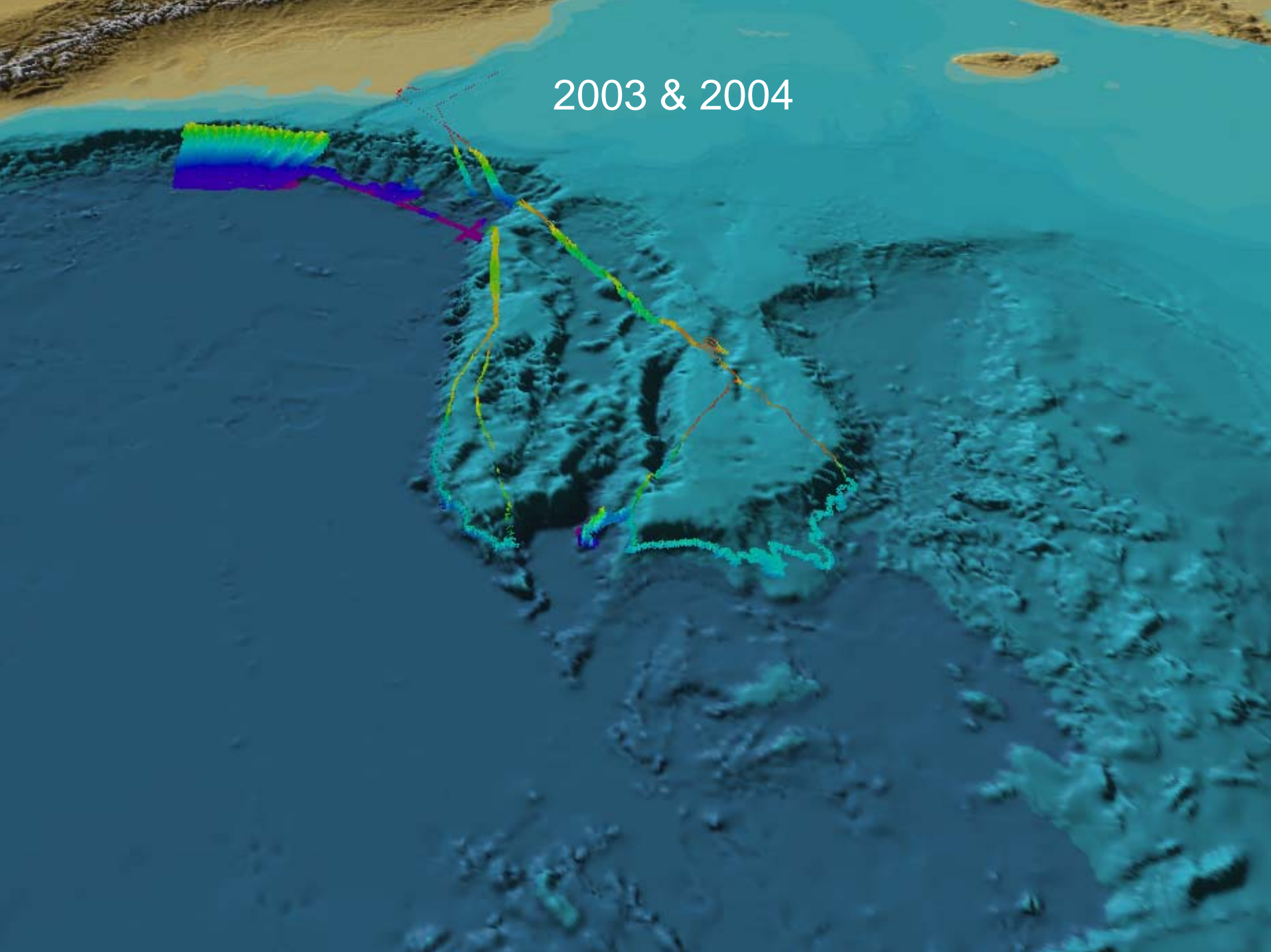
Knudsen 320 B/R sub bottom profiler

Data Acquisition and Processing by CCOM/JHC

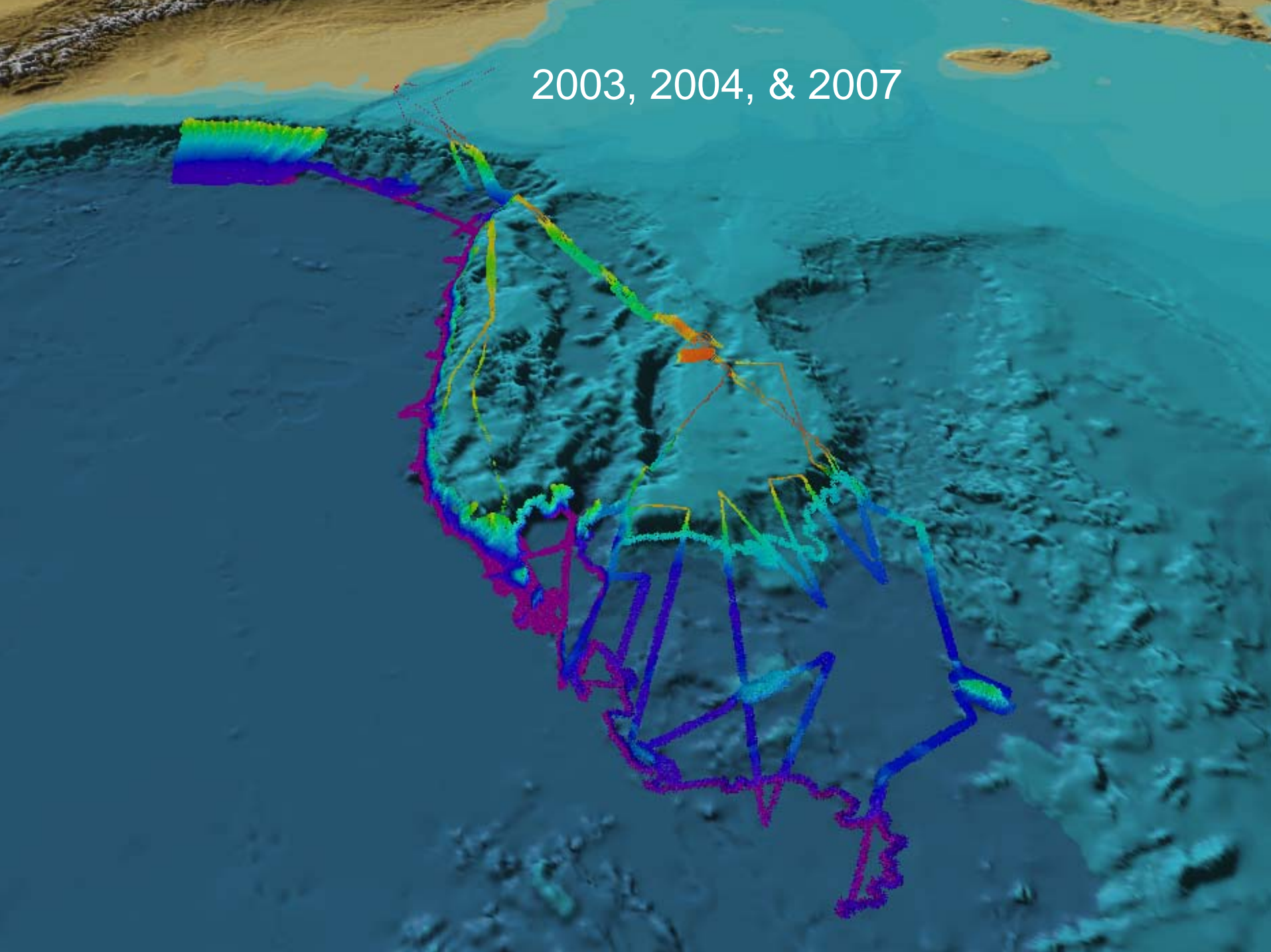




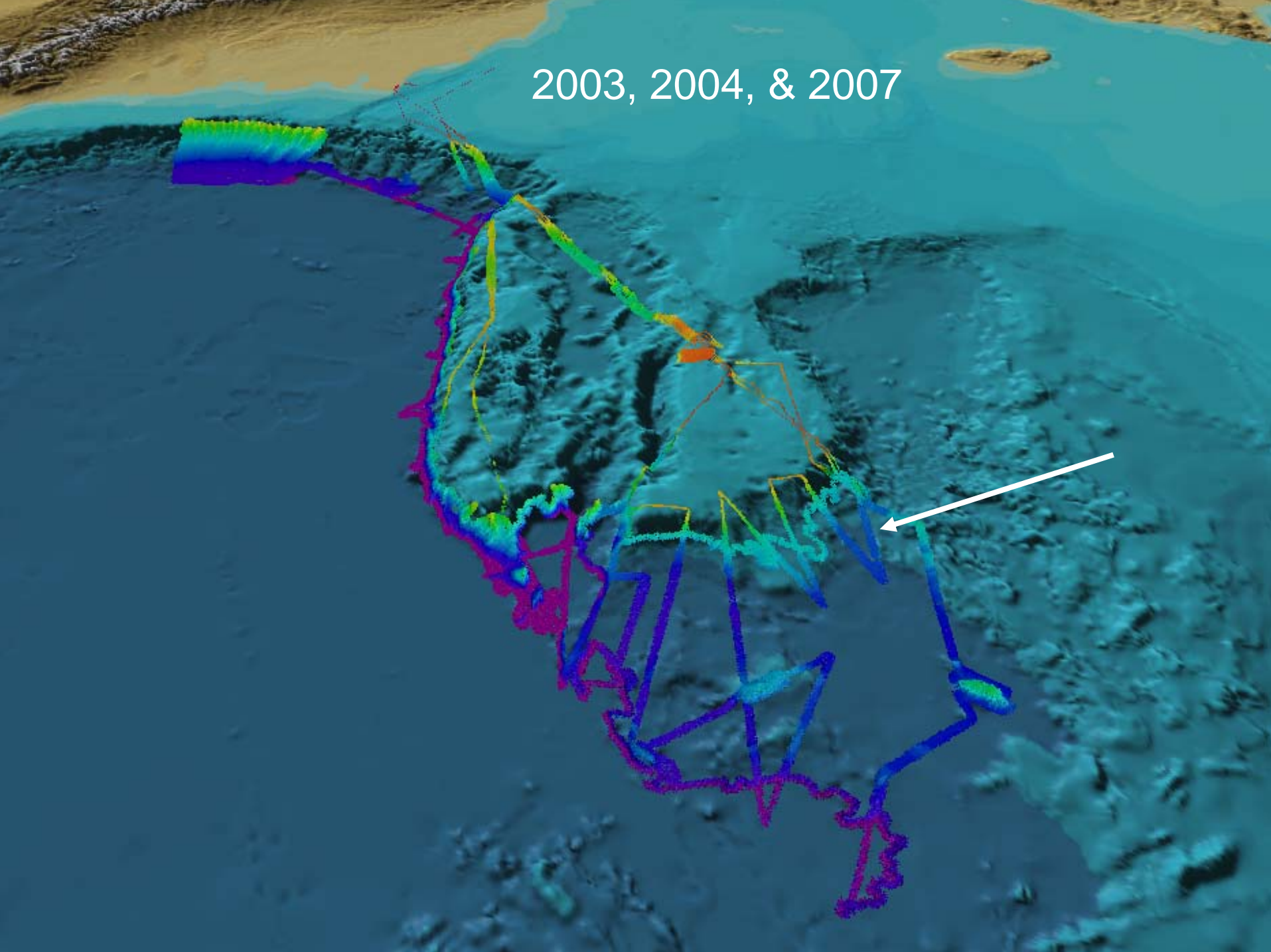
2003 & 2004



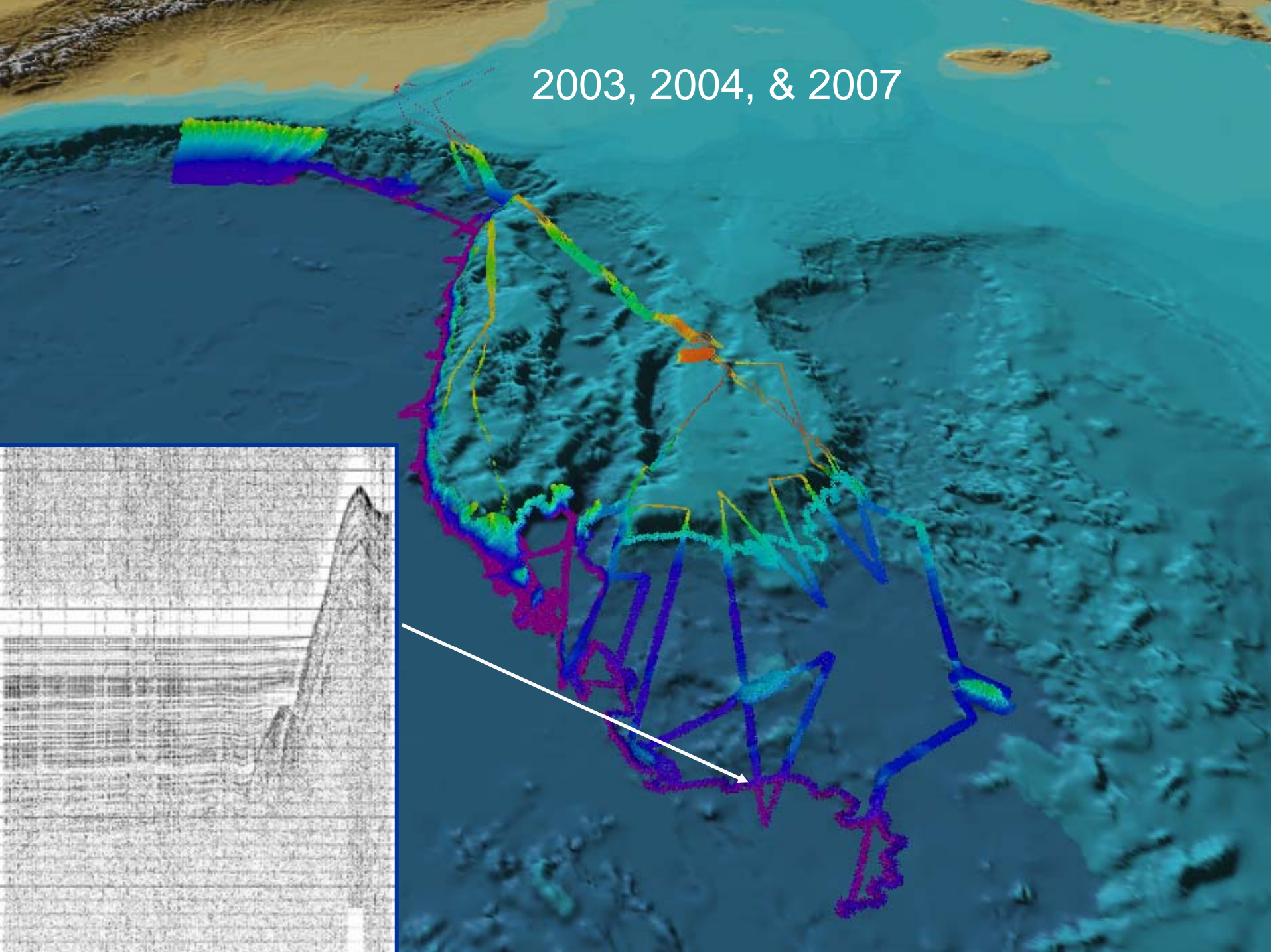
2003, 2004, & 2007



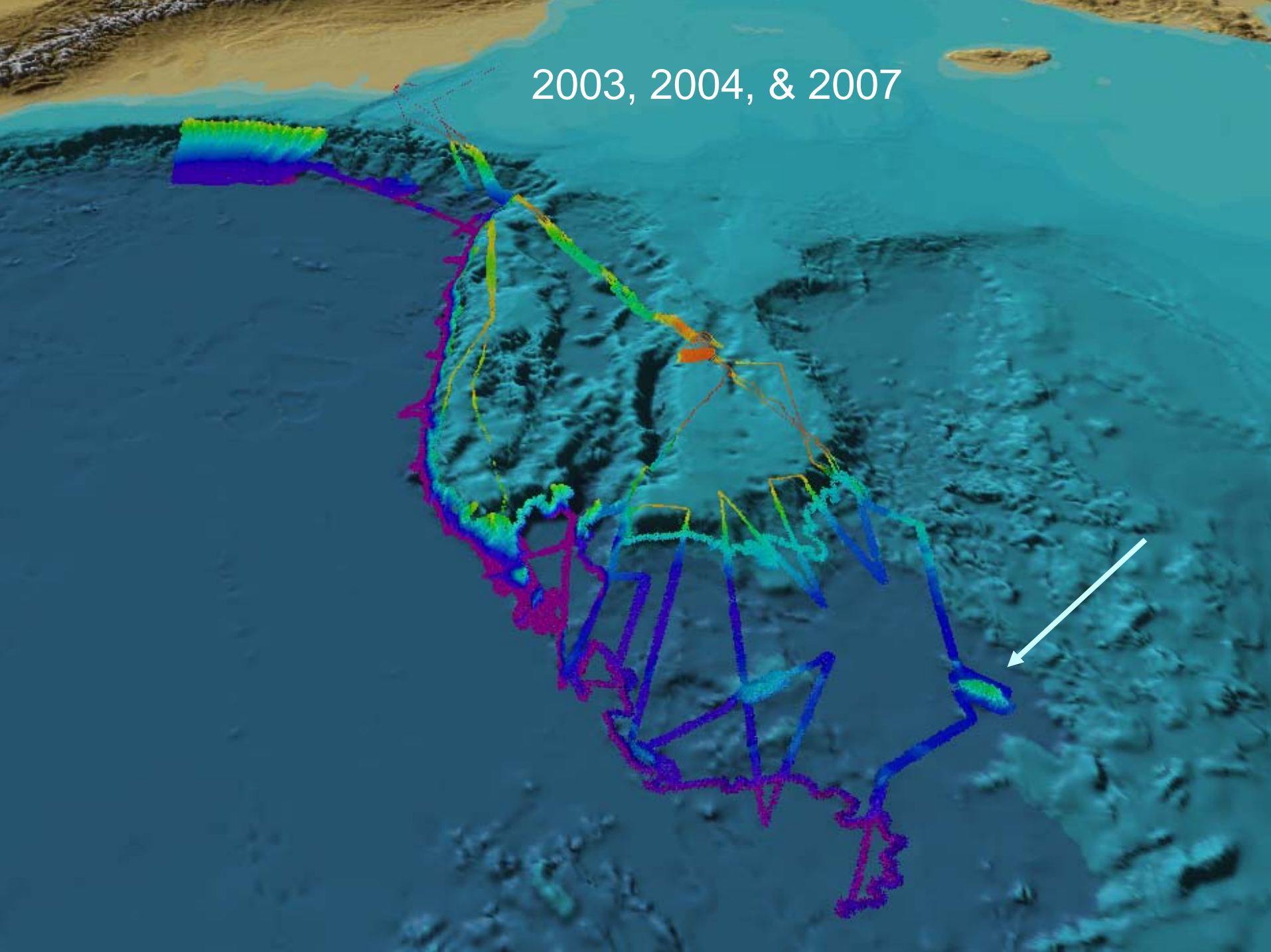
2003, 2004, & 2007

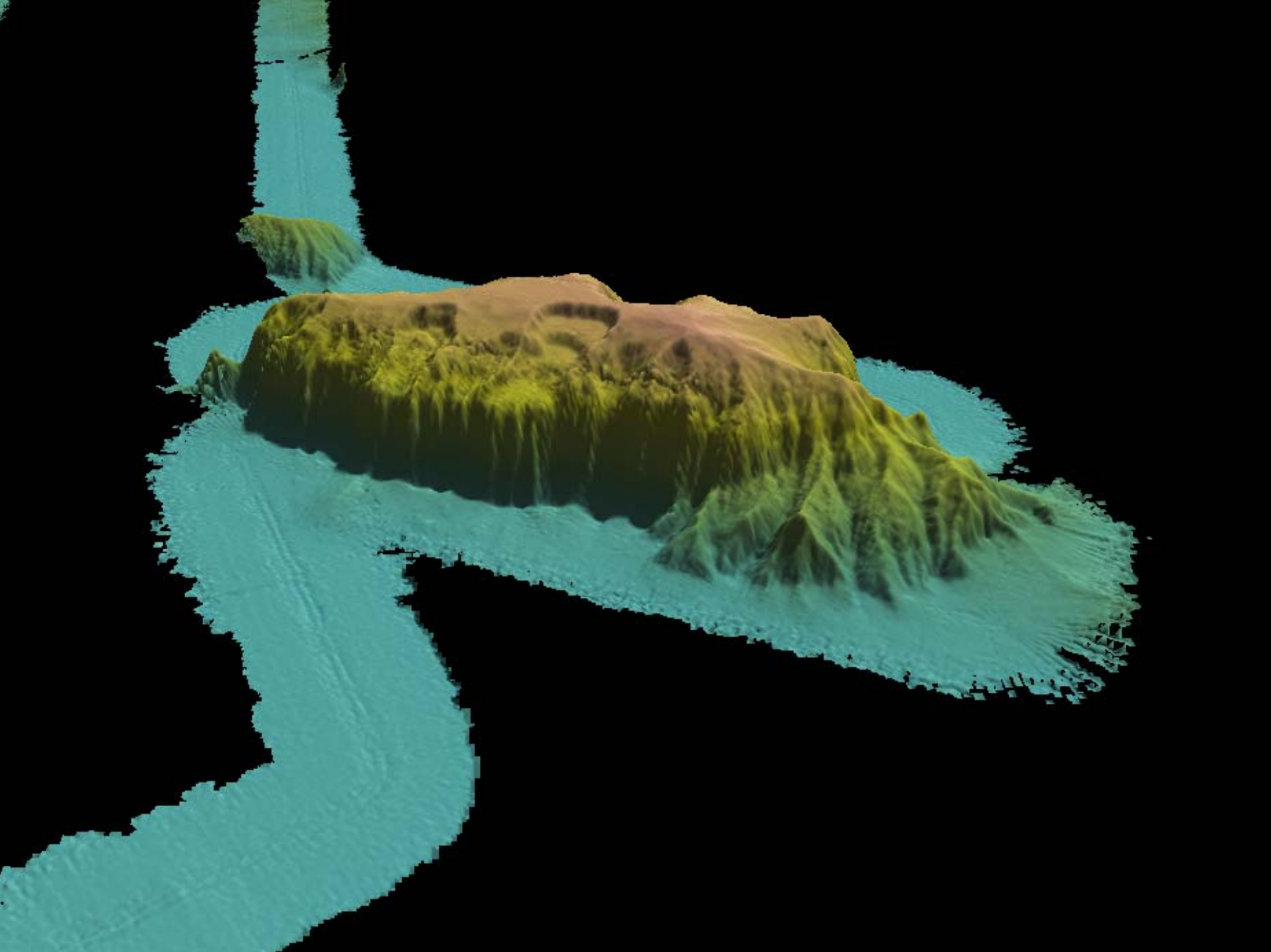


2003, 2004, & 2007

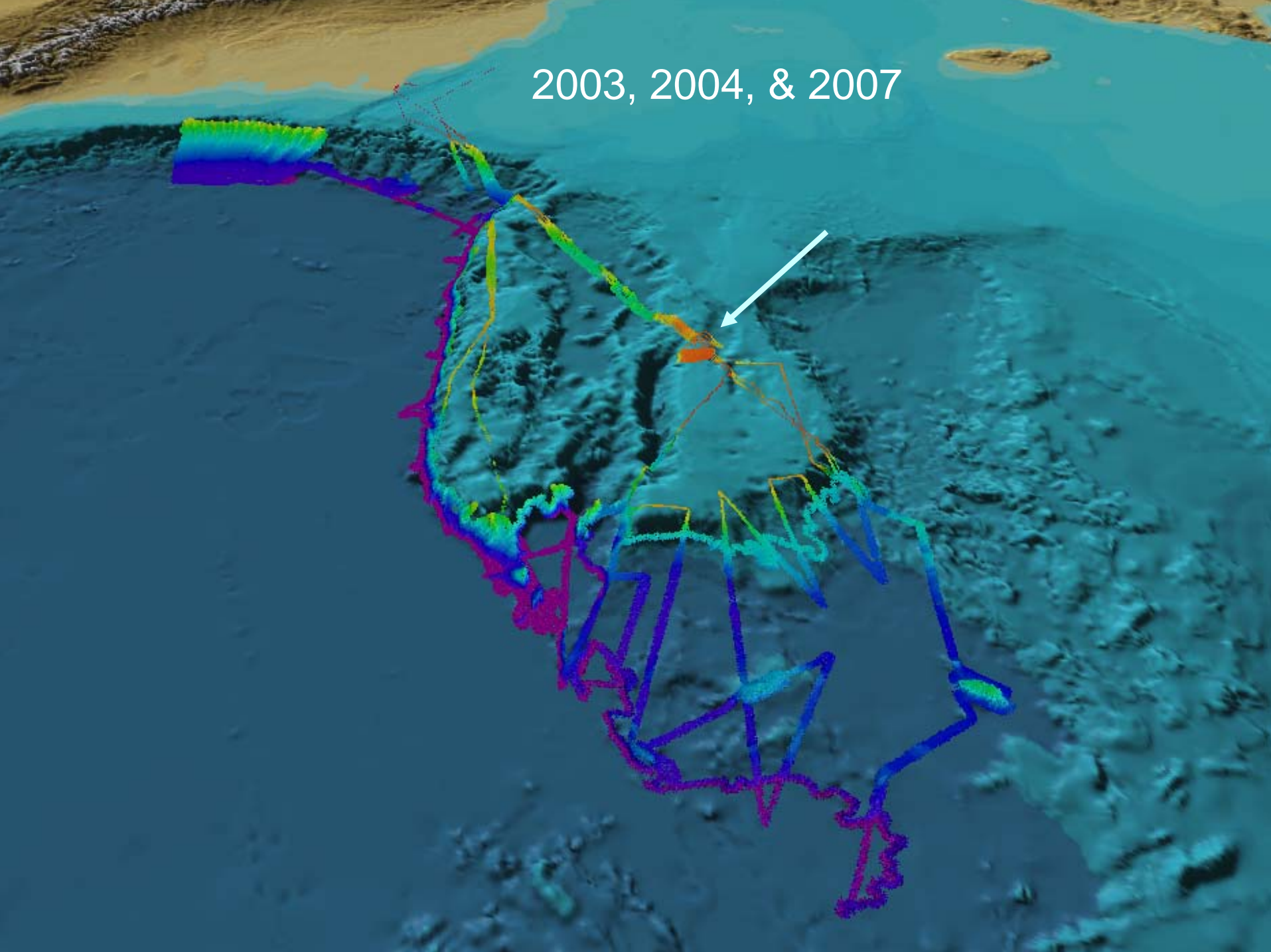


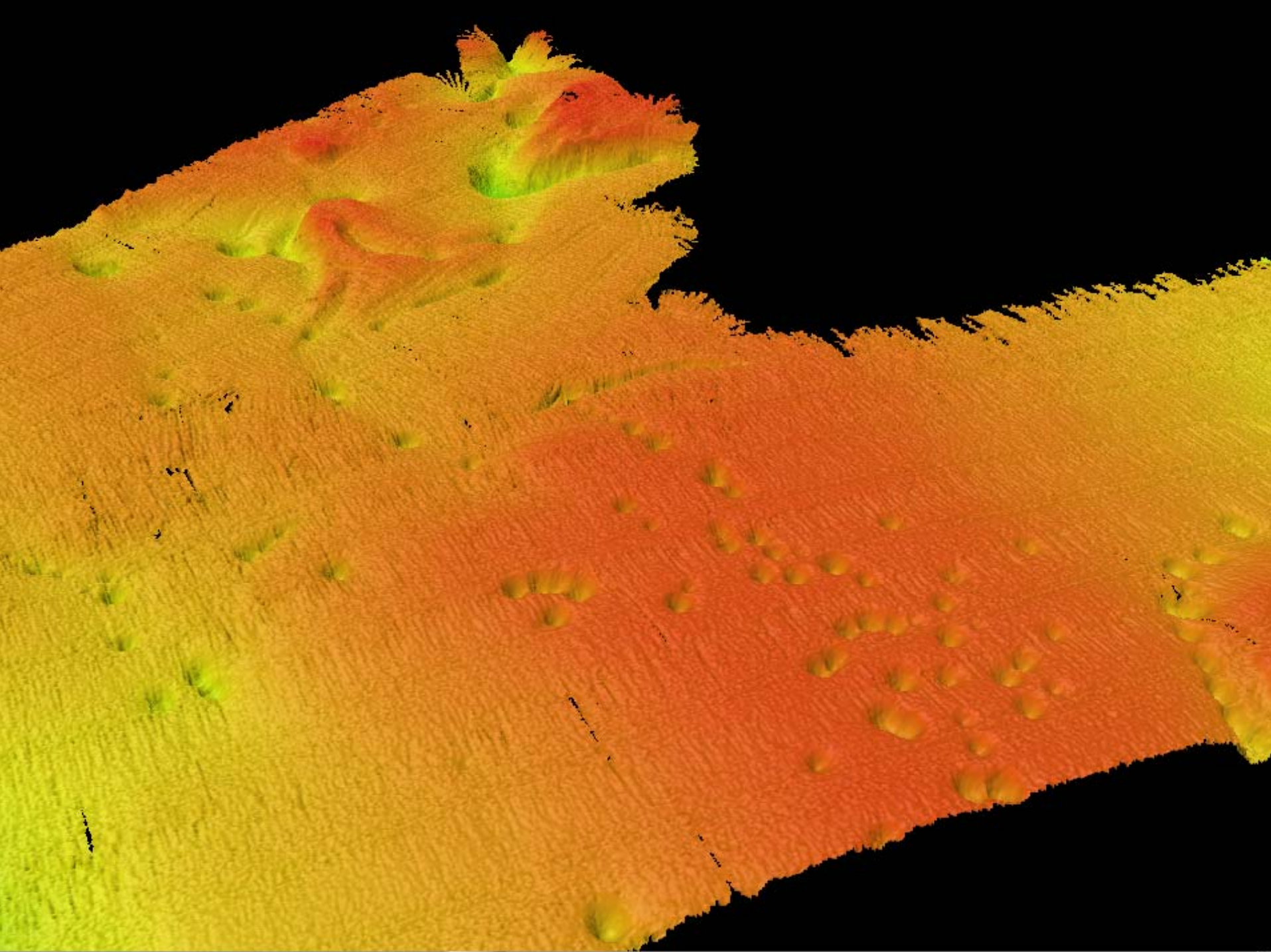
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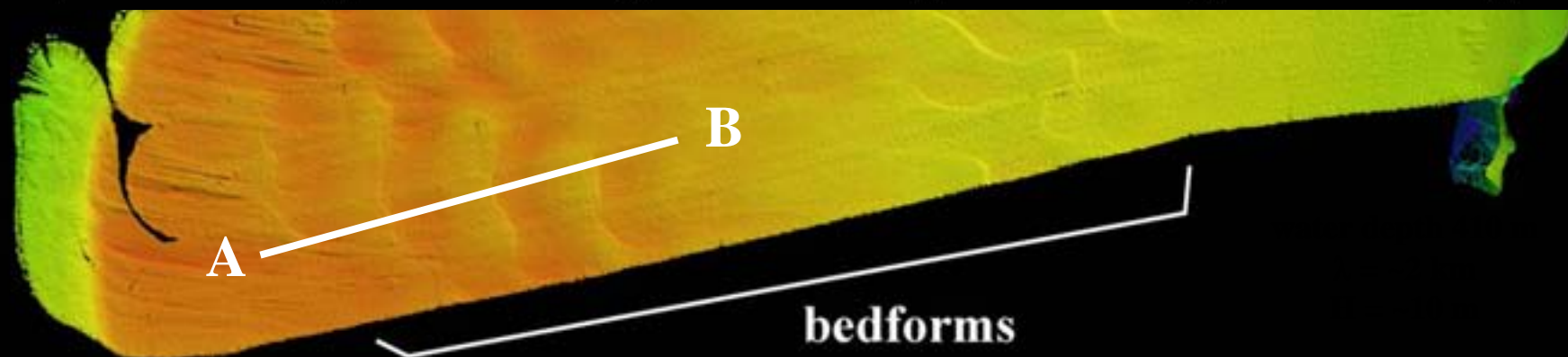
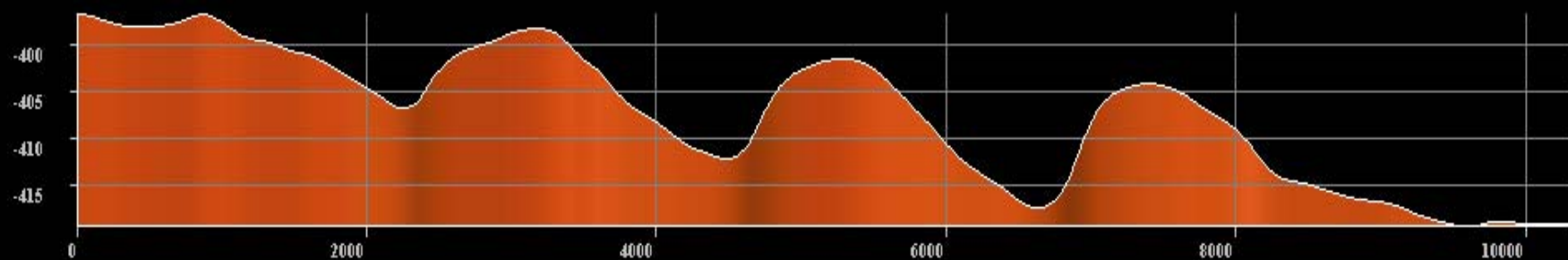
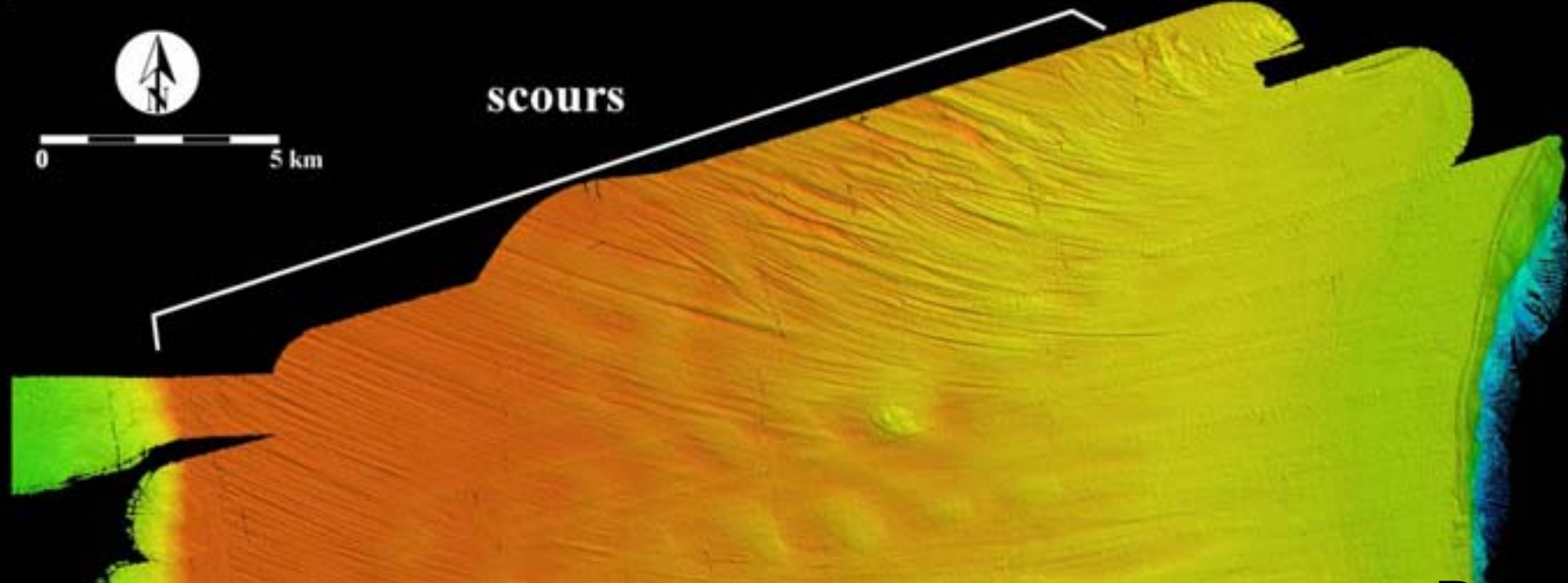




2003, 2004, & 2007

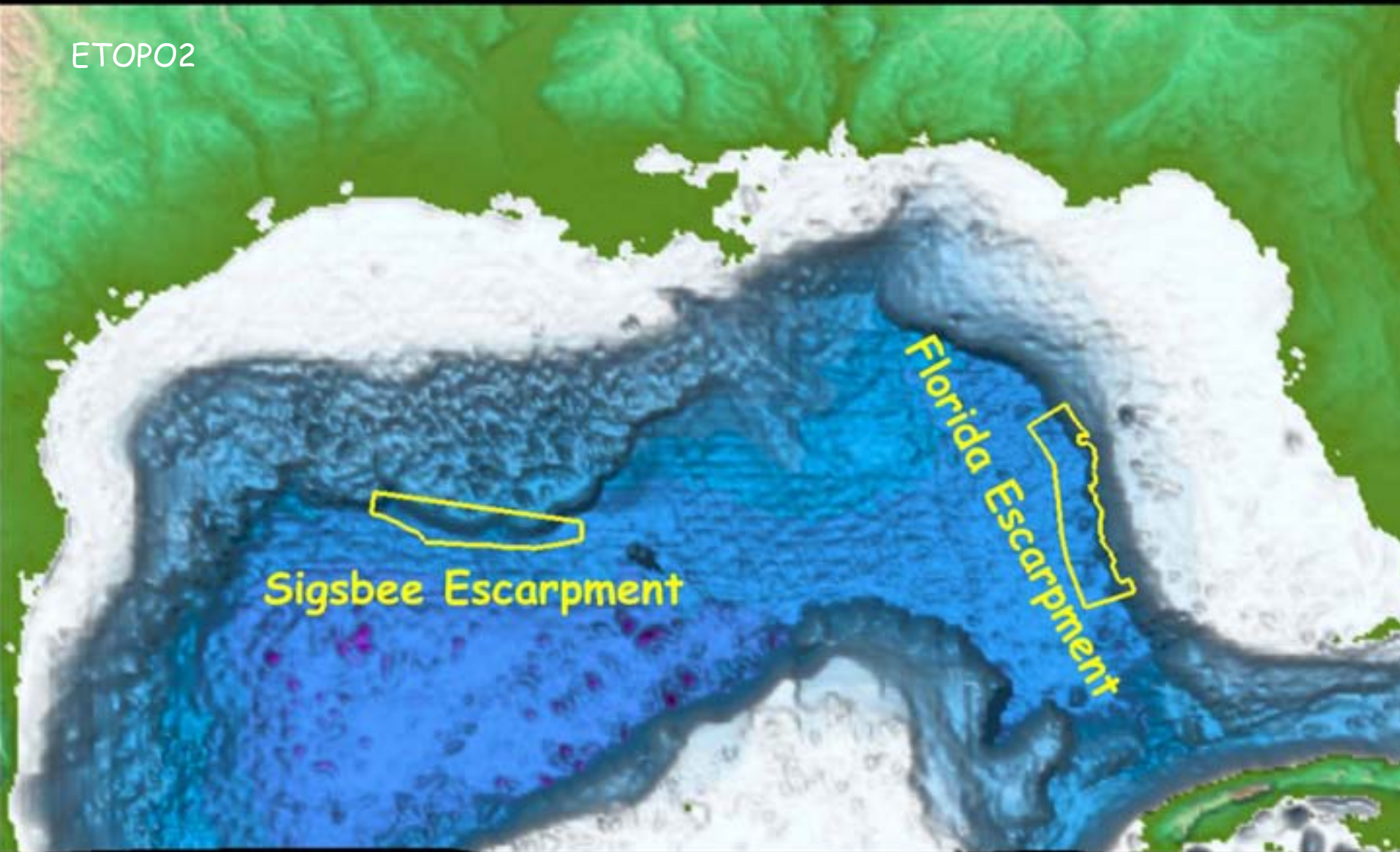






U.S. UNCLOS Gulf of Mexico bathymetric mapping

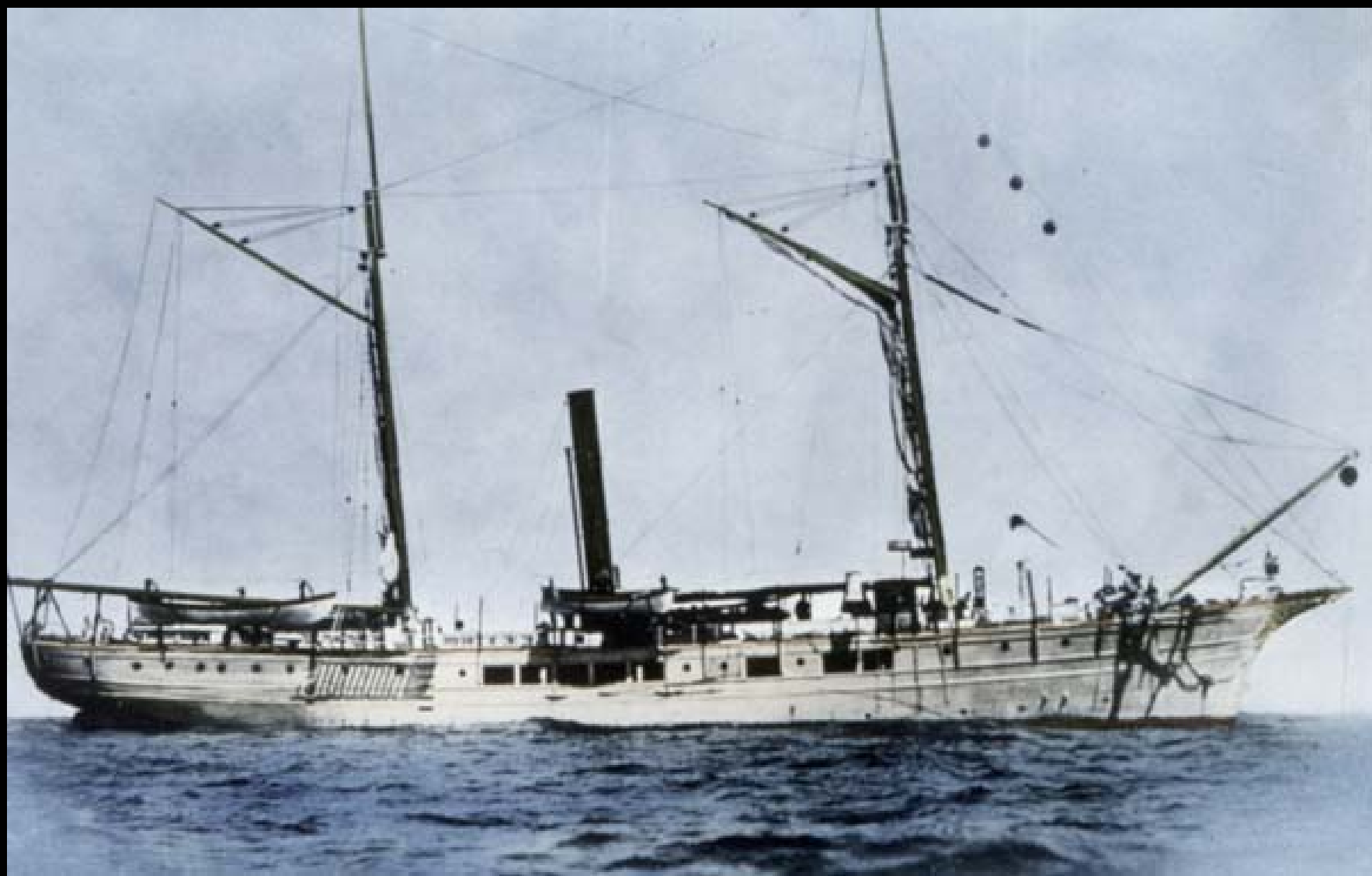
ETOPO2



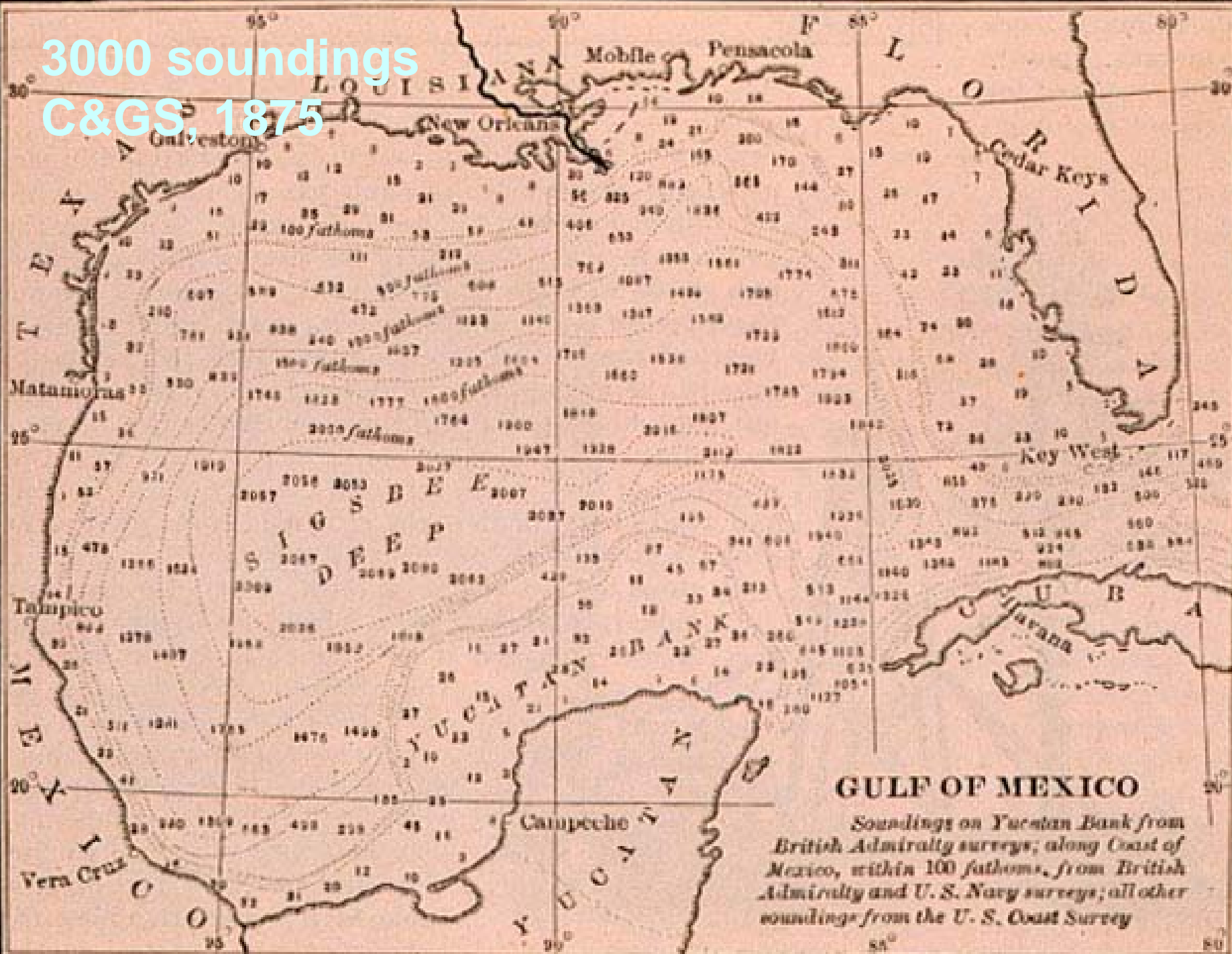
Charles D.
Sigsbee
(1845-1923)



Photo # NH 95096 Capt. C.D. Sigsbee



3000 soundings
C&GS, 1875



GULF OF MEXICO

Soundings on Yucatan Bank from British Admiralty surveys; along Coast of Mexico, within 100 fathoms, from British Admiralty and U. S. Navy surveys; all other soundings from the U. S. Coast Survey

R/V Northern Resolution

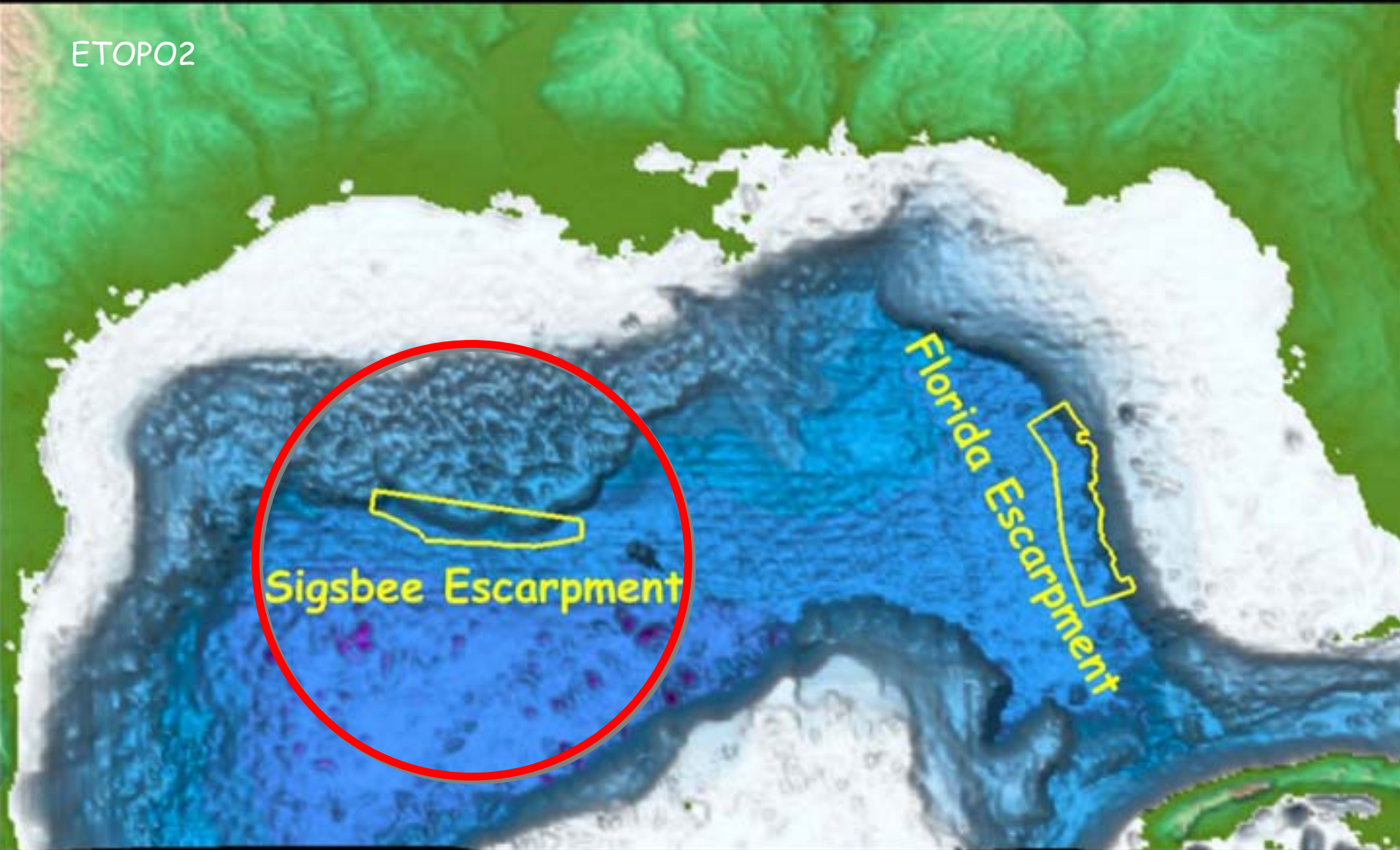


**Kongsberg Simrad EM120: 12 kHz, 191-1° x 2° beams
bathymetry &
full-time-series backscatter**

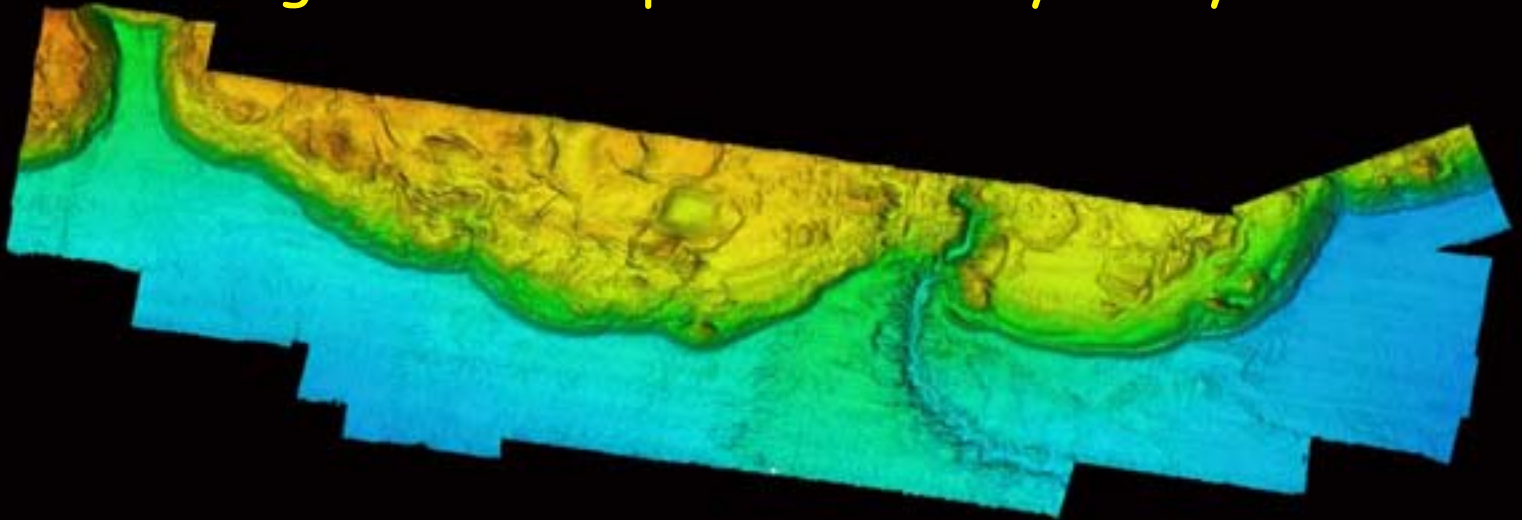
**C&C Technologies, Inc: data acquisition
UNH: bathymetry & backscatter processing**

U.S. UNCLOS Gulf of Mexico bathymetric mapping

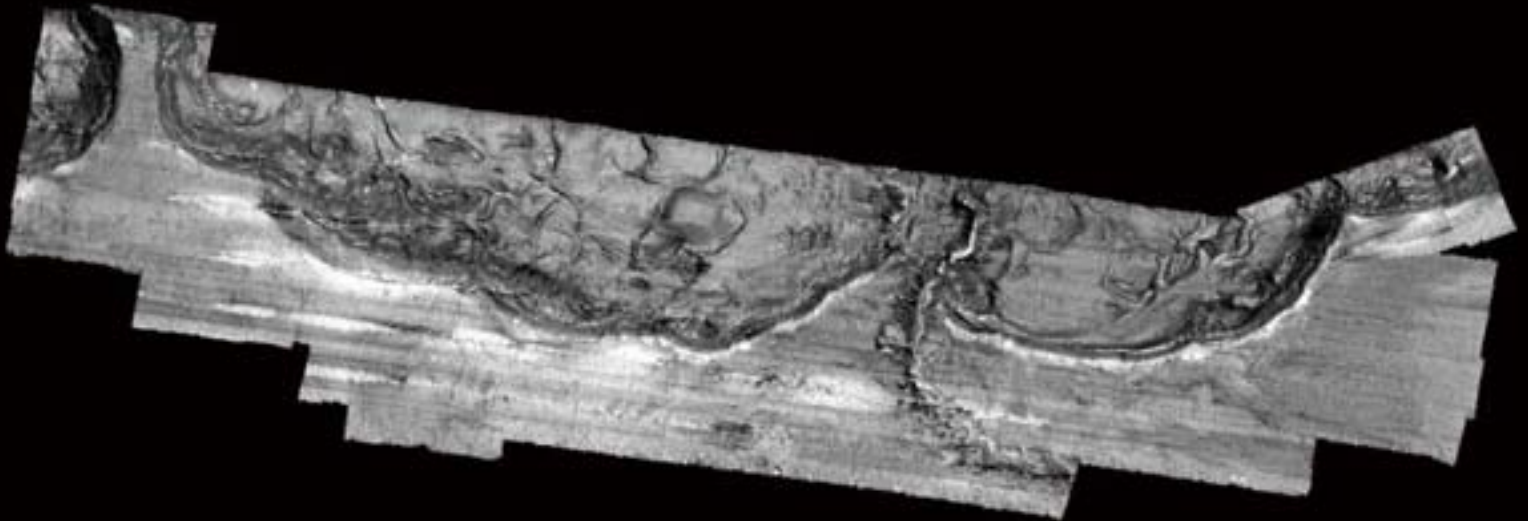
ETOPO2



Sigsbee Escarpment - bathymetry

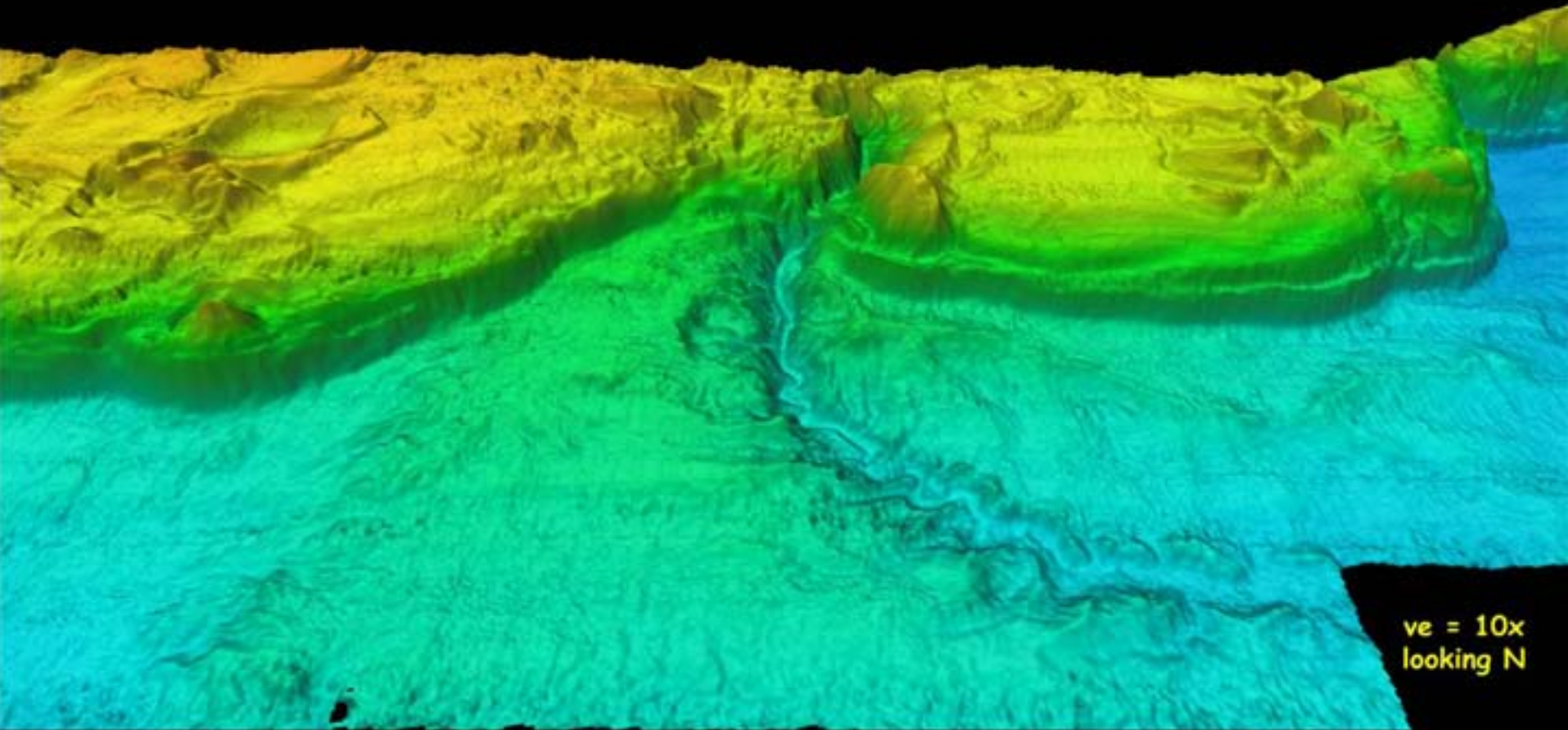


Sigsbee Escarpment - acoustic backscatter



Bryant Canyon and Fan

(>400 km³)



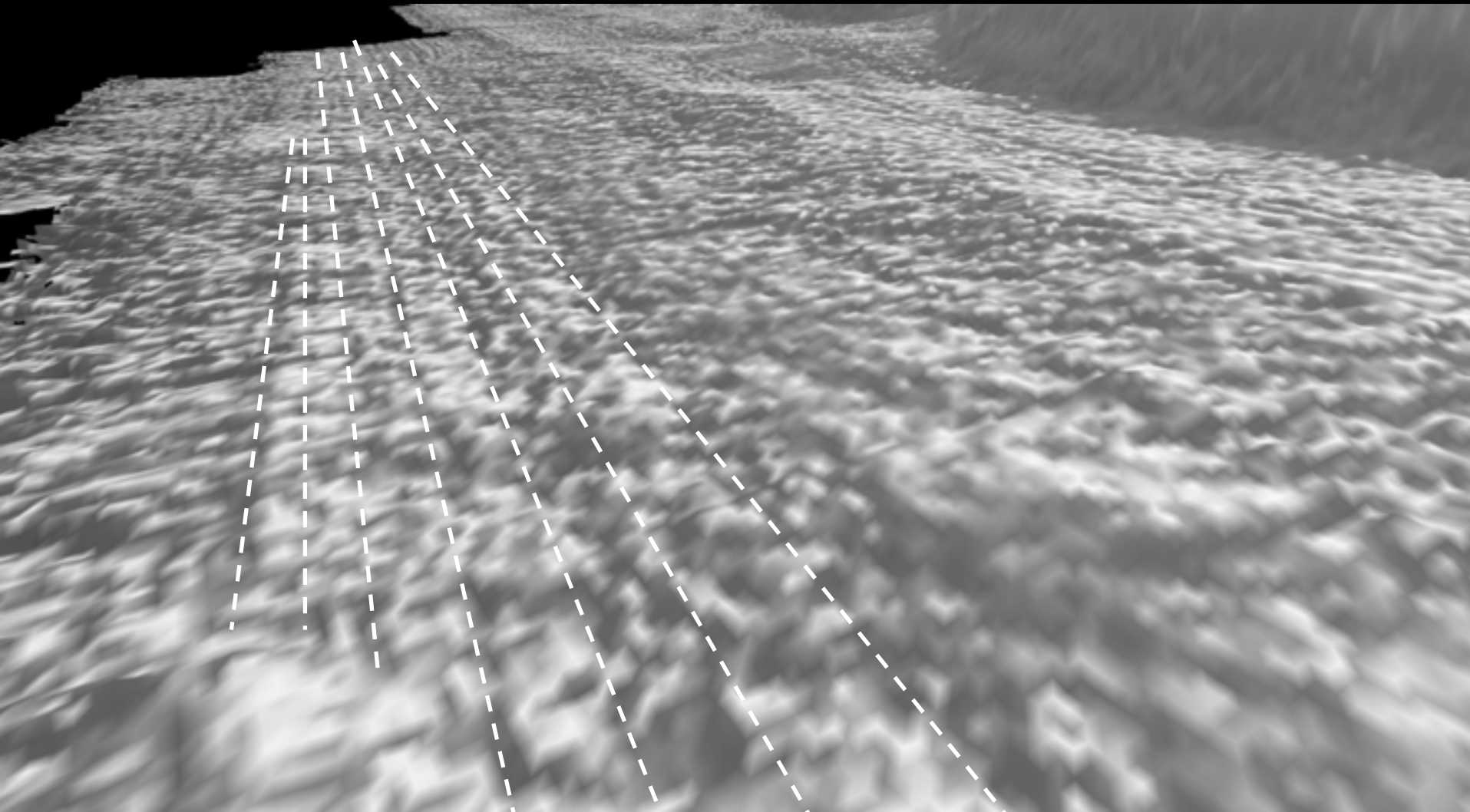
Sigsbee furrows - backscatter

(ve=10x, looking N)



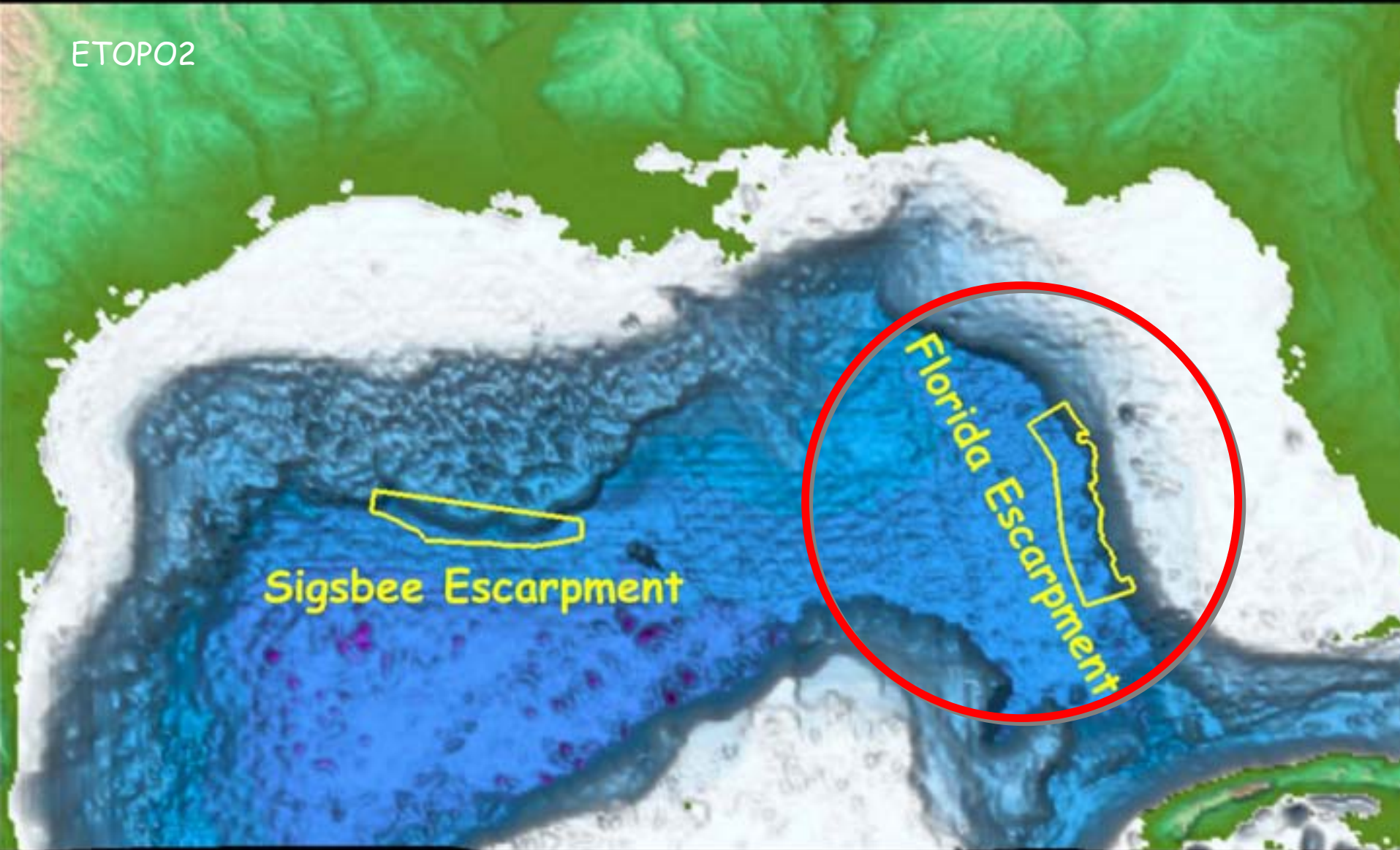
Sigsbee furrows - bathymetry

(ve=10x, looking N)

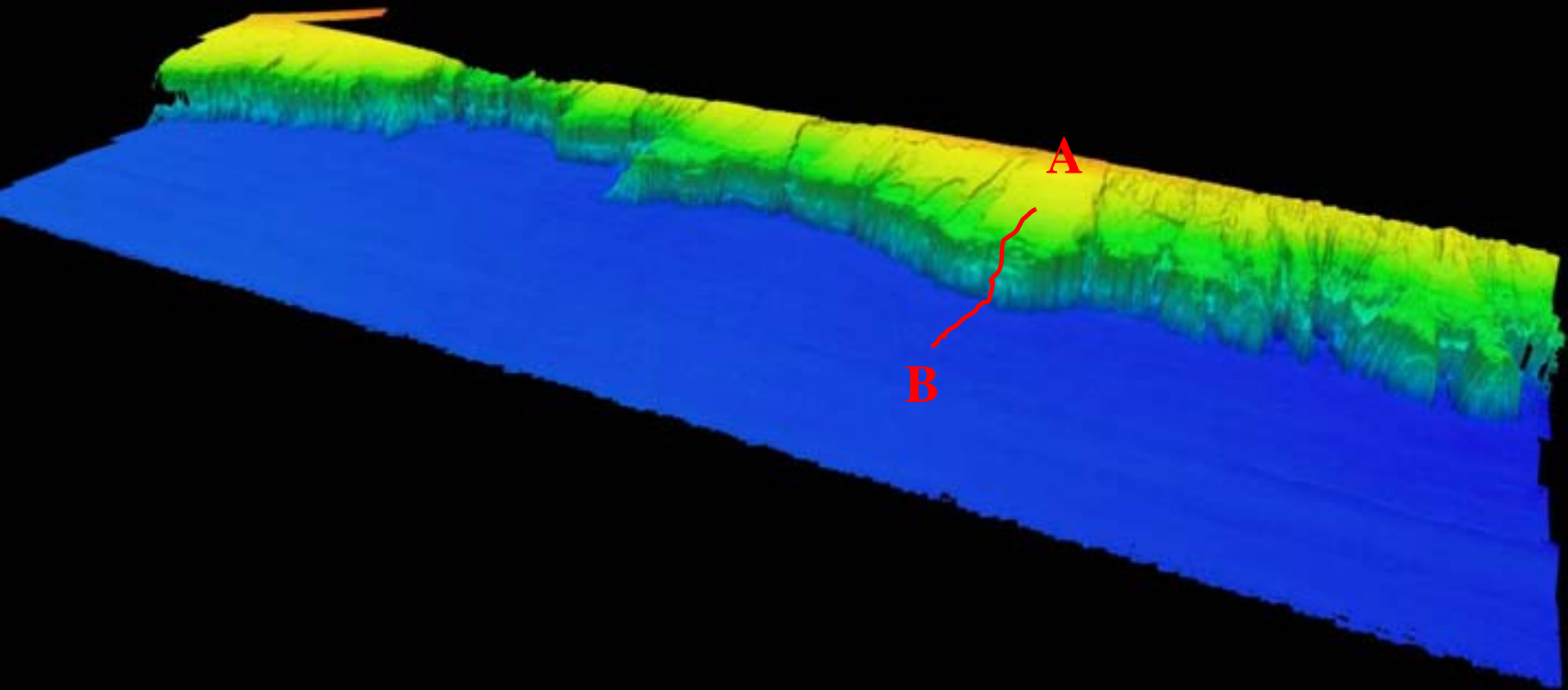


U.S. UNCLOS Gulf of Mexico bathymetric mapping

ETOPO2

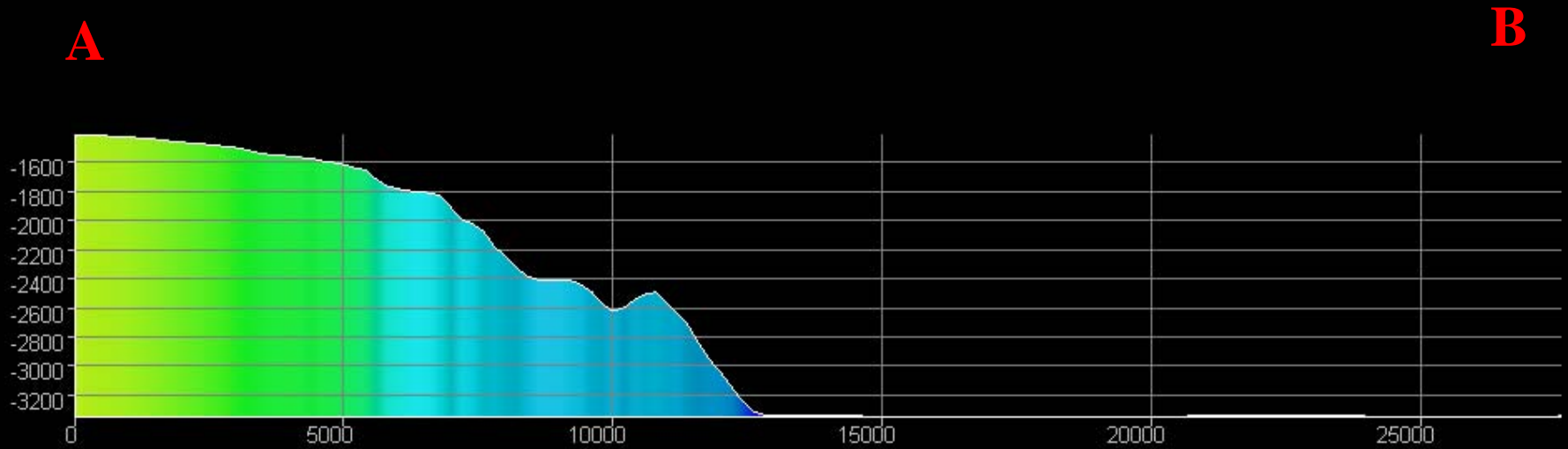


Florida Escarpment – bathymetry

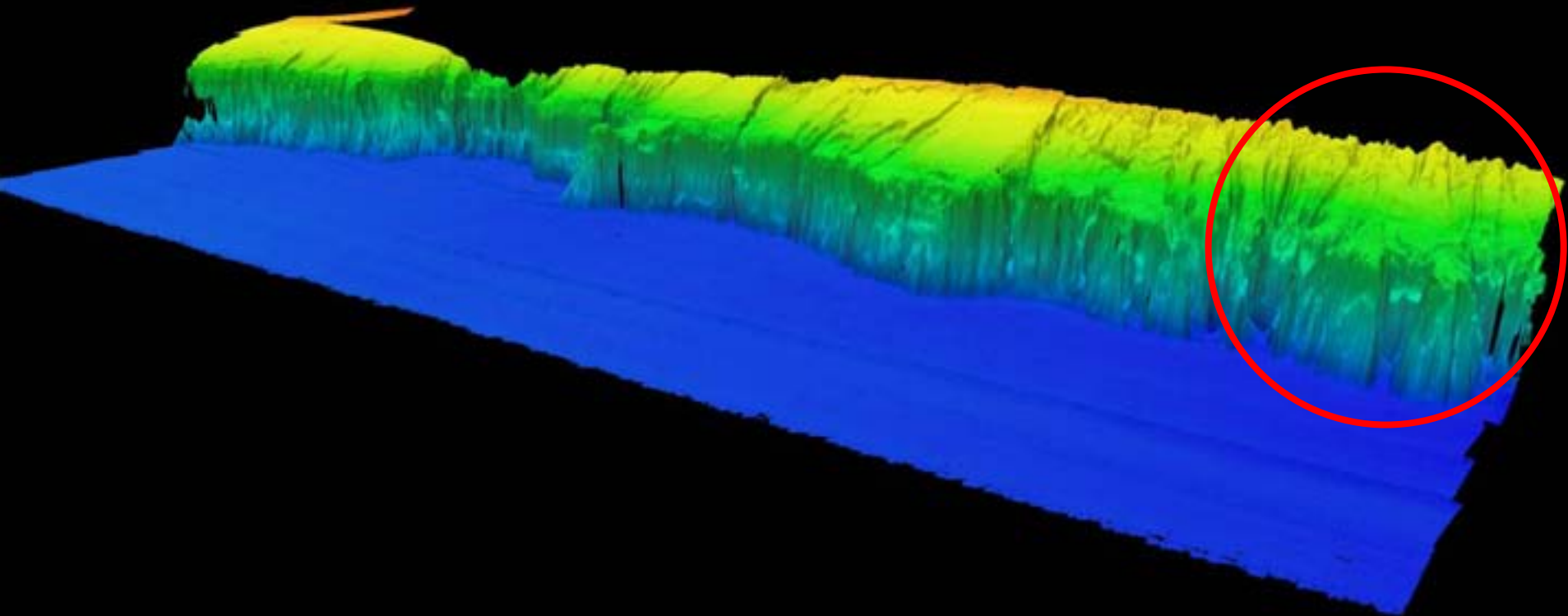


VE=6x
looking E

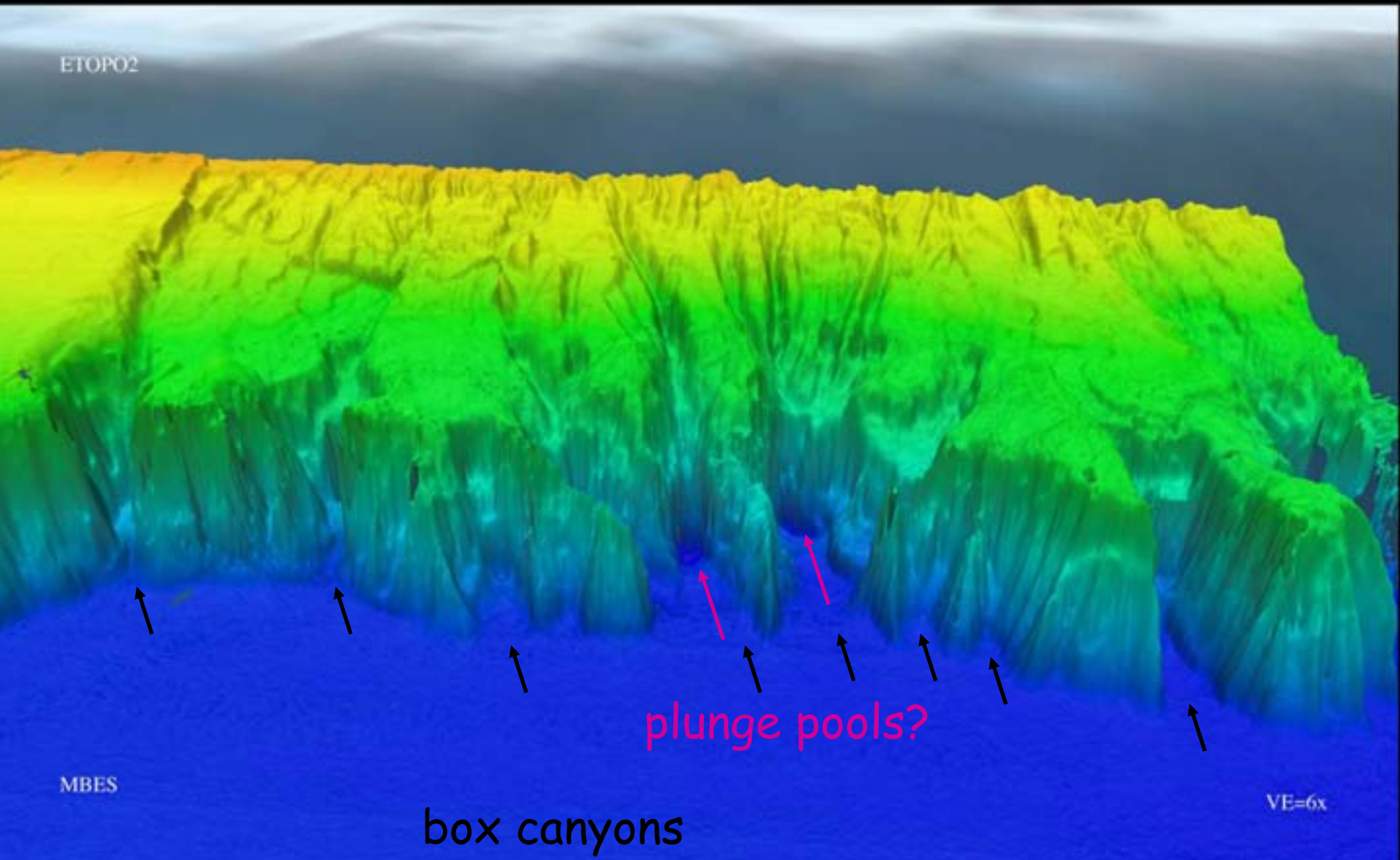
Florida Escarpment profile



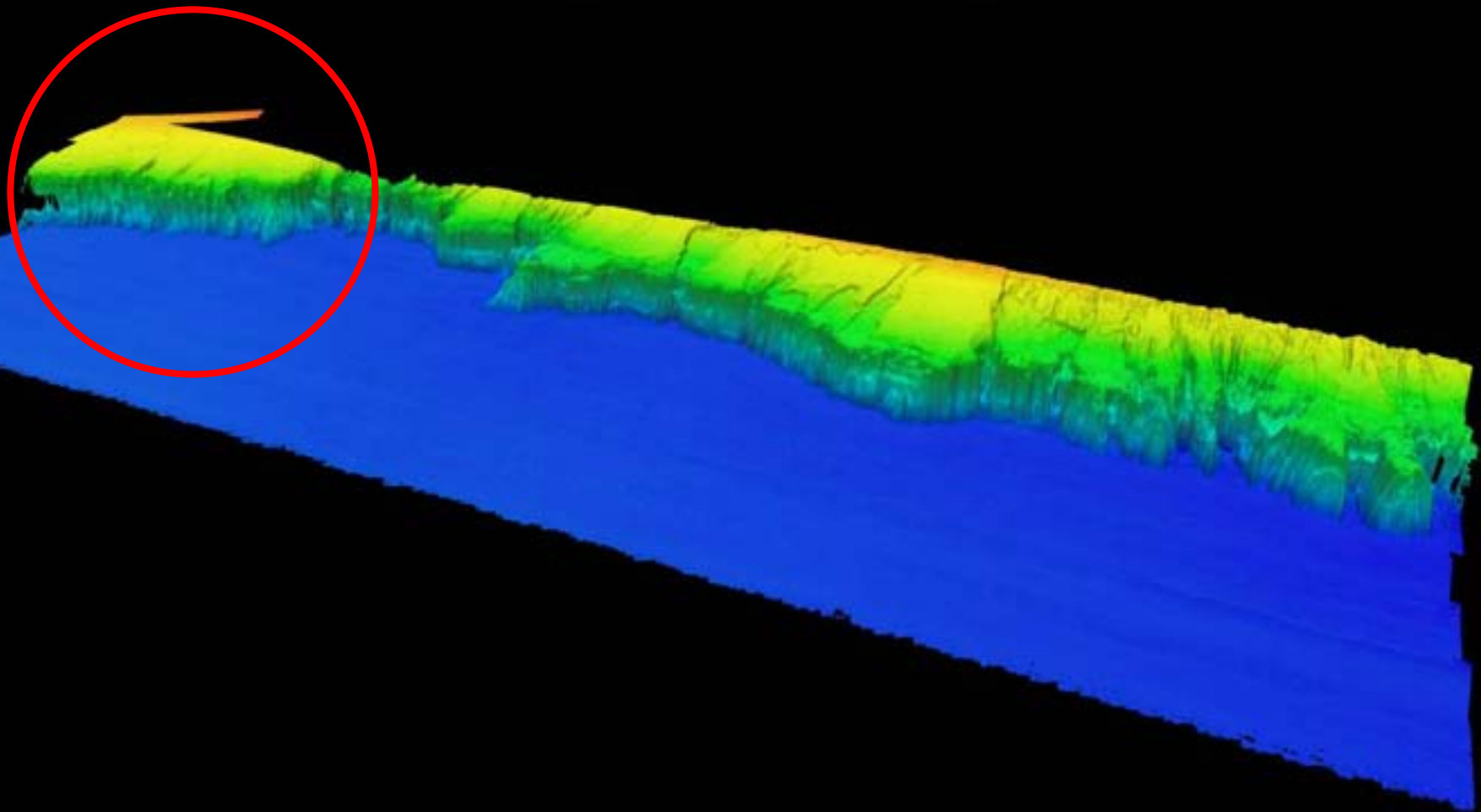
Florida Escarpment



southern Florida Escarpment erosion



Florida Escarpment - bathymetry

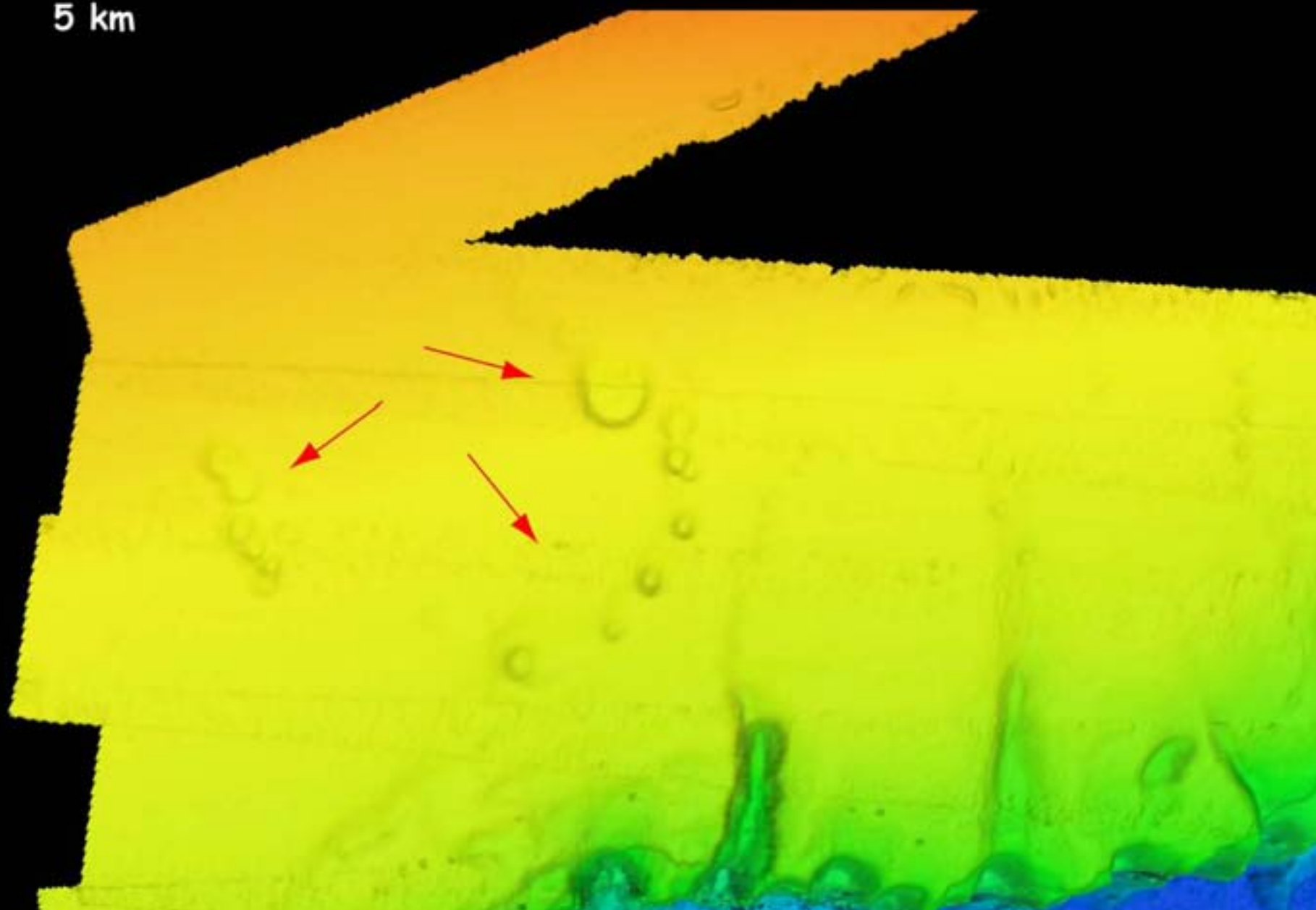


VE=6x
looking E

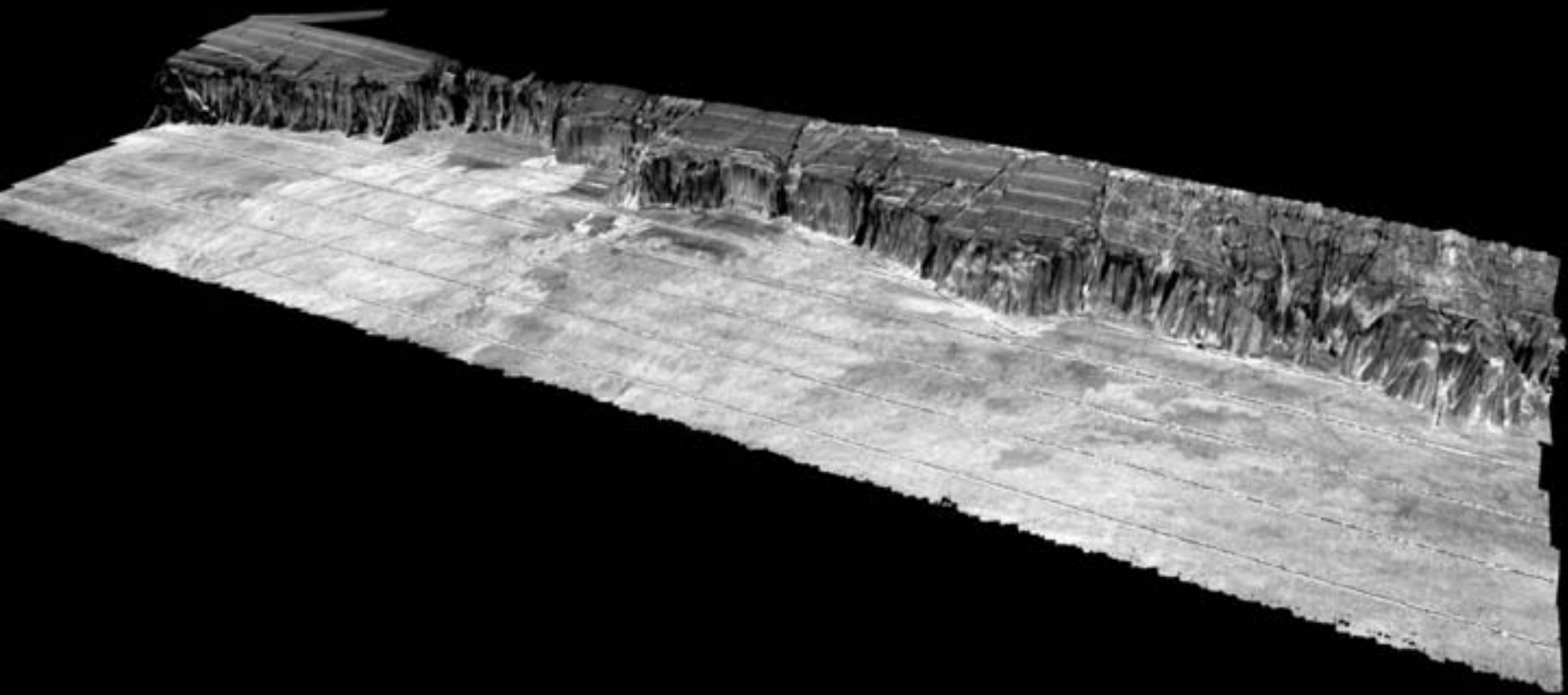
sink holes: Florida Escarpment



5 km



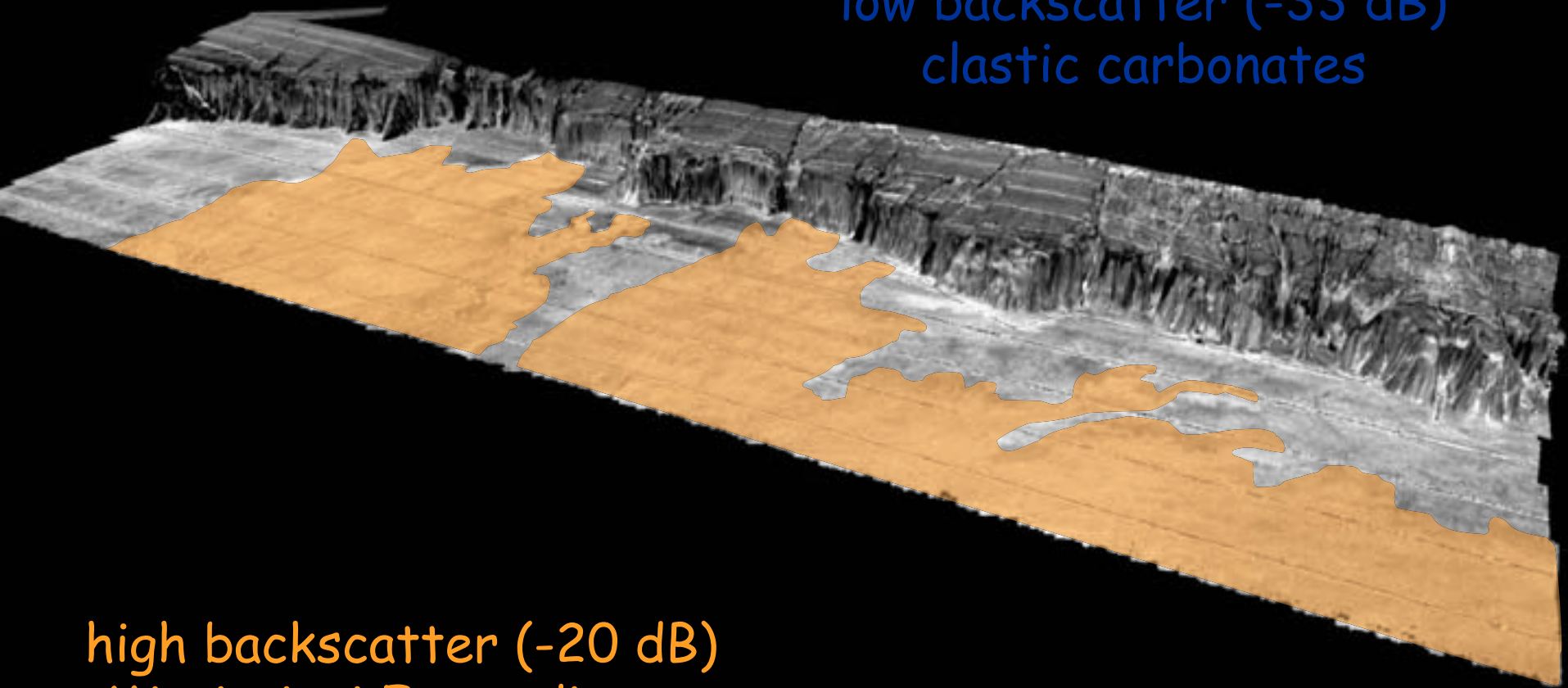
Florida Escarpment - acoustic backscatter



VE=6x
looking E

Florida Escarpment - acoustic backscatter

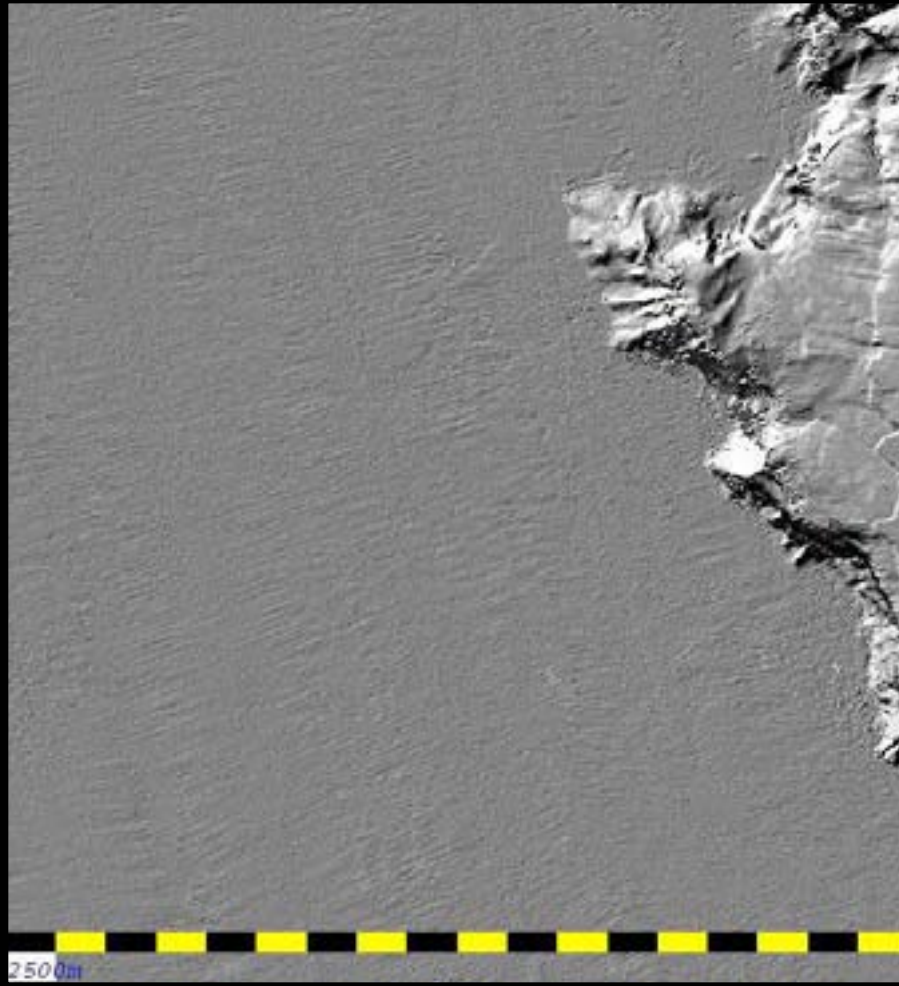
low backscatter (-33 dB)
clastic carbonates



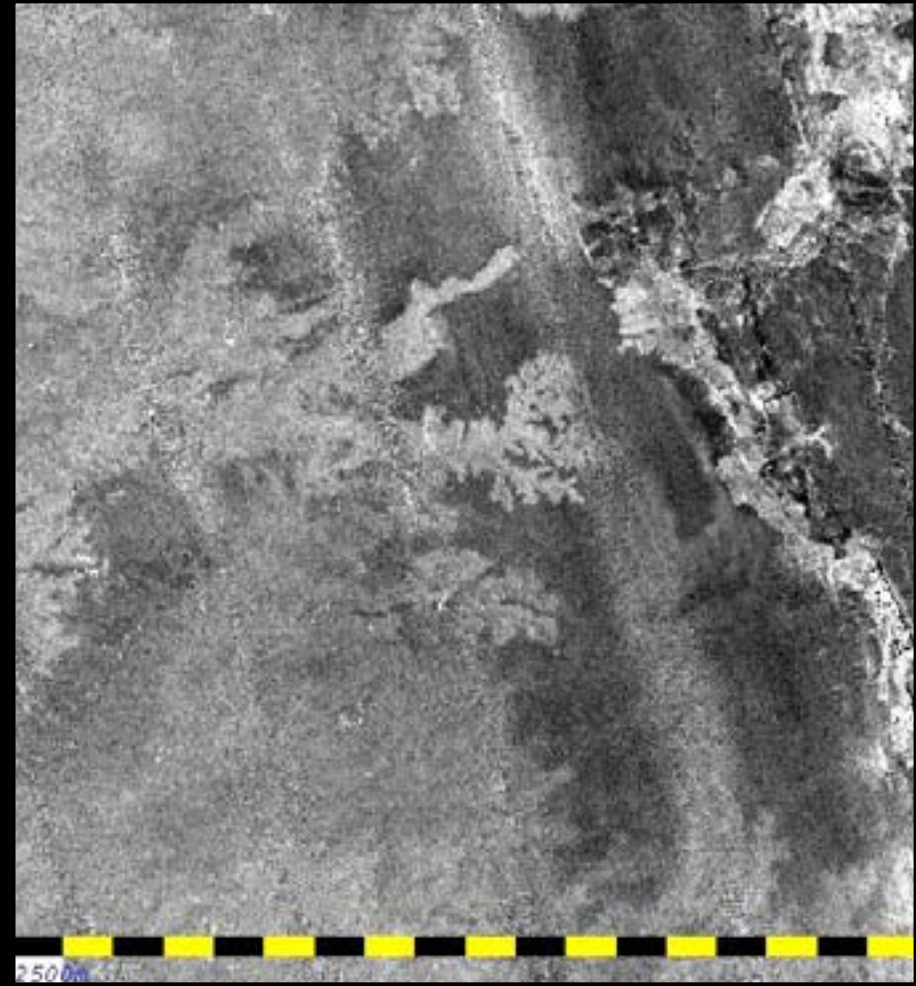
high backscatter (-20 dB)
Mississippi Fan sediment
medium backscatter (-27 dB)
pelagic sediment

VE=6x
looking E

latest depositional lobe of Mississippi Fan

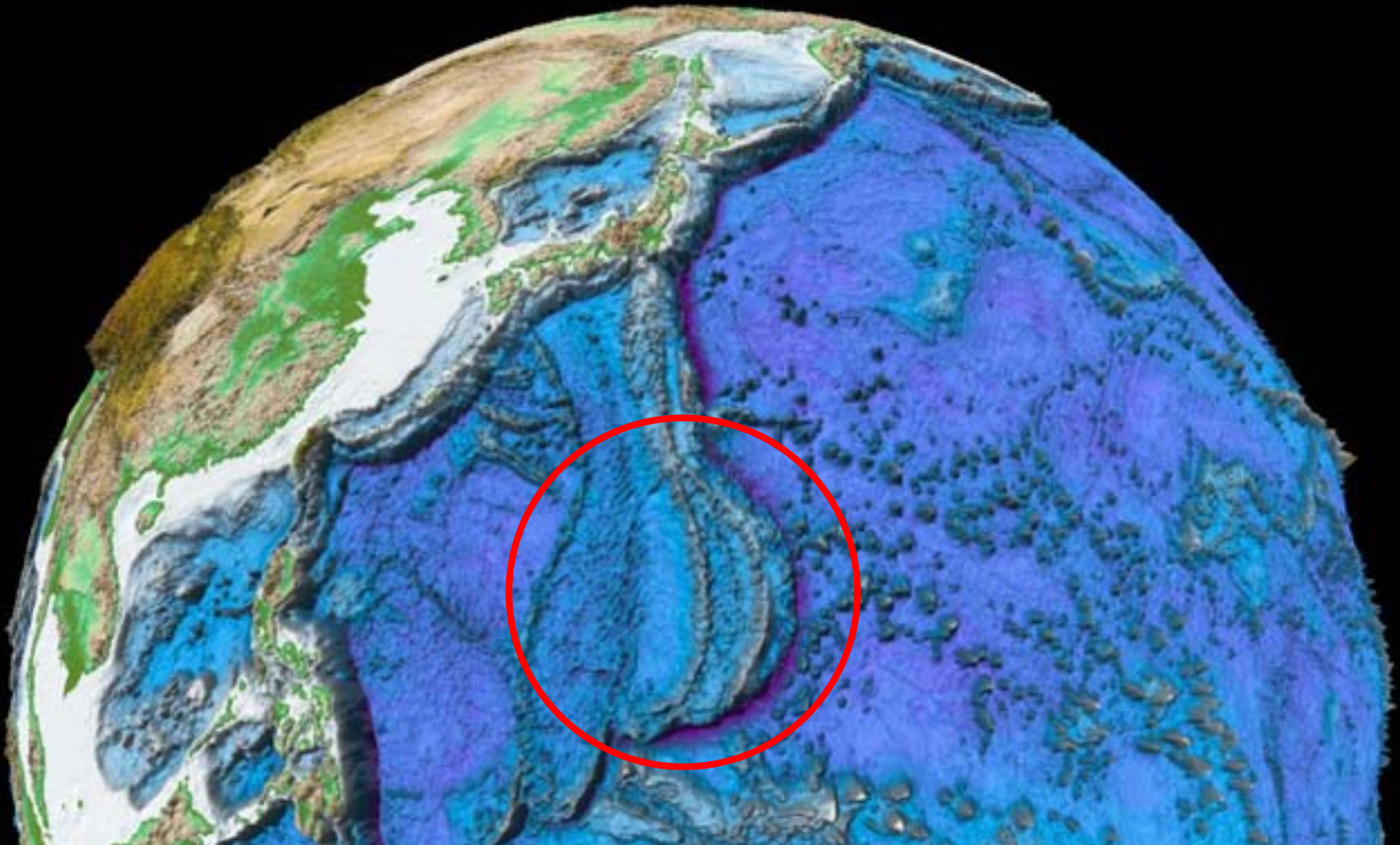


Bathymetry



Acoustic Backscatter

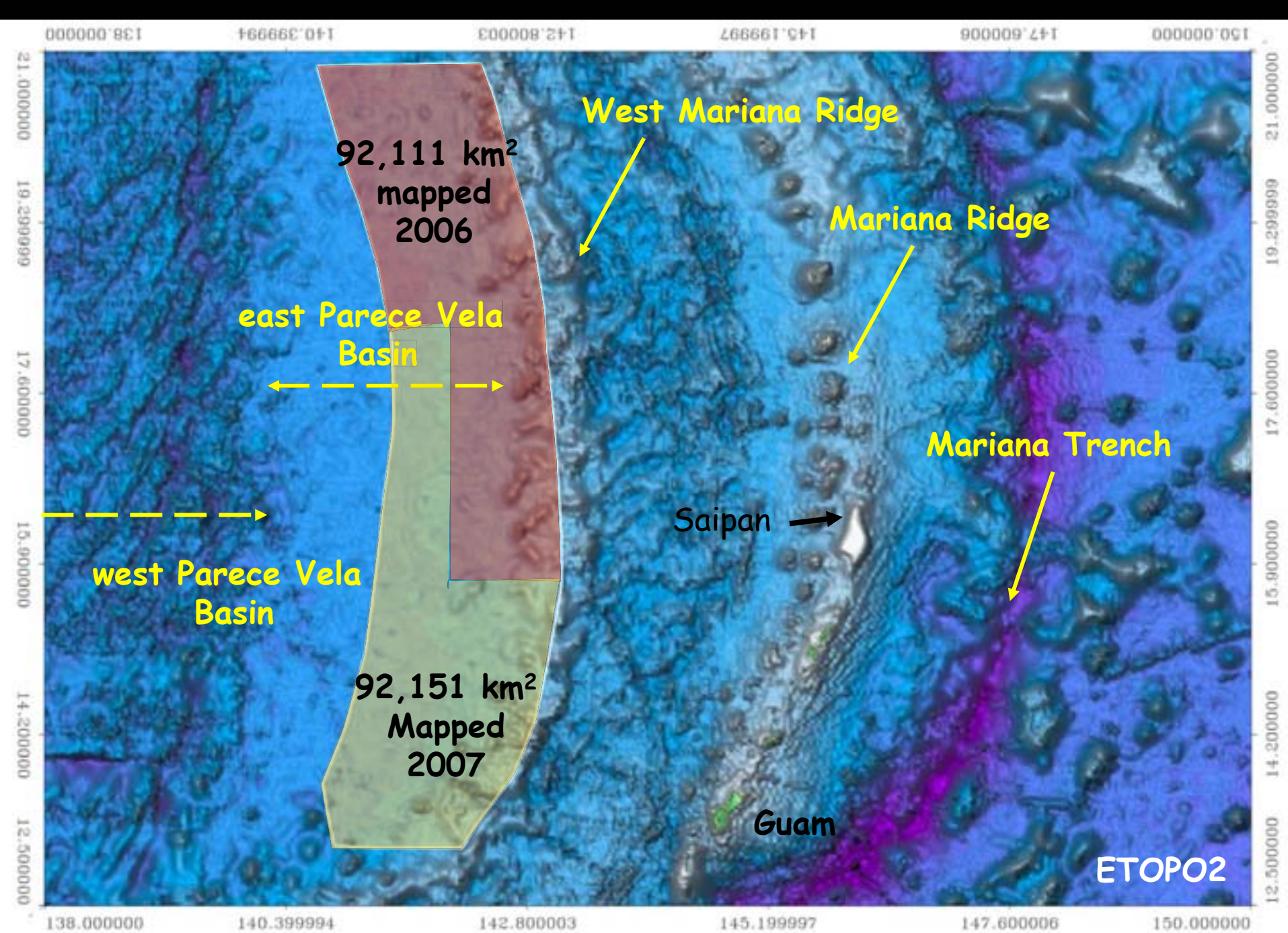
Northern Mariana Islands - West Mariana Ridge 2006 & 2007

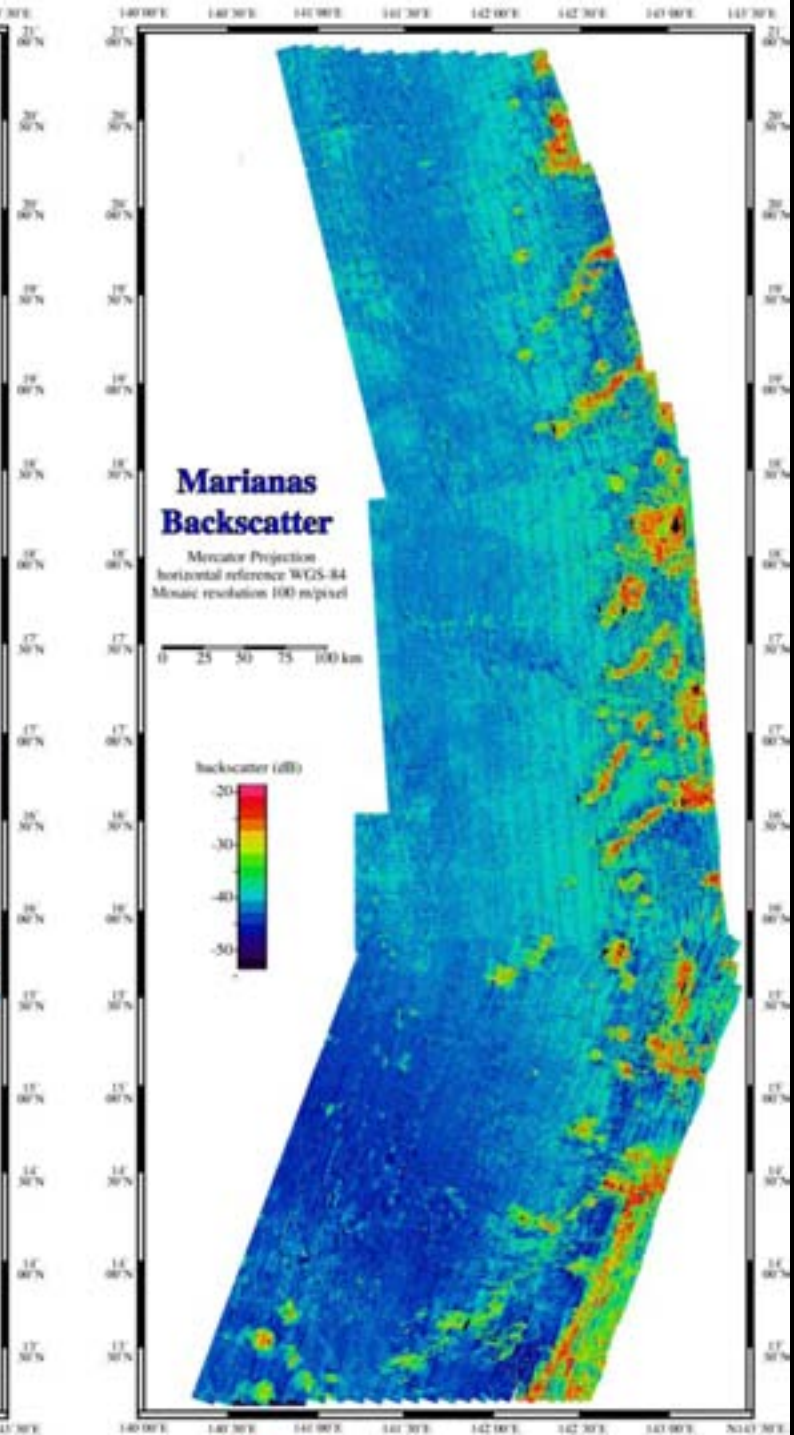
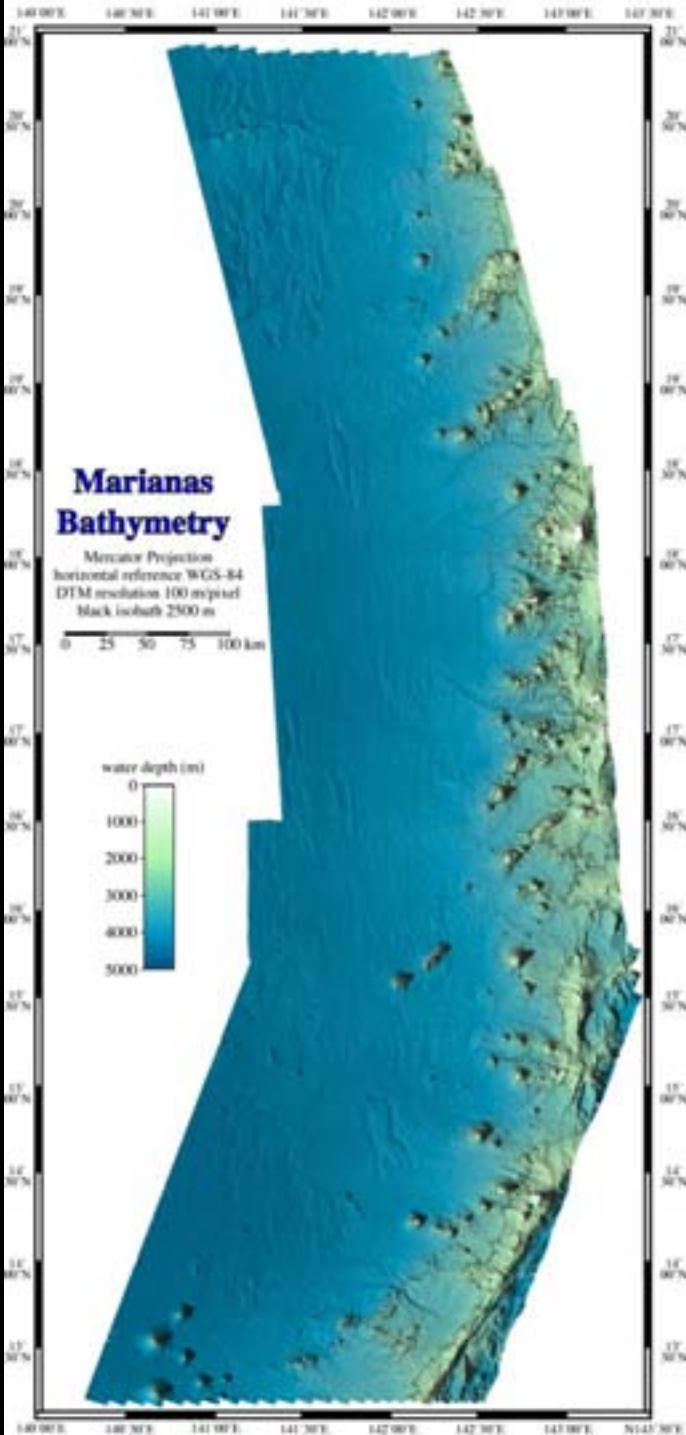


USNS Bowditch (T-AGS 62)



Simrad EM121A.....12 kHz, 121-1°x 1° beams
bathymetry &
full-time-series backscatter
NAVO: data acquisition
UNH: bathymetry & backscatter processing





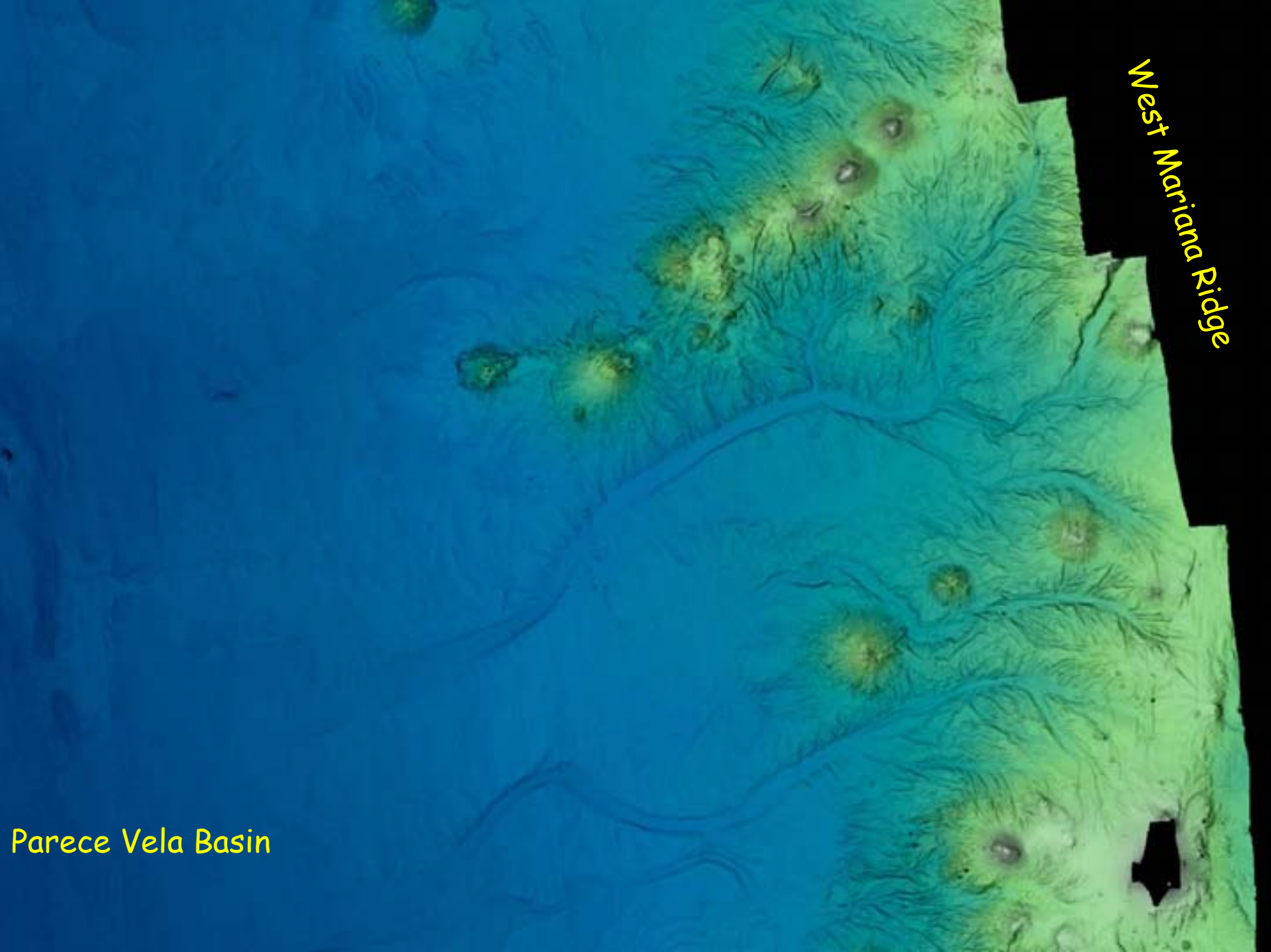


West Mariana Ridge

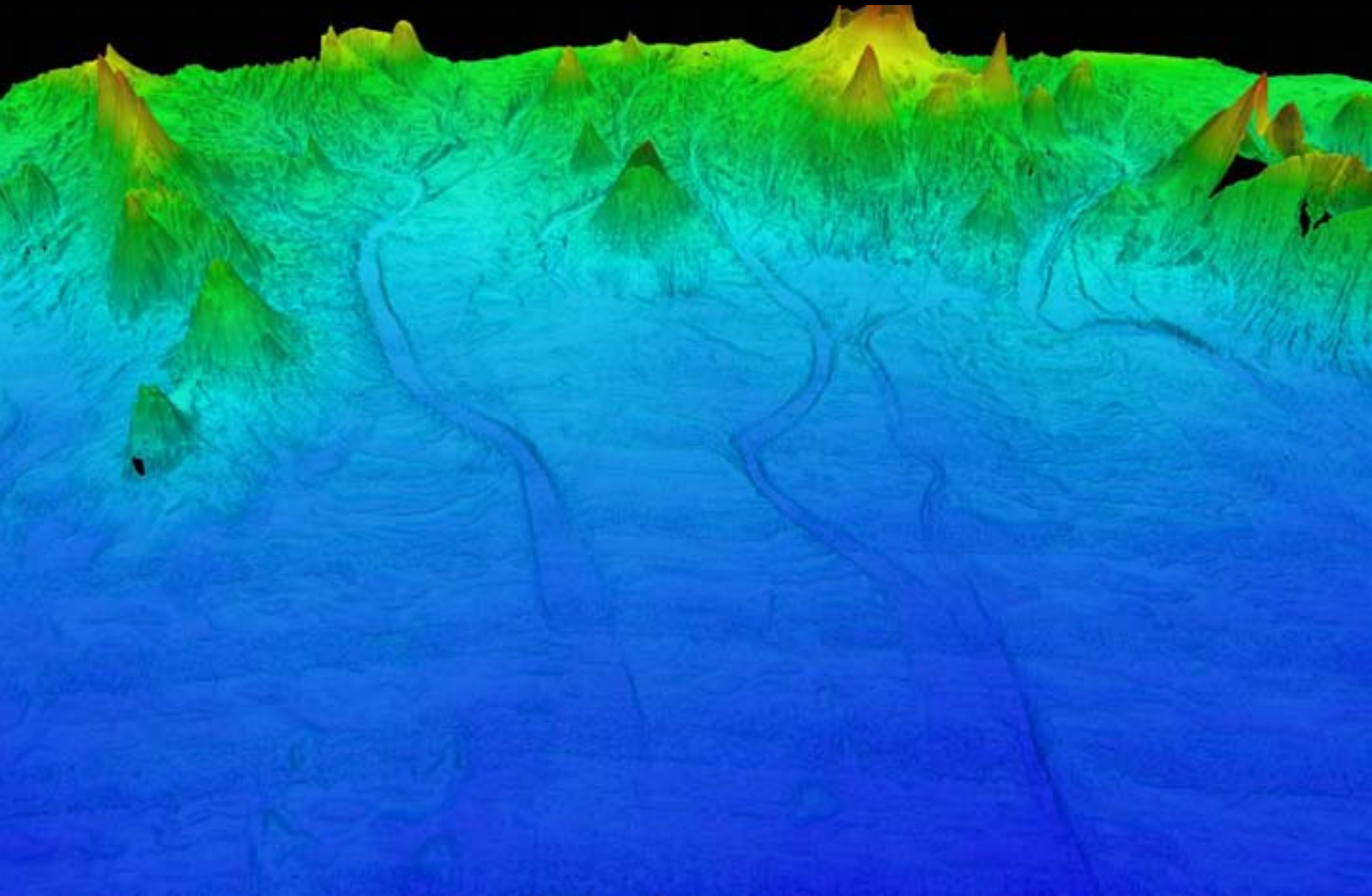
Parece Vela Basin

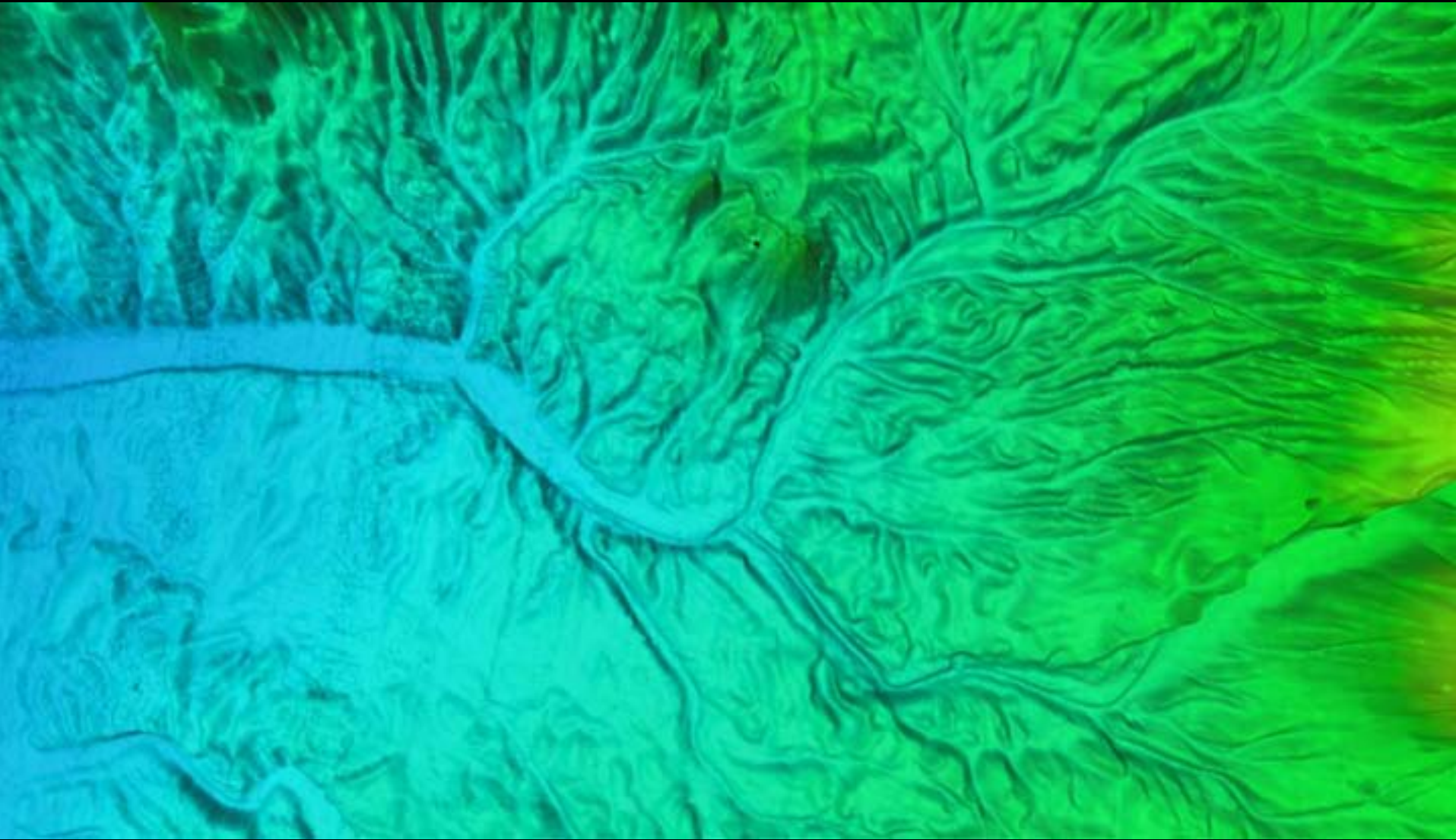
West Mariana Ridge

Parece Vela Basin



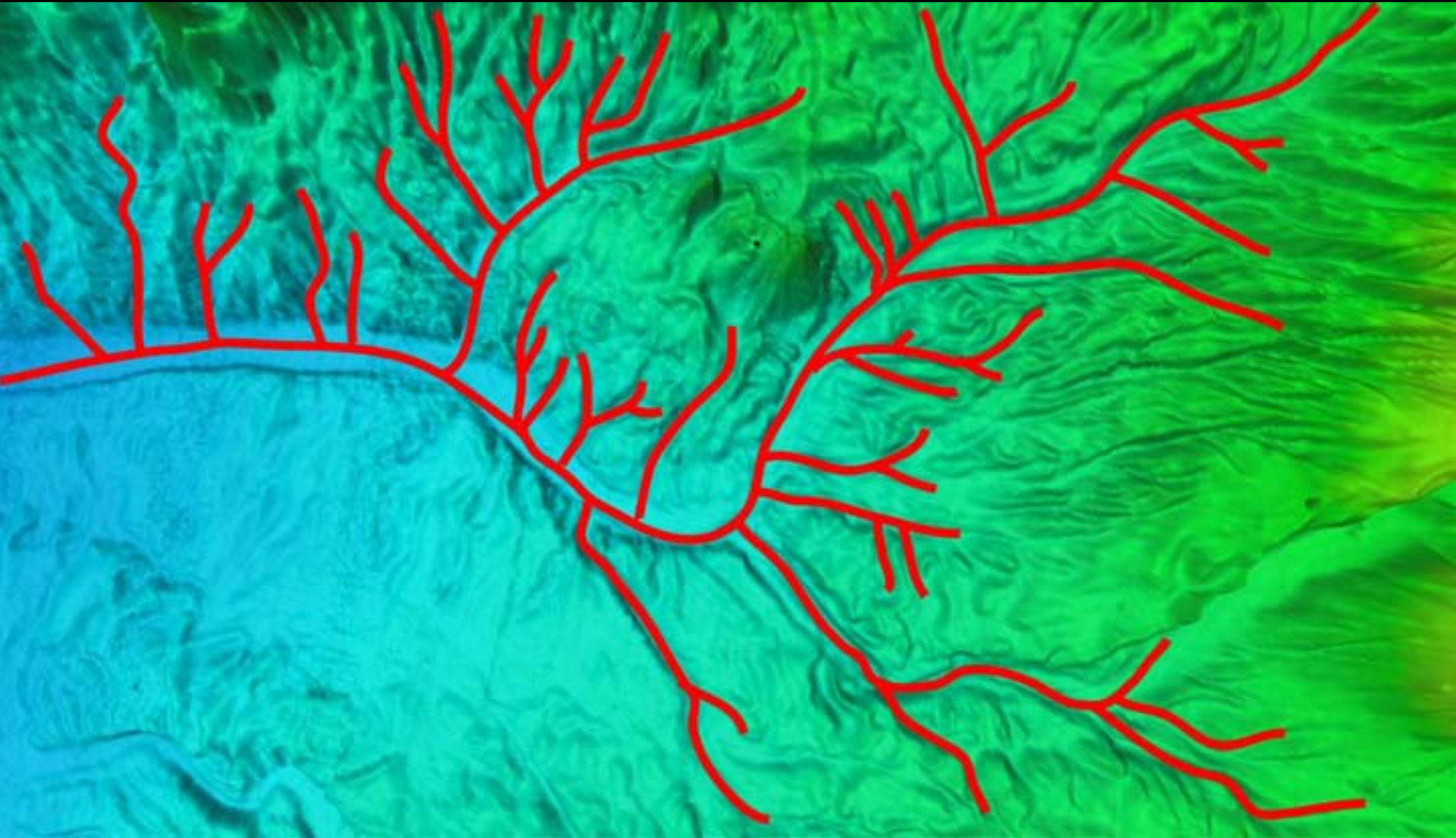
"drainage" channels





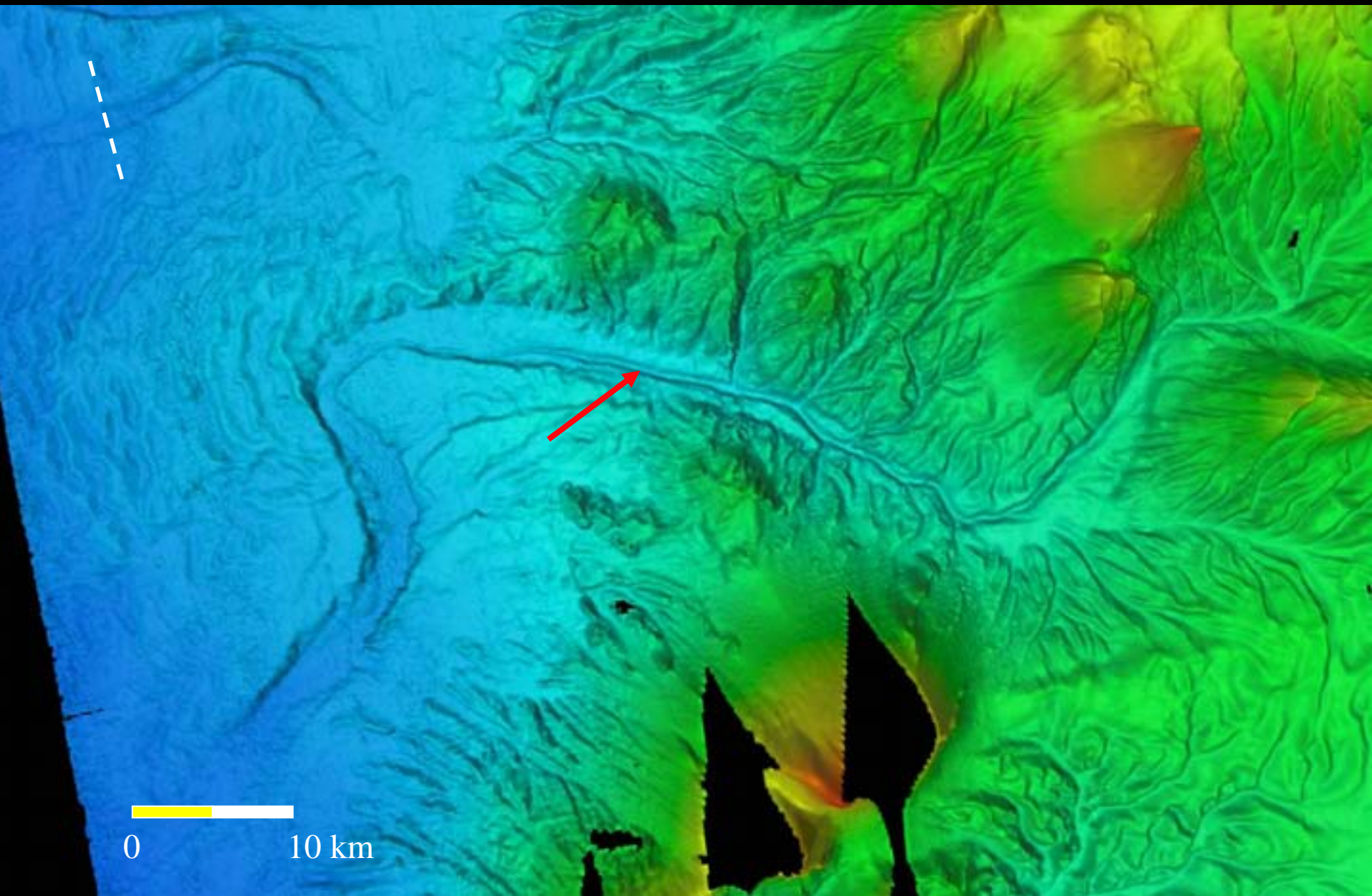
channel floor 2-km wide, >100-km long,
incised >150 m

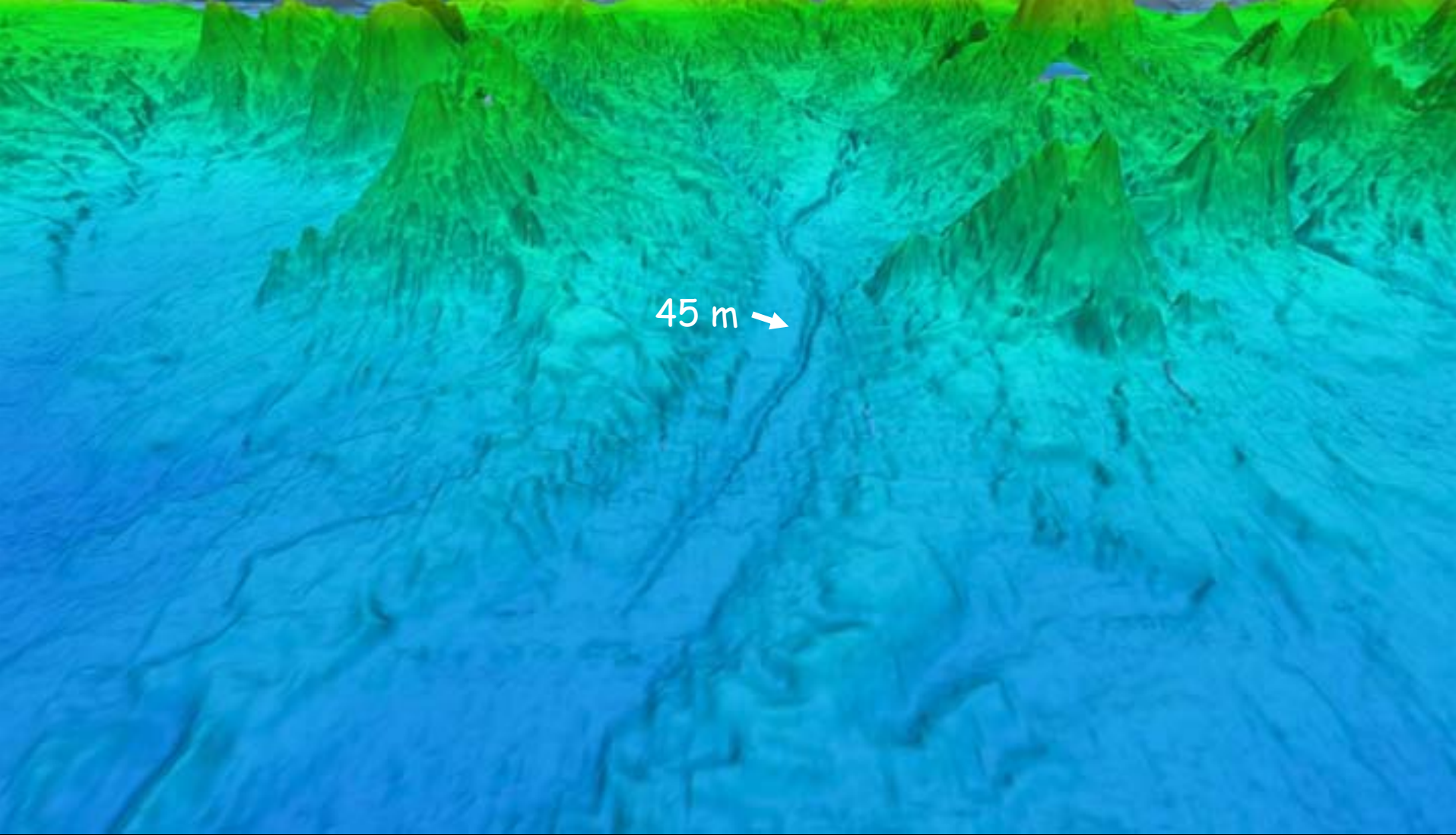
3rd-order dendritic "drainage"



channel floor 2-km wide, >100-km long,
incised >150 m

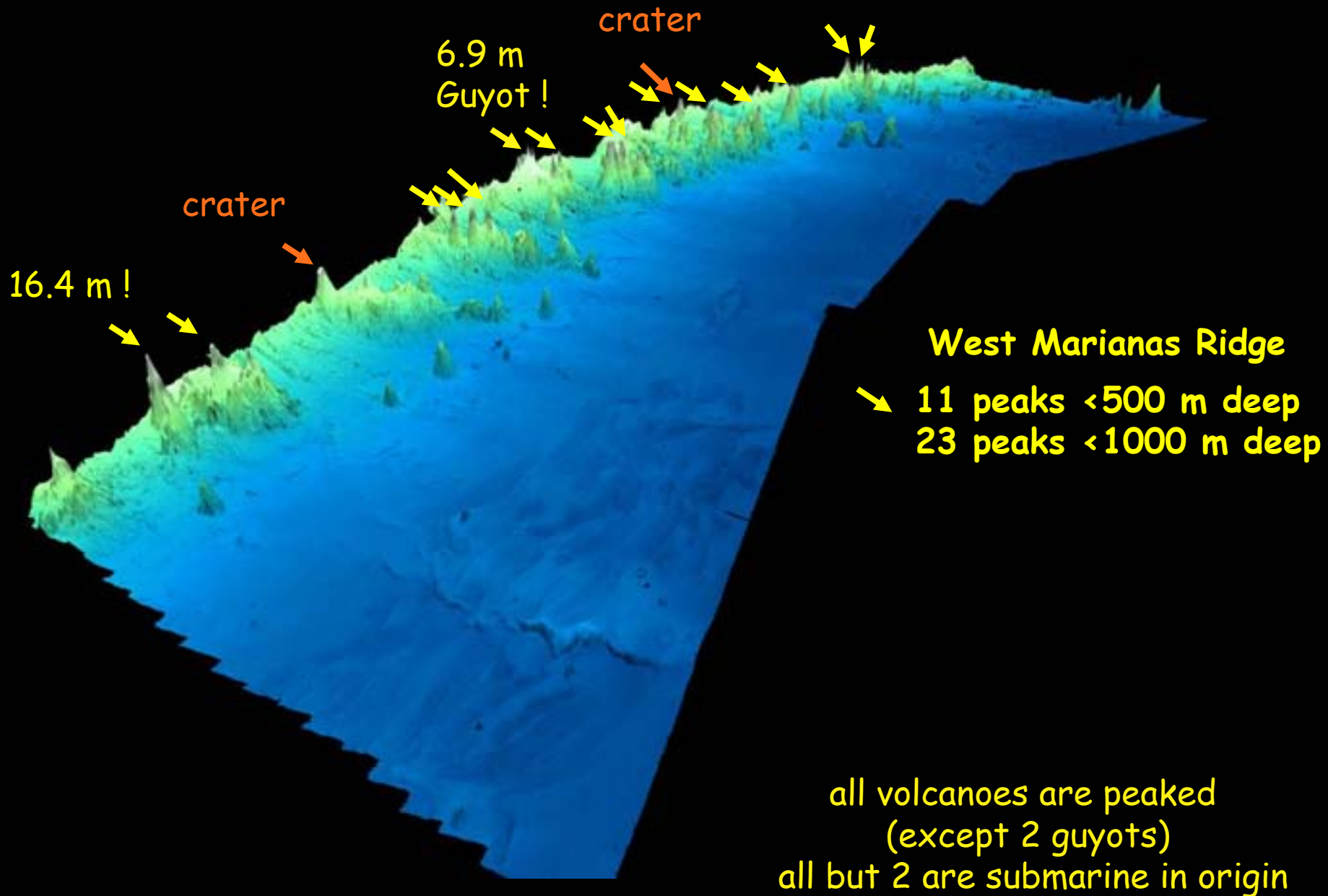
channel incision 4-km across, 50-m deep





channel incision
6-km wide channel, 45-m deep thalweg

ve = 6x





All the data are freely available at:
http://www.ccom.unh.edu/law_of_the_sea.html

Special thanks to the ships' personnel, and the
technical teams aboard *Healy*, *Northern Resolution*
and *Bowditch*