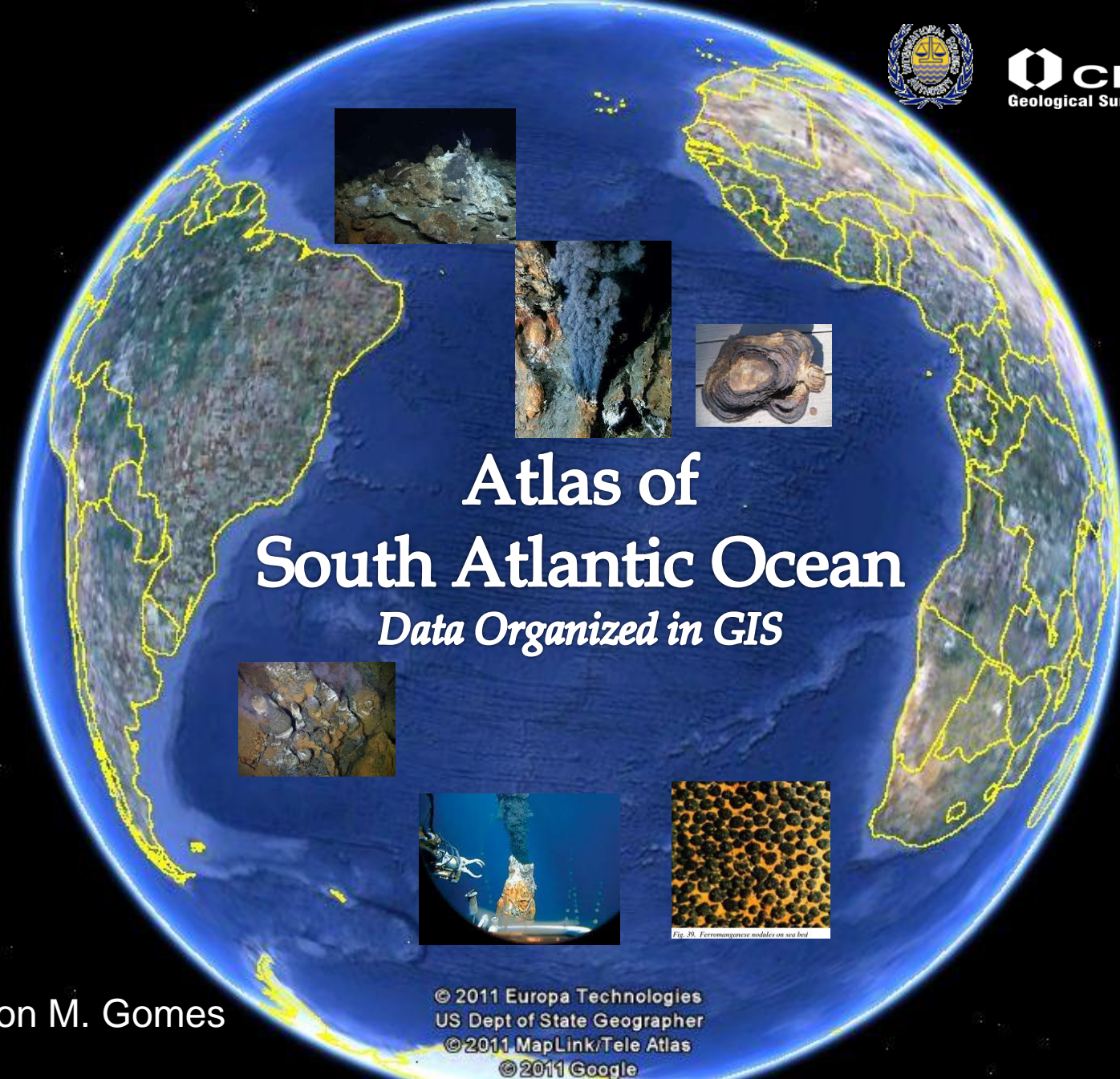




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Atlas of South Atlantic Ocean

Data Organized in GIS

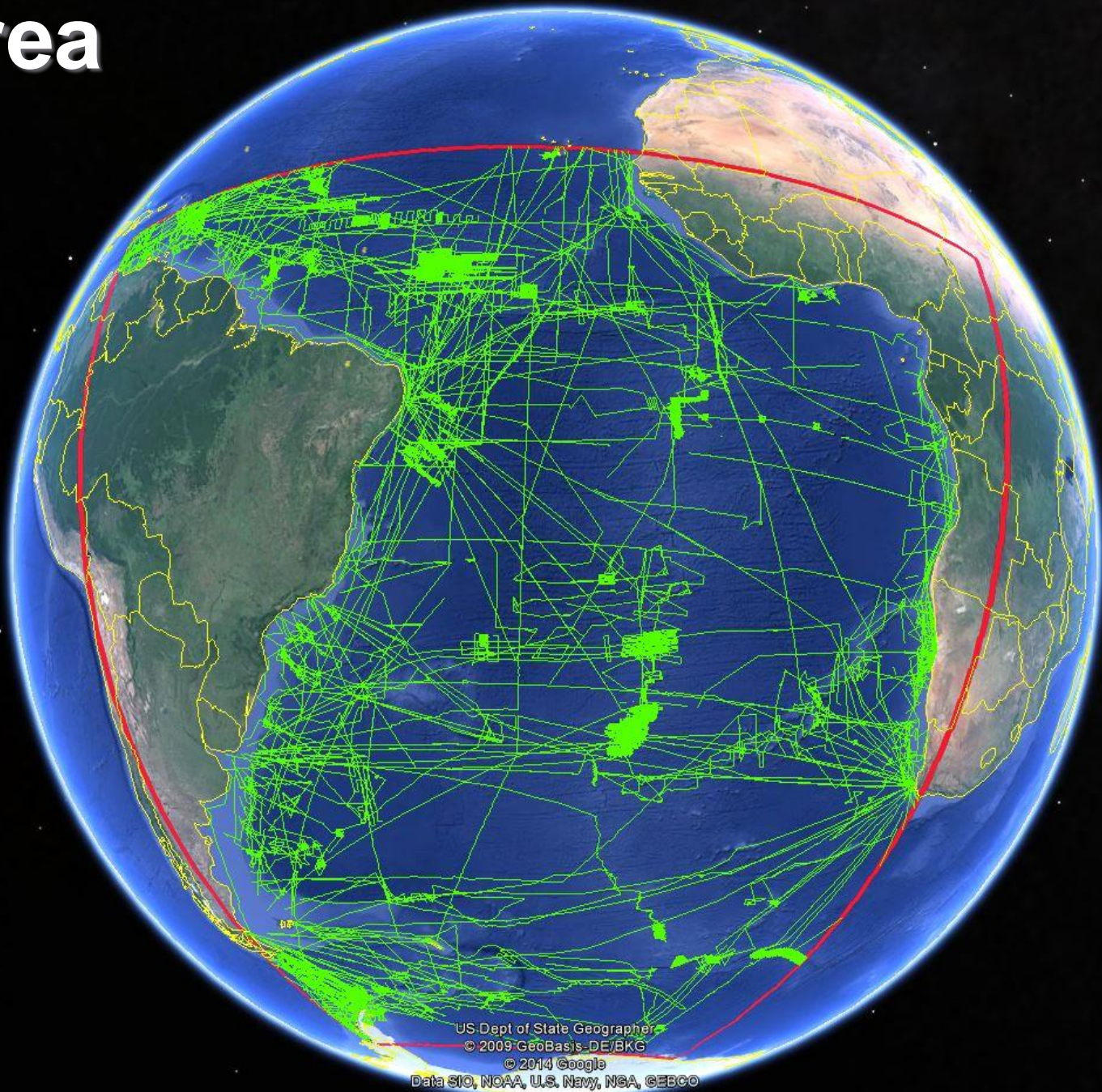


Fig. 39. *Ferromanganese nodules on sea bed*

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Geologist
CPRM – Geological Survey of Brazil

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Area





BACKGROUND

The “*Atlas of the South Atlantic Ocean – Data organized in GIS*” was designed by the Geological Survey of Brazil (CPRM) and the International Seabed Authority (ISA).

It integrates all available data on the geology, mineral resources, environmental issues, and geographic information of the South and Equatorial Atlantic Ocean.



PRODUCTS

GIS PROJECT

STRUCTURAL MAP

MORPHOTECTONIC MAP

DIGITAL
ATLAS

46 DATASETS OR THEMATIC LAYERS



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STRUCTURAL ELEMENTS

Free-Air Anomalies

AXES OF ACCRETIONARY RIDGES

Heat Flow

ANGOLA-BRAZIL GEOTRANSECT DATA

DIAPIR ISOPACHS

OCEANIC TOP OF BASEMENT GRID

EARTHQUAKE EPICENTERS

Plate Boundaries

Bouguer Anomalies

GEBCO_08 GRID

Hydrothermal vents

Volcanoes

MINERAL OCCURRENCES

Isopachs

Cobaltiferous Crusts

Seamount biological data

Ocean-Continent Transitions

Polymetallic Sulphides

Sediment Thickness

Age of oceanic lithosphere

Offshore brazilian protected areas

SLAB DEPTHS

Morphotectonic features

Salt boundary

Large Igneous Provinces - LIPs

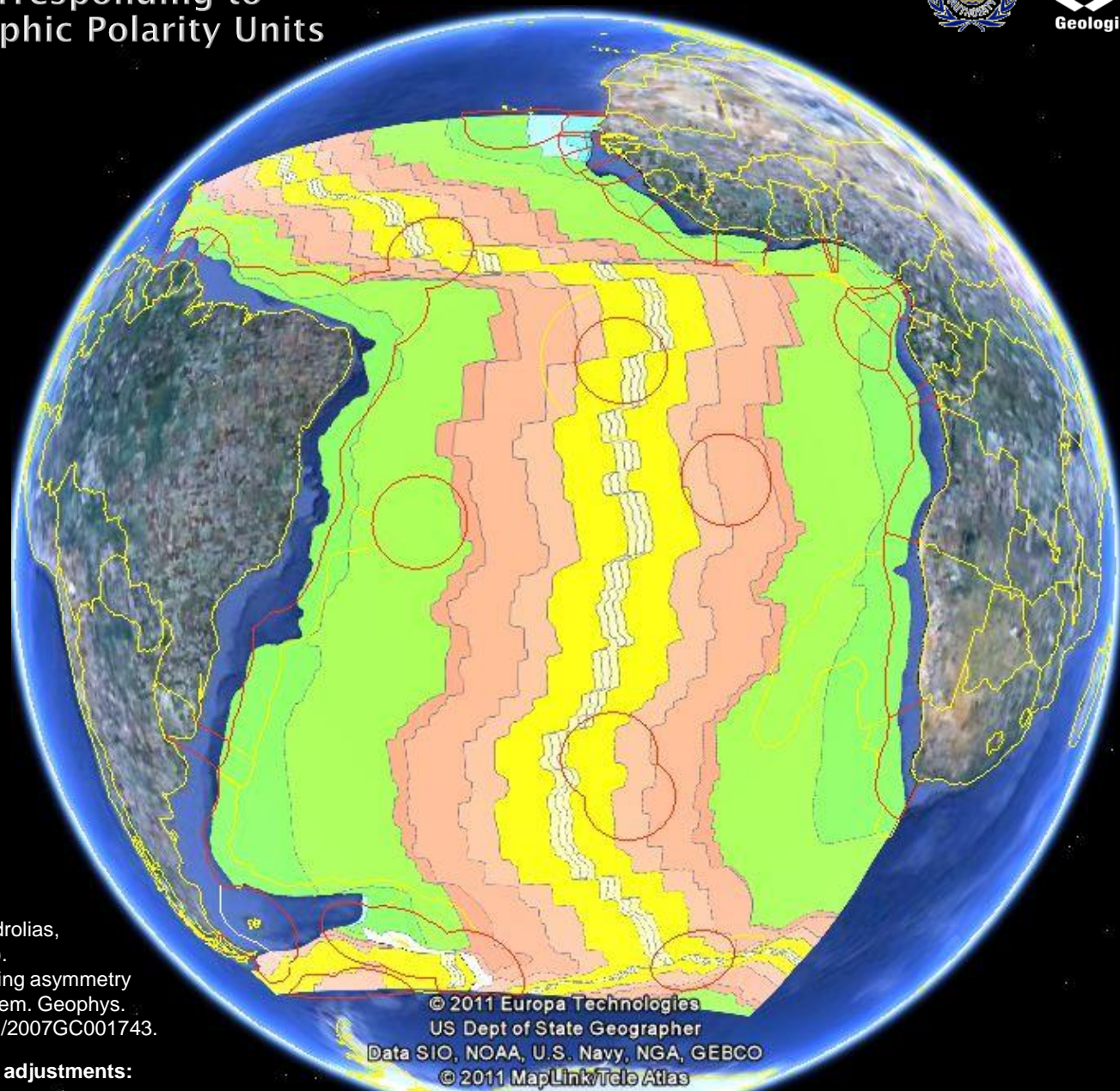
POTENTIAL MINERAL RESOURCES

SURFICIAL SEDIMENTS FACIES (Brazilian Continental Shelf)



Chronostratigraphic ages of oceanic crust (epochs) corresponding to Magnetostratigraphic Polarity Units (Chrons)

Epoch	Age Ma
Undefined	
Pleistocene	2.58 to 0.01
Pliocene	5.33
Miocene	23.03
Oligocene	33.9
Eocene	55.8
Paleocene	65.5
Upper Cretaceous	99.6
Lower Cretaceous	145.5
Upper Jurassic	161.2
Midle Jurassic	175.6
Lower Jurassic	199.6



Data Source: Muller, R. D., M. Sdrolias, C. Gaina, and W. R. Roest (2008). Age, spreading rates, and spreading asymmetry of the world's oceanic crust, *Geochem. Geophys. Geosyst.*, 9, Q04006, doi:10.1029/2007GC001743.

Geoprocessing and geological adjustments:
Francisco Edson M. Gomes
Geological Survey of Brazil

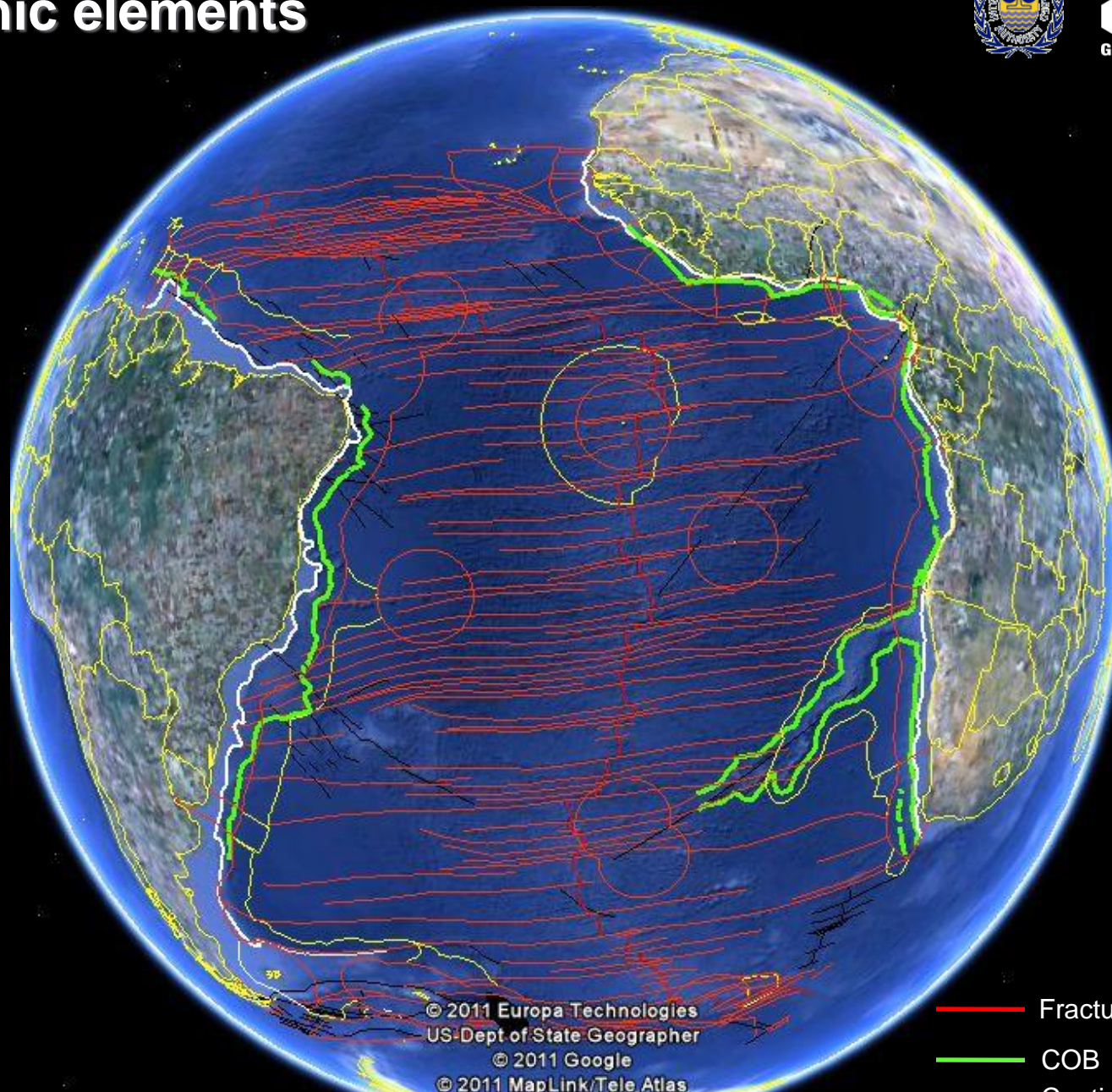
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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lat -23.5513042 lon -47.5542272 elev -4555 m

Tectonic elements



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- Fracture zone
- COB
- Continental Slope

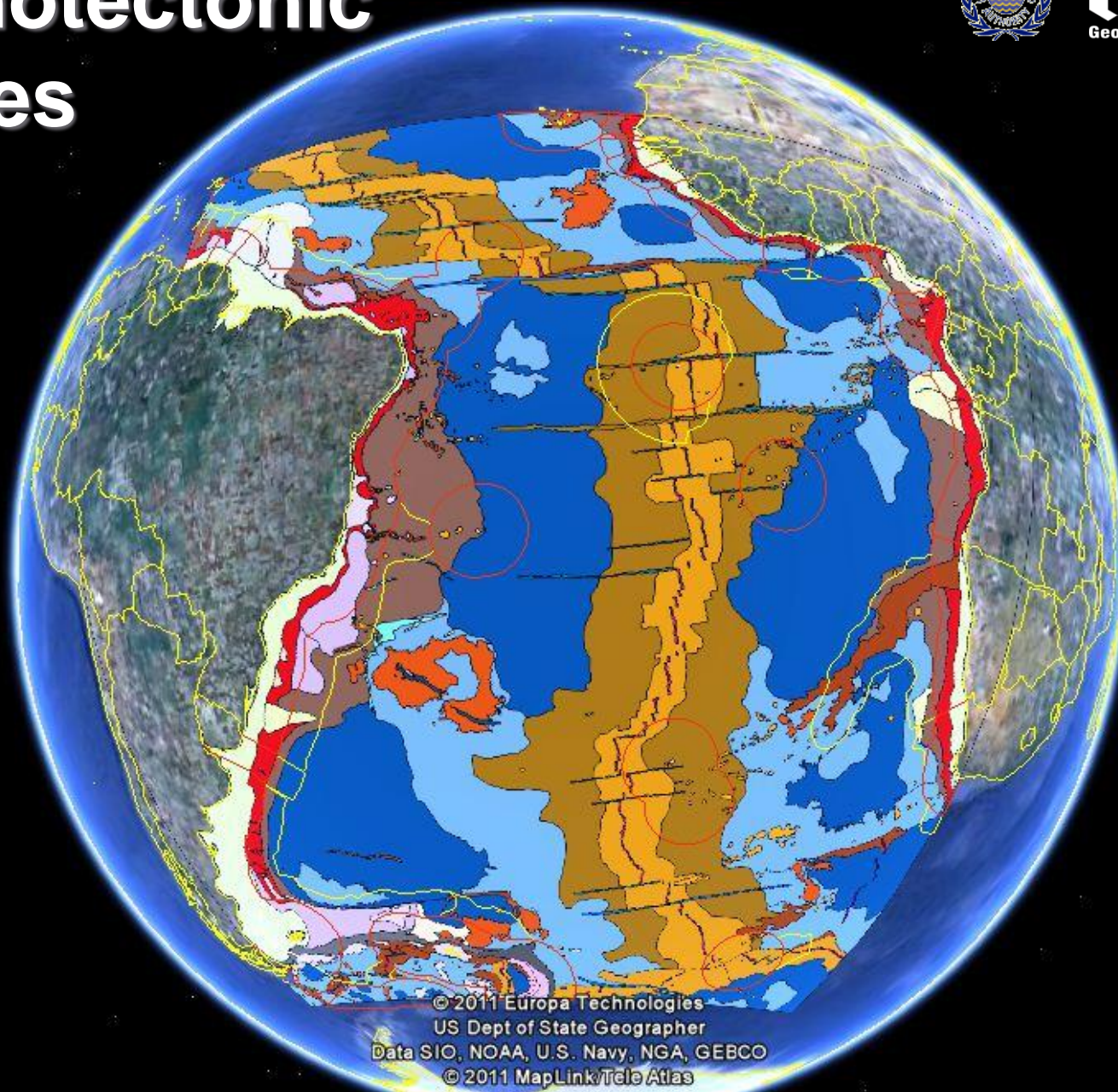
Compiled by: Francisco Edson M. Gomes
Geological Survey of Brazil.

lat -18.787163 lon -18.505932 elev -4461 m

Morphotectonic features



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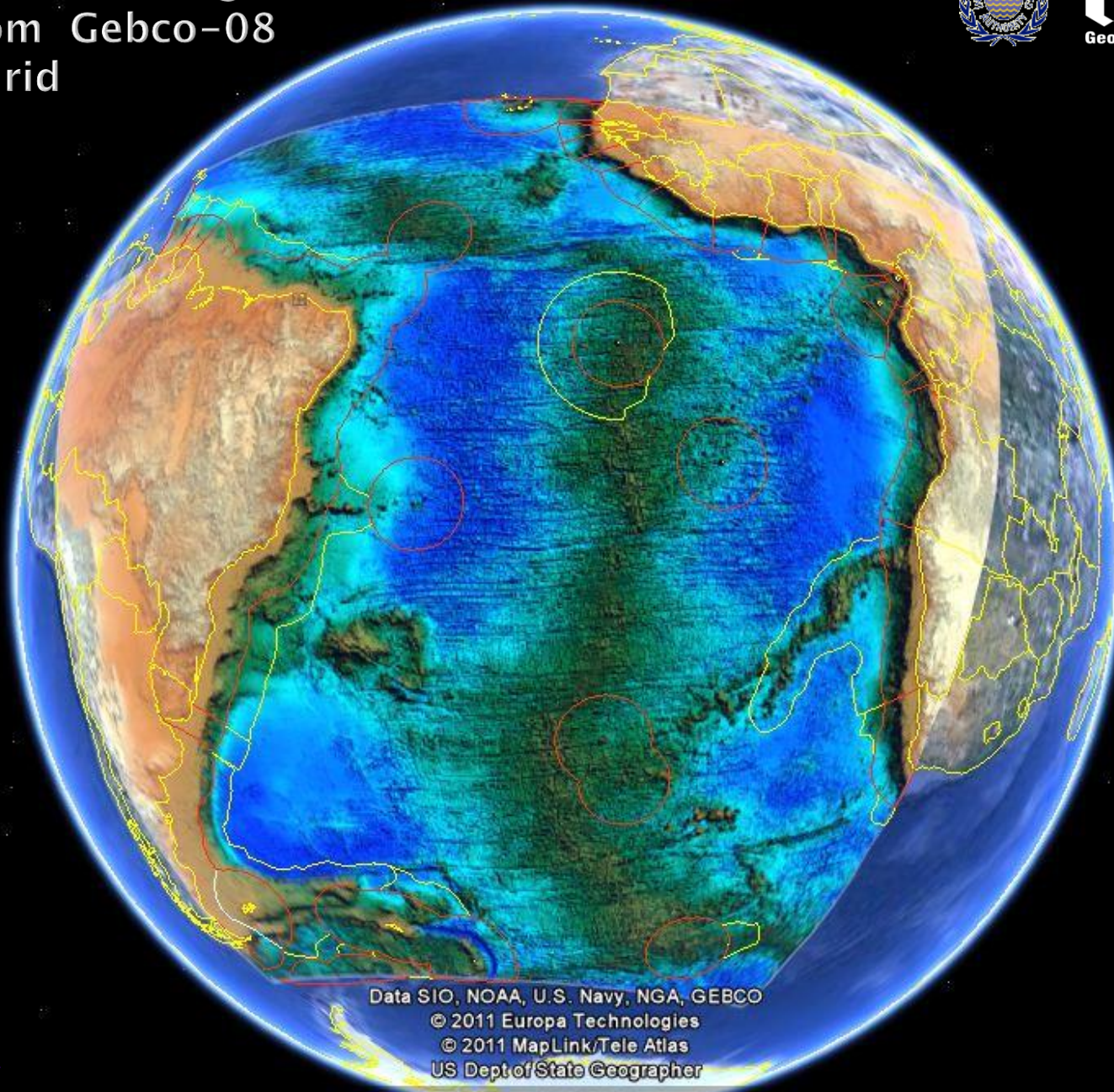
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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lat -23.094805° lon -22.100294° elev -5529 m

Topobathymetric image derived from Gebco-08 grid



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lat -24.419207° lon -47.058905° elev -4361 m

Source of grid:

<http://www.gebco.net>

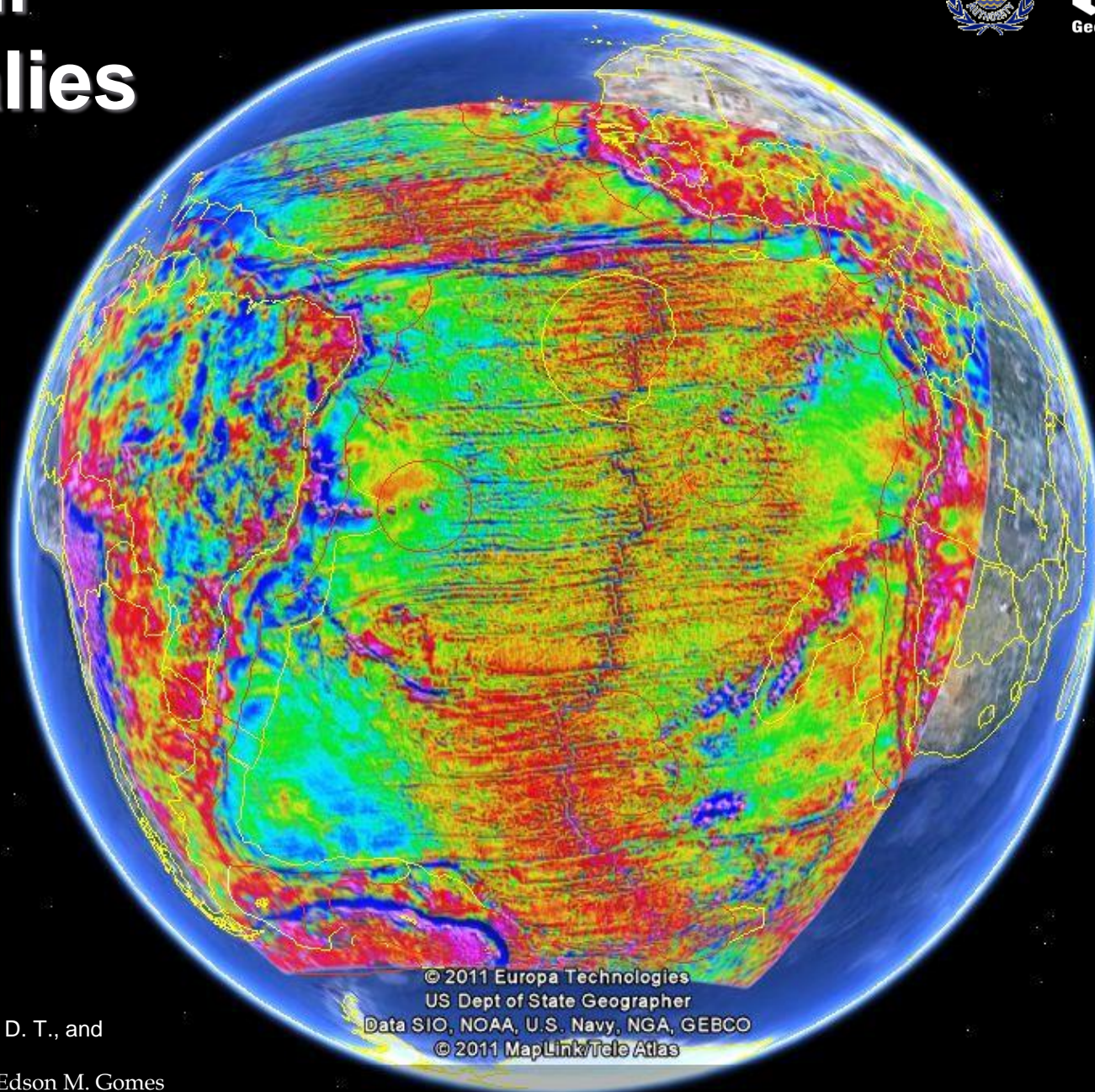
Geoprocessing:

Francisco Edson M. Gomes

Free-air anomalies



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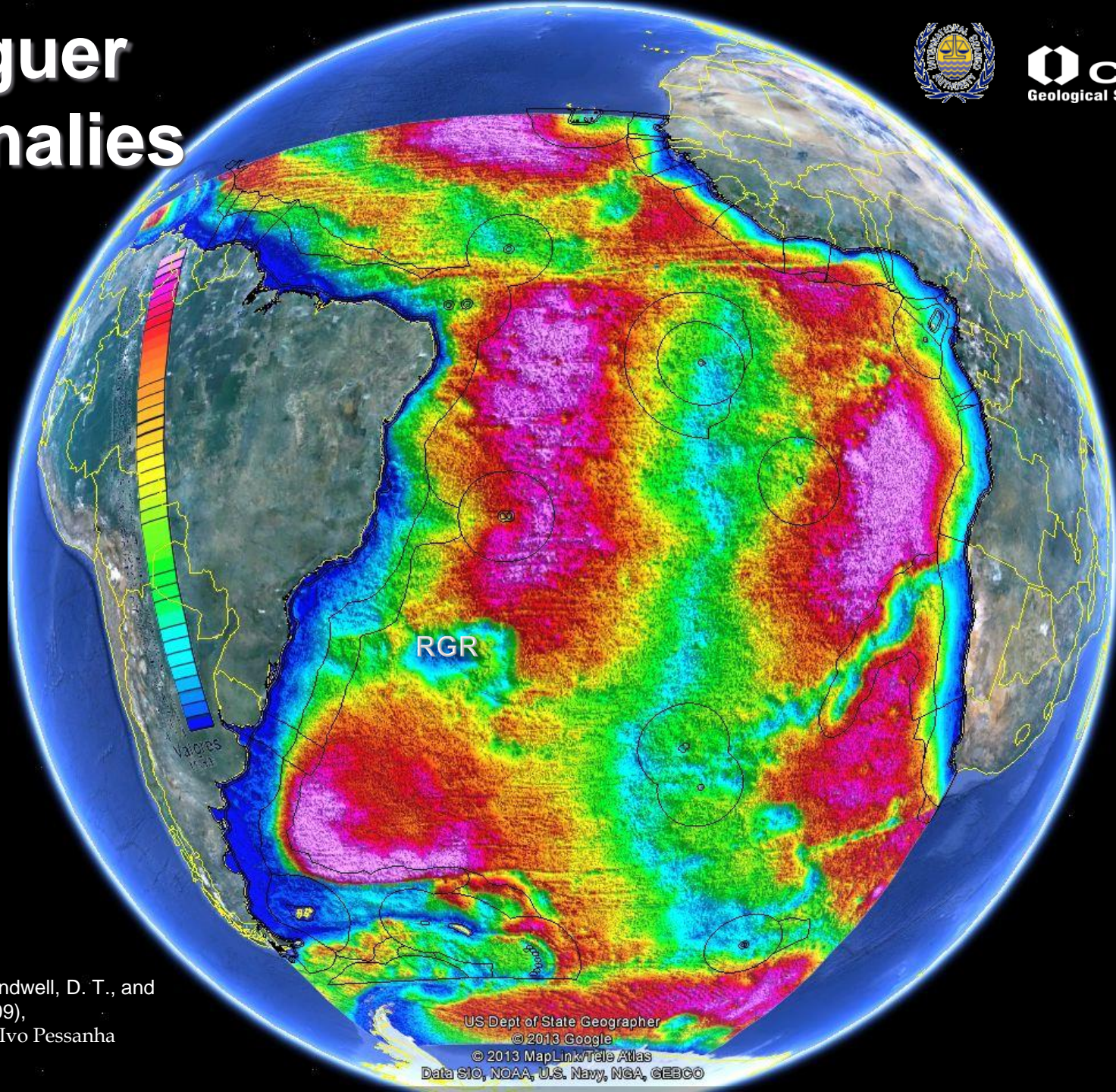
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Source of grid: Sandwell, D. T., and
W. H. F. Smith (2009),
Geoprocessing: Francisco Edson M. Gomes

Bouguer anomalies



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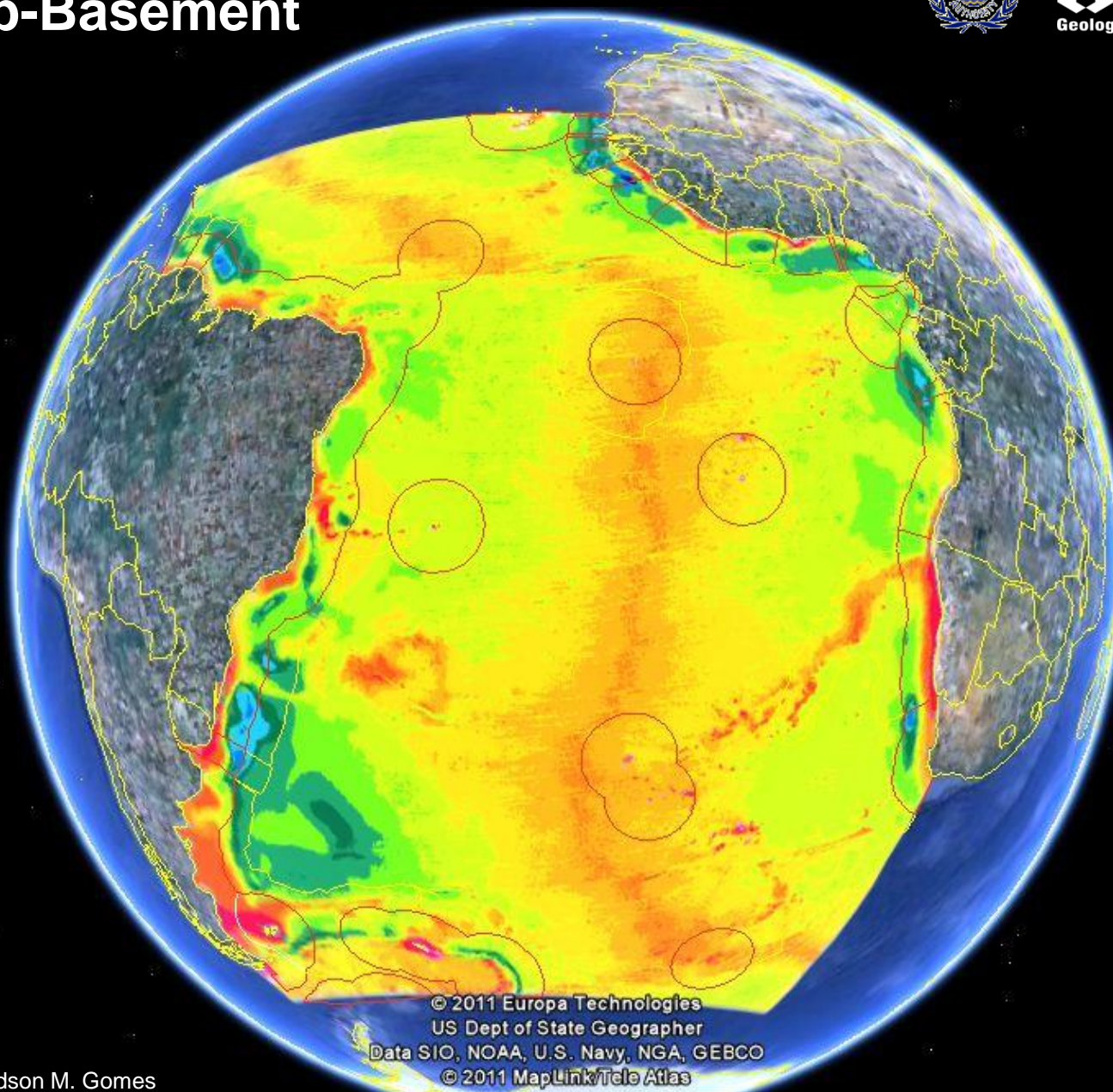
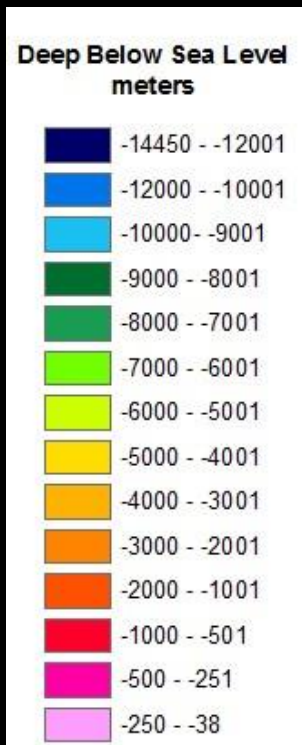


Source of grid: Sandwell, D. T., and
W. H. F. Smith (2009),
Correção Bouguer: Ivo Pessanha

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO



Oceanic Top-Basement



Source of grid: Gebco,
NGDC, NESDIS, NOAA, U.S
Department of Commerce

Geoprocessing: Francisco Edson M. Gomes

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lat -23.521644° lon -18.829823° elev -4816 m

Altitude

Slope



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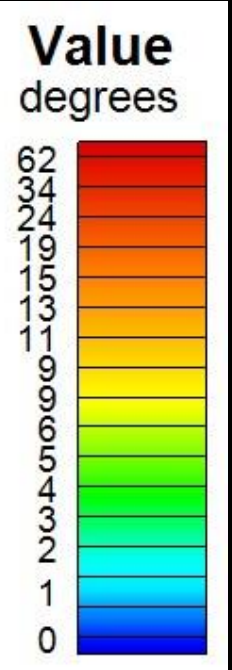
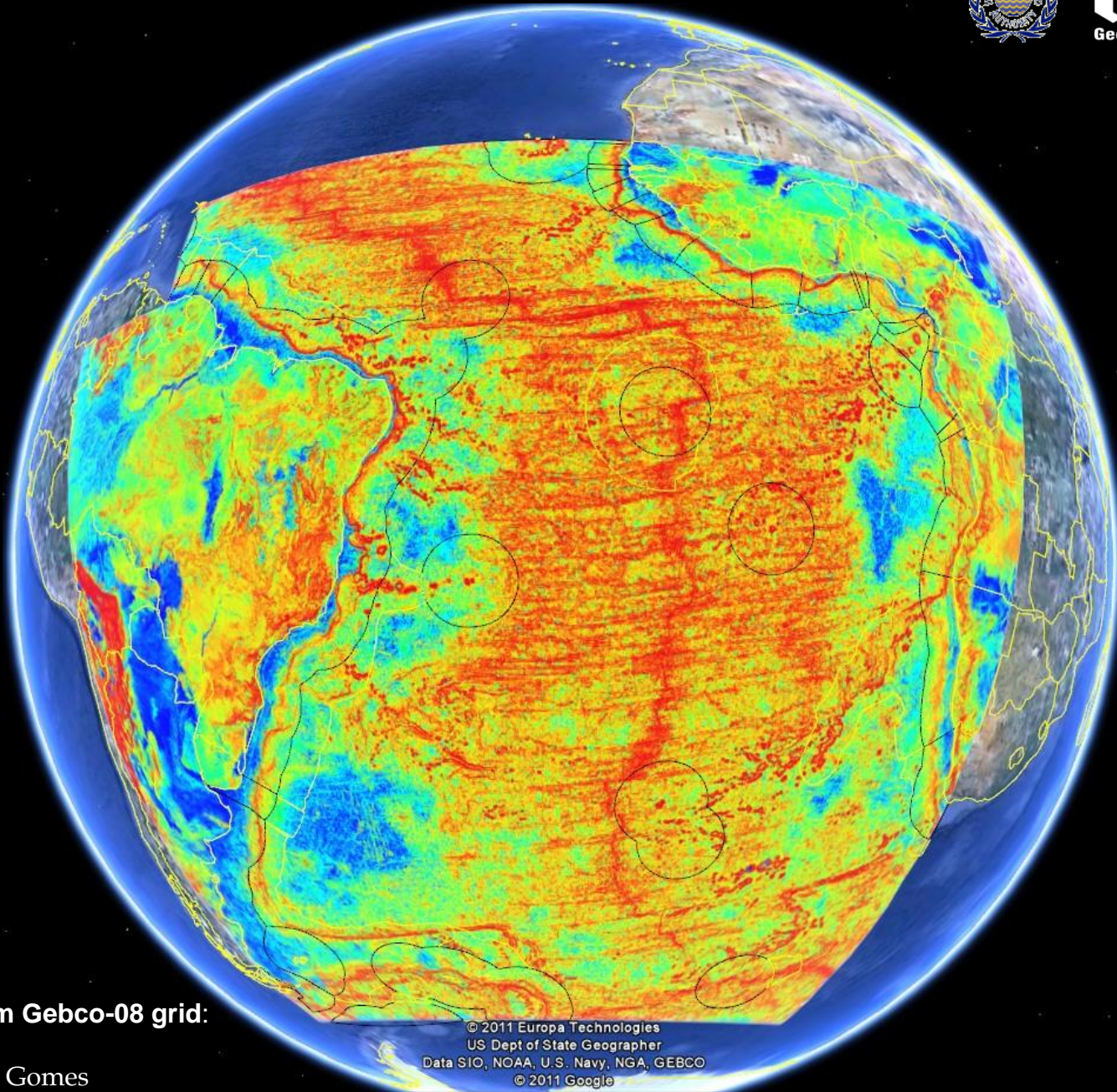


Image derived from Gebco-08 grid:
Geoprocessing:
Francisco Edson M. Gomes

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2011 Google

20°22'58.05"S 4°00'41.11"E elev -4583 m

Magnetic anomalies

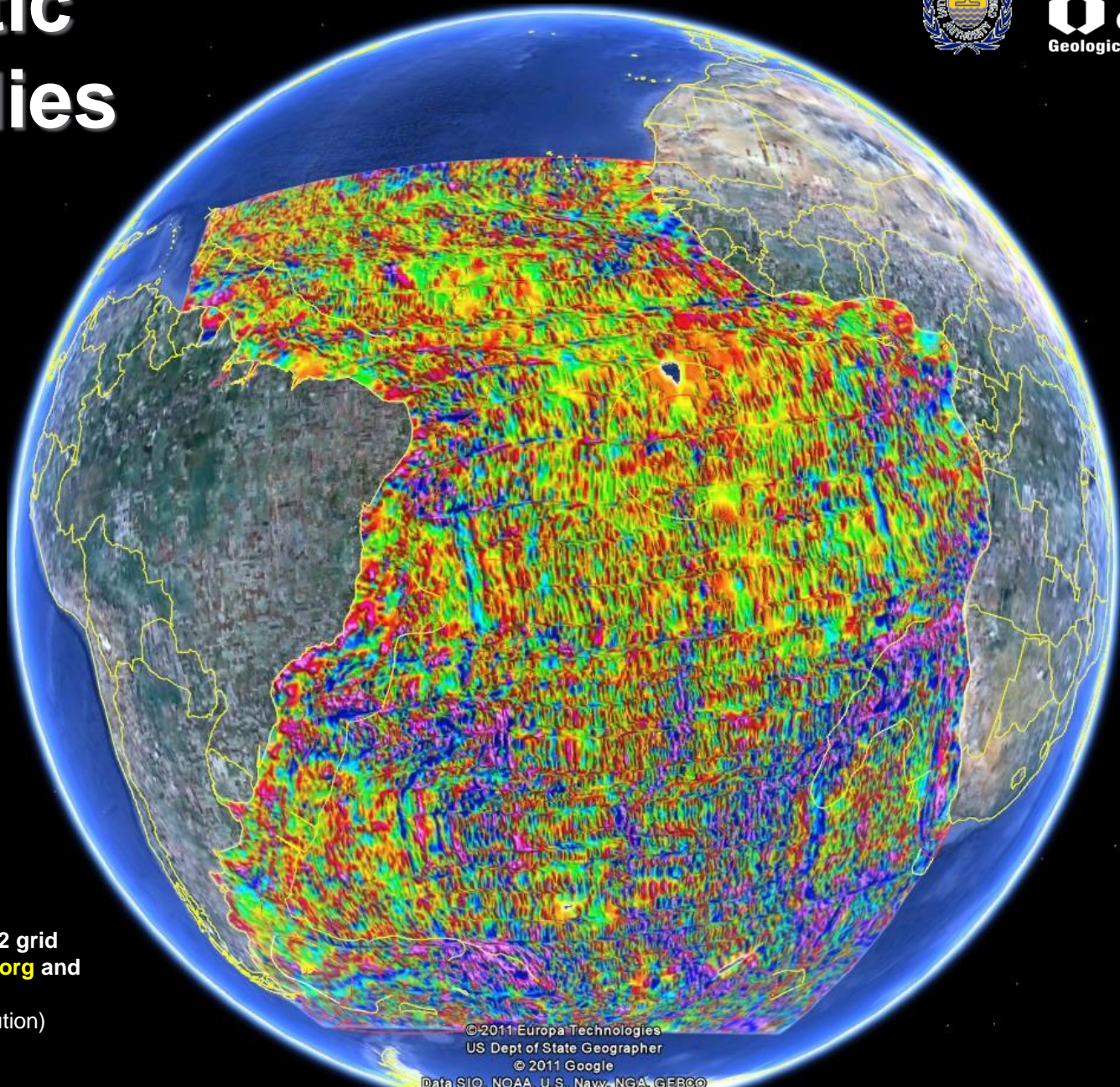
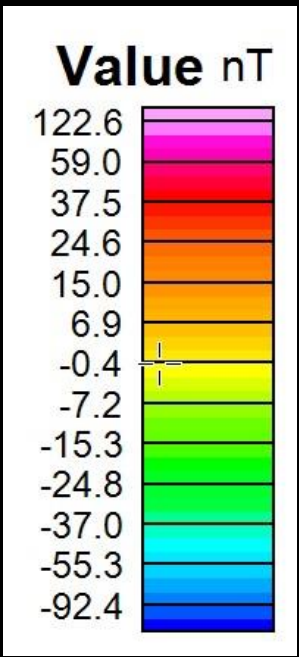


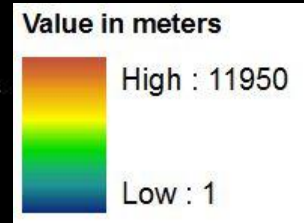
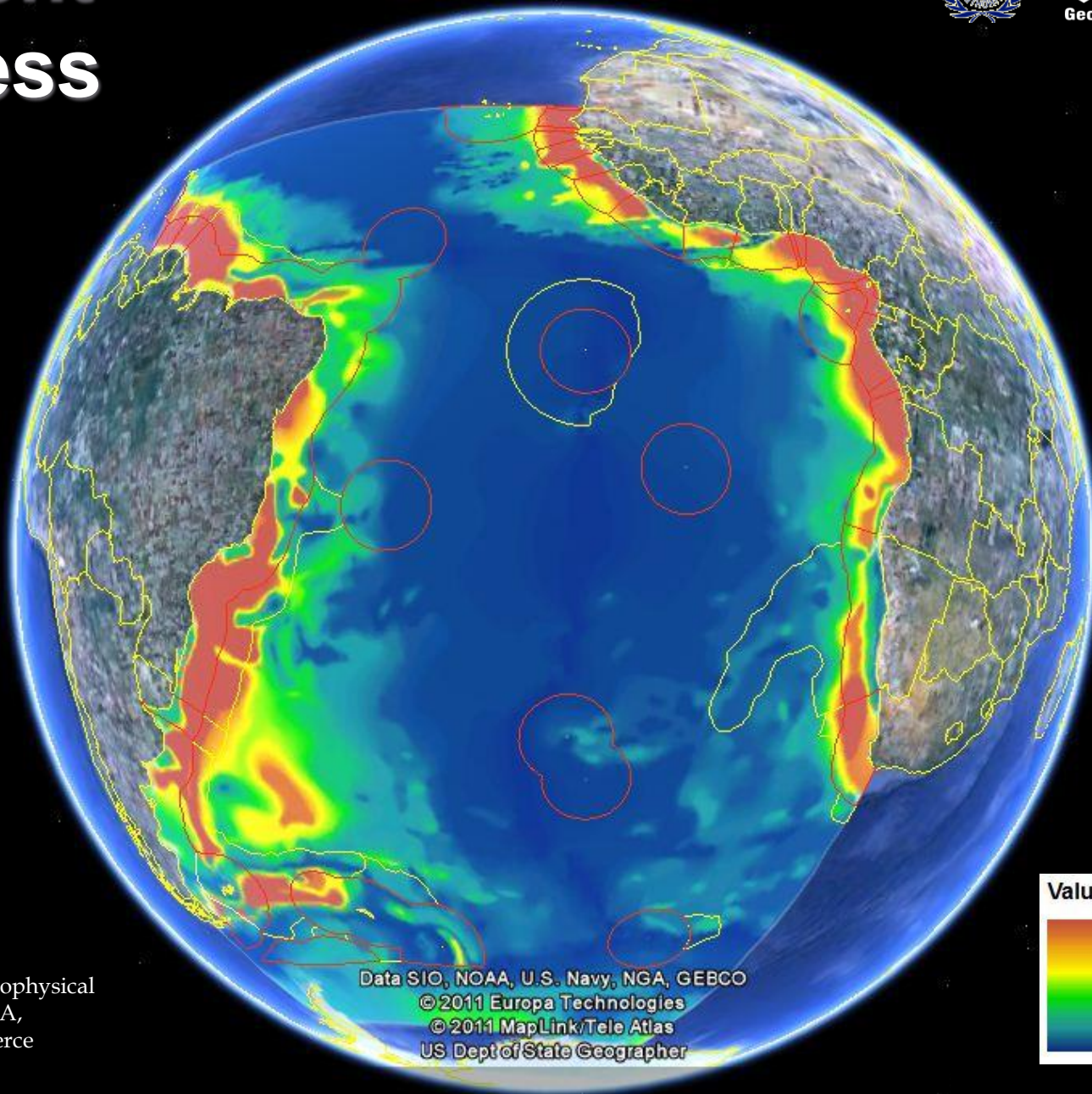
Image derived from EMAG2 grid available at <http://geomag.org> and <http://ngcd.noaa.gov>.
EMAG2 (2-arc-minute resolution)
Geoprocessing:
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Sediment thickness



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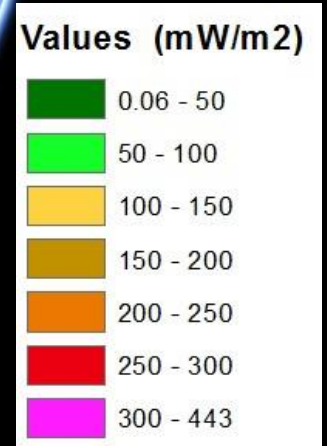
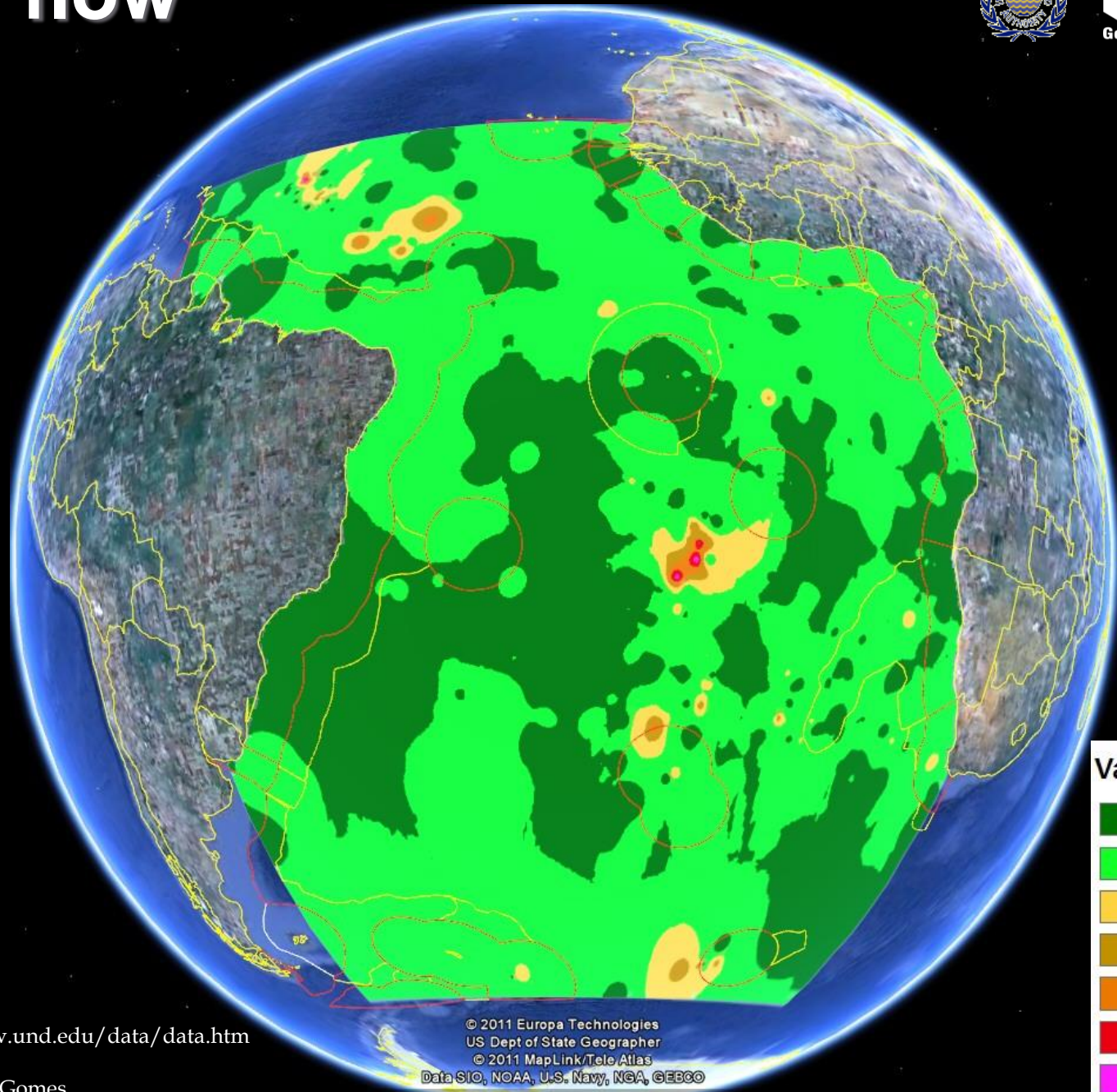
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Source of grid: National Geophysical
Data Center, NESDIS, NOAA,
U.S. Department of Commerce
Geoprocessing:
Francisco Edson M. Gomes

Heat flow



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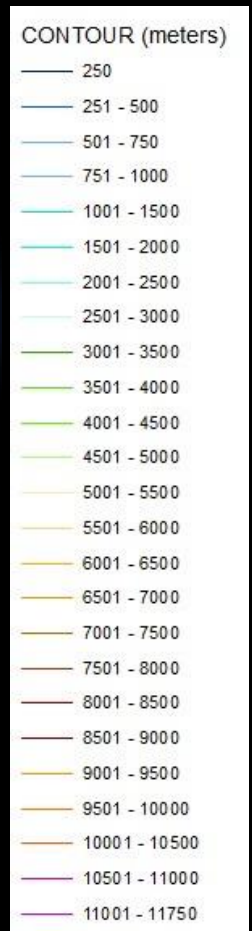
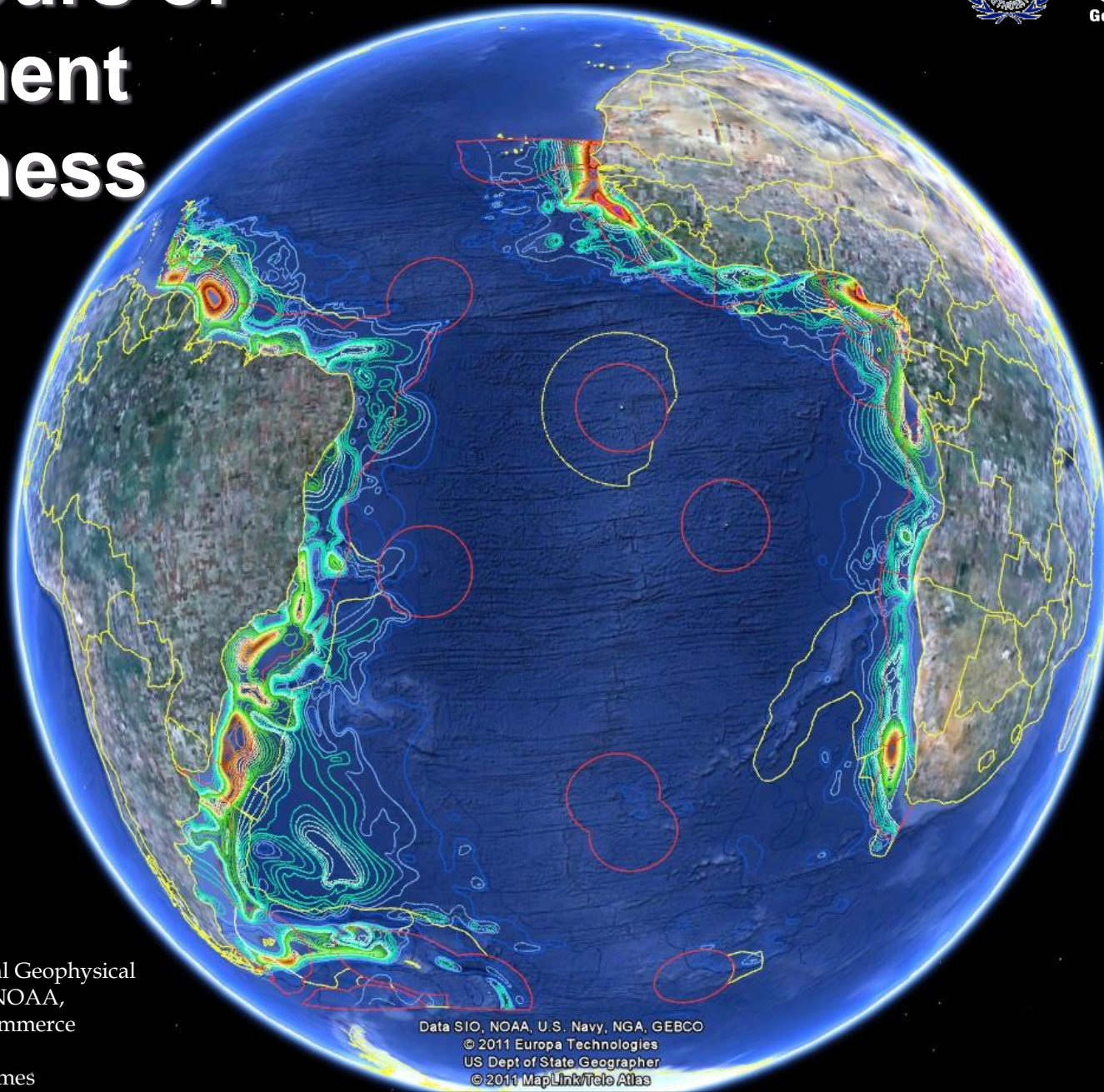
Source of csv files:
<http://www.heatflow.und.edu/data/data.htm>
Geoprocessing:
Francisco Edson M. Gomes

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© 2011 MapLink/Tele Atlas
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
19°04'00.48"S 0°56'48.59"W elev -5120 m

Contours of sediment thickness



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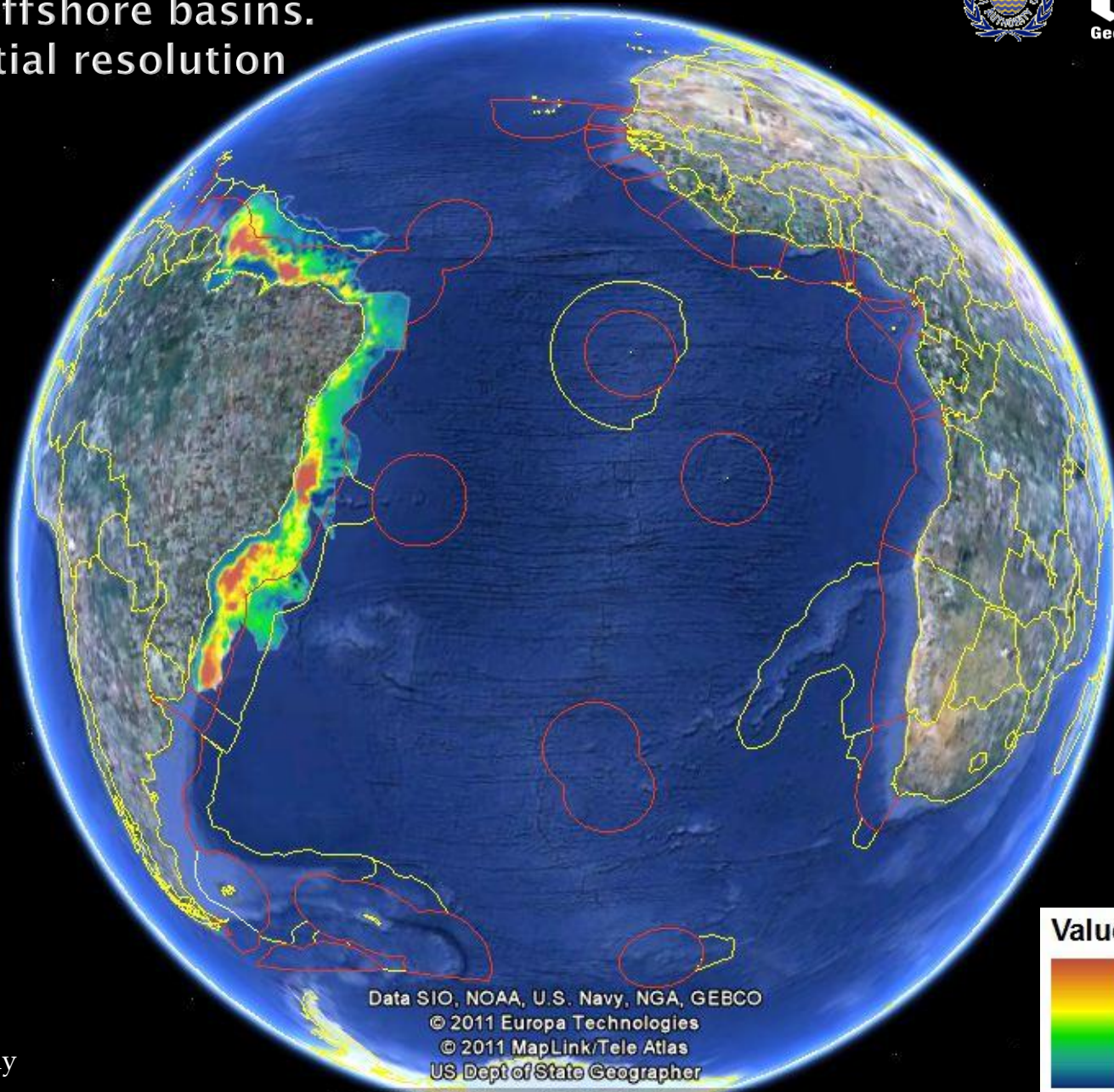
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Source of grid: National Geophysical
Data Center, NESDIS, NOAA,
U.S. Department of Commerce
Geoprocessing:
Francisco Edson M. Gomes

Sediment-thickness of Brazilian offshore basins. High spatial resolution

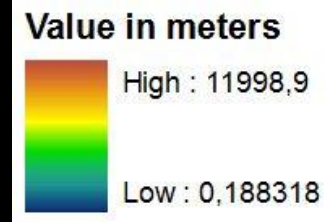


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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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lat -24.109320° lon -17.072772° elev -4397 m



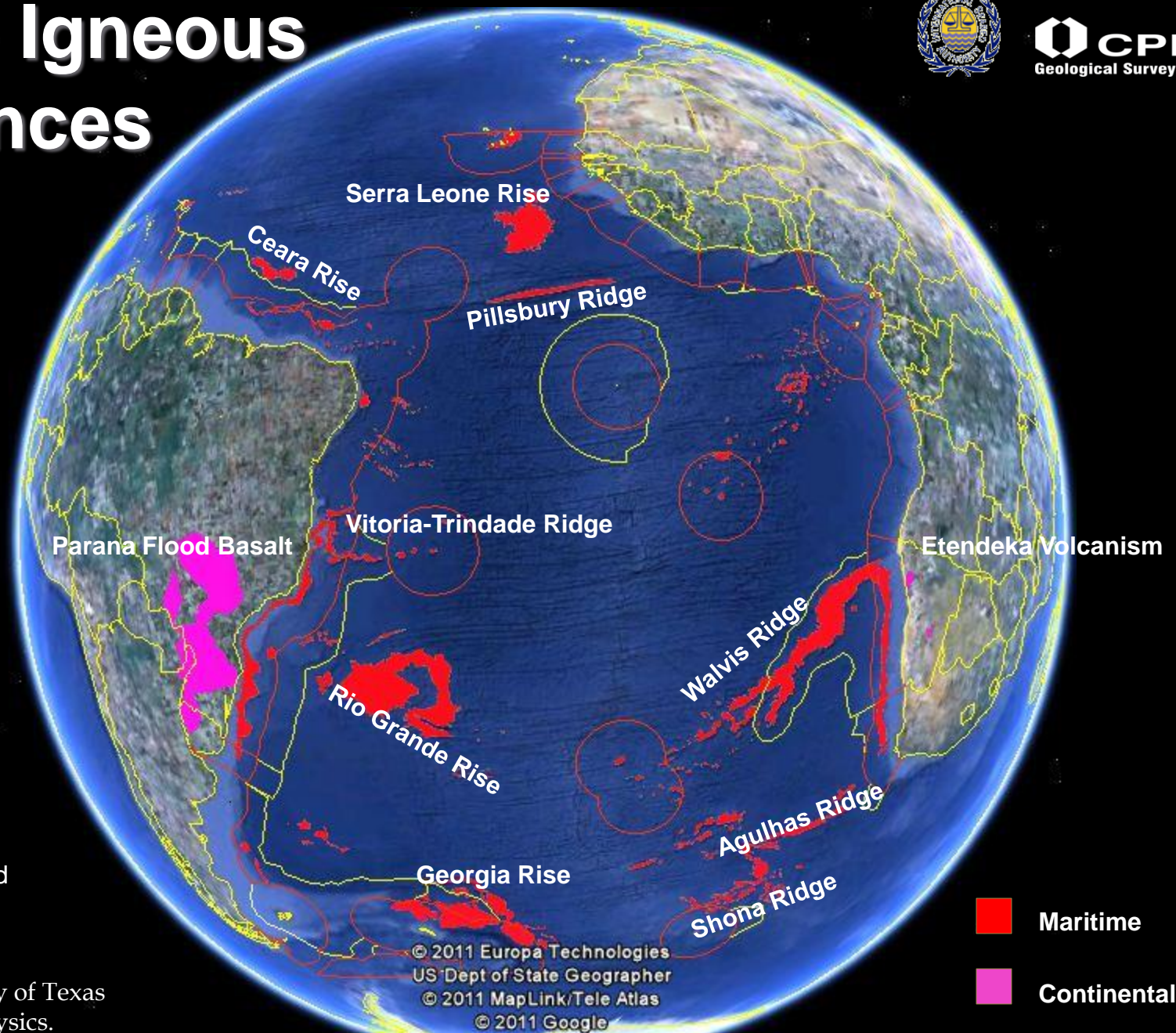
Source: PETROBRAS

Status: Available only
on the coast of Brazil

Large Igneous Provinces



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Status: completed

Source: University of Texas
Institute of Geophysics.
Modified by
Francisco Edson M. Gomes

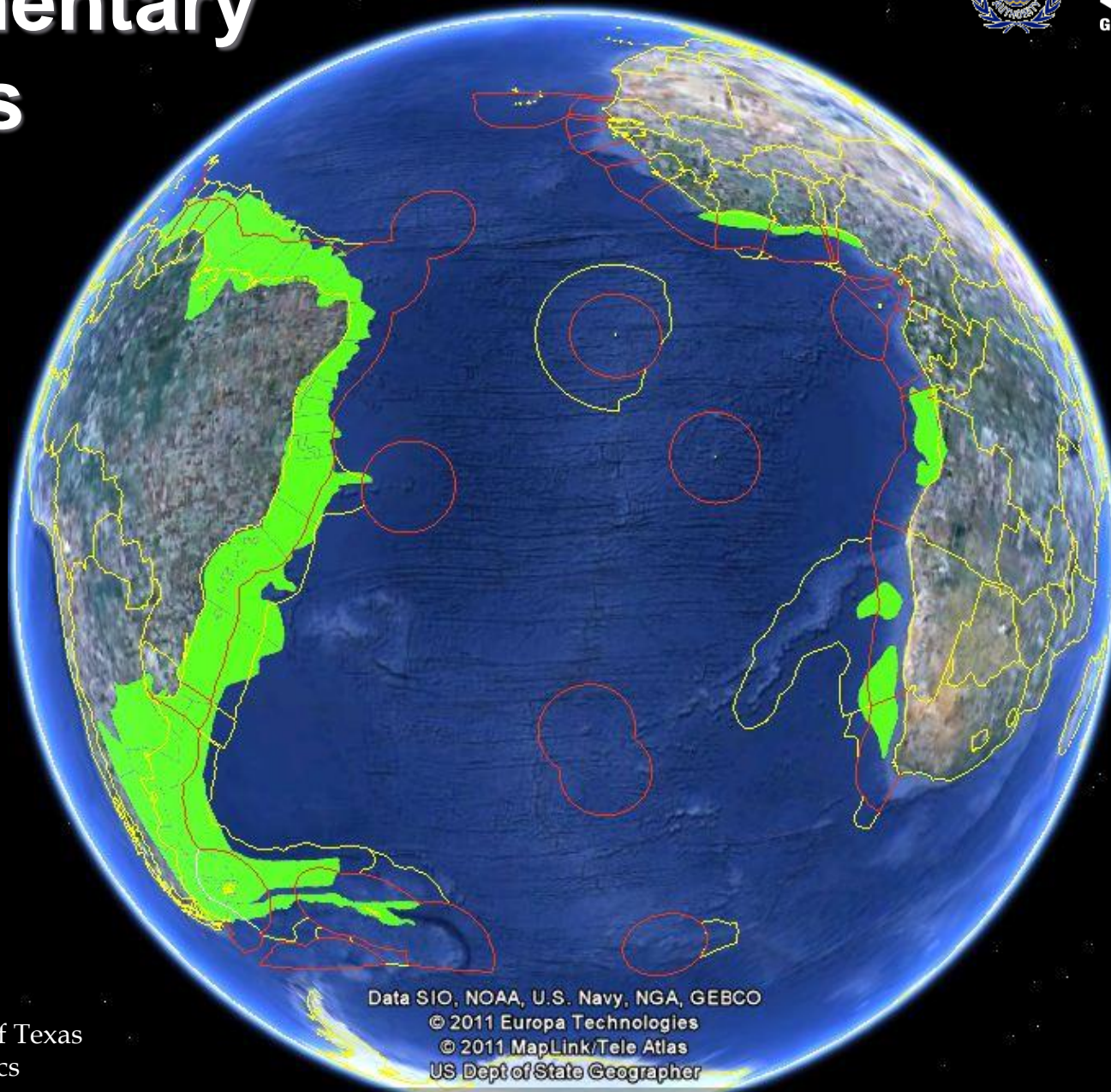
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US Dept of State Geographer
© 2011 MapLink/Tele Atlas
© 2011 Google

lat -19.560280° lon -20.491388° elev -4906 m

Sedimentary basins



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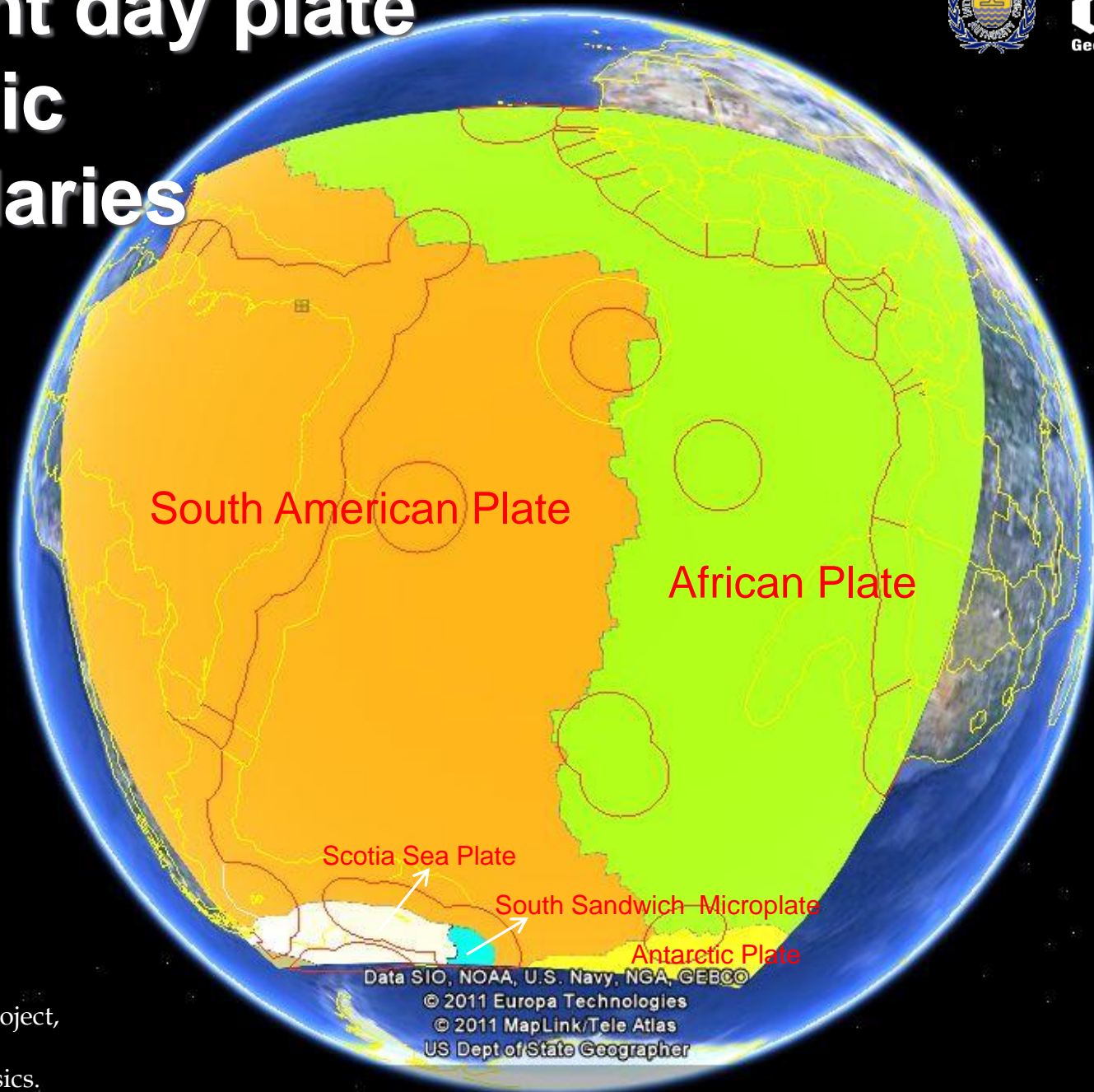
Status: missing
complementary
data on African side

Source: University of Texas
Institute of Geophysics
Modified by
Francisco Edson M. Gomes

Present day plate tectonic boundaries



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South American Plate

African Plate

Scotia Sea Plate

South Sandwich Microplate

Antarctic Plate

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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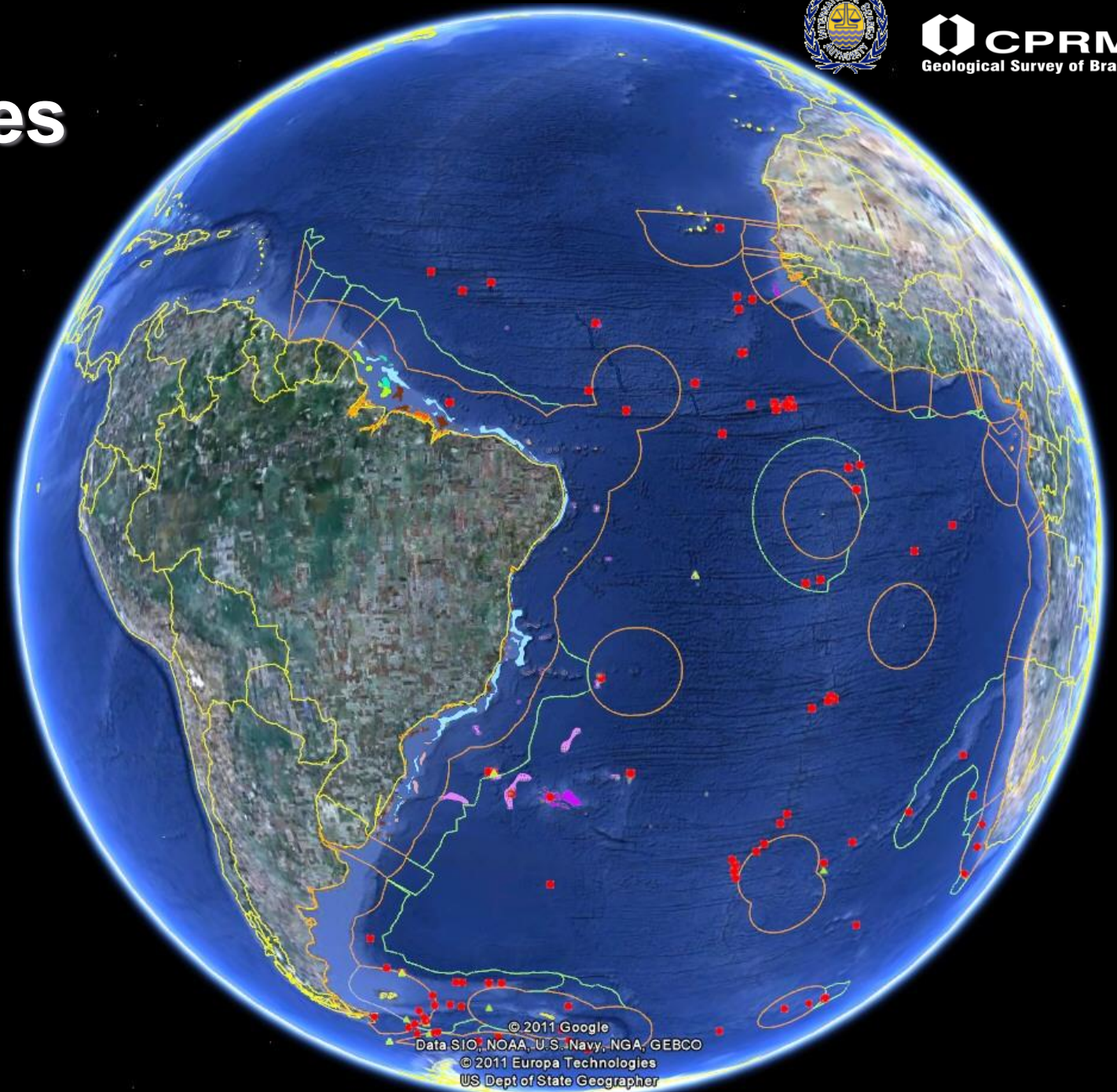
US Dept of State Geographer

Source: PLATES Project,
University of Texas
Institute of Geophysics,
Modified by Francisco Edson M. Gomes

Mineral Resources



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Legend

recursos_minerais

SUBSTANCIA

	Crosta cobaltífera
	Areia
	Calcário
	Carrvão
	Diamante e minerais pesados
	Escândio
	Fosforita
	Ilmenita
	Ilmenita, e/ou monazita, e/ou zircão, e/ou rutilo
	Nódulos polimetálicos
	Ouro e minerais pesados
	Sais de potássio
	Salgema
	Sulfetos polimetálicos
	Vanádio

Polymetallic Nodules

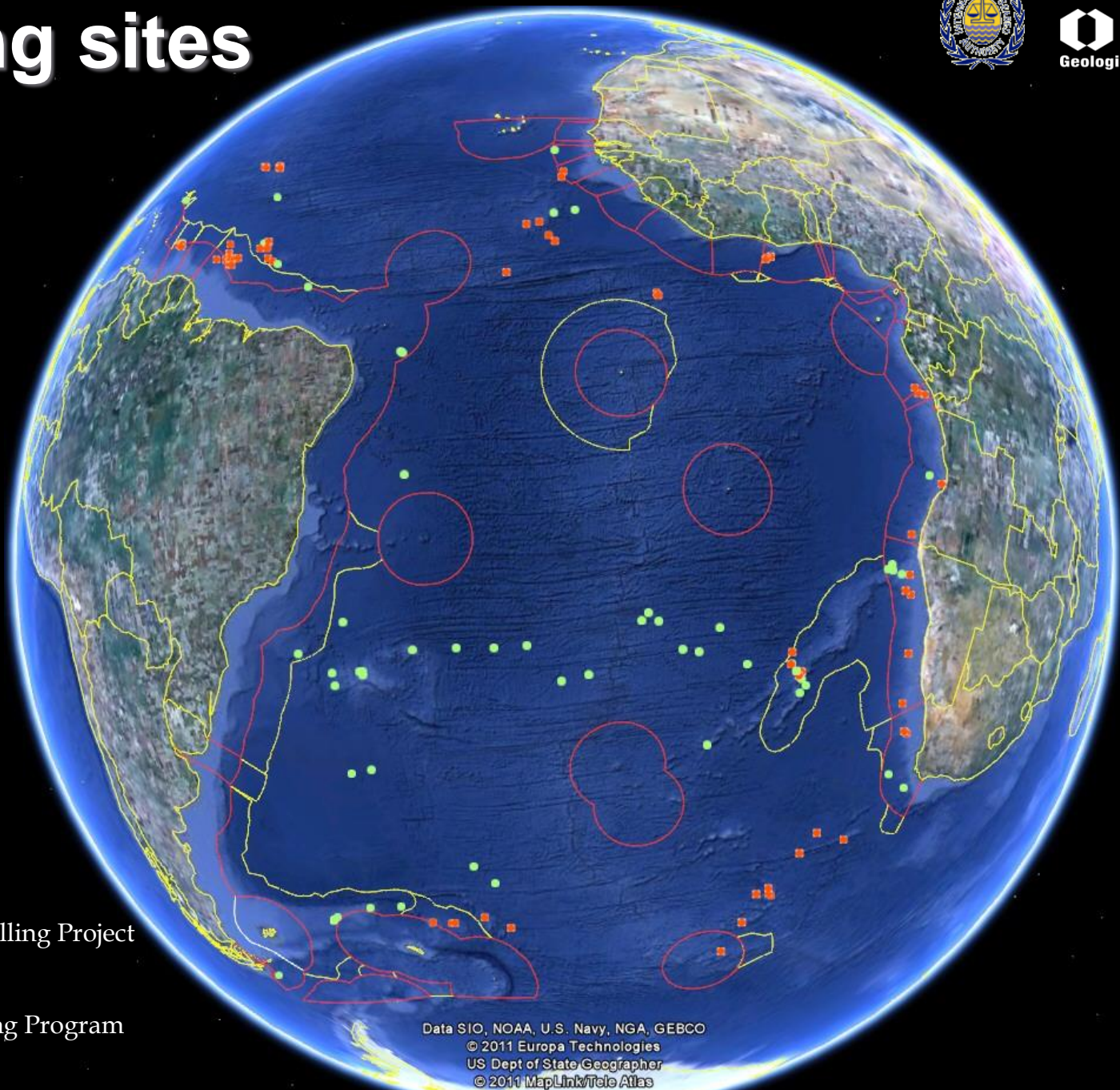
Ferromanganese crust occurrences

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Drilling sites



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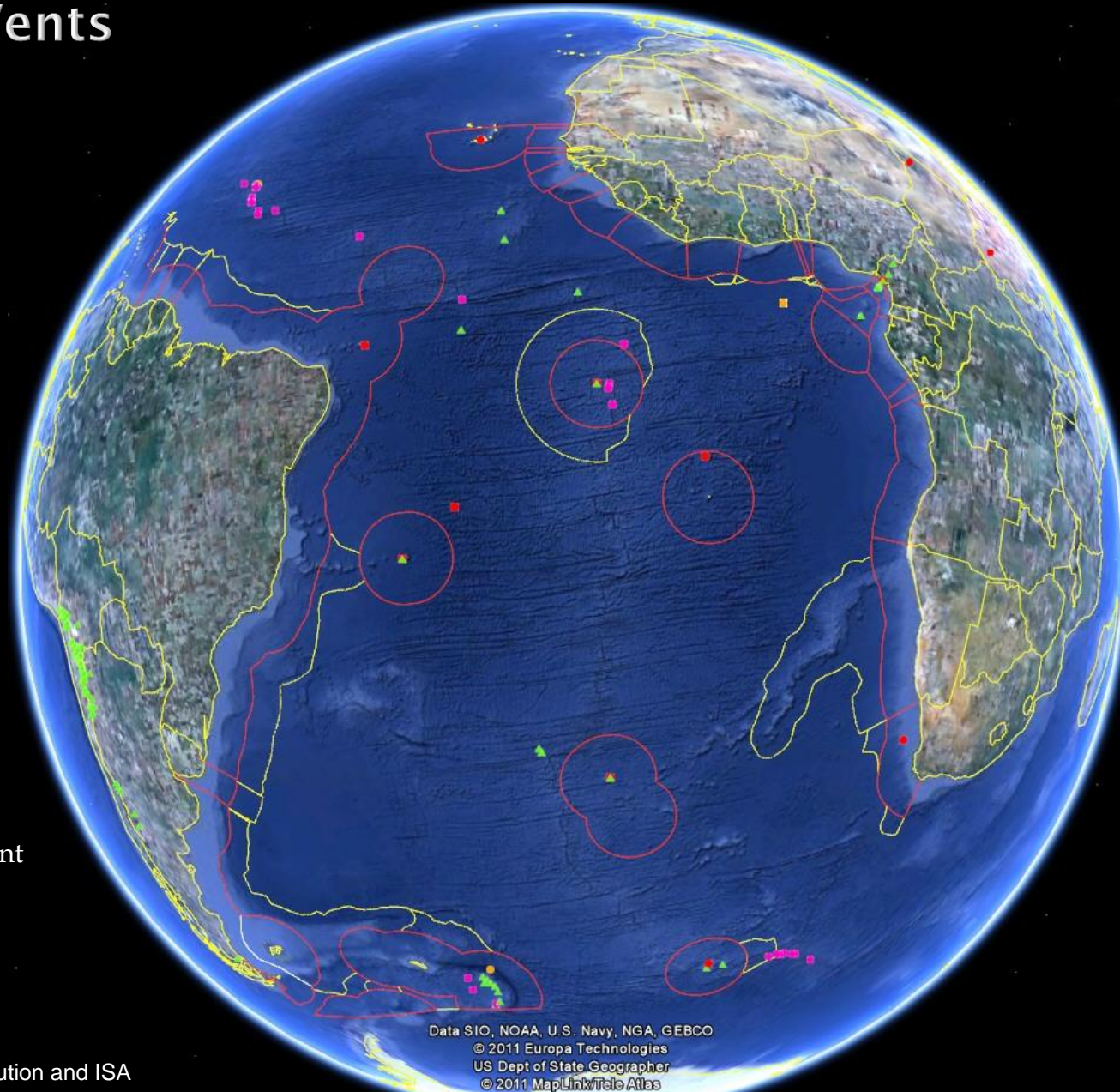
● Deep Sea Drilling Project (DSDP)

● Ocean Drilling Program (ODP)

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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US Dept of State Geographer
© 2011 MapLink/Tele Atlas

4°42'40.57" S 32°19'22.35" W elev -4693 m

Volcanoes, Hot spots and Vents



- Hydrothermal vent
- ▲ Volcano
- Hot spot

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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© 2011 MapLink/Tele Atlas

3°19'20.98"S 3°37'20.99"E elev -4821 m

Significant earthquakes (Magnitudes ≥ 5)



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Status: completed

Source: USGS

US Dept of State Geographer
© 2014 Google
© 2009 GeoBasis-DE/BKG
Data SIO, NOAA, U.S. Navy, NSA, GEBCO



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ANGOLA-BRAZIL GEOTRANSECT DATA

SURVEYED AREA



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SAMPLE LOCATIONS



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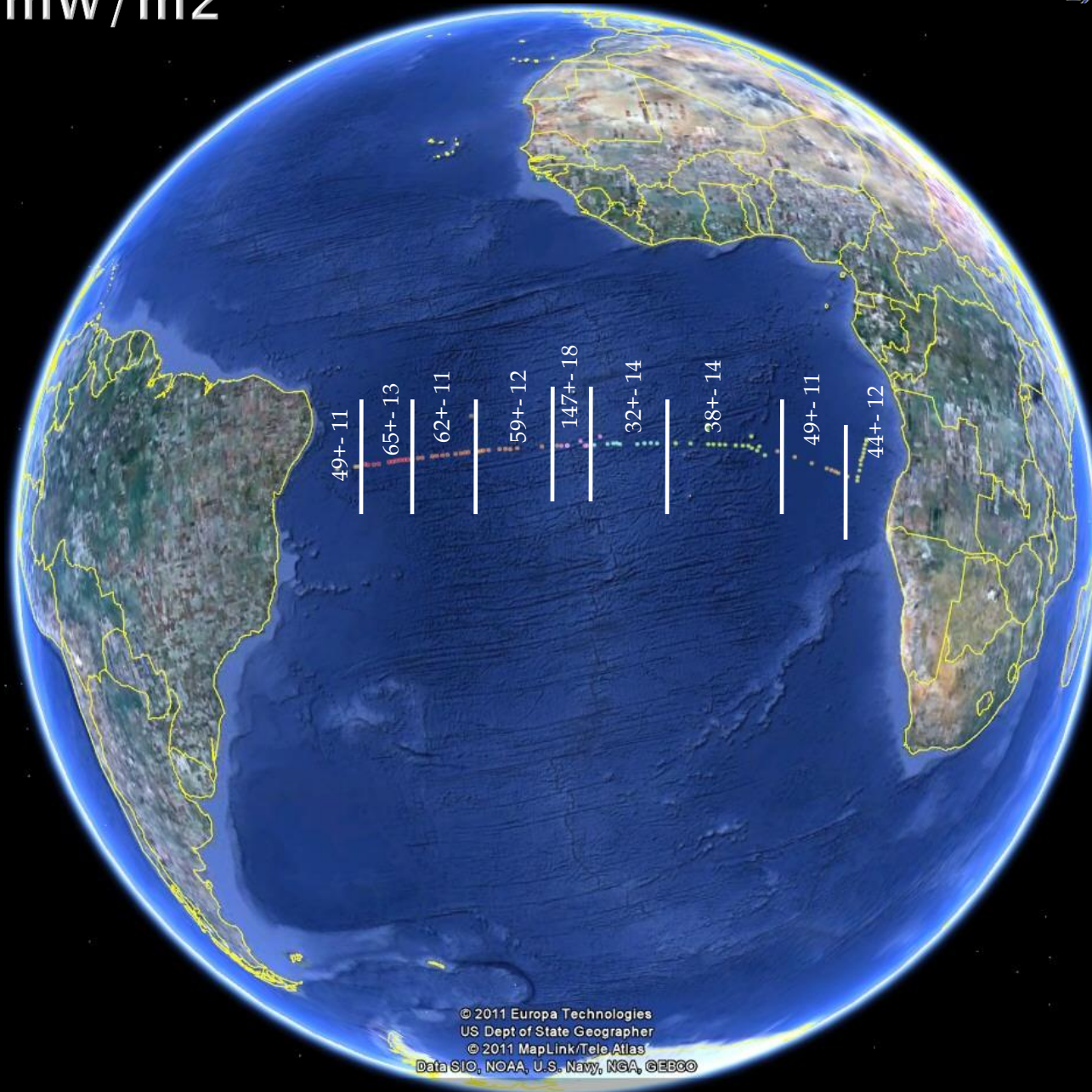
- End drager
- Start drager
- Undefined
- ▲ drager "Sigsbi"
- gravity corer
- small box corer

Samples collected between
1981 and 1987

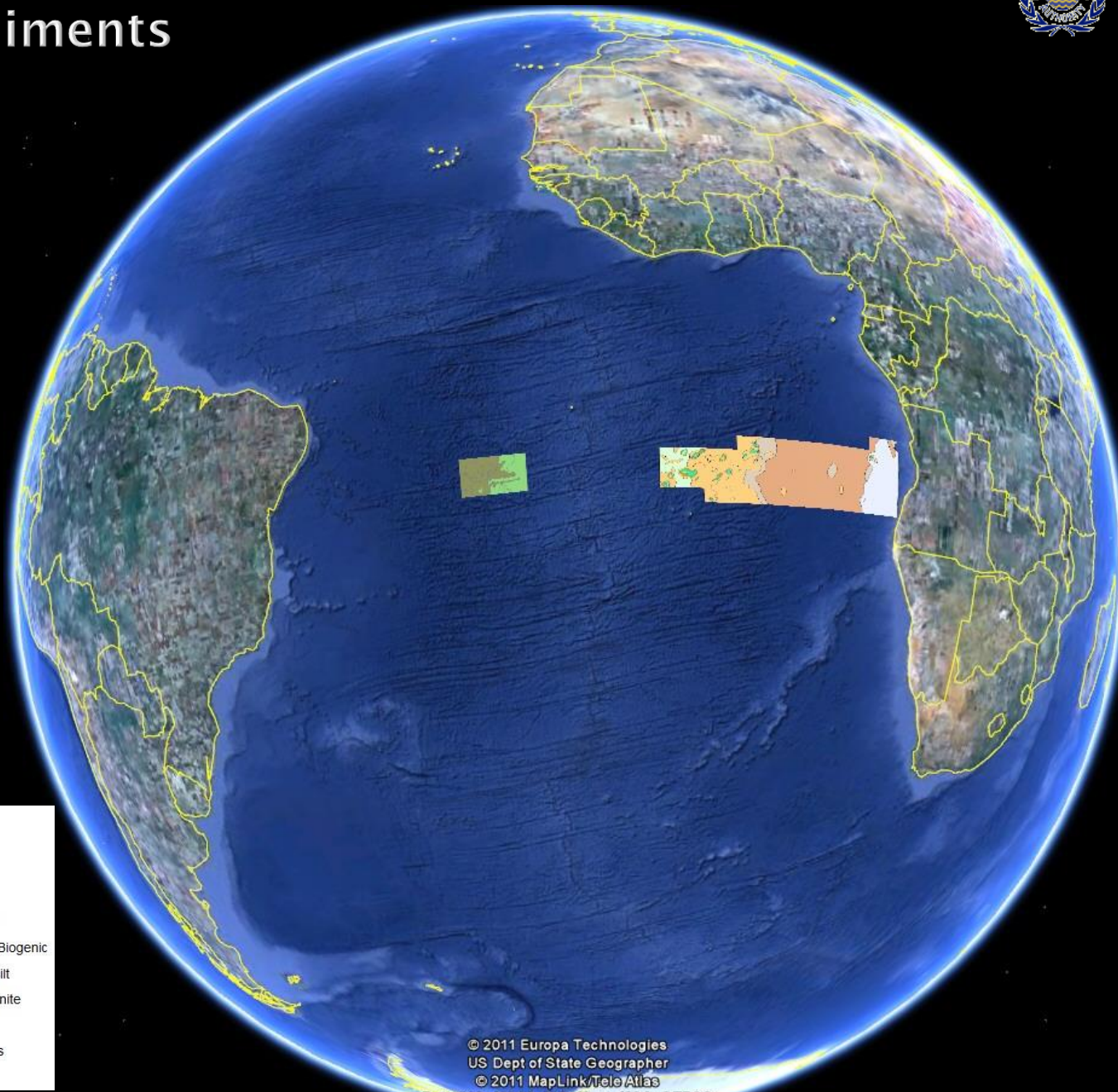
Average Heat Flow mW/m²



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Types of bottom sediments



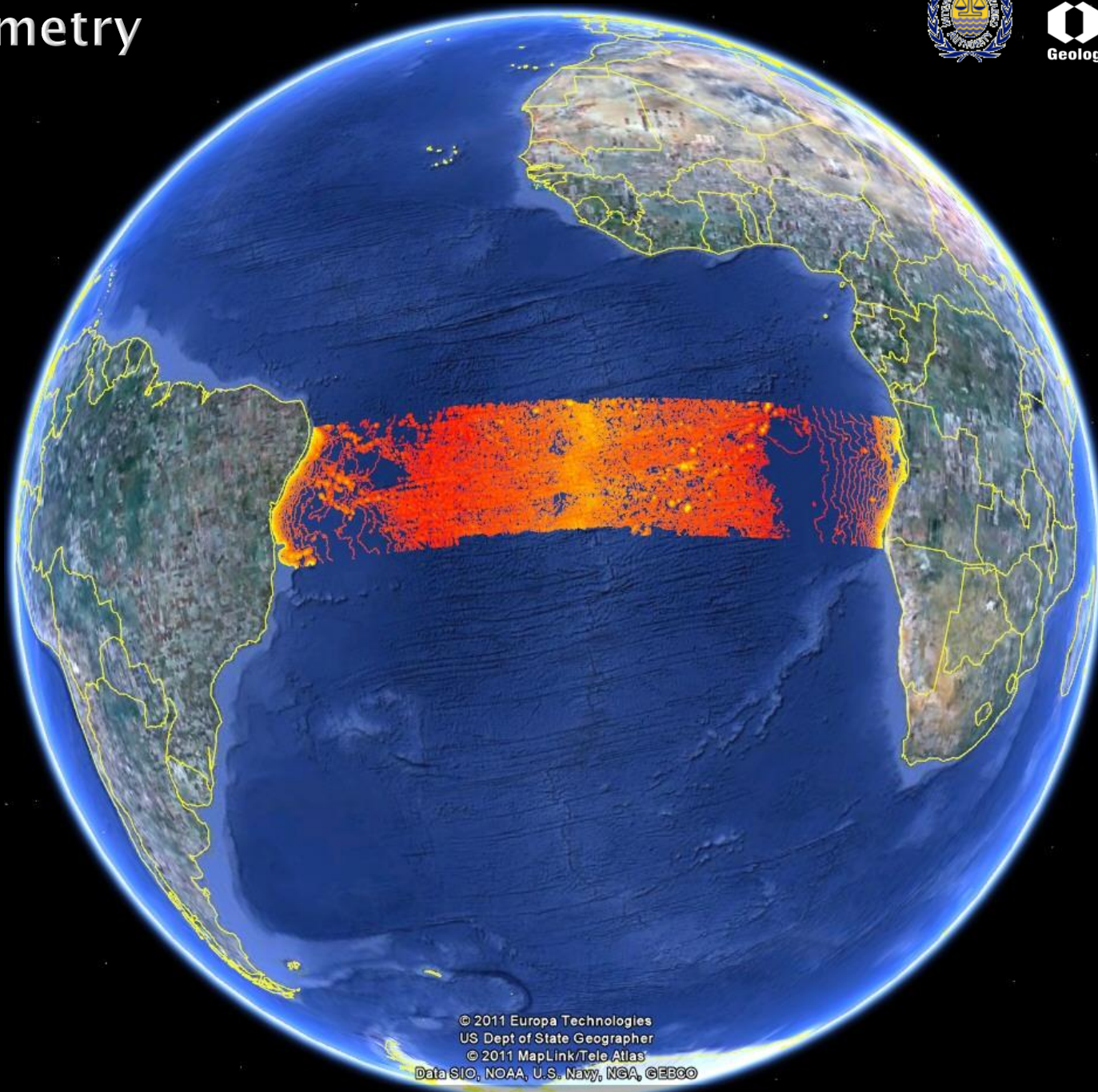
- Biogenic sediments
- Clay - terrigenous
- Dolerite
- Limestone
- Poligenic sediments
- Sand an silty sand - Biogenic
- Sandy clay bearing silt
- Silty clay with glauconite
- Silty clay- biogenic
- Silty clay- terrigenous
- Silty sand - biogenic

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Bathymetry

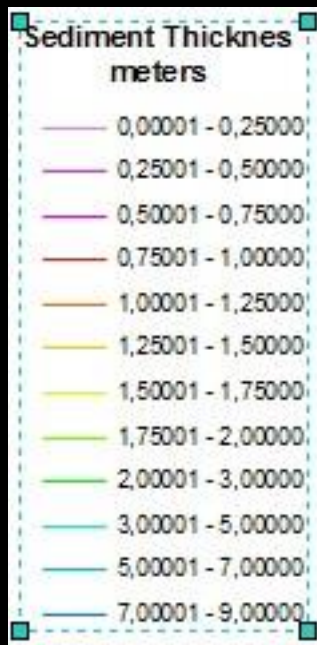
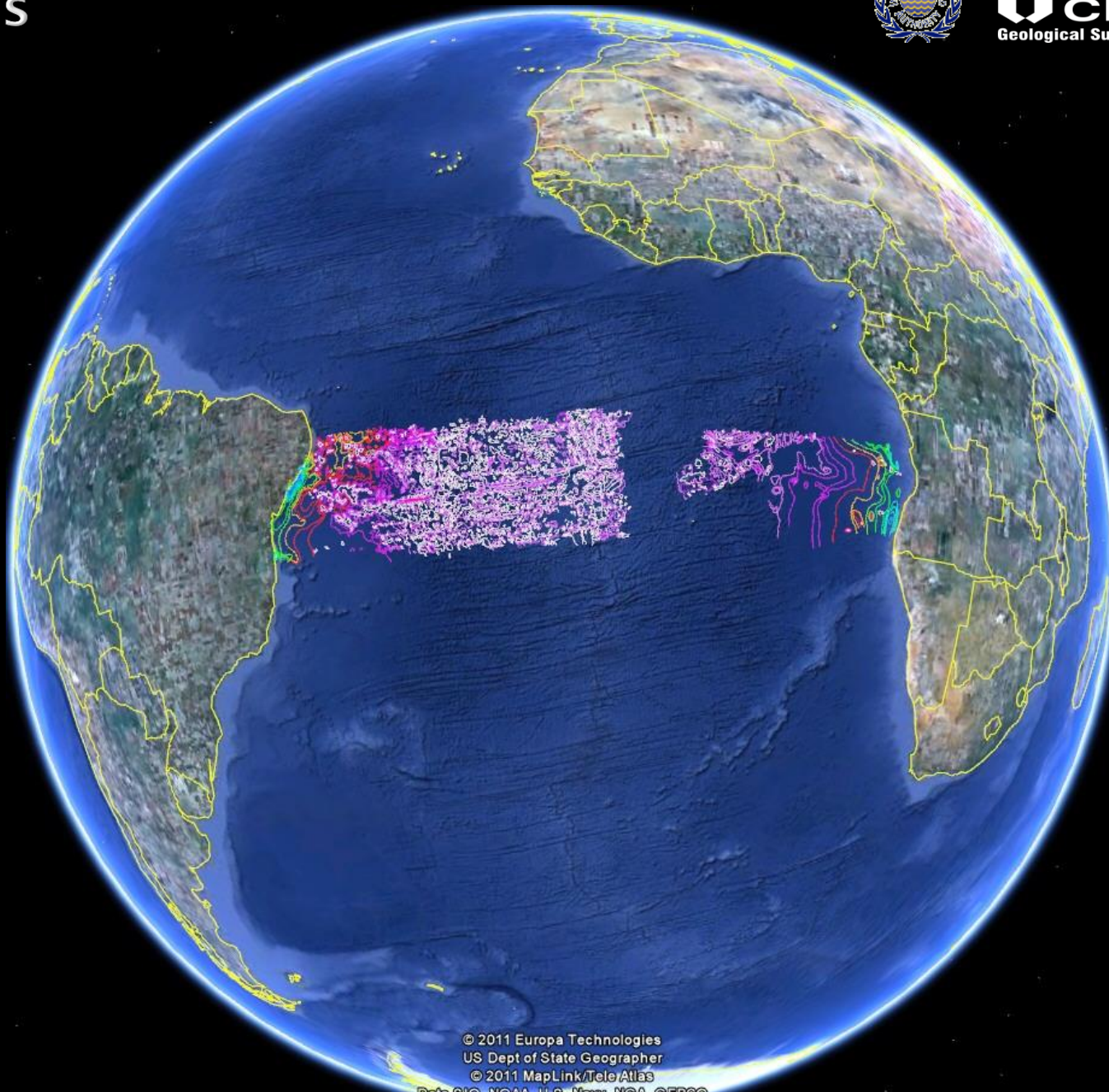


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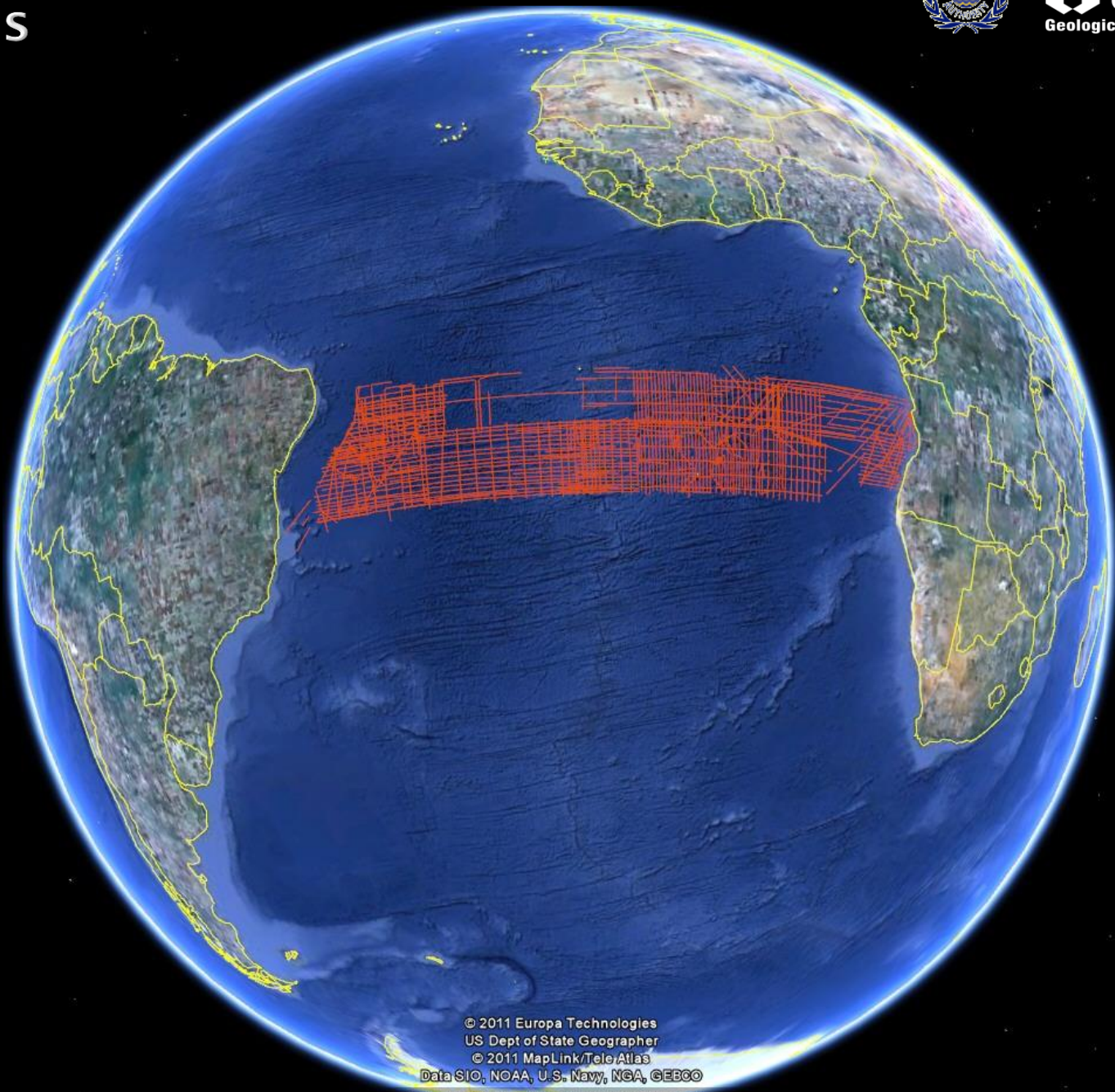
Isopachs



Magnetometry Lines



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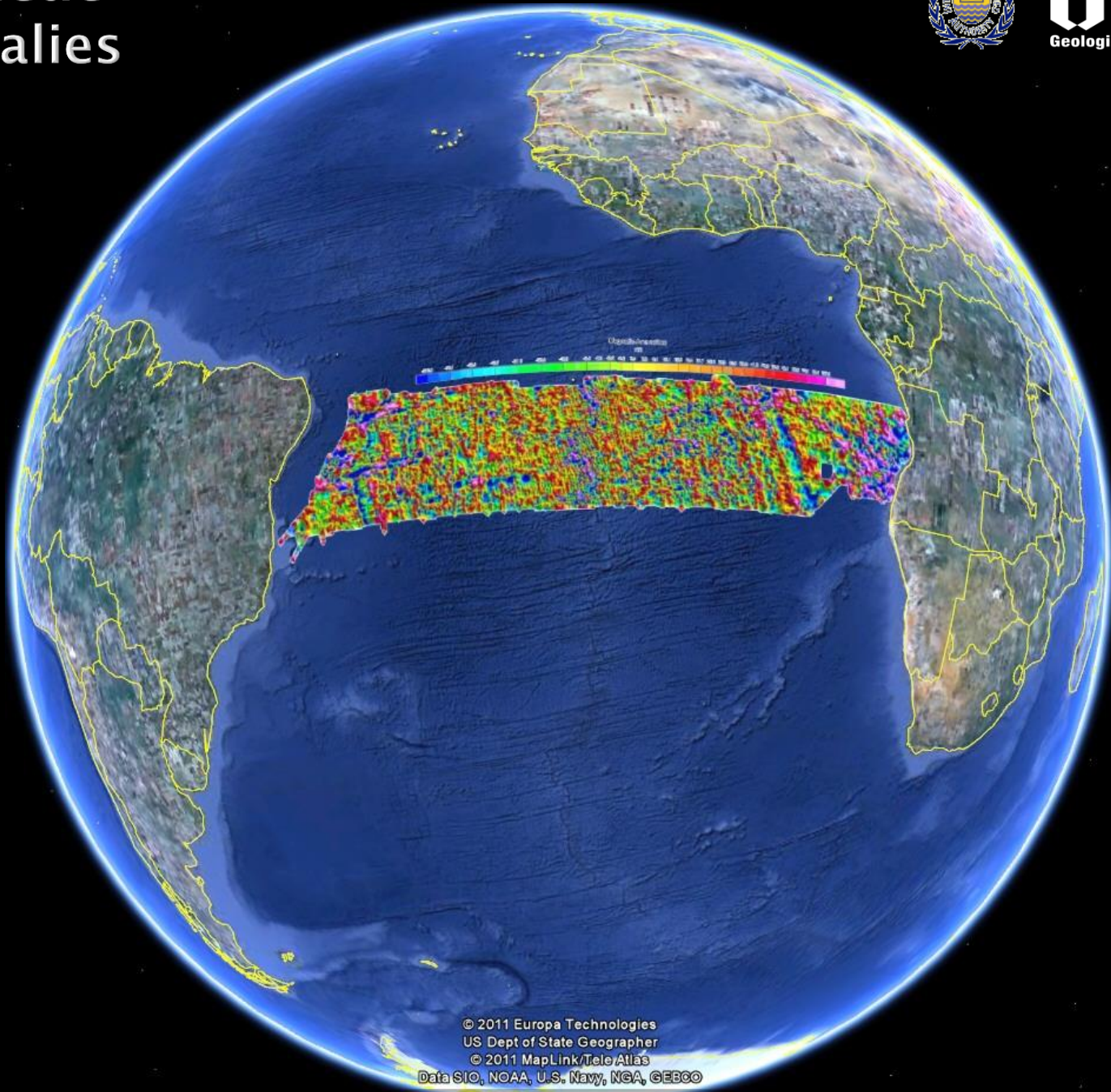


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Magnetic Anomalies



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37°05'37.90\"/>



Thank You

Francisco Edson M. Gomes

E-mail: edson.gomes@cprm.gov.br