

FIG
2018
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6-11 May 2018

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XVI FIG Congress 2018

Selection of Algorithms to Determine Foot of the Continental Slope to Delineate the Extended of the Continental Shelf

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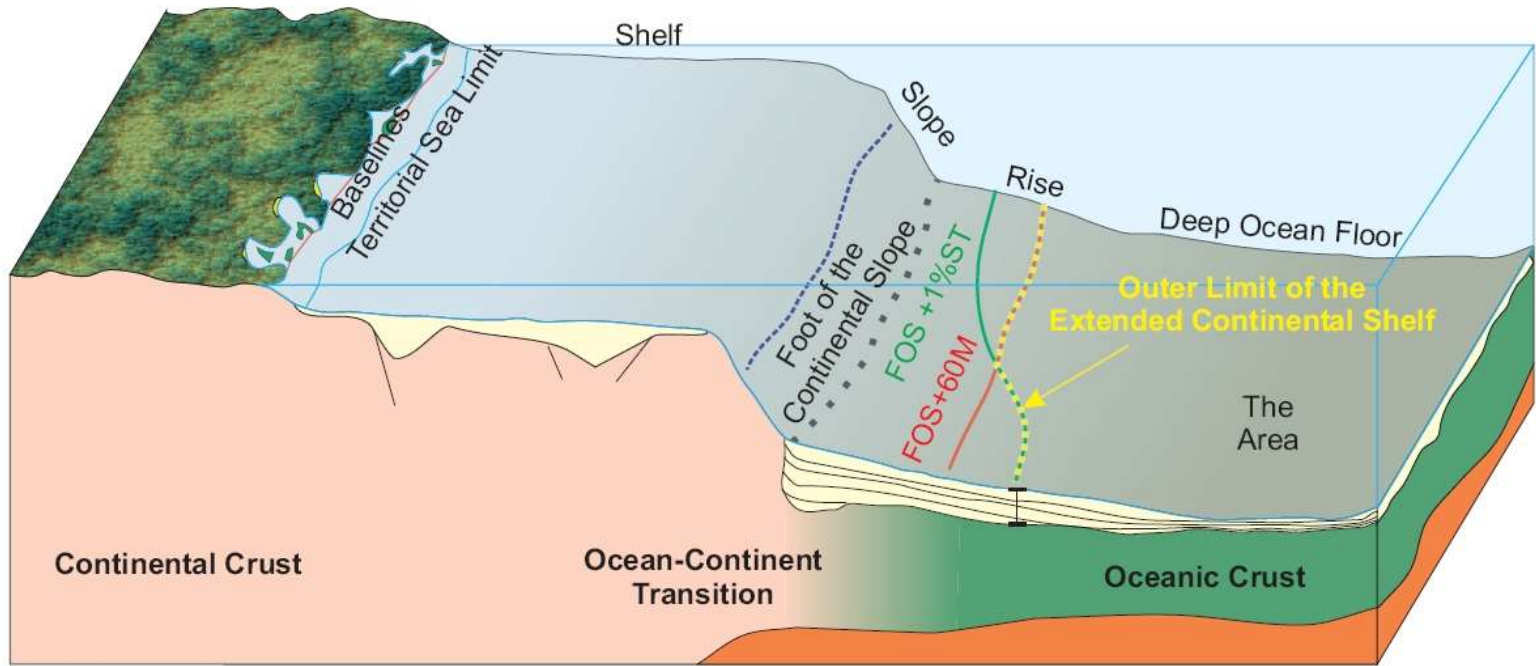


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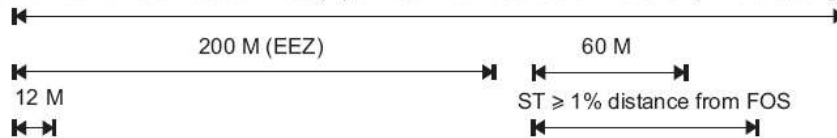


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Maximum Limit - 350 Nautical Miles (M) or 100 M from the 2500 m isobath (whichever is greater)



Source: <http://www.geolimits.com/>

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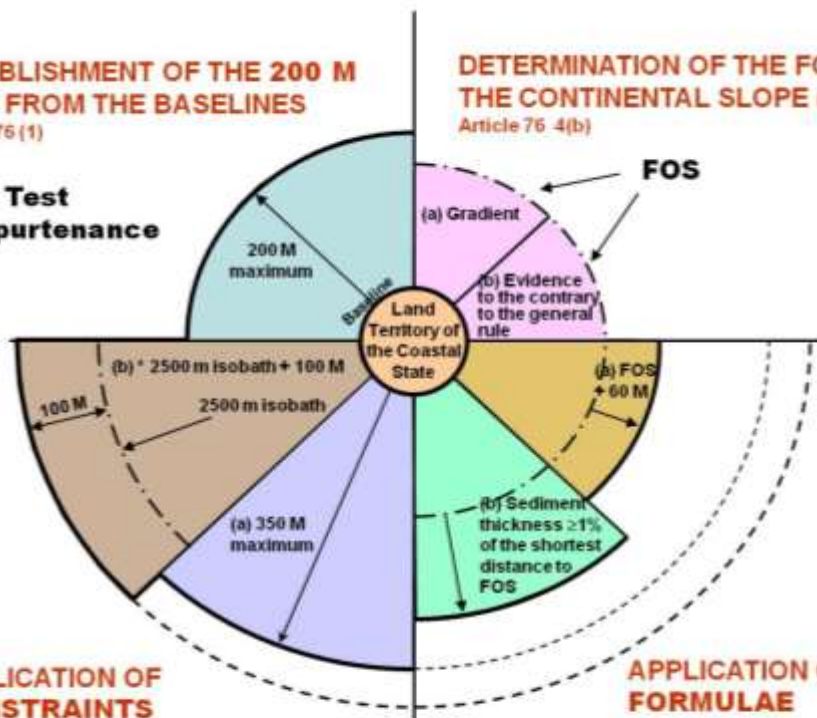
**ESTABLISHMENT OF THE 200 M
LIMIT FROM THE BASELINES**

Article 76 (1)

**DETERMINATION OF THE FOOT OF
THE CONTINENTAL SLOPE (FOS)**

Article 76 4(b)

**Test
of Appurtenance**



**APPLICATION OF
CONSTRAINTS**

Article 76 (5)

**APPLICATION OF
FORMULAE**

Article 76 4(a)

Note: * This criterion applies in the case of submarine ridges but does not apply in the case of submarine elevations

**Application of
Formulae and
Constraints for
establishing the
Outer Limits of the
Continental Shelf**

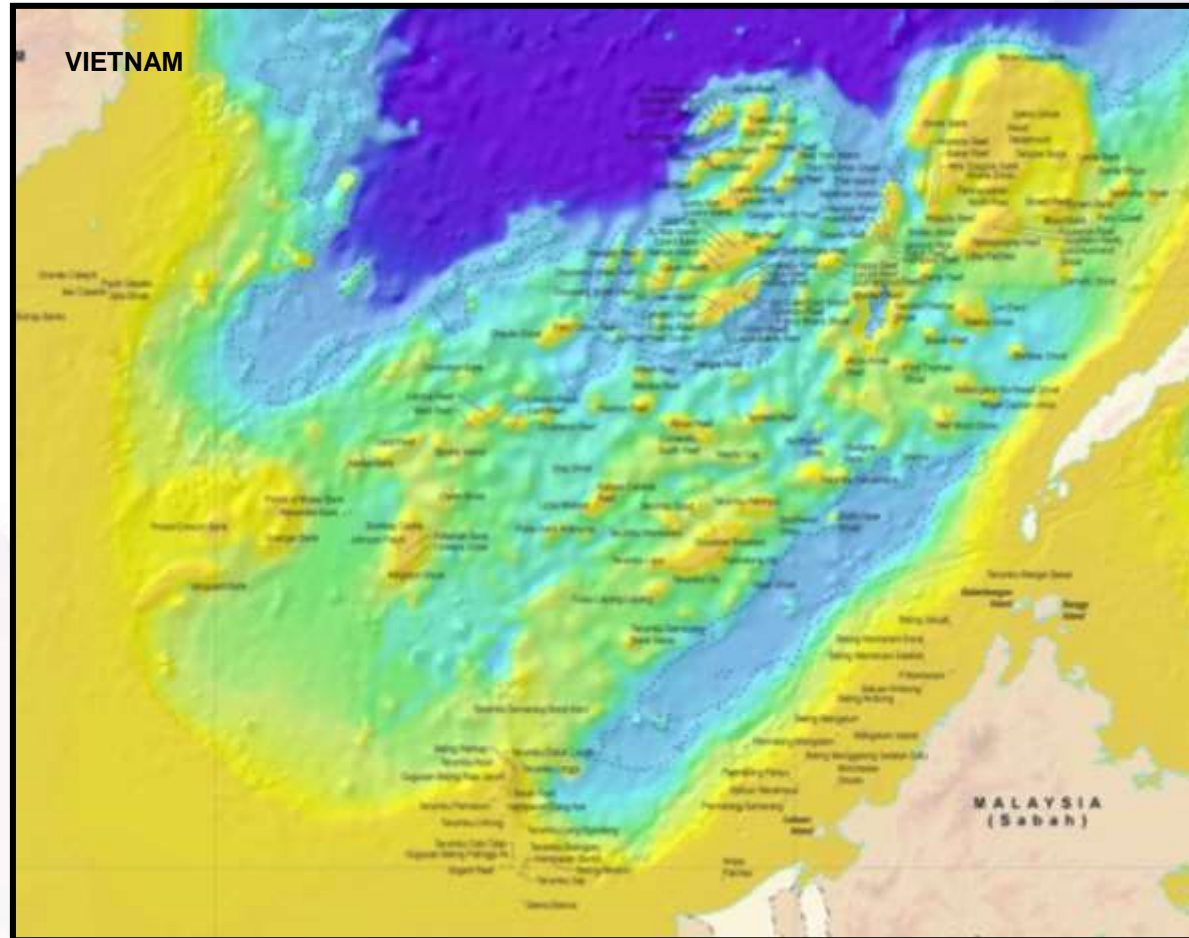


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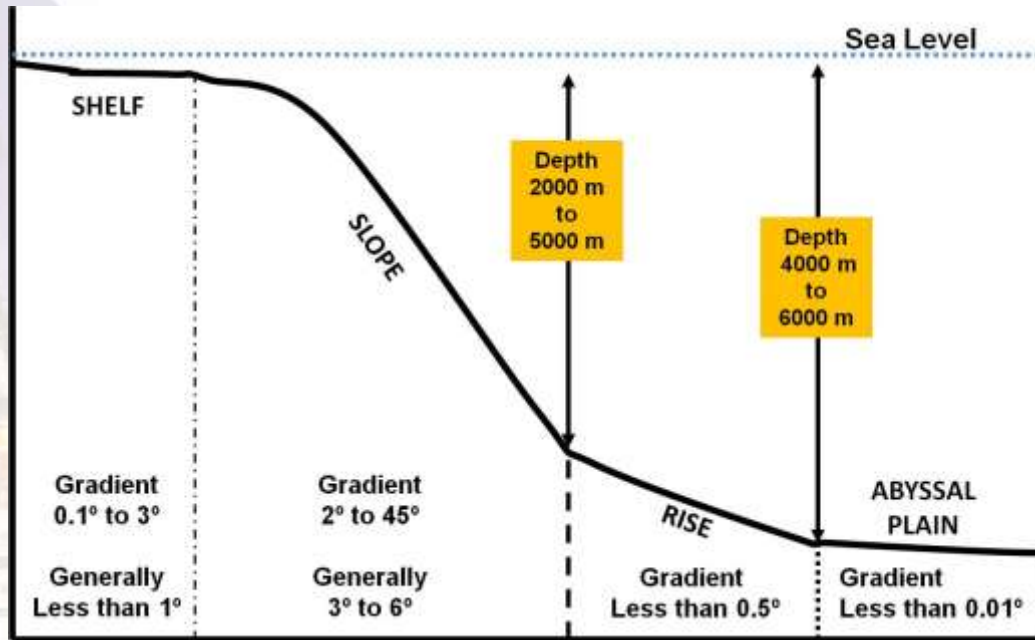
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Identification of Base of Slope (BOS) Region



Cross section of simple seafloor morphology and gradients (after Symonds et al., 2000)

The base of slope is defined as:

“From a geomorphological perspective, the shelf in ideal cases is the part of the seabed adjacent to the continent, which forms a large submerged terrace that dips gently seaward. The breadth of the shelf depends on the geological evolution of the adjacent continent. The continental shelf extends seaward to the continental slope, which is characterized by a marked increase in gradient. The base of the slope is a zone where the lower part of the slope merges into the top of the continental rise or into the top of the deep ocean floor, in the case where no rise exists”.

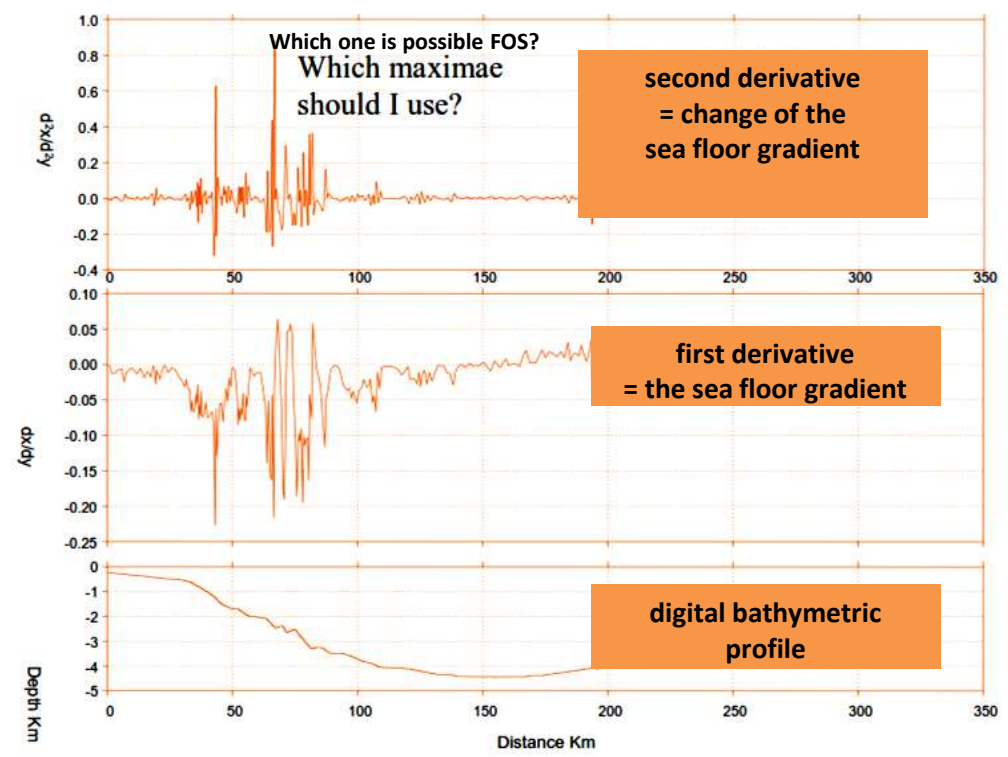
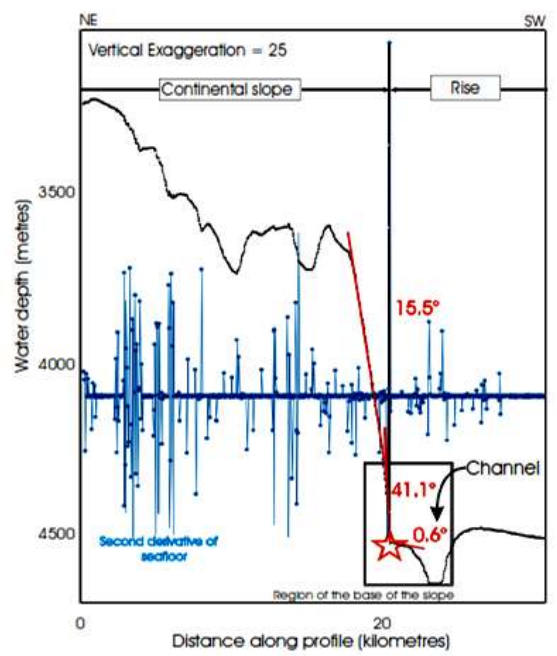
[paragraph 6.2.2. of CLCS/11 (1999)]



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Determination of Foot of the Continental Slope by means of Point of Maximum Change in the Gradients at its Base



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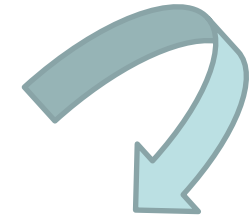
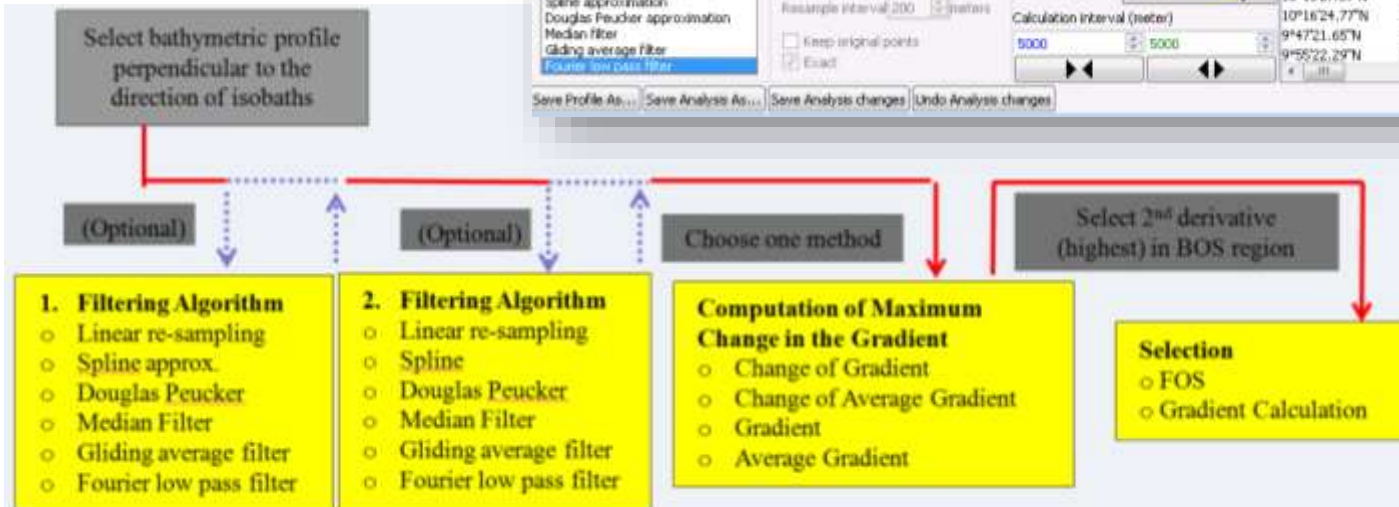
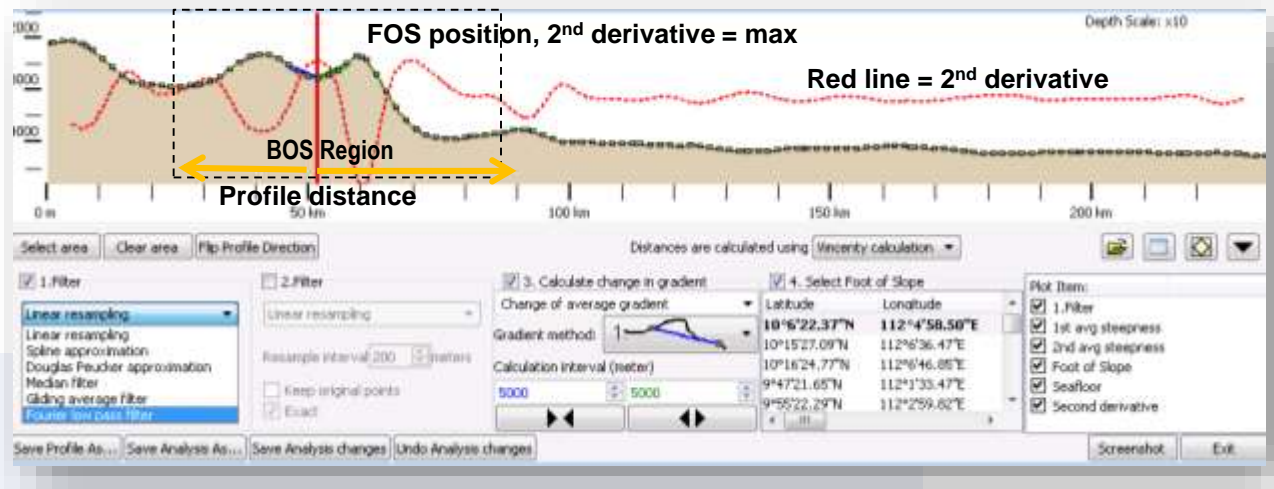


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Data Processing & Analysis

Comparison on selection of algorithms in Geocap and ArcGIS to determine FOS in 2D profile and 3D map

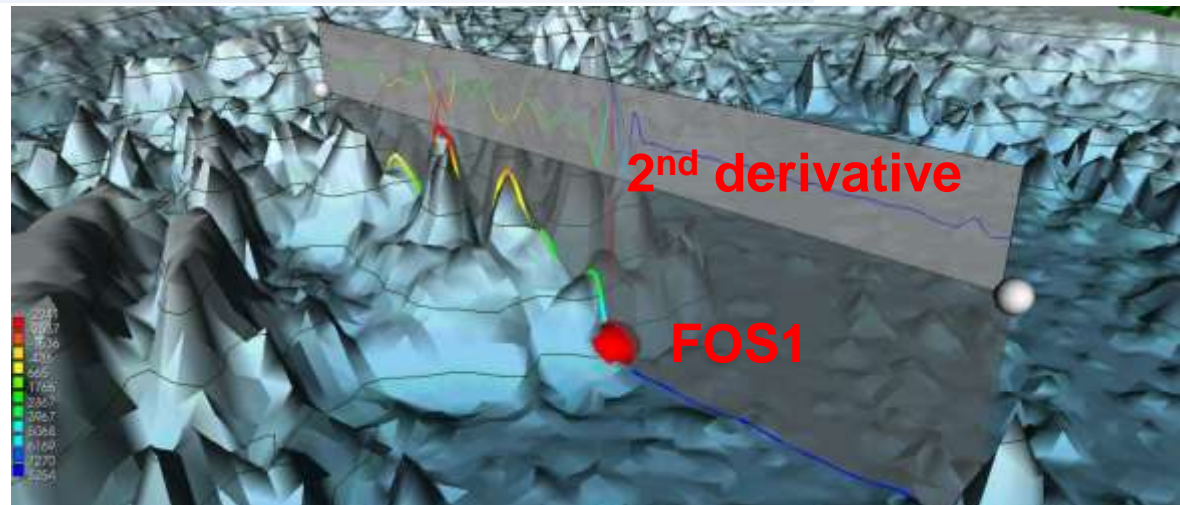


Geocap Shelf Software Workflow

- Generate derivative map
- Generate Gradient band analysis

ArcGIS

- Computation of curvature map (Curvature Spatial Analyst tool)
- Generate 2D slope raster map (Slope Spatial Analyst tool)





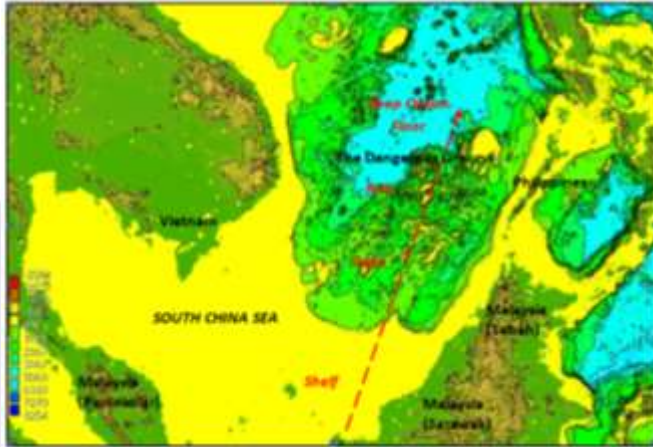
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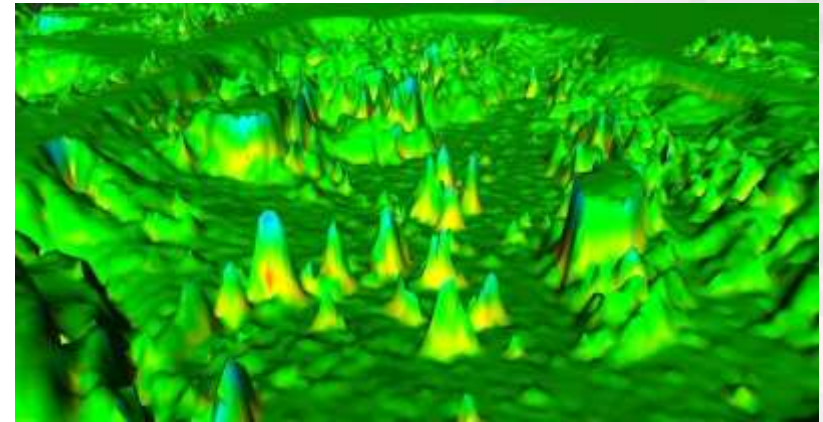
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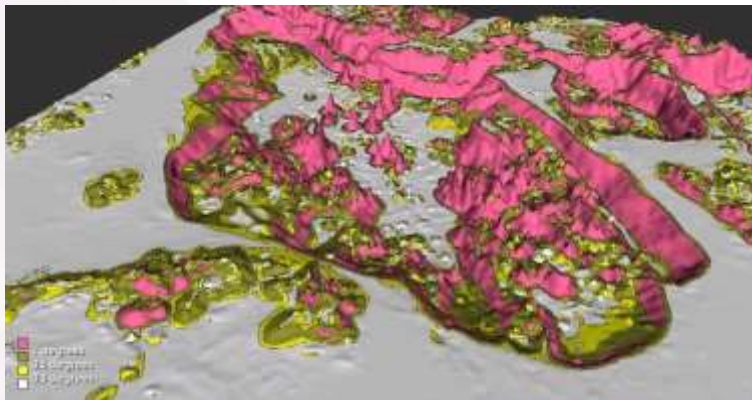
Result and Discussion



2D contour map demonstrate the continuity of continental margin of South China Sea process in Geocap



Change of Gradient in Gradient Direction's (shaded with yellow) in the vicinity of The Dangerous Ground process in Geocap



Gradient Band Analysis Map of The Dangerous Ground Area

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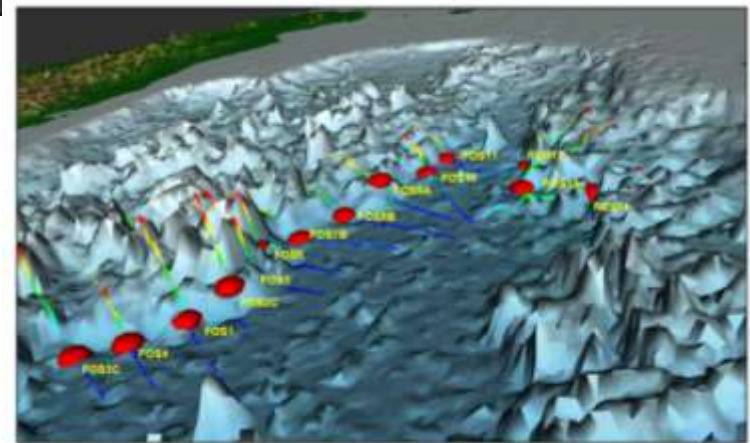
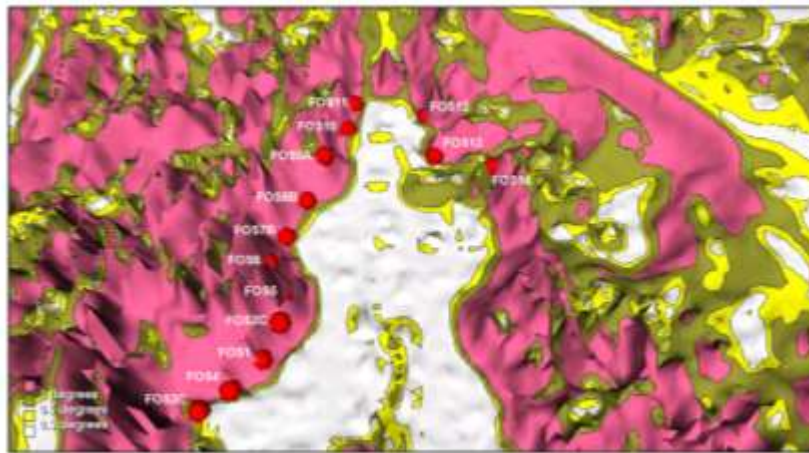
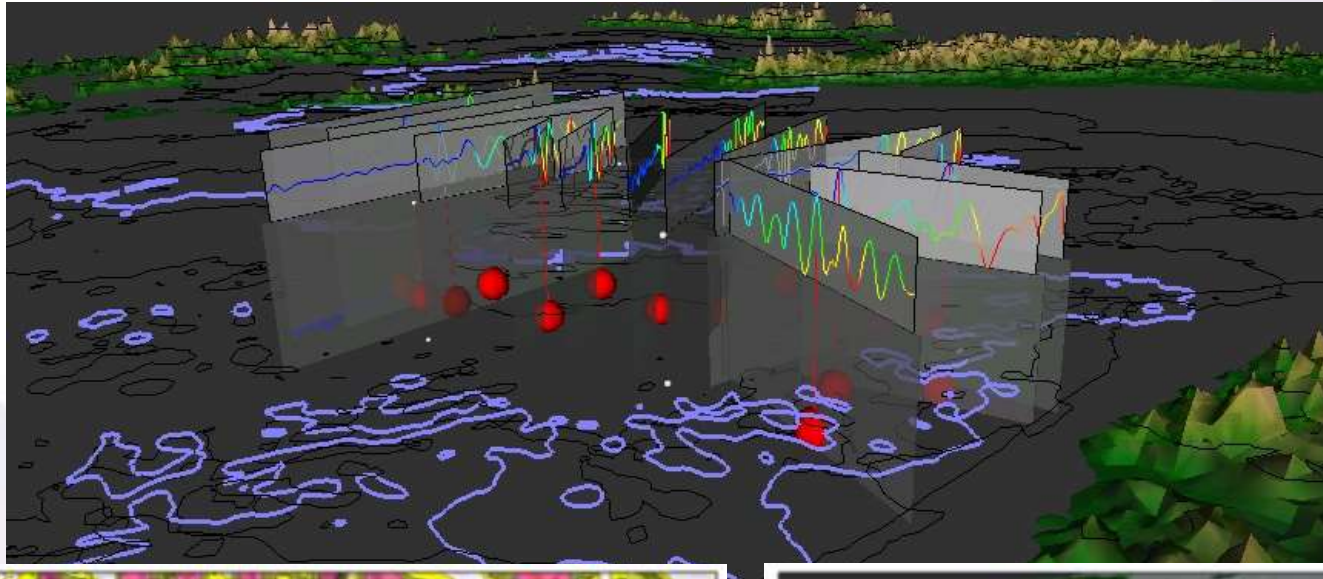
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Supporting Evidence from Geological and Geophysical Map

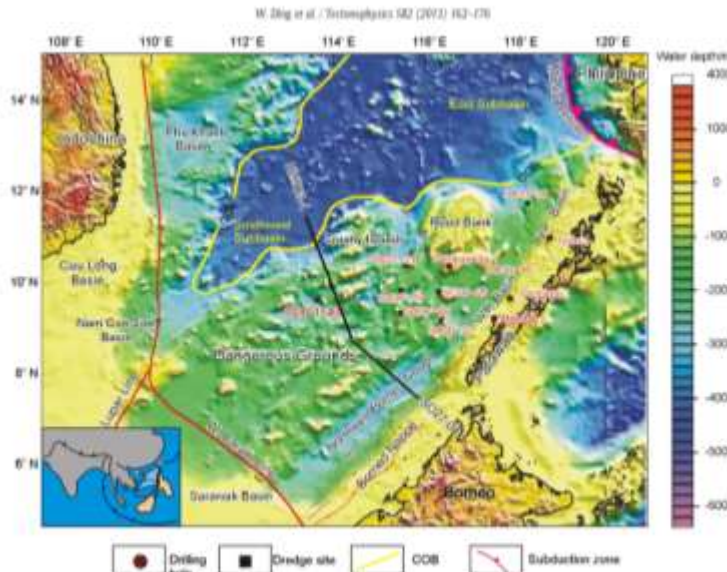


Fig. 1. Morphological features and major tectonic axes in the Daguangou Canyon area of the South China Sea. The location of the multi-channel seismic line, running from the deep oceanic Southwest Sub-basin of the South China Sea towards Borneo is shown as black line (S027-3 and S027-04). Continental-ocean boundary (COB) is shown according to Burchfiel and Royer (2004). Dredge sites (asterisks) are from Buzza et al. (1986). Well locations are from IODP Neogene Scientific Party (2000) and Schlatter et al. (1994).

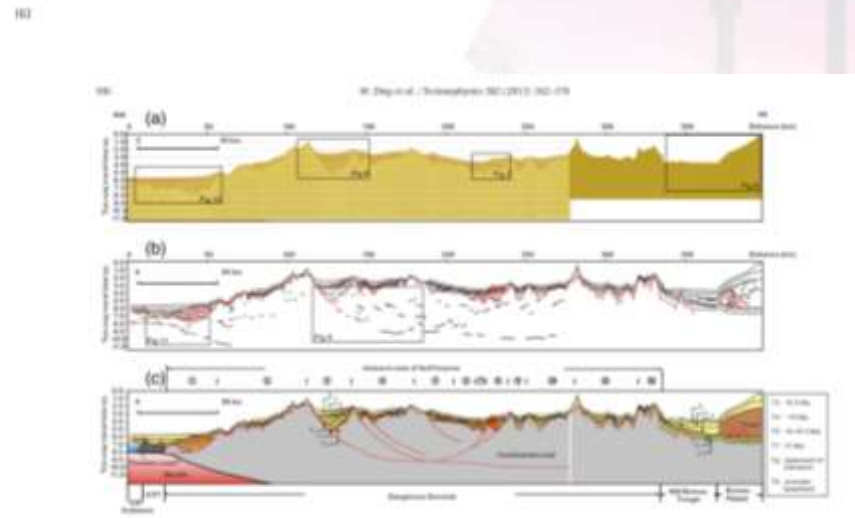


Fig. 2. Multi-channel seismic profiles S027-3 and S027-04 running from the Southwest Sub-basin of the South China Sea in a SE direction across the Daguangou Canyon. Top: original seismic profiles available after processing of the data collection, and bottom: geological interpretations. The area where fault zones were measured is indicated. Vertical exaggeration is nearly 5x. The location of the original seismic sections shown in the following is indicated.

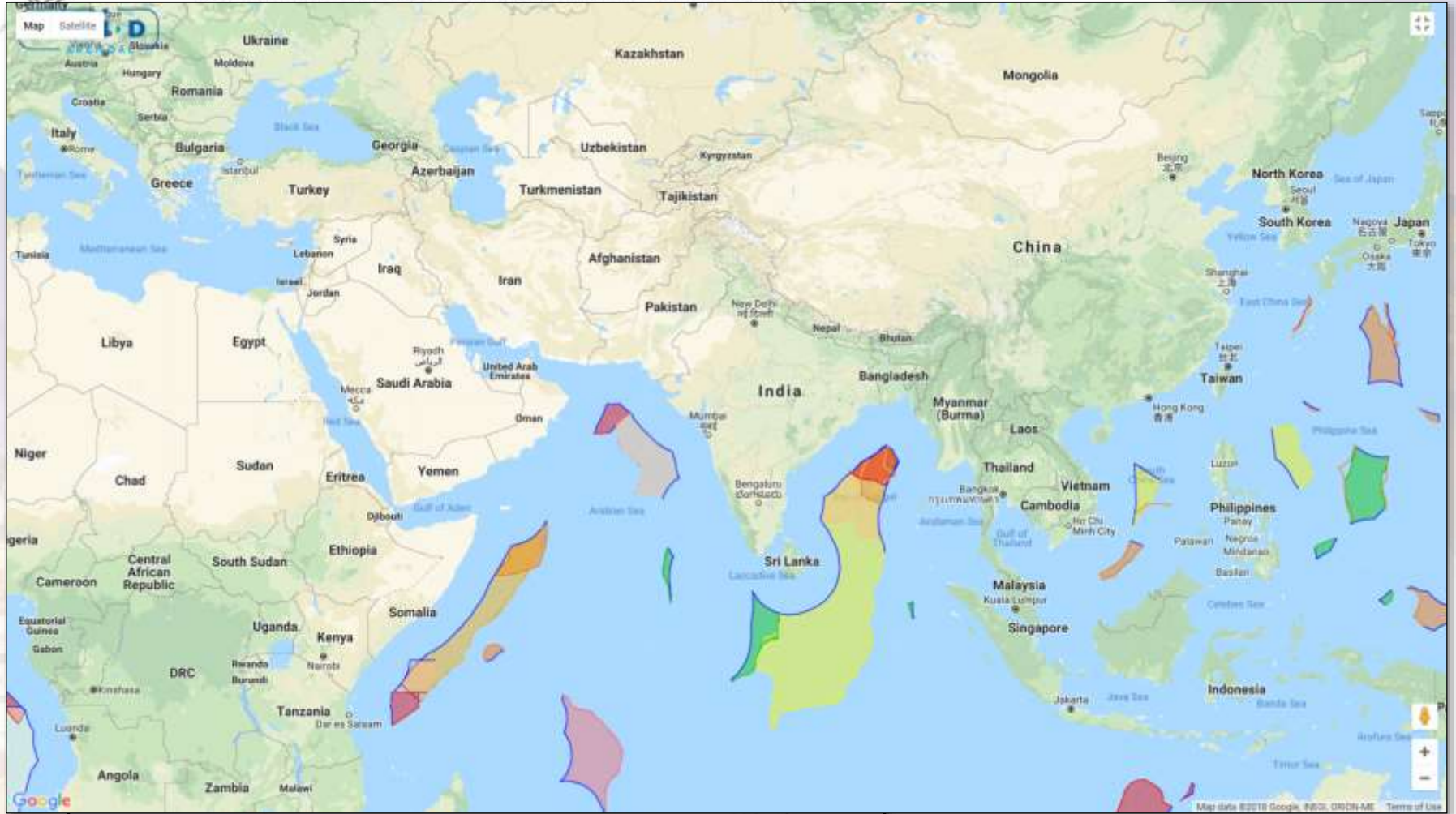
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There is a saying among seafarers that "the hardest part about captaining a ship is finding a ship to captain" (Carleton et al., 2000)

- Thank You -

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