

Preliminary Information
Indicative of the outer limits of the continental shelf
And
Description of the status of preparation of making a submission
To the Commission on the Limits of the Continental Shelf
For
the Democratic Republic of São Tomé and Príncipe



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1. Introduction

São Tomé and Príncipe ratified the United Nations Convention on the Law of the Sea, hereinafter referred to as "the Convention", on 3 November 1987. The Convention entered into force for São Tomé and Príncipe on 16 November 1994.

Article 4 of Annex II to the Convention stipulates that where a coastal State intends to establish, in accordance with article 76, the outer limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, it should submit particulars of such limits to the Commission on the Limits of the Continental Shelf, hereinafter referred to as "the Commission", along with supporting scientific and technical data as soon as possible, but in any case within ten years from the entry into force of the Convention for that State.

In 2001 the Eleventh Meeting of States Parties to the Convention decided that in the case of a State Party for which the Convention entered into force before 13 May 1999, it is understood that the ten-year time period referred to in article 4 of Annex II to the Convention shall be taken to have commenced on 13 May 1999 (document SPLOS/72, paragraph (a)). This decision applies to São Tomé and Príncipe. Consequently in the case of São Tomé and Príncipe the ten-year time period referred to in article 4 of Annex II to the Convention expires on 13 May 2009.

The Eleventh Meeting of States Parties to the Convention also decided that the general issue of the ability of States, particularly developing States, to fulfil the requirements of article 4 of Annex II to the Convention be kept under review (document SPLOS/72, paragraph (b)). Due to lack of financial and technical resources and relevant capacity and expertise, or other similar constraints, many developing countries, including the Democratic Republic of São Tomé and Príncipe, are in fact facing particular challenges to fulfil these requirements.

In June 2008 the Eighteenth Meeting of States Parties to the Convention therefore decided that it is understood that the ten-year time period referred to in article 4 of Annex II to the Convention may be satisfied by submitting preliminary information indicative of the outer limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, and a description of the status of preparation and intended date of making a submission (document SPLOS/183, paragraph 1 (a)).

On 5 December 2008 the General Assembly of the United Nations adopted its resolution A/RES/63/111 on Oceans and the Law of the Sea which in its paragraph 19 called upon "States to assist developing States, and especially the least developed countries and small island developing States, as well as coastal African States, at the bilateral and, where appropriate, at the multilateral level, in the preparation of submissions to the Commission regarding the outer limits of the continental shelf beyond 200 nautical miles, including the assessment of the nature and extent of the continental shelf of a coastal State through a desktop study, and the delineation of the outer limits of the continental shelf as well as in the preparation of preliminary

information to be submitted to the Secretary-General in accordance with the decision contained in SPLOS/183”.

2. Assistance and advice received during the preparation of this communication

In accordance with paragraph 19 of resolution A/RES/63/111 of the United Nations General Assembly, the Government of Norway has provided assistance and advice in the preparation of the present submission. Both the Royal Norwegian Ministry of Foreign Affairs and the Norwegian Petroleum Directorate have been involved in the preparation.

Based on open and accessible sources and modern Geographical Information System technology (GIS), the UNEP Shelf Programme, represented by GRID-Arendal, has provided an initial desktop study of the continental shelf of São Tomé and Príncipe for the purpose of the present submission.

The Democratic Republic of São Tomé and Príncipe has moreover been assisted in the preparation of the present submission by Mr Harald Brekke, member of the Commission (1997 – present). No advice was provided by any other member of the Commission.

All expenses related to the preparation of the present submission have been covered by the Government of Norway.

3. Outer limit of the continental shelf of the Democratic Republic of São Tomé and Príncipe – Baselines

The present submission deals with the outer limits of the continental shelf appurtenant to the Democratic Republic of São Tomé and Príncipe, without prejudice to any issue of bilateral maritime delimitation with neighbouring States. Such issues will be referred to under item 6 below.

The Democratic Republic of São Tomé and Príncipe is an archipelagic State in the sense of article 46 of the Convention. The archipelagic baseline from which the breadth of the territorial sea in the Democratic Republic of São Tomé and Príncipe is measured is defined in article 2 of Law No. 1/98 on delimitation of the territorial sea and the exclusive economic zone. As regards the present submission all measurements are carried out based on the world Vector Shoreline.

4. Provisions of article 76 invoked in support of this communication

The provisions of paragraphs 1, 3 and 4 of article 76 of the Convention are referred to in support of preliminary information indicative of the outer limits of the continental shelf beyond 200 nautical miles.

5. General description of the continental margin in the Atlantic Ocean off the coast of the Democratic Republic of São Tomé and Príncipe

The Democratic Republic of São Tomé and Príncipe is located in the Gulf of Guinea about 250 km west of northern Gabon. They are 140 km apart and form the southwestern end of a chain of mountains and islands. Bathymetry around both islands is typified by a steeply plunging upper slope on all sides to a depth of over 2000m. The islands sit on a high, known as the Cameroon Volcanic Line (CVL), that extends for 1600 km from the Atlantic Island of Pagalu inland to Cameroon. On the north-western side of the CVL, the continental margin of São Tomé and Príncipe descends gently into the Guinea Basin.

The geological description of both São Tomé and Príncipe can be summarised as consisting of a cap of lava flows and intrusives less than 2 km thick, overlying 4-5 km of pre and syn-volcanic sediments (turbidites and pelagic rocks of Aptian to Miocene age) which in turn lie on ocean basement of Aptian to Late Cretaceous age (Meyers et al., 1998)¹ Volcanic rocks are therefore thought to only comprise a small part of the total mass of the rocks that make the islands and there underlying basement. This succession was uplifted (by up to 3km) on an asymmetric arch with a gentle ramp to the NW and a steeper limb to the SE. Post Miocene deep-water sediments can be seen onlapping a clear uplift/folding related unconformity, which depicts this phase of structural evolution.

The intraplate volcanic centers of the CVL have been active for at least 65 myr (Lee et al., 1994)². The trend of this line is 030°, oblique to the more NE-SW trending fracture zones in the region. Unlike the Hawaiian hotspot islands, São Tomé and Príncipe are not thought to have formed as a result of plate movement over a fixed mantle hot spot. Three scenarios for their formation have been suggested, including that they developed: i) at the points at which fracture zones cross an older shear zone ii) above the location of magma chambers lying along a 'mantle hot line' iii) on structural rhombs formed by sinistral shear along the CVL.

¹ Source: Meyers J., Rosendahl B., Harrison C. and Zan-Dong Ding, 1998. Deep-imaging seismic and gravity results from the offshore Cameroon Volcanic Line, and speculation of African hotlines, *Tectonophysics* 284 (1998) 31-63.

² Source: Lee, D.C., Halliday, A.N., Fitton, J.G. and Poli, G., 1994. Isotopic variations with distance and time in the volcanic islands of the Cameroon Line - evidence for a mantle plume origin. *Earth and Planetary Science Letters*, 123(1-4): 119-138.

The details of the shearing process of Africa and America to which the formation of the islands of São Tomé and Príncipe is linked to are still a matter of discussion and research. But it is clear that the continental margin of the islands of São Tomé and Príncipe, through this link, are part of a transform continental margin that was formed by the continental break-up between the African Continent and the American Continent during the Cretaceous.

6. Maritime delimitations and other issues

All information and maps contained in this submission are without prejudice to issues of maritime delimitation. Nor do they constitute any expression of views by Norway or UNEP Shelf Programme/GRID-Arendal.

The Democratic Republic of São Tomé and Príncipe has entered into bilateral treaties on maritime delimitation with the Republic of Equatorial Guinea (Treaty regarding the Delimitation of the Maritime Boundary between the Republic of Equatorial Guinea and the Democratic Republic of São Tomé and Príncipe, 26 June 1999) and with the Gabonese Republic (Agreement on the Delimitation of the Maritime Border between the Gabonese Republic and the Democratic Republic of São Tomé and Príncipe, 26 April 2001). With the Federal Republic of Nigeria the Democratic Republic of São Tomé and Príncipe has entered into a treaty on the joint development of petroleum and other resources (Treaty between the Federal Republic of Nigeria and the Democratic Republic of São Tomé and Príncipe on the Joint Development of Petroleum and other Resources, in respect of Areas of the Exclusive Economic Zone of the Two States, 21 February 2001).

Article 4.1 of this latter treaty stipulates that: “Nothing contained in this treaty shall be interpreted as a renunciation of any right or claim relating to the whole or any part of the Zone by either State Party or as recognition of the other State Party’s position with regard to any right or claim to the Zone or any part thereof”.

There may be a potential overlap between areas beyond 200 nautical miles claimed by the Democratic Republic of São Tomé and Príncipe and some of its neighbouring States. Possible unresolved issues of delimitation of the continental shelf in these areas should be considered by reference to rule 46 and Annex I of the Rules of Procedure of the Commission. Such unresolved delimitation issues should be considered as a “maritime dispute” for the purpose of rule 5 (a) of Annex I to the Rules of Procedure of the Commission.

The Democratic Republic of São Tomé and Príncipe is ready to enter into consultations with its neighbouring States with a view to reach agreements which will allow the Commission to consider and make recommendations on submissions by the coastal States in question in any areas under dispute without prejudice to final delimitations of the continental shelf concluded subsequently in these areas between the Democratic Republic of São Tomé and Príncipe and its neighbouring States.

7. Preliminary information indicative of outer limits of the continental shelf beyond 200 M

In accordance with SPLOS/183 op.p. 1 (a), this communication seeks to document that at least a single Foot of the Slope Point (FOS point) has a location that indicates that the Democratic Republic of São Tomé and Príncipe's continental shelf extends beyond 200 M from the normal baseline.

Considering the limited scientific data available, no final conclusion is made regarding the most appropriate location of the base of the continental slope of the Democratic Republic of São Tomé and Príncipe at this stage. Rather it is found incumbent, based on available data, to document at least the minimum extent of the legal continental shelf – by providing *prima facie* evidence that an FOS point may at least be located in a certain area, if not further offshore.

While there may be grounds for carrying out additional surveys for the precise identification of FOS points (for which there is the possibility of significant variations), the following FOS point and the associated preliminary outer limit points are submitted as part of the preliminary information. These may be subject to later revision.

7.1 Existing database

Figures 3 and 4 show track lines for bathymetric and analog seismic data that has been available for analyses to determine if the Democratic Republic of São Tomé and Príncipe meets the criteria for an extended continental shelf beyond 200 M (test of appurtenance).

The majority of bathymetric and seismic data are sourced from the Geophysical Data System (Geodas) of the NOAA National Geophysical Data Center (NGDC) in Colorado.

Additional bathymetric and seismic data are sourced from: L'Institut français de recherche pour l'exploitation de la mer (IFREMER).

The following satellite derived bathymetric grids have been used: SRTM30plus_V4. Total Sediment Thickness of the World's Oceans & Marginal Seas (provided by: World Data Center for Geophysics & Marine Geology, Boulder) was used as a first approximation for sediment thickness.

All data are assembled, reformatted and provided by the One Stop Data Shop (GRID-Arendal, www.continentalsshelf.org).

The analyses of the data were done in the Geocap software utilizing the UNCLOS Module (www.Geocap.no). Methods used are documented in the software documentation.

7.2 Foot of the continental slope points

Several FOS points have been identified both on single-beam bathymetric profiles from the GEODAS and IFREMER databases and on bathymetric profiles extracted from the SRTM30plus_V4 grid. These FOS points are shown to generate continental shelf area beyond 200 M. One FOS point extracted from the SRTM30plus_V4 grid is plotted on figures 1 and 5 and is described in more detail in the following for documentation purposes and to demonstrate the variable nature of the continental margin off the coast of the Democratic Republic of São Tomé and Príncipe. This FOS point is indicative only and does not in any way represent the final representation of the foot of the continental slope in the vicinity of the Democratic Republic of São Tomé and Príncipe.

The possibility of identifying FOS points located further seaward than the one documented here cannot be excluded, should more data be discovered or acquired and made available at a later stage.

7.2.1 FOS-1

Basic Data

Data type	Data source
Synthetic bathymetric profile extracted from bathymetric grid	SRTM30plus_V4

Point FOS-1 is located on the south-western flank of the Niger Fan west of the Democratic Republic of Sao Tome & Principe at the base of the continental slope. (Figures 1 and 2). The area of the base of the slope is identified on the basis of the morphology of the continental slope in the area as depicted by a synthetic bathymetric profile extracted from the satellite derived bathymetric grid SRTM30plus_V4 (Figure 6). Point FOS-1 was determined as the point of maximum change in gradient within the base of the slope area (Figure 6).

7.3 Indicative extent of continental shelf based on selected FOS points

The FOS point generates continental shelf area beyond 200 M based on the sediment thickness criterion of article 76 paragraph 4(a)(i) and the 60 M distance criterion of article 76 paragraph 4(a)(ii). The exact location of the outer limits of the continental shelf beyond 200 M awaits the final analysis which will be submitted to the Commission (see section 8). However, the extent of the continental shelf beyond 200 M adjacent to the Democratic Republic of São Tomé and Príncipe is indicated in a general way in figure 5.

Further studies and data are needed to clarify the final extend of the continental shelf beyond 200 M of the Democratic Republic of São Tomé and Príncipe.

8. Description of status of preparation and intended date of making a submission

This communication takes advantage of available data from relevant intergovernmental bodies and organizations.

The utilization of GRID-Arendal's global public marine geoscientific database, provides a careful documentation of the aforementioned FOS point thus providing *prima facie* evidence that the Democratic Republic of São Tomé and Príncipe's continental shelf extends beyond 200 M from the baseline.

However, additional data collection may be necessary to provide exact information on the location of foot of the slope points. It should be pointed out that several conditions make it unfeasible or unpractical at this stage to engage into any attempts to acquire such data.

The Scientific and Technical Guidelines (STG) of the Commission³ gives guidance to the type and quality of the data that is required to support the submission of coastal State to the CLCS concerning the outer limit of its continental shelf. Chapter 9 of the STG specifies the format and recommended contents of such a submission. The STG, on the other hand, does not give any guidance to the planning and organisation of the project of preparing a submission.

The Training Manual provided by Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs (DOALOS)⁴, however, contains more details on how such a project may be conducted. According this Training Manual the following steps should be taken to plan and manage a submission:

- Undertake the initial appurtenance study;
- Produce a desktop study;
- Plan and acquire data;
- Analyse all data and produce all relevant scientific and technical documentation;
- Prepare the final submission; and
- Provide technical support to political level throughout the project cycle.

The "*Preliminary information indicative of the outer limits of the continental shelf*" provided in this document shows that the Democratic Republic of São Tomé and Príncipe passes the test of appurtenance and the next step will be to prepare a desktop study.

³ Commission on the Limits of the Continental Shelf, 1999. Scientific and technical guidelines of the commission of the continental shelf. Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs United Nations, document CLCS/11, 92 p.

⁴ Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, 2006. Training Manual for delineation of the outer limits of the continental shelf beyond 200 nautical miles and for preparation of submissions to the Commission on the Limits of the Continental Shelf.

According to the Training Manual a desktop study shall cover the following items:

- Assemble and organize all pre-existing data;
- Analyse the data according to article 76;
- Identify areas of critical value for further studies;
- Subdivide the geographical area being considered according to the applicability of the formulae and constraints provisions;
- Identify the need for further data; and
- Determine preliminary survey plans, cost estimates and recommendations for future work.

To fund activities related to preparing a submission, the Democratic Republic of São Tomé and Príncipe will make an application to the *“Trust fund for the purpose of facilitating the preparation of submissions to the Commission on the Limits of the Continental Shelf for developing States, in particular the least developed countries and small island developing States, and compliance with article 76 of the United Nations Convention on the Law of the Sea”* (UN Trust Fund)

(http://www.un.org/Depts/los/clcs_new/trust_fund_article76.htm).

The UN Trust Fund does, however, not fund acquisition of data; consequently the desktop study should investigate ways to secure funding for acquisition of additional data if further studies show that this is necessary for the delineation of the Democratic Republic of São Tomé and Príncipe’s extended continental shelf beyond 200 M.

9. Conclusion

The data provided in the present submission of preliminary information indicative of the outer limits of the continental shelf beyond 200 nautical miles show that the Democratic Republic of São Tomé and Príncipe passes the test of appurtenance as described in the Scientific and Technical Guidelines of the Commission. The FOS point identified on the south-western flank of the Niger Fan west of the Democratic Republic of Sao Tomé and Príncipe at the base of the continental slope generates continental shelf area beyond 200 nautical miles based on the sediment thickness criterion of article 76, paragraph 4(a)(i) of the Convention and the 60 nautical miles criterion of article 76, paragraph 4(a)(ii) of the Convention.

Appendix

Figures

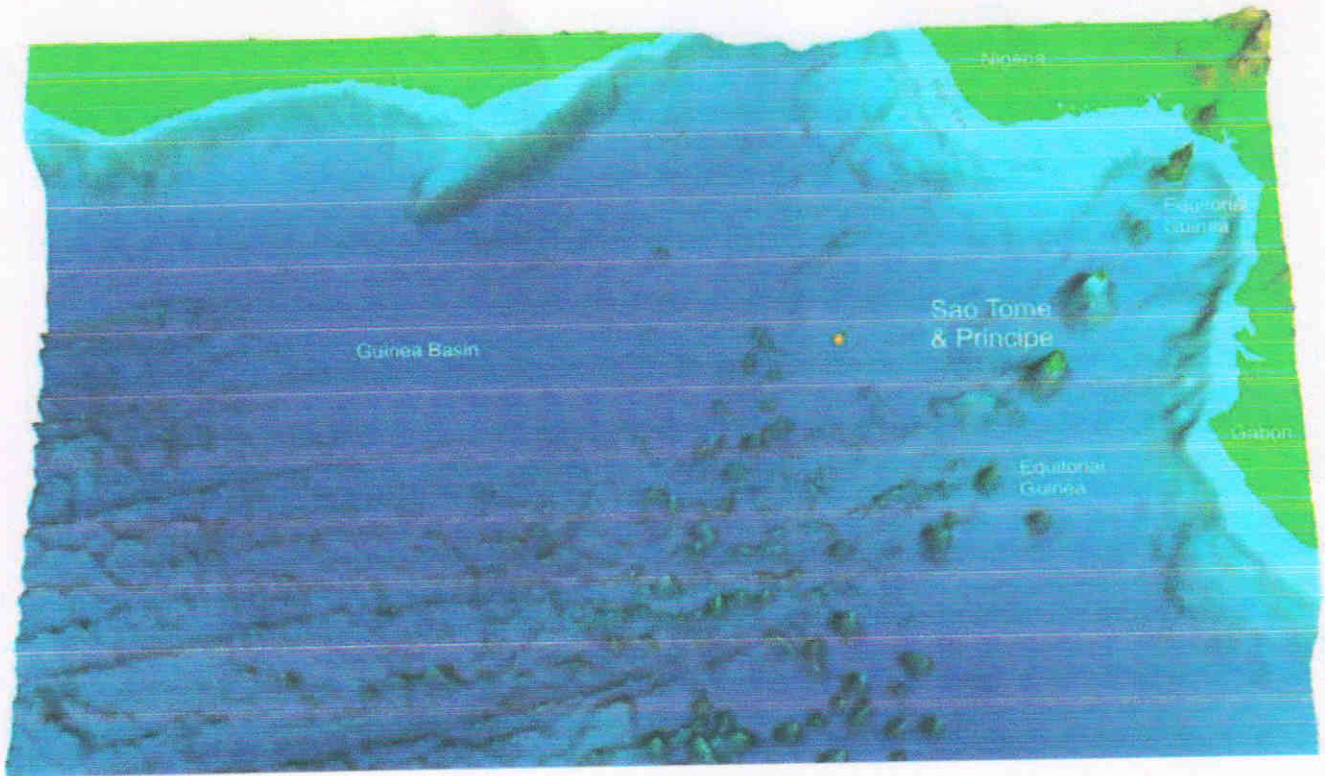
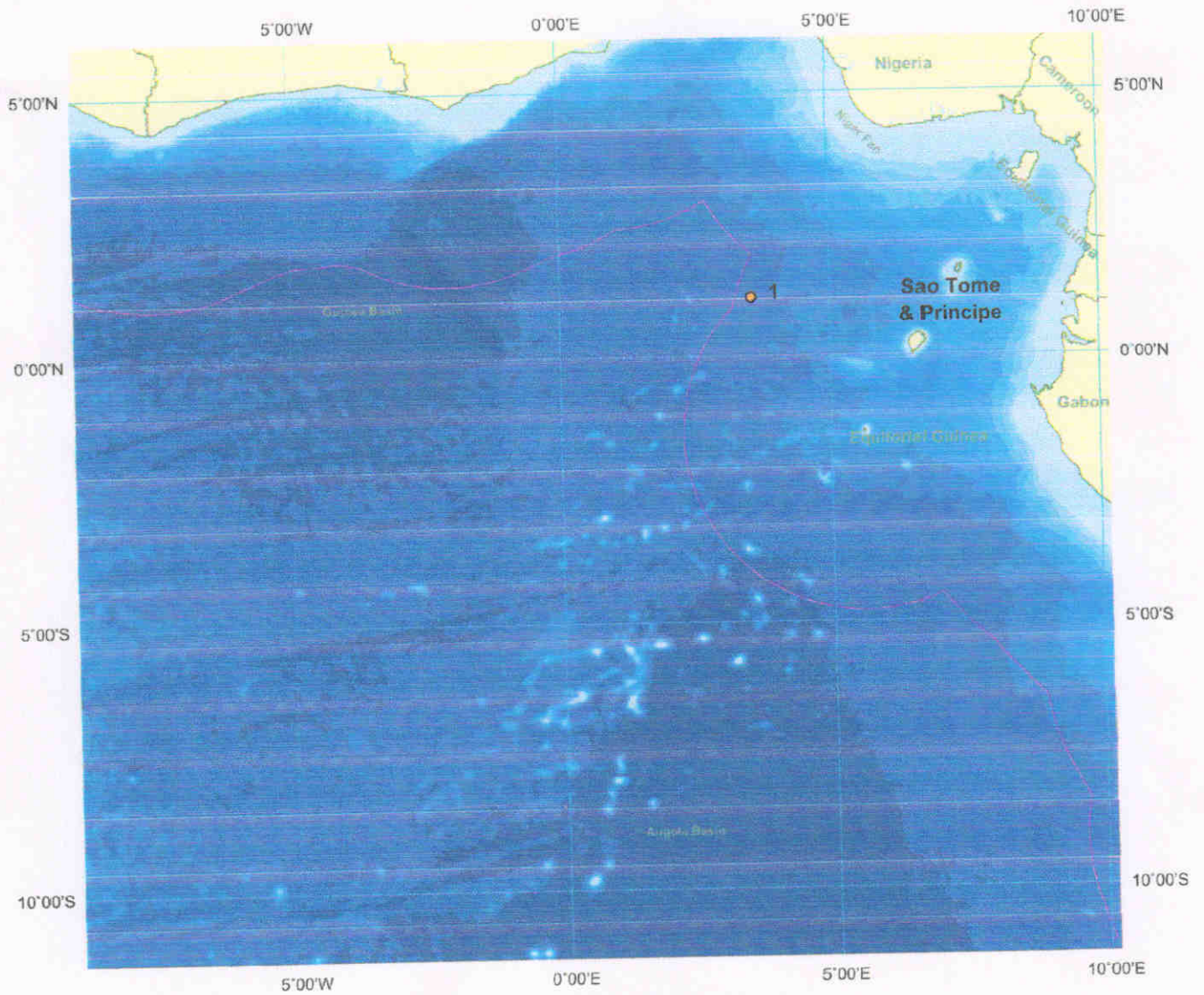


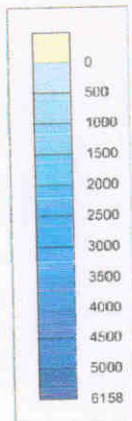
Figure 1: Three dimensional view of the continental margin adjacent to the Democratic Republic of Sao Tome & Principe in the Equatorial Atlantic Ocean. Names of primary submarine features (from GEBCO) are included. Coloured sphere represents FOS point.



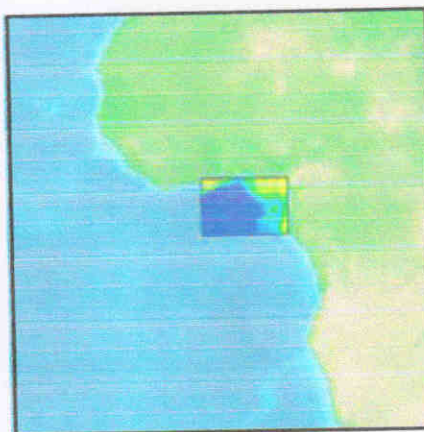
— 200 nautical mile limit

Foot of slope points:

● From SRTM30plusV4



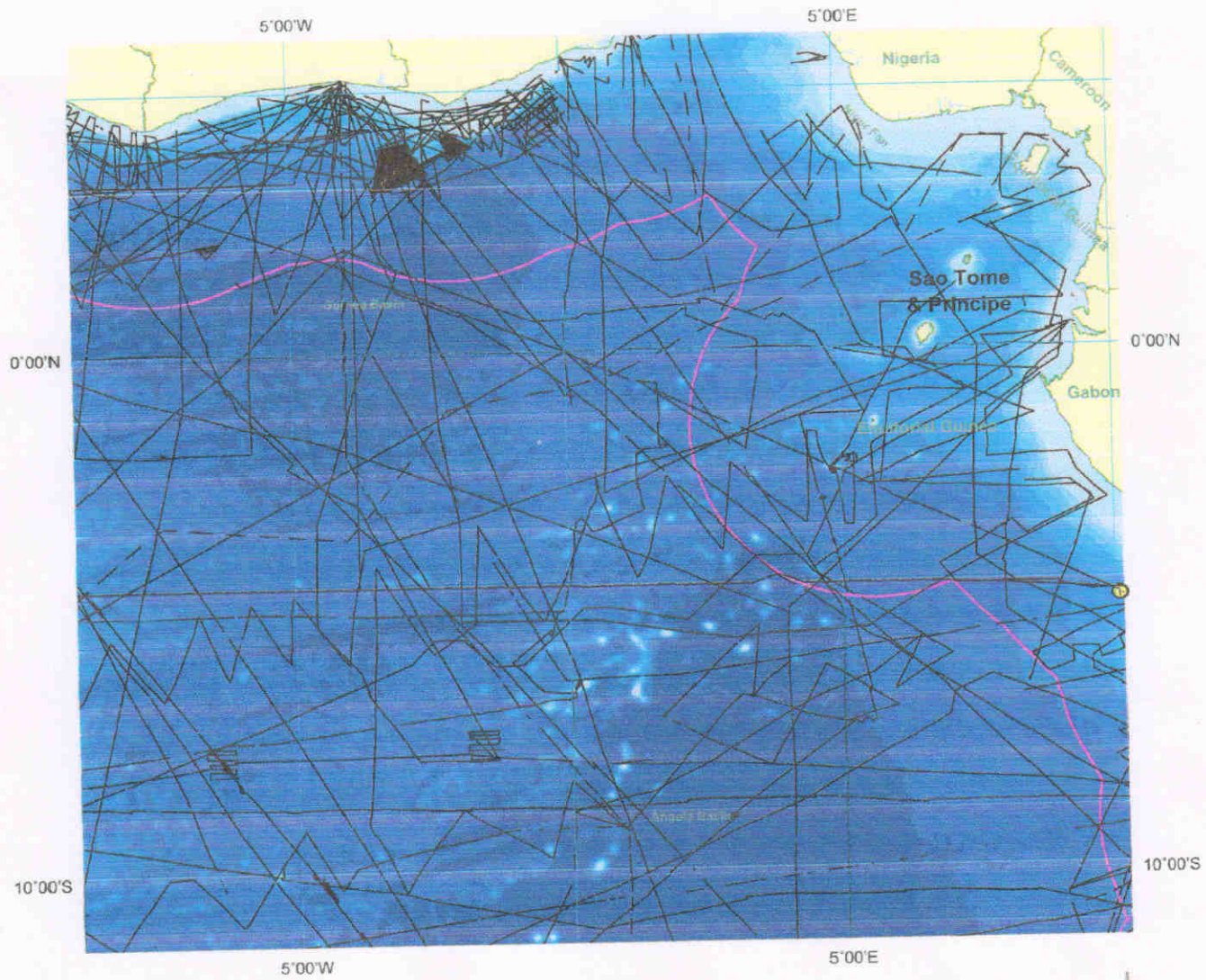
Depth (m)



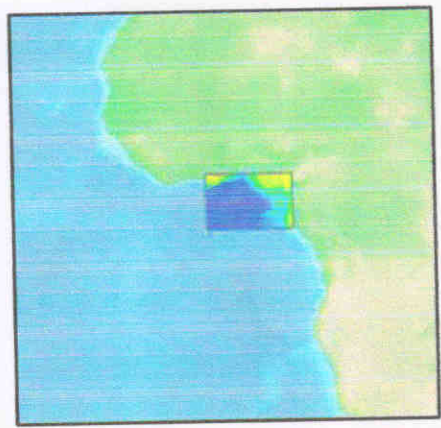
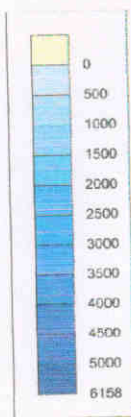
Projection Mercator
Datum: WGS 84
Bathymetric grid: SRTM30plusV4



Figure 2: Map of the Equatorial Atlantic Ocean coastline adjacent to the Democratic Republic of Sao Tome & Principe.



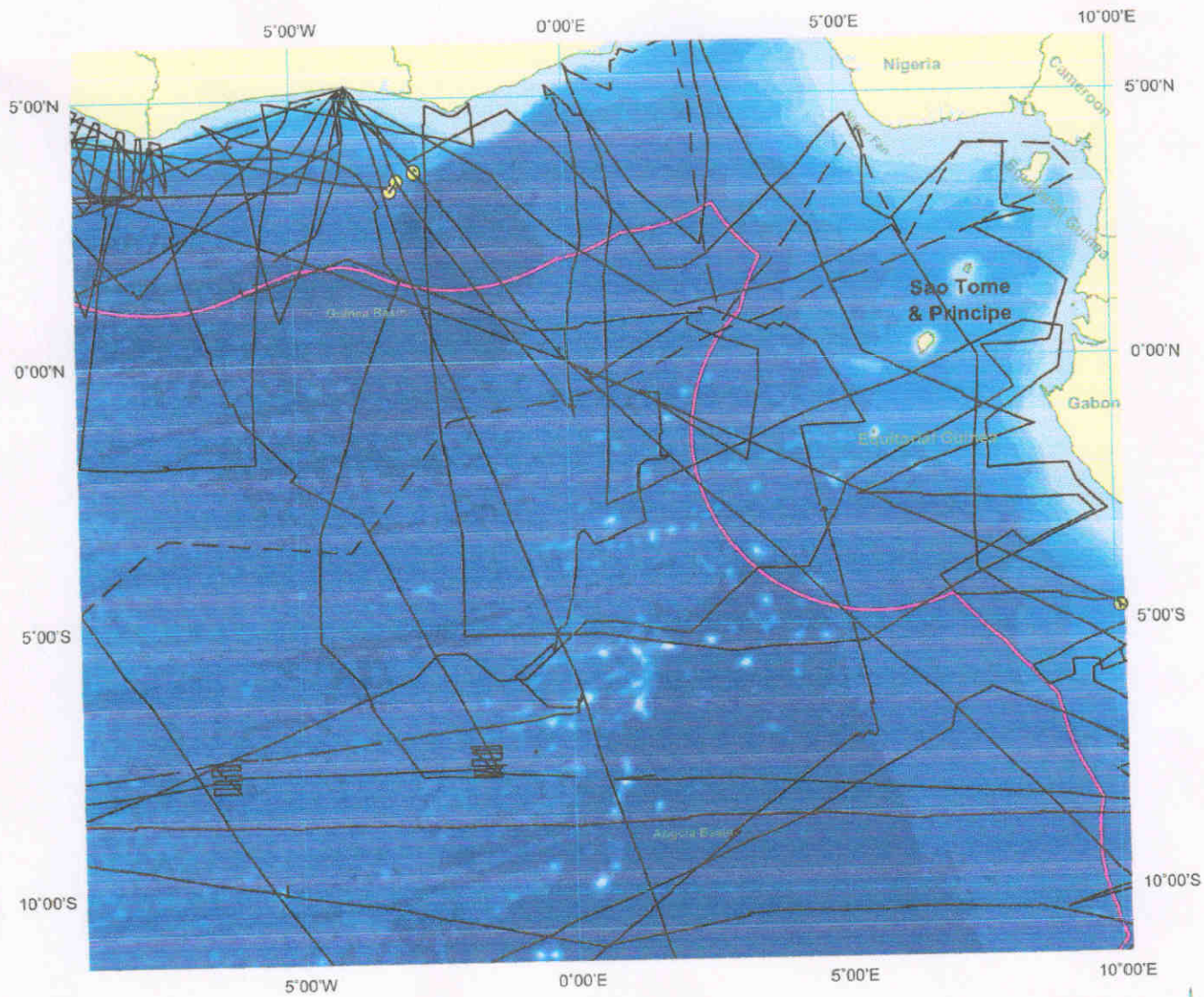
-  200 nautical mile limit
-  Bathymetry
-  ODP/DSDP drill sites






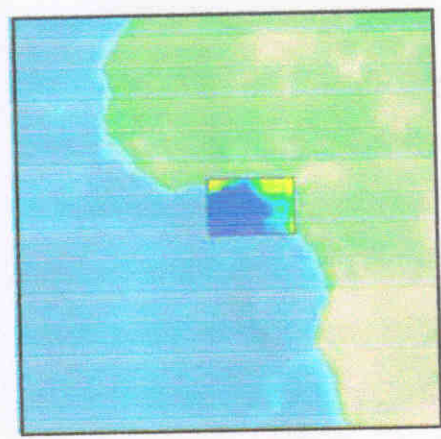
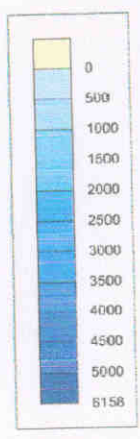
Projection Mercator
Datum: WGS 84
Bathymetric grid: SRTM30plusV4



Figure 3: Map showing echo sounder single beam corrected depth measurements and the position of DSDP/ODP drill sites.



-  200 nautical mile limit
-  Analog seismic data
-  ODP/DSDP drill sites



Projection Mercator
 Datum: WGS 84
 Bathymetric grid: SRTM30plusV4



Figure 4: Map showing analog seismic data and the position of DSDP/ODP drill sites.

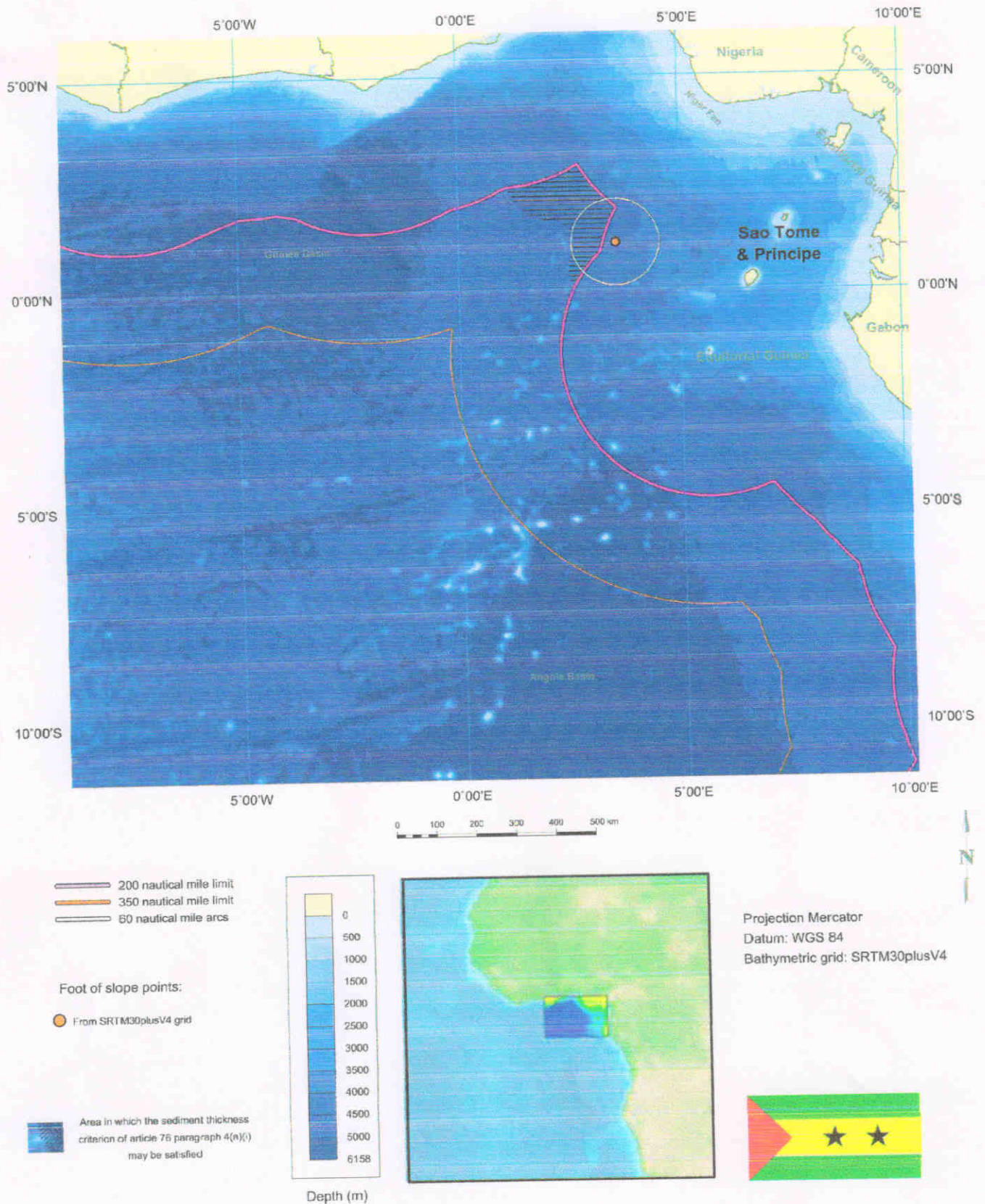


Figure 5: Map showing the location of one FOS point. This FOS point generates continental shelf beyond 200M based on the sediment thickness criterion and the 60M distance criterion of article 76 paragraphs 4(a)(ii) respectively. This point is described in more detail in section 7.2.1 and figure 6.

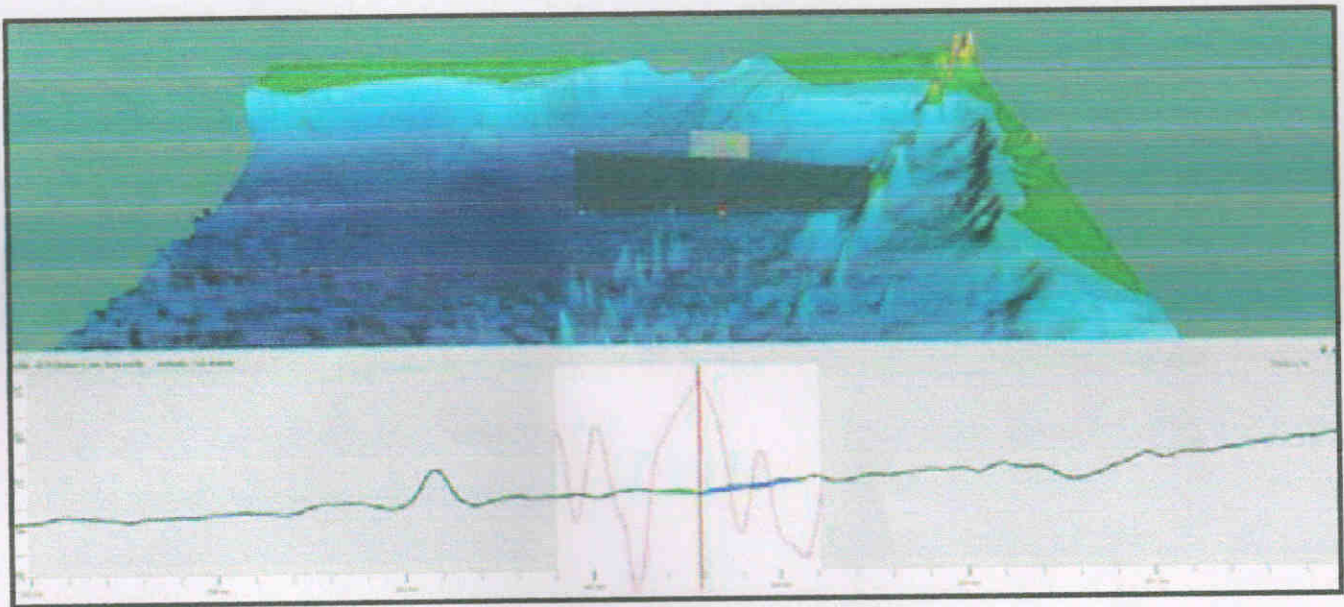


Figure 6: Analysis of point FOS-1 at the base of the continental slope, based on a synthetic bathymetric profile extracted from the satellite derived bathymetric grid SRTM30plus_V4 (lower panel). The upper panel shows a 3D view of the continental margin of the Republic of Sao Tome & Principe viewed from south towards north, including the location of the point FOS-1 (orange sphere) and the bathymetric profile (grey shaded panel). The point FOS-1 has been calculated to be the point of maximum change in average gradient across the area of the base of the slope based on the 2nd derivative of the slope (red dotted graph in white shaded area of lower panel).

Regarding the use of the SRTM30plus_V4 in the above figures, the following is observed:

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Please note that due to the use of the Mercator projection system, the scale bar displayed with the maps on Figure 2-5 is only precise when measurements are made at the Equator. Precision diminishes with distance in relation to the Equator (e.g. about 3 % of error has degree of latitude 15°N).