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GLOSSARY OF TERMS

60 M formula line	The line delineated by reference to fixed points determined at a distance of 60 nautical miles from the foot of the continental slope		
60 M formula point	Fixed point determined at a distance of 60 nautical miles from the foot of the continental slope		
200 M line	The line at a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured		
2,500 m isobath	A line connecting the depth of 2,500 metres		
article 76	rticle 76 of the Convention		
article 76 margin	The continental margin established by a line at the maximum distance permissible in accordance with the provisions of paragraph 4(a)(i) and (ii) of article 76 when invoking the SOU		
baselines	The baselines from which the breadth of the territorial sea is measured		
BOS	The base of the continental slope		
Commission	The Commission on the Limits of the Continental Shelf		
Convention	The United Nations Convention on the Law of the Sea of 10 December 1982		
depth constraint	The constraint line determined at a distance of 100 M from the 2,500 m isobath		
distance constraint	The constraint line determined at a distance of 350 M from the baselines		
DOALOS	Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations		
FOS	Foot of the continental slope		
Guidelines	The		

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Secretary-General that the delimitation of the continental shelf between the Somali Republic and the Republic of Kenya had not been settled and that this unresolved delimitation issue was to be considered a "maritime dispute" for the purposes of rule 5(a) of annex I to the Rules of Procedure. Accordingly, any action taken by the Commission shall, in accordance with the Convention, not prejudice matters relating to the delimitation of the continental shelf between the Republic of Kenya and the Somali Republic. Based on a Memorandum of Understanding between the Government of the Republic of Kenya and the Transitional Federal Government of the Somali Republic, signed on 7 April 2009, the Somali Republic reiterated its consent, in accordance with rule 5(a), to the examination of the Submission by the Commission.

The Delegation informed the Commission in this regard that there were no 10 unresolved disputes relating to the Submission. With respect to Tanzania, the Delegation indicated that Kenya had concluded a Maritime Boundary Agreement with the United Republic of Tanzania on 23 June 2009, which applied to the territorial sea, exclusive economic zone, and continental shelf. The Delegation pointed out that the agreement was also applicable to the extended continental shelf, after its outer limits were established. Regarding the communication received from the Transitional Federal Government of the Republic of Somalia dated 19 August 2009, the Delegation indicated that provisional arrangements of a practical nature had been entered into, as contained in the Memorandum of Understanding signed on 7 April 2009, wherein the parties had undertaken not to object to the examination of their respective submissions and that, at an appropriate time, a mechanism would be established to finalize the maritime boundary negotiations with Somalia. In reference to the communication received from Sri Lanka dated 22 July 2009, and the indication that the "principal State" referred to in paragraph 3 of the Statement of Understanding was Sri Lanka, the Delegation indicated that, in the view of the Government of Kenya, the principles contained in the Statement of Understanding could apply whenever a State was

Understanding signed on 7 April 2009 was considered by the Transitional Federal Parliament of Somalia and that the members voted to reject its ratification on 1 August 2009. The Transitional Federal Government of the Republic of Somalia, therefore, requested the relevant offices of the United

included Macharia Kamau, Permanent Representative of Kenya to the United Nations, and Koki Muli Grignon, Deputy Permanent Representative of Kenya to the United Nations, as well as a number of scientific, legal and technical advisers. mi912.2(nt)o()-12.3143.1(1((2.2(w)-2.9(41(.).3(ma-0-11.6. -1.1

- 19 In addition to elaborating on substantive points of the Submission, Mr. Muigai noted that one member of the Commission, Mr. Simon Njuguna,⁴ had provided Kenya with advice and assistance concerning the Submission.
- 20 With reference to paragraph 2(a) of annex I to the Rules of Procedure, Mr. Muigai observed that Kenya had yet to conclude a maritime boundary agreement with Somalia. He noted that provisional arrangements of a practical nature had been entered into, in accordance with article 83(3) of the Convention, as contained in a Memorandum of Uor 0 M

annex II to the Convention, the Commission instructed the Subcommission to consider the Submission on a scientific and technical basis under the provisions of article 76 of the Convention and the Statement of Understanding.

- 28 The five-year term of office of the 21 members of the Commission elected in 2012 expired on 15 June 2017. On 14 June 2017, during the twenty-seventh Meeting of States Parties, 20 members were elected to the Commission for a five-year term. During the subsequent forty-fourth session of the Commission, the following members were appointed to the Subcommission: Lawrence Folajimi Awosika, Martin Vang Heinesen, Mazlan Bin Madon, Jair Alberto Ribas Marques, Marcin Mazurowski, Domingos de Carvalho Viana Moreira and Yong Ahn Park. The Subcommission subsequently elected Mr. Heinesen as its Chair and Messrs. Awosika and Marques as its Vice-Chairs.
- 29 On 8 December 2021, the thirty-first Meeting of States Parties was resumed for the purpose of conducting a by-election to fill the vacancy resulting from the passing of Mr. Marques. The States Parties elected Antonio Fernando Garcez Faria as a member of the Commission. At its fifty-fourth session the Commission appointed Mr. Garcez as a member of the Subcommission. The Subcommission subsequently elected Mr. Madon as a Vice-Chair.
- 30 Following its establishment, the Subcommission met during the thirty-ninth session to commence its consideration of the Submission and to conduct a preliminary analysis of the Submission pursuant to paragraph 5.1 of annex III to the Rules of Procedure. On 19 October 2015, the Delegation submitted a revised Main Body and Supporting Scientific and Technical Data.
- 31 At the fortieth session, the Subcommission commenced the main scientific and technical examination of the Submission pursuant to paragraph 9 of annex III to the Rules of Procedure. The main scientific and technical examination continued until the forty-second session when, on 25 October 2016, the Subcommission provided a comprehensive presentation of its views and general conclusions arising from the examination of the Submission in accordance with paragraph 10.3 of annex III to the Rules of Procedure. Thereafter, Kenya provided the Subcommission with additional data and information.
- 32 Subsequently,

B. Preliminary analysis of the Submission

- 45 Pursuant to paragraph 5 of annex III to the Rules of Procedure, the Subcommission undertook a preliminary analysis of the Submission, in accordance with article 76 and the Guidelines and determined that:
 - (a) the test of appurtenance has been satisfied by Kenya as sediment thickness point 1%Sed01, related to FOS 1, is located beyond 200 M from the baselines. Detailed examination of the FOS and sediment thickness points is presented in sections 2.1 and 3.1, respectively;
 - (b) the outer limits of the continental shelf submitted by Kenya (Figure 1) were determined by the formulae line established by reference to the outermost fixed points at each of which the thickness of sedimentary rocks was not less than 1 km in accordance with the Stateme 3.hesp-13.11(h0) Tj -0t.1(w)d1(h)7013 9 /LBody

C. Main scientific and technical examination of the Submission

- 46 Pursuant to paragraph 9, section IV of annex III to the Rules of Procedure, the Subcommission conducted an examination of the Submission based on the Guidelines and the Statement of Understanding and evaluated the following:
 - (a) the data and methodology employed by Kenya to determine the location of the foot of the continental slope;
 - (b) the data and methodology used to demonstrate the fulfilment of the scientific and technical requirements in accordance with the Statement of Understanding;
 - (c) the data and methodology used to determine the formula line delineated by reference to the outermost fixed points at each of which the thickness of sedimentary rock should not be less than 1 km;
 - (d) the data and methodology used to determine the constraint line at a distance of 350 M from the baselines;
 - (e) the delineation of the outer limit of the continental shelf by means of straight lines not exceeding 60 M in length with a view to ensuring that only the portion of the seabed that satisfied all the provisions of article 76 of the Convention and the Statement of Understanding was enclosed;
 - (f) the estimates of the uncertainties in the methods applied, with a view to identifying the main source(s) of such uncertainties and their effect(s) on the Submission; and
 - (g) whether the data submitted were sufficient in terms of quantity and quality to justify the proposed limits.
- 47 In conducting its examination of the Submission, the Subcommission:
 - (a) proceeded with a detailed examination of the data and information supporting the establishment of the outer edge of the continental margin in accordance with the Statement of Understanding;
 - (b) sought clarification and additional data from the Delegation, as necessary;
 - (c) presented preliminary views and conclusions to the Delegation; and
 - (d)

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reached its present-day position (Phethean et al., 2016; Sauter et al., 2018; Vormann and Jokat, 2021).

Figure 2*. Main physiographic features in the region of the Submission.

50 Oblique rifting of the Kenya/Somalia and Madagascar conjugate margins resulted in predominantly strike-

- 55 The Subcommission first considered the location of the BOS as identified by Kenya.
- 56 In the search for the BOS, Kenya utilized the two-step approach in accordance with paragraph 5.4.5 of the Guidelines. Using gradient band analysis of ETOPO2, Kenya identified the morphological components of the continental margin shelf, slope and rise. The top of the rise was identified as the region where gradients range from 0.6° to 1° (brown area in Figure 4).



Figure 4*. Gradient band analysis by Kenya identifying the top of the rise as the region where gradients range from 0.6° to 1° (brown area) (2014_09_03_KEN_PRE_COM_002, slide 45, modified by the Subcommission)

57 Kenya also utilised single and multibeam bathymetric data to support the identification of the BOS (Figure 5).

Figure 5*. (A) BOS region identified by Kenya based on various datasets, as submitted in the Main Body, compared to the COB from Seton et al. (2012). ETOPO2 is the 2006 version of the 2 arc-minute grid of land and ocean elevation from NGDC (2001). The bathymetric data used by Kenya are profiles from single- and multi-

(B) Derivative of the gradient generated from Smith and Sandwell bathymetric grid v9.1, 2007, showing the region of maximum gradient change (warm colours) seaward of the shelf (cool colours). Kenya presented the line of maximum gradient change as representing the approximate position of the BOS.

- 58 To support the morphological determination of the BOS, Kenya provided geological and geophysical data and information, including seismic, gravity and magnetic evidence for the location of the COB.
- 59 Based on the tectonic evolution of the WSB (Figure 3), and regional Bouguer anomaly from satellite-derived gravity data, Kenya argued that the COB in the rifted northern margin is within 70 km of the coastline and continues southward along the north-south oriented DFZ (Main Body, Figure 5.18).
- 60 Free-air and Bouguer gravity anomalies examined by the Subcommission indicate a sharp, probably



Figure 6*. Gravity anomalies indicate a sharp transition between continental and oceanic crust along the northern Kenyan and Somali coasts, indicative of the COB/COT, which appears to be offset by the transform fault zone along Davie Ridge. BOS and FOS points identified by Kenya are shown for reference. (A) Free-air anomaly map based on satellite-derived gravity grid of Sandwell and Smith v 30.1 (Sandwell et al., 2014). (B) Bouguer gravity based on World Gravity Map (WGM 2012) anomaly map (Bonvalot et al., 2012).



Figure 7*. (A) Derivative of the vertical gravity gradient from the Sandwell and Smith grid v 30.1 (Sandwell et al., 2014) showing a distinct zone of steep gravity gradients along Kenya-Somalia coasts, indicative of the COB. (B) Crustal thickness map based on the global grid of Szwillus et al. (2019) showing the sharp transition zone where the crustal thickness changes from continental (cool colours) to oceanic (warm colours). The BOS and FOS points identified by Kenya are shown for reference.

- 61 According to Seton et al. (2012, 2020), the COB/COT along the Somali and Kenyan coasts continues south-west across the Davie Ridge and along the coasts of Tanzania and Mozambique (Figures 6 and 7).
- 62 ENE-trending magnetic anomalies in EMAG2 data (Meyer et al., 2012) indicate oceanic crust spreading fabric, consistent with the N-S rifting of Madagascar from Somalia/Kenya. This fabric does not appear to continue west of the Davie Ridge, due to deeper oceanic basement and proximity to continental crust.
- 63 Multi-channel seismic (MCS) data indicate that the BOS region in the rifted northern margin is closely correlated with the COT, which is characterised by a zone of widespread salt diapirism as well as gravitationally induced toe-thrusts associated with a deepwater fold-thrust belt that was active during the Late Cretaceous to Early Miocene (Coffin and Rabinowitz, 1987; Cruciani and Barchi, 2016). As suggested by Cruciani and Barchi (2016), the seaward advance of the fold-thrust belt appears to be limited by the presence of Late Cretaceous volcanic intrusions that have been mapped on seismic data along a line that conforms approximately with the trend of the BOS (Figure 8).
- 64 In the transform southern margin, the BOS appears to have been deflected by Davie Ridge and continues south along its eastern flank (Figures 6 and 7).

Figure 8*. Geological and geophysical elements supporting the location of the BOS/FOS, compiled by the Subcommission from the Main Body and

points according to article 76, paragraph 4(a)(i), and the fulfilment of the relevant requirements in the application of the SOU.

3. The establishment of the outer edge of the continental margin

- 70 In establishing the outer edge of its continental margin, Kenya applied the method specified in the SOU.
- 71 By applying the SOU, Kenya submitted that its continental margin possesses the "special characteristics" described therein. Kenya further stated that, establishing the outer edge of its continental margin according to paragraph 4(a) of article 76 would result in an inequity, as more than half of its margin would be excluded thereby.
- 72 According to the SOU, notwithstanding the provisions of article 76, the outer edge of the continental margin may be established by straight lines not exceeding 60 M in length connecting fixed points, at each of which the thickness of sedimentary rock is not less than 1 km.
- 73 In its consideration of the application of the SOU, the Subcommission understood the following as the necessary scientific and technical requirements to be fulfilled by Kenya:
 - (a) Requirement 1 the average distance at which the 200 m isobath occurs is not more than 20 M from the baselines (Figure 10);

Figure 10*. Illustration of Requirement 1 - The average distance at which the 200 m isobath occurs is not more than 20 M from the baselines. Baselines in



Figure 11^{*}. Illustration of Requirement 2 – The proportion (volume) of sedimentary rock beneath the rise (B) is greater than that beneath the shelf and slope (A).

- (c) Requirement 3 the mathematical average of the thickness of sedimentary rock along a line established at the maximum distance permissible in accordance with the provisions of paragraph 4(a)(i) and (ii) of article 76 as representing the entire outer edge of the continental margin should not be less than 3.5 km (Figure 12);
- (d) Requirement 4 more than half of the margin would be excluded thereby (Figure 12); and



Figure 12*. Illustration of Requirement 3 – The average sediment thickness along the article 76 margin line is not less than 3.5 km; and Requirement 4 – Area B is greater than Area A.

- (e) Requirement 5 establish the outer edge of the continental margin by straight lines not exceeding 60 M in length connecting fixed points, defined by latitude and longitude, at each of which the thickness of sedimentary rock is not less than 1 km (SOU margin in Figures 11 and 12).
- 74 The Subcommission understands that the application of the SOU does not exclude the application of other relevant provisions contained in article 76.

3.1 <u>The application of the SOU</u>

Requirement 1 – Consideration and conclusions

- 75 Kenya submitted data and information on the baseline from which the breadth of its territorial sea is measured and on the 200 m isobath (section 4.2.1 of the Main Body). Kenya constructed the 200 m isobath using multibeam bathymetric data combined with ETOPO2. The Subcommission verified the construction of the 200 m isobath and determined that the average distance measured from the baseline is 6.4 M (Figure 13).
- 76 Consequently, the Subcommission agreed that Kenya fulfils Requirement 1.

Figure 13*. Fulfilment of Requirement 1 by Kenya - Lines perpendicular to the baselines at 1 M intervals were used by the Subcommission in its verification. Baseline in light green, 200 m isobath in orange, 20 M from the baselines in white.

Requirement 2 – Consideration and conclusions

- 77 The consideration of Requirement 2 involved the calculation of the volumes of sedimentary rock beneath the shelf and slope, and beneath the rise (A and B, respectively, in Figure 11).
- 78 In the Submission, Kenya determined the 1 per cent sediment thickness fixed f61Ta42(t)-1.1(s)-8(a(c)-8 c)-8.1 origh(t)-1.1(o)-12.2 paurp(h)-21.14 ()()-6.4 (i mf ericleheer the o(t)-1.1(i)3.2(n)-12.3(ent)-13.2((l)-8.9 maur)-18.4g(i)3.1(n)]TJ 0 Tc 0 Tw80.446 0 Td ()Tj -0.00

Figure 16*. Revised 1 km sediment thickness fixed points (red dots) determined on a new set of single-channel seismic lines (white lines) submitted by Kenya (2018_01_24_KEN_RPT_008). Also shown in the figure are the 200 M and 350 M lines.

According to Kenya, the sediment thickness estimated from inversion of gravity data corroborates with those obtained from the single-channel seismic data (2018_01_24_KEN_RPT_008).

- 89 The Subcommission noted that the results of the gravity inversion method as applied by Kenya presented an uncertainty of 30 per cent compared to those based on seismic data at the SOU margin, which requires a minimum of 1 km of sediments. On this basis, the Subcommission was of the view that the estimation of sediment thickness at the SOU margin in this region should be based principally on seismic data as per paragraph 8.2.4 of the Guidelines. Consequently, it sought further clarification from the Delegation regarding the remaining points.
- 90 In its communication to the Subcommission of 22 July 2019, pending the outcome of the consideration of the fixed points of the outer edge of the continental margin (SOU margin), Kenya submitted what it referred to as a "provisional' SOU margin" using multichannel seismic data "solely for the purpose of demonstrating the fulfilment of the second SOU requirement". The proposed "provisional SOU' margin" consists of six sediment thickness points PFPSED01 to PFPSED06 (Figure 17 and Table 4 of annex I).

Figure 17*. "'Provisional' SOU margin" (green) as proposed by Kenya, in relation to other lines in the Submission: article 76 margin (red) and SOU margin (yellow) lines. Also shown in the figure are the FOS points (green dots) and the 200 M and 350 M lines.

- 91 At the end of the fifty-first session the Subcommission agreed to Kenya's proposal to use the "provisional' SOU margin", provided that:
 - (a) the entire "provisional' SOU margin" is located within the continental margin established in accordance with the SOU; and
 - (b) the greater proportion of the sedimentary rock of the "provisional' SOU

- (c) assuming a multi-layered sedimentary section using PSTM time grids between the seabed and the top of the basement with interval velocities derived from the data provided.
- 97 By all these methods (Table 2A) and considering the associated uncertainties (Table 2B), the Subcommission verified that the calculated volume of rock beneath the rise is greater than that beneath the shelf and slope.



Table 2*. Verification of volume calculations by Subcommission (A) Using the three methods described in paragraph 96 (B) Using method (c) incorporating the uncertainties associated with the pick of the top of the basement.

98 Consequently, the Subcommission agreed that Kenya fulfils Requirement 2.

Requirement 3 - Consideration and conclusions

- 99 Kenya initially submitted seven 1 per cent sediment thickness fixed points 1%Sed01 to 1%Sed07 (Table 6.1 of the Main Body) to establish the outer edge of the continental margin according to the provisions of paragraph 4(a)(i) of article 76. The sediment thickness fixed points were determined by Kenya from FOS 1 and FOS 8 using multi-channel seismic lines. Velocity data from those lines and an ocean-bottom seismometer (OBS) survey line were used for sediment thickness calculation.
- 100 In its consideration of Requirement 3, the Subcommission investigated whether the submitted fixed points are at the "maximum distance permissible" from the FOS and whether the average sediment thickness along the line connecting those points is not less than 3.5 km.
- 101 In the view of the Subcommission, for those fixed points to be at the "maximum distance permissible", an optimum set of FOS points would be required. Based on its analysis of the data and information, the Subcommission had concluded at the forty-first session, and presented to the Delegation on 2 August 2016, that FOS points 1, 9 and 10 are the optimum set of FOS points that would generate

107 At the fifty-first session, Kenya submitted revised 1 per c(i)3.09cn0- 9l6ied x5 rifty

connecting fixed points at each of which the sediment thickness is not less than 1 km, in fulfilment of Requirement 5.

114 As described in paragraphs 84 to 87, the Subcommission considered the submitted data and information regarding the outer edge of the SOU margin until the forty-sixth session and could agree to only one of the seven

Figure 23. Outer edge of the continental margin of Kenya, established by fixed points (red dots) connected by straight lines (yellow) not exceeding 60 M. (2022_09_30_KEN_RPT_014, Figure 15)

3.3 <u>Recommendations</u>

- 127 In accordance with the SOU, Kenya established the outer edge of its continental margin beyond 200 M by straight lines not exceeding 60 M in length connecting six fixed points, defined by latitude and longitude, at each of which the thickness of sedimentary rock is not less than 1 km (Figure 23). The fixed points are listed in Table 2 of annex I to these Recommendations.
- 128 The Commission recommends, based on the submitted data and information, that these points be used as the basis for delineating the outer limits of the continental shelf, subject to the application of the relevant constraints.

4. The application of the constraint criteria (article 76, paragraphs 5 and 6)

129 The outer limits of the continental shelf shall not extend beyond the constraints as per the provisions contained in article 76, paragraphs 5 and 6. For the outer limits of its continental shelf, Kenya invoked only the distance constraint. Consequently, the fixed points comprising the line of the outer limits of the continental shelf of Kenya shall not exceed 350 M from the baselines.

4.1 <u>The construction of the distance constraint line</u>

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ANNEX I

TABLES OF GEOGRAPHICAL COORDINATES OF: THE FOOT OF THE CONTINENTAL SLOPE POINTS, THE FIXED POINTS OF THE OUTER EDGE OF THE CONTINENTAL MARGIN BEYOND 200 M, AND THE FIXED POINTS OF THE OUTER LIMITS OF THE CONTINENTAL SHELF BEYOND 200 M AS RECOMMENDED BY THE COMMISSION, BASED ON THE SUBMISSION BY KENYA. ALSO INCLUDED ARE TABLES OF GEOGRAPHICAL COORDINATES OF: THE 'PROVISIONAL' OUTER EDGE OF THE CONTINENTAL MARGIN AND THE LINE DEFINING THE MAXIMUM DISTANCE PERMISSIBLE ESTABLISHED IN ACCORDANCE WITH THE STATEMENT OF UNDERSTANDING.

Table 1. Coordinates of the foot of the continental slope points (Datum: WGS 84)

FOS Point ID	DS Latitude Longitude at ID (dd) (dd)		Water Depth (m)
FOS 1	-4.6817165	41.5502395	2789
FOS 2	-4.30355	41.49706	2594
FOS 3	-4.058126	41.43077	2497
FOS 4	-3.596429	41.47224	2625
FOS 5	-3.304524	41.29672	2224
FOS 6	-2.946422	41.40705	2386
FOS 7	-2.644317	41.55566	2458
FOS 8	-2.426686	41.662	2412
FOS 9	-2.0259111	42.1177148	2553
FOS 10	-1.7739678	42.1631420	2305

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Table 3.

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I	KEN-OCS-37	-4.5006674	46.6841793	5.0	350M
I	KEN-OCS-38	-4.5739595	46.6438188	5.0	350M
I	KEN-OCS-39	-4.6466652	46.6024142	5.0	350M
Ì	KEN-OCS-40	-4.6809304			