



## Council

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### Twenty-ninth session

Council session, part II

Kingston, 15–26 July 2024

Agenda item 9

**Consideration, with a view to approval, of applications  
for a plan of work for exploration**

### **Report and recommendations of the Legal and Technical Commission to the Council of the International Seabed Authority relating to an application for approval of a plan of work for exploration for polymetallic sulphides by the Earth System Science Organization-Ministry of Earth Sciences of the Government of India**

#### **I. Introduction**

1. On 18 January 2024, the Secretary-General of the International Seabed Authority received an application for approval of a plan of work for exploration for polymetallic sulphides along the Carlsberg Ridge in the Indian Ocean. The application was submitted, pursuant to the regulations on prospecting and exploration for polymetallic sulphides in the Area ([ISBA/16/A/12/Rev.1](#), annex), by the Earth System Science Organization (ESSO)-Ministry of Earth Sciences of the Government of India.

2. On the same date, in accordance with regulation 22, paragraph (c), the Secretary-General notified the members of the Authority of the receipt of the application and circulated information of a general nature concerning the application. Also on the same date, the Secretary-General notified the members of the Legal and Technical Commission and placed consideration of the application on the agenda of the Commission for discussion during the first part of its twenty-ninth session, held from 4 to 15 March 2024.

#### **II. Methodology and consideration of the application by the Legal and Technical Commission**

##### **A. General methodology applied by the Commission in consideration of the application**

3. In its consideration of the application, the Commission noted that, in keeping with the provisions of article 6 of annex III to the United Nations Convention on the Law of the Sea, and paragraph 3 of regulation 23, it was first required to make an



objective determination as to whether the applicant had fulfilled the requirements contained in the regulations, in particular with respect to the form of the application; whether the applicant had given the undertakings and assurances specified in regulation 15; possessed the financial and technical capabilities to carry out the proposed plan of work for exploration and had provided details as to its ability to comply promptly with emergency orders; and, as relevant, had satisfactorily discharged its obligations in relation to any previous contract with the Authority. The Commission was then required to determine, in accordance with regulation 23, paragraph 4, and its procedures, whether the proposed plan of work would provide for effective protection of human health and safety and effective protection and preservation of the marine environment, and ensure that installations would not be established where interference might be caused to the use of recognized sea lanes essential to international navigation or in areas of intense fishing activity. In its paragraph 5, regulation 23 also provides that, if the Commission makes the determinations specified in its paragraph 3 and determines that the proposed plan of work for exploration meets the requirements of its paragraph 4, the Commission shall recommend approval of the plan of work for exploration to the Council.

4. In considering the proposed plan of work for exploration for polymetallic sulphides, the Commission took into account the principles, policies and objectives relating to activities in the Area, as provided for in part XI of annex III to the Convention and in the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982.

## **B. Consideration of the application**

5. The Commission considered the application during the first and second parts of the twenty-ninth session, on 5 and 6 March and 3, 4, 10 and 11 July 2024. It evaluated the application in accordance with the procedure contained in document [ISBA/18/LTC/8/Rev.1](#).

6. On 5 March 2024, the Commission invited the applicant to make a presentation on the application. Members of the Commission then asked questions to obtain clarification on certain aspects of the application. The Commission evaluated the legal, financial, geological, technological, environmental and training aspects of the application.

7. On 7 March 2024, the Commission sent a set of written comments and questions to the applicant. Written responses were sent to the Commission by the applicant on 24 May. The Commission considered those responses on 24 May. The Commission also considered the responses on 2, 3 and 4 July and sent a further list of questions to the applicant on 6 July. On 10 July, the Commission received responses to the questions from the applicant and reviewed them.

## **III. Summary of basic information regarding the application**

### **A. Identification of the applicant**

8. Name of applicant: Earth System Science Organization (ESSO)-Ministry of Earth Sciences, Government of India.

9. Address of the applicant:

(a) Street address: Ministry of Earth Sciences, Prithvi Bhavan, Lodi Road, New Delhi-110003, India;

- (b) Postal address: same as above;
  - (c) Telephone number: +91-11-24629771/24629772;
  - (d) Fax number: +91-11-24629777.
10. Email address: [secretary@moes.gov.in](mailto:secretary@moes.gov.in).
11. Name of applicant's designated representative:
- (a) Dr. M. Ravichandran;
  - (b) Street address: same as above;
  - (c) Postal address: same as above;
  - (d) Telephone number: same as above;
  - (e) Fax number: same as above;
  - (f) Email address: same as above.
12. As a juridical person, the applicant's details are:
- (a) Place of registration: not applicable;
  - (b) Principal place of business/domicile: not applicable.

## **B. Sponsorship**

13. The sponsoring State is India.
14. The date of deposit by India of its instrument of ratification of the Convention and the date of consent to be bound by the 1994 Agreement is 29 June 1995.

## **C. Area of application**

15. The total application area covers 10,000 km<sup>2</sup>, located in the Central Indian Ocean, and consists of 100 blocks, each 10 km by 10 km, with none exceeding 100 km<sup>2</sup> in area. The blocks are organized and grouped into 11 clusters, each containing from 5 to 18 blocks. The application area covering the 11 clusters is enveloped within a rectangular area not exceeding 300,000 km<sup>2</sup> in size, where the longest side does not exceed 1,000 km in length. The coordinates and general location of the area under application are shown in the annexes to the present document.
16. A breakdown of the clusters and the number of blocks contained in each cluster is as follows: cluster A: 18 blocks; cluster B: 15 blocks; cluster C: 8 blocks; cluster D: 7 blocks; cluster E: 16 blocks; cluster F: 5 blocks; cluster G: 5 blocks; cluster H: 6 blocks; cluster I: 5 blocks; cluster J: 7 blocks; and cluster K: 8 blocks.
17. The application area is a part of the Area and lies beyond the limits of the national jurisdiction of any State.
18. The Commission notes that the area of the application does not overlap with existing contract areas.
19. The Commission also notes that the applicant will ensure that it will not establish any installations where interference may be caused to the use of recognized sea lanes essential to international navigation or in areas of intense fishing activity.

**D. Other information**

20. The applicant provided the written undertakings signed by its designated representative, in compliance with regulation 15.
21. The applicant elected to offer an equity interest in a joint venture arrangement with the Enterprise, in accordance with regulation 19.
22. The applicant paid a fee of \$500,000, in accordance with regulation 21, paragraph 1.

**IV. Examination of information and technical data submitted by the applicant**

23. The following technical documents and information were submitted by the applicant:
- (a) Information relating to the area under application:
    - (i) Charts of the location of the blocks;
    - (ii) A list of the coordinates of the corners of blocks under application, in accordance with the World Geodetic System 1984;
  - (b) Information to enable the Council to determine whether the applicant is financially capable of carrying out the proposed plan of work for exploration;
  - (c) Information to enable the Council to determine whether the applicant is technically capable of carrying out the proposed plan of work for exploration;
  - (d) A plan of work for exploration;
  - (e) Information relating to training;
  - (f) Written undertakings by the applicant.

**V. Consideration of financial and technical qualifications of the applicant****A. Financial capability**

24. The applicant submitted a statement by the Government of India, signed by its designated representative, certifying that the applicant has the financial resources necessary to meet the estimated costs of the proposed plan of work for exploration and to fulfil its financial obligation to the Authority in accordance with regulation 13, paragraph 3.

**B. Technical capability**

25. In evaluating the technical capability of the applicant, the Commission took note of information provided by the applicant in relation to its marine expertise over the past 40 years, including the implementation of extensive marine exploration programmes, deep ocean research, environmental research, exploration for marine mineral resources and technology development. In addition, the applicant provided a description of key activities undertaken in deep-sea-related surveys, exploration, and scientific and environmental studies. The applicant also provided details of its technical capabilities and achievements under its two contracts with the Authority.

The first contract was signed in 2002 for exploration for polymetallic nodules in the Central Indian Ocean Basin. The second contract was signed in 2016 for exploration for polymetallic sulphides in the Central Indian and South-west Indian Ridges. The nodal agency for the first contract is the National Centre for Polar and Ocean Research and the nodal agency for the second contract is the National Institute of Ocean Technology, both within the Ministry of Earth Sciences of the Government of India.

## 1. General description of equipment and methods

26. The applicant provided information regarding the planned operation to carry out the proposed plan of work for exploration, as well as on the methods and instruments to be used for that purpose, including a detailed list of equipment to be used for the first five-year programme of activities. The applicant informed the Commission that it would use such equipment as:

(a) Three fully equipped vessels owned by India: *ORV Sagar Kanya*, *R/V Sagar Nidhi* and *R/V Sindhu Sadhana*. In addition, the applicant plans to procure an additional high sea vessel equipped with state-of-the-art facilities to supplement the survey and exploration efforts for polymetallic sulphides in the proposed exploration area;

(b) Multibeam echo sounder: to conduct bathymetric surveys of the seabed in the exploration area;

(c) Bottom/sub-bottom profiler system (without use of explosives): acoustic data are to be used to study the thickness and physical characteristics of subsurface sediment;

(d) Conductivity, temperature and depth sampler/clean conductivity, temperature and depth sampler, with water sampler: to determine essential physical properties of the seawater;

(e) Miniature autonomous plume recorder: to collect hydrothermal plume data (suspended particle concentrations). Such recorders especially target operations where hydrothermal plume data are not normally collected: rock cores, dredges or deep-towed geophysical and bottom imaging;

(f) Grab/corer systems: for rock/sediment sampling to study the mineralization process and benthic and microbial fauna;

(g) Remotely operated vehicle: equipped with multifunctional tools, sensors and camera/video systems that transfer video images via fibre-optic cable to the vessel. The remotely operated vehicle is planned to be used for image data collection, ground truthing, precise small-scale sampling and, in particular, direct sampling of hydrothermal fluids at active black smoker chimneys in the exploration area, as well as in vent habitats and for sampling in sensitive environments;

(h) Autonomous underwater vehicle: a self-propelled, uncrewed, untethered underwater vehicle with multiple sensors for near-seabed geophysical surveys in vent habitats and seafloor imaging in large areas, at approximately 6–8 m above the seafloor;

(i) On-board laboratory facilities: for biological and geological processing, with specialized equipment and modern facilities optimized for dealing with polymetallic sulphides and deep-sea biology, and box-core samplers for efficient handling, documentation and preservation of the samples acquired;

(j) Television-guided grab systems: for precise large-scale (up to about 3 ton) sampling of rocks, sediment or massive sulphides. Owing to a high-resolution video camera and several lights mounted in the centre of the grab, the system can be used for small-scale mapping of the seafloor as well as for sample selection, on seamounts/

ridges, for quantitative benthic biodiversity studies, and to verify photographic data acquired during regular environmental studies;

(k) Acoustic Doppler current profiler: to measure water currents with sound using the principle of the Doppler effect;

(l) Magnetometer: to detect variations in the total magnetic field of the underlying seafloor;

(m) Sea floor observation systems for video/still photographic observations;

(n) Benthic sledge: camera-mounted sledges for sample collection on the seafloor, avoiding sensitive areas and reducing dragging time;

(o) Dynamic positioning system: for accurate navigation positioning;

(p) Dredges: for seabed sampling, avoiding sensitive zones.

27. The applicant noted that a new research vessel dedicated exclusively to the investigation of deep-sea minerals is currently under construction and will be commissioned in the next few years.

## **2. Financial and technical capabilities to respond to any incident or activity that causes serious harm to the marine environment**

28. The applicant provided information related to its expertise and technical capabilities developed over the past four decades in a variety of marine survey, exploration and environmental studies and campaigns. In particular, it provided information on major activities that it had conducted in the deep ocean, including exploration for polymetallic massive sulphides and polymetallic nodules, prospecting for cobalt-rich ferromanganese crusts, studies in the Southern Indian Ocean, delineation of outer limits of the continental shelf of India and mapping of its exclusive economic zone.

29. The applicant indicated that the implementation of these programmes required extensive planning and precautions for marine-related surveys, research and technology development activities. The activities have therefore provided experience in anticipating, responding to and monitoring any harmful effects on the marine environment as a result of deep-sea survey, exploration and research activities.

30. The applicant stated that the plan of work will have a precautionary mechanism in place for anticipating as well as responding to any incident that may have the potential to cause serious harm to the marine environment.

31. The Government of India, through ESSO-Ministry of Earth Sciences (the applicant), has confirmed that it has made available the funds required for implementation of the proposed plan of work. The estimated funds requirement has an element of contingency that accounts for responding to unforeseen incidents or activities that may occur during the proposed research and exploration activities.

## **VI. Consideration of data and information submitted for approval of the plan of work for exploration**

32. In accordance with regulation 20, the applicant submitted the following information, with a view to receiving approval of the plan of work for exploration:

(a) A general description and schedule of the proposed exploration programme, including the programme of activities for the immediate five-year period, such as studies to be undertaken in respect of the environmental, technical, economic and other appropriate factors that must be taken into account in exploration;

(b) A description of the programme for oceanographic and environmental baseline studies in accordance with the regulations and any environmental rules, regulations and procedures established by the Authority that would enable an assessment of the potential environmental impact, including, but not restricted to, the impact on biodiversity of the proposed exploration activities, taking into account the recommendations issued by the Commission ([ISBA/25/LTC/6/Rev.3](#));

(c) A preliminary assessment of the possible impact of the proposed exploration activities on the marine environment;

(d) A description of proposed measures for the prevention, reduction and control of pollution and other hazards, as well as possible impacts, in the marine environment;

(e) Data necessary for the Council to make the determination required under regulation 13, paragraph 1;

(f) A schedule of expected yearly expenditure in respect of the programme of activities for the first five-year period.

33. In response to questions, the applicant informed the Commission that it would consider the development of mining technology in the final phase of the implementation of the plan of work and produce a road map of its proposed mining technology. The applicant indicated that the exploration activities would identify the presence or absence of submarine structures, shipping lanes, zones relating to fisheries and exclusion zones. The applicant agreed to study the impacts of its exploration activities on fisheries. The applicant also committed to carrying out more environmental monitoring in the area and to take into account sites of ecological sensitivity in its environmental baseline plan.

34. At the request of the Commission, the applicant submitted further information on the location of submarine cables, navigation routes and fisheries operations in the proposed area.

35. The applicant presented a map showing the Oman Australia submarine cable that runs through cluster J of the proposed area and noted that sufficient distance will be maintained between the cable and sampling in the proposed area to avoid the risk of damage to the cable or sampling gear. The applicant provided assurance that sampling activities will be planned and managed considering the level and period of shipping along the shipping route identified directly along the midline of the applicant's proposed area. Furthermore, the applicant indicated that exploration activities will be managed to avoid interference with fishing activities in the proposed area.

## VII. Training

36. The Commission took note of the applicant's proposed training programme for the first five years of the contract period. The applicant indicated that detailed training plans for the second and third phases of the contract would be developed at an appropriate time in consultation with the Authority.

37. The Commission also noted that the applicant's proposed training programme for the first five years included at-sea and on-land training opportunities. The applicant provided detailed information on the objectives and content of the training programme for the first five-year period, including the general qualifications of candidates.

38. The applicant indicated that the National Centre for Polar and Ocean Research would be the coordinator for conducting the training programme on its behalf. The training programme would be organized in association with various national institutes, namely the Centre for Marine Living Resources and Ecology, Cochin, the Indian National Centre for Ocean Information Services, Hyderabad, the National Centre for Earth Science Studies, Thiruvananthapuram, the National Institute of Ocean Technology, Chennai, and the National Institute of Oceanography of the Council of Scientific and Industrial Research, Goa.

39. The schedule of the first five-year training programme includes two slots for 10 candidates. The first group of five trainees will undergo land-based training in institutes and laboratories in the second year of the contract, and the second group of five trainees will receive sea-based training in the fourth year of the contract.

## **VIII. Conclusion and recommendations**

40. Having examined the particulars submitted by the applicant, as summarized in sections III to VII above, the Commission is satisfied that the application has been duly submitted in accordance with the regulations and that the applicant is a qualified applicant within the meaning of article 4 of annex III to the Convention.

41. The Commission is also satisfied that the applicant:

- (a) Has complied with the provisions of the regulations;
- (b) Has given the undertakings and assurances specified in regulation 15;
- (c) Possesses the financial and technical capabilities to carry out the proposed plan of work for exploration.

42. The Commission is further satisfied that none of the conditions in regulation 23, paragraph 6, apply.

43. The Commission is satisfied that the proposed plan of work for exploration will:

- (a) Provide for effective protection of human health and safety;
- (b) Provide for effective protection and preservation of the marine environment, including, but not restricted to, the impact on biodiversity;
- (c) Ensure that installations are not established where interference may be caused to the use of recognized sea lanes essential to international navigation or in areas of intense fishing activity.

44. Accordingly, pursuant to paragraph 5 of regulation 23, the Commission recommends to the Council approval of the plan of work for exploration for polymetallic sulphides submitted by ESSO-Ministry or Earth Sciences of the Government of India.



## Annex I

## Geographical coordinates of the area under application

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
<i>Cluster A</i>									
1	59	47	46.9	6	58	25.3	59.79635032	6.97370545	100
	59	51	23.1	7	2	28	59.85642592	7.04112298	
	59	55	26.1	6	58	51.5	59.92391594	6.98096836	
	59	51	49.8	6	54	48.8	59.86384634	6.91356525	
2	59	51	23.1	7	2	28	59.85642592	7.04112298	100
	59	54	59.5	7	6	30.7	59.91651599	7.10853438	
	59	59	2.4	7	2	54.1	59.98399984	7.04836548	
	59	55	26.1	6	58	51.5	59.92391594	6.98096836	
3	59	54	59.5	7	6	30.7	59.91651599	7.10853438	100
	59	58	35.8	7	10	33.4	59.97662040	7.17593947	
	60	2	38.8	7	6	56.7	60.04409791	7.11575644	
	59	59	2.4	7	2	54.1	59.98399984	7.04836548	
4	59	51	49.8	6	54	48.8	59.86384634	6.91356525	100
	59	55	26.1	6	58	51.5	59.92391594	6.98096836	
	59	59	29.1	6	55	14.9	59.99140277	6.92080973	
	59	55	52.8	6	51	12.3	59.93133903	6.85342088	
5	59	55	26.1	6	58	51.5	59.92391594	6.98096836	100
	59	59	2.4	7	2	54.1	59.98399984	7.04836548	
	60	3	5.3	6	59	17.5	60.05148066	6.98819275	
	59	59	29.1	6	55	14.9	59.99140277	6.92080973	
6	59	59	2.4	7	2	54.1	59.98399984	7.04836548	100
	60	2	38.8	7	6	56.7	60.04409791	7.11575644	
	60	6	41.7	7	3	20.1	60.11157254	7.05556975	
	60	3	5.3	6	59	17.5	60.05148066	6.98819275	
7	59	55	52.8	6	51	12.3	59.93133903	6.85342088	100
	59	59	29.1	6	55	14.9	59.99140277	6.92080973	
	60	3	32	6	51	38.3	60.05888643	6.86064710	
	59	59	55.8	6	47	35.8	59.99882838	6.79327233	
8	59	59	29.1	6	55	14.9	59.99140277	6.92080973	100
	60	3	5.3	6	59	17.5	60.05148066	6.98819275	
	60	7	8.3	6	55	40.9	60.11895845	6.92801618	
	60	3	32	6	51	38.3	60.05888643	6.86064710	
9	60	3	5.3	6	59	17.5	60.05148066	6.98819275	100
	60	6	41.7	7	3	20.1	60.11157254	7.05556975	
	60	10	44.6	6	59	43.4	60.17904429	6.99537939	
	60	7	8.3	6	55	40.9	60.11895845	6.92801618	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
10	59	59	55.8	6	47	35.8	59.99882838	6.79327233	100
	60	3	32	6	51	38.3	60.05888643	6.86064710	
	60	7	34.9	6	48	1.7	60.12636690	6.80048047	
	60	3	58.7	6	43	59.2	60.06631441	6.73311962	
11	60	3	32	6	51	38.3	60.05888643	6.86064710	100
	60	7	8.3	6	55	40.9	60.11895845	6.92801618	
	60	11	11.2	6	52	4.2	60.18643321	6.86783578	
	60	7	34.9	6	48	1.7	60.12636690	6.80048047	
12	60	7	8.3	6	55	40.9	60.11895845	6.92801618	100
	60	10	44.6	6	59	43.4	60.17904429	6.99537939	
	60	14	47.4	6	56	6.7	60.24651316	6.93518538	
	60	11	11.2	6	52	4.2	60.18643321	6.86783578	
13	60	3	58.7	6	43	59.2	60.06631441	6.73311962	100
	60	7	34.9	6	48	1.7	60.12636690	6.80048047	
	60	11	37.8	6	44	25.1	60.19384420	6.74030985	
	60	8	1.7	6	40	22.7	60.13379709	6.67296274	
14	60	7	34.9	6	48	1.7	60.12636690	6.80048047	100
	60	11	11.2	6	52	4.2	60.18643321	6.86783578	
	60	15	14.1	6	48	27.5	60.25390493	6.80765157	
	60	11	37.8	6	44	25.1	60.19384420	6.74030985	
15	60	11	11.2	6	52	4.2	60.18643321	6.86783578	100
	60	14	47.4	6	56	6.7	60.24651316	6.93518538	
	60	18	50.3	6	52	30	60.31397915	6.87498771	
	60	15	14.1	6	48	27.5	60.25390493	6.80765157	
16	60	5	23.9	6	37	25.7	60.08998553	6.62381567	100
	60	9	0.1	6	41	28.2	60.15002632	6.69116841	
	60	13	3	6	37	51.6	60.21750606	6.63100013	
	60	9	26.9	6	33	49.2	60.15747052	6.56366097	
17	60	9	0.1	6	41	28.2	60.15002632	6.69116841	100
	60	12	36.3	6	45	30.7	60.21008074	6.75851575	
	60	16	39.2	6	41	54	60.27755507	6.69833405	
	60	13	3	6	37	51.6	60.21750606	6.63100013	
18	60	12	36.3	6	45	30.7	60.21008074	6.75851575	100
	60	16	12.5	6	49	33.1	60.27014864	6.82585753	
	60	20	15.4	6	45	56.4	60.33761739	6.76566254	
	60	16	39.2	6	41	54	60.27755507	6.69833405	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
<i>Cluster B</i>									
19	60	12	47.8	6	31	21.8	60.21328294	6.52272222	100
	60	16	22.4	6	35	25.5	60.27289399	6.59041259	
	60	20	26.6	6	31	50.4	60.34073287	6.53065645	
	60	16	52.1	6	27	46.7	60.28112651	6.46297949	
20	60	16	22.4	6	35	25.5	60.27289399	6.59041259	100
	60	19	57.1	6	39	29.2	60.33251851	6.65809811	
	60	24	1.3	6	35	54	60.40035252	6.59832870	
	60	20	26.6	6	31	50.4	60.34073287	6.53065645	
21	60	19	57.1	6	39	29.2	60.33251851	6.65809811	100
	60	23	31.8	6	43	32.8	60.39215635	6.72577861	
	60	27	35.9	6	39	57.6	60.45998533	6.66599608	
	60	24	1.3	6	35	54	60.40035252	6.59832870	
22	60	16	52.1	6	27	46.7	60.28112651	6.46297949	100
	60	20	26.6	6	31	50.4	60.34073287	6.53065645	
	60	24	30.8	6	28	15.2	60.40856844	6.47089615	
	60	20	56.3	6	24	11.6	60.34896662	6.40323244	
23	60	20	26.6	6	31	50.4	60.34073287	6.53065645	100
	60	24	1.3	6	35	54	60.40035252	6.59832870	
	60	28	5.5	6	32	18.8	60.46818337	6.53855531	
	60	24	30.8	6	28	15.2	60.40856844	6.47089615	
24	60	24	1.3	6	35	54	60.40035252	6.59832870	100
	60	27	35.9	6	39	57.6	60.45998533	6.66599608	
	60	31	40.1	6	36	22.4	60.52781129	6.60620974	
	60	28	5.5	6	32	18.8	60.46818337	6.53855531	
25	60	18	50.5	6	21	48.8	60.31402013	6.36355255	100
	60	22	25	6	25	52.4	60.37361756	6.43122013	
	60	26	29.2	6	22	17.3	60.44145368	6.37146007	
	60	22	54.7	6	18	13.7	60.38186065	6.30380557	
26	60	22	25	6	25	52.4	60.37361756	6.43122013	100
	60	25	59.6	6	29	56	60.43322812	6.49888314	
	60	30	3.8	6	26	20.8	60.50105968	6.43911016	
	60	26	29.2	6	22	17.3	60.44145368	6.37146007	
27	60	25	59.6	6	29	56	60.43322812	6.49888314	100
	60	29	34.3	6	33	59.5	60.49285166	6.56654144	
	60	33	38.4	6	30	24.3	60.56067848	6.50675568	
	60	30	3.8	6	26	20.8	60.50105968	6.43911016	
28	60	22	54.7	6	18	13.7	60.38186065	6.30380557	100
	60	26	29.2	6	22	17.3	60.44145368	6.37146007	
	60	30	33.4	6	18	42.1	60.50928649	6.31169587	
	60	26	58.9	6	14	38.6	60.44969770	6.24405427	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
29	60	26	29.2	6	22	17.3	60.44145368	6.37146007	100
	60	30	3.8	6	26	20.8	60.50105968	6.43911016	
	60	34	8	6	22	45.6	60.56888807	6.37933321	
	60	30	33.4	6	18	42.1	60.50928649	6.31169587	
30	60	30	3.8	6	26	20.8	60.50105968	6.43911016	100
	60	33	38.4	6	30	24.3	60.56067848	6.50675568	
	60	37	42.6	6	26	49.1	60.62850228	6.44696612	
	60	34	8	6	22	45.6	60.56888807	6.37933321	
31	60	26	58.9	6	14	38.6	60.44969770	6.24405427	100
	60	30	33.4	6	18	42.1	60.50928649	6.31169587	
	60	34	37.6	6	15	6.9	60.57711598	6.25192753	
	60	31	3.1	6	11	3.5	60.51753129	6.18429866	
32	60	30	33.4	6	18	42.1	60.50928649	6.31169587	100
	60	34	8	6	22	45.6	60.56888807	6.37933321	
	60	38	12.2	6	19	10.4	60.63671329	6.31955229	
	60	34	37.6	6	15	6.9	60.57711598	6.25192753	
33	60	34	8	6	22	45.6	60.56888807	6.37933321	100
	60	37	42.6	6	26	49.1	60.62850228	6.44696612	
	60	41	46.8	6	23	13.8	60.69632307	6.38717276	
	60	38	12.2	6	19	10.4	60.63671329	6.31955229	
<i>Cluster C</i>									
34	61	4	48.1	5	46	25.6	61.08004041	5.77376705	100
	61	7	46.9	5	50	56.6	61.12970219	5.84906095	
	61	12	18.6	5	47	57.4	61.20516326	5.79927605	
	61	9	19.8	5	43	26.4	61.15550427	5.72399608	
35	61	7	46.9	5	50	56.6	61.12970219	5.84906095	100
	61	10	45.8	5	55	27.7	61.17937798	5.92435191	
	61	15	17.4	5	52	28.4	61.25483607	5.87455320	
	61	12	18.6	5	47	57.4	61.20516326	5.79927605	
36	61	10	45.8	5	55	27.7	61.17937798	5.92435191	100
	61	13	44.6	5	59	58.7	61.22906765	5.99963975	
	61	18	16.3	5	56	59.4	61.30452257	5.94982734	
	61	15	17.4	5	52	28.4	61.25483607	5.87455320	
37	61	11	11.8	5	46	16.1	61.18661596	5.77114460	100
	61	14	10.6	5	50	47.1	61.23627495	5.84642456	
	61	18	42.2	5	47	47.9	61.31173331	5.79663509	
	61	15	43.5	5	43	16.9	61.26207699	5.72136887	
38	61	14	10.6	5	50	47.1	61.23627495	5.84642456	100
	61	17	9.4	5	55	18.1	61.28594775	5.92170171	
	61	21	41.1	5	52	18.8	61.36140326	5.87189862	
	61	18	42.2	5	47	47.9	61.31173331	5.79663509	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
39	61	17	4.2	5	45	19.4	61.28451005	5.75538441	100
	61	20	3	5	49	50.3	61.33418000	5.83064794	
	61	24	34.7	5	46	51	61.40963292	5.78084046	
	61	21	35.9	5	42	20.1	61.35996571	5.70559037	
40	61	20	34.6	5	40	47.3	61.34295484	5.67979451	100
	61	23	33.4	5	45	18.2	61.39260862	5.75504718	
	61	28	5	5	42	18.9	61.46806157	5.70524857	
	61	25	6.3	5	37	48	61.41841021	5.63000927	
41	61	23	33.4	5	45	18.2	61.39260862	5.75504718	100
	61	26	32.2	5	49	49.1	61.44227584	5.83029728	
	61	31	3.8	5	46	49.7	61.51772618	5.78048543	
	61	28	5	5	42	18.9	61.46806157	5.70524857	
<i>Cluster D</i>									
42	62	0	18	5	8	39.9	62.00499393	5.14442414	100
	62	5	14.3	5	10	53.6	62.08730942	5.18156272	
	62	7	28.1	5	5	56.9	62.12448212	5.09914575	
	62	2	31.8	5	3	43.3	62.04217807	5.06201771	
43	62	5	14.3	5	10	53.6	62.08730942	5.18156272	100
	62	10	10.7	5	13	7.3	62.16963544	5.21868971	
	62	12	24.5	5	8	10.5	62.20679660	5.13626241	
	62	7	28.1	5	5	56.9	62.12448212	5.09914575	
44	62	2	31.8	5	3	43.3	62.04217807	5.06201771	100
	62	7	28.1	5	5	56.9	62.12448212	5.09914575	
	62	9	41.9	5	1	0.2	62.16165049	5.01672651	
	62	4	45.7	4	58	46.6	62.07935768	4.97960890	
45	62	7	28.1	5	5	56.9	62.12448212	5.09914575	100
	62	12	24.5	5	8	10.5	62.20679660	5.13626241	
	62	14	38.2	5	3	13.8	62.24395364	5.05383294	
	62	9	41.9	5	1	0.2	62.16165049	5.01672651	
46	62	2	38.3	4	57	49.1	62.04398573	4.96365093	100
	62	7	34.6	5	0	2.8	62.12628978	5.00077898	
	62	9	48.4	4	55	6.1	62.16345815	4.91835973	
	62	4	52.2	4	52	52.5	62.08116534	4.88124213	
47	62	7	34.6	5	0	2.8	62.12628978	5.00077898	100
	62	12	31	5	2	16.4	62.20860426	5.03789563	
	62	14	44.7	4	57	19.7	62.24576130	4.95546616	
	62	9	48.4	4	55	6.1	62.16345815	4.91835973	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
<i>Cluster E</i>									
48	63	30	33.9	3	40	2.6	63.50942119	3.66738099	100
	63	32	26.7	3	45	7.3	63.54075728	3.75202902	
	63	37	32	3	43	14.3	63.62554326	3.72063061	
	63	35	39.1	3	38	9.6	63.59420747	3.63599748	
49	63	32	26.7	3	45	7.3	63.54075728	3.75202902	100
	63	34	19.6	3	50	12	63.57210838	3.83667664	
	63	39	24.8	3	48	18.9	63.65689385	3.80526340	
	63	37	32	3	43	14.3	63.62554326	3.72063061	
50	63	34	19.6	3	50	12	63.57210838	3.83667664	100
	63	36	12.5	3	55	16.8	63.60347441	3.92132363	
	63	41	17.7	3	53	23.6	63.68825916	3.88989564	
	63	39	24.8	3	48	18.9	63.65689385	3.80526340	
51	63	35	39.1	3	38	9.6	63.59420747	3.63599748	100
	63	37	32	3	43	14.3	63.62554326	3.72063061	
	63	42	37.2	3	41	21.2	63.71032781	3.68922753	
	63	40	44.4	3	36	16.6	63.67899224	3.60460909	
52	63	37	32	3	43	14.3	63.62554326	3.72063061	100
	63	39	24.8	3	48	18.9	63.65689385	3.80526340	
	63	44	30	3	46	25.8	63.74167797	3.77384571	
	63	42	37.2	3	41	21.2	63.71032781	3.68922753	
53	63	39	24.8	3	48	18.9	63.65689385	3.80526340	100
	63	41	17.7	3	53	23.6	63.68825916	3.88989564	
	63	46	23	3	51	30.5	63.77304263	3.85846340	
	63	44	30	3	46	25.8	63.74167797	3.77384571	
54	63	40	44.4	3	36	16.6	63.67899224	3.60460909	100
	63	42	37.2	3	41	21.2	63.71032781	3.68922753	
	63	47	42.4	3	39	28.2	63.79511093	3.65781979	
	63	45	49.6	3	34	23.6	63.76377550	3.57321584	
55	63	42	37.2	3	41	21.2	63.71032781	3.68922753	100
	63	44	30	3	46	25.8	63.74167797	3.77384571	
	63	49	35.3	3	44	32.7	63.82646073	3.74242357	
	63	47	42.4	3	39	28.2	63.79511093	3.65781979	
56	63	44	30	3	46	25.8	63.74167797	3.77384571	100
	63	46	23	3	51	30.5	63.77304263	3.85846340	
	63	51	28.2	3	49	37.3	63.85782483	3.82702694	
	63	49	35.3	3	44	32.7	63.82646073	3.74242357	
57	63	45	49.6	3	34	23.6	63.76377550	3.57321584	100
	63	47	42.4	3	39	28.2	63.79511093	3.65781979	
	63	52	47.6	3	37	35.1	63.87989261	3.62640741	
	63	50	54.8	3	32	30.5	63.84855725	3.54181771	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
58	63	47	42.4	3	39	28.2	63.79511093	3.65781979	100
	63	49	35.3	3	44	32.7	63.82646073	3.74242357	
	63	54	40.5	3	42	39.6	63.91124214	3.71099699	
	63	52	47.6	3	37	35.1	63.87989261	3.62640741	
59	63	49	35.3	3	44	32.7	63.82646073	3.74242357	100
	63	51	28.2	3	49	37.3	63.85782483	3.82702694	
	63	56	33.4	3	47	44.1	63.94260575	3.79558625	
	63	54	40.5	3	42	39.6	63.91124214	3.71099699	
60	63	50	54.8	3	32	30.5	63.84855725	3.54181771	100
	63	52	47.6	3	37	35.1	63.87989261	3.62640741	
	63	57	52.8	3	35	42	63.96467286	3.59499037	
	63	56	0	3	30	37.5	63.93333748	3.51041472	
61	63	52	47.6	3	37	35.1	63.87989261	3.62640741	100
	63	54	40.5	3	42	39.6	63.91124214	3.71099699	
	63	59	45.7	3	40	46.4	63.99602219	3.67956598	
	63	57	52.8	3	35	42	63.96467286	3.59499037	
62	63	54	40.5	3	42	39.6	63.91124214	3.71099699	100
	63	56	33.4	3	47	44.1	63.94260575	3.79558625	
	64	1	38.6	3	45	50.9	64.02738539	3.76414134	
	63	59	45.7	3	40	46.4	63.99602219	3.67956598	
63	63	57	52.6	3	35	41.4	63.96461783	3.59484183	100
	63	59	45.5	3	40	45.9	63.99596716	3.67941744	
	64	4	50.7	3	38	52.7	64.08074584	3.64798200	
	64	2	57.8	3	33	48.3	64.04939663	3.56342015	
64	63	59	45.5	3	40	45.9	63.99596716	3.67941744	100
	64	1	38.4	3	45	50.4	64.02733036	3.76399280	
	64	6	43.6	3	43	57.2	64.11210871	3.73254367	
	64	4	50.7	3	38	52.7	64.08074584	3.64798200	
<i>Cluster F</i>									
65	64	57	38.5	3	2	11.8	64.96068142	3.03662491	100
	65	0	46.4	3	6	37	65.01287534	3.11026778	
	65	5	11.8	3	3	28.8	65.08661151	3.05799380	
	65	2	3.9	2	59	3.7	65.03442108	2.98436626	
66	65	0	40.3	2	57	5.6	65.01118055	2.95155479	100
	65	3	48.1	3	1	30.7	65.06335564	3.02518564	
	65	8	13.5	2	58	22.5	65.13709192	2.97292172	
	65	5	5.7	2	53	57.5	65.08492002	2.89930614	
67	65	3	48.1	3	1	30.7	65.06335564	3.02518564	100
	65	6	56	3	5	55.7	65.11554607	3.09881319	
	65	11	21.4	3	2	47.5	65.18927899	3.04653413	
	65	8	13.5	2	58	22.5	65.13709192	2.97292172	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
68	65	6	48.3	2	56	22.3	65.11340804	2.93951445	100
	65	9	56.1	3	0	47.3	65.16559511	3.01312686	
	65	14	21.6	2	57	39	65.23932478	2.96084274	
	65	11	13.7	2	53	14.1	65.18714095	2.88724528	
69	65	9	56.1	3	0	47.3	65.16559511	3.01312686	100
	65	13	4.1	3	5	12.2	65.21779720	3.08673590	
	65	17	29.5	3	2	4	65.29152346	3.03443696	
	65	14	21.6	2	57	39	65.23932478	2.96084274	
<i>Cluster G</i>									
70	65	14	19.2	2	52	0.5	65.23865641	2.86681927	100
	65	18	18.8	2	55	40	65.30523603	2.92778629	
	65	21	58.6	2	51	40	65.36628736	2.86109892	
	65	17	59	2	48	0.5	65.29971499	2.80014517	
71	65	18	18.8	2	55	40	65.30523603	2.92778629	100
	65	22	18.6	2	59	19.5	65.37182896	2.98874592	
	65	25	58.3	2	55	19.4	65.43287289	2.92204544	
	65	21	58.6	2	51	40	65.36628736	2.86109892	
72	65	22	18.6	2	59	19.5	65.37182896	2.98874592	100
	65	26	18.4	3	2	58.9	65.43843504	3.04969799	
	65	29	58.1	2	58	58.7	65.49947142	2.98298457	
	65	25	58.3	2	55	19.4	65.43287289	2.92204544	
73	65	17	59	2	48	0.5	65.29971499	2.80014517	100
	65	21	58.6	2	51	40	65.36628736	2.86109892	
	65	25	38.4	2	47	39.9	65.42733530	2.79440805	
	65	21	38.8	2	44	0.5	65.36077000	2.73346742	
74	65	21	58.6	2	51	40	65.36628736	2.86109892	100
	65	25	58.3	2	55	19.4	65.43287289	2.92204544	
	65	29	38.1	2	51	19.2	65.49391359	2.85534161	
	65	25	38.4	2	47	39.9	65.42733530	2.79440805	
<i>Cluster H</i>									
75	65	49	19.8	2	53	40.1	65.82215443	2.89446566	100
	65	52	31.3	2	58	2	65.87535790	2.96722787	
	65	56	54	2	54	49.9	65.94833364	2.91385554	
	65	53	42.5	2	50	28	65.89513315	2.84110607	
76	65	52	31.3	2	58	2	65.87535790	2.96722787	100
	65	55	42.9	3	2	24	65.92857417	3.03998694	
	66	0	5.6	2	59	11.8	66.00154675	2.98660201	
	65	56	54	2	54	49.9	65.94833364	2.91385554	
77	65	55	7.3	2	52	24	65.91869879	2.87333110	100
	65	58	18.9	2	56	46	65.97191689	2.94609779	
	66	2	41.6	2	53	33.8	66.04488697	2.89271813	
	65	59	30	2	49	11.9	65.99167198	2.81996436	



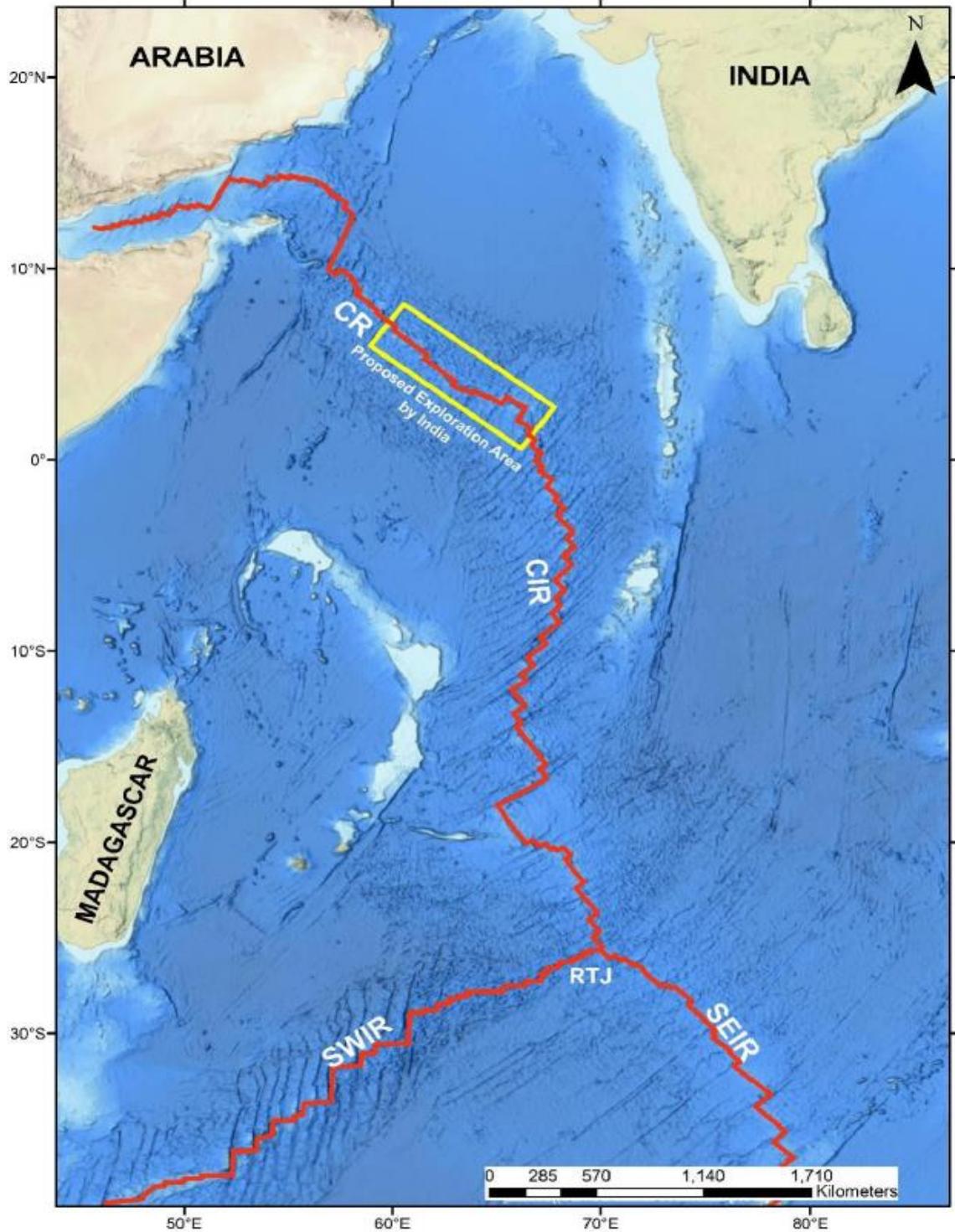
Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
78	65	58	18.9	2	56	46	65.97191689	2.94609779	100
	66	1	30.5	3	1	7.9	66.02514798	3.01886122	
	66	5	53.2	2	57	55.7	66.09811477	2.96546877	
	66	2	41.6	2	53	33.8	66.04488697	2.89271813	
79	65	59	8.2	2	48	42.1	65.98562400	2.81169577	100
	66	2	19.8	2	53	4	66.03883899	2.88444954	
	66	6	42.5	2	49	51.8	66.11180628	2.83106565	
	66	3	30.9	2	45	30	66.05859426	2.75832462	
80	66	2	19.8	2	53	4	66.03883899	2.88444954	100
	66	5	31.4	2	57	25.9	66.09206679	2.95720018	
	66	9	54.1	2	54	13.7	66.16503092	2.90380368	
	66	6	42.5	2	49	51.8	66.11180628	2.83106565	
<i>Cluster I</i>									
81	66	7	14.4	2	41	25.8	66.12065429	2.69050521	100
	66	10	50.5	2	45	28.2	66.18069108	2.75784326	
	66	14	53.4	2	41	51.6	66.24816653	2.69766976	
	66	11	17.3	2	37	49.2	66.18813483	2.63034511	
82	66	10	50.5	2	45	28.2	66.18069108	2.75784326	100
	66	14	26.7	2	49	30.6	66.24074133	2.82517607	
	66	18	29.6	2	45	54	66.30821152	2.76498930	
	66	14	53.4	2	41	51.6	66.24816653	2.69766976	
83	66	12	10.1	2	38	48.5	66.20280914	2.64680172	100
	66	15	46.3	2	42	50.9	66.26285099	2.71413525	
	66	19	49.2	2	39	14.2	66.33032192	2.65395667	
	66	16	13	2	35	11.9	66.27028516	2.58663654	
84	66	15	46.3	2	42	50.9	66.26285099	2.71413525	100
	66	19	22.5	2	46	53.3	66.32290631	2.78146354	
	66	23	25.3	2	43	16.6	66.39037197	2.72127170	
	66	19	49.2	2	39	14.2	66.33032192	2.65395667	
85	66	17	52.9	2	37	3.8	66.29801542	2.61773091	100
	66	21	29.1	2	41	6.2	66.35807325	2.68506341	
	66	25	32	2	37	29.5	66.42554312	2.62486928	
	66	21	55.8	2	33	27.2	66.36549073	2.55754989	
<i>Cluster J</i>									
86	66	33	24.5	2	25	29.2	66.55681829	2.42478648	100
	66	38	40.3	2	26	45.5	66.64453165	2.44596585	
	66	39	56.7	2	21	29.1	66.66574295	2.35807555	
	66	34	41	2	20	12.9	66.57804169	2.33690415	
87	66	38	40.3	2	26	45.5	66.64453165	2.44596585	100
	66	43	56.1	2	28	1.7	66.73225292	2.46713296	
	66	45	12.4	2	22	45.2	66.75345207	2.37923493	
	66	39	56.7	2	21	29.1	66.66574295	2.35807555	

Block	Longitude (E)			Latitude (N)			Longitude (E)	Latitude (N)	Area (km <sup>2</sup> )
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	Decimal degrees	Decimal degrees	
88	66	34	41	2	20	12.9	66.57804169	2.33690415	100
	66	39	56.7	2	21	29.1	66.66574295	2.35807555	
	66	41	13	2	16	12.7	66.68694959	2.27018385	
	66	35	57.3	2	14	56.5	66.59926021	2.24902035	
89	66	39	56.7	2	21	29.1	66.66574295	2.35807555	100
	66	45	12.4	2	22	45.2	66.75345207	2.37923493	
	66	46	28.7	2	17	28.8	66.77464678	2.29133554	
	66	41	13	2	16	12.7	66.68694959	2.27018385	
90	66	45	12.4	2	22	45.2	66.75345207	2.37923493	100
	66	50	28.2	2	24	1.4	66.84116883	2.40038221	
	66	51	44.5	2	18	44.9	66.86235155	2.31247536	
	66	46	28.7	2	17	28.8	66.77464678	2.29133554	
91	66	41	13	2	16	12.7	66.68694959	2.27018385	100
	66	46	28.7	2	17	28.8	66.77464678	2.29133554	
	66	47	45	2	12	12.4	66.79583705	2.20343482	
	66	42	29.3	2	10	56.2	66.70815157	2.18229076	
92	66	46	28.7	2	17	28.8	66.77464678	2.29133554	100
	66	51	44.5	2	18	44.9	66.86235155	2.31247536	
	66	53	0.7	2	13	28.4	66.88353005	2.22456722	
	66	47	45	2	12	12.4	66.79583705	2.20343482	
<i>Cluster K</i>									
93	66	40	23.8	2	0	25.5	66.67328861	2.00707019	100
	66	45	47.5	2	0	54.4	66.76319545	2.01512442	
	66	46	16.5	1	55	30.2	66.77125279	1.92506640	
	66	40	52.9	1	55	1.3	66.68135956	1.91701808	
94	66	45	47.5	2	0	54.4	66.76319545	2.01512442	100
	66	51	11.2	2	1	23.4	66.85310814	2.02316490	
	66	51	40.1	1	55	59.2	66.86115185	1.93310120	
	66	46	16.5	1	55	30.2	66.77125279	1.92506640	
95	66	40	52.9	1	55	1.3	66.68135956	1.91701808	100
	66	46	16.5	1	55	30.2	66.77125279	1.92506640	
	66	46	45.5	1	50	6	66.77930553	1.83500769	
	66	41	21.9	1	49	37.1	66.68942569	1.82696525	
96	66	46	16.5	1	55	30.2	66.77125279	1.92506640	100
	66	51	40.1	1	55	59.2	66.86115185	1.93310120	
	66	52	9.1	1	50	34.9	66.86919118	1.84303682	
	66	46	45.5	1	50	6	66.77930553	1.83500769	
97	66	39	10	1	49	25.3	66.65278091	1.82368628	100
	66	44	33.6	1	49	54.2	66.74266076	1.83172872	
	66	45	2.6	1	44	30	66.75070890	1.74166932	
	66	39	39	1	44	1.1	66.66084221	1.73363275	


<i>Block</i>	<i>Longitude (E)</i>			<i>Latitude (N)</i>			<i>Longitude (E)</i>	<i>Latitude (N)</i>	<i>Area (km<sup>2</sup>)</i>
	<i>Degrees</i>	<i>Minutes</i>	<i>Seconds</i>	<i>Degrees</i>	<i>Minutes</i>	<i>Seconds</i>	<i>Decimal degrees</i>	<i>Decimal degrees</i>	
98	66	44	33.6	1	49	54.2	66.74266076	1.83172872	100
	66	49	57.2	1	50	23.1	66.83254641	1.83975785	
	66	50	26.1	1	44	58.9	66.84058137	1.74969281	
	66	45	2.6	1	44	30	66.75070890	1.74166932	
99	66	39	39	1	44	1.1	66.66084222	1.73363272	100
	66	45	2.6	1	44	30	66.75070891	1.74166929	
	66	45	31.5	1	39	5.8	66.75875246	1.65160921	
	66	40	8	1	38	36.9	66.66889870	1.64357849	
100	66	45	2.6	1	44	30	66.75070891	1.74166929	100
	66	50	26.1	1	44	58.9	66.84058138	1.74969278	
	66	50	55	1	39	34.7	66.84861198	1.65962708	
	66	45	31.5	1	39	5.8	66.75875246	1.65160921	

Annex II

Map showing the location of the area under application  
(rectangular area of 300,000 km<sup>2</sup> where the longest side does not  
exceed 1,000 km in length)



Abbreviations: CR, Carlsberg Ridge; CIR, Central Indian Ocean Ridge; SEIR, South-east Indian Ridge; SWIR, South-west Indian Ridge.

 Location of area under application.

**Map of the area under application showing the location of clusters and blocks in a rectangular area of 300,000 km<sup>2</sup> enveloping 11 clusters and 100 blocks**

