



LETTERS
OF THE
COMMISSION ON MANGANESE
(IAGOD)



INFORMATION ON THE IGCP PROJECT (74/II/111):
GENESIS OF MANGANESE ORE DEPOSITS

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President Secretary

On behalf of the IAGOD Commission on Manganese the President of the Commission submitted a project proposal to the Board of the International Geological Correlation Programme (UNESCO-IUGS) entitled "Genesis of Manganese Ore Deposits". The main objective of this project would be a comparative study of manganese ore deposits of different origin including the study of their geological, mineralogical, geochemical and palaeogeographical peculiarities and their relations to prospecting methods as well as the summary of the modern methods of analysis applied to the manganese ores and minerals, respectively.

The IGCP Board at its third session in London, 21—24 April 1975, accepted the project under category A within the IGCP as defined at the second session of the Board (see Geological Correlation No. 2, 1974, p. 8), that is as a key project, in priority area 4 (Sources of energy and minerals).

The IGCP Board is looking forward to see the working group of this project in the framework of the IGCP being established on the occasion of the 25th International Geological Congress in Sydney in 1976.

Present state of the project

The project "Genesis of Manganese Ore Deposits" is in the initial stage of its development. It is mostly based on the activity and results of the Commission on Manganese of the International Association on the Genesis of Ore Deposits (IAGOD).

The Commission on Manganese has been established by the present president of the Commission in 1967 at the 2nd Symposium of the IAGOD, in St. Andrews, Scotland. Since that time the Commission organized technical sessions in 1970 in Tokyo during the IMA-IAGOD Meeting, in 1972 in Montreal on the occasion of the 24th International Geological Congress and in 1974 in Varna during the 4th Symposium of the IAGOD. Reports on the activity of the Commission on Manganese (IAGOD), and on its technical sessions and business meetings were yearly published in the "Letters of the Commission on Manganese (IAGOD)" in the volumes of the *Acta Mineralogica-Petrographica*, Szeged, Hungary, vol. XIX—XXI/2 (1969—1974), which is the semi-official organ of the Commission.

On the basis of the results obtained and the increasing international interest in the activity of the Commission, the Commission on Manganese decided to organize the 2nd International Symposium on the Geology and Geochemistry of Manganese during the 25th IGC, 1976, Sydney, Australia.

At the same time a successful programme was achieved in preparing an International Monograph on the Geology and Geochemistry of Manganese summarizing in three volumes the advances in the field of geology, mineralogy, geochemistry of manganese during the last twenty years, i.e. since the Mexican Symposium on Manganese (1956).

The Editorial Board of the Monograph and the Commission on Manganese, respectively, received till now 60 abstracts of papers to be presented at the technical sessions and published in the Monograph, respectively.

The 25th International Geological Congress offers the possibility to start this project, to outline the tasks of the future, to establish the co-operation on a broad international scale with countries, institutions and individuals interested in this field of research, to organize the working groups and to prepare a detailed working programme.

Scope of the project

The title "Genesis of Manganese Ore Deposits" denotes only in general the main direction of the project, in reality the project comprehends the different topics of the geology, mineralogy and geochemistry of manganese and the associated heavy metals taking into consideration that the processes of ore formation are not isolated from the geological and geochemical background in space and time. The project includes also the study of modern analytical methods applicable to the investigation of manganese ores and minerals, respectively, as well as the methods of prospection.

The Commission on Manganese intending to prepare a fruitful consultation of scientists concerned with the progress of the project mentioned during the 25th IGC, presents some basic objectives for deliberation and requests comments, recommendations of institutions, organizations or individuals having the intention to take part in this project.

The main subject areas denoted only on the whole may be:

- a) Distribution and enrichment of manganese, processes of ore formation, their conditions and controlling factors
 - i) Manganese in magmatic processes
 - ii) Manganese in the hydrosphere
 - iii) Manganese in the weathering zone
 - iv) Manganese in sedimentary formations
 - v) Manganese in metamorphic formations
 - vi) Classification and characteristics of manganese ore deposits
- b) Modern instrumental methods of analysis to the investigation of manganese ores and minerals, respectively,
- c) Methods of prospection

Grouping the subject areas from another aspects is also possible, e.g.:

1. Manganese in Precambrian formations
2. Manganese in geosyncline formations
3. Manganese in platform formations
4. Manganese deposits on continental margin zones with special reference to global tectonics

5. Manganese in the main structural zones of the World Ocean with special reference to the results of deep sea drilling material
6. Manganese in the weathering zone with special reference to lateritization phenomena
7. Evolution of manganese deposits in the main structural zones of the Earth Crust

It should be noted the two versions above concerning the possible subject areas of the project are not yet completed and are considered merely as guidelines for discussion.

The Commission on Manganese requests the IGCP National Committees, organizations, institutions and individuals, respectively, having the intention of taking part in the project, to send their criticism, comments, recommendations and proposals concerning

- a) *the fundamental idea of the project*
- b) *the subject areas mentioned*
- c) *the subject areas with which the programme should be completed*
- d) *the major unsolved problems in specific subject areas*
- e) *subject panels to be organized to consider programme proposals in each of the subject areas*

to the President of the Commission on Manganese up to April 1, 1976.

Activities foreseen for 1976

After having received the recommendations, proposals requested, the Commission on Manganese will be able to draft a more detailed, preliminary project programme including the main subject areas, the specific recommendations for study of different problems in each of the subject areas and panel groups concerned with specific subject areas.

This preliminary project programme will be sent before the 25th IGC to IGCP National Committees, institutions, individuals expressed their intention to take part in the project by forwarding their proposals and recommendations requested to the President of the Commission on Manganese.

This preliminary project programme will be discussed at the statutory meeting of the project at the 25th IGC, 1976, in Sydney, with the aim to formulate the strategy for the further development and co-ordination of the project.

The Commission on Manganese suggests that the deliberation of some basic questions, in connection with the discussion of the subject areas, would be desirable:

- a) *A review of present knowledge on the geology and geochemistry of manganese ore deposits of different genesis.*
- b) *A critical selection of the major unsolved problems and the possibilities how and where these might be investigated.*
- c) *Programme of investigation for the further research work including suggestions for major field activities and major laboratory research.*
- d) *Consideration of possibilities of division of research work and co-operation, respectively, among the participating countries, institutions and individuals, resp.*

As to the item a) it is hoped that the International Monograph on the Geology and Geochemistry of Manganese which is in preparation will give a fairly good summary on the present knowledge on the geology and geochemistry of manganese ore deposits. The Symposium on the Geology and Geochemistry of Manganese on the

occasion of the 25th IGC offers the possibility to review the most important results and to discuss thoroughly the items b—d supported by the preliminary programme drawn up by compiling the recommendations, proposals requested from the participants.

It is hoped that the previous activity and experiences of the IAGOD Commission on Manganese as well as the ever increasing co-operation of scientists of different countries in the activity and scientific meetings of the Commission will be a good starting basis for the further development of the new IGCP project: Genesis of Manganese Ore Deposits.

Any comments, proposals and recommendations are highly appreciated.

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TABLE 1

Chemical composition of the Lake Szappanosszék and that of the ground-waters from the bores in the neighbourhood

Sampling point	The water of the Szappanosszék		Lake Kondor, borehole No. 1		Lake Kondor, borehole No. 2		Lake Kondor, borehole No. 6		Lake Kondor, borehole No. 8		Lake Kondor, borehole No. 4		Lake Kondor, borehole No. 7		Lake Szappanosszék, borehole No. 12		Lake Szappanosszék, borehole No. 11		Lake Szivósszék, borehole No. 13		Lake Hattyússzék, borehole No. 17		Lake Hattyússzék, borehole No. 16	
	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent	mg/l	THAN's ionic equivalent per cent
Sodium Na ⁺	5 689.2	97.19	140.2	59.92	108.9	27.32	22.3	10.58	48.1	17.67	264.6	53.13	239.4	64.91	400.2	55.63	3421.3	97.56	252.7	47.76	1080.2	88.58	256.5	68.75
Potassium K ⁺	184.0	1.85	9.0	2.26	8.3	1.22	0.8	0.22	2.0	0.43	9.6	1.13	5.5	0.87	16.5	1.35	120.0	2.01	1.6	0.18	31.3	1.51	4.5	0.71
Calcium Ca ⁺⁺	traces	—	53.1	26.03	160.7	46.26	98.9	53.79	95.0	40.6	54.0	12.44	49.2	15.30	6.4	1.02	traces	—	124.8	27.07	16.0	1.50	54.0	16.60
Magnesium Mg ⁺⁺	29.6	0.96	14.6	11.79	53.1	25.19	39.5	35.40	60.2	41.83	87.7	33.29	36.9	18.91	159.8	41.99	7.8	0.42	69.9	24.98	54.2	8.40	27.5	13.93
Iron Fe ⁺⁺	traces	—	traces	—	—	—	—	—	—	—	traces	—	—	—	—	—	—	—	—	—	—	—	traces	—
Ammonium NH ⁻	traces	—	—	—	—	—	—	—	traces	—	traces	—	traces	—	—	—	traces	—	—	—	traces	—	—	—
Chloride Cl ⁻	1 631.7	18.08	74.2	20.55	67.2	10.93	3.2	0.98	97.7	23.28	39.4	5.13	46.8	8.22	66.8	6.02	975.2	18.03	150.6	18.46	368.2	19.58	92.8	16.13
Hydrogen-carbonate HCO ₃ ⁻	3 282.7	21.13	427.1	68.73	499.1	47.17	528.4	94.34	463.7	64.19	1199.6	90.73	771.2	78.74	1300.9	68.11	2092.9	22.48	646.8	46.06	2262.5	69.89	818.8	82.66
Carbonate CO ₃ ⁻⁻	4 059.6	53.15	—	—	—	—	—	—	—	—	—	—	—	—	166.8	17.76	2400.4	52.46	—	—	—	—	—	—
Sulphate SO ₄ ⁻⁻	934.0	7.64	52.4	10.71	448.8	41.89	20.6	4.68	71.2	12.52	43.0	4.13	100.4	13.03	121.8	8.10	514.0	7.02	392.0	35.47	268.0	10.52	9.4	1.20
Meta-silica H ₂ SiO ₃	3.1	—	17.9	—	19.7	—	22.9	—	19.7	—	18.7	—	14.8	—	8.0	—	—	—	17.9	—	22.9	—	14.5	—
Total dissolved solids	15 813.9	100.00	788.5	99.99	1265.8	99.99	736.6	100.00	857.6	99.99	1716.6	99.99	1264.2	99.99	2247.2	99.99	9531.6	99.99	1656.3	99.99	4103.3	99.99	1278.0	99.99
Alkalinity	189.10	—	7.00	—	8.18	—	8.66	—	7.60	—	19.66	—	12.46	—	26.88	—	114.30	—	10.60	—	37.08	—	13.42	—
Total hardness in N°	6.80	—	10.78	—	34.71	—	22.92	—	27.14	—	27.73	—	15.37	—	37.65	—	1.79	—	33.54	—	14.70	—	13.88	—
Carbonate hardness in N°	—	—	—	—	22.90	—	—	—	21.28	—	—	—	—	—	—	—	—	—	29.68	—	—	—	—	—
Chemical reaction to phenolphthaleine	Alkaline	—	Acid	—	Acid	—	Acid	—	Acid	—	Acid	—	Acid	—	Alkaline	—	Alkaline	—	Acid	—	Acid	—	Acid	—