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High zinc contents of sea water in Kangerdluarssuk, the Ilímaussaq area, South Greenland

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Samples of sea water were collected in Kangerdluarssuk in the summers of 1974 and 1975 (fig. 28) as part of the geochemical-ecological Narssaq project (Bohse *et al.,* 1975; Nielsen *et al.,* 1976). These have been analysed for dissolved zinc, cadmium, lead and copper by anodic

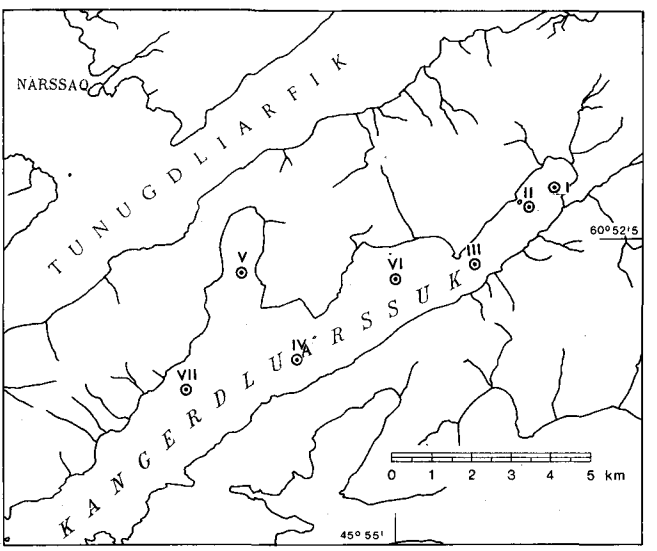

Fig. 28. Sketch map of the head of Kangerdluarssuk, South Greenland, showing positions of the analysed sea water samples discussed by Asmund & Rose-Hansen.

Table 5. Zinc contents in sea water from Kangerdluarssuk, South Greenland

Dates of sampling	Depth in m	Station I	II	III	IV	V	VI	VII
	0	14.8	10.4	9.7	13.6	12.2	20	22
	5	3.7	6.5	2.0	260	54	31	950
July	15	3.0	17.5	505	34	21	595	2
	25		7.1	10	131	31	29	55
1974	50		3.4	12.7	88	200	14	34
	96		4.5	1.0	40	66	35	168
	0	9	2	130	8	37	17	93
	5	51	19	65	55		7	11
	15	32	16	63	<10	33	< 5	43
May	25	13	84		62	35	< 5	67
	50	35	14	25	120	13	< 5	40
1975	100		29	71	120	33	31	55
	130					85		
	150						25	60
	0	6.3	7.5	3.6	6.3	12.5	5.8	18.9
	5	1.3	10.1	3.1	3.6	39.1	5.7	8.7
	10	1.9	3.7	4.7	3.8	11.0	5.3	8.9
Sep-	15	6.9	5.1	10.6	2.6	5.1	1.7	4.0
tem-	25	7.4	3.4	4.8	4.5	6.9	12.4	4.5
ber	50	5.7	5.7	5.0	7.7	34.5	5.4	4.9
	75						4.7	
1975	90		7.1	3.6				
	100				2.3	13.7		4.4
	125				3.9			
	150					77		4.9
	200							6.3

Concentrations are given in µg/litre

The samples have been analysed by anodic stripping voltammetry in the chemical laboratories of GGU

stripping voltammetry (Table 5). Water samples were collected with teflon-coated 5 litre Universal Series water samplers with drop messengers (Hydro-bios, Kiel). In 1974 the water samples were taken from GGU motor cutter *N. V. Ussing,* in May 1975 from M/S *Adolf Jensen* and in September 1975 from a rubber boat. The samples were kept in plastic canisters previously analysed for heavy elements.

The contents of Cd and Cu were from less than 0.1 to 0.4 µg/1 and less than 0.1 to 1.6 µg/1 respectively. These values are in accordance with values reported for sea water elsewhere. The Pb content was generally less than 0.2µg/l, but a few samples had up to 1.6 µg/l (Rose-Hansen *et al.,* 1977). The content of Zn is, however, strongly abnormal for sea water varying from 1 to more than 500 µg/l. The very high zinc contents found in 1974 necessitated renewed sampling in May and September 1975.

The rocks of the Ilímaussaq alkaline intrusion have high contents of zinc, from an average

of 0.04 per cent in the naujaites to 0.2 per cent in the lujavrites (Gerasimovsky, 1969; see also Bailey *et al.*, this report) and the bottom sediments of the fjord have contents of 200–1000 g/l. The province is thus very rich in zinc. The mechanism by which the very high amounts of dissolved zinc have been transferred to the sea water is not yet known. However, we consider that the sampling and analytical errors cannot alone explain the anomaly.

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Gravity and rock densities in the Ilímaussaq area, South Greenland

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Early gravity measurements in South Greenland (Kejlsø, 1958; J. Olsen, personal communication) indicated a large positive Bouger anomaly around Narssaq. Newer terrain-corrected gravity data obtained by the Geodetic Institute as part of regional surveys in the Julianehåb and Godthåb regions showed this anomaly to be approximately over the Ilímaussaq alkaline intrusion. The anomaly is interesting not only because of its size, but also due to the lack of similar anomalies over other Gardar intrusions, such as the Igaliko complex.

The sparse data available (fig. 29) show the residual anomaly is about +30 mgal and 'pulled' away from the centre of the intrusion towards the Narssaq gabbro complex.

To investigate the applicability of a detailed gravity survey for studying the structure of the Ilímaussaq intrusion, a knowledge of density contrast between the different rock types of the intrusion and surroundings is imperative. With this aim, a laboratory density determina-