



ORKUSTOFNUN
Vatnsorkudeild

SKILAGREIN

VATNSFELLSVIRKJUN
Cobradorun 1982

Ingibjörg Kaldal

OS82105/VOD46 B

Desember 1982



ORKUSTOFNUN
GRENSÁSVEGI 9, 108 REYKJAVÍK

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Dags. 12. DES 1982

F O R M Á L I

ÞESSI GREINARGERÐ ER UNNIN EFTIR VERKSAMNINGI MILLI
LANDSVIRKJUNAR OG ORKUSTOFNUNNAR DAGSETTUM 1. JÚNI 1982.

ÞYKKT LAUSRA JARÐLAGA Á VEITULEIÐUM OG STÍFLUSTÆÐUM VAR
KÖNNUÐ MED COBRABOR. MIÐAÐ VIÐ NÚVERANDI HUGMYNDIR UM
VIRKJUN VIÐ VATNSFELL HAFNA FREKARI COBRABORANIR TÆPAST
TILGANG. BERGGRUNN ÞARF HINSVEGAR AÐ KANNA MEÐ BORUN OG
LEKTUN.

Haukur Tómasson
HAUKUR TÓMASSON

David Egilson
DAVÍÐ EGILSON

Ingibjörg Kaldal
INGIBJÖRG KALDAL

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TAFLA 1: COBRABORANIR VIÐ VATNSFELL 1982.

VIÐAUKI A: SNIÐ AF COBRAHOLUM VIÐ VATNSFELL 1982.

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1.0 INNGANGUR

Sumarið 1982 var fram haldið rannsóknum á þykkt lausra jarðlaga á svæði fyrirhugaðrar Vatnsfellsvirkjunar. Til verksins var notaður Cobrador og var einkum borað á eftirfarandi þrem svæðum: 1. Svæðið fyrir ofan Haft IV (ýmsir stíflustæðismöguleikar, tilheyrandi botnrásir og yfirföll). 2. veitufarvegurinn fyrir ofan Haft III, og 3. Hvosin sunnan við Haft III (sjá mynd 1).

Landsvirkjun lét í haust gera nýtt grunnkort af svæðinu í mælikvarðanum 1:5000 og er það í fyrsta skipti sem Vatnsfellsveita og þær landslagsbreytingar sem hún hafði í för með sér eru kortlagðar. Kort þetta barst Orkustofnun í hendur (fyrir tilviljun) seint í nóvember, og birtist það hér með þeim holum sem boraðar hafa verið á svæðinu.

2.0 NIÐURSTÖÐUR COBRABORANA

Boraðar voru alls 121 hola, og eru snið af þeim í Viðauka A (sjá einnig Töflu 1). Hér á eftir verður einungis fjallað um holur sem falla á þau langsníð, sem verkfræðiráðgjafi óskaði eftir, en um aðrar holur vísast í Viðauka A.

Inn á langsníðin eru færðar athugasemdir bormanna við lok borunar, til glöggvunar á borniðurstöðum. Hér á eftir fara skilgreiningar á þessum athugasemdum:

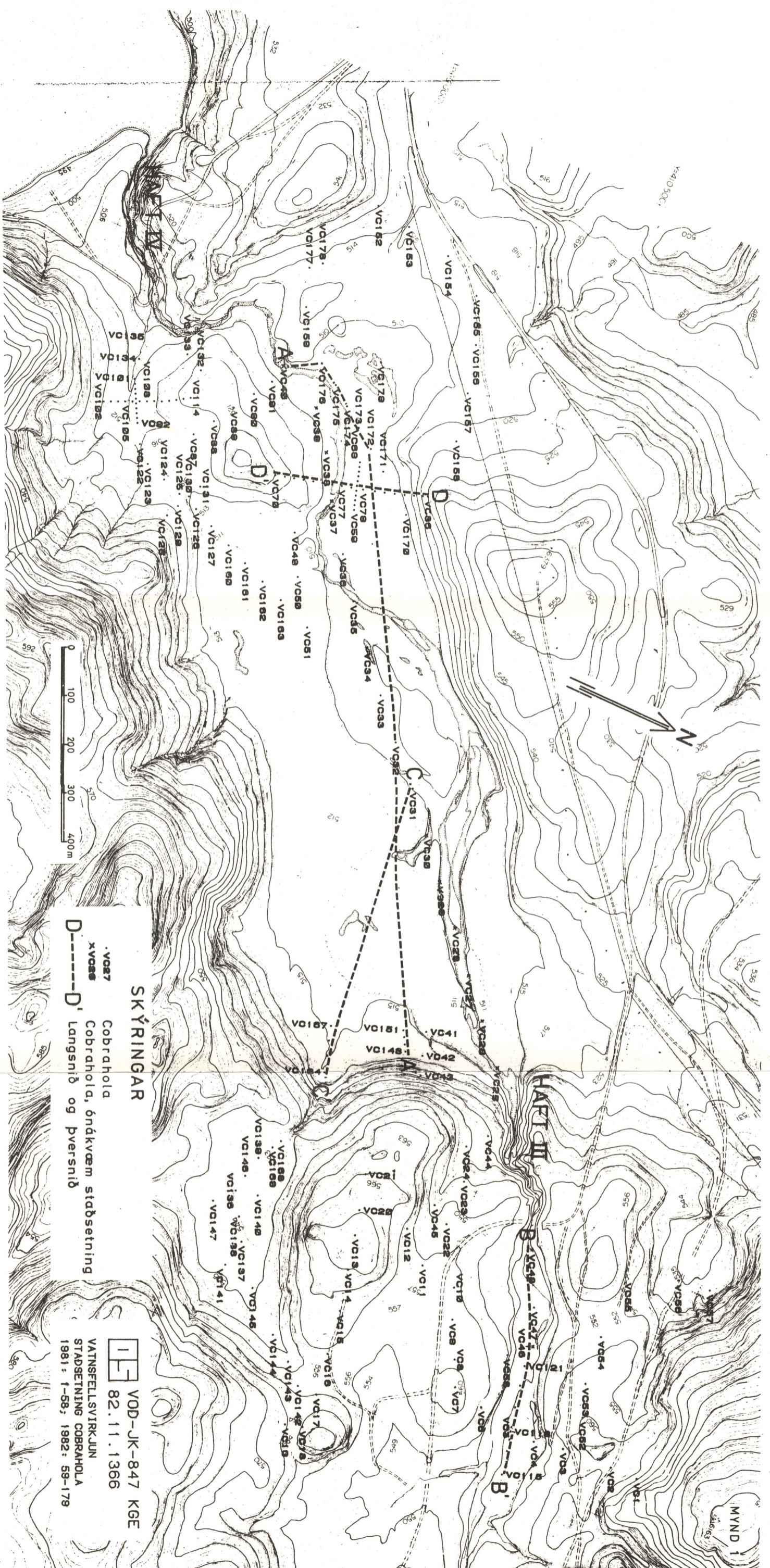
H = HÆTT: Borinn hreyfist, en gengur það hægt, að hann fer yfir sett tímamörk (60 s/20 cm). Engin ákveðin fyrirstaða. Fastur botn getur verið neðar. Stundum er hætt af öðrum ástæðum, t.d. vegna þess að ekki eru til fleiri stangir, eða ekki er þörf fyrir að bora lengra.

S = STOPP: Borinn hefur nánast stöðvast. Fyrirstaða er þó ekki mjög afmörkuð og greinileg. Borinn heggur ekki eins og þegar hann stöðvast á klöpp eða viðlíka.

F = FAST: Borinn stopp. Mjög ákveðin fyrirstaða. Hann heggur og glamrar. Stoppar gjarnan snögglega. Þarf ekki að þýða að komið sé niður á klöpp.

2.1 Langsníð A-A af frárennslisskurðleið.

Boraðar voru nokkrar holur við rætur kollsins sunnan við Haft III (Mynd 1), til þess að kanna hversu fljótt dýpkar á fast berg í sandlögðinni. Í ljós kom, að á innan við 50 m vegalengd jókst dýpi úr 3,5 m í meira en 20 m (niður í 495,9 m hæð eða lægra) (Mynd 2). Þess ber að geta, að í síðustu holunni var borun hætt í 20,0 m dýpi vegna stangaleysis. Hins vegar er ólíklegt að dýpi sé þar mikið meira, ef borið er saman við VC 31 - VC 33 frá því í fyrra,



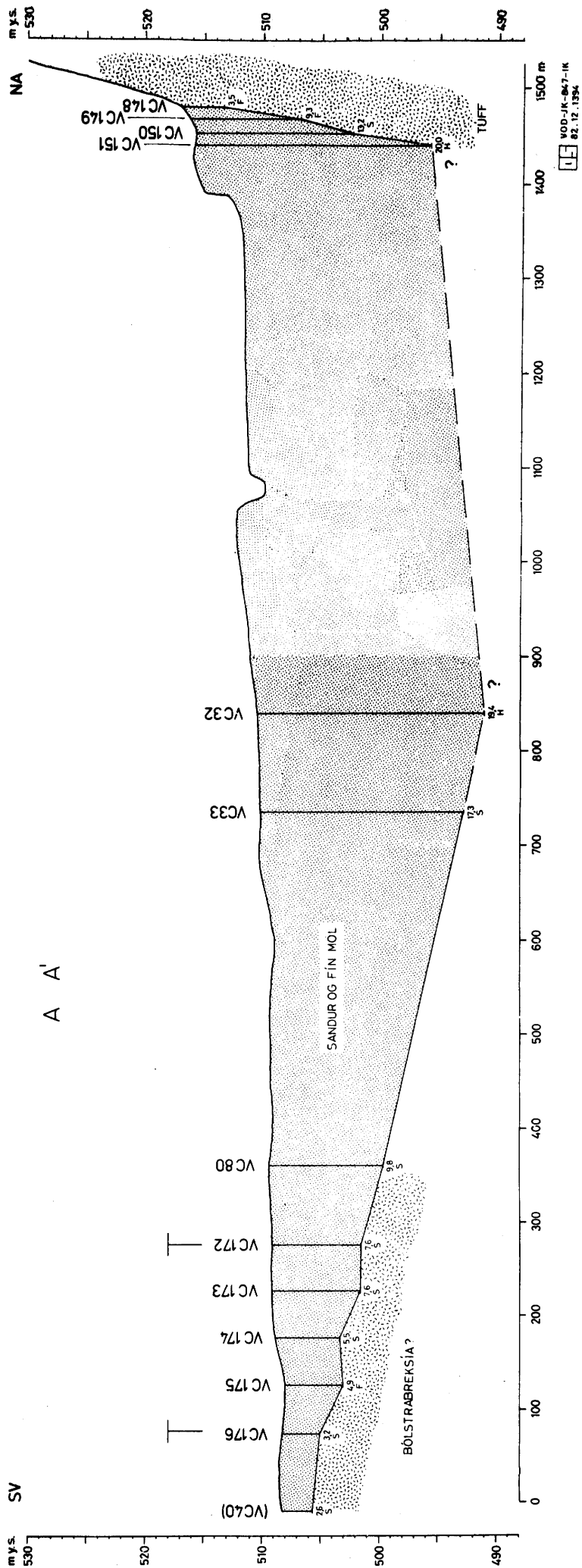
.V027 Cobrahola
 .XV028 Cobrahola, óndkvæm stöðsetning
 D-----D' Langsníð og þversníð

SKÝRINGAR


 VOD-JK-847 KGE
 82.11.1366

VATNSFELLSVIKJUN
 STAÐSETNING COBRAHOLA
 1981: 1-58; 1982: 59-179

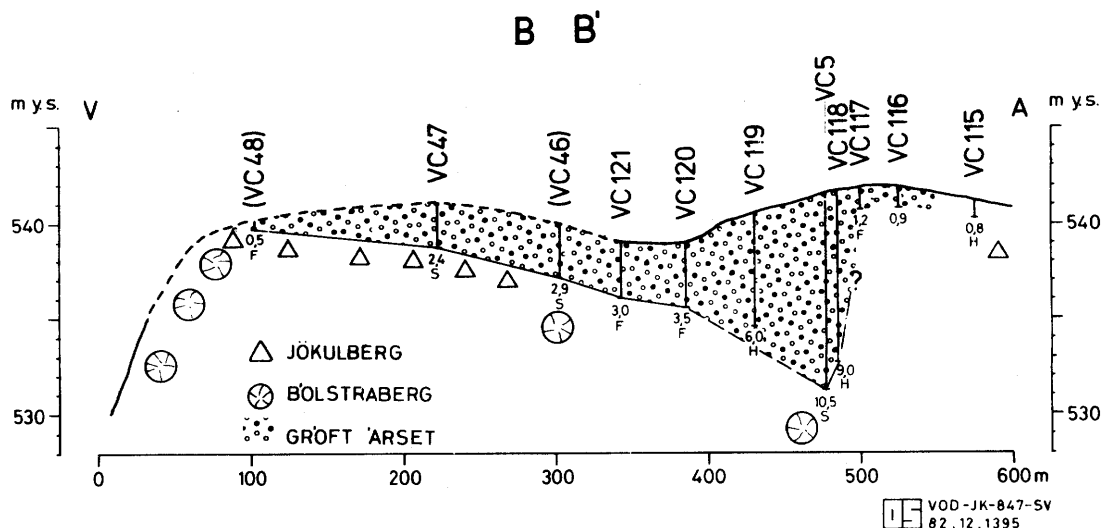
MYND 1



Mynd 2 : Langsnið af frárennisskuróleið. Sjá staðsetningu á mynd 1.

þar sem borun var hætt vegna mótstöðu (491,0-492,8 m y.s.) (Kristjana Eypórsdóttir o.fl. 1981*). Er nalgast fer Haft IV liggur Snið A-A aðeins norðar en samsvarandi snið frá því í fyrra, þ.e. í miðri sandlægðinni. Holur VC 172 - VC 176 frá því í sumar eru því eðlilega djúpri (3,2-7,6m) en VC 38 (3,4 m) og VC 39 (3,9 m) frá því í fyrra, sem eru sunnar og fjær miðju sandlægðarinnar. VC 80 liggur á sniði þvert yfir lægðina. Á mynd 5 sést að lægðin er ívið djúpri (10,6 m, niður í 498,5 m y.s.) nær norðurjaðri hennar. Því er hugsanlega djúp renna meðfram hæðunum sem takmarka sandlægðina í norðvestri.

2.2 Langsnið B-B í veitufarvegi ofan við Haft III.

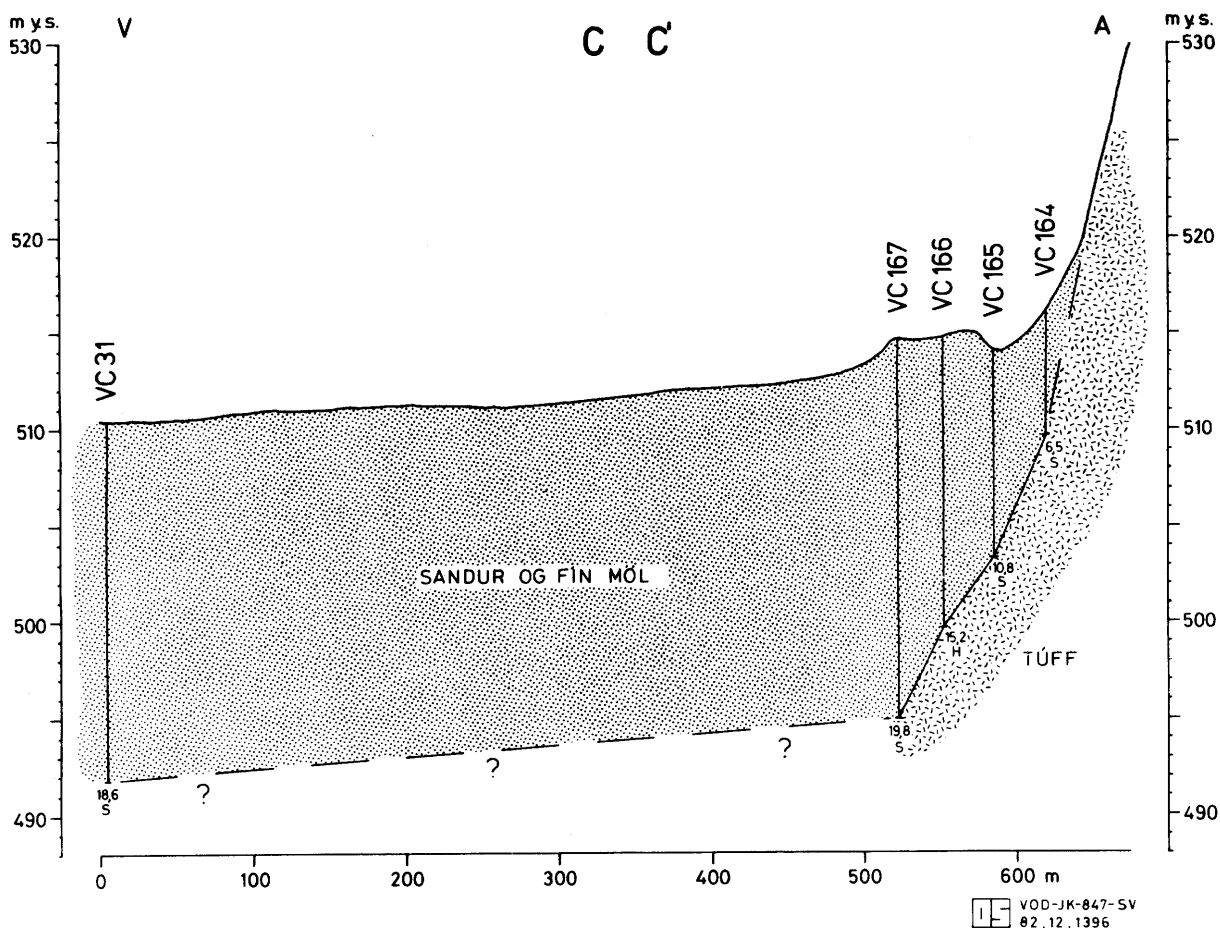


Mynd 3: Langsnið í veitufarvegi ofan við Haft III. Sjá staðsetningu á Mynd 1

Þegar borað var á fyrirhuguðu stíflustæði í fyrra, kom í ljós að rúmlega 10 m eru niður á fast berg í veituskurðinum um 400-500 m fyrir ofan Haft III, þar sem stíflan hafði verið hugsuð (VC 5, sjá Kristjana Eypórsdóttir o.fl. 1981). Því var óskað eftir nánari könnun á veitufarveginum á þessum slóðum. Mynd 3 sýnir niðurstöður borana sumarsins ásamt upplýsingum frá því í fyrra. Svo virðist, sem einmitt sé djúpst á fast í VC 5, en síðan fari berggrunnur snarhækkandi upp eftir farveginum. Fyrir neðan VC 5 er sömu sögu að segja. Þar fer berg jafnt hækkandi í áttina að Hafti III.

*) Kristjana G. Eypórsdóttir, Ingibjörg Kaldal og Halína Bogadóttir: Vatnsfellsvirkjun. Orkustofnun - Vatnsorkudeild. Greinargerð. Desember 1981.

2.3 Langsnið C-C sunnan við Haft III.

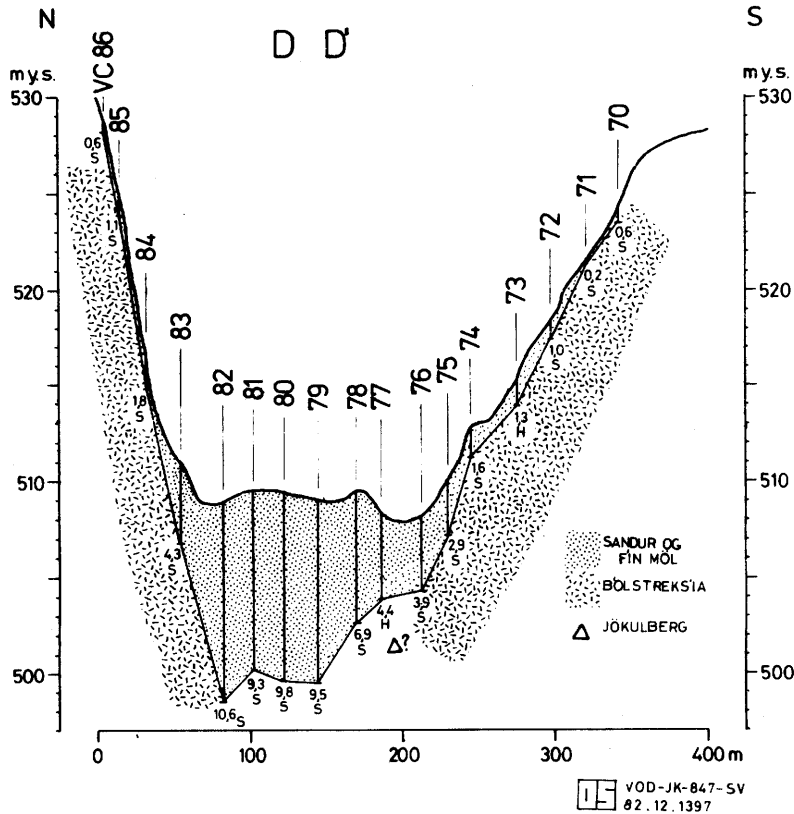


Mynd 4: Langsnið sunnan við Haft III. Sjá staðseningu á Mynd 1.

Boraðar voru fjórar holur fyrir neðan hvosina sunnan við Haft III (Mynd 1 og 4) til þess að kanna hversu snarlega dýpkaði á fast berg. Þar er svipaða sögu að segja og í sniði A-A, sem er um 150 m norðar. Dýpi eykst tiltölulega hratt, úr 6,5 m í 19,8 m á um 100 m vegalengd. Í VC 167 sem er fjærst hæðinni er botn holu í 494,9 m, sem er í ágætu samræmi við næstu holu í sandlægðinni VC 31 þar sem botn holu er í 491,8 m (18,6 m djúp).

2.4 Þversnið D-D í nyrðri farvegi ofan við Haft IV.

Boraðar voru 17 holur á lfnu þvert yfir sandlægðina um 200-300 m fyrir ofan Haft IV (Mynd 1 og 5). Grunnt er á



Mynd 5: Þversnið í nyrðri farvegi ofan við Haft IV. Sjá staðsetningu á mynd 1.

fast til beggja enda, eða 0,2 - 1,8 m. Þegar út í sandlægðina kemur, dýpkar skyndilega niður á um 4 m, en mesta dýpi er norðan til í farveginum, þar sem fast berg virðist vera á 10,6 m dýpi eða í 498,5 m.

3.0 FREKARI RANNSÓKNIR

Miðað við núverandi virkjunarhugmyndir við Vatnsfell, er ekki líklegt að frekari Cobraborun hafi neinn tilgang. Hins vegar er nauðsynlegt að kanna gerð berggrunns undir setlögnum, einkum með tilliti til styrktar og lektar á stíflustæðum, og vinnsloeiginleika á skurðleiðum. Mætti hugsanlega nota Borró IV eða loftbor í hluta verksins. Einnig þarf að rannsaka gerð setlaganna, t.d með tilliti til stæðni frárennslisskurðar. Til þess að ná óhreyfðum setsýnum er líklega ekkert sem dugar nema sýnabor Vita- og hafnamálastofnunarinnar, en sá bor gaf mjög góða raun við Búrfell í sumar er leið.

TAFLA 1

ORKUSTOFNUN

VATNSORKUDEILD

82.11.02 KGE

COEFABORUN

VATNSFELL 1982

BLAÐ 01

Hnitakerfi: Lambert		Hæð sfir- borðs (m)	Nafn punkts	Dælt holu (m)	Borð nidur í hæð (m)	Athugasemd gerð Pesar hætt ver ed borð
X-hnit (m)	Y-hnit (m)					
551169.7	410188.1	509.6	VC59	6.20	503.4	HÆTT
551179.2	410184.7	509.4	VC60	7.20	502.2	STOPP
551188.8	410181.7	509.8	VC61	7.60	502.2	STOPP
551198.1	410178.9	509.5	VC62	7.30	502.1	STOPP
551207.4	410175.9	509.5	VC63	7.80	501.7	HÆTT
551217.0	410172.9	509.0	VC64	7.30	501.7	STOPP
551226.5	410170.2	508.9	VC65	8.10	500.8	STOPP
551236.0	410167.4	508.6	VC66	7.70	500.9	STOPP
551245.3	410164.5	508.9	VC67	9.00	499.9	HÆTT
551254.4	410161.6	509.0	VC68	9.50	499.5	STOPP
551263.5	410158.4	509.3	VC69	10.90	498.4	HÆTT
551166.3	410011.0	524.1	VC70	0.55	523.5	STOPP
551171.7	410030.3	521.6	VC71	0.20	521.4	STOPP
551176.8	410048.9	518.4	VC72	1.00	517.4	STOPP
551182.1	410068.1	515.2	VC73	1.30	513.9	HÆTT
551187.6	410087.4	512.8	VC74	1.60	511.2	STOPP
551192.9	410106.4	510.1	VC75	2.90	507.2	STOPP
551198.3	410125.5	508.2	VC76	3.90	504.3	STOPP
551203.8	410144.8	508.3	VC77	4.40	503.9	HÆTT
551208.9	410163.9	509.5	VC78	6.90	502.6	STOPP
551215.5	410187.4	509.0	VC79	9.50	499.5	STOPP
551222.6	410211.3	509.4	VC80	9.80	499.6	STOPP
551228.4	410230.5	509.5	VC81	9.30	500.2	STOPP
551234.6	410250.3	508.9	VC82	10.40	498.5	STOPP
551241.0	410269.7	511.1	VC83	4.30	506.8	STOPP
551247.8	410288.0	516.6	VC84	1.80	514.8	STOPP
551254.2	410304.9	525.0	VC85	1.10	523.9	STOPP
551257.9	410314.5	528.8	VC86	0.60	528.2	STOPP
551172.7	409822.2	517.6	VC87	6.60	511.0	HÆTT
551214.7	409849.2	519.6	VC88	2.75	516.8	STOPP
551257.0	409875.2	520.7	VC89	1.10	519.6	HÆTT
551299.7	409900.9	516.0	VC90	1.40	514.5	HÆTT
551337.8	409924.5	511.9	VC91	1.60	510.3	HÆTT
551145.4	409707.1	513.6	VC92	5.10	508.5	STOPP
551154.4	409702.2	513.3	VC93	3.80	509.5	FAST
551162.9	409697.5	512.8	VC94	2.50	510.3	FAST
551171.8	409692.8	512.3	VC95	1.70	510.6	STOPP
551180.6	409688.2	511.9	VC96	1.20	510.6	FAST
551189.4	409683.6	511.6	VC97	0.50	511.1	HÆTT
551198.4	409679.0	511.5	VC98	0.65	510.9	FAST
551206.8	409674.2	511.2	VC99	1.20	510.0	HÆTT
551216.0	409669.7	510.8	VC100	0.80	510.0	FAST
551224.8	409664.9	510.5	VC101	0.60	510.0	HÆTT
551157.0	409625.8	515.0	VC102	1.90	513.1	FAST
551163.2	409639.2	513.2	VC103	1.20	512.0	HÆTT
551169.5	409652.7	511.8	VC104	1.00	510.8	STOPP
551175.8	409666.2	511.1	VC105	1.40	509.7	HÆTT
551181.9	409679.8	511.4	VC106	1.20	510.2	STOPP
551188.2	409693.4	512.1	VC107	0.50	511.6	HÆTT
551194.4	409707.0	513.2	VC108	2.90	510.3	FAST

TAFLA 1

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BLAD 02

Hnitakerfi: Lambert		Hæð	Nafn	Dýpt	Borad	Athugasemd
X-hnit	Y-hnit	yfir- borðs	punkts	holu	niður í hæð	serd Pesar hætt var að bora
(m)	(m)	(m)		(m)	(m)	
551201.2	409720.2	514.2	VC109	1.10	513.1	HÆTT
551206.9	409734.9	516.6	VC110	0.10	516.5	FAST
551214.4	409747.9	517.7	VC111	1.40	516.3	HÆTT
551222.2	409760.6	518.9	VC112	1.00	517.9	HÆTT
551230.4	409773.2	520.7	VC113	0.90	519.8	STOPP
551238.3	409785.6	522.0	VC114	0.50	521.5	FAST
549496.3	411292.0	541.2	VC115	0.80	540.3	HÆTT
549544.6	411280.5	541.8	VC116	0.90	540.8	GRJOT
549568.5	411275.8	541.8	VC117	1.20	540.7	FAST
549584.0	411270.8	541.7	VC118	9.00	532.7	HÆTT
549634.0	411258.0	540.5	VC119	6.00	534.5	HÆTT
549678.3	411249.0	539.0	VC120	3.50	535.5	FAST
549718.6	411240.2	539.0	VC121	3.00	536.0	FAST
551108.5	409730.1	515.4	VC122	7.10	508.3	STOPP
551077.7	409761.6	517.2	VC123	10.70	506.5	HÆTT
551062.8	409805.9	517.3	VC124	7.10	510.2	FAST
551049.5	409846.8	517.2	VC125	3.10	514.1	FAST
551035.3	409890.7	514.8	VC126	2.10	512.7	FAST
551016.4	409933.8	512.3	VC127	4.40	508.0	STOPP
550998.8	409841.6	522.2	VC128	0.70	521.5	GRJOT
551025.6	409854.0	518.6	VC129	2.60	516.0	FAST
551052.9	409866.4	516.4	VC130	2.00	514.4	FAST
551080.7	409879.6	517.2	VC131	0.70	516.5	FAST
551298.2	409781.6	521.7	VC132	0.30	521.4	STOPP
551316.7	409742.4	514.2	VC133	2.90	511.3	HÆTT
551266.4	409656.5	508.7	VC134	0.90	507.8	FAST
551314.3	409653.8	506.8	VC135	1.10	505.7	FAST
549797.4	410548.4	543.7	VC136	4.00	539.7	HÆTT
549706.7	410602.8	543.8	VC137	14.20	529.6	HÆTT
549751.9	410576.7	543.7	VC138	9.80	533.9	HÆTT
549877.9	410562.7	543.0	VC139	9.80	533.2	HÆTT
549807.4	410593.6	543.3	VC140	9.80	533.5	HÆTT
549650.2	410592.1	544.7	VC141	9.80	534.9	HÆTT
549486.8	410833.3	557.9	VC142	1.20	556.7	STOPP
549524.0	410793.4	552.1	VC143	1.10	551.0	STOPP
549561.3	410742.2	547.2	VC144	1.70	545.5	FAST
549630.1	410663.5	544.7	VC145	4.20	540.5	HÆTT
549833.3	410553.2	543.5	VC146	9.80	533.7	HÆTT
549758.9	410514.1	544.3	VC147	4.20	540.1	HÆTT
550203.1	410747.1	516.9	VC148	3.50	513.4	FAST
550215.9	410739.4	516.2	VC149	9.30	506.9	FAST
550228.8	410732.1	515.7	VC150	13.20	502.5	STOPP
550241.0	410724.9	515.9	VC151	20.00	495.9	HÆTT
551757.6	409974.6	520.1	VC152	0.50	519.6	STOPP
551744.3	410049.6	514.8	VC153	1.60	513.2	FAST
551723.6	410147.4	516.6	VC154	1.00	515.6	STOPP
551673.9	410233.6	518.4	VC155	0.70	517.7	STOPP
551582.1	410274.4	518.3	VC156	0.80	517.5	STOPP
551484.6	410300.5	517.4	VC157	0.90	516.5	FAST
551385.4	410320.3	522.5	VC158	0.90	521.6	STOPP

TAFLA 1

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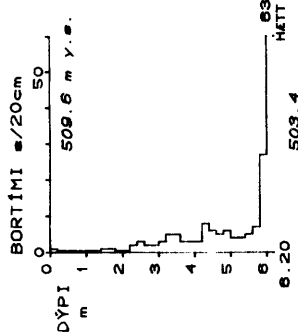
VATNSFELL 1982

BLAD 03

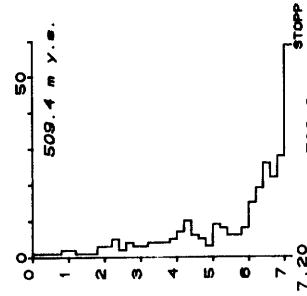
Hnitakerfi: Lambert		Hæð yfirl- borðs (m)	Nafn punkts	Dypt holu (m)	Borad nidur í hæð (m)	Athugasemd særd Pessar hætt var að bora
X-hnit (m)	Y-hnit (m)					
551506.7	409925.3	516.0	VC159	0.20	515.8	FAST
550995.3	409982.4	510.9	VC160	5.60	505.3	HÆTT
550976.4	410028.9	510.8	VC161	7.70	503.1	FAST
550956.9	410077.6	510.6	VC162	11.40	499.2	FAST
550937.1	410127.7	510.4	VC163	11.90	498.5	STOPP
550094.3	410613.0	516.2	VC164	6.50	509.7	STOPP
550129.1	410603.0	514.1	VC165	10.80	503.3	STOPP
550158.6	410593.9	514.8	VC166	15.20	499.6	HÆTT
550187.3	410585.3	514.7	VC167	19.80	494.9	STOPP
549928.7	410590.5	542.3	VC168	4.90	537.6	STOPP
549909.9	410580.1	542.4	VC169	10.00	532.4	HÆTT
551204.8	410288.8	508.4	VC170	2.10	506.3	FAST
551266.1	410209.6	509.5	VC171	8.80	500.7	STOPP
551298.0	410167.0	509.1	VC172	7.60	501.5	STOPP
551327.0	410126.3	509.1	VC173	7.60	501.5	STOPP
551357.2	410086.1	508.8	VC174	5.50	503.3	STOPP
551386.6	410047.0	507.9	VC175	4.90	503.0	FAST
551414.9	410002.9	508.2	VC176	3.20	505.0	STOPP
551582.7	409898.1	514.8	VC177	4.30	510.5	FAST
551602.1	409919.4	514.7	VC178	2.80	511.9	FAST
551468.2	410112.0	509.6	VC179	7.00	502.6	HÆTT

VIÐAUKI A

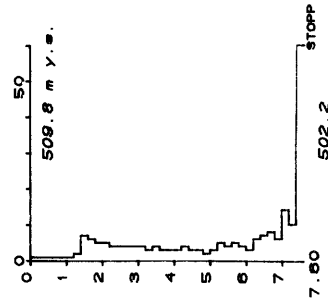
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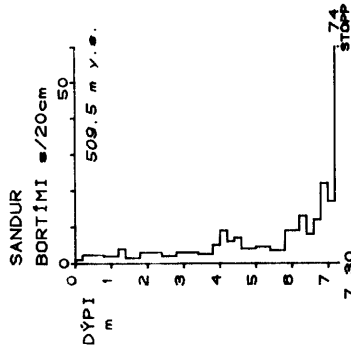
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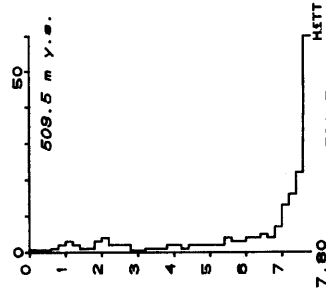
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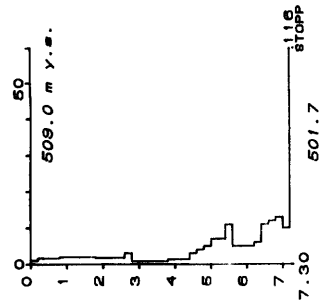
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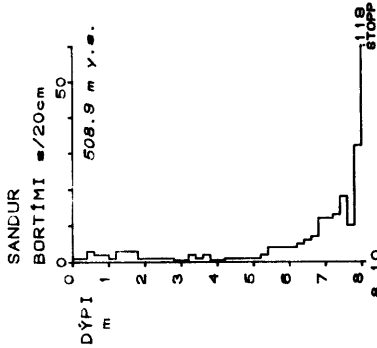
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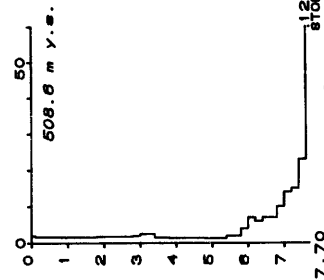
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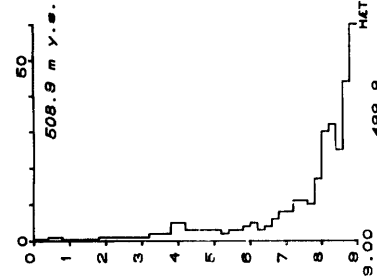
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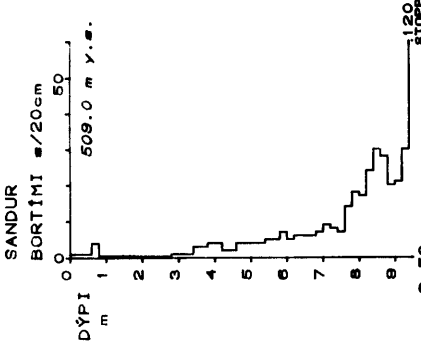
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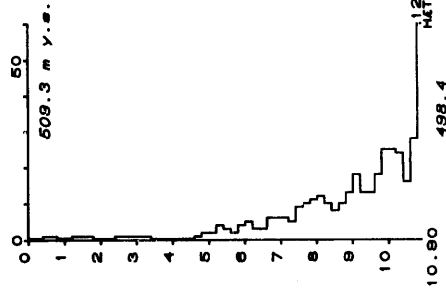
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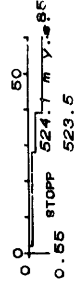
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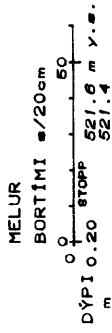
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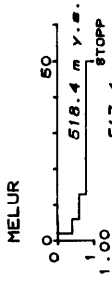
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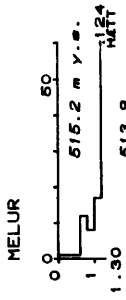
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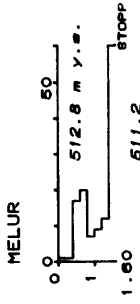
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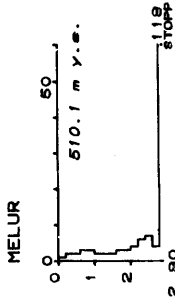
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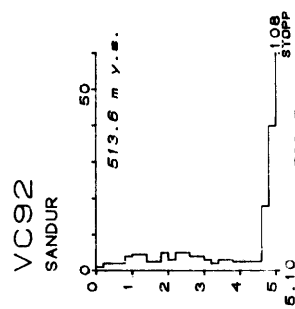
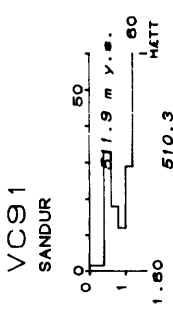
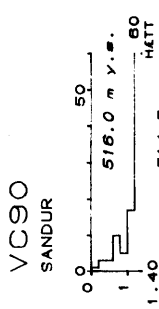
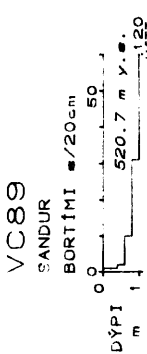
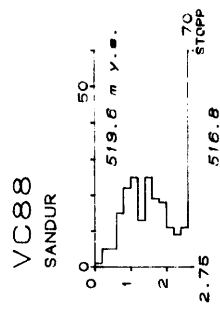
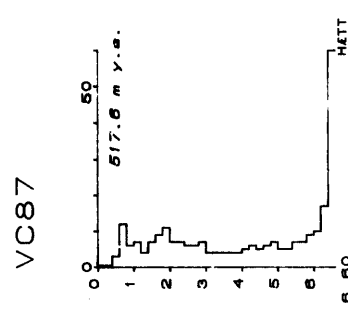
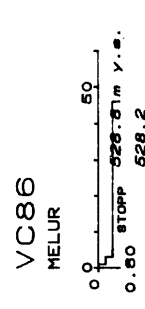
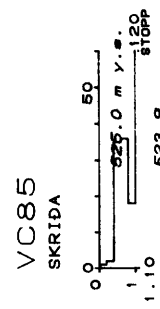
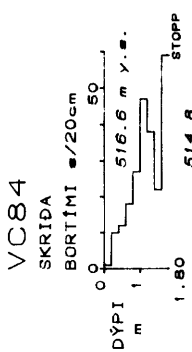
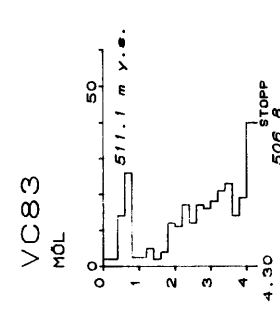
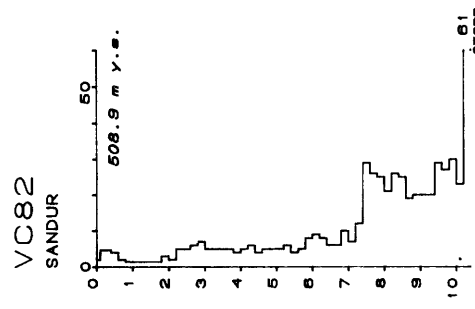
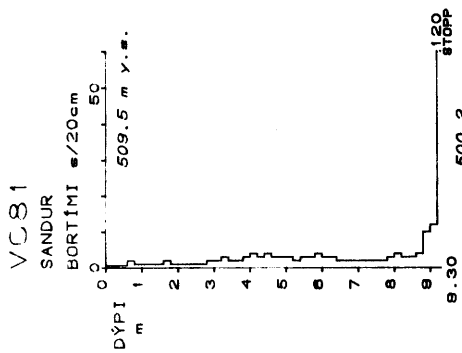
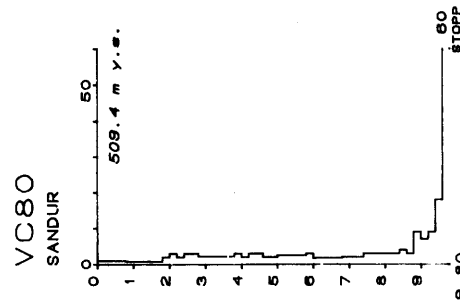
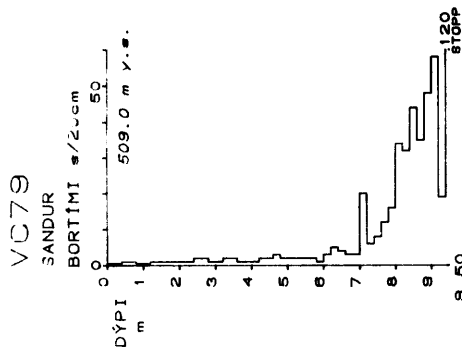
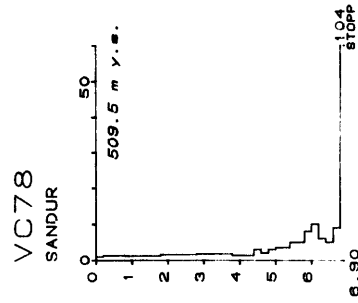
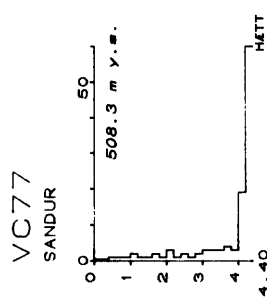
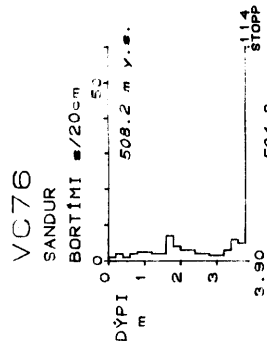
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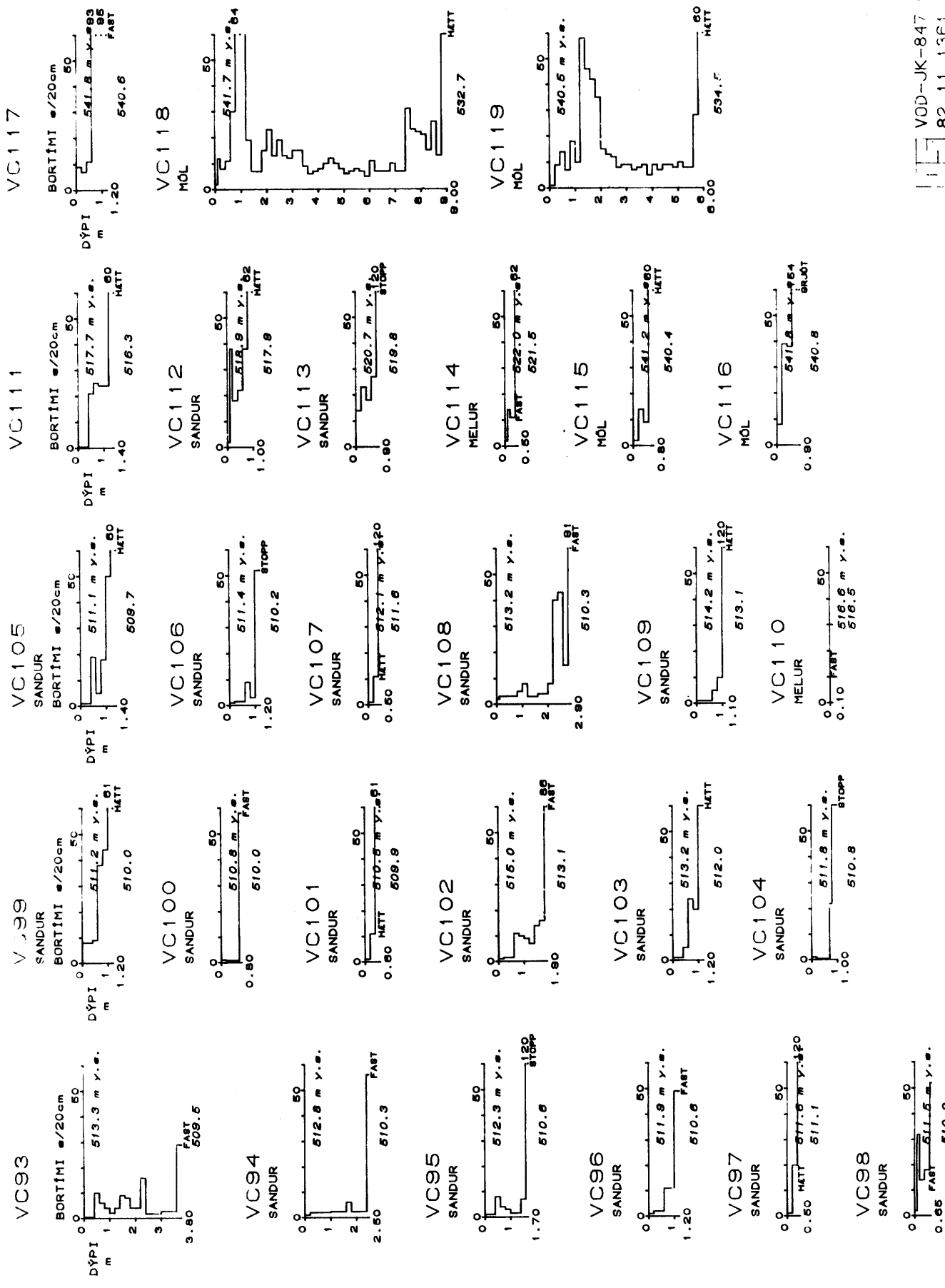


VC75

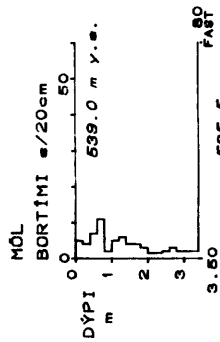


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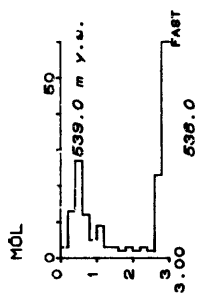




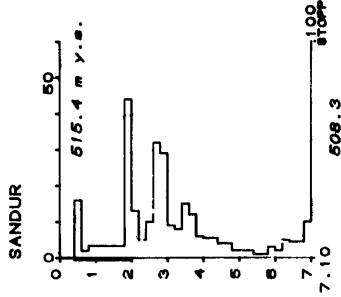
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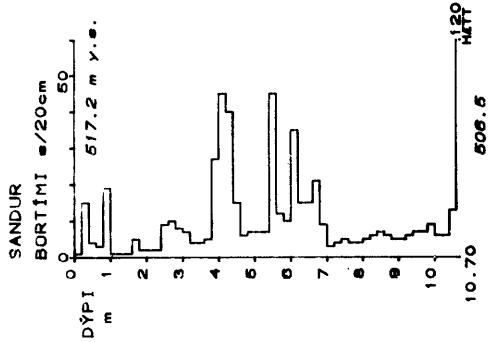
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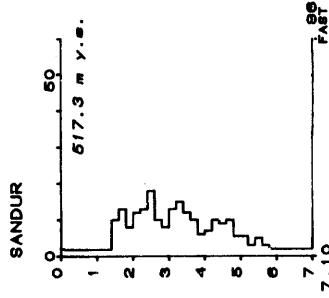
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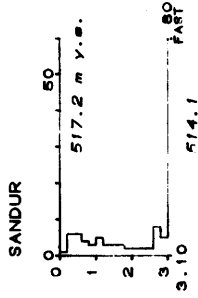
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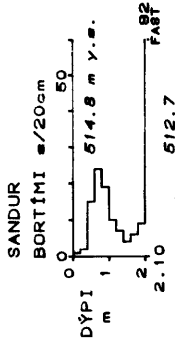
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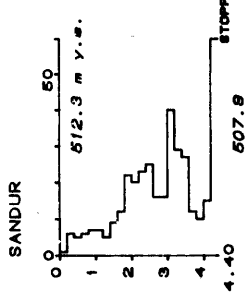
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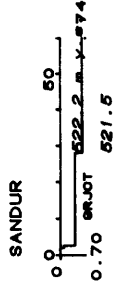
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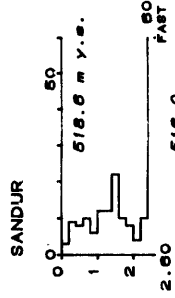
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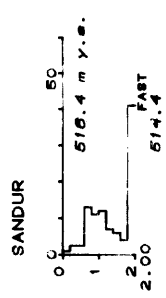
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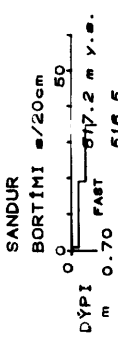
VC129



VC130



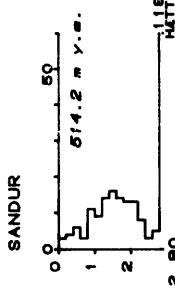
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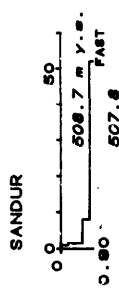
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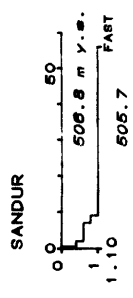
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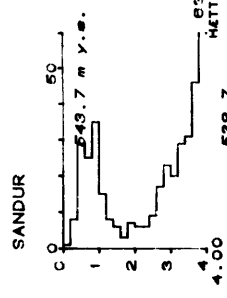
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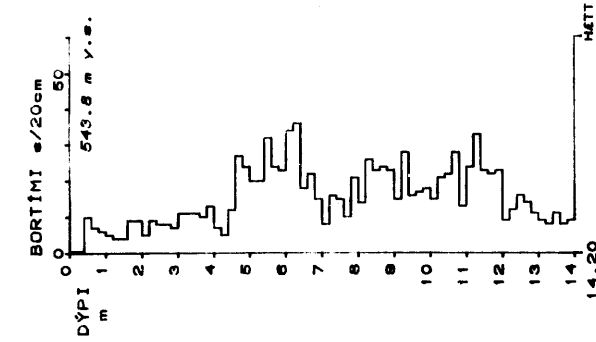
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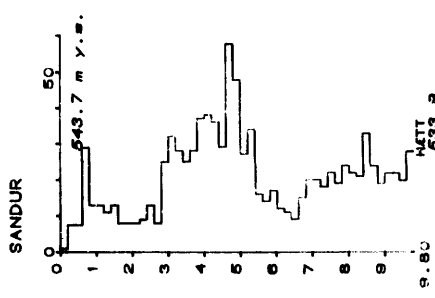
VC136



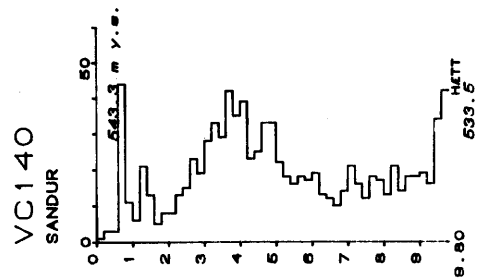
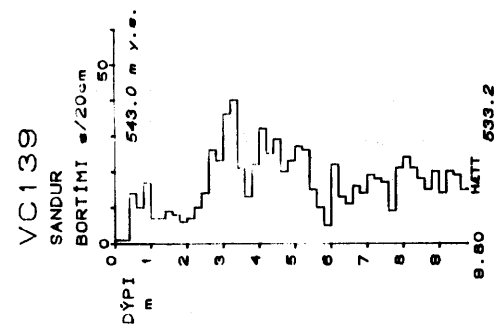
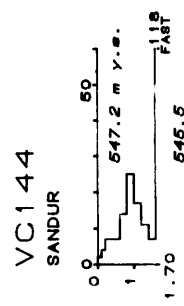
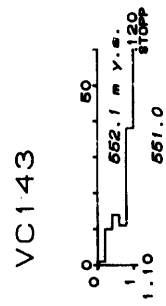
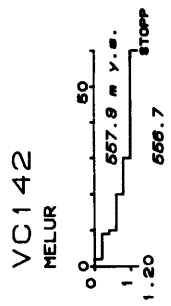
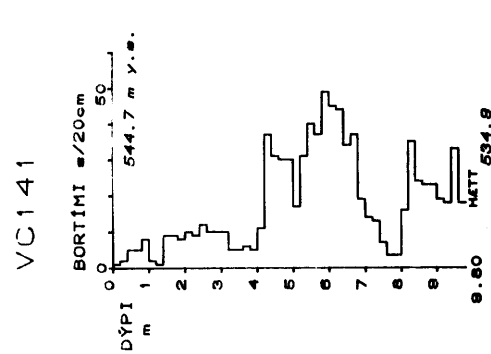
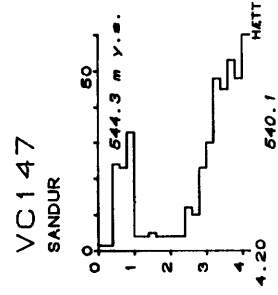
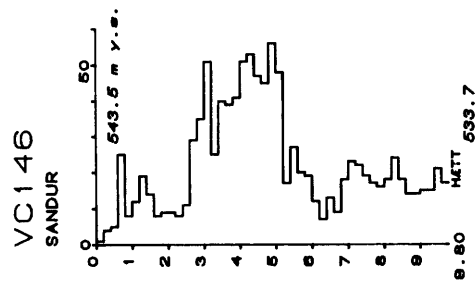
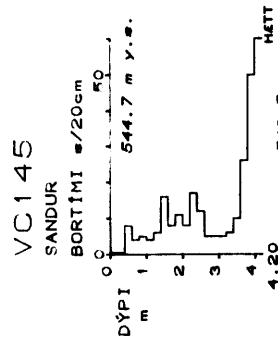
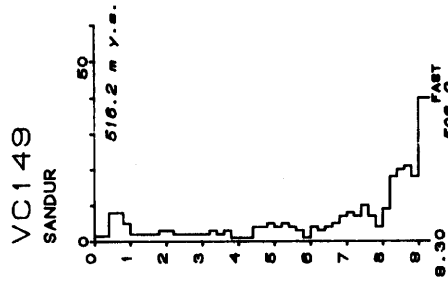
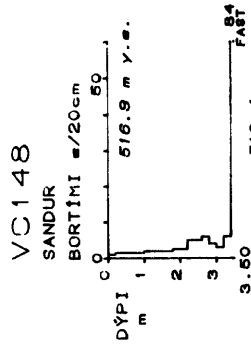
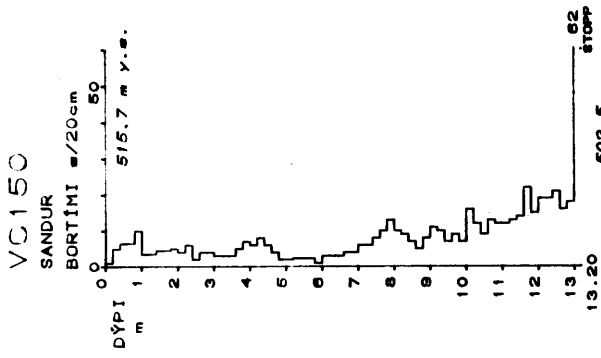
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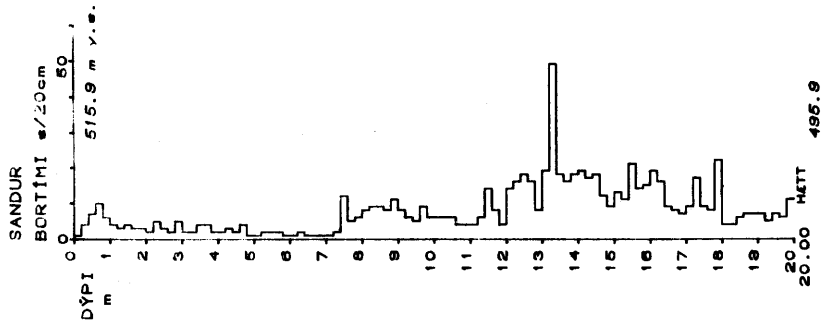
VC138



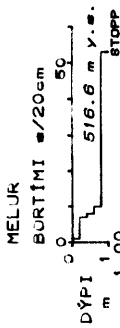
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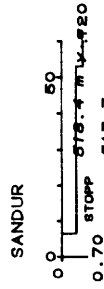
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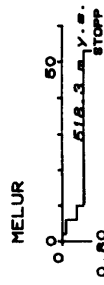
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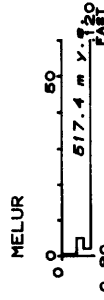
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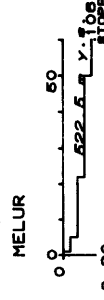
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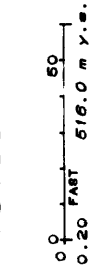
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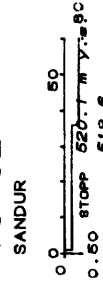
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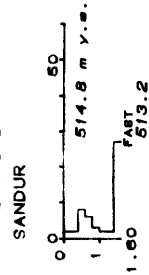
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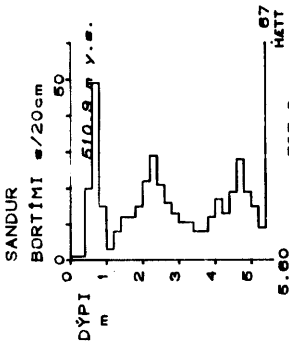
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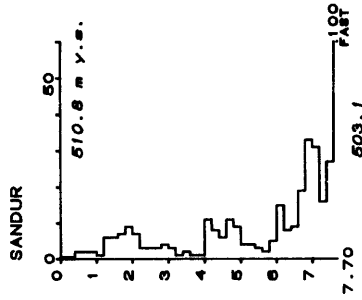
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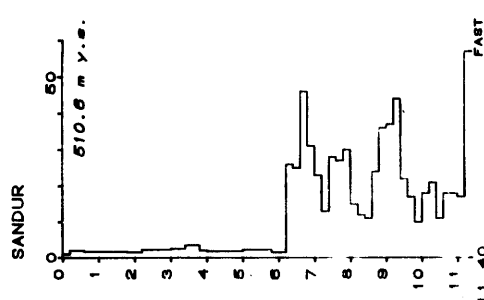
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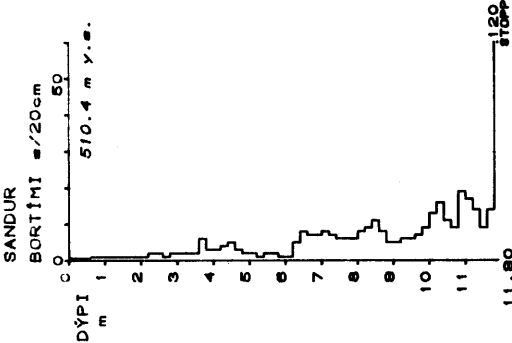
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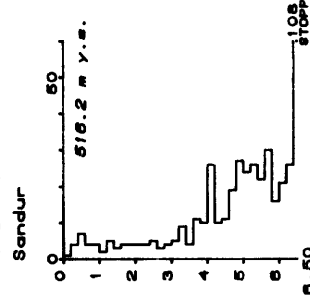
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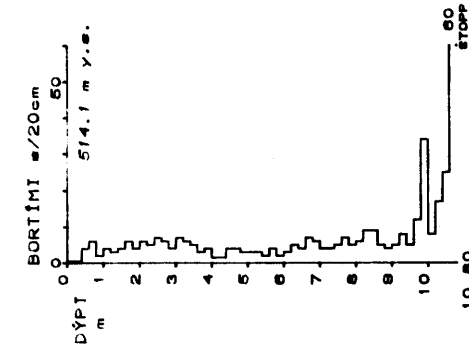
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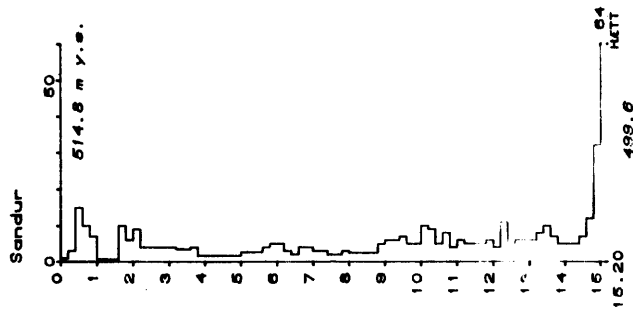
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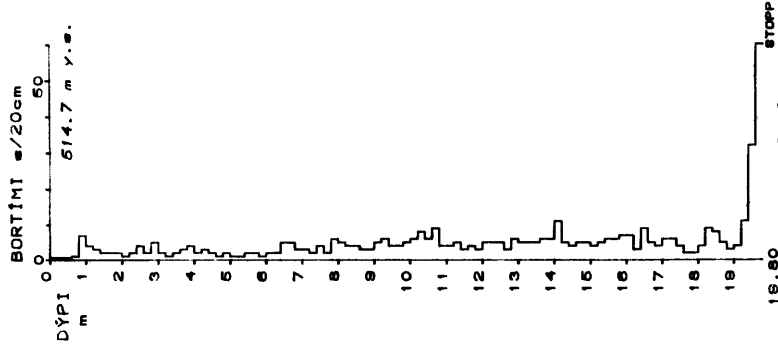
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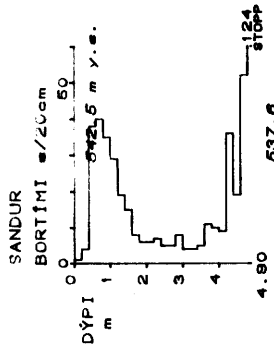
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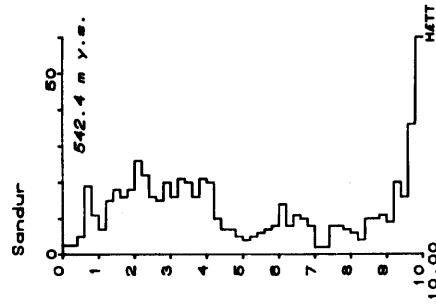
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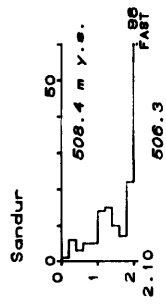
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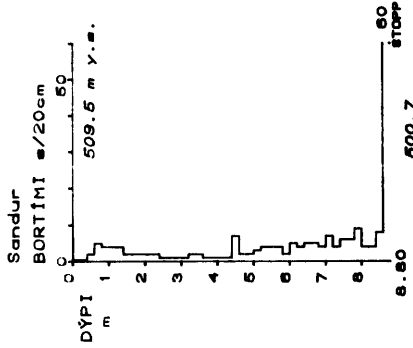
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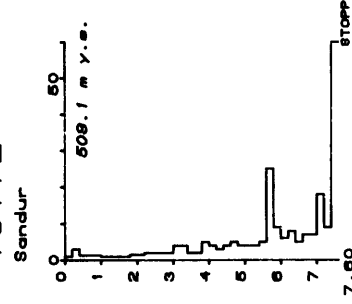
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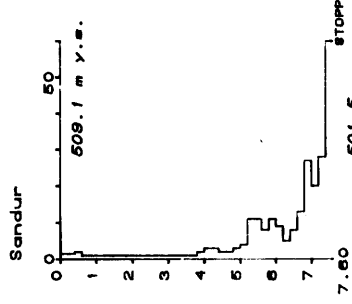
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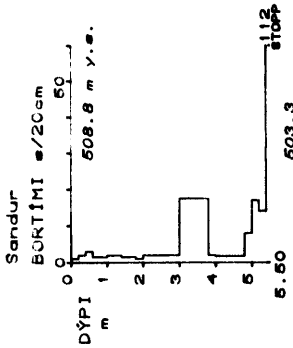
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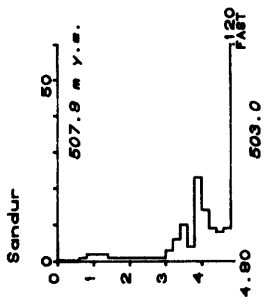
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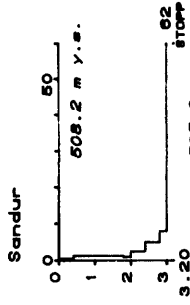
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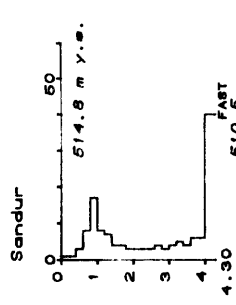
VC175



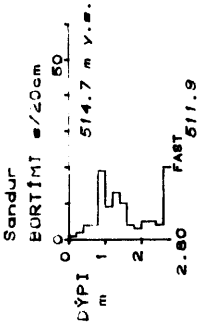
VC176



VC177



VC178



VC179

