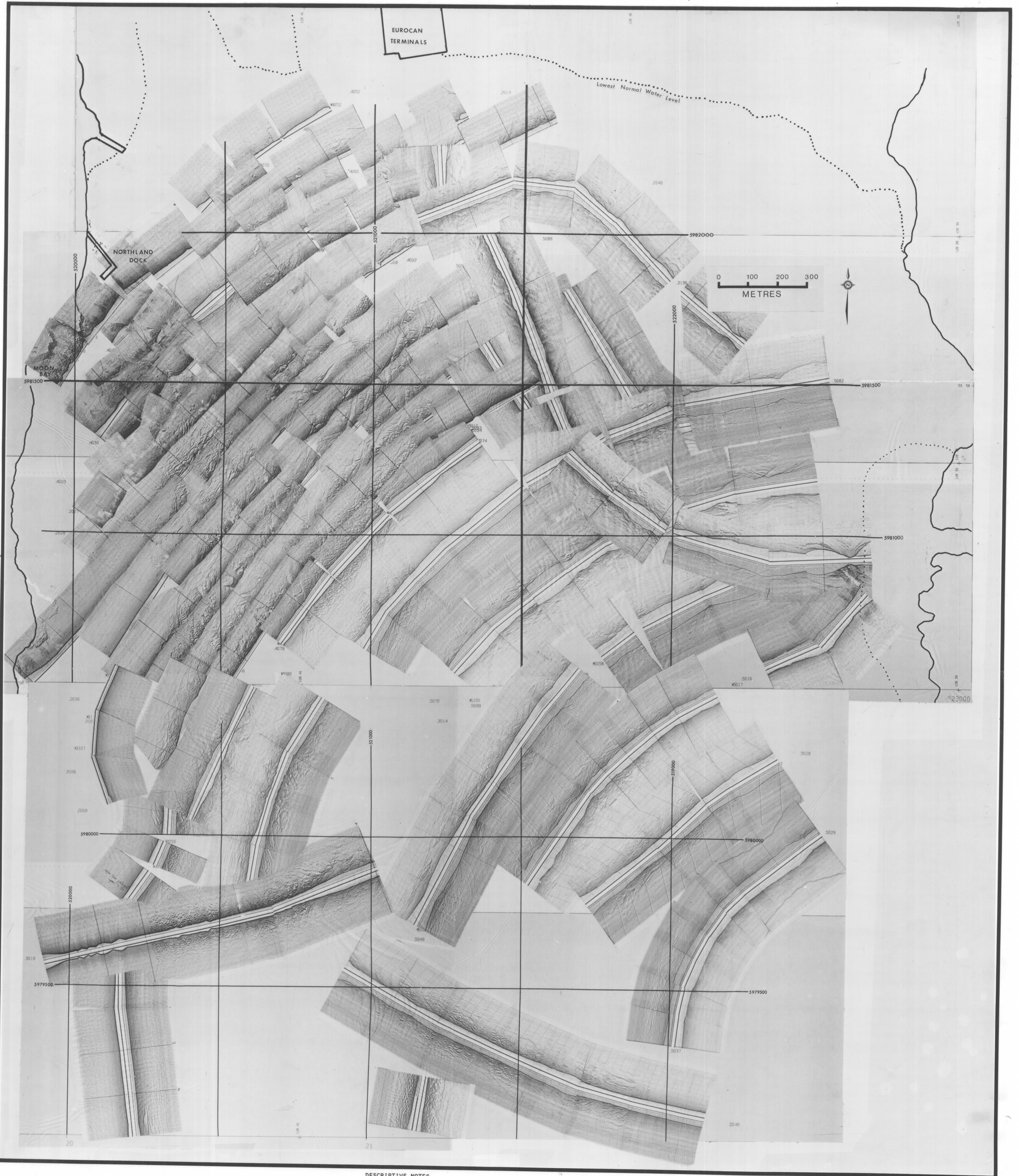


# MOSAIC OF SIDE SCAN SONAR RECORDS

## NORTHERN KITIMAT ARM, B.C.



### DESCRIPTIVE NOTES

SIDE SCAN SONAR IS A TECHNIQUE WHEREBY A VISUAL IMAGE IS PRODUCED USING REFLECTED SOUND WAVES RATHER THAN LIGHT WAVES. CONSEQUENTLY, THE MOSAIC OF SIDE SCAN SONAR RECORDS SHOWN ABOVE REPRESENTS A "PICTURE" OF THE SEA FLOOR OF NORTHERN KITIMAT ARM. THE DATA ACQUISITION AND PROCESSING TECHNIQUES REQUIRED TO PRODUCE THE FINAL MOSAIC ARE RELATIVELY COMPLEX, THUS THERE ARE SEVERAL POINTS WHICH SHOULD BE KEPT IN MIND WHEN INTERPRETING THIS MOSAIC. 1) THE INDIVIDUAL RECORDS ARE OBTAINED BY TOWING AN INSTRUMENT "FISH" BEHIND THE SURVEY VESSEL. SHORT PULSES OF SOUND EMITTED BY THE FISH ARE REFLECTED TO PRODUCE A VISUAL IMAGE. THE FIRST SIGNAL RECORDED IS THE ACTUAL SOUND TRANSMISSION FROM THE SIDE SCAN FISH. SHORT PULSES OF SOUND RECORDED ARE RECORDED (ONE ON EACH SIDE OF THE TOWFISH) TWO DARK, PARALLEL LINES ARE PRODUCED AT THE CENTRE OF RECORDS, INDICATING THE TRACKLINE OF THE TOWFISH. THE HEIGHT OF THE TOWFISH ABOVE THE BOTTOM IS INDICATED BY THE DISTANCE BETWEEN THESE TRANSMISSION LINES AND THE FIRST RECEIVED ECHOES. 2) THE GEOGRAPHIC POSITION OF THE SURVEY SHIP WAS KNOWN WITHIN 5 METRES. THE LOCATION OF THE TOWFISH IS LESS CERTAIN. BASED UPON THE IDENTIFICATION OF DISTINCTIVE BOTTOM FEATURES ON ADJACENT SIDE SCAN RECORDS IT IS ESTIMATED THAT THE FEATURES SHOWN ARE WITHIN 50 METRES OF THEIR TRUE POSITIONS. 3) THE SIDE SCAN TECHNIQUE INvariably PRODUCES A DISTORTED IMAGE OF THE SEAFLOOR (SEE B.W. FLEMING'S "SIDE SCAN SONAR; A PRACTICAL GUIDE" IN THE INTERNATIONAL HYDROGRAPHIC REVIEW, VOLUME 53, 1976, P.65-67 FOR MORE DETAILS ON RECORD DISTORTIONS). FOR THIS PARTICULAR SURVEY THE VESSEL SPEED AND TOWFISH HEIGHT ABOVE THE BOTTOM WERE DESIGNED TO MINIMIZE SUCH DISTORTIONS. 4) IN COMPILING THE PHYSICAL RECORDS SOME EXTRANEOUS FEATURES WERE PRODUCED. THESE INCLUDE MOTLEY PATCHES IN THE EXTREME NORTH-WEST SECTION OF THE MOSAIC AND MUTED WAVE-LIKE FEATURES THROUGHOUT. THE LATTER CAN BE EASILY RECOGNIZED IN THE SOUTHERN SECTION OF THE MOSAIC WHERE THEY CROSS TRANSMISSION LINES, PASSING THROUGH AREAS WHERE NO REAL DATA EXISTS.

A GEOLOGICAL INTERPRETATION OF THE MOSAIC IS PRESENTED IN THE INSET MAP TO THE RIGHT. THE LARGEST FEATURE IS A 1975 SUBMARINE SLUMP DEPOSIT CHARACTERIZED BY LARGE CROSS FRACTURES AND RIDGES. SIDE SCAN LINES TO THE SOUTH INDICATE THAT THIS DEPOSIT EXTENDS APPROXIMATELY 4 KM DOWN THE INLET. HIGH RESOLUTION SEISMIC RECORDS DEMONSTRATE THAT THIS DEPOSIT IS SOME 7.5 METRES THICK OVER THE SEA BOTTOM (ASSUMING AN ACOUSTIC VELOCITY OF 1.5 KM PER SEC.) SO THAT THE VOLUME OF SLUMP MATERIAL IS ON THE ORDER OF 60,000,000 CUBIC METRES. THE NORTHEAST BOUNDARY OF THE SLUMP DEPOSIT IS OBTAINED BY FEATURES DISTINCTLY DIFFERENT FROM THOSE OF THE SLUMP. THESE FEATURES PROBABLY RESULT FROM RECENT SEDIMENTATION BY THE KITIMAT RIVER AND BY A SMALL STREAM THAT ENTERS THE INLET FROM THE EAST. A SECOND, SMALLER SLUMP DEPOSIT DUE TO A SUBMARINE SLOPE FAILURE THAT OCCURRED IN 1971 DURING THE BUILDING OF THE EUROCAN TERMINAL DOMINATES THE NORTH CENTRAL SECTION OF THE MOSAIC. JUST TO THE WEST OF THIS ARE IRREGULAR HUMMOCKS WHICH ARE PROBABLY DREDGE SPOIL. A COMPLETE DESCRIPTION OF THE METHODS USED TO CONSTRUCT THIS MOSAIC IS GIVEN BY D. SWAN, "ACOUSTICAL IMAGING OF THE SEA BED IN NORTHERN KITIMAT ARM, B.C.", B.S.C. THESIS, 1978, DEPARTMENT OF GEOPHYSICS AND ASTRONOMY, UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER, B.C. THE GENERALIZED OUTLINE OF THE COASTLINE AND TIDAL FLATS USED FOR THIS MOSAIC IS ADAPTED FROM NATIONAL TOPOGRAPHIC SERIES SHEET 103H/15 AND CANADIAN HYDROGRAPHIC SERVICES CHART 3736.

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