

CHAPTER II

METHODOLOGY

2.1 Study Plan.

The study program was carried out step by step as shown in flow charts illustrated in Figure 2.1. There are six major steps including : step 1, preparation ; step 2, selection of the area studied and the appropriate methodology suitable for the subject ; step 3, preliminary study of ADL by using maps, aerial photograph and Landsat images were tried out for selected area and followed by interpretation of the whole area ; step 4, image interpretation was carried out covering the studied area to locate ADL and geologic data ; step 5, field study was carried out in four selected areas where gravity survey and details study were operated, and followed by data processing and correlation, which lead to the conclusion of the study for the last step.

2.2 Maps and Remote Sensing as a Data Source.

Geological map, topographic map and remote sensing images were used as data sources in mapping geologic structures and study of ADL. They are listed as follows.

2.2.1 Maps.

This study used three map types (Table 2.1) topographic map

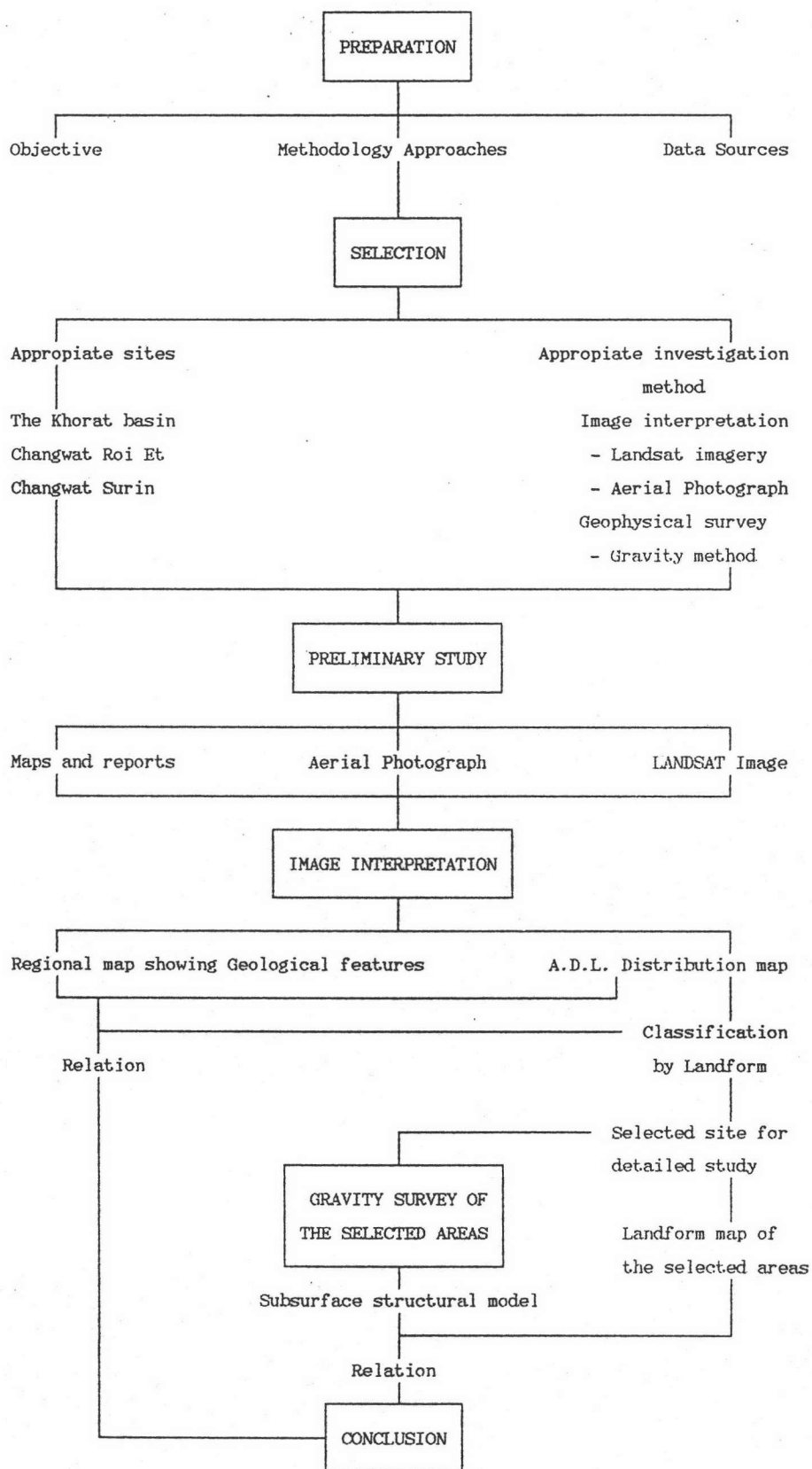


Figure 2.1 The summarized flow charts illustrating the study methodology for the study program.

Table 2.1 List of maps used in this study.

Maps	Scale	Sheet
Topographic map	1:250,000	ND 48-2
		NE 48-14
		ND 48-1
		NE 48-13
	1:50,000	5539 I
		5540 II
		5639 I, IV
		5640 I, II, III, IV
		5641 I, II, III, IV
		5739 I, IV
		5740 I, II, III, IV
		5741 I, II, III, IV
		5839 I, II, III, IV
		5840 II, III
5939 IV		
Geologic map	1:250,000	Changwat Ubon Ratchatani
		Changwat Roi Et
		Changwat Chaiyaphum
		Changwat Khon Kaen

1:50,000 scale 29 sheets and 1:250,000 scale 4 sheets and geologic map scale 1:250,000 scale 4 sheets.

2.2.2 Aerial Photographs.

The primary data source for this study is 78 frames of black and white aerial photographs of approximately scale 1:50,000 and 1:15,000 in format 23x23 cm.. Those aerial photographs applied in the study area are listed in Table 2.2 (approximately scale 1:50,000 ;67 frames), and Table 2.3 (approximately scale 1:15,000 ; 11 frames).

2.2.3 Satellite Imagery.

Landsat-3 Imageries (MSS.) band 7 (infrared band) scene : Thailand I.D. 3-5 are selected for use in this study such as, recorded in October 7, 1979 and January 1, 1976. In addition, Landsat-3 Imagery (MSS.) band 7 scene : Thailand I.D. 2-5, recorded in October 6, 1979 which is also used together.

2.3 Gravity Survey.

Gravity method is considered as one of the most appropriated geophysical method to study subsurface form of ADL. It is based on the measurement of small variations in the gravitational field. Small differences or distortions in that field from point to point over the surface of the earth are caused by any lateral variation in the distribution of mass in earth's crust. Therefore, if geologic movements involve rocks of differing density, the resulting irregularity in mass distribution will make a corresponding variation in the intensity of gravity. Sensitive instruments are used to

Table 2.2 Selected aerial photographs (WWS. Project) used in this study.

Area	Sheet	Roll	Strip	Photo No.	Date	Total
4	7	90	30	15330 - 15346	2/ 6/54	17
		93	31	15811 - 15827	2/ 6/54	17
		93	32	15918 - 15931	2/ 8/54	14
		113	32	19854 - 19862	3/24/54	9
		93	33	15979 - 15995	2/ 9/54	17
		94	34	16171 - 16187	2/ 9/54	17
		95	35	16267 - 16283	2/10/54	17
		96	36	16397 - 16413	2/10/54	17
		104	37	18084 - 18098	3/ 1/54	15
		104	38	18170 - 18179	3/ 1/54	10
		107	39	18771 - 18780	3/ 5/54	10
		113	39	19863 - 19868	3/24/54	6
		108	40	18936 - 18945	3/15/54	10
		112	40	19785 - 19789	3/23/54	5
		112	41	19651 - 19659	3/23/54	9
		112	42	19605 - 19613	3/20/54	9
		113	42	19803 - 19810	3/23/54	8
4	11	118	25	20634 - 20650	4/14/54	17
		88	26	14757 - 14764	2/ 1/54	8
		86	26	14608 - 14620	2/ 1/54	13
		88	27	14826 - 14848	2/ 1/54	23
		89	28	14998 - 15013	2/ 1/54	16
		90	29	15172 - 15187	2/ 3/54	16
		89	29	15074 - 15077	2/ 2/54	4
		95	30	16210 - 16213	2/ 9/54	4
		90	30	15346 - 15367	2/ 6/54	22
		86	31	14468 - 14471	1/21/54	4

Table 2.2 (continued)

Area	Sheet	Roll	Strip	Photo No.	Date	Total
4	11	93	31	15790 - 15811	2/ 6/54	22
		113	32	19833 - 19854	3/24/54	22
		86	32	14406 - 14409	1/21/54	4
		93	33	15957 - 15978	2/ 9/54	22
		84	33	14180 - 14184	1/21/54	5
		94	34	16187 - 16208	2/ 9/54	22
		84	34	14121 - 14123	1/21/54	3
		95	35	16246 - 16267	2/10/54	22
		84	35	14118 - 14120	1/20/54	3
		95	36	16413 - 16430	2/10/54	17
		104	36	18024 - 18031	2/10/54	8
		84	36	14057 - 14062	1/20/54	6
		84	37	14052 - 14056	1/20/54	5
		104	37	18064 - 18084	3/ 1/54	21
		104	38	18180 - 18200	3/ 1/54	21
		84	38	13989 - 13994	1/20/54	6
		107	39	18780 - 18799	3/ 5/54	20
		75	39	12252 - 12259	1/14/54	8
		75	40	12187 - 12194	1/14/54	8
		109	40	19134 - 19147	3/17/54	14
		109	40	18931 - 18936	3/15/54	6
		112	41	19633 - 19651	3/23/54	19
		75	41	12181 - 12186	1/14/54	6
112	42	19613 - 19632	3/20/54	20		
73	42	11897 - 11899	1/14/54	3		
4	12	73	42	11897 - 11901	1/14/54	5
		112	42	19612 - 19632	3/20/54	21

Table 2.2 (continued)

Area	Sheet	Roll	Strip	Photo No.	Date	Total
4	12	111	43	19462 - 19473	3/20/54	12
		73	43	11884 - 11896	1/14/54	13
		73	44	11817 - 11839	1/14/54	23
		73	45	11743 - 11758	1/14/54	16
		66	46	10475 - 10484	1/ 9/54	10
		72	46	11727 - 11742	1/12/54	16
		110	47	19195 - 19205	3/18/54	11
		72	47	11574 - 11592	1/12/54	19
		66	48	10397 - 10415	1/ 8/54	19
		66	48	10416 - 10422	1/ 9/54	7
		65	49	10251 - 10272	1/ 7/54	22
		110	49A	19248 - 19270	3/18/54	23
		65	50	10181 - 10206	1/ 7/54	26
		64	51	10038 - 10060	1/ 7/54	23
Total						913

Table 2.3 Selected aerial photographs (approximately scale 1:15,000)
use in this study.

BAN	AMPHOE	CHANGWAT	MAP No.	PROJECT	ROLL	No.	DATE
Nam Om	Kaset Wisai	Roi Et	5740 III	-	M71	15983-15985	-/ -/74
Non Tum	"	"	5639 I	NS.3	E121	154-156	30/11/76
				TATKR	5	140-141	14/ 1/87
Sra Hong	"	"	5740 III	-	M78	17775-17777	-/ -/74
				TATKR	9	104-105	14/ 1/87
Saen Si	"	"	5740 III	-	M91	21405-21406	-/ -/74
				TATKR	9	239-240	14/ 1/87
Phrai Khla	Chumphon Buri	Surin	5739 IV	NS.3	E106	272-273	17/ 1/76
				TATKR	7	405-406	15/ 1/87
Khi Lek (3)	Tha Tum	"	5739 I	NS.3	E108	483-484	18/11/76
				TATKR	2	105-106	9/ 1/87

measure relative value of gravity. The measured variations can be interpreted in terms of probable geologic conditions. Principle of gravity method is described in detail in Appendix B.

The gravity study of ADL was carried out step by step as following : Firstly the aerial photograph were used to prepare topographic map of the study area and the survey lines were selected. Secondly, the selected survey lines were located in the field and gravity meter reading are made on every station on the surveyed lines. Thirdly, the Bouguer gravity values are calculated with an aid of computer through data reduction methods.

Subsequently, the Bouguer gravity values are plotted as profiles. These profiles would reflected the underlying geological structure. In order to interpret the underlying geological structure, the method of constructing 2 ¹/₂ dimension polygons has been used. The data from Potash and Rock salt exploration's boreholes (Table A-1) in the Northeastern Thailand and from the boreholes near the study area and other interesting boreholes, such as the borehole near the proved shallow salt dome position, were used as geological constraints in building polygons.

Gravity anomaly of each polygon is calculated and summed for the models. The resulted gravity values are compared to the observed Bouguer gravity. The polygon models were adjusted until satisfactory results are obtained.