

Figure B.15 Exploited Amount of Groundwater by River Basin

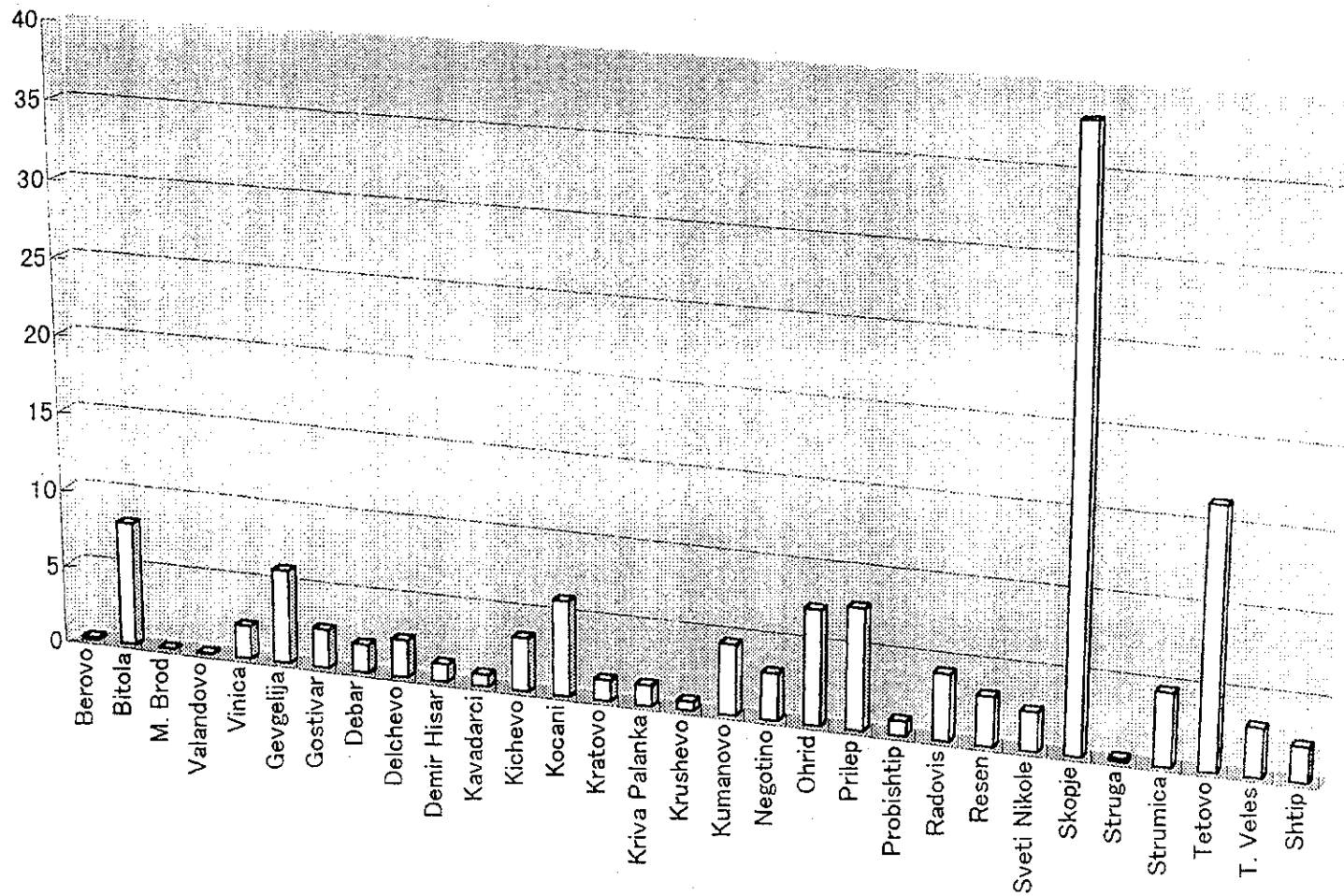


Figure B.16 Potential Amount of Groundwater By Former Municipality

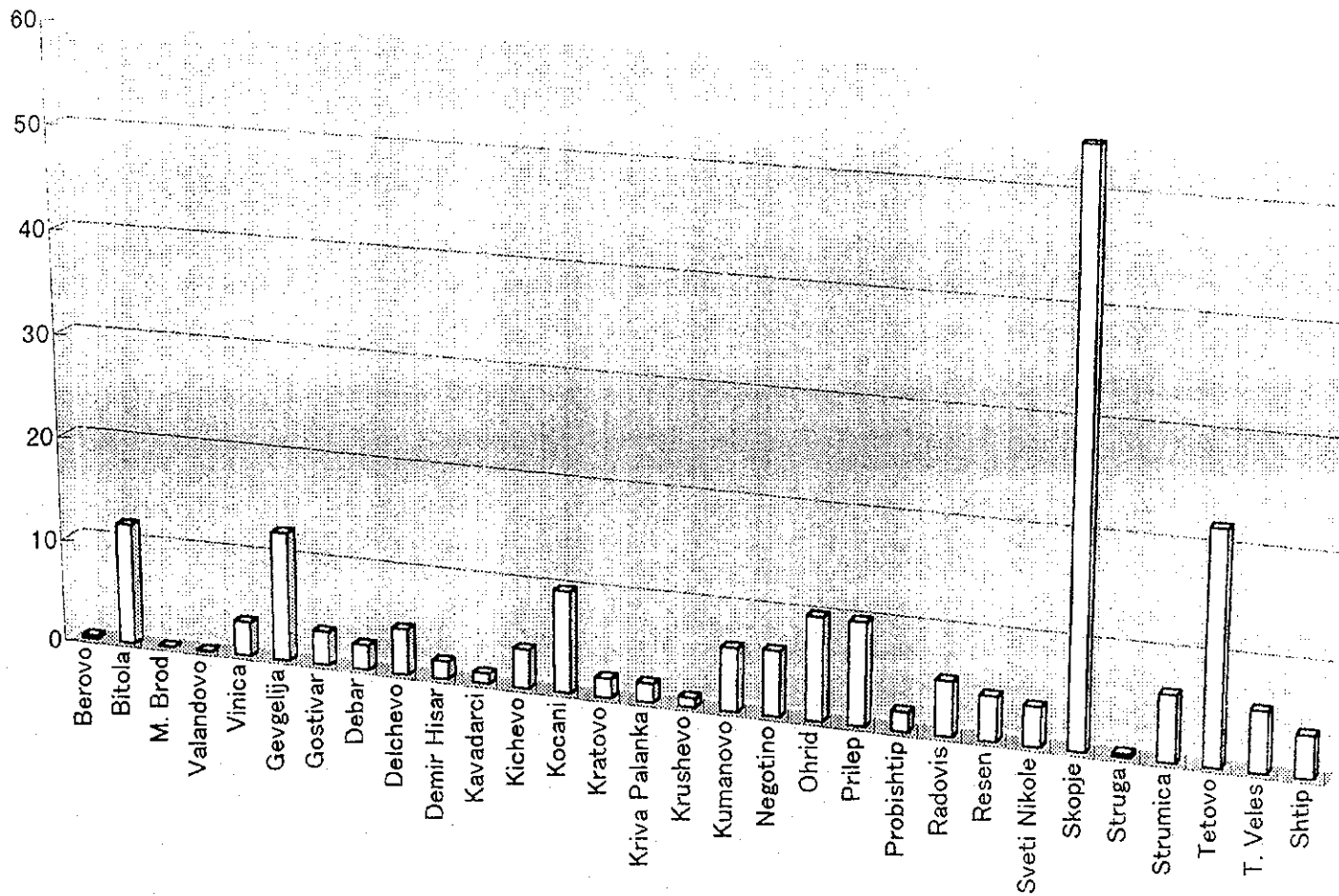


Figure B.17 Total Amount of Groundwater by Former Municipality.

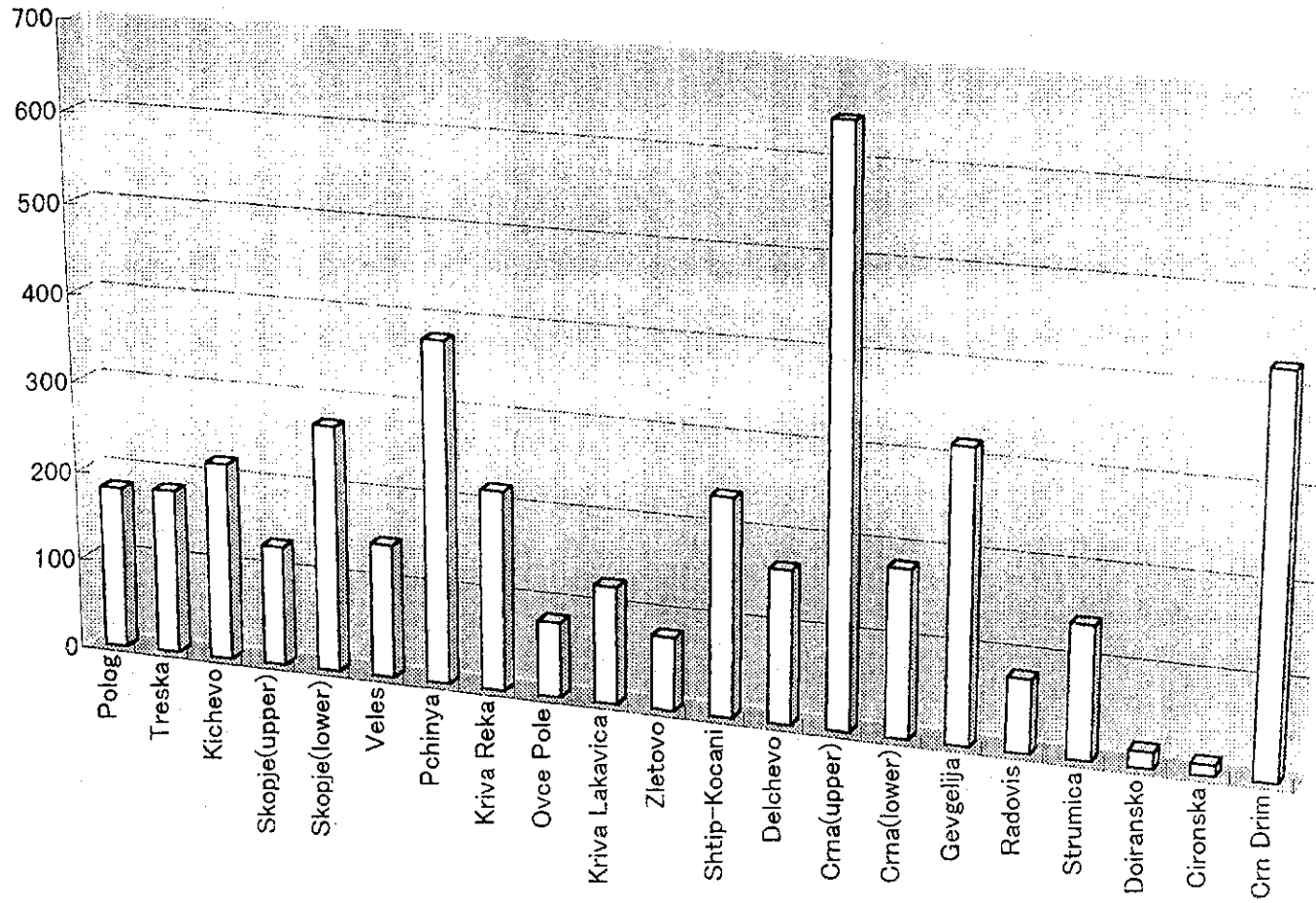


Figure B.18 Number of Springs by River Basin

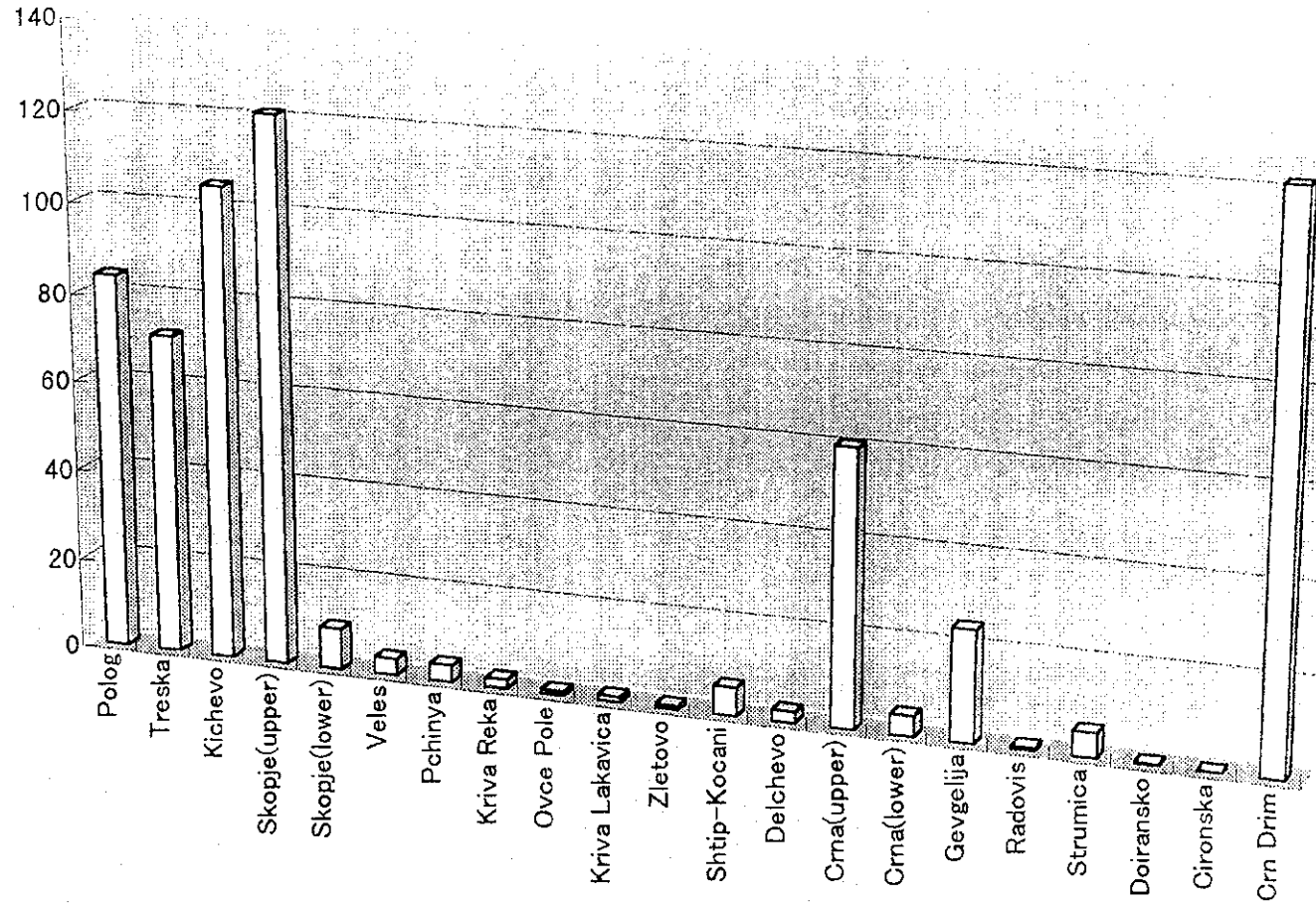


Figure B.19 Total Yield of Spring Water by River Basin

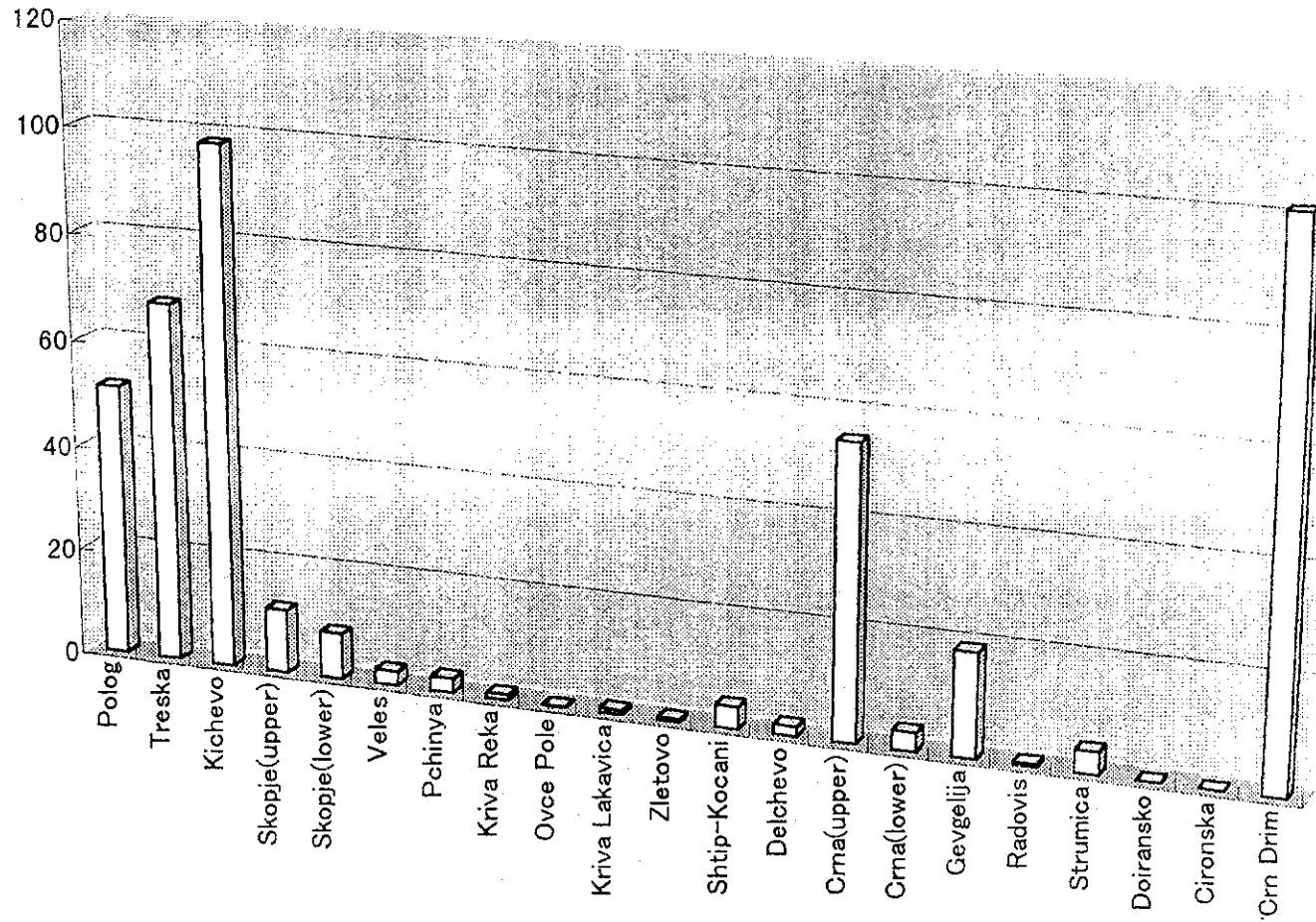


Figure B.20 Free-Flowing Spring Water by River Basin

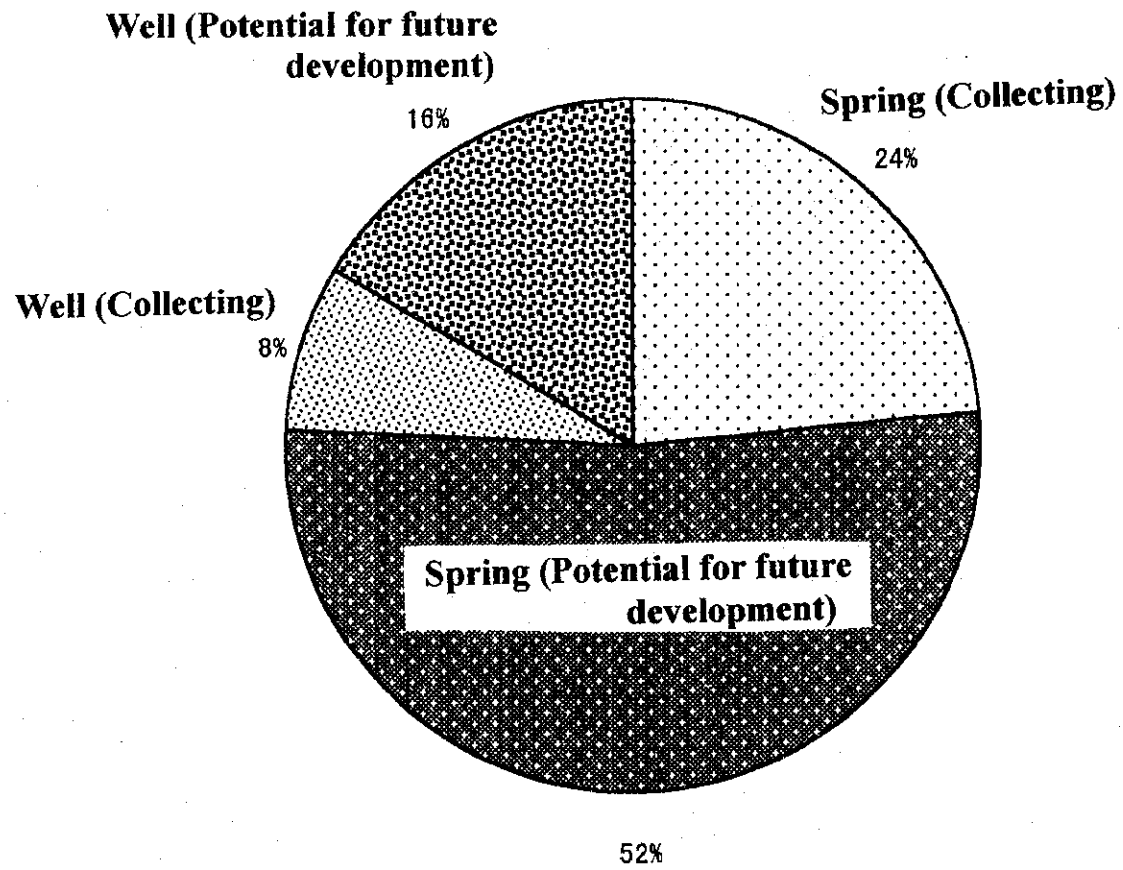


Figure B.21 Nationwide Groundwater and Spring Water Resources

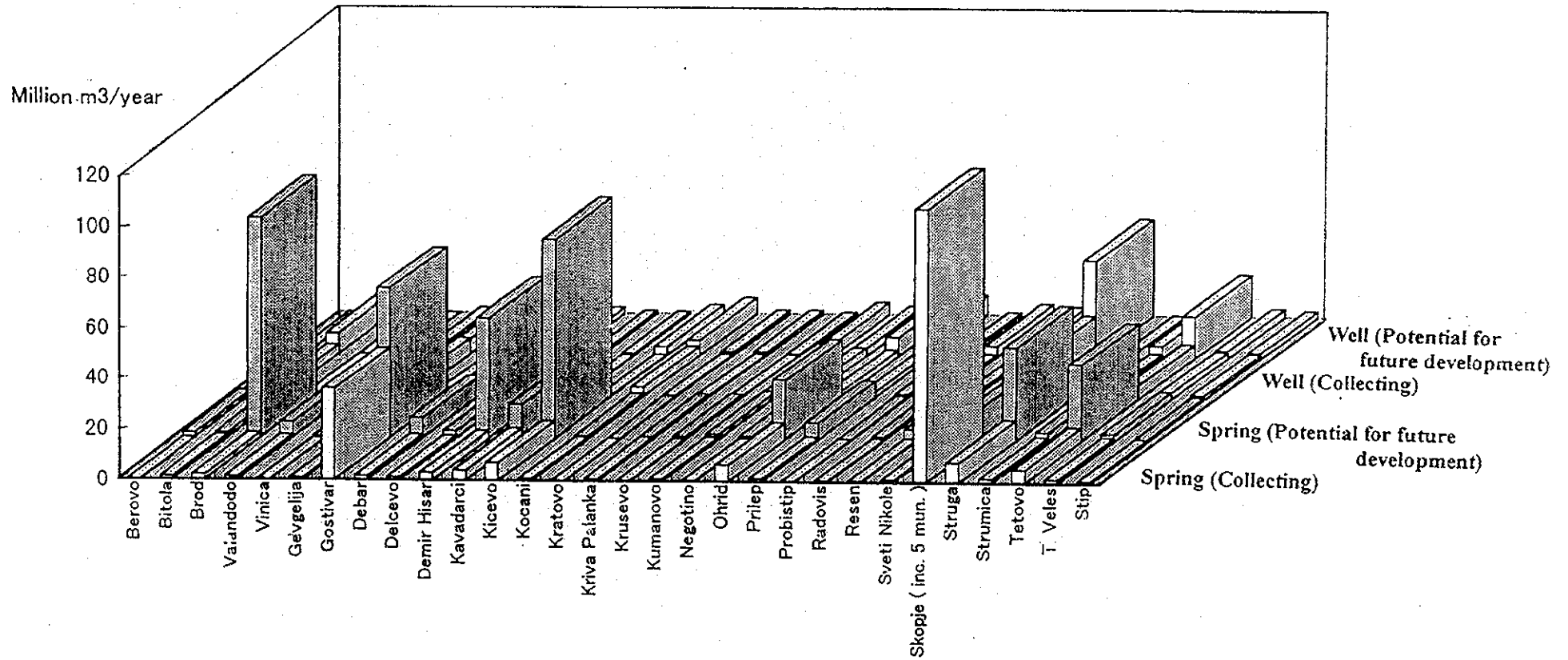
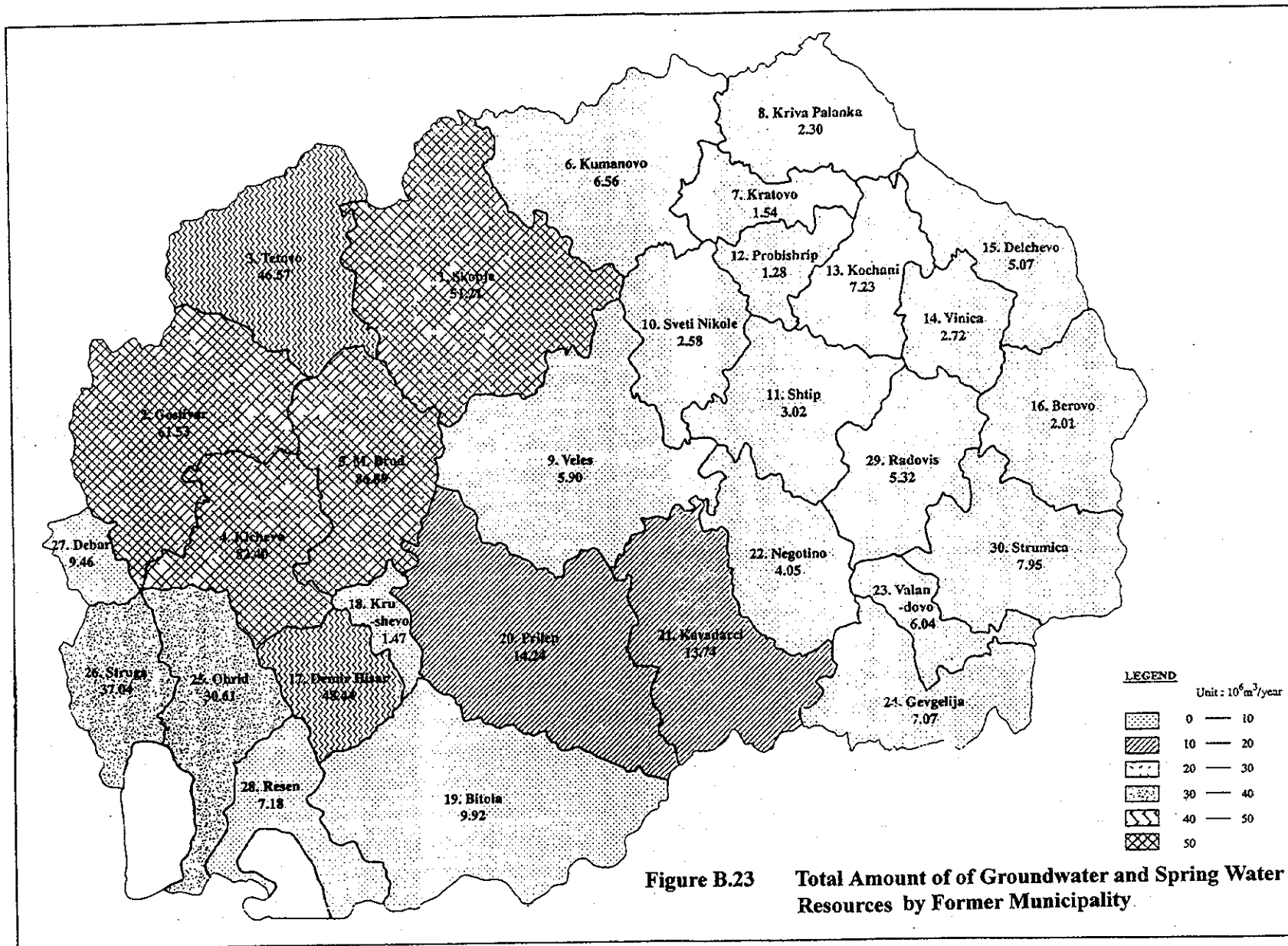
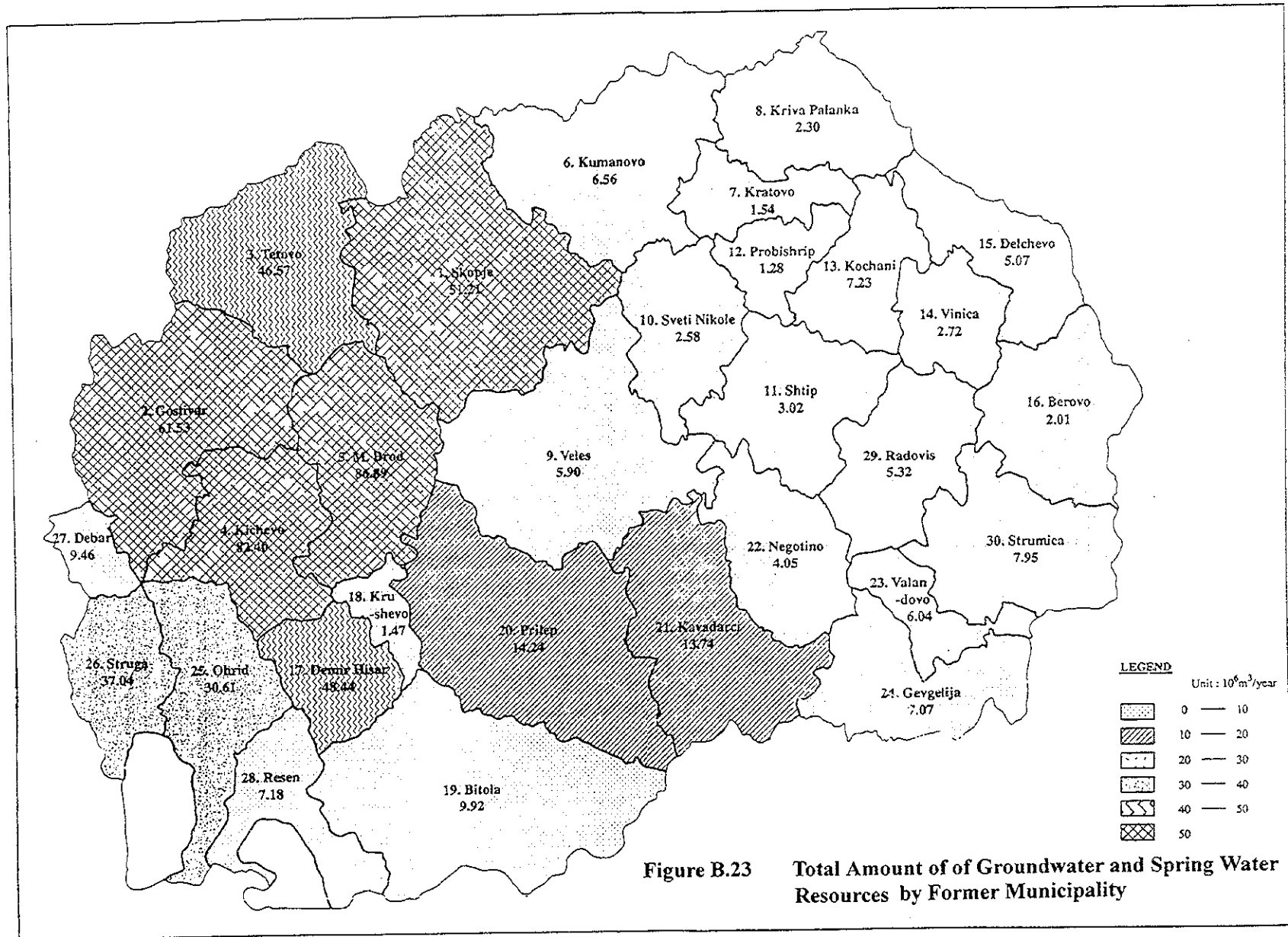


Figure B.22 Groundwater and Spring Water Resources by Former Municipality





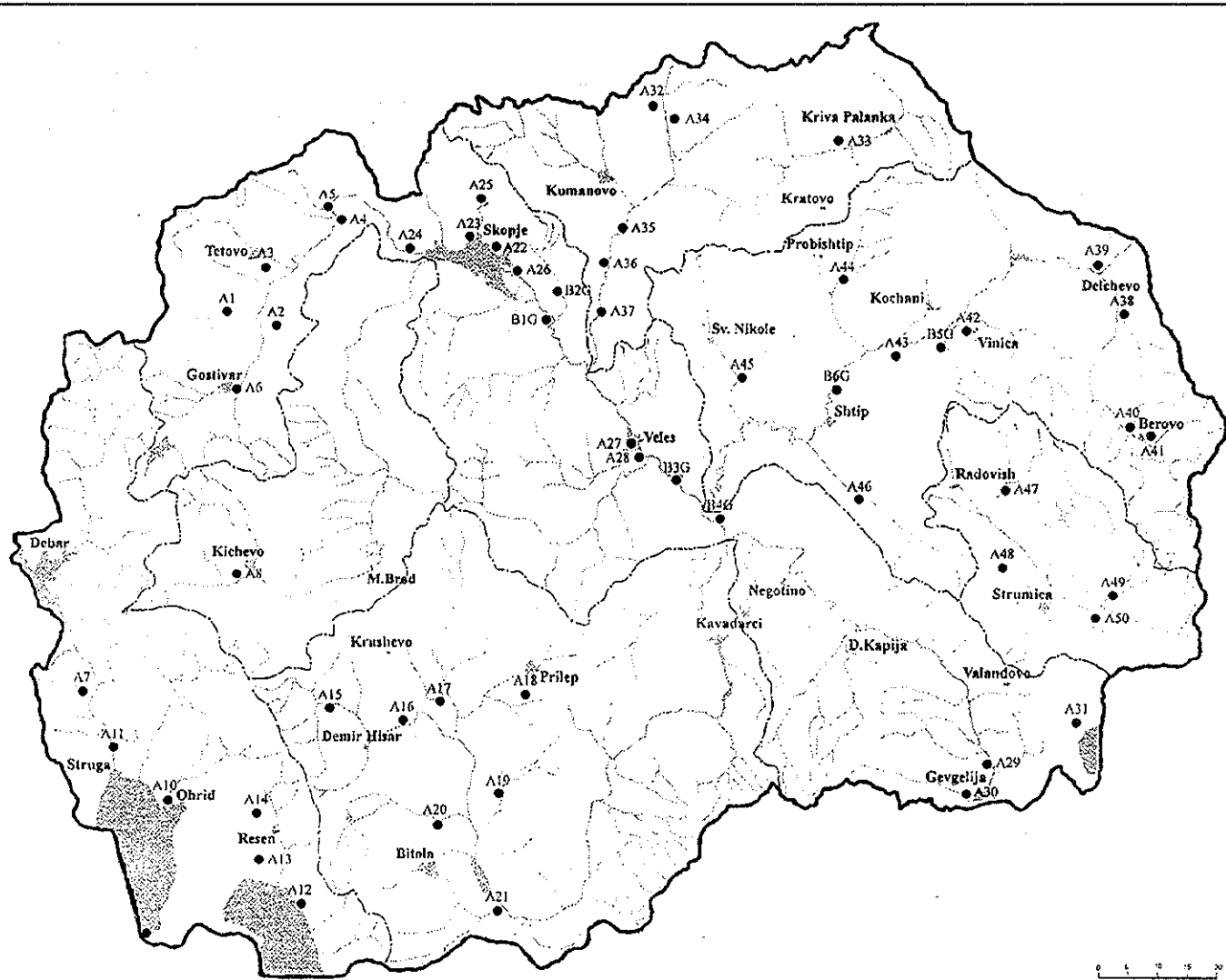


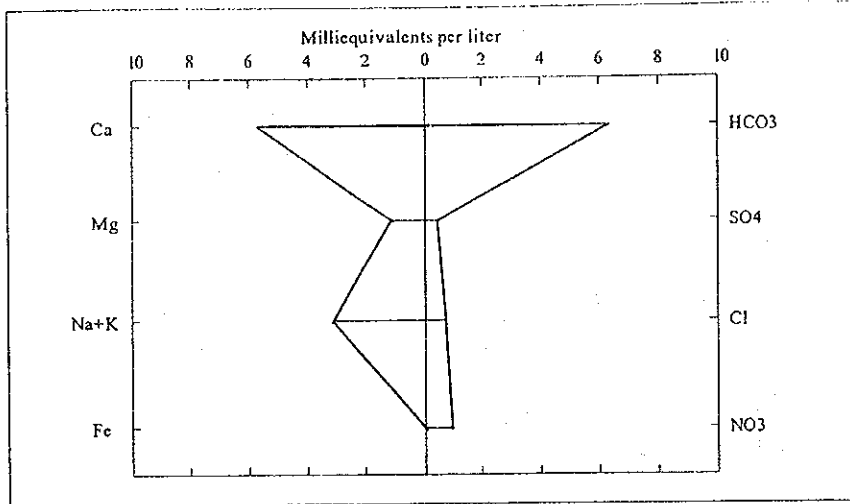
Figure B.24 / Groundwater Sampling Points (Groundwater Quality Survey)

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STIFF Diagram

A2

LOCALITY Well Milctino village
RIVER BASIN Polog



Cations						
	Ca	Mg	Na	K	Fe	Total
Milliequivalents per liter	5.730	1.170	1.480	1.600	0.002	9.982
Milligrams per liter	11.500	14.300	34.100	62.700	0.060	
% ekv	57.0	12.0	31.0			

Anions						
	HCO3	CO3	SO4	Cl	NO3	Total
Milliequivalents per liter	6.400	0.000	0.426	0.730	0.960	8.516
Milligrams per liter	390.400	0.000	20.900	26.000	60.000	
% ekv	84.8	0.0	5.6	9.6		

Mn (mg/l)	Fe (mg/l)	NO ₂ (mg/l)	F (mg/l)	SiO ₂ (mg/l)
0.004	0.060	0.0	0.10	209.62
Turbidity (mg/silica ground)	Hardness	Alkalinity (m)	Conductivity (p)	pH
0.0	19.5	6.4	0	781.2
				6.48

Water Type

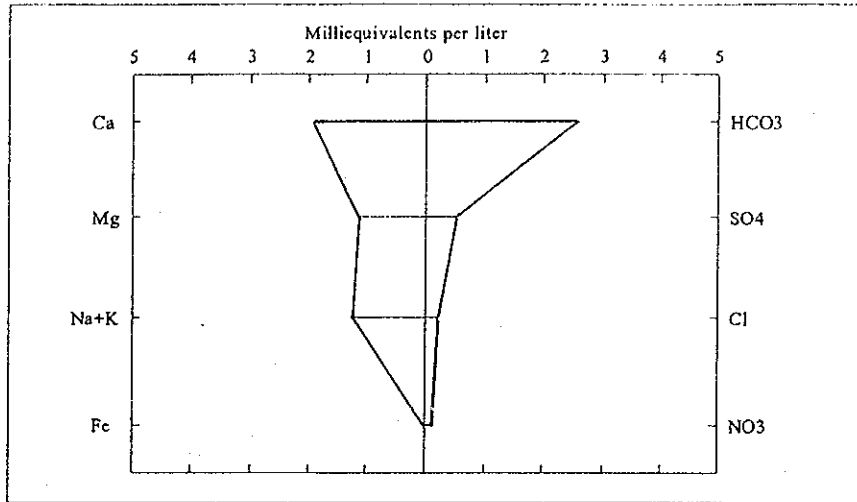
Calcium Bicarbonate

Figure B.25 Stiff Diagram (Polog Valley)

STIFF Diagram

A13

LOCALITY Well Carev Dvor village
RIVER BASIN Prespa



Cations						
	Ca	Mg	Na	K	Fe	Total
Milliequivalents per liter	1.940	1.120	1.170	0.060	0.009	4.299
Milligrams per liter	38.900	13.600	26.800	2.500	0.274	
% ekv	45.0	26.0	29.0			

Anions						
	HCO ₃	CO ₃	SO ₄	Cl	NO ₃	Total
Milliequivalents per liter	2.600	0.000	0.520	0.200	0.100	3.420
Milligrams per liter	158.600	0.000	25.000	7.000	6.000	
% ekv	78.3	0.0	15.7	6.0		

Mn (mg/l)	Fe (mg/l)	NO ₂ (mg/l)	F (mg/l)	SiO ₂ (mg/l)
0.200	0.274	0.000	0.20	93.52
Turbidity (mg/silica ground)	Hardness	Alkalinity m	Conductivity p	pH
5.0	8.7	2.6	0.0	329.4
				6.52

Water Type

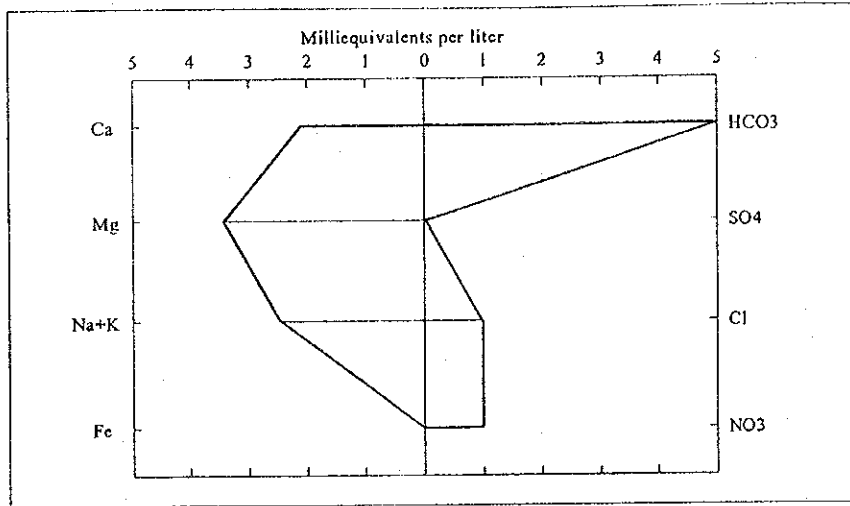
Calcium Bicarbonate

Figure B.26 Stiff Diagram (Prespa Valley)

STIFF Diagram

A19

LOCALITY Well Aglarci village
RIVER BASIN Crna river - Pelagonija



Cations						
	Ca	Mg	Na	K	Fe	Total
Milliequivalents per liter	2.120	3.440	2.300	0.160	0.009	8.029
Milligrams per liter	42.600	41.800	52.900	6.200	0.275	
% ekv	26.0	43.0	31.0			

Anions						
	HCO ₃	CO ₃	SO ₄	Cl	NO ₃	Total
Milliequivalents per liter	5.000	0.000	0.014	0.980	0.970	6.964
Milligrams per liter	305.000	0.000	0.660	35.000	60.000	
% ekv	83.4	0.0	0.2	16.4		

Mn (mg/l)	Fe (mg/l)	NO ₂ (mg/l)	F (mg/l)	SiO ₂ (mg/l)
0.023	0.275	0.000	0.50	170.92
Turbidity (mg/silica ground)	Hardness	Alkalinity (m p)	Conductivity	pH
5.0	15.90	5.0 0.0	627.7	6.46

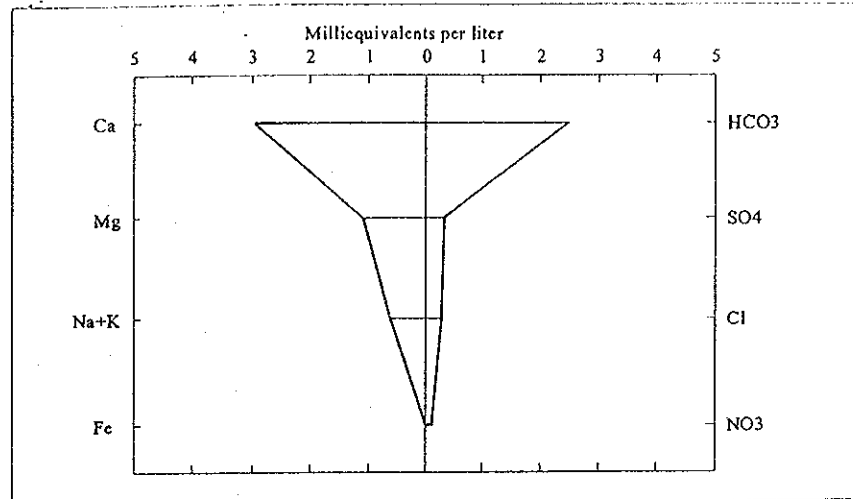
Water Type

Magnesium Bicarbonate

Figure B.27 Stiff Diagram (Pelagonija Valley)

STIFF Diagram

Drillhole Volkovo village
RIVER BASIN Vardar river, Skopje



Cations						
	Ca	Mg	Na	K	Fe	Total
Milliequivalents per liter	2.980	1.100	0.550	0.060	0.001	4.691
Milligrams per liter	59.660	13.340	12.600	2.200	0.047	
% ekv	63.5	23.4	13.0			

Anions						
	HCO3	CO3	SO4	Cl	NO3	Total
Milliequivalents per liter	2.500	1.400	0.330	0.280	0.100	4.610
Milligrams per liter	152.500	42.000	16.020	10.000	6.000	
% ekv	55.4	31.1	7.3	6.2		

Mn (mg/l)	Fe (mg/l)	NO ₂ (mg/l)	F (mg/l)	SiO ₂ (mg/l)
0.006	0.047	0.000	0.10	122.44
Turbidity (mg/silica ground)	Hardness	Alkalinity m p	Conductivity	pH
0.0	11.39	3.9 7	520.3	6.65

Water Type

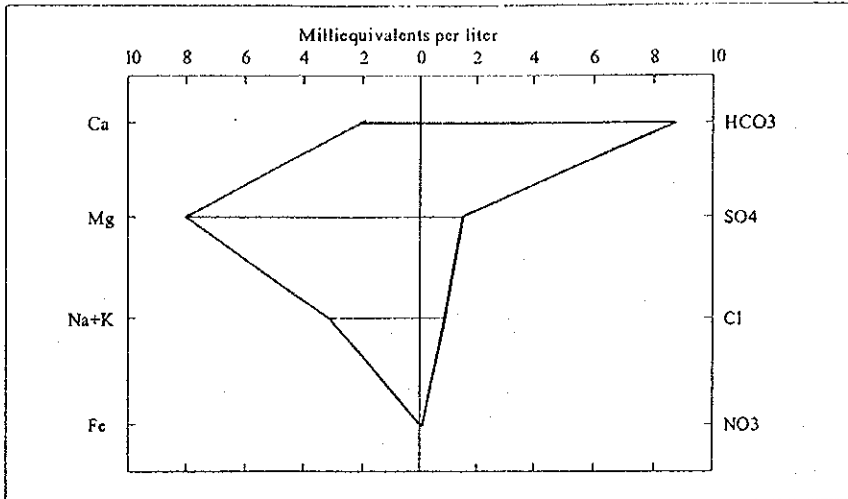
Calcium Bicarbonate

Figure B.28 Stiff Diagram (Skopje Valley)

STIFF Diagram

A37

LOCALITY Well Katlanovo village
RIVER BASIN Pčinja



Cations						
	Ca	Mg	Na	K	Fe	Total
Milliequivalents per liter	2.120	8.050	2.680	0.440	0.002	13.292
Milligrams per liter	42.550	97.900	61.800	17.200	0.067	
% ekv	16.0	61.0	23.0			

Anions						
	HCO3	CO3	SO4	Cl	NO3	Total
Milliequivalents per liter	8.800	0.800	1.480	0.850	0.100	12.030
Milligrams per liter	536.799	24.000	71.060	30.000	6.000	
% ekv	73.8	6.7	12.4	7.1		

Mn (mg/l)	Fe (mg/l)	NO ₂ (mg/l)	F (mg/l)	SiO ₂ (mg/l)
0.016	0.067	0.000	0.30	319.06
Turbidity (mg/silica ground)	Hardness	Alkalinity (m p)	Conductivity	pH
0.0	29.68	96 4	1065.3	6.63

Water Type

Magnesium Bicarbonate

Figure B.29 Stiff Diagram (Pchinja Valley)

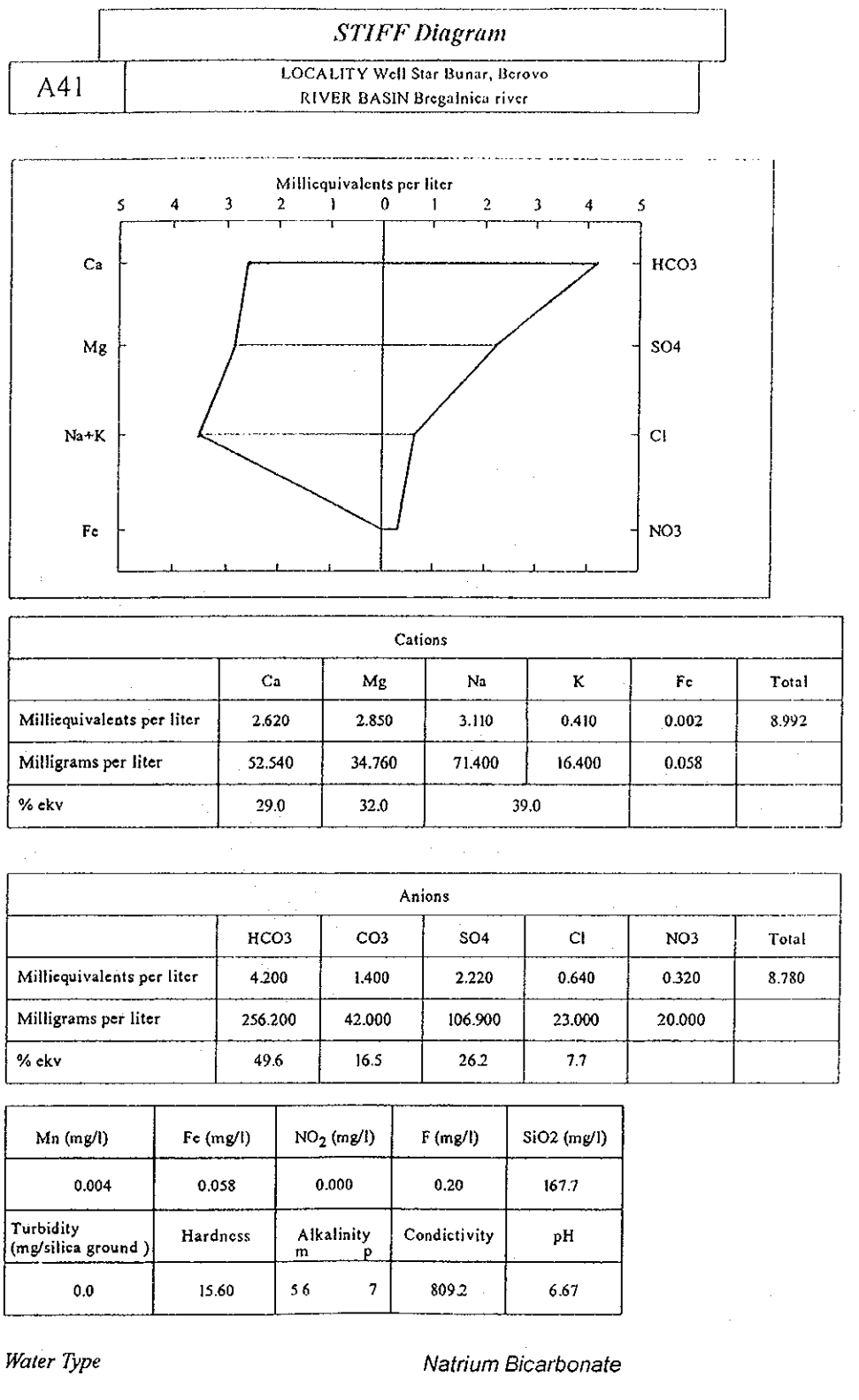
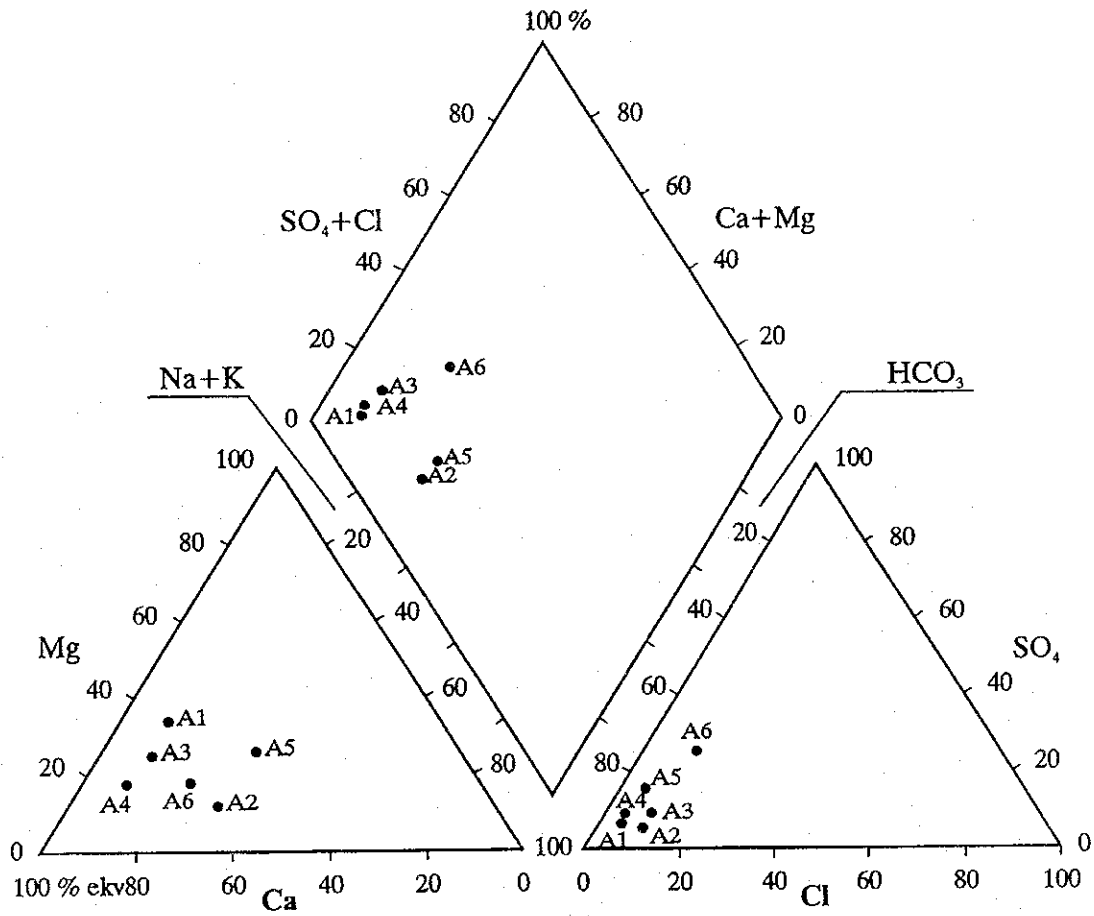


Figure B.30 Stiff Diagram (Bregalnica Valley)

RIVER BASIN: POLOG
Piper Diagram



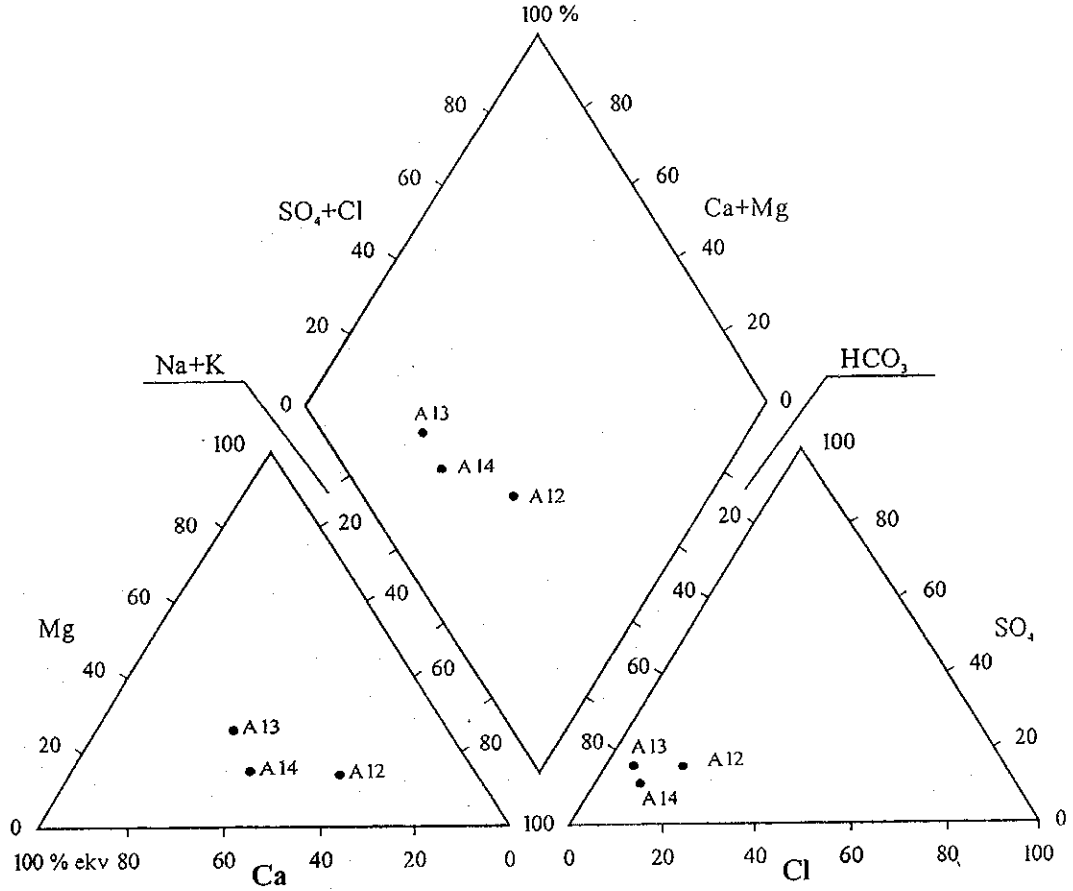
Legend:

- A1: - Well Gas station Tetovo
- A2: - Well Miletino village
- A3: - Well Fershped - Tetovo
- A4: - Drillhole Raotince village
- A5: - Drillhole Jegunovce village
- A6: - Drillhole OHIS Gostivar

Figure B.31 Piper Diagram (Polog Valley)

RIVER BASIN: PRESPA

Piper Diagram



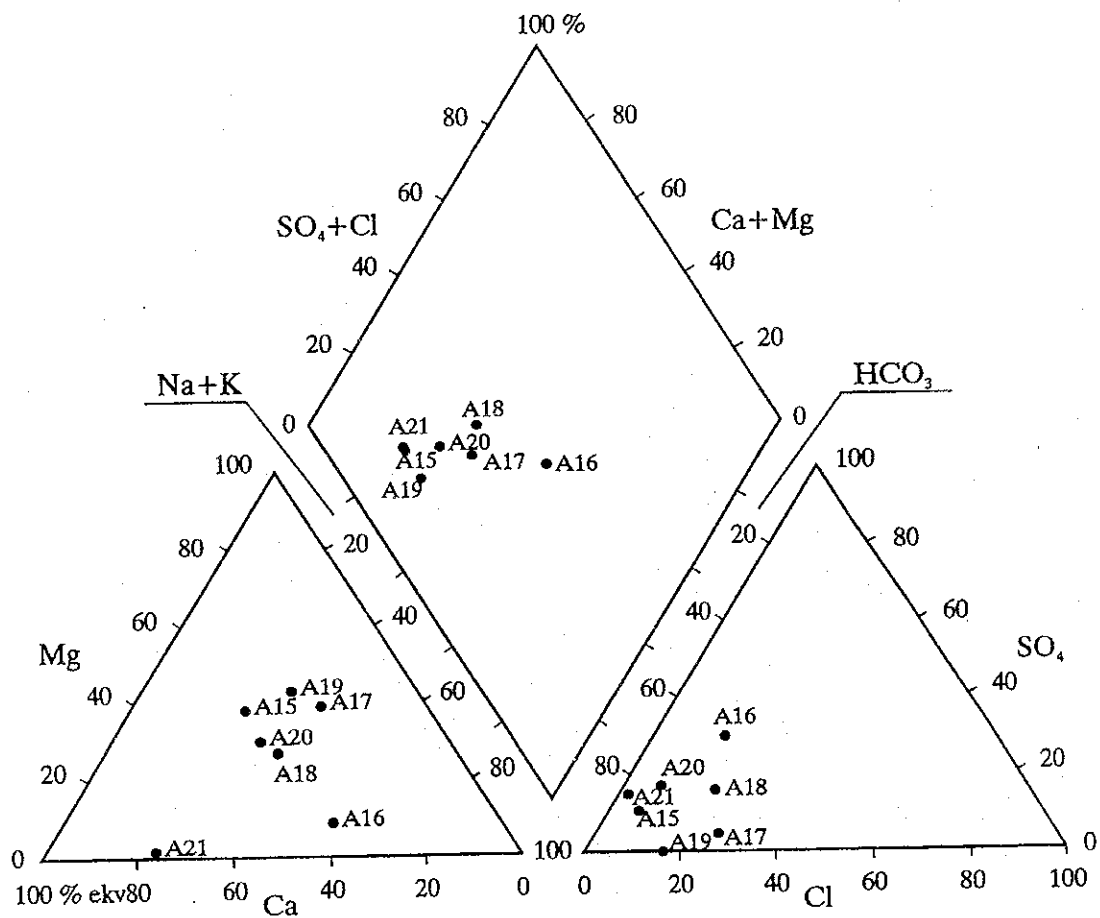
Legend: RIVER BASIN: PRESPA

- A12: - Well Asamati village
- A13: - Well Carev Dvor village
- A14: - Well Krušje village

Figure B.32 Piper Diagram (Prespa Valley)

RIVER BASIN: CRNA RIVER - PELAGONIJA

Piper Diagram

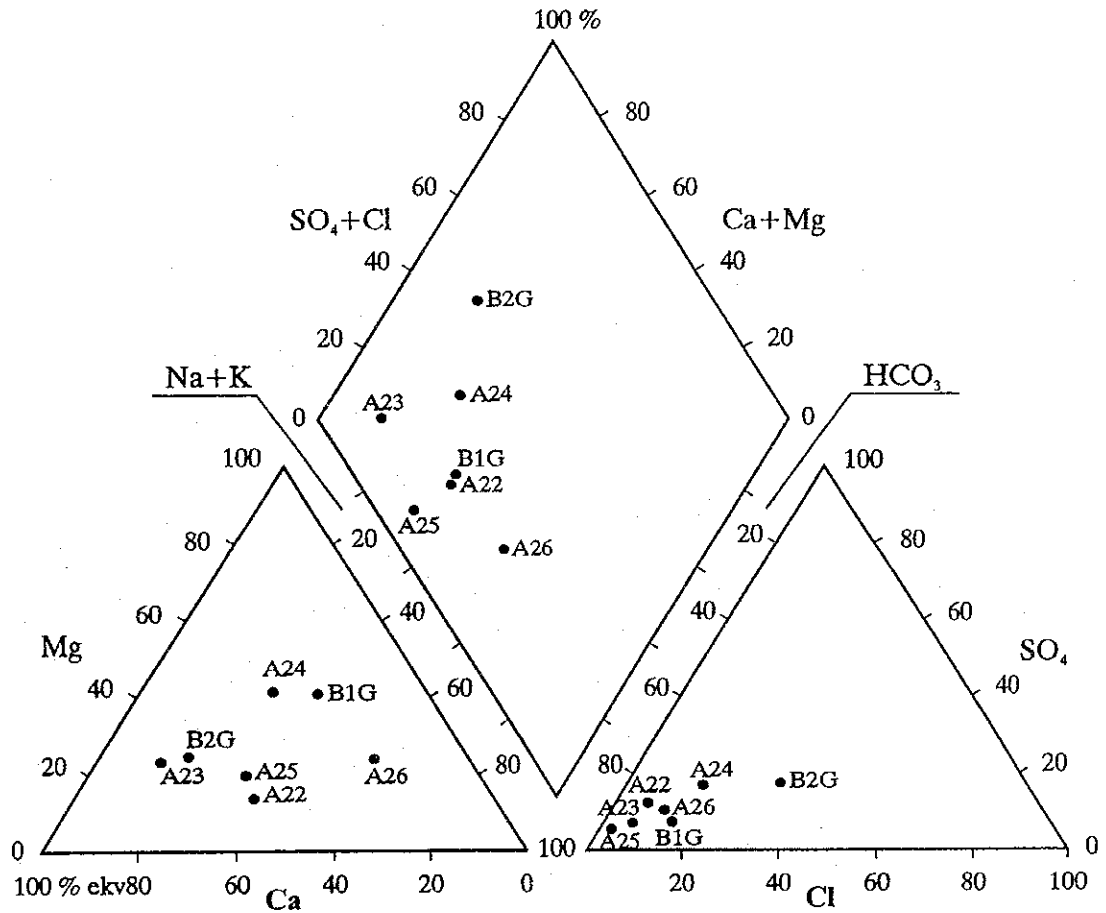


Legend:

- A15: - Well Sopotnica village
- A16: - Well Bučin village
- A17: - Drillhole (artesian) Krušecani village
- A18: - Well "Pivara" Prilep
- A19: - Well Aglarci village
- A20: - Well Kvasara Bitola
- A21: - Drillhole (artesian) Egri village

Figure B.33 Piper Diagram (Pelagonija Valley)

RIVER BASIN : VARDAR - SKOPJE
Piper Diagram



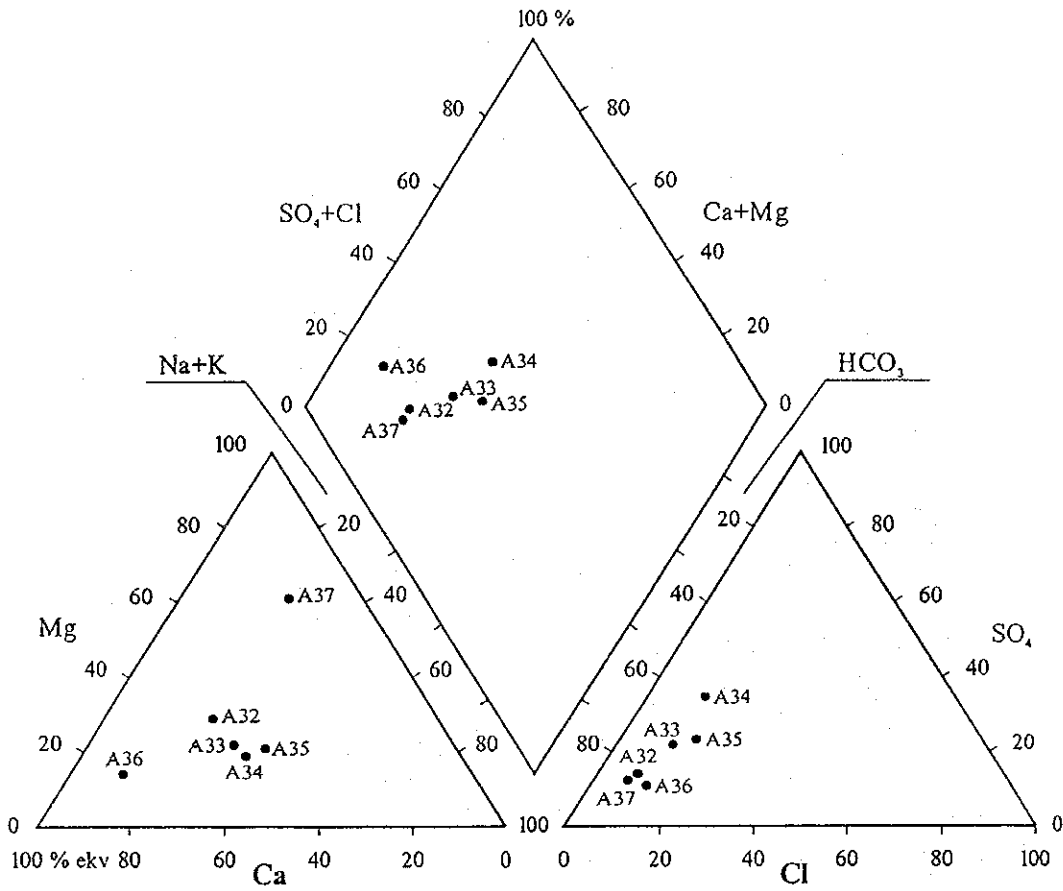
Legend:

- B1 G: - Well Zelenikovo village
- B2 G: - Well Makedonija Pat, Petrovec
- A22: - Drillhole near the Bardovci hospital
- A23: - Drillhole - Volkovo village
- A24: - Drillhole - Saraj
- A25: - Well Pobožje
- A26: - Well Kožara - settlement Aerodrom

Figure B.34 Piper Diagram (Skopje Valley)

RIVER BASIN : PČINJA

Piper Diagram

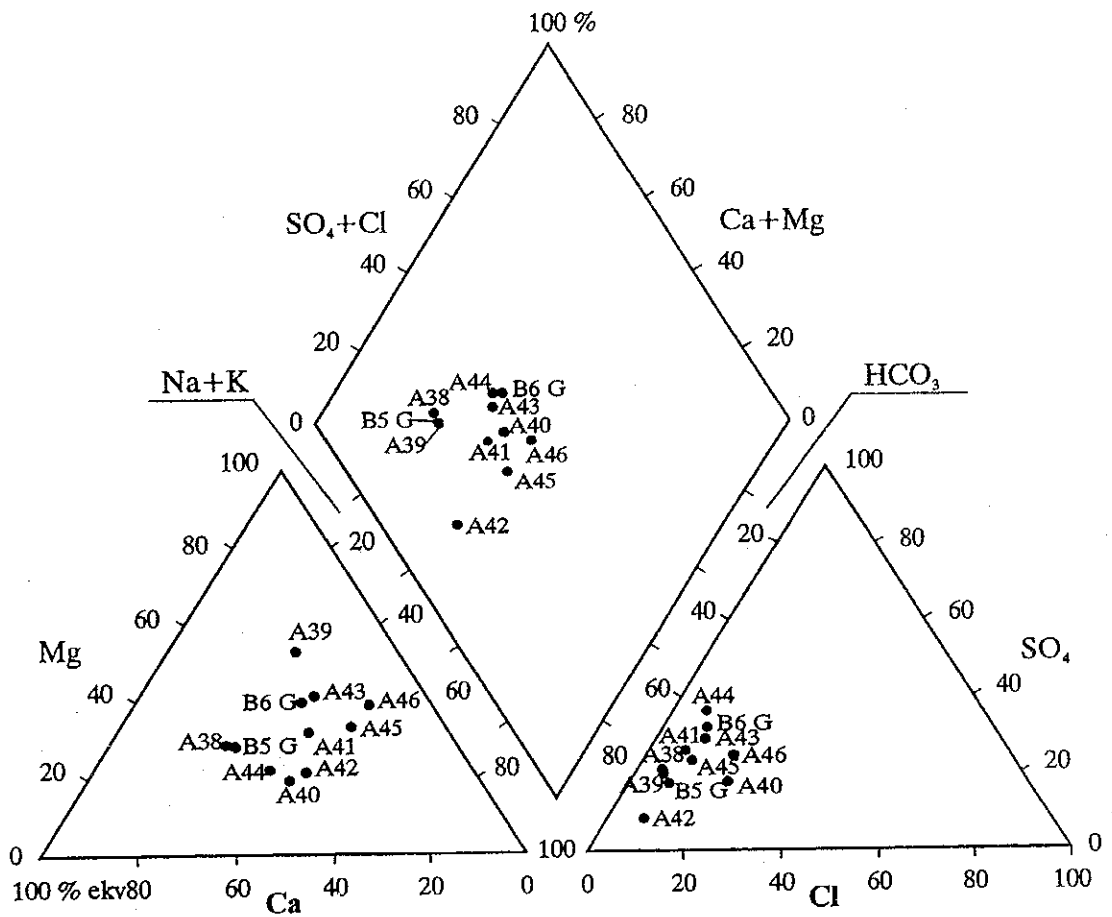


Legend: RIVER BASIN: PČINJA

- A32: - Well Čelopek village
- A33: - Well Ginovci village
- A24: - Well Dragomance village
- A35: - Well Pčinja village
- A36: - Well Sredno Konjari village
- A37: - Well Katlanovo village

Figure B.35 Piper Diagram (Pchinja Valley)

RIVER BASIN : BREGALNICA RIVER
Piper Diagram



Legend:

- B5 G: - Well Grdovski Orman, Kočani
- B6 G: - Well in alluvion Bregalnica river, Štip
- A38: - Well Trebotivište village
- A39: - Well in Delčevo (center of the city)
- A40: - Well Alkaloid, Berovo
- A41: - Well Star Bunar, Berovo
- A42: - Well Osojnica river, Vinica
- A43: - Well Buričevo village
- A44: - Well Ratavica village
- A45: - Well meat industry Amzebegovo

Figure B.36 Piper Diagram (Bregalnica Valley)

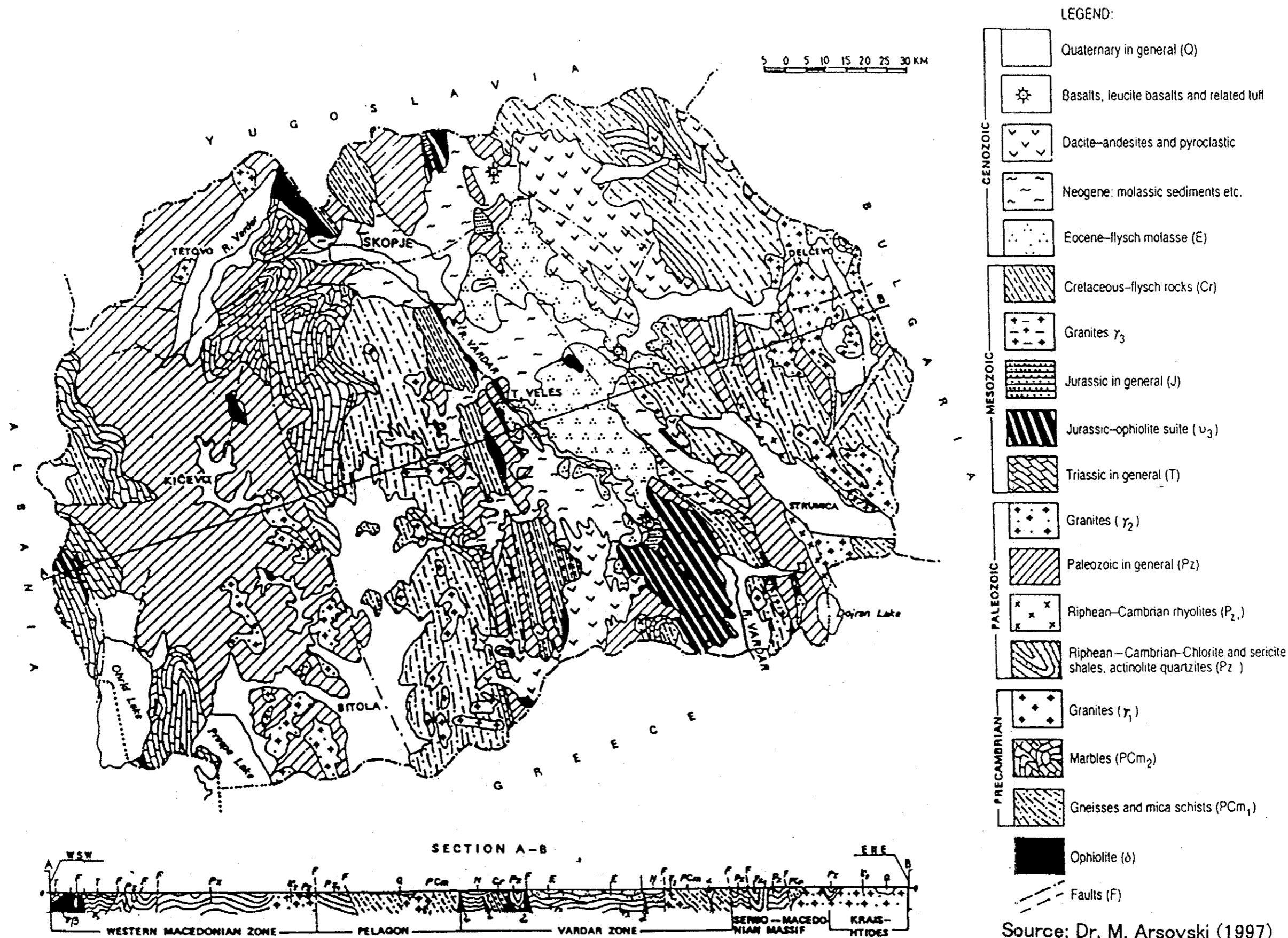


Figure B.37 Geological Map of Macedonia

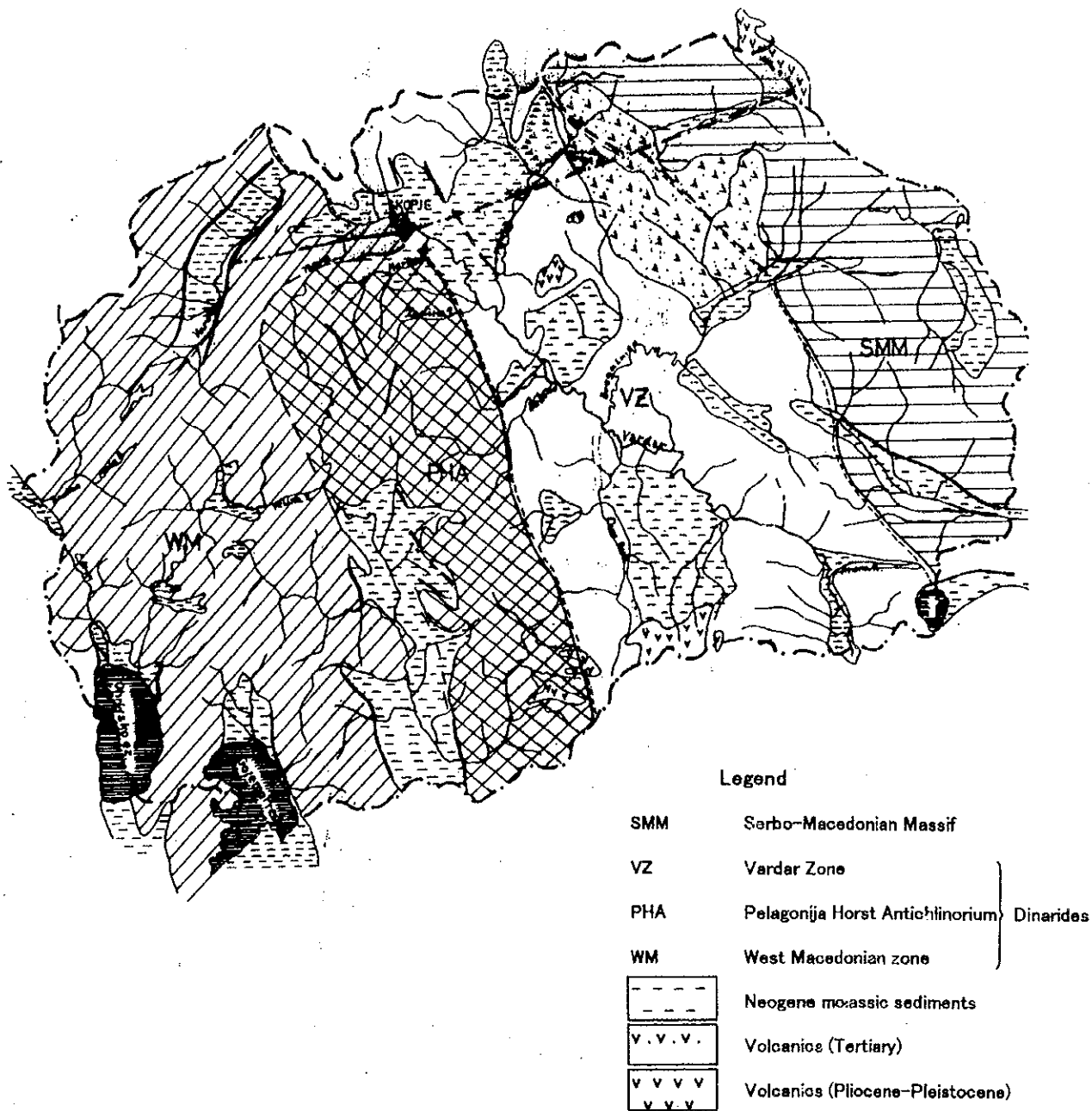


Figure B.38 Tectonic Map of Macedonia

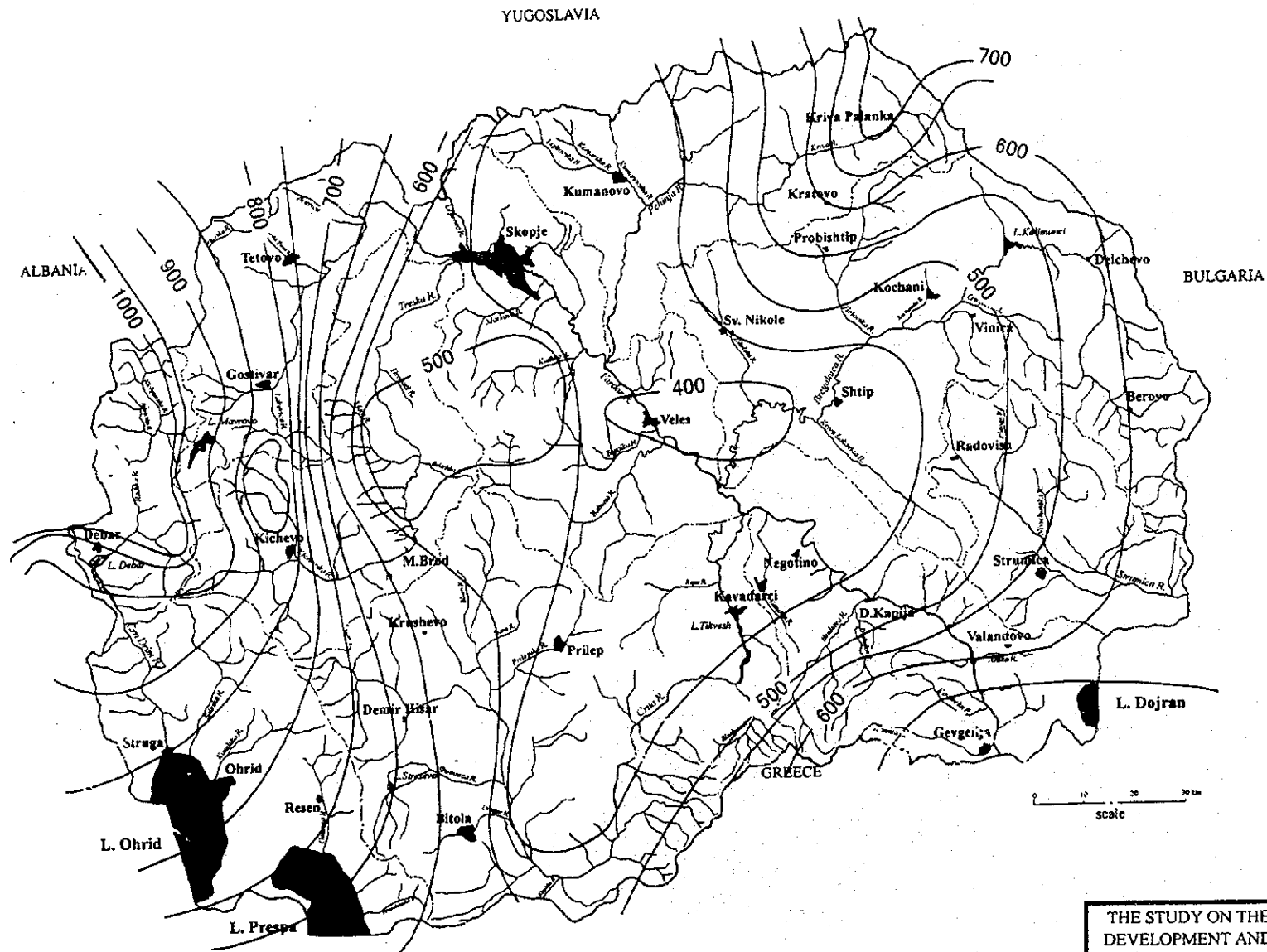
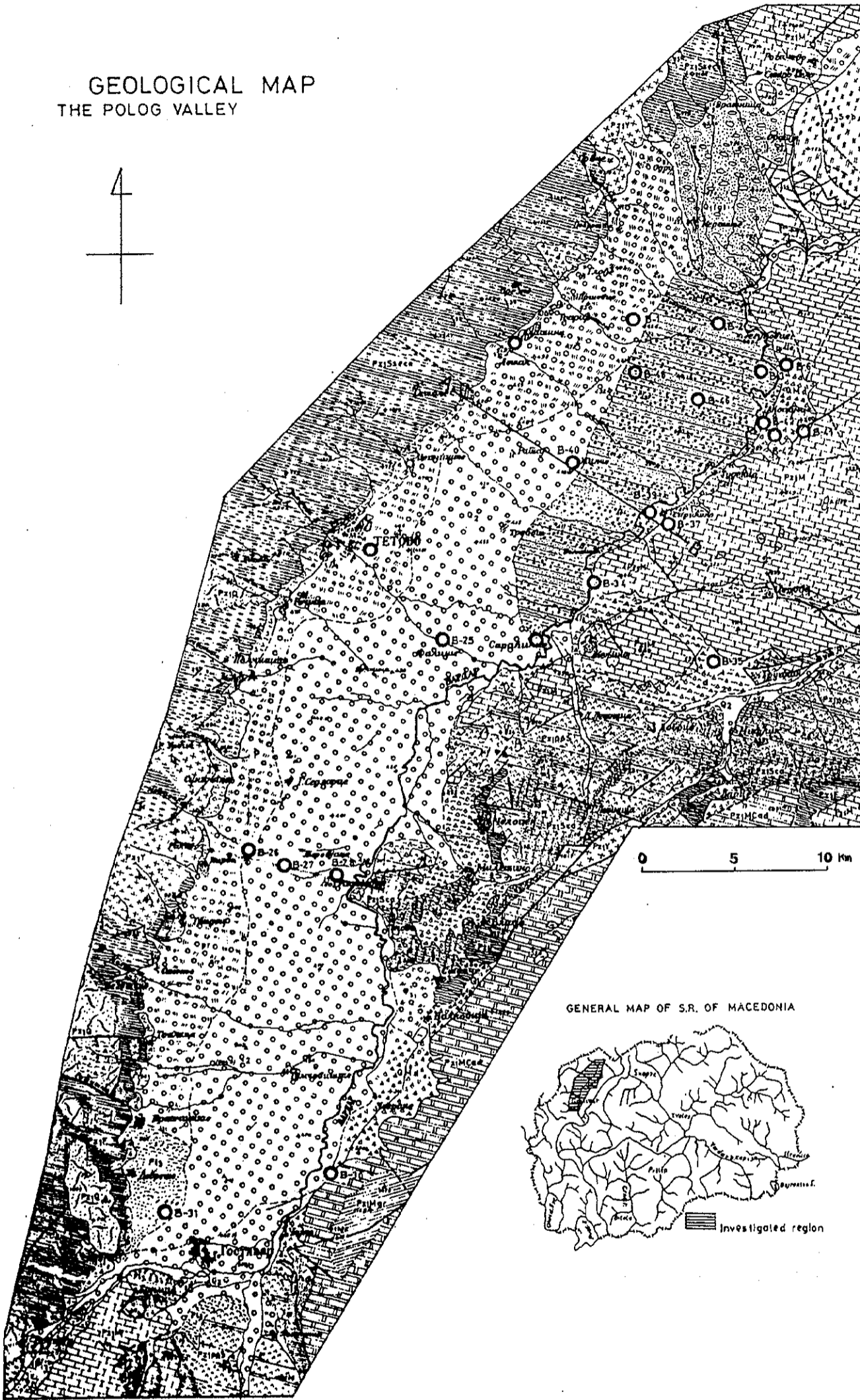
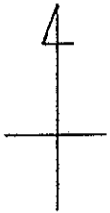


Figure B.39 Isohyetal Map of Macedonia (1961-1996)

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GEOLOGICAL MAP
THE POLOG VALLEY



LEGEND

- Aluvijalni naslagi
Aluvial deposits
- Mermerna drobina i breči
Marble detritus and breccia
- Proluvijalni naslagi
Proluvium deposits
- Detuvijalni naslagi
Detuvial deposits
- Mermerna drobina i ivernica vo vrtadi i slični karstni vdabnaini-Marble detritus with terra rossa situated in funnel shaped or similar depressions in karst
- Fluvio-glacijalni naslagi
Fluvio-glacial deposits
- Mermerni breči i konglomerati
Marble breccia and conglomerates
- Braonkasti crveni i žolti glini mnagu retko prostoeni so žakal-Clays, brownish, red and yellow rarely striped with gravel
- Čakalesti i pesoklivi naslagi prostoeni so glini
Gravelly sandy deposits banded with clay
- Peridotiti, pirokseniti i serpentinili
Peridotites piroksenites and serpentinites
- Kataklazirani graniti
Granites cataclazed
- Kvarcni škrlci i kvarciti
Quartz schists and quartzites
- Raznorazni zeleni škrlci: sericitski, hloritsko-sericitski, epidotski, amfibolski, grafitični i slični varieteti-Green schists differently coloured
- Mermeri
Marbles
- Karbonatni škrlci
Carbonate schists
- Metamorfisani dijabazi i raznorazni škrlci
Metamorphosed diabases and other schists
- Grafitični mermeri i karbonatni škrlci
Graphitic marbles and carbonate schists
- Sivo-beli mermeri mermerizirani varovnici kristalesti dolomiti
Marbles marbleized and crystalline dolomites
- Metamorfisani kvarc-porfiri
Metamorphosed quartz porphyries
- Filitoidi: filiti, argilofiliti, argilošisti i hloritsko-sericitski škrlci
Phyllitoides: argillophyllites a.o.
- Normalna granica a) utvrđena b) pretpostavljena
Normal boundary a) observed b) probable
- Granica na postupnoj prelazi
Boundary of gradual transition
- Elementi pada na sloji i foliacija
Dip. element of layer and foliation
- Rasedi a) utvrđeni b) pretpostavjeni
Fault a) observed b) probable
- Naviaki a) utvrđeni b) pretpostavjeni
Scale a) observed b) probable
- Osa na antiklinala i osa na sinklinala
Anticlinal axis and synclinal axis
- Istražni dupnatini
Exploratory bore holes
- Profilski linii
Profile lines

GENERAL MAP OF S.R. OF MACEDONIA

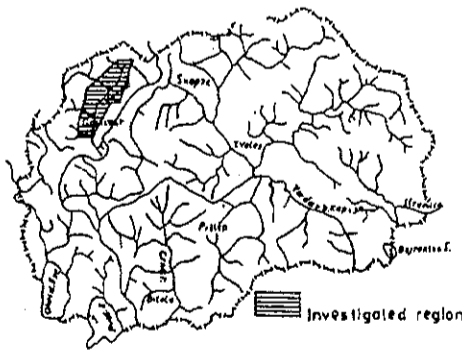


Figure B.40 Geological Map of Polog Valley

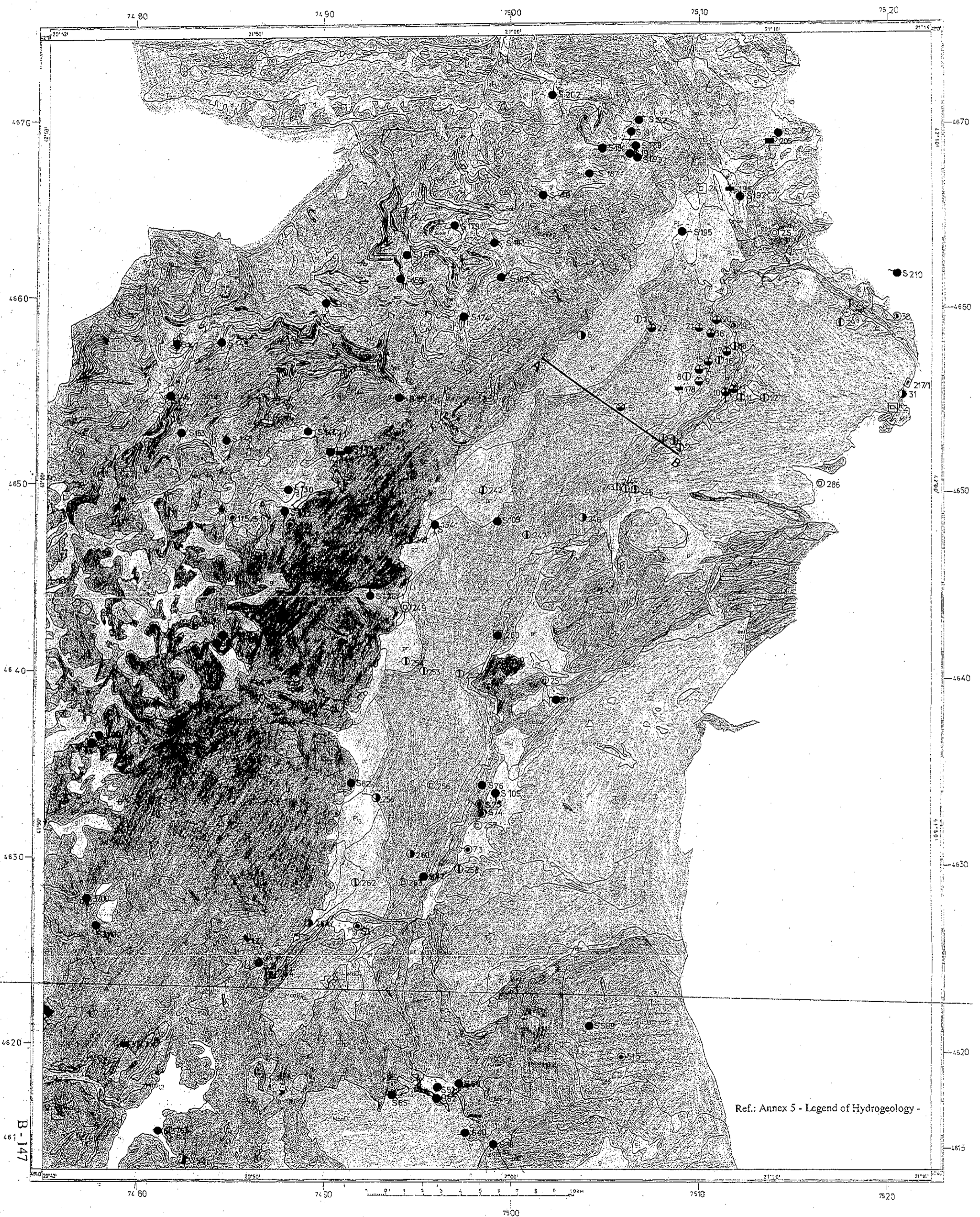


Figure B.41 Hydrogeological Map of Polog Valley

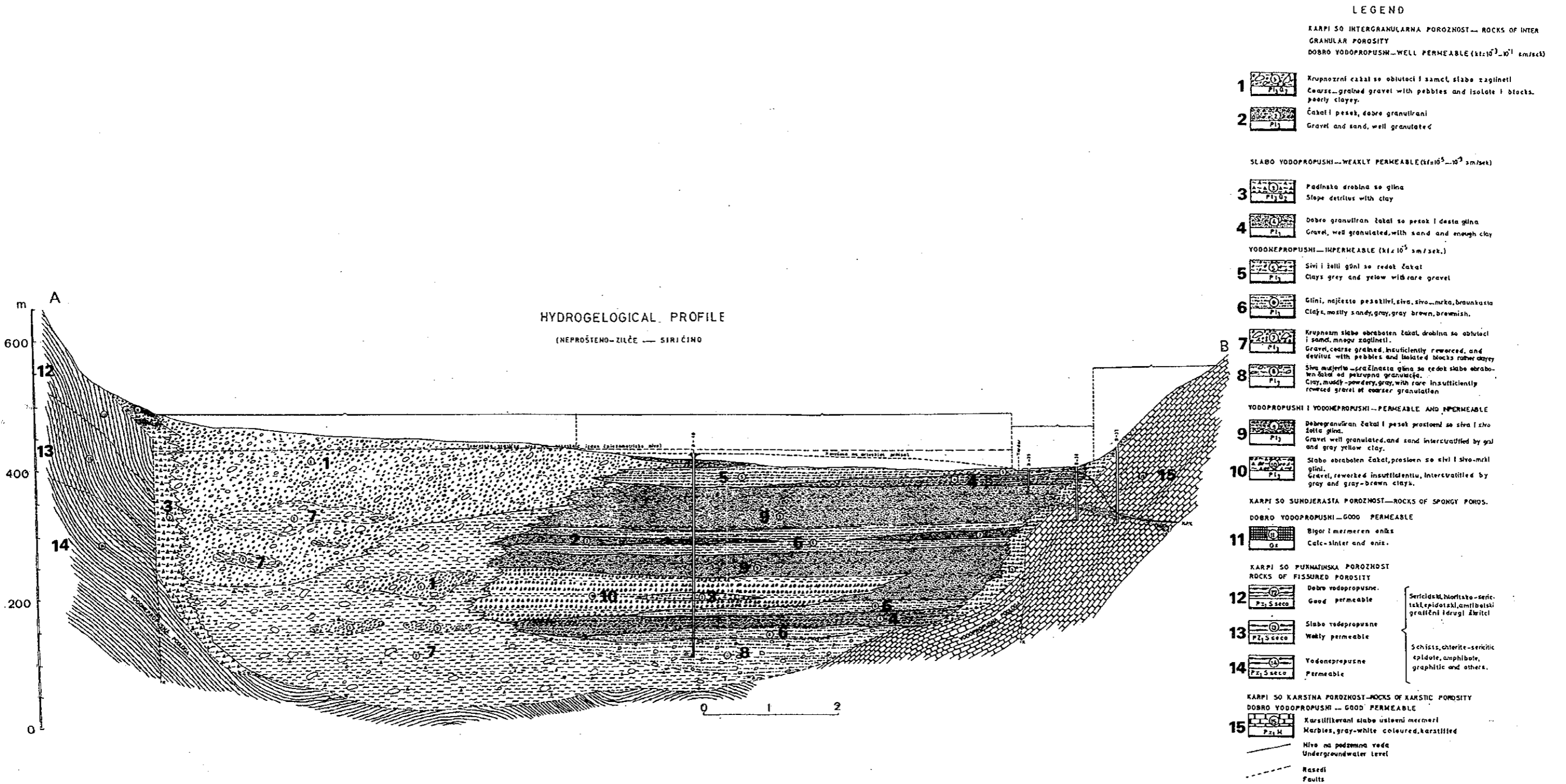
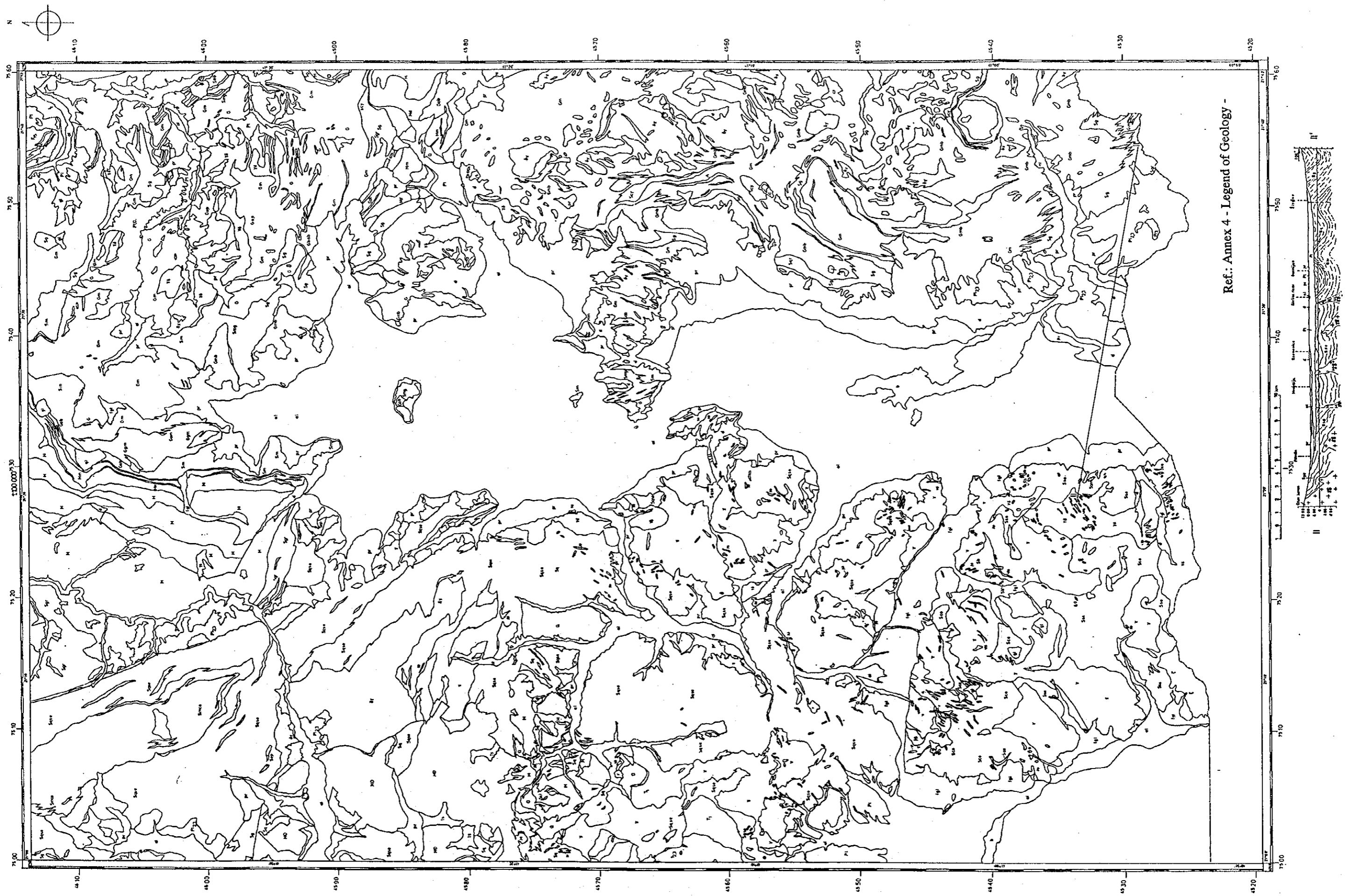


Figure B.42 Hydrogeological Cross Section of Polog Valley



Ref.: Annex 4 - Legend of Geology -

Figure B.43 Geological Map of Pelagonija Valley