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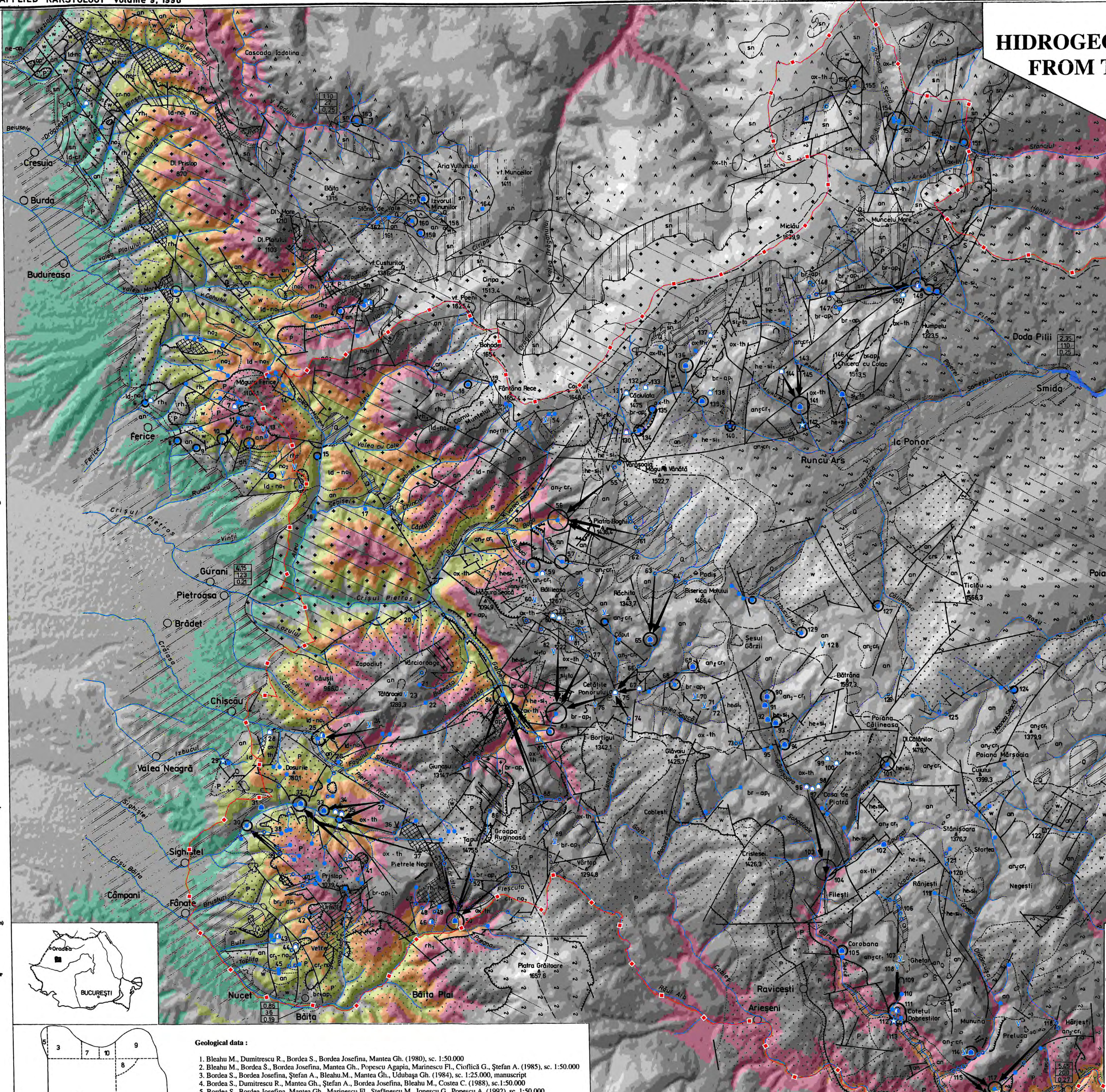
IANCU ORĂŞEANU

HIDROGEOLOGICAL MAP OF THE KARST AREAS FROM THE BIHOR VLĂDEASA MOUNTAINS


0 1 2 3 km
Cascada Iadolina
Beiuşele
Cresuia
Burda
Budureasa
Dl. Prislop 870
Băiţa 1315
Aria Vulturului
vf. Muncelor 1411
Izvorul Minunilor
Stâna de Vale
Dl. Mare 1210
Dl. Plaiului 1103
vf. Custurilor 1386
Ciripa 1513,4
vf. Poeni 1825,4
Bohodei 1654
Fântâna Rece 1652,4
Cornul 1648,4
Miclău 1639,9
Muncelu Mare
Humpelu 1323,5
Chicera cu Colac 1513,5
Căciulata 1475
Vărăşoaia
Măgura Vânătă 1522,7
Runcu Ars
Ic Ponor
Doda Pilii
Smida
Răchiţele
Măgura Ferice 1106,1
Ferice
Gurani
Pietroasa
Brădet
Chişcău
Valea Neagră
Sighiştel
Câmpani
Fânaţe
Nucet
Băiţa
Băiţa Plai
Căuşii 966,0
Tătăroaia 1289,3
Dosurile 780,1
Prislop 1039,4
Pietrele Negre
Giuaşu 1314,7
Tapul 1475,5
Groapa Ruginoasă
Piatra Boghii 1436,4
Padiş
Răchita 1343,7
Bălileasa 1267
Măgura Seacă 1094,9
Căput
Cetăţile Ponorului
Bortigul 1342,1
Glăvoiu 1425,7
Vârtop 1294,8
Piatra Grăitoare 1657,6
Biserica Moţului 1466,4
Şesul Gârzii
Bătrâna 1597,3
Ticlău 1566,3
Poiana Călineasa
Dl. Cătânilor 1479,7
Poiana Mărşoaia
Cujului 1399,3
Cristesei 1426,3
Casa de Piatră
Coblesti
Stânişoara 1376,7
Rânjeşti
Fileşti
Negeşti
Corobana
Ghetar
Coteţul Dobreştilor
Muntuna
Preluca
Ravicesti
Arieşeni
Gârda de Sus
Scărişoara
Hârjeşti
Poiana Horea
Crişul Pietros
Someşul Cald
Râul Alb
Arieşul Mare
1,10 27 0,25
2,35 110 0,25
4,15 123 0,21
1,69 83 0,28
0,86 36 0,19
5,45 200 0,27
Oradea
BUCUREŞTI
1 2 3 4 5 6 7 8 9 10

Legend of the numbers on the map
In brackets, altitude of the points in meters a.s.l.

Hydrographic basin of Crişul Negru river

1. Cornilor Cave (375 m) and spring (370 m)
2. Groşi spring (1000 m)
3. Spring of Coasta Rea (425 m)
4. Spring of Cociu bridge (710 m)
5. "La trei izvoare" Cuciului cave and spring (870 m)
6. Ferice spring (360 m) and cave (370 m)
7. Peştera Vacii cave (892 m)
8. Cornilor spring (425 m)
9. Topliţa spring (475 m)
10. Cerbasca spring (570 m)
11. Ponor of Groapa Budeştilor (875 m)
12. Ponor (820 m) and spring (600 m) of Troscău stream
13. Pothole (860 m) and ponor (800 m) of Socei
14. Puşului spring (675 m)
15. Berbecul spring (485 m)
16. Spring of Aleu-Sebişel confluence (435 m)
17. Ciurgău spring (545 m)
18. Aleu spring (under Cornu Muntelui, 1125m)
19. Spring of Valea Popii stream (1300 m)
20. Ulmului spring (575 m)
21. Bonciului spring (1140 m)
22. "La scoici" spring (1000 m)
23. Pothole of Tătăroaia (1250 m)
24. "Gaura care suflă" (Petit Tibi) pothole (960 m) and IPEG entrance mining gallery
25. Spring of Giuleşti (505 m) and Micula cave (510 m)
26. Valea Prelucilor IPEG mining gallery (620 m)
27. Losses of Pietrile Roşii stream (800 m)
28. Peştera Urşilor cave of Chişcău (440 m)
29. Warm spring and Cold spring of Valea Neagră ("Sapte izvoare", 375 m)
30. Hidrei spring (390 m)
31. Camenita cave (410 m)
32. Blidaru spring (Răsuflătoarea Blidarului cave, 435 m)
33. Pişolca cave (500 m)
34. Măgura cave (565 m)
35. Coliboaia cave (550 m) and spring (515 m)
36. Secătura pothole (930 m) and losses of Secătura stream (925 m)
37. Pothole of Dosul Muncelului (1100 m)
38. Losses of Sodolul Pietrei stream (550 m)
39. Losses of Sodolul Tomeştilor stream (550 m)
40. Losses of Crăciune stream (880 m)
41. Losses of Preluca Neşului stream (815 m)
42. Losses of Sodolul Gheţarului stream (740 m)
43. Cave (500 m) and spring of Fînaţe (450 m)
44. Secătura cave (610 m)
45. Springs of Topliţa stream (525 m)
46. Poarta Bihorului cave (640 m)
47. Losses of Hoanca Codreanului stream (850 m)
48. Losses of Coşuri stream (750 m)
49. Elena pothole (845 m)
50. Crişului spring (700 m)
51. Losses of Corlatul stream (1040 m)
52. Losses of Corlăţelul stream (1150 m)
53. Losses of Fleşcuţa stream (1150 m)
54. Adrian pothole(Valea Rea, 1275 m)
55. Ponor of Vărăşoaia (1290 m) and V5 (Faţa Muncelului) pothole (1400 m)
56. Boga springs (675 m)
57. Oşelu spring (910 m)
58. Bulbuci spring (900 m)
59. Fântâna Roşie spring (975 m) and cave (985 m)
60. Pothole of Plaiului stream springs (1060 m)
61. Ponor of Cuţilor stream (1260 m)
62. Ponor of Rengle stream (1235 m)
63. Ponor of Arsurii stream (1245 m)
64. Ponor of Trângheşti stream (1270 m)
65. Spring of Poiana Ponor (1100 m)
66. Ponor of Poiana Ponor (1060 m)
67. Peştera de la Căput cave (1051 m)
68. Izvorul Rece spring (1075 m)
69. Izbucul Ursului spring (1095 m)
70. Gemănata pothole (1200 m)
71. Avenul Negru pothole(1220 m)
72. Losses of Părăul Sec stream (1205 m)
73. Ponors of Iezere (1266 m)
74. Losses of Barsa Cohanului stream (1090 m)
75. Cetăţile Ponorului (950 m)
76. Gheţarul Borţigul pothole(1200 m)
77. Ştevia Lupil ponor (1125 m)
78. Groapa de la Barsa (1100–1150 m)
79. Gheţarul de la Barsa cave (1125 m)
80. Cave of Zăpodie (1100 m)
81. Peştera Neagră cave (1100 m)
82. Gheţarul Focul Viu (1170 m)
83. Galbenei spring (815 m)
84. Păuleasa spring (570 m)
85. Losses of Ţiganului stream (820 m)
86. Losses of Valea Seacă stream (1100 m)
87. Losses of Lunceşoara stream (700 m)
88. Losses of Crişanul stream (975 m)
89. Pothole of Hoanca Urzicarului (1165 m)

Hydrographic basin of Arieş river

90. Gura Apei spring (1125 m)
91. Peştra cu Apă din Faţa Bălăcenii cave (1115 m)
92. Şura Popii cave (1105 m)
93. Cave of Apa din Piatră (1100 m)
94. Spring of Coliba Chiobului (1100 m)
95. Fântâna Tâlharului spring (1210 m) and spring of Poiana Gîrdişoara (1145 m)
96. Coiba Mică cave (1015 m)
97. Coiba Mare cave (1030 m)
98. Gheţarul de la Vîrtop (1150 m)
99. Peştera de după Deluţ cave (1270 m)
100. Orbului cave (1260 m)
101. Vulturului spring (1040 m)
102. Peştera cu Apă cave of Brusturi stream (1095 m)
103. Hodobana cave (1000 m)
104. Tăuz spring (850 m)
105. Corobana cave (800 m)
106. Losses of Ocoale stream (1170 m)
107. Pothole of Şesuri (1134 m)
108. Gheţarul de la Scărişoara (1175 m)
109. Pojarul Poliţei cave (970 m)
110. Poliţei spring (920 m)
111. Spring of Coteţul Dobreştilor (770 m)
112. Warm spring of Coteţul Dobreştilor (Feredeu, 757 m)
113. Morii spring (760 m)
114. Zgurăşti pothole (880 m) and Poarta lui Ioanel spring (810 m)
115. Losses of Ordincuşa stream (745 m)
116. Izbucul Mic spring (730 m)
117. Izbucul Mare spring (725 m)
118. Ponor of Pleşa stream (875 m
119. Iapa spring (1205 m)
120. Gheţarului spring (1195 m)
121. Ponors of Stînişoara (1230 m, 1250 m)
122. Dîrnini cave (1260 m)

Hydrographic basin of Someşul Cald river

123. Apa Caldă spring (1120 m)
124. Spring of Hoanca Seacă (1150 m)
125. Losses of Beliş stream (1220–1160m)
126. Ponor of Călineasa (1305 m)
127. Călineasa spring (1170 m)
128. Pothole of Bătrîna Mountain (1485 m)
129. Izbucul Mic spring (1255 m)
130. Cetăţile Rădesei (1280 m)
131. Ponorul din Cuciulata cave (1400 m)
132. Pothole of Cuciulata (1400 m)
133. Fisura Neagră cave (1327 m)
134. Moloh spring (1210 m)
135. Izbucul cu Cascadă spring (1200 m)
136. Alunul Mare spring (1180 m)
137. Cerbului cave (1300 m)
138. Colţului cave (1260 m)
139. Peştera Pepii cave (1125 m)
140. Spring of Someşul Cald–Părăul Sec confluence (1095 m)
141. Alunul Mic spring (1100 m)
142. Warm spring of Alunul Mic stream (1065 m)
143. Ponor of Ponor stream(1130 m)
144. Diaclază cave (1235 m)
145. Lucii pothole (1140 m)
146. Poieniţa pothole (1395 m)
147. Ponor of Poiana Vîrtopului (1322 m)
148. Ponorul cu pod ponor (1315 m)
149. Şurile din Firea (1070 m)
150. Humpleu cave (1175 m)

Hydrographic basin of Crişul Repede river

151. Lespezi spring (950 m)
152. Răchiţele waterfall (1000 m)
153. Nimoioasa springs (1100 m)
154. Peştera cu Şase Intrări cave (1140 m)
155. Ponor and cave of Tău (1150 m)
156. Vărfuraşul spring and cave (1175 m)
157. Izvorul Minunilor spring (1150 m)
158. Brebu ponor (1200 m)
159. Rampei spring (1145 m)
160. Păstrăvăriei spring (1100 m)
161. Pavel spring (1085 m)
162. Radu spring (1085 m)
163. Murgaşul spring (930 m)
164. Ariei spring (1325 m)

Geological data :

1. Bleahu M., Dumitrescu R., Bordea S., Bordea Josefina, Mantea Gh. (1980), sc. 1:50.000
2. Bleahu M., Bordea Ş., Bordea Josefina, Mantea Gh., Popescu Agapia, Marinescu Fl., Cioflică G., Ştefan A. (1985), sc. 1:50.000
3. Bordea S., Bordea Josefina, Ştefan A., Bleahu.M., Mantea Gh., Udubaşa Gh. (1984), sc. 1:25.000, manuscript
4. Bordea S., Dumitrescu R., Mantea Gh., Ştefan A., Bordea Josefina, Bleahu M., Costea C. (1988), sc.1:50.000
5. Bordea S., Bordea Josefina, Mantea Gh., Marinescu Fl., Ştefănescu M., Ionescu G., Popescu A. (1992), sc. 1:50.000
6. Dumitrescu R., Bleahu M., Lupu M. (1970), sc. 1:50.000
7. Istrate G. (1978), sc. 1:50.000
8. Mantea Gh. (1986), sc. 1:25.000
9. Mantea Gh., Ştefan A., Rusu A., Dumitrescu R. (1987), sc. 1:50.000
10. Ştefan A. (1980), sc. 1:50.000

L E G E N D

HYDROGEOLOGICAL CHARACTERISTICS OF THE MAIN FORMATIONS

□	Carbonate Mesozoic series (limestones, dolomites), highly fractured and karstified, characterised by very high effective infiltration and intensive groundwater flow. Numerous karst systems with various size and prevelant binary type. Spring flow rate up to 550 l/s. Important water resources in large karst systems.
+ a ^ b s c	Laramian magmatites (banatites: a-intrusives; b-volcanics) and metamorphites (c) with permeability of fissures with discontinuous distribution and intensity. The weathering zone is well developed and provide a continuous and important supply of rivers (memory effect is 55–120 days for 0.2) and of binary karst systems.
⁘	Prevalent detritic Permo-Mesozoic deposits (sandstones and conglomerates with argillaceous shales and rhyolites) with different permeability. The groundwater flow is mostly confined to the fissured areas. They act as an impervious barrier for karst water reservoirs and frequently form bedrock and/or the caprock for these.
▥	Senonian post-tectonic deposits (sandstones, conglomerates and less frequently argillaceous shales) with local extension in northern part of map area. Senonian reservoirs supply springs with discharge up to 3 l/s, and also, in north-east, subjacent karst reservoirs.
▩	Marly and argillaceous deposits, devoid of groundwater flow, and flysch-like series, including rock-complexes of variable permeability (marls, argillaceous shales, sandstones, limestones), hosting occasionally discontinuous aquifer accumulation occurring, in the more permeable terms.
▨	Pannonian–Quaternary deposits (marls, argillaceous shales, sands, gravels) hosting discontinuous water accumulations in the more permeable terms.

CORRELATION OF THE BIHOR UNIT AND THE UNITS OF THE CODRU NAPPES SYSTEM OF THE BIHOR VLĂDEASA MOUNTAINS

(compiled after BLEAHU *et al.*, 1981; BLEAHU *et al.*, 1985; BORDEA *et al.*,1988 and MANTEA *et al.*, 1987)

		BIHOR UNIT	CODRU NAPPES SYSTEM						
			Vălani Nappe	Gîrda Nappe	Ferice Nappe	Bătrînescu Nappe	Următ Nappe	Vetre Nappe	Arieşeni Nappe
CRETAC.	Aptian	Ecleja Form. Urgonian limestones	Urgonian limestones						
	Barremian								
	Hauterivian		- - - - - - -						
	Valanginian		limestones						
	Berriasian	- - - - - - -							
JURASSIC	Tithonic	darkish lms.	white & grey reef limestones				black & gray limestones (J3)		
	Kimmerid.	light-coloured reef massive lms.							
	Oxfordian								
	Callovian	limestones, marls, sandstones					black argillaceous shales & sandstones (Următ Form) (J1+J2)		
	Aalenian								
	Toarcian								
	Domerian								
	Carixian								
	Sinemurian								
	Hettangian	Gresten Form.	Coşuri Beds		ma-s.ss.lms (J1)				
TRIASSIC	Rhaetian		Carpth.K		Kössen Form. V.F. Form.		Kössen Form. Carpath.Keuper	Băiţa marble	
	Norian				V.F&C.Form. Codru Form.	white limestones		Frăsinel dolomites	
	Carnian	Scăriţa Form.	white dolom. limestones		black lms. with cherts (R.F.)				gray lms. & dolomitic limestones
	Ladinian	black limestones with cherts (R.F.)	black limestones with cherts(R.F.)			gray bedded limestones & lms.with cherts			
	Anisian	Zugăi Form. white dolomites black lms.	gray dolomites ss. & shales		gray dolomit. gray lms. ss.&dol.shales	black dolomites ss.&dol.shales			black dolomites.
	Werfenian	Werfen Form.	WerfenForm	Werfen Form	Werfen Form.	Werfen Form.			Werfen Form.
PERMIAN		breccia, rhyolites	breccia rhyolites	breccia, argill. shales, rhyolite	sandstones argill. shales	argill. shales rhyolites			ss,argil.shales rhyolites
CARBONIFER									
DEVONIAN									
SILURIAN									chloritic shale
ORDOVICIAN									
CAMBRIAN		Arada Series							
VENDIAN		Someş Series							

Carpathian Keuper - argillaceous shales and marls with gray dolomites; **Codru Formation** - argillaceous shales, breccias, limestones; **Coşuri Beds** - ortoquartzites, sandstones and argillaceous shales in pyrometamorphic facies; **Ecleja Formation** - marls, sandstones, limestones; **Gresten Formation** - quartzitic sandstones and conglomerates, argillaceous shales. limestones; **Kössen Formation** - limestones, black marly shales; **R.F.** - Roşia Formation; **Scăriţa Formation** - limestones, argillaceous shales, breccias; **Valea Frunzii Formation** - magnesian limestones, sandstones, conglomerates, black marly shales; **Zugăi Formation** - breccias, argillaceous shales, limestones, quartzitic sandstones; **Werfen Formation** - ortoquartzites, quartzitic conglomerates, argillaceous shales; **lms** - limestones; **dol** - dolomites; **ss** - sandstones; **ma-s** - marly argillaceous shales.
- - - - - - bauxites.

EXPLANATION OF LINES AND SYMBOLS USED IN THE CENTRAL MAP

-·-·-·-	Geological boundary
———	Geological boundary of magmatites
━━ ━	Fault
┷┷┷┷	Overthrust front
———	Course of perennial stream
— — —	Course of temporary stream
—— ——	Watershed
5,45 200 0,27	River gauging station with mean discharge in m^3/s (top), surface water catchment area in square kilometres (middle) and base flow index (bottom)
- - - - - - -	Cave passage
⬭	Karst depression
⌒⌒	Abrupt
	Selected gas leaks associated with:
★	- cold springs:
☆	- subthermal springs
➡	Proved groundwater flow direction
⎍	Mine gallery

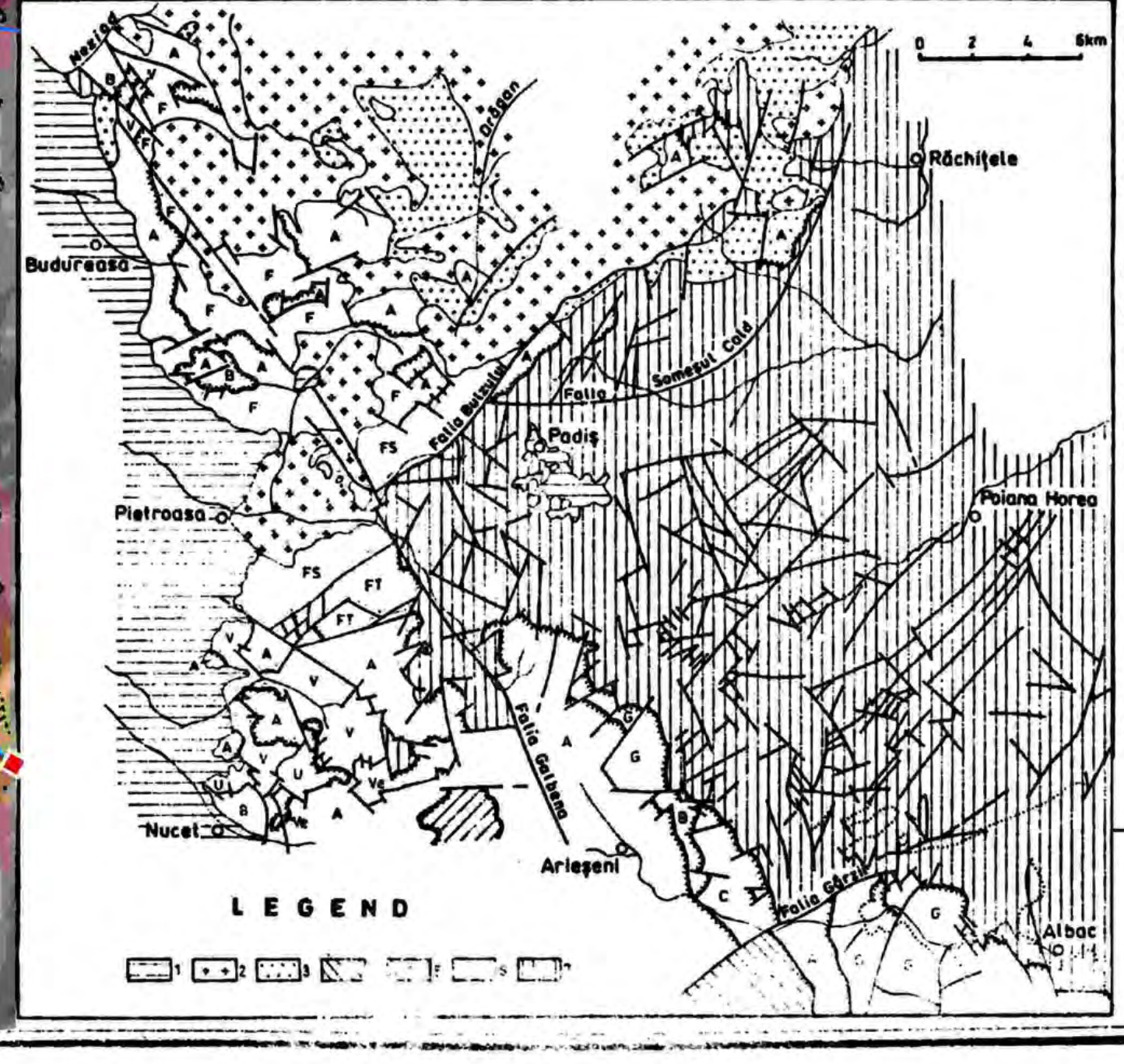
HYDROLOGIC FEATURES OF KARST CAVITIES

Hydrologic regime of cavity entrance / Cavity	Perennial		Temporary		Absent	
	Source	Ponor	Source	Ponor	Tapping an underground stream	Fossil cavity
Cave	▮	∩	◧	⋂	∩	∩
Pothole	▽	▽	▼	▼	V	V
Impenetrable	•	○				

MEAN ANNUAL DISCHARGE OF THE SPRINGS (l/s)

(Hydrologic year X.1984–IX.1985)

under 1	1–10	10–50	50–100	100–300	300–600
•	◉	⊙	⊙	⊙	⊙


0 2 4 6km
Răchiţele
Budureasa
Pietroasa
Padiş
Poiana Horea
Nucet
Arieşeni
Albac
Someşul Cald
Falia Galbena
LEGEND
1 2 3 4 5 6 7

Structural map of the Bihor Vlădeasa Mountains
after geological maps of Romania, scale 1:50.000, edited by the Geological Institute of Romania

Legend: 1-Neogene sedimentary cover; 2-Banatitic magmatites; 3- Senonian; 4-Muncel–Lupşa Nappe; 5-Biharia Nappe; 6-Codru Nappe system; 7-Bihor Unit.

— ■ — Limita Parcului natural Apuseni

3D Projection, Anca Ardelean, Parcul natural Apuseni