

FIELD EXCURSION

**Special Meeting
of the IAH Council**

**held at Stâna de Vale,
România**

23-28 May 2002



ASOCIAȚIA HIDROGEOLOGILOR DIN ROMÂNIA
ASSOCIATION ROUMAINE DES HYDROGEOLOGUES
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Edited by *Romanian Association of Hydrogeologists*
Sponsored by *European Drinks*

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NOTE: Guide of field excursions 2 and 3 is a compilation of several texts and figures published by various authors either as independent articles or as a part of other field guides. A list of references used in this compilation is available at the end of this booklet.

PADIȘ - CETĂȚILE PONORULUI CLOSED CATCHMENT BASIN

Padiș - Cetățile Ponorului closed catchment basin (Figure 4, after Oraseanu, 1996) has an area of 37,2 km² and is surrounded by a continuous ridges depriving it from a surface hydrologic relation with the neighboring basins. Hydrologically, however, it belongs to the Crișul Negru basin, fact established by tracer labelings.

The genesis of the basin is closely linked to the geological constitution of the area and to the alternance of karstifiable and nonkarstifiable deposits. The mainly detritic Werfenian deposits from Măgura Vânăta mountain, the Permian ones from the Borțigu - Glăvoiu summit, and the Lower Jurassic ones from the Bulz - Valea Seacă stream alignment favor the organization of the surface drainage, in permanent (Cuților, Renghii, Arsurii, Tringhești, Pârâul Sec and Pârâul Ursului streams) or temporary streams supplied by water from precipitations. The surface flow is abandoned for alternative underground paths when entering carbonate terrains. The numerous karst catchment phenomena led to the fragmentation of the surface drainage and of the relief.

In the Padiș-Cetățile Ponorului area, nine closed catchment sub-basins were delimited: Vărășoaia (0,92 km²), Padiș (15.2 km²), Bălileasa (1.6 km²), Groapa de la Barsa (2.6 km²), divided in two zones: Poiana Zăpodiei to the north and Ștevia Lupii to the south, Cetăților Valley (3.37 km²), Barsa Cohanului (1.1 km²), Paragina (2.65 km²), Lumea Pierdută (7.7 km²), and Poiana Ponor (2.06 km²).

Tracer labelings established the underground flows from Vărășoaia and from the northern half of Padiș basin towards Boga spring (Orășeanu et al., 1991).



Photo 1 - Portal of Cetățile Ponorului



Photo 2 - Galbena river downstream of Galbena spring

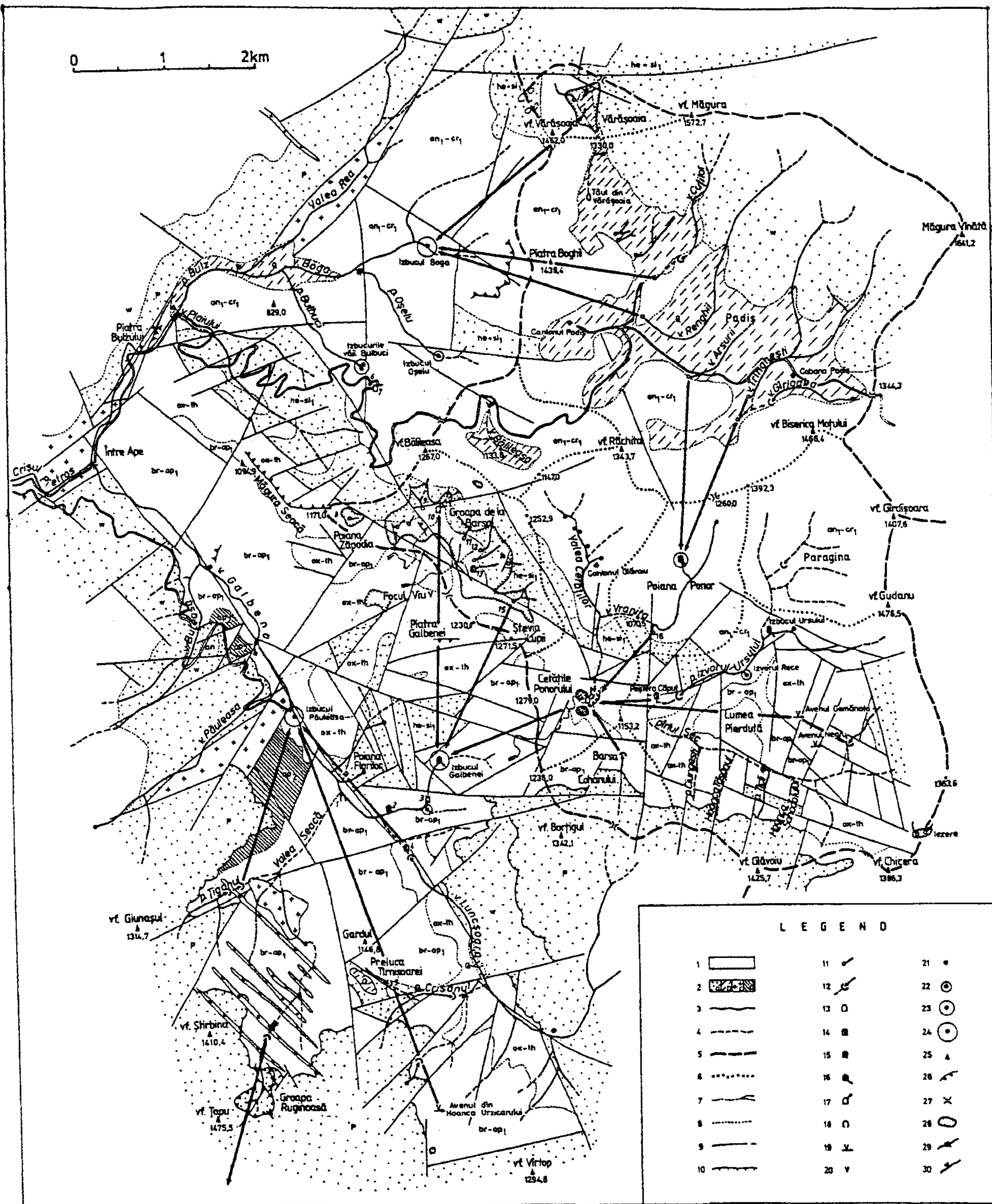


Figure 4 **Hydrogeological Map of Padiș-Valea Galbenă area (after I. Orășeanu, 1996).**

Legend: 1-Carbonate deposits; 2-Non-carbonate deposits: a-sandstones, conglomerates, shales; b-sands, gravels, clays; c-granodiorites; d-marls; ...

Key of the numbers on the map: 1-Peștera Seacă cave, 2- Peștera cu Apă cave; 3-Tunnel of Galbena river; 4-Inflow cave in Luncșoara brook; 5-Losses of Crișanu brook; 6-Fântâna Rece spring; 7-Cave of Fântâna Rece; 8-Ponor of Zăpodie glade; 9- Ponor of Zăpodie valley; 10-Ghețarul de la Barsa cave and ponor; 11-Ponor of Tăul Negru; 12- "D" ponor of Groapa de la Barsa; 13-Peștera Neagră cave; 14-Ponorul Argilei ponor; 15-Ponor of Stevia Lupii; 16-Ponor of Poiana Ponor.

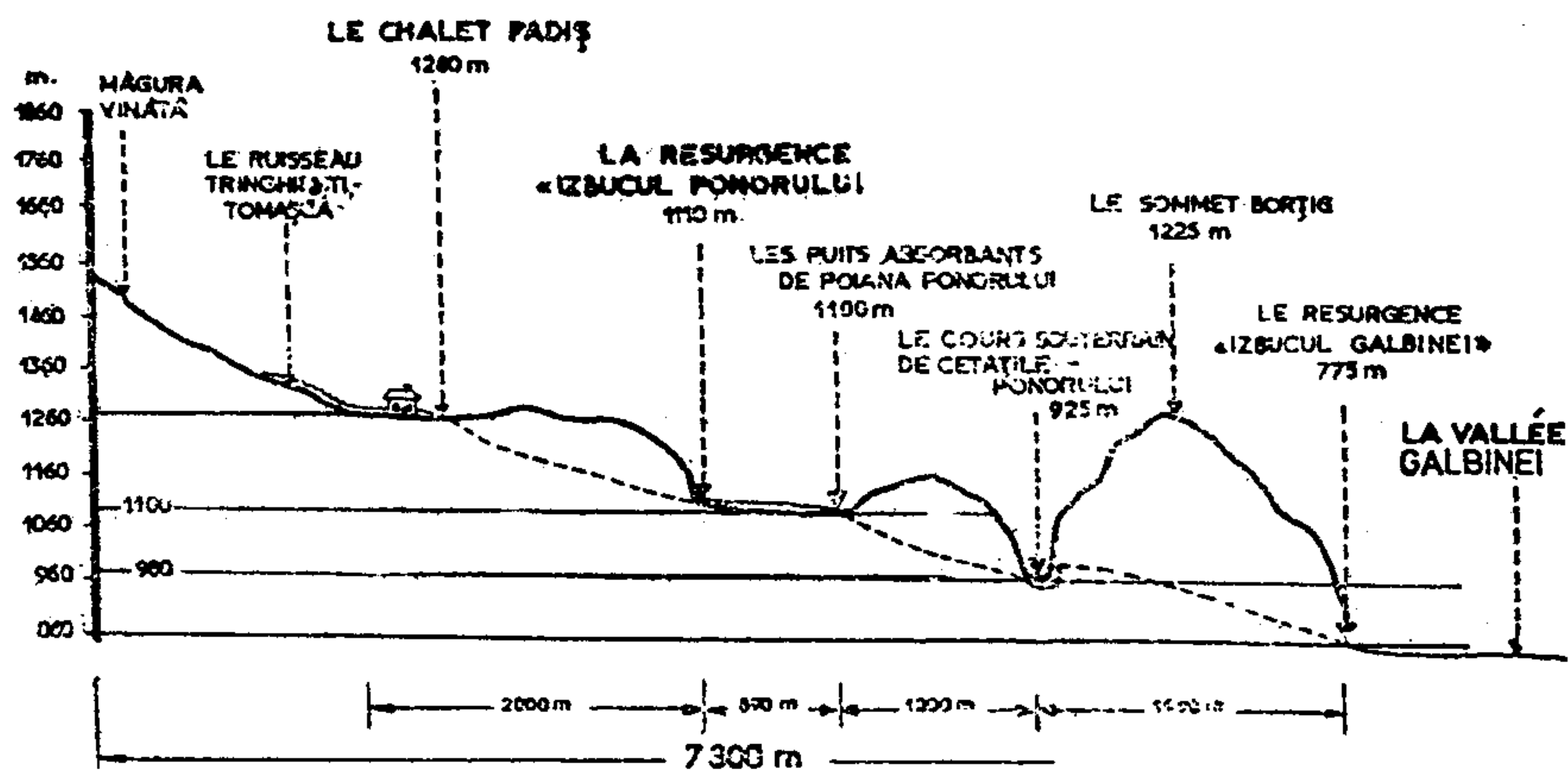


Figure 5. Cross section between Măgura Vânăta hill and Galbena valley (after Viehmann, 1966)

The surface waters from the southern half of the Padiș sub-basin are drained in a first stage to the spring in Poiana Ponor, wherefrom they take another 500 m long surface course. They sink again into an impenetrable swallet and emerge shortly afterwards in the outlet close to the entrance in Cetățile Ponorului cave, where they continue their underground course until Galbena spring (Figure 5) (Viehmann, 1966).

Cetățile Ponorului

Cetățile Ponorului is located at an elevation of 1240 m asl, at the border of the Padiș closed catchment basin. They are the most remarkable karst feature not only in Apuseni Mountains, but also in Romania. They consists of three large “collapse dolines” in a large forested depression 300 m deep and more than 1 km in diameter at the upper part. The continuous ridges circling the depression are cut only by the Cetăților Valley canyon (Bleahu & Bordea, 1981).

The three “dolines”, of which the left is 158 m deep, are connected by a descending underground passage and by a “window” to the underground river that starts at the portal of the Central Doline (Figure 6 and 7).

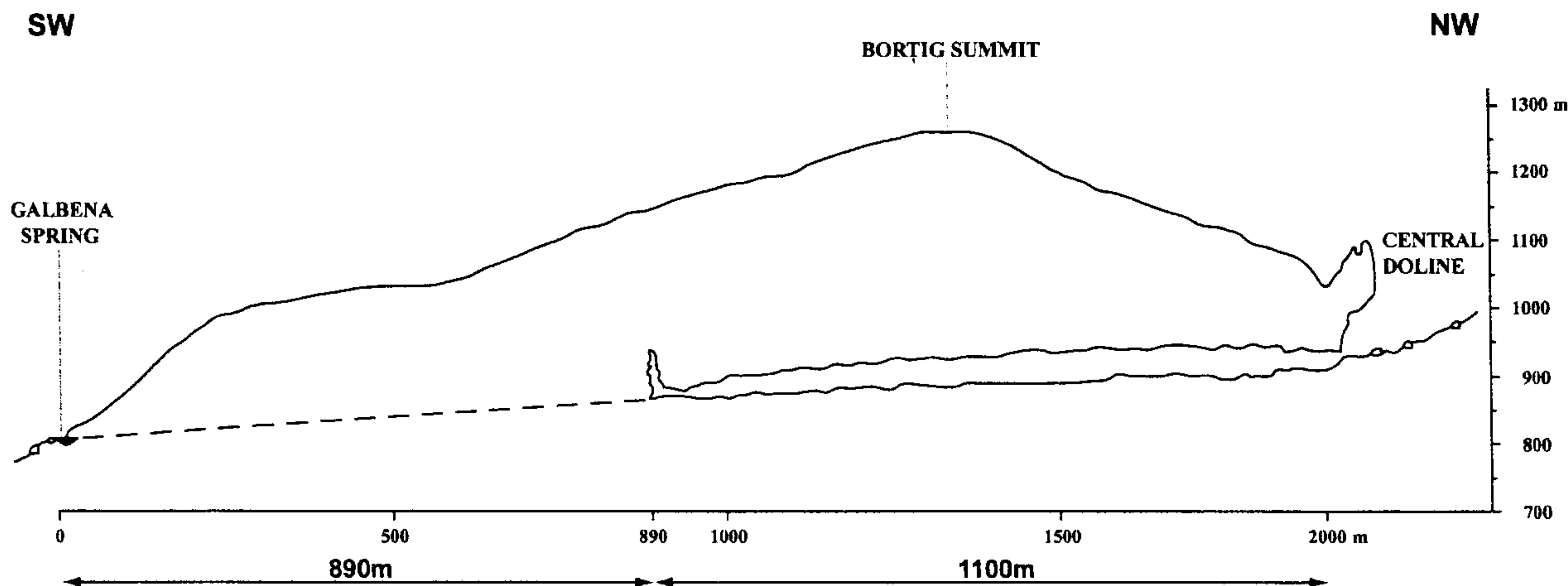


Figure 6. Cross section in Bortig limestone massif which hosted the Cetatile Ponorului Cave (after T. Rusu, in I. Viehman et al., 1980)

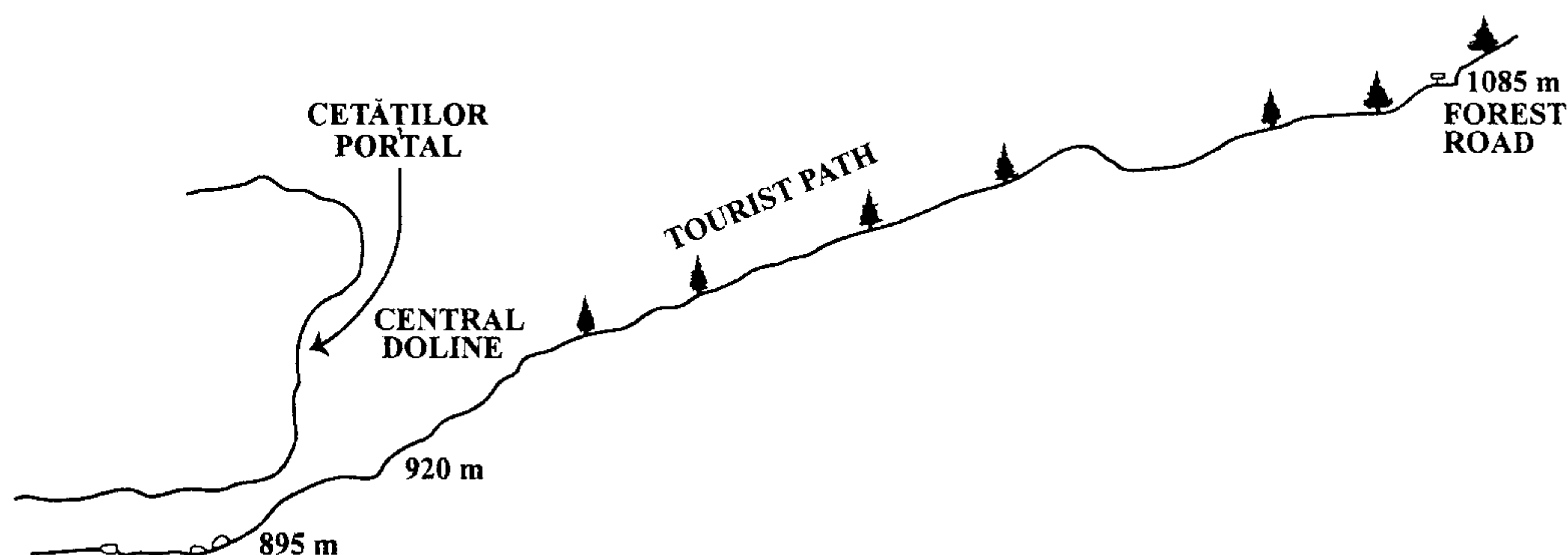


Figure 7. Cross section in Cetatilor Valley, Central Doline and entrance in underground (after I. Viehman et al., 1980)

The cave river comes from a neighboring cave, 2 km away (Căput Cave, Figure 4) as well as from the surface of the karst plateau. The Cetăților creek occasionally contributes with water in spring (snow melting) and after heavy rains. It joins the cave river through the central portal.

The access underground is possible through the portal of the central doline or by a passage from the left doline, which descends 70 m to the cave river.

The underground river from Cetățile Ponorului karstic complex has 2.5 km in length, of which are known and have been surveyed approximately half (Figure 8). The known sector ends with a sump lake filled with several levels of fir tree trunks brought by the underground stream.

The morphology of the underground passage is the second spectacular feature of the Complex:

- the average passage width is 10 m;
- the record passage height is 90 m and 110 m above the terminal sump;
- the cave river forms 19 lakes on its way to the sump;
- the cave river reappears at day through Galbena spring, forming the renown Galbena Valley.

The three “dolines” are not strict sense dolines, and the term is only conventionally used; they have the shapes of giant buckets with U profile.

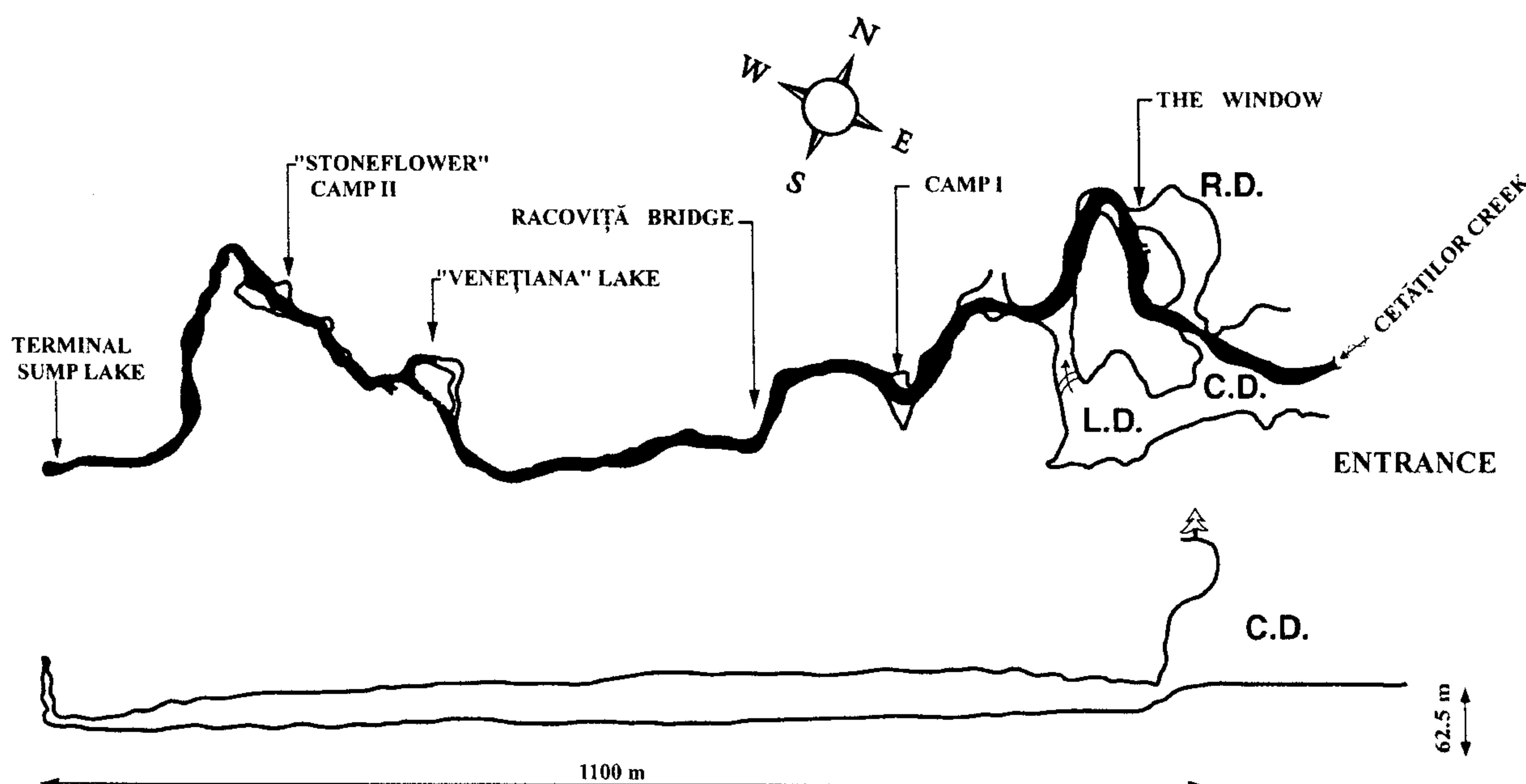


Figure 8. Map and cross section in Cetatile Ponorului (After I. Viehman et al, 1980)

The cave river passage is accessible for tourists on its first 0.5 km, after which follow the waterfalls and the lakes; the exploration thereafter is possible on tyrolean traverses, with boats or in neoprene suits.

The dolines have been known since the beginning of this century. The cave exploration started in the fifties and the present terminus was reached in 1970 by an expedition of the "Emil Racoviță" Speleological Institute in Cluj and then by the French Speleo Expeditions (1972-73). A similar karst phenomenon can be seen in Slovenia at Skocjanska jama.

Galbenei spring also drains Groapa de la Barsa sub-basin, as well as Barsa Cohanului and the diffuse losses from the upper course of the Pârâul Sec stream (Orășeanu et al., 1991). Lumea Pierdută sub-basin is drained by the Izvorul Rece spring, and Paragina sub-basin, by Izbucul Ursului spring, both situated in the basin of Izvorul Ursului stream which sinks in Căput cave. The mean annual flow rate of the Galbenei spring in the hydrologic year 1984-1985 was 550 l/s (Orășeanu, 2000).