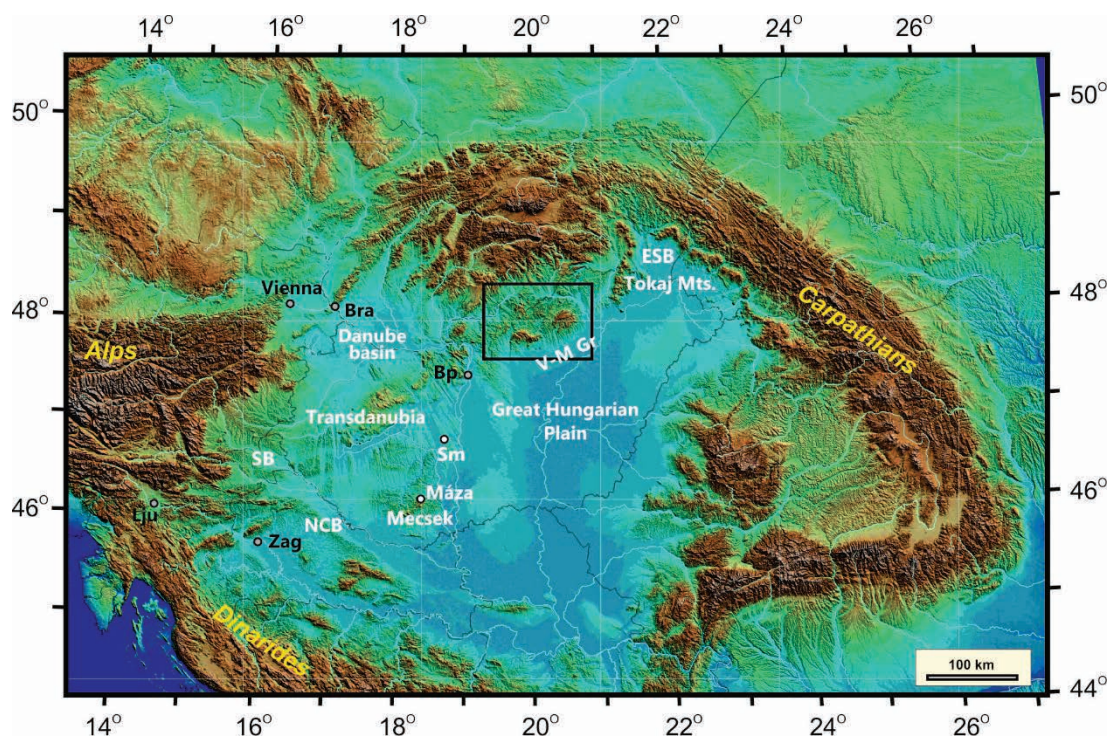


Supplementary material

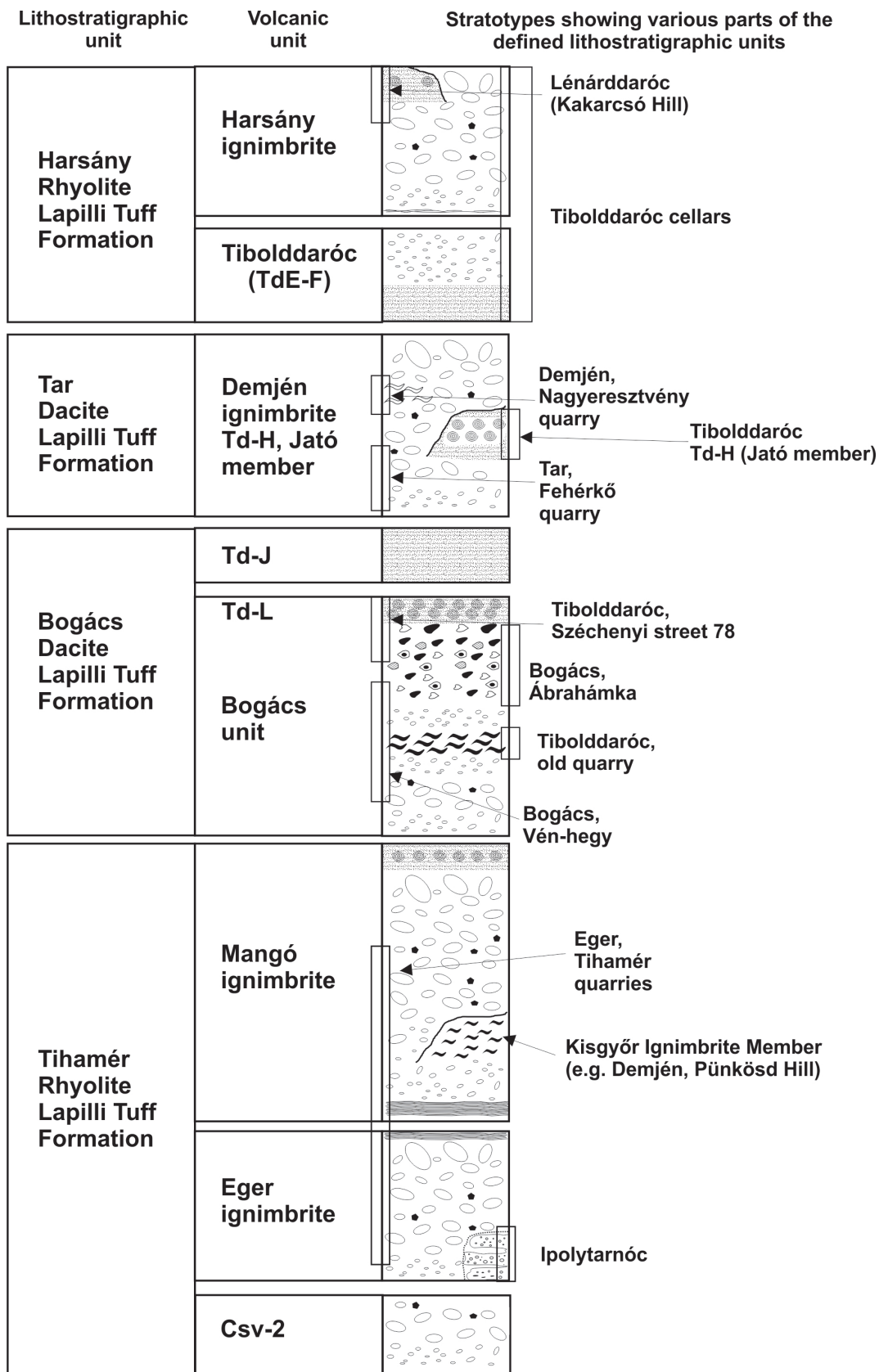
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Map of the Carpathian-Pannonian Region with the geographic names mentioned in the main text. The close-up area of North Hungary, included as Fig. 1 in the article, is indicated by black rectangular line. Abbreviations: V-M Gr= Vatta-Maklár Graben, ESB= East Slovakian Basin, SB= Styrian Basin, NCB= North Croatian Basin, Bp= Budapest, Lju= Ljubljana, Bra= Bratislava, Sm= Sárszentmiklós

Locality of stratotypes	GPS coordinates
Tihamér Fm.	
Eger, Tihamér old quarry (lower, abandoned)	47°53'7.19"N, 20°24'0.63"E
Eger, Tihamér quarry (upper, active)	47°53'8.04"N, 20°24'14.38"E
Ipolytarnóc, Borókás valley	48°13'50.19"N, 19°39'47.17"E
Ipolytarnóc, Botos creek	48°14'04.45"N, 19°39'22.40"E
Ipolytarnóc, Puhakő quarry	48°14'12.07"N, 19°39'17.17"E
Ipolytarnóc, Mučín Cave (Slovak Republic)	48°13'59.64"N, 19°40'34.44"E
Bogács Fm.	
Bogács, Vén Hill	47°54'36.90"N, 20°32'15.91"E
Bogács, Ábrahámka quarry	47°55'28.15"N, 20°30'42.74"E
Tibolddaróc old quarry	47°55'48.14"N, 20°37'56.92"E
Tibolddaróc, Széchenyi street 78 outcrop	47°55'41.49"N, 20°37'58.37"E
Tar Fm.	
Tar, Fehérkő quarry	47°57'9.88"N, 19°45'46.45"E
Demjén, Nagyeresztvény quarry	47°50'1.51"N, 20°20'37.19"E
Harsány Fm.	
Harsány	47°58'35.30"N, 20°44'39.25"E
Tibolddaróc cellars	47°55'31.59"N, 20°37'49.77"E
Lénárdaróc, Kakarcso Hill	48° 8'49.61"N, 20°21'38.08"E



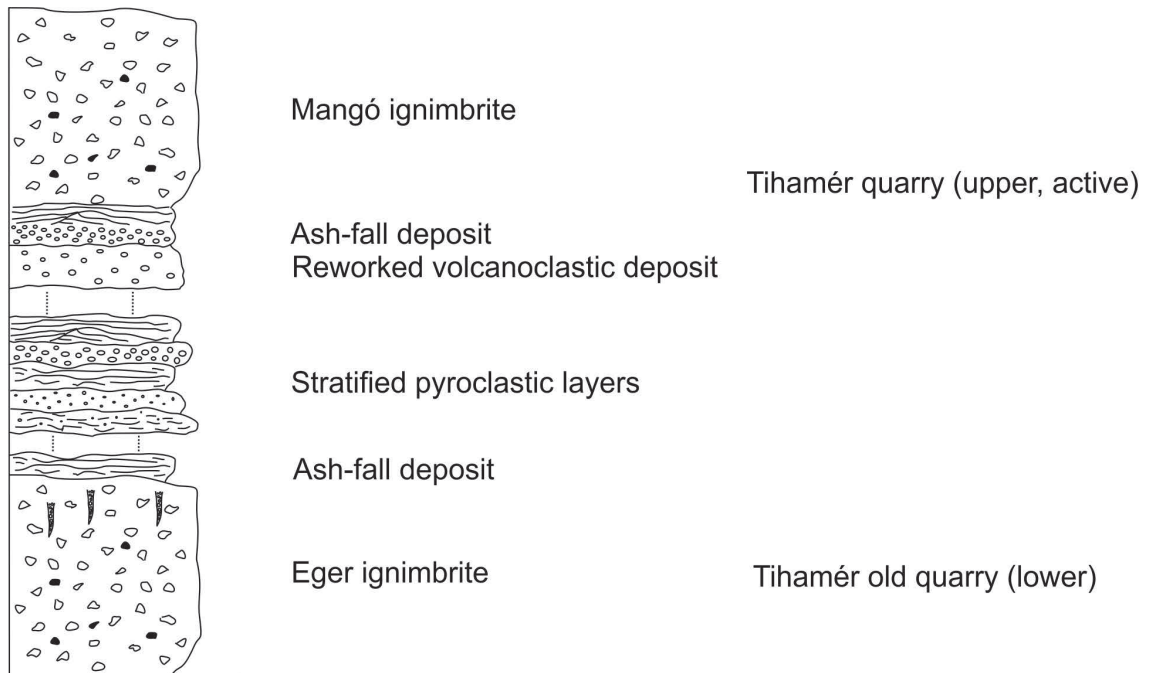
Summary of the so-far defined volcanic units and the most abundant facies of the lithostratigraphic units and the related stratotypes. Note that this section is idealized, not to scale and does not give properly the complexity of the lateral and vertical facies transitions.

Localities, geological sections and additional photos of the
stratotypes

Stratotype of the Tihamér Rhyolite Lapilli Tuff Formation: Eger, Tihamér quarries



Volcanological section of the Tihamér Rhyolite Lapilli Tuff Formation at Eger Tihamér quarries. For further information see Lukács et al. 2018 and Hencz et al. 2021.



Mangó ignimbrite bottom part: unconformably deposited ash-fall bed overlain by pyroclastic surge deposit followed by the massive ignimbrite (entrance of the Tihamér, upper quarry)



The Mangó ignimbrite unconformably deposited on reworked volcanoclastic deposit (Tihamér, upper quarry)

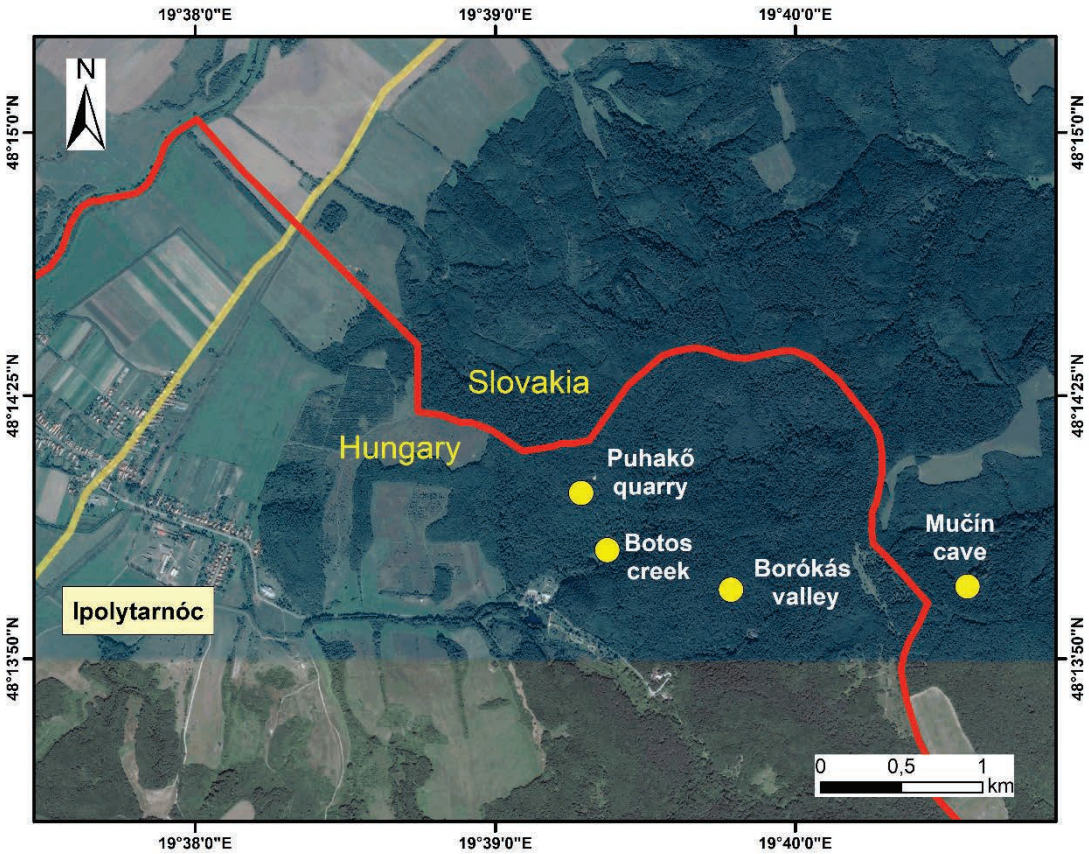


Set of pyroclastic and volcanoclastic layers between the Eger and Mangó ignimbrite units (outcrop along the path between the lower and upper Tihamér quarries)

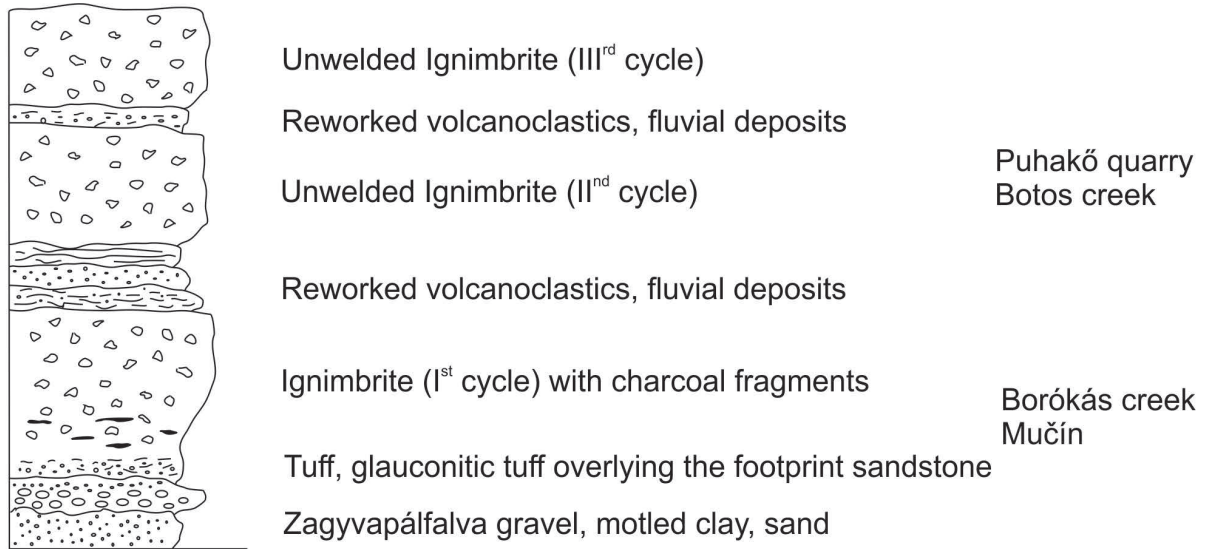


Eger ignimbrite with gas-segregation pipes at the upper part (Tihamér, lower abandoned quarry)

Stratotype of the Tihamér Rhyolite Lapilli Tuff Formation: Ipolytarnóc



Volcanological section of the Tihamér Rhyolite Lapilli Tuff Formation compiled from the Ipolytarnóc outcrops after Korpás (2003), Vass et al. (2006), Márton et al. (2007b), Šarinová et al. (2021). For further information see these publications.



Charcoal-bearing ignimbrite (Ist cycle) in the Borókás creek



Unwelded ignimbrite (IInd cycle) in the Puhakő quarry

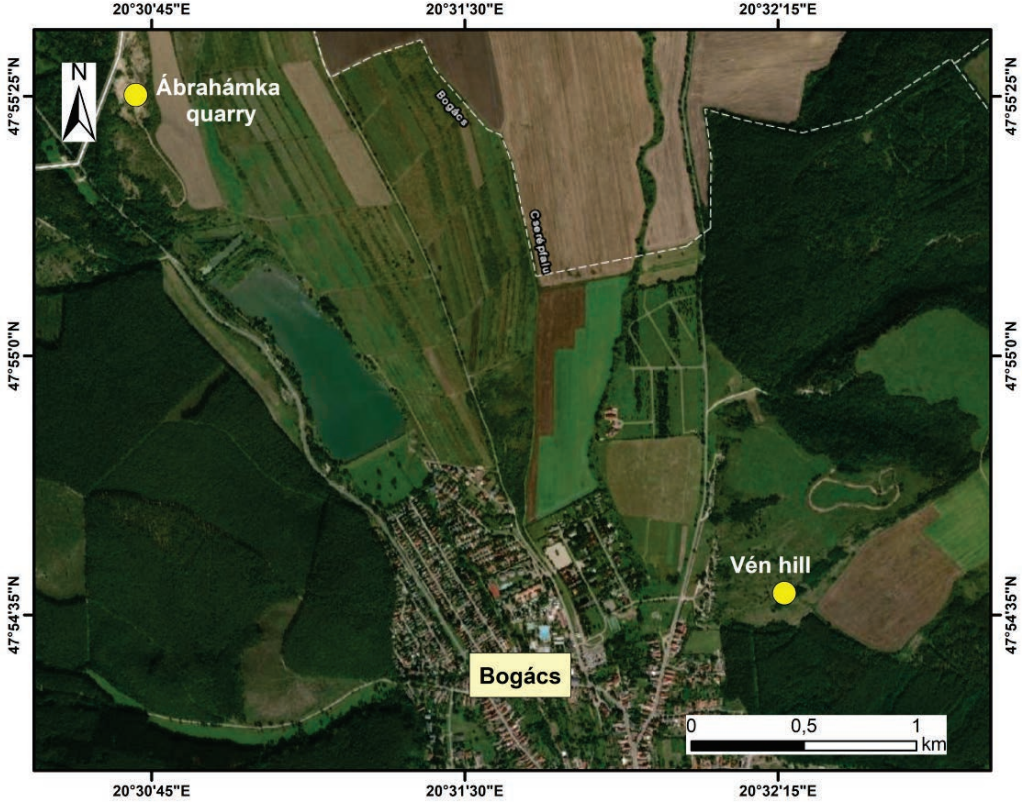


Tuff-glauconitic tuff beds at the bottom part of the charcoal-bearing ignimbrite (Ist cycle) in the Borókás creek

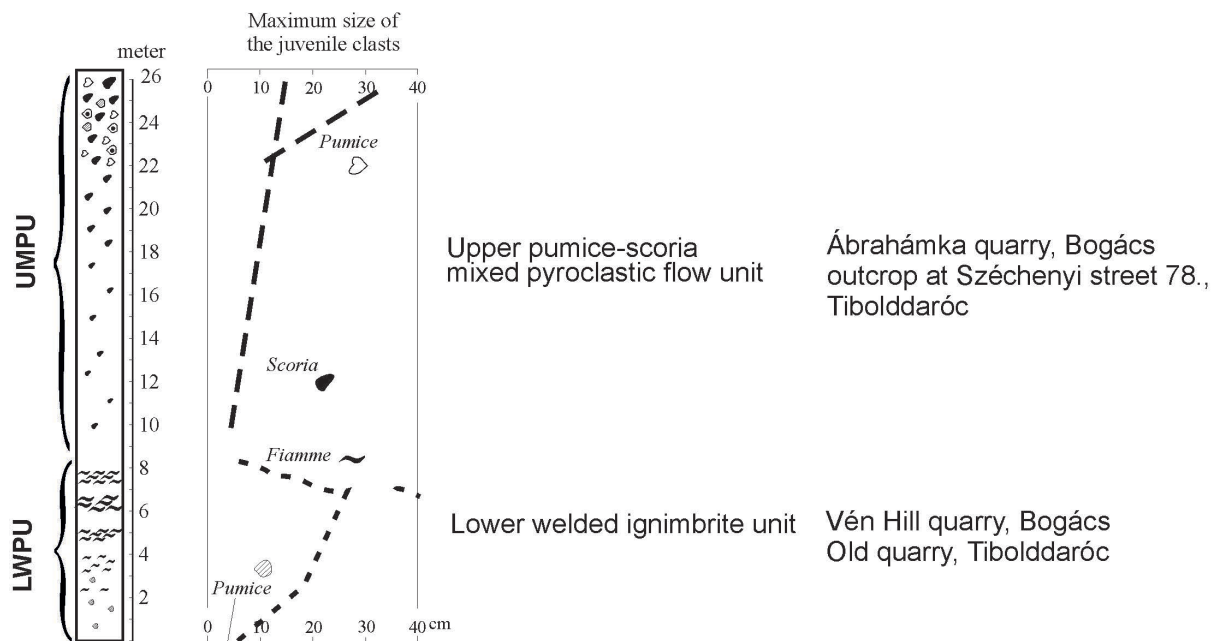


Fine-ash tuff at the bottom part of the charcoal-bearing ignimbrite (Ist cycle) at the Mučín cave

Stratotype of the Bogács Dacite Lapilli Tuff Formation: Ábrahámka quarry and Vén Hill, north of Bogács; Tibolddaróc old quarry and outcrop at the Széchenyi street 78.



Volcanological succession of the two major facies of the Bogács Dacite Lapilli Tuff Formation after Czuppon et al. (2012): LWPU – Lower welded pyroclastic unit; UMPU: Upper mixed pyroclastic unit. Stratotype sections displaying these lithofacies are also indicated.



Ábrahámka quarry, Bogács



Close view of the mixed pumice-scoria unit (Ábrahámka quarry)

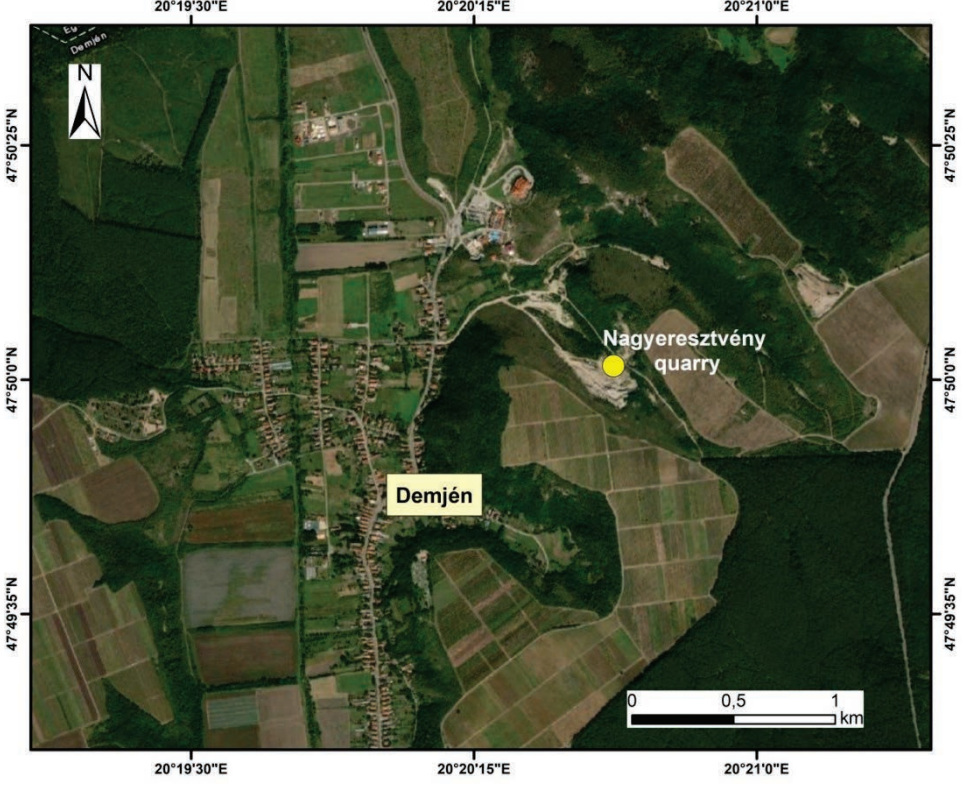
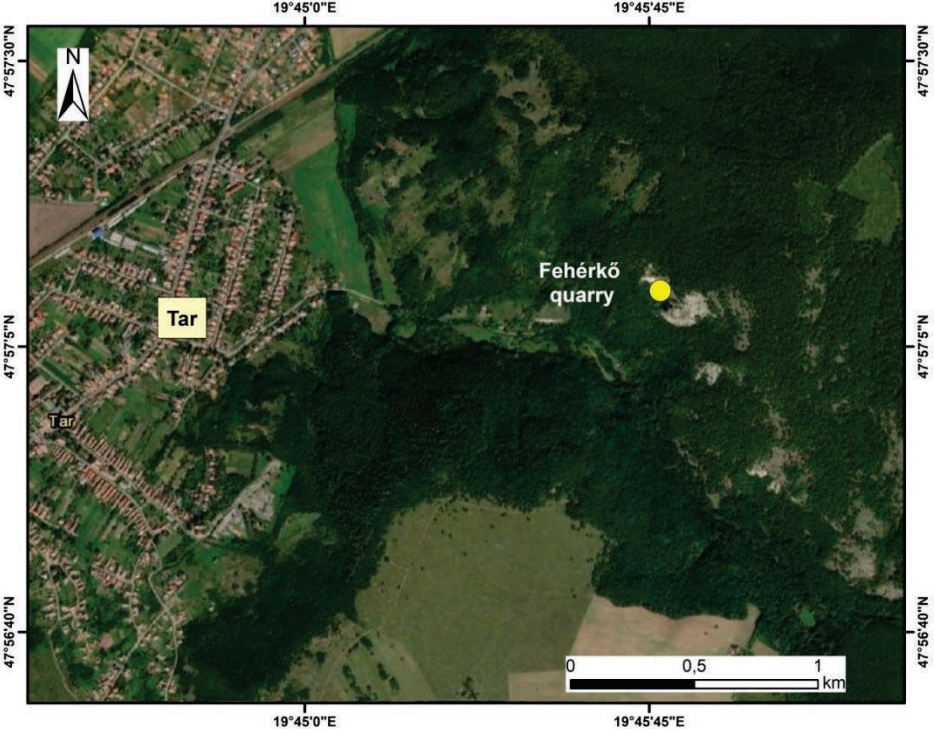


Outcrop at Vén Hill, Bogács: the lower welded ignimbrite unit

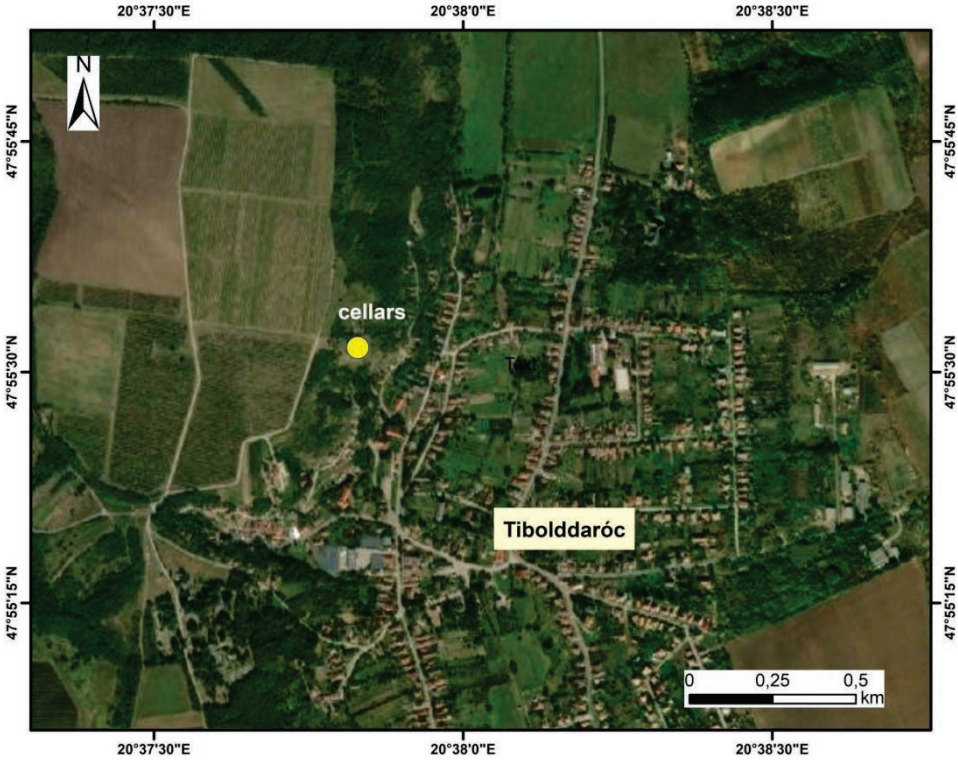


Close view of the fiamme-bearing lower welded ignimbrite unit (Vén Hill, Bogács)

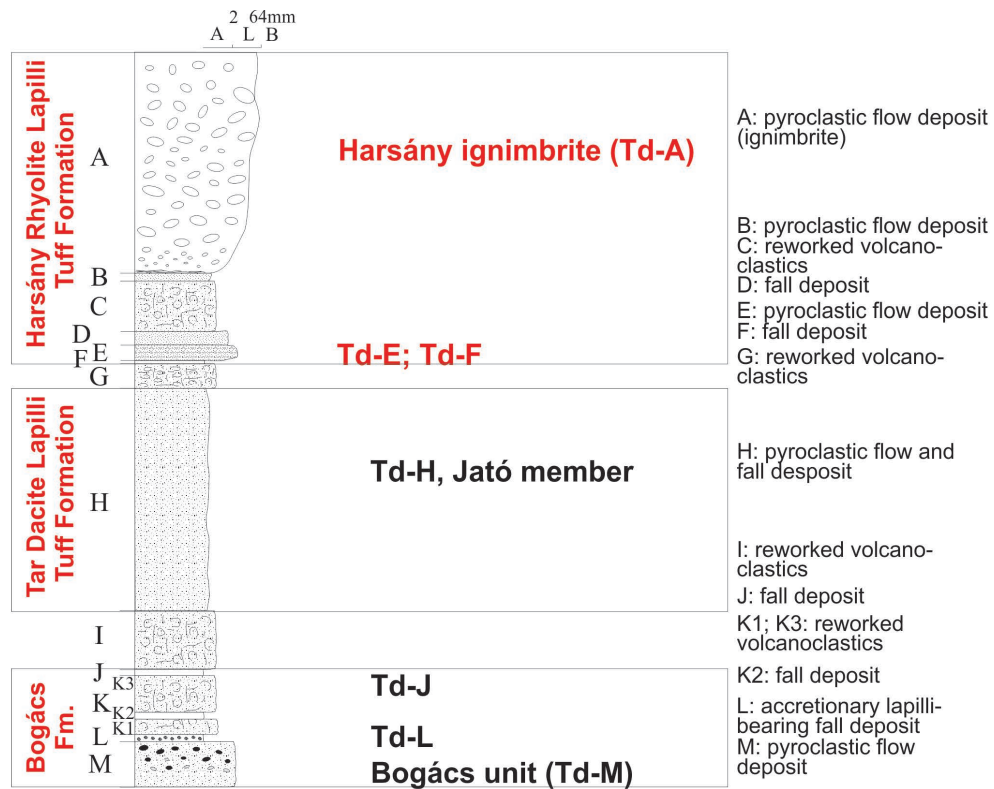
Stratotype locations of the Tar Dacite Lapilli Tuff Formation: (1) Tar, Fehérkő quarry and (2) Demjén Nagyeresztvény quarry. For photos of the outcrop features see Fig. 5 a,b,c in the main text



Stratotype of the Harsány Rhyolite Tuff Formation: Tibolddaróc, cellars. Note that the „cellars” point on the map refers to the Harsány ignimbrite part of the lithostratigraphic unit. East of this point, a continuous section down to the Bogács unit can be followed as described by Lukács et al. (2007).



The Tibolddaróc section displays a continuous stratigraphy from the Bogács Dacite Lapilli Tuff Formation up to the Harsány Rhyolite Lapilli Tuff Formation. Detailed description is found in Lukács et al. (2007) and (2015) with additional information by Biró et al. (2020).



The western part of Tibolddaróc, where outcrops at cellars show the entire section from the Bogács unit up to the Harsány ignimbrite



Close view of the Harsány ignimbrite (Tibolddaróc)

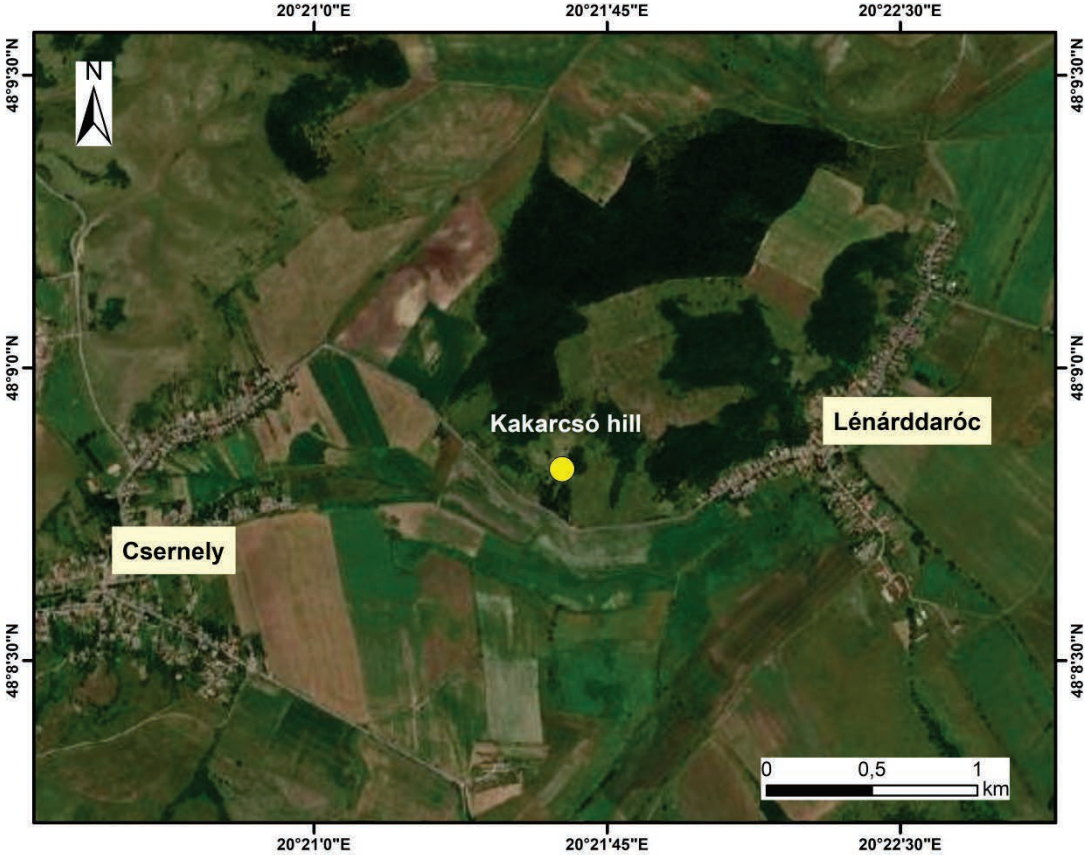


The partially phreatomagmatic ash fall and flow beds of the Tar Formation (Tibolddaróc)

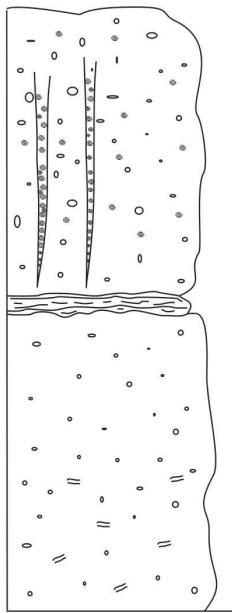


Close view of the accretionary lapilli-bearing tuff at the top of the Bogács unit (Széchenyi str 78. outcrop, NW Tibolddaróc)

Stratotype location of the Harsány Rhyolite Tuff Formation: Lénárdaróc, Kakarcsó Hill



Volcanological section of the Kakarcsó Hill outcrops (abandoned quarry) after Fodor et al (2005)



Massive lapilli tuff with gas-segregation channels filled with accretionary lapilli (pyroclastic flow)

Harsány Rhyolite Lapilli Tuff Formation

Undulating fine ash tuff (pyroclastic surge)

(Harsány ignimbrite)

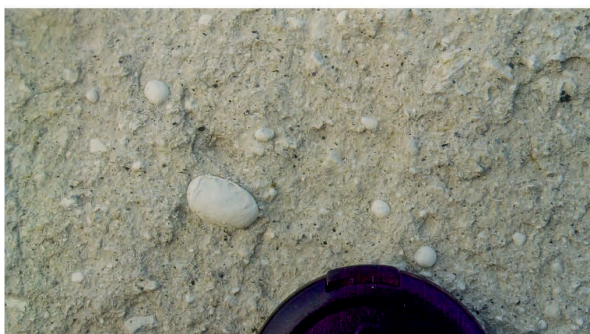
Massive lapilli tuff with charcoal fragments (pyroclastic flow)



Abandoned quarry west of Lénárdaróc showing two pyroclastic units belonging to the Harsány Rhyolite Lapilli Tuff Formation



Gas-segregation pipe filled with accretionary lapilli in pumiceous lapilli tuff (upper pyroclastic unit)



Accretionary lapilli-bearing pumiceous lapilli tuff (upper pyroclastic unit)

Additional publications referred here, but not involved in the reference list of the main text:

Korpás, L. (2003): Az ipolytarnóci homokkő új szedimentológiai modellje. A vulkáni esemény kronológiája és központjának rekonstrukciója. Magyar Karszt és Barlangkutató Társulat, 1–42. (in Hungarian)

References of the Geological Map Sheets of Gyalog and Síkhegyi (2005)

[https://map.mbfisz.gov.hu/fdt100/:](https://map.mbfisz.gov.hu/fdt100/)

Rónai, A., Pelikán, P., Kuti, L., Kaiser, M. (2005): L-34-4 Gyöngyös. In: Gyalog, L., Síkhegyi, F. (eds): Magyarország földtani térképe 1:100000. Magyar Állami Földtani Intézet (Geological Institute of Hungary)

Prakfalvi, P., Kaiser, M. (2005): M-34-136 Salgótarján. In: Gyalog, L., Síkhegyi, F. (eds): Magyarország földtani térképe 1:100000. Magyar Állami Földtani Intézet (Geological Institute of Hungary)

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Rónai, A., Pelikán, P., Pentelényi, L., Kuti L., Kaiser, M. (2005): L-34-5 Eger. In: Gyalog, L., Síkhegyi, F. (eds): Magyarország földtani térképe 1:100000. Magyar Állami Földtani Intézet (Geological Institute of Hungary)

Rónai, A., Less, Gy., Kuti, L., Kaiser, M. (2005): , M-34-138 Miskolc. In: Gyalog, L., Síkhegyi, F. (eds): Magyarország földtani térképe 1:100000. Magyar Állami Földtani Intézet (Geological Institute of Hungary)

Rónai, A., Less, Gy., Pelikán, P., Pentelényi, L., Kuti L., Kaiser, M. (2005): L-34-6 Mezőkövesd. In: Gyalog, L., Síkhegyi, F. (eds): Magyarország földtani térképe 1:100000. Magyar Állami Földtani Intézet (Geological Institute of Hungary)