

# THE VRANCEA HALF-WINDOW: A SIGNIFICANT AND IGNORED TECTONICS CONTRIBUTION OF ȘTEFAN I. MATEESCU

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**Abstract.** An exceptional, unknown cartographic contribution is introduced: the map of Vrancea-Putna region by Ștefan I. Mateescu. The manuscript of the map was submitted to the Romanian Science Academy, published at the end of 1937, and printed, probably, between 1938-1939. The authorship of Vrancea tectonic half-window has been intensively disputed in the Romanian geological literature, without a thorough study regarding the various stages in the knowledge of East Carpathians Bend. The ignored map of Ștefan I. Mateescu is very close to the modern cartographic image of the Vrancea tectonic half-window and represents an unquestionable priority of Ștefan I. Mateescu, a forgotten geologist who deserves to be recognised.

**Key words:** Vrancea tectonic half-window, the Mateescu map of 1937, East Carpathians Bend, history of Geology in Romania

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## ȘTEFAN I. MATEESCU – BIBLIOGRAPHICAL HIGHLIGHTS\*

Ștefan I. Mateescu was born in Bucharest, on October, 17, 1888. He graduated the Science Section of "Mihai Viteazu" Highschool in Bucharest, in 1907. After that, he graduated the University of Bucharest, Faculty of Sciences, with a license in Natural Sciences, in June 1912. Between October 1912 and October 1919, he held the position of Assistant Professor, at the Laboratory of Geology, University of Bucharest. He passed the exams for the Secondary Professor degree, with a major in Natural Sciences and a minor in Law and Political Economy, in 1919. In November 1918, he was conferred the Assistant Geologist (Second and Third Class) degree, with the Geological Institute of Romania. During the First World War, he served as a combat officer.

In autumn 1919, he moved from the University of Bucharest, where he was an assistant of Professor Sava

Athanasiu, to "Gheorghe Barițiu" Highschool, in Cluj, and to the Geological Institute of the University of Cluj. He became an assistant of Professor Ion Popescu-Voitești (1919-1921), and a lecturer, between 1922 and 1929. He defended his PhD thesis, in 1925, under the supervision of Professor Sava Athanasiu from the University of Bucharest. He also taught at the Department of Agro-Geology of the Agricultural Academy in Cluj (1923-1926). Between 1927 and 1929, he taught the course of Geology of Romania to students in Natural Sciences and Geography of the University of Cluj. In 1923, he followed Professor Popescu-Voitești in the field for oil researches in Prahova, Putna, and Bacău counties, as well as in the Bucovina Flysch. In 1927, he was sent by the Geological Institute to Wien to study Sarmatian insects belonging to the Mollass Collection. He studied with Professor Hans Rebel, from the Naturhistorische Stadtmuseum, Entomology section. The Mollass Collection was bought by the Geological-Palaeontological Museum of the University of Cluj. Also, in Wien, he identified a series of dinosaur teeth from Pui, Hațeg area, with Professor Othenio Abel, from the Palaeontological Institute.

At January, 1, 1930, he moved to the Polytechnics School of Timișoara, as a full Professor of Geology. He became a

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\* Mateescu I. Șt., 1938a. *Memoriu de titluri și lucrări*. (Collection of works and titles, in Romanian), 16 p., Institutul de Arte Grafice „Tipografia Românească”, Timișoara; Anuarul Universității din Cluj (AUC), 1919-1920, p. 34; AUC, 1921-1922, p. 204; AUC, 1922-1923, p. 132; AUC, 1923-1924, p. 161; AUC, 1924-1925, p. 138; AUC, 1925/1926-1926/1927, p. 190; AUC, 1927-1928, p. 185; AUC, 1928-1929, p. 189.

Corresponding member of the Academy of Sciences, in December, 27, 1935. He was a Member of the Geological Society of Romania, applying, in 1931, and becoming a member at March, 13, 1932. He was a founding member of the Society of Science of Cluj (1920), a member of the Association of the Carpathian Geologists (1927), of the Society of Science of Timișoara (1930) and of the "Astra" Transylvanian Association. He taught Mineralogy, Geology and Agro-Geology, at the Agricultural Academy of Cluj (1921-1932), Palaeontology (1927-1929), Agro-Geology for secondary teachers in Natural Sciences (1927), Geology and Palaeontology for students in mining at the Polytechnic School of Timișoara, Mining Section (1930-1938).

Mircea Paucă (1998)\*\* remembered the last years in the life of Mateescu: "*Ștefan Mateescu belongs to a long list of geologists who, although having significant research and teaching careers (...), were forgotten due to the tradition of not praising the late geologists. Those who knew him are so few today. He was more than 70 years old, in the fifth and sixth decades of the 20th century, when I was spotting him, in trolleybuses, along the Kiseleff Boulevard, with his stick, as he was living in the Triumph Arch north-eastern neighbourhood. As he was deeply hearing-impaired during his last 10-15 years of life, he was barely in contact with his former colleagues. He died unknown by geologists, probably, around the year 1970, and I could not find out where he was buried. The book "The history of Sciences in Romania" (1977) barely mentions him*".

He authored 24 research papers, published over 23 years (1917-1940), four of them dealing with the Vrancea flysch.

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\*\* Paucă M., 1998. "*Mi-am re-trăit viața*". Amintirile unui geolog. (I have re-lived my life. Memories of a geologist - in Romanian), 288 p., București.

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## INTRODUCTION

The knowledge regarding the flysch structure in the East Carpathians has a long and complicated history, especially after 1931, when the final confrontation between classical and nappe geologists took place (Băncilă, 1944). The opponents were two generations of geologists, namely, the older geologists, adepts of classical geology (Athanasiu,

Macovei, Atanasiu) versus adepts of the nappe structure (Mrazec, Popescu-Voitești), including younger geologists, such as Murgeanu and Filipescu (1933), Murgeanu (1944), who supported the Median and Marginal nappes in the flysch of the East Carpathians bending zone. This support was continued by Dumitrescu (1952a, b) and Grigoraș (1955, 1959) until the beginning of the seventh decade of the XX-th century. Modern knowledge upon the stratigraphy and tectonics of Vrancea region is due, especially, to Dumitrescu and Grigoraș, but the cartographic image of the Vrancea tectonic half-window had a more intricate history, in which the contribution of Ștefan Mateescu should not be underrated.

### MATEESCU MAP, 1937

Eighty years ago, on June, 3, 1937, Ștefan I. Mateescu, corresponding member of the Academy of Sciences, delivered a lecture in front of his colleagues (Ion Popescu-Voitești, Otto Protescu, Miltiade G. Filipescu, Ion Băncilă, Ștefan Cantuniari, Alexandru Codarcea, Mircea Paucă\*\*\*) entitled "*Presentation de la carte géologique de la region de Vrancea, distr. Putna. 1: 50 000*". This map was published in December, the same year (Mateescu, 1937). A year later (Mateescu, 1938a, p. 13), he showed that he presented "*in manuscript the coloured geological map of the Vrancea region, at 1:50,000 scale, following his researches in the region, between 1923-1936. On this occasion, an abstract of the map caption is given, defining the extent of the Vrancea region, of its morphological and geological units and of their links, supported by a geological profile at the same scale*". Shortly after publishing this communication, the geological map of the Putna-Vrancea region at 1: 100,000\*\*\*\* is published, drawn by A. Hagiu (cartographer at the Geological Institute of Romania), in 48.5x42.5 cm format, covering approximately 2,000 square kilometers, including the *complete cartographic outline* of Vrancea tectonic half-window, the Tarcău Sandstone thrust, the marginal zone thrust, the pericarpathian zone thrust and lithostratigraphic details, without any indication to the year of publication (Fig. 1, 2a).

The map published in line codes for Senonian-Pliocene and monochrome for the Barremian black shales (the Tisaru Beds in the author's view) remained, practically unknown, and it was never reproduced or cited, excepting the comments belonging to Grigoraș (1955, p. 117) on Mateescu's 1937 paper. Regarding the tectonic relationships in the area of Tarcău Sandstone and of the marginal zone, Mateescu (1937, p. 78) shows that "*the tectonic relationships between the marginal flysch zone and the neighbouring zones are abnormal: the Tarcău Sandstone zone is thrust over the marginal zone, and the marginal zone is, at its turn, thrust over the Miocene pericarpathian zone. In my opinion, we deal*

*with a gulf (sinus) deepened by the overthrust of the Tarcău Sandstone, especially in Macradu and Giurgiu mountains*". Emphasizing the geological complexity of the marginal zone, Mateescu (1938b) showed: "*the Barremian Tisaru black shales (sensu Sava Athanasiu) generates a geanticlinal zone in Coza and Tisaru mountains. This tectonic accident generates a deformation of the outer margin of the Tarcău Sandstone zone, at the contact with the marginal zone, as the marginal flysch beds are deviated from N-S (as they occur north of Zăbala Valley) to NE-SW (as they occur south of this valley). In this way, a new and deep understanding of the East Carpathian bending zone is gained*".

Although the new image regarding Vrancea geanticlinal and the cartographic outline of the Tarcău Nappe represented a remarkable contribution, no reaction occurred from fellow geologists. Moreover, only two years after the talk of 3 June 1937, Ion Băncilă remarked on 3 February 1939 the contributions of Murgeanu and Filipescu (1933), without citing Mateescu (Băncilă, 1944). Also, in his synthesis of the East Carpathians (Băncilă, 1958), Mateescu was not cited, as Băncilă wrote: "*following the works of Dumitrescu and Grigoraș, the nappe outline was strengthened for the whole northern and southern Vrancea, which was therefore defined as a half-window* (p. 303-304), *corresponding to the Putna-Vrancea tectonic half-window*" (p. 307).

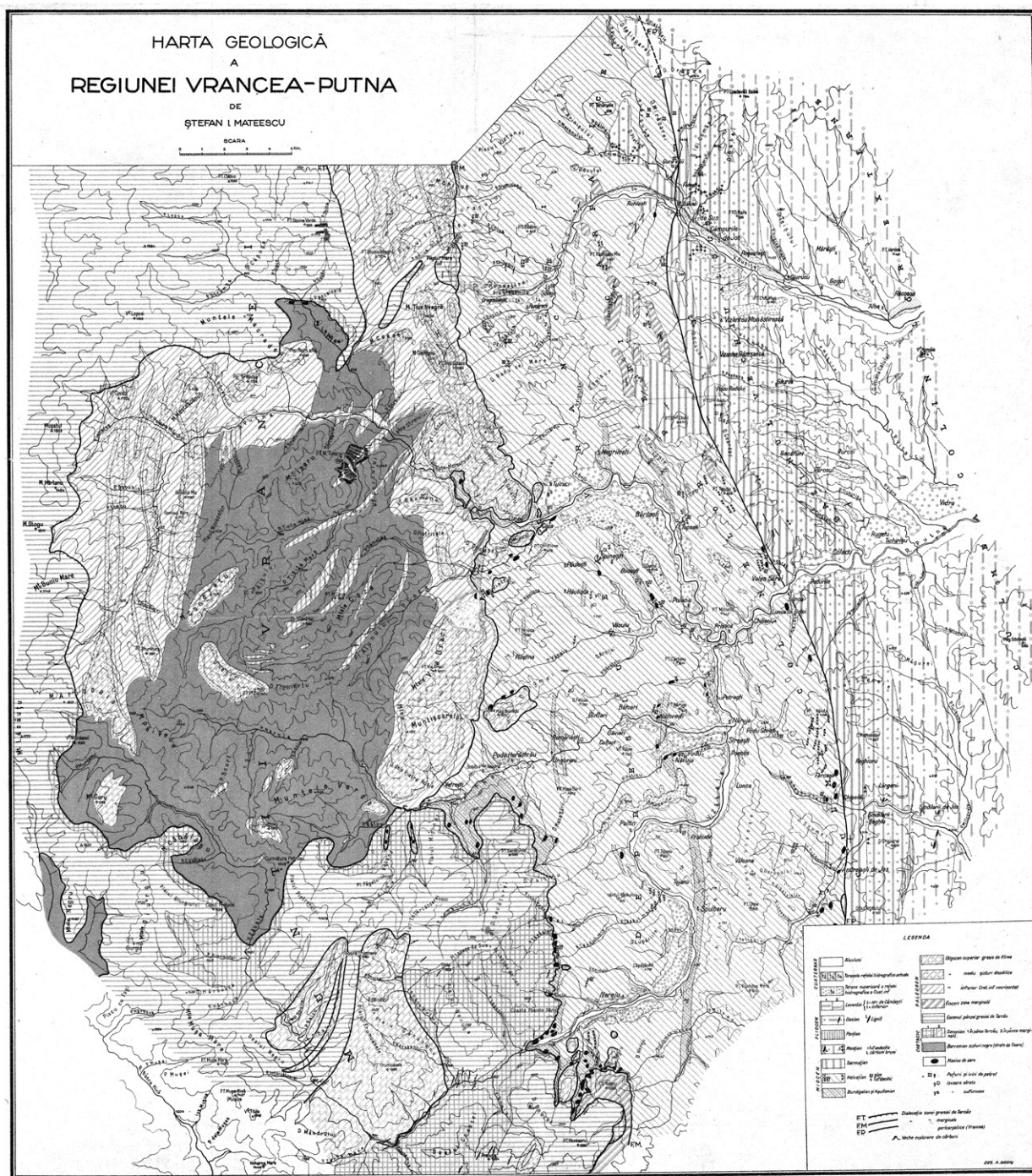
Popescu-Voitești (1942, p. 9) stressed the valuable contributions in flysch research of Preda, Atanasiu, Mateescu, Băncilă, Murgeanu, Filipescu, Oncescu, but in his map (scale 1: 2,500,000; p. 23) the Vrancea half-window is not emphasized; the only detail occurring was the Tarcău Nappe klippe in Neculele zone (Fig. 2b), taken from Mateescu map of 1925, which was attached to his PhD thesis in 1927. This was a surprising omission, considering the notoriety of Popescu-Voitești and his presidency of the Geology-Mineralogy-Geography Section of the Science Academy. He surely attended Mateescu's presentation as an update for the East Carpathians bending area geological structure.

In 1942 the fifth sheet of the geological map of Romania, scale 1: 500,000\*\*\*\*\* was edited; in it the Vrancea tectonic half-window was illustrated (Fig. 2c), with its cartographic outline and stratigraphic content similar to Mateescu map. On 21 April 1941, Dumitrescu (1948) contributed with his observations from the Cașin and Putna region, showing that "*between Soveja and Zăbala Creek, the marginal flysch zone is included in the large Vrancea tectonic half-window (tectonic gulf)*" (p. 104). Dumitrescu (1941) cited some of Mateescu including that referring to the map manuscript (Mateescu, 1937), without any comments. In December 1948, Dumitrescu (1952a) referring to the Tarcău Nappe relationships with various autochthonous units, showed that "*we have to admit*

\*\*\* Scurtu I., Lungu C.M., 2013. *Istoria Academiei de Științe din România (History of the Romanian Academy of Science, in Romanian)* (1935-1948), vol. I, 304 p., Ed. AOSR, București.

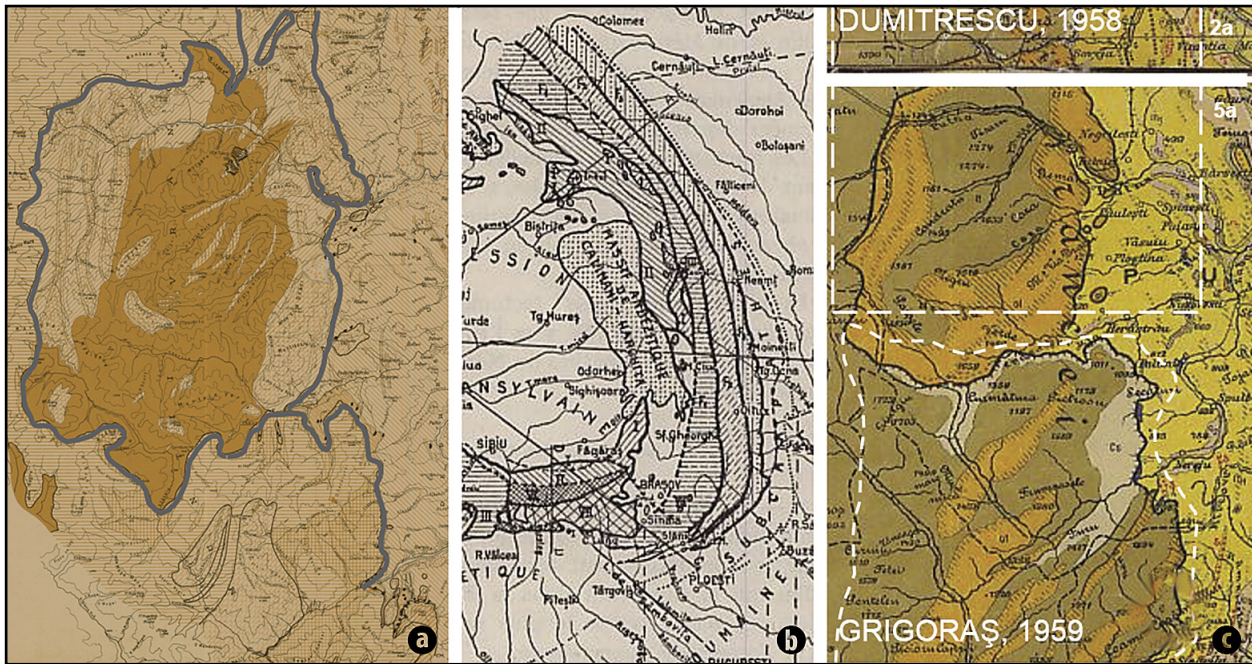
\*\*\*\* A copy, without date, in private library (T.B.)

\*\*\*\*\* The year when sheet 5a of the geological map, scale 1: 500, 000 was edited, differs with each author: 1936 (Băncilă, 1958, p. 16); 1937 (Grigoraș, 1955, p.103); 1942 (Dumitrescu, 1962a, p. 15, is the only author who details the chronology of editing the sheets of the map, in the 1936 - 1959 interval).



**Fig. 1.** Vrancea half-window and the Pericarpathian Fault on the geological map of Vrancea-Putna region, by Ștefan I. Mateescu (probably, printed in 1938-1939).





**Fig. 2. a.** Vrancea half-window according to Mateescu map; **b.** The marginal zone on the tectonic sketch of Popescu-Voițești (1942); **c.** Vrancea tectonic half-window on the geological map of Romania, scale 1: 500,000 (the sectors mapped in the field by Dumitrescu, 1952 and Grigoraș, 1959, in their PhD theses, marked by dashed lines)

an autochthonous relief before the genesis of the Tarcău Nappe" (p. 59). In his PhD thesis, Dumitrescu (1952b), although citing the contribution of Mateescu (1937), made no comments related to tectonics, but stressing two significant ideas: a. "the marginal zone shows an axial uplift, marked by the outcropping of the oldest horizon, the Streiu Beds, within the axis of the Coza Anticline, and also marked by the retreat of the Tarcău Nappe beyond the old border with Transylvania, generating a large tectonic gulf" (p. 257), and b. "southwards, in Zăbala Valley, the marginal zone records a supplementary axial dive, where it disappears completely". This structure (b.) was probably intuited by Murgeanu and Filipescu (1933).

Their contributions, lacking cartographic support and captions lead to the supposition that survived for many years later from an author to another author (ex. Oncescu, 1965; Mutihac and Ionesi, 1974; Mutihac, 1990, ending with Săndulescu, 1977, 1984). Săndulescu (1977, p. 86), without reading Mateescu, wrote: "a little bit later (1931, sic!), Murgeanu and Filipescu demonstrated that the Tarcău Sandstone unit is thrust, along the East Carpathians bending zone, over the Tortonian and over the flesh of the marginal unit which occurs in a large half-window and dives, south of Năruja Valley, under the Tarcău Nappe". Also, Săndulescu (1977, p. 17) wrote that "Murgeanu and Filipescu (1937) cartographically outlined the southern part of the Vrancea half-window, contributing again to the foundations of the nappe structure concept in the flysch zone of the East Carpathians".

After Mateescu (1937, see map), Dumitrescu (1962b) illustrated the outline of the northern half of the half-window up to a line connecting the Buniu Mountain and western

Păulești (Fig. 2c), emphasizing the Via Draci-Mocearu and the Omuș-Munțișoarele autochthonous duplexes. Grigoraș (1955, map edition of 1959) illustrated the overthrusting line south of Năruja Valley, between Arșoia Mountain – Goru Peak (west) and Secăturile (east). Related to these ideas, Grigoraș (1955, p. 113) referred to Murgeanu and Filipescu (1932, sic!): "we have no data regarding the stratigraphy of formations included in both nappes, as the former communication was not published. The tectonic relationships considered here come from Băncilă". In fact, Grigoraș (1955) stressed that Murgeanu and Filipescu (1933) and Murgeanu (1944) contributed *only* to the median and marginal nappes at the Carpathians bending zone, a fact showed also by Oncescu (1957, p. 198-199).

It is significant the fact that Stille (1953), based on the fifth sheet of the geological map, scale 1: 500.000, illustrated the Vrancea half-window in his *Tektonik des Karpatenraumes*, noting that (p. 55): "the extent of the overthrust, which was recorded only to the outer area of the Tarcău Nappe, outcropped the younger flysch and the Miocene in a very limited, window area".

## FINAL REMARKS

The cartographic image of the Vrancea half-window was refined in four stages during four decades (1937-1968). Between 1937-1939, Mateescu (1937) published the introduction to the 1: 50,000 map, printing soon the map of the Vrancea-Putna region, scale 1: 100,000 (Fig. 1). The outline of the half-window and the distribution of the included Eocene-Oligocene formations, quite similar to those of the Mateescu map, were illustrated on the fifth

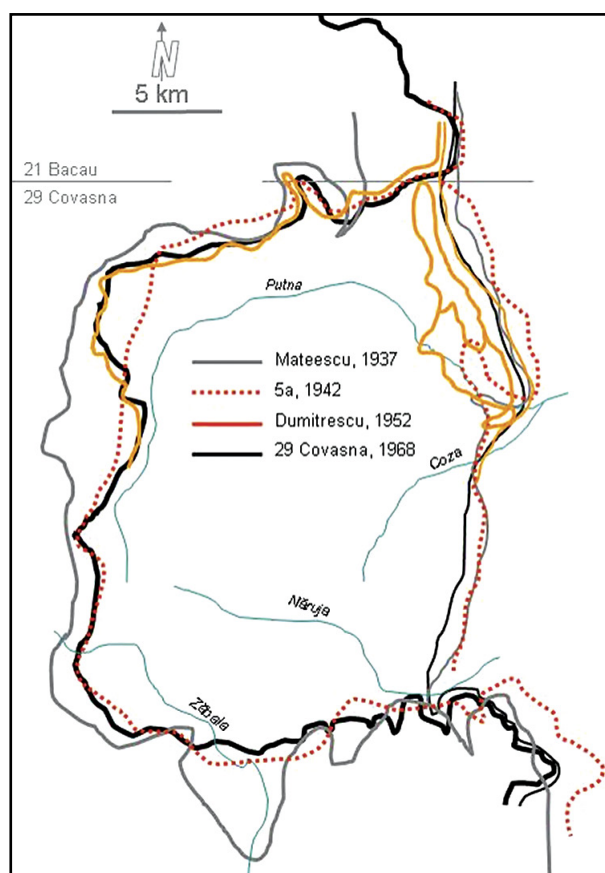
sheet of the geological map, scale 1: 500,000 (1942, Fig. 2c). Later details were added by Dumitrescu (1952, 1958) and by Grigoraș (1955, 1959). The modern outline is illustrated on the 21 Bacău sheet and on the 29 Covasna sheet of the Geological map of Romania, scale 1: 200,000 (Murgeanu *et al.*, 1968, Fig. 3). To this last cartographical image contributed the geological teams supervised by Filipescu and Mutihac (1959) and Dumitrescu (1959) who produced the 1:100,000 scaled geological maps of the Geological Committee, and the works of Dumitrescu (1963) and Dumitrescu *et al.* (1962b, 1970) detailing the lithostratigraphy and structures.

The unchallenging priority of the contributions of Ștefan I. Mateescu was systematically ignored due to an unjustified presumption regarding the priority of defining and outlining the Vrancea half-window. This presumption was perpetuated for a long time in the Romanian geological literature. Ștefan I. Mateescu is a wrongly forgotten geologist for whom a well-deserved homage should be paid.

### ACKNOWLEDGEMENTS

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**Fig. 3.** The outlines of the Vrancea half-window in various stages of geological knowledge (as explained in the text)



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