Krister Sundblad & Evgenia Salin:

Historic background to the nomenclature used in regional geological correlations within Fennoscandia.

Key note lecture, Baltic Basement Spring School, May 27-29, 2026. Arbavere research center

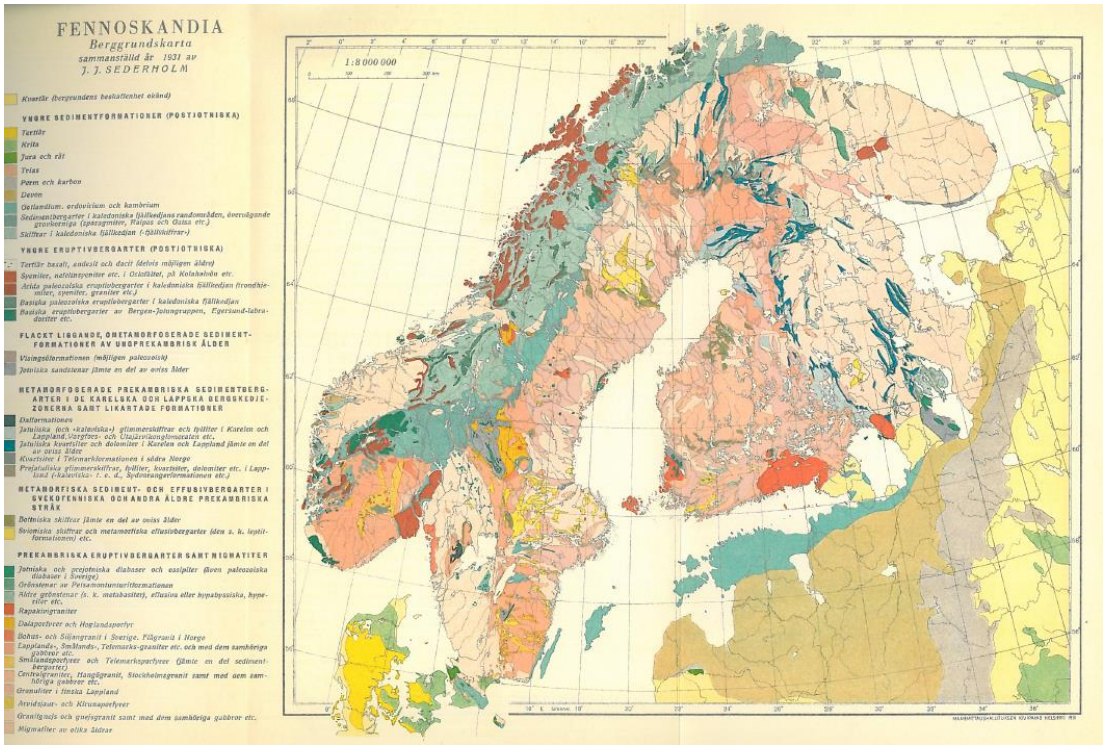
Part III

Correlations between the shield and elsewhere in Fennoscandia

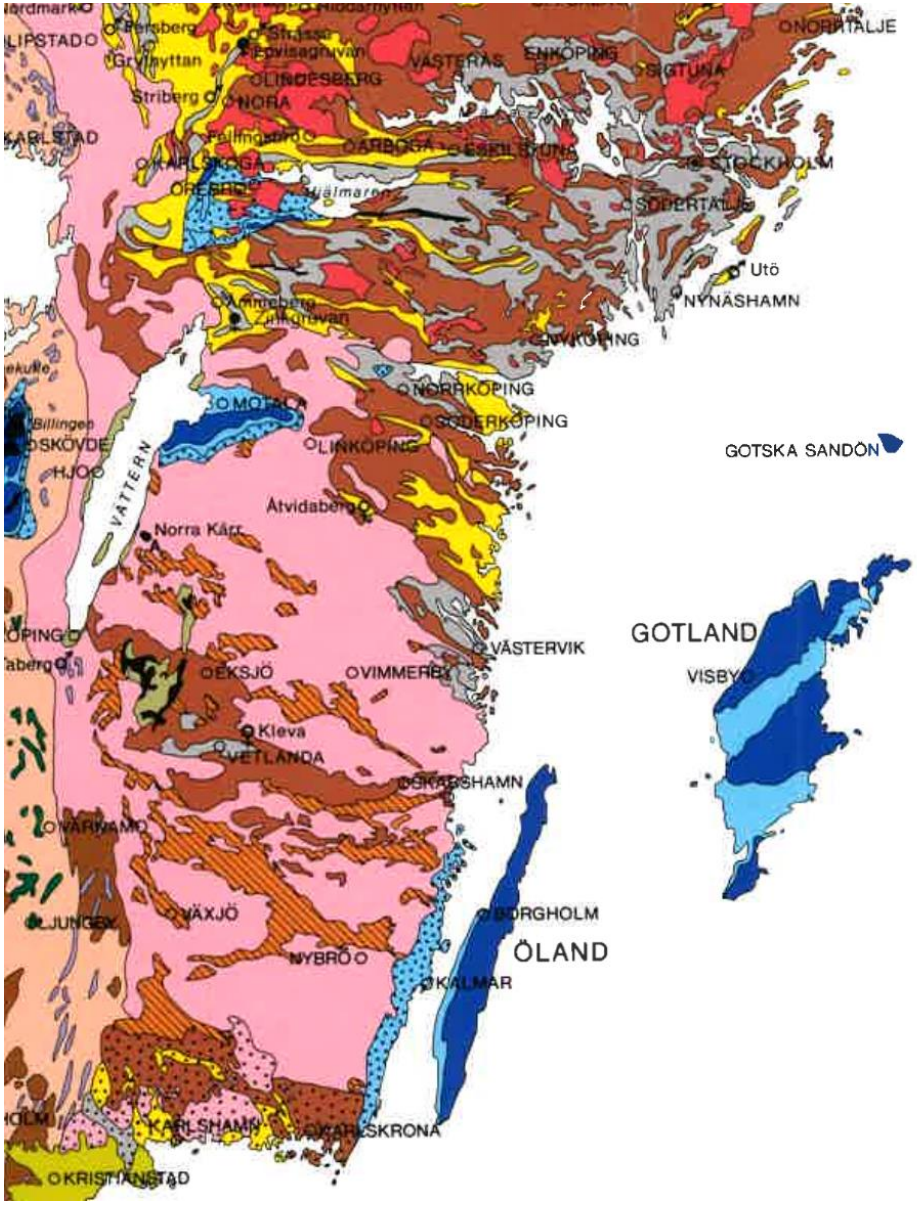
The Tallinn-Arbavere meeting in 1990

A geoscientific meeting on the Precambrian was held in Tallinn and Arbavere in April 1990.

This meeting emerged from discussions that had been held between Väino Puura, Gediminas Motuza, Roland Gorbatschev and Krister Sundblad in the Kola peninsula in 1989.



At that time, the Swedish understanding of the Precambrian east of the Baltic Sea was not very different from the view of Sederholm in 1932, i.e. in principle zero.

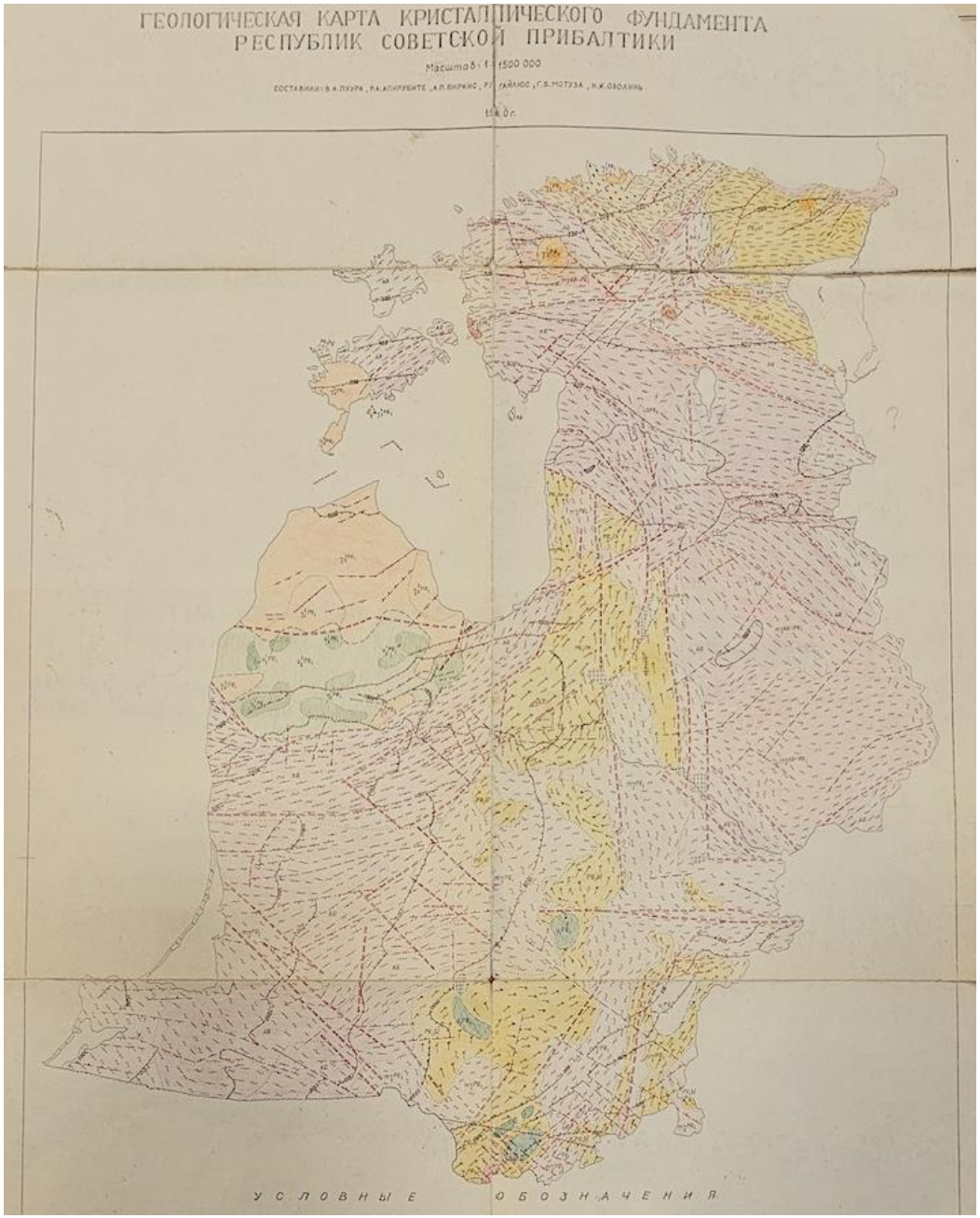


Precambrian *west* of the Baltic Sea

In 1990, the bedrock knowledge of SE Sweden was at a reasonable level and kept improving through Geological Survey and university projects.

All rock units were safely known to be Proterozoic.

Drill cores from the Precambrian under the islands Öland and Gotland existed, but there was no systematic study of them and no one knew where they were stored.



The Precambrian *east* of the Baltic Sea

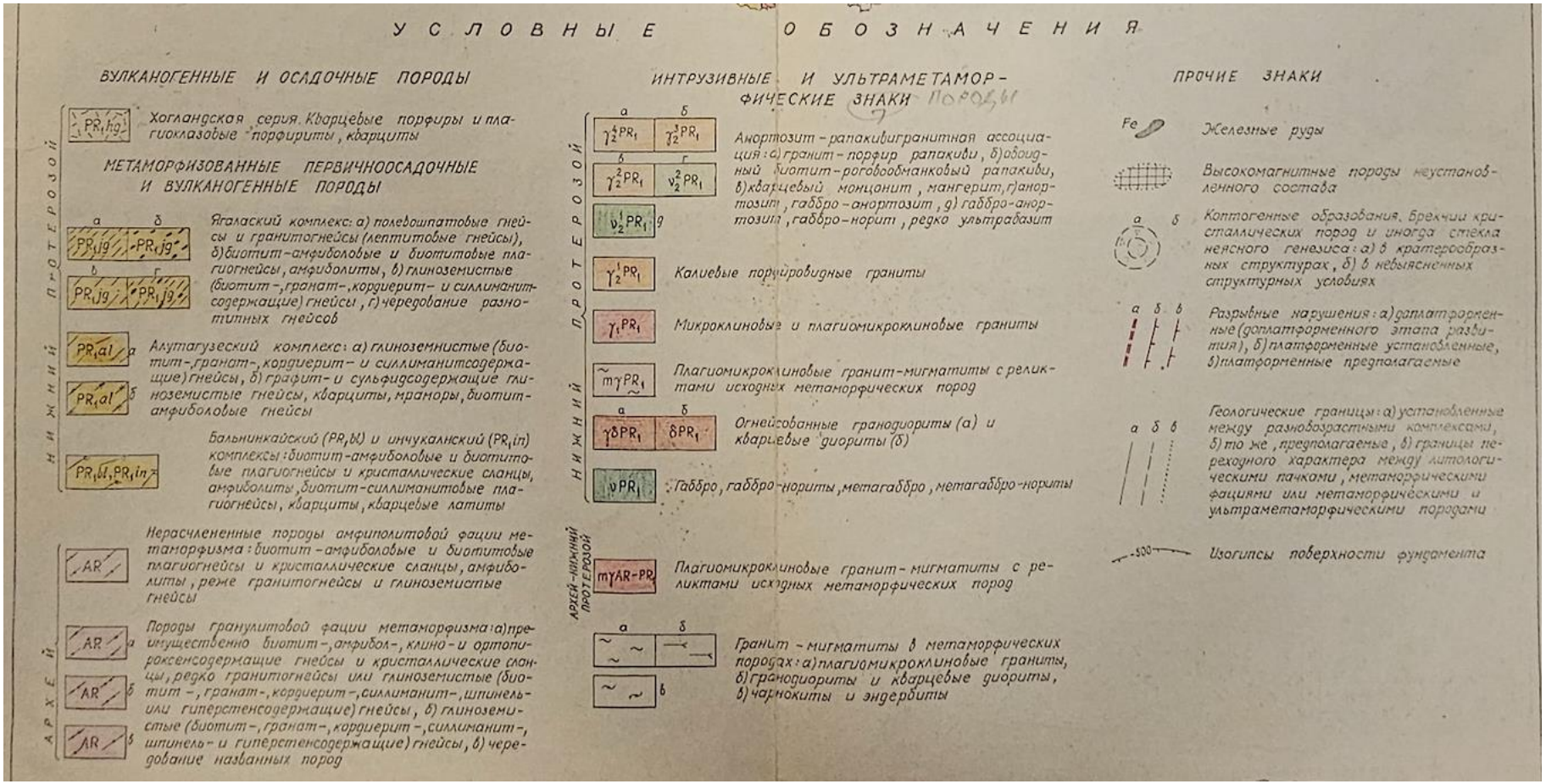
For the Precambrian east of the Baltic Sea, an incredible amount of drill cores and knowledge existed on the rocks.

However, no isotope data were available and in consequence, all age models for the crystalline rocks followed the old system;

***highly metamorphosed rocks* (granulites in western Lithuania and elsewhere) were considered to be *Archaean*,**

while *less metamorphosed rocks* (belts in NE Estonia and through central Latvia/ central Lithuania as well as the Kurzeme batholith in western Latvia) were assumed to be *Lower Proterozoic*.

Puura, Birkis, Motuza et al. (1978)
published in the VSEGEI series



As can be seen, significant parts of the Baltic republics were considered to be Archaean in the Soviet days, exactly as the Fennoscandian rocks were considered to be prior to 1960.

Some immediate initiatives taken on the Arbavere meeting 1990

Estonia

A Sm-Nd study was made of selected "Archaean" units in Estonia (Huhma & Puura, 1991).
A Pb-isotope study was made of the iron ores in the Johvi zone (Sundblad & Kivisilla, 1991).

Both studies concluded that *the Estonian units are Svecofennian*!

Latvia

A PhD study (Joakim Mansfeld) was initiated on rocks in the Småland region and Latvia, also indicating a Svecofennian age east of the Baltic Sea (Mansfeld, 2001).

Lithuania

A U-Pb study of a Mo-bearing granite in southern Lithuania, showed that the anorogenic Mazury complex can be followed all the way to the Sarmatian border (Sundblad et al., 1994).

Some long-term actions

In the 1990ies, Roland Gorbatschev and Svetlana Bogdanova opened the gates in Lund for Lithuanian and Belarusian scientists: Grazina Skridlaite, Audrius Čečys and Ludmilla Taran.

This was followed by cooperation projects with Stefan Claesson, Martin Whitehouse and Åke Johansson at the Swedish Museum of Natural History in Stockholm.

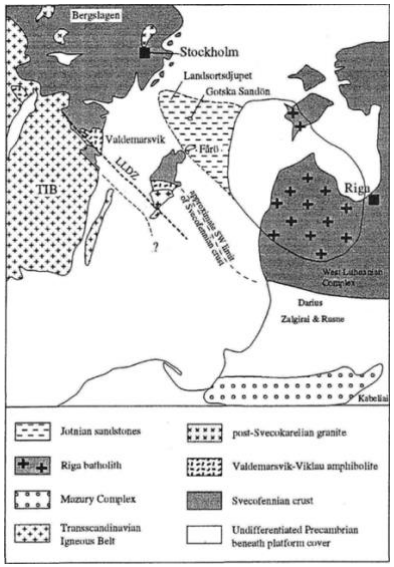
In the beginning of the 21st century, the Polish team (Krzeminska, Wiszniewska et al.) initiated cooperation with Ian Williams on the SHRIMP ion microprobe in Canberra.

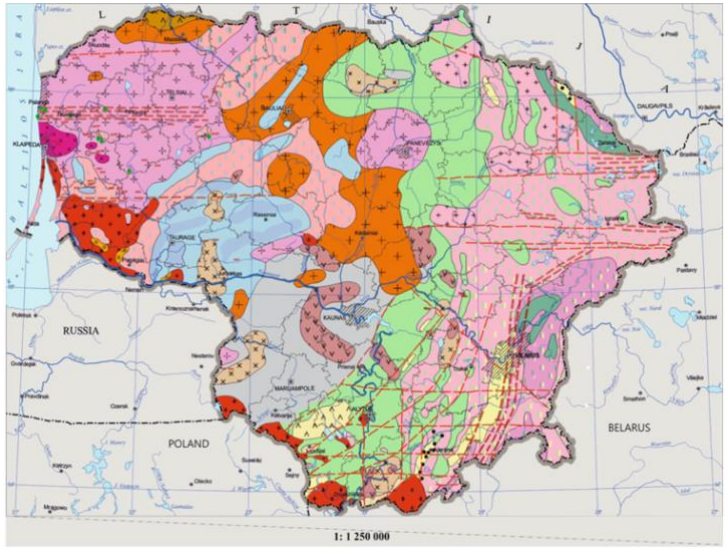
Another major task was initiated already in 1990, to locate drill cores from the Gotland island. Although some results were available already in 1998; the work did not get momentum until Evgenia Salin was involved in in 2014 and was finally completed in 2021.

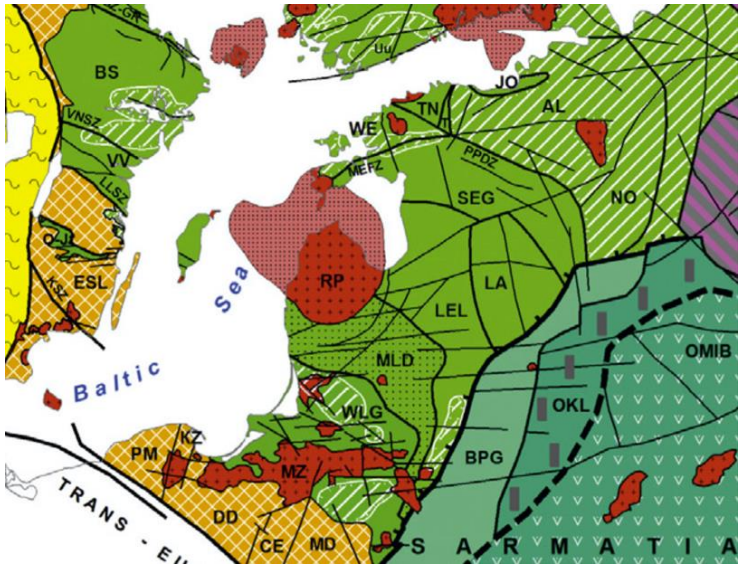
The extensive engagement in Fennoscandian geology by Svetlana Bogdanova was finally crowned with the publication of her (and colleagues) in Precambrian Research in 2015.

All this led to a much better correlation of the Precambrian across the Baltic Sea.

Some early correlations between the Fennoscandian Shield and the hidden Precambrian in the Baltic region







A *very* early effort

At least for the FS shield vs. Gotland.
Sundblad et al. (1998)

Other important steps

Correlation between W Lithuania and Askersund (TIB 0, Sweden).
G. Motuza & V. Motuza (2011)

Correlations between Bliudziai/ Lauksargiai (W Lithuania) and Västervik (Sweden).
Motuza (2022)

A much more mature product

Bogdanova et al. (2015)

There is, however, one important shortcoming in Bogdanova et al. (2015)

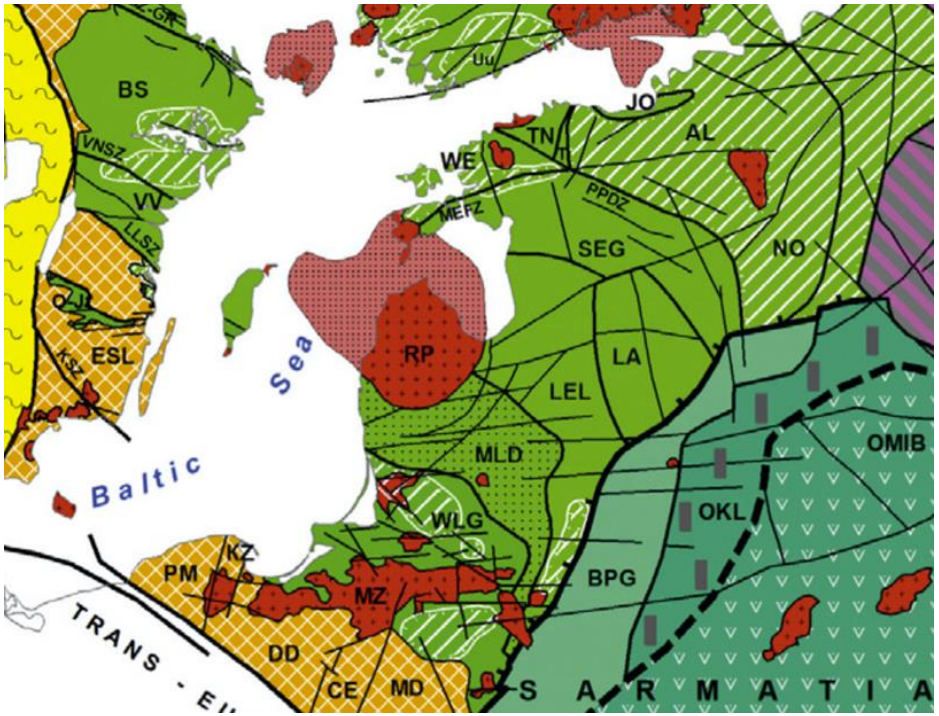


Fig. 1 (Bogdanova et al., 2015).

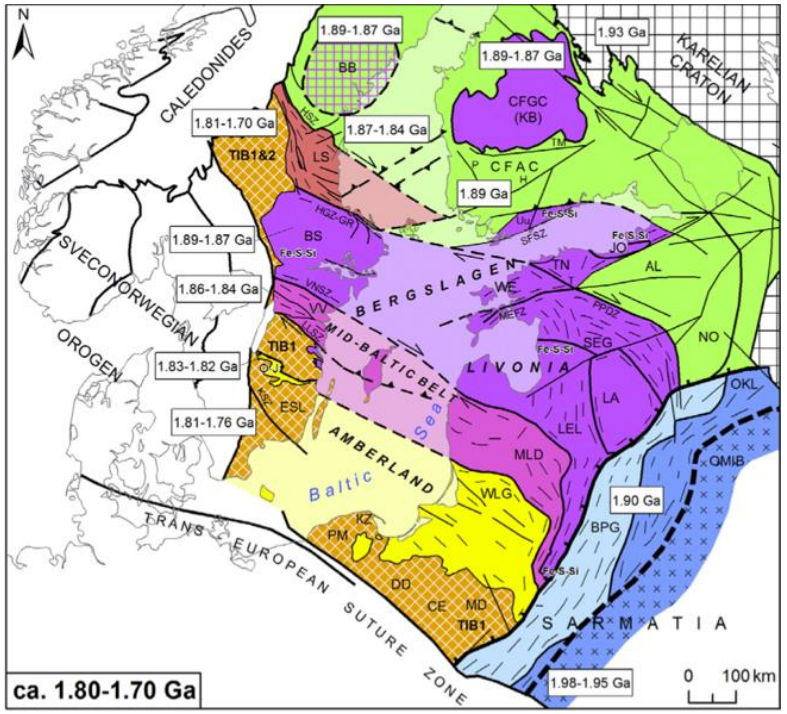


Fig. 9 (Bogdanova et al., 2015).

"VV" (*Västervik*) is marked in Figs. 1 and 9 of Bogdanova et al. (2015),

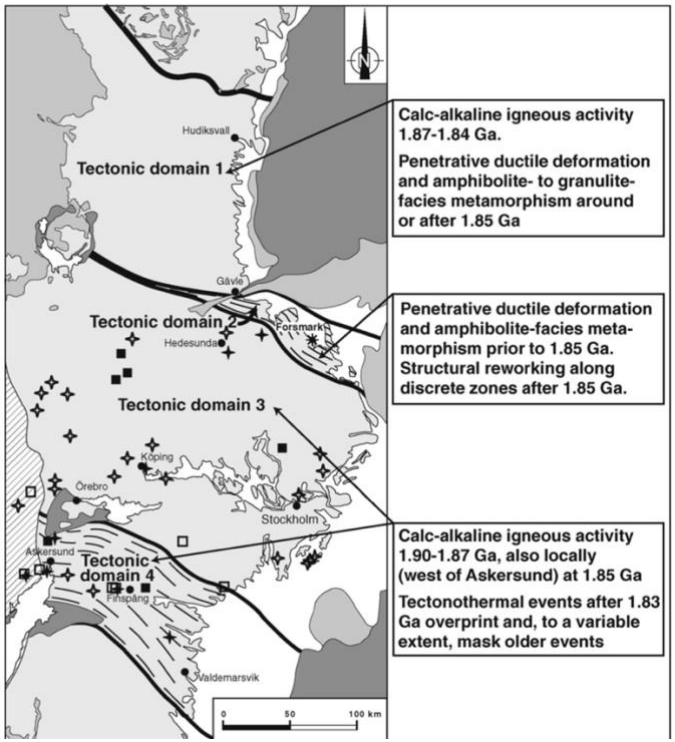
and refers to a region *between*

VNSZ and LLDZ (Vingåker-Nyköping and Linköping-Loftahammar Deformation Zones).

This is *very* confusing for any Swedish person in general and for Swedish geologists in particular.

This tendency of southward younging of accretionary magmatism has been observed also in the Swedish part of the Mid-Baltic Belt to the west of the Baltic Sea with its 1.86–1.85 Ga calc-alkaline active continental margin magmatism in what Hermansson et al. (2008) define as their "domain 4" of the Bergslagen region (VV in Figs. 1 and 9). In that domain, however, there was still a substantial amount of 1.90–1.87 Ga calc-alkaline Bergslagen magmatism. At ca. 1.86 Ga, quartz-rich sandstones were deposited in the Västervik area and its continuation towards the west along a one-time south-facing continental slope (Sultan et al., 2005; Sultan and Plink-Björklund, 2006). The south-eastern extreme part of the MLD in

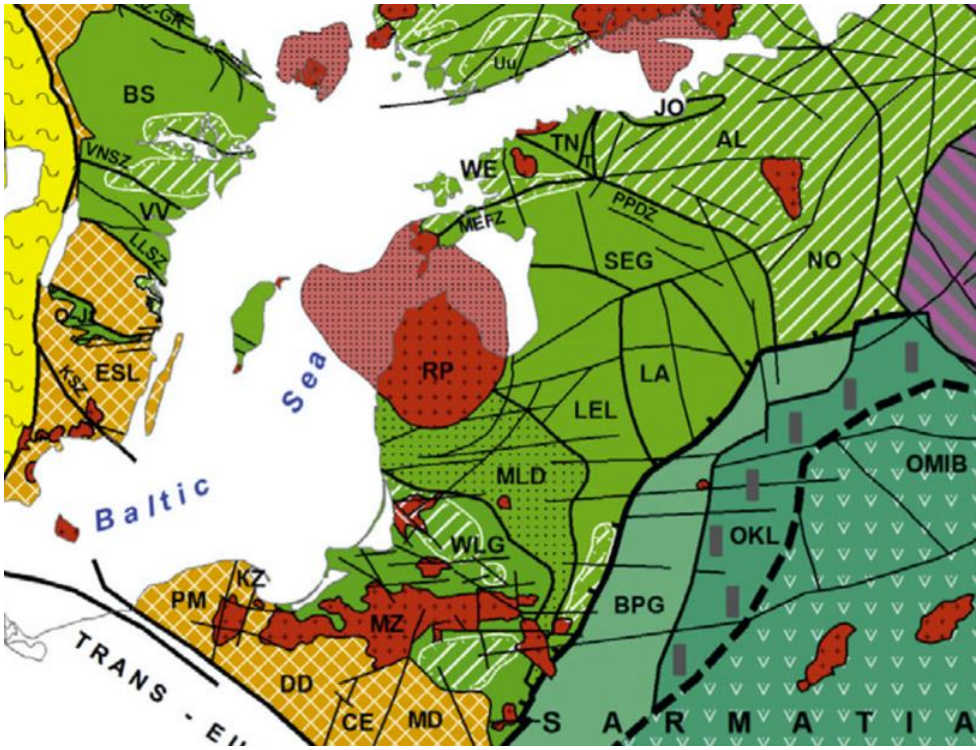
page 25 in Bogdanova et al. (2015).



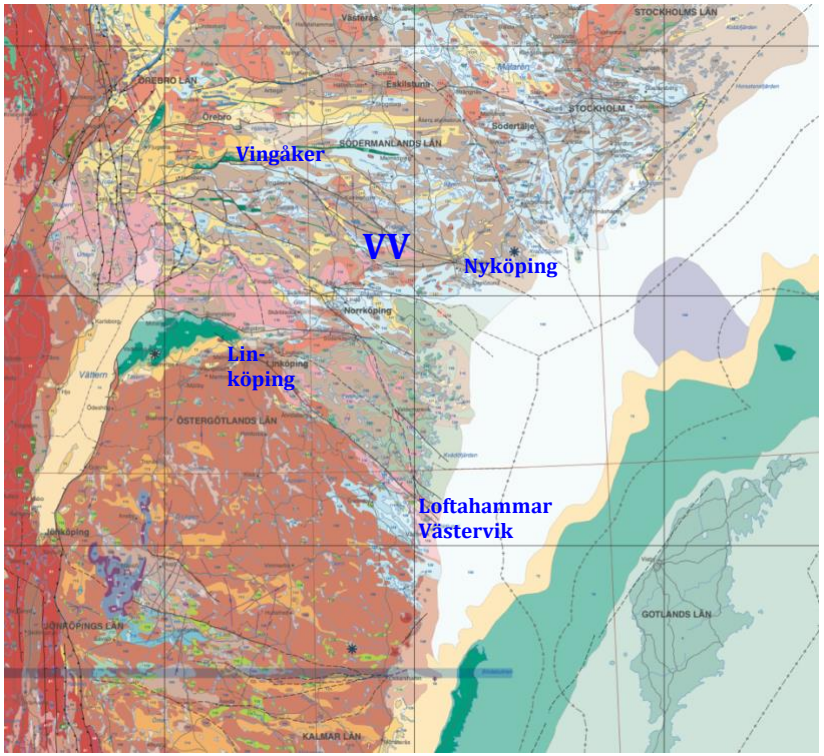
page 264 in Hermansson et al. (2008).

When we look into the text of Bogdanova et al. (2015) it is even more confusing!

VV is compared to "domain 4" of Hermansson et al. (2008), which is complete nonsense.



Bogdanova et al. (2015)

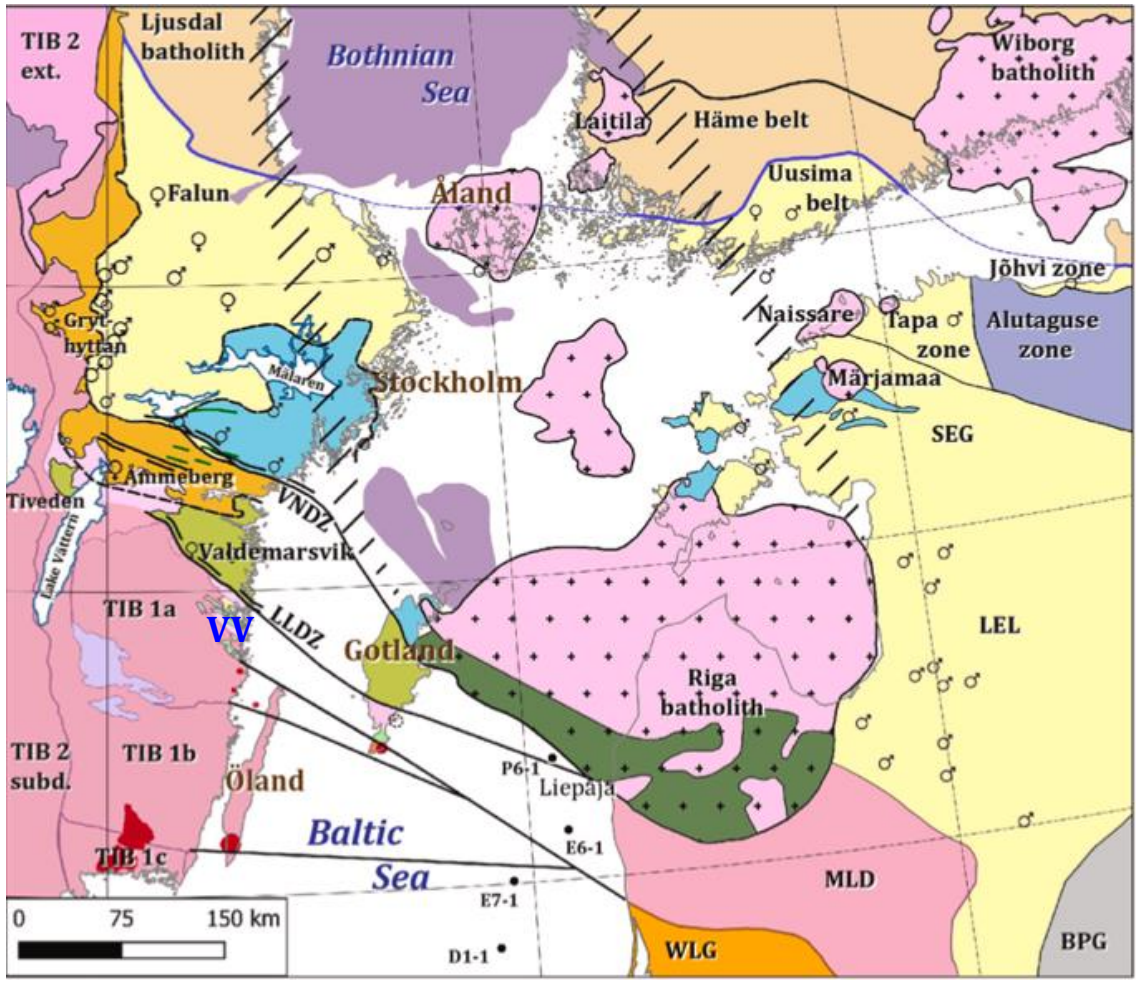


Bergman et al. (2012)

"VV" of Bogdanova et al. (2015) and "domain 4" of Hermansson et al. (2008) is simply the *Valdemarsvik* region, not the *Västervik* region.

Svetlana and her coworkers have thus mixed Valdemarsvik with Västervik, with severe implications for any trans-Baltic correlation.

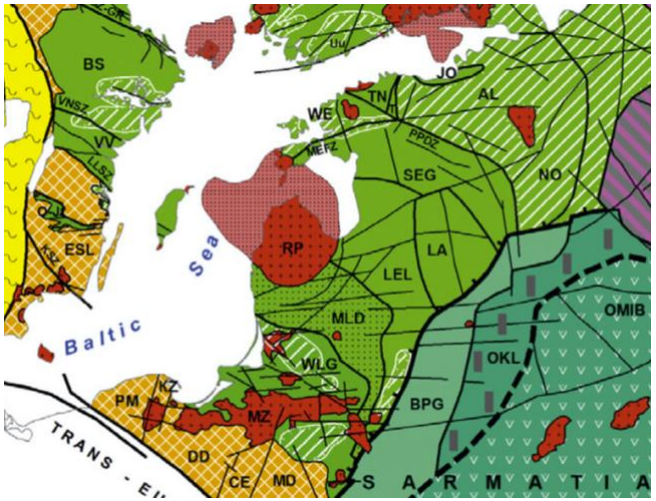
Sundblad et al. (2021) tried to correct this by using…



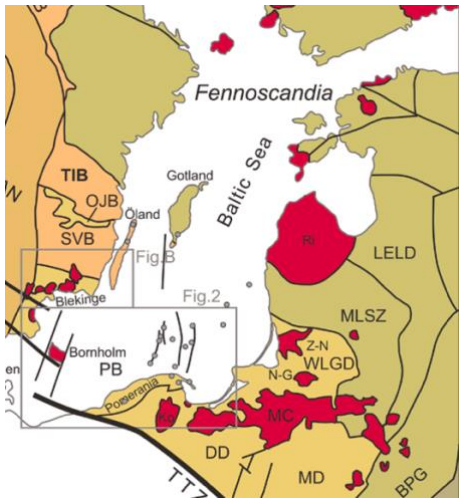
… Valdemarsvik as a key unit, extending along the SW margin of the Svecofennian Domain, from the Tiveden region to off shore Latvia.

But still, *"VV" is kept in the wrong position* in publication after publication!

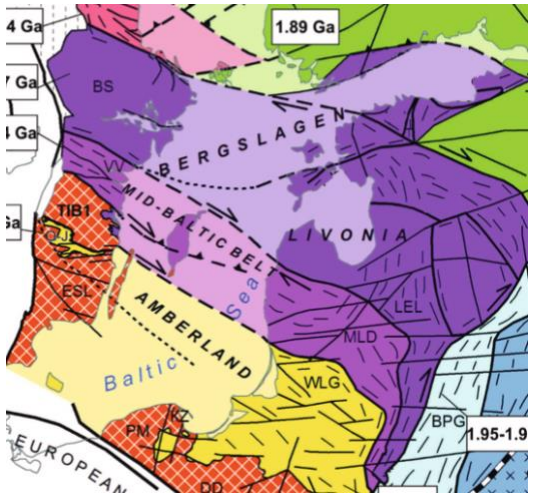
while strange concepts like "ESL" and "SVB" (what are they?) appear in many of the contributions…



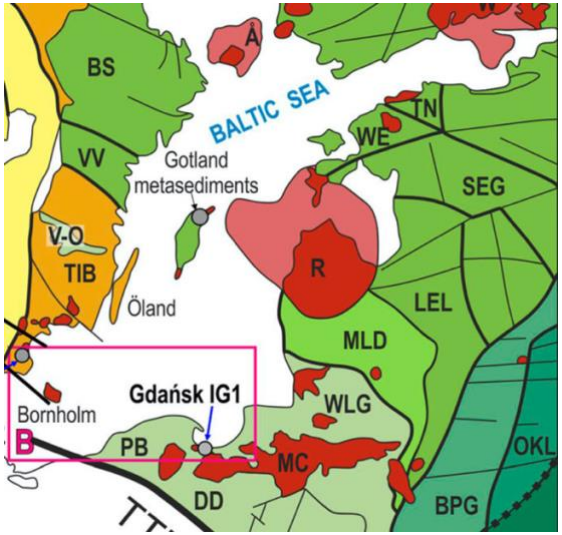
Bogdanova et al. (2015)



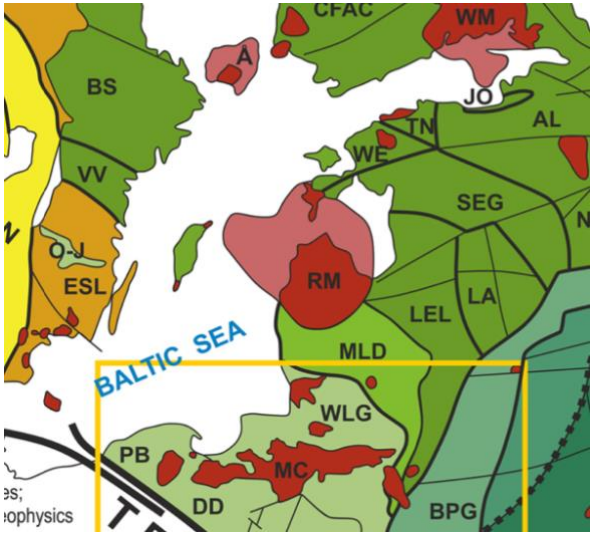
Krzeminska et al. (2021)



Skridlaite et al. (2021)



Gurba et al. (2023)



Grabarczyk et al. (2023)

Skridlaite et al. (2024)

Reflections and conclusions

As can be seen from the previous publications, there is no coherent view on how to correlate the Precambrian across the Baltic Sea. However, …

1. **In spite of granulite facies conditions, locally distorting original conditions of the Precambrian crust in the Baltic republics, the bedrock of SE Sweden provides an evident model for any correlation across the Baltic Sea.**

2. **It is thus of high international scientific importance that modern research on the crystalline basement in the Baltic republics and Poland can continue;**

   such research will build on what Puura, Birkis and Motuza once built and will create a better understanding of a region we all belong to; *Fennoscandia*.

In this perspective, the value of organizing another "Arbavere-meeting" (next time in Lithuania), for trans-Baltic correlations, cannot be over-estimated.

Thank you, Kairi!