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Crystalline Basement of Latvia – an Undercover Opportunity

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The mineral-rich, geologically varied, and well-explored Baltic (Fennoscandian) Shield of Scandinavia seemingly dips into the abyss of the Baltic Sea, but in fact, it continues below the sedimentary cover of the Baltic states. In Latvia, this 400- to 2000-m-thick Phanerozoic sedimentary layer has been a critical obstacle for crystalline basement mineral exploration. The main exploratory efforts, including approximately 200 drill holes, were done from the 1960s till the 1980s, after which only reinterpretations and additional analysis of already-extracted material have been performed. But a changing European Union strategy has reignited the interest in searching for valuable minerals.

The main interest lies in the Kurzeme batholith—one of the largest rapakivi-type granite intrusions in the region, with an area of approximately 40,000 km^2, lying 2 km below the surface. The southern part of this layered intrusion has an increased concentration of Ni, Cu, Co, Cr, and platinum group elements.

Additionally, two high-quality Fe-quartzite deposits, Staicele and Garsene, have been of interest due to their high Fe-oxide content of approximately 50%, as well as additional mineralization. Although the depths of 700 and 1000 m from the surface were considered attainable for extraction operations, at the time of exploration, it was not economically viable.

There are also smaller potential ore deposits—for example, Strenci magnetic anomaly—with a notable concentration of elements, like Co, V, Cu, Ni, Sr, and Mn, deemed critical in the European Union, under a thinner, 500-m sedimentary cover and thus more accessible to exploration.

The crystalline basement of Latvia is a previously hidden opportunity for mineral exploration and potentially the extraction of minerals, hopefully utilising the best European practices of sustainable mining.