

# Geology of natural stone deposits in Finland

The main types of natural stone produced in Finland are granite, schist, and soapstone with focus on granite and soapstone. The main granite production centre is the rapakivi granite area in southeastern Finland while soapstone is produced mainly in the municipality of Juuka in eastern Finland.

**Granite** is extracted from approx. thirty sites (Fig. 1) as rough blocks for export and domestic markets. The granites are typically red, brown, grey, green, or black. Geologically, the most important group is rapakivi granites, which cover approx. 60 % of all granite production in Finland. The rapakivi granites are mainly quarried from the Wiborg batholith in southeastern Finland with stone qualities like "Baltic Brown" (Fig. 2) and "Carmen Red" (Fig. 3). The age of these rocks is ca 1640 Ma. The undeformed rapakivi granites form composite intrusives, consisting of smaller intrusions with a variety of different granite types, post-dating regional ductile deformations. The anorogenic rapakivi granites are homogeneous and sparsely fractured and have the highest potential for granitic natural stone in Finland (Härmä & Selonen 2018, Härmä et al. 2018). Other granite qualities often include coarse-grained porphyritic stones, e.g. Viitasaari Light (Fig 4), which are mostly quarried from the Central Finland Granitoid Complex, which comprises synkinematic and weakly foliated or undeformed post-kinematic intrusions. The ages of the quarried granites vary from 1875 to 1890 Ma.

**Migmatitic rocks**, which are commercially classified as granites, are mainly extracted from the South Finland Migmatite Zone, characterized by granite sheets with intense and penetrative subhorizontal regional deformation, and high-grade metamorphism (Ehlers et al. 1993, Nironen 2005). These quarried migmatites have the ages of 1830-1870 Ma. Most schist quarries are located along the ca 1900 Ma Tampere Schist Belt in the south-central Finland (e.g. "Orivesi Schist") and in eastern Finland in the early-Proterozoic Jatulian orthoquartzites ("Nilsia Quartzite").

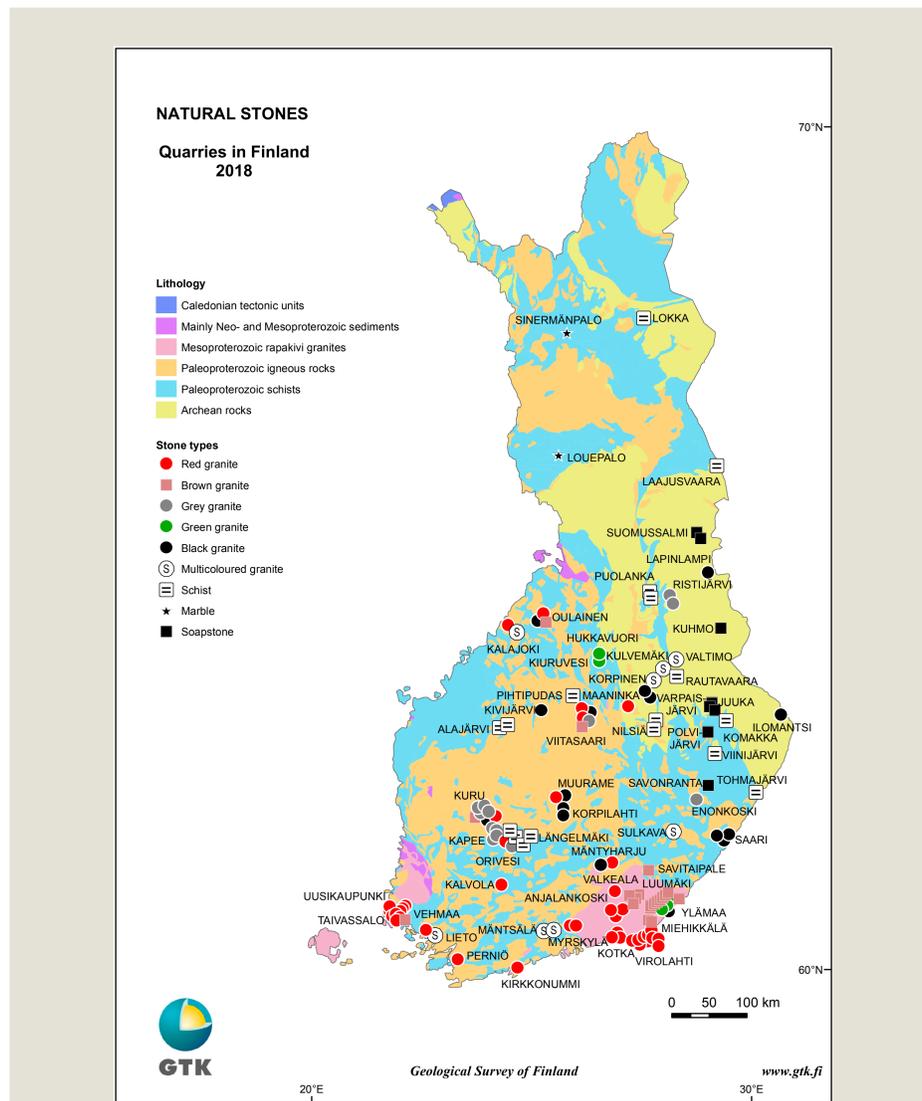


Figure 1. Natural Stone Quarries in Finland.



Figure 2. Baltic Brown, a brown coloured rapakivi granite quarried in Ylämaa, Lappeenranta. Photo: Åbo Akademi University, Geology and Mineralogy.



Figure 3. Carmen Red, a red coloured rapakivi granite quarried in Virolahti. Photo: Åbo Akademi University, Geology and Mineralogy.



Figure 4. Viitasaari Light, a porphyritic granodiorite quarried in Viitasaari in the Central Finland. Photo: Åbo Akademi University, Geology and Mineralogy.



Figure 5. Tulikivi Classic, a soapstone quarried in Nunnalahti, Juuka. Photo: Geological Survey of Finland.

**Soapstones** are low to medium-grade metamorphic rocks, formed through complex metamorphic and carbonatization processes (Pirinen et al. 2018). Soapstones are quarried mainly in two geological environments in eastern Finland: Archean greenstone belts and Proterozoic ophiolite complexes. The soapstones occur typically as folded, elongated, and lenticular bodies inside the greenstone belts and ophiolite complexes, closely connected to serpentinites. (Pirinen et al. 2018). The principal location of quarries is situated in the Archean Nunnanlahti greenstone belt in Juuka. The main stone qualities are "Tulikivi Classic" (Fig. 5) and "Mammutti Soapstone".

## REFERENCES

- Ehlers, C., Lindroos, A. & Selonen, O. 1993. The late Svecofennian granitoid zone of southern Finland - a belt of transpressive deformation and granite emplacement. *Precambrian Res.*, 64. 295-309.
- Härmä, P. & Selonen, O. 2018. Natural stone production in the Wiborg rapakivi granite batholith in southeastern Finland. Geotechnical report 10. The Finnish natural stone association. 35 p. [https://www.suomalainenkivi.fi/wp-content/uploads/2018/05/geotechnical\\_report\\_10\\_web.pdf](https://www.suomalainenkivi.fi/wp-content/uploads/2018/05/geotechnical_report_10_web.pdf) [4.3.2019]
- Härmä, P., Vartiainen, R., Pirinen, H. & Selonen, O. 2018. Natural stone potential in Finland. Abstract book. 4th Finnish National Colloquium of Geosciences, 25. Turku.
- Nironen, M. 2005. Proterozoic orogenic granitoid rocks. In: Lehtinen, M., Nurmi, P.A. & Rämö, O.T. (eds.) *Precambrian Geology of Finland-Key to the Evolution of the Fennoscandian Shield*. Elsevier B.V. Amsterdam, Netherlands. 443-480.
- Pirinen, H., Leinonen, S. & Selonen, O. 2018. Soapstone from eastern Finland-characteristics and use. Geotechnical report 11. The Finnish natural stone association. 33 p. [https://www.suomalainenkivi.fi/kuvaaineisto/geotechnical\\_report\\_11\\_web.pdf](https://www.suomalainenkivi.fi/kuvaaineisto/geotechnical_report_11_web.pdf) [4.3.2019].

## Geological Survey of Finland

Härmä, P.<sup>1</sup> and Selonen, O.<sup>2</sup>

<sup>1</sup> Geological Survey of Finland, P.O. Box 96. FI-02151 Espoo, FINLAND  
e-mail: paavo.harma@gtk.fi

<sup>2</sup> Åbo Akademi University, FI-20500 Turku, Finland  
e-mail: olavi.selonen@abo.fi