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Report

Marble deposits in the Salten Region, Nordland County, Norway

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Introduction and background

The marble deposits in the Salten Region have been known and exploited since the 1880's. This geologic province displays a great variety of marble types, including white dolomites, pink and grey calcite marble and the well-known pink and white calcite-dolomite marble named "Norwegian Rose". The marble production in the region has experienced two "golden ages" of industrial success: by the end of the 19th century and early 20th, and the late 1980's and early 1990's. The area is geologically complex, containing marble units from three different periods welded together during the later stages of the Caledonian orogeny. Thus, one of the most important goals for the PNASTINA project in the area was to obtain better maps that display the spatial distribution of marble types in the region. Combined with information about quarries and registered deposits, these thematic maps can prove to be powerful tools for better characterization of the marble types and thus industrial development.

Marbles of the Salten Region

Four different units of marble have been identified in the region[1]: the Bufjellsæter Formation (650 million years), the Leivset Formation (560 million years), the Dverset Formation (520 million years) and the Fiskvågflåget Formation (440 million years). These are welded together in a complex tectonic pattern, and except the oldest unit, all contain a mixture of different types of dolomitic and calcitic marble. In figure 1, a general map of the region is given, showing distribution of main marble types (i.e. dolomitic and calcitic). A much more detailed map of the southern (most complex) part of the area is given in Figure 2.

From the exploitation of marble began in Fauske, most attention was paid to the pure white dolomitic marble, which was applied for both construction and sculptures in the late 19th century. Shortly after, however, the value of colour banded marbles became the driving force in the industrial development, and particularly the pink and white "Norwegian Rose" and "Koloritt" varieties were exploited. Also, some varieties of grey and white calcite marble, as well as greenish fuchsite bearing marble were found attractive. Several quarries have during the years, been active, but at present time only two quarries are in continuous operation (see Figure 1). Below is given an overview of the different marble types in the region and their economic potential.

[1] Based on isotope dating carried out by Victor Melezhik, NGU

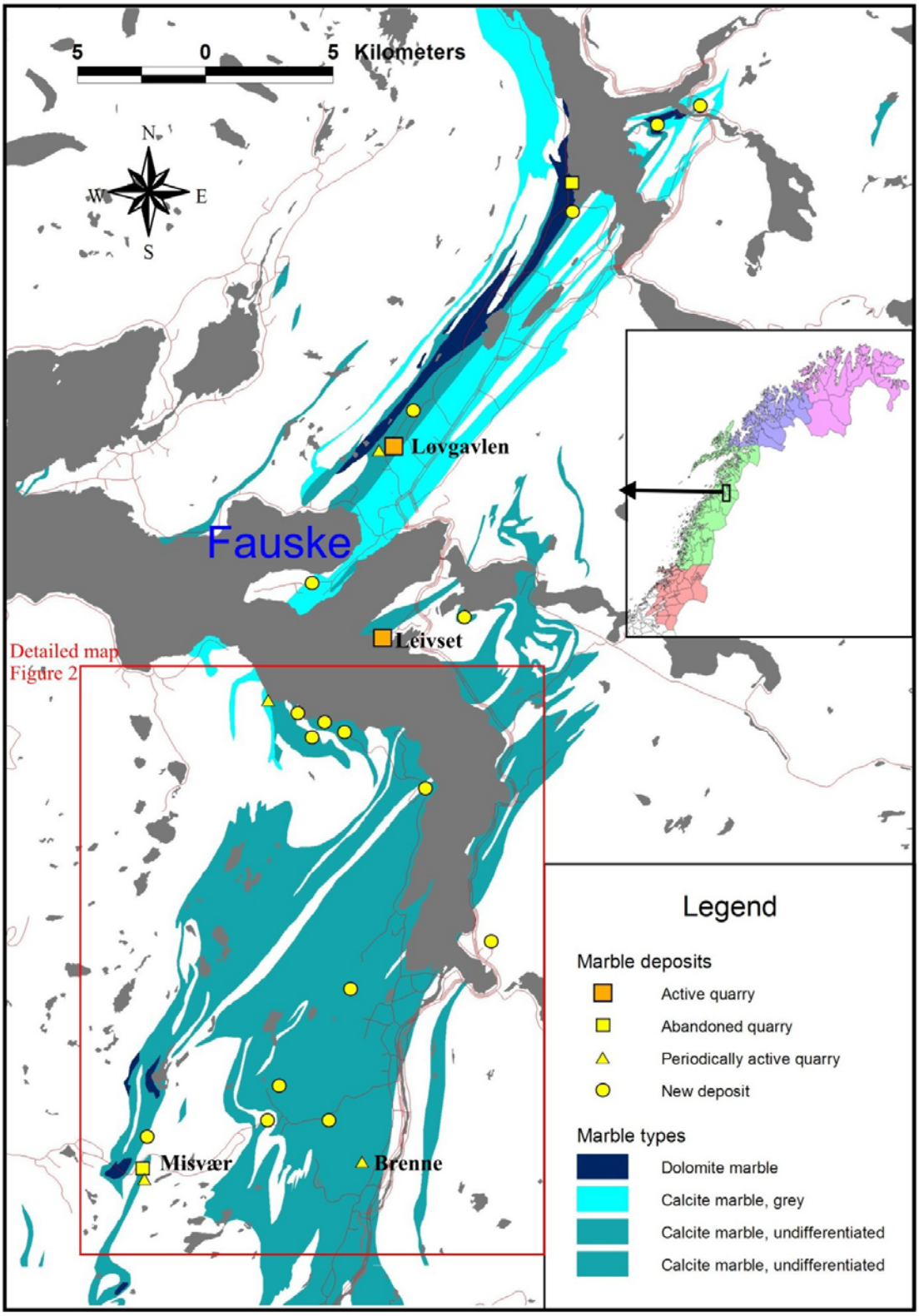

Figure 1: Map of marble outcrops in the Salten Region, marble deposits and quarries.

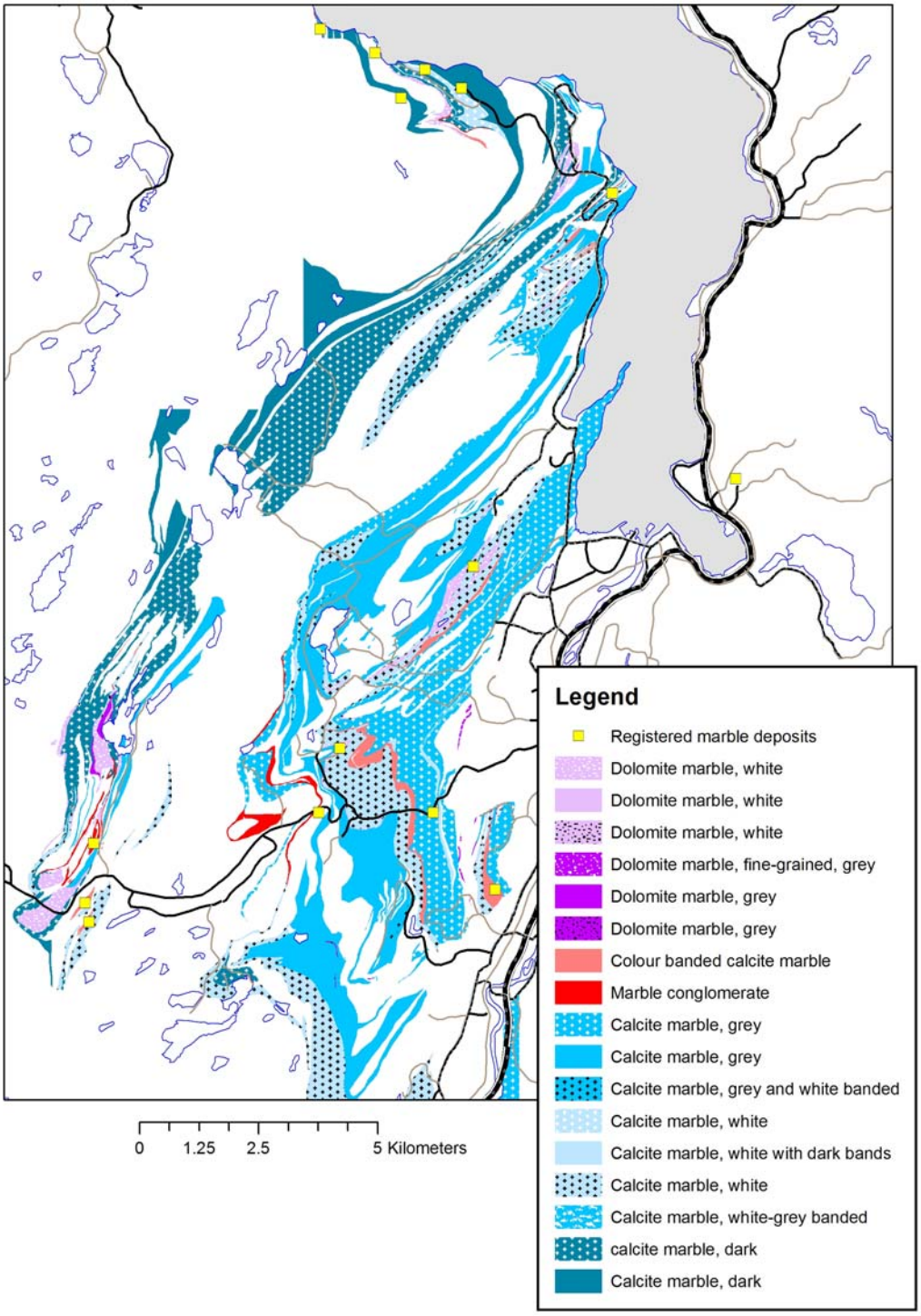

Figure 2: Detailed map of the southern part of the Salten Region, displaying subtypes of marble. Several formations of similar types reflects the difference in formation age.

Pink and white, calcite-dolomite marble conglomerate: this type includes the "Norwegian Rose" type marble, characterized by elongated white dolomite pebbles in a pink calcite matrix. The main deposit is situated near Fauske (Løvgavlen Quarry). Similar deposits have also been found further south, but of less good quality, and the

future potential outside Fauske is insecure to limited. Available reserves of the attractive type is limited and cannot sustain significant increase in production.

Colour-banded calcite marble (Leivset-type): Found several places in the area, but as thin layers. Thus, the reserves are limited. At present time only exploited at Leivset close to Fauske. A pale variety (whitish with rare pink and greenish layers) occurs at Ljøsenhammeren in the Southwestern part of the area.

White dolomite marble: found several places within the region. These dolomites are pure white and thus attractive to the market. However, the technical quality (strength) varies considerably, and it is not expected that any significant production can be initiated unless larger volumes of homogenous, good quality dolomite is found. Hammerfall Dolomitt AS is trying to reopen stone quarrying of the white dolomite in their quarry area at Løvgavlen for dolomite for industrial minerals (Fig 6). Detailed technical investigations, combined with test quarrying, are necessary to enlighten such features.

Grey dolomite marble: being one of the less commonly occurring subtypes, grey dolomites rarely appears market attractive or of sound technical quality, and it is believed that the subtype is of minor interest as dimension stone.

Grey and white calcite marble: this subtype is the most widespread in the area. The marble is grey with white veins and patches, and there are large occurrences several places within the region. However, due to low prices for grey marble in the world market, there is no significant production of the subtype at present time, except as a by-product to the Løvgavlen Quarry, Fauske (commercial name "Antique Foncé"). The latter is beautifully displayed in the floor of the departure area at Oslo Airport Gardermoen.

White calcite marble: found several places on both sides of the Fauske Fjord, this subtype may represent an interesting development potential. Rarely, these marbles are pure white, rather they display small patches of greyish marble on a white background, defending the old trade name of the subtype – Hermelin. Several deposits are located

Dark calcite marble: this subtype occupies mainly the western part of the region. The colour is predominantly dark grey, with black veins and minor white. No production has been carried out within the subtype, and it is believed that the international market is extremely competitive concerning such types.

Conclusions

Whether or not the Salten Region will experience a new "golden Age" of marble production in the future, remains uncertain. However, the geological mapping in the area has uncovered several new potentially interesting deposits, and the detailed map of different marble types marks an important step forward as a tool for prospecting and, not at least, proper management of the marble deposits.

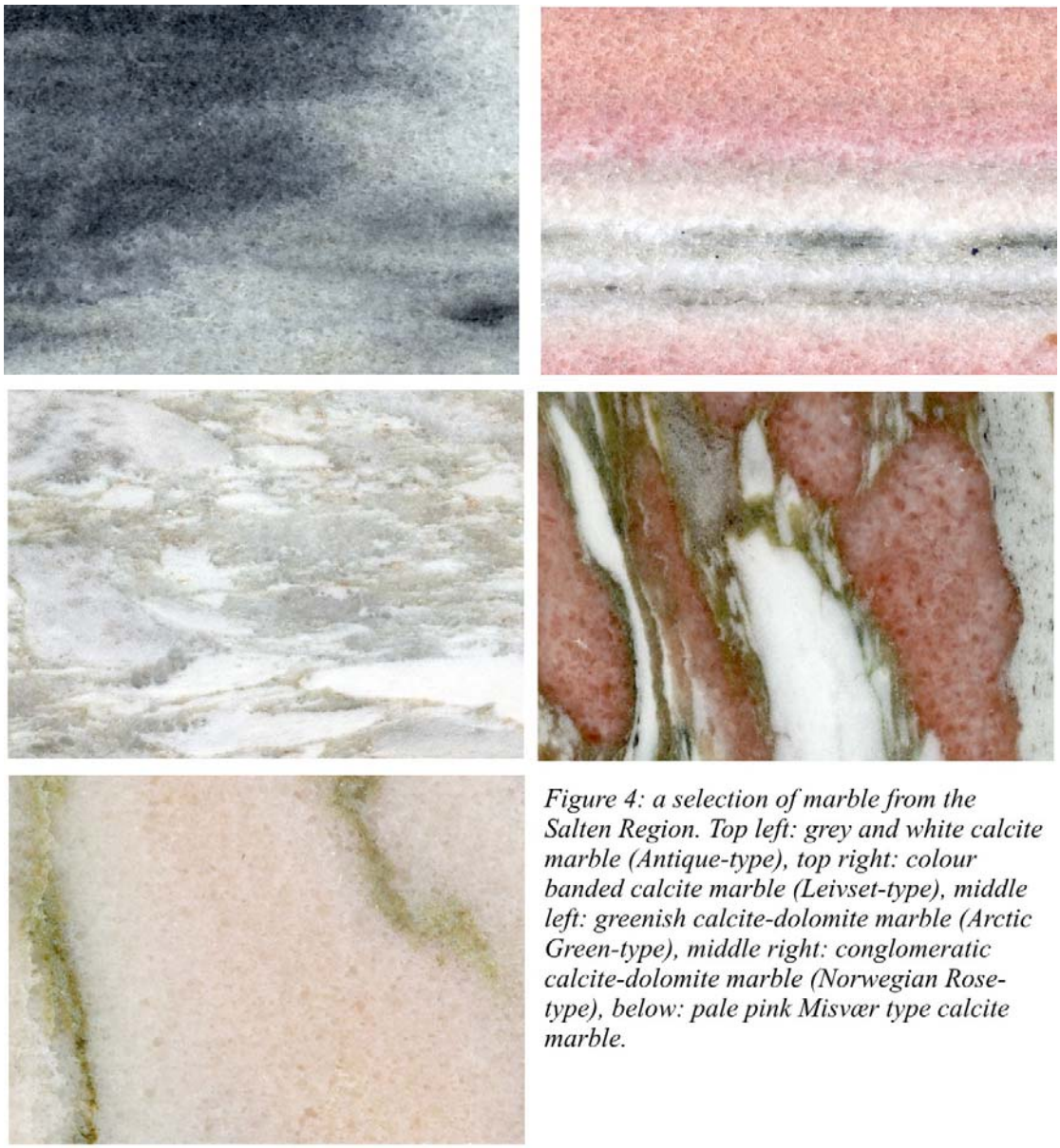

Figure 4: a selection of marble from the Salten Region. Top left: grey and white calcite marble (Antique-type), top right: colour banded calcite marble (Leivset-type), middle left: greenish calcite-dolomite marble (Arctic Green-type), middle right: conglomeratic calcite-dolomite marble (Norwegian Rose-type), below: pale pink Misvær type calcite marble.

Figure 4: Abandoned quarry in colour-banded marble, Misvær.

Figure 5: "Norwegian Rose" quarry at Løvgavlen, Fauske.

Figure 6: Attempt at re-opening dimension-stone quarry in white dolomite at Løvgavlen, Fauske.